# TOWN OF CHAPEL HILL

## Town Council
## Meeting Agenda

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

Mayor Pam Hemminger
Mayor pro tem Michael Parker
Council Member Jessica Anderson
Council Member Allen Buansi
Council Member Hongbin Gu
Council Member Tai Huynh
Council Member Amy Ryan
Council Member Karen Stegman

**Wednesday, October 13, 2021 7:00 PM** **Virtual Meeting**

### Virtual Meeting Notification

*Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.*

*The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar:
https://us02web.zoom.us/webinar/register/WN_buNtrEUnQ_qjIL-xdK6UUg
After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 837 2865 0965*

*View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).*

## OPENING

## ROLL CALL

## PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

*Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions* *to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.*

## ANNOUNCEMENTS BY COUNCIL MEMBERS

## CONSENT

*Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.*

**1.** Approve all Consent Agenda Items. **[21-0759]**

By adopting the resolution, the Council can approve various resolutions and ordinances all at once without voting on each resolution or ordinance separately.

**2.** Adopt a Vision Zero Resolution. **[21-0760]**

By adopting this resolution, the Council adopts a Vision Zero strategy to help eliminate traffic deaths and serious injuries by 2031.

**3.** Update Council and Advisory Board Policies and Procedures to Comply with Chapter 160D. **[21-0761]**

By adopting Resolutions A, B, and C, the Council updates various Council and Advisory Board policies and procedures to comply with Chapter 160D.

**4.** Call a Legislative Hearing for Land Use Management Ordinance Text Amendments - Proposed Changes to Section 3.6.2 Historic Districts Related to Review Criteria on October 27, 2021. **[21-0762]**

By adopting the resolution, the Council calls a Legislative Hearing to consider matters related to the Historic District Review Criteria on October 27, 2021.

**5.** Continue the Legislative Hearing for Conditional Zoning - Amending the Chapel Hill Zoning Atlas to Rezone the Rosemary-Columbia Street Hotel Property Assemblage Located at 108, 110, and 114 W. Rosemary Street and 208 Pritchard Avenue from Residential-3 (R-3), Office/Institutional-1 (OI-1), and Town Center-2 (TC-2) to Town Center-2-Conditional Zoning District (TC-2-CZD) to November 10, 2021. **[21-0763]**

By adopting the resolution, the Council defers consideration of the proposed conditional zoning district application for the

Rosemary-Columbia Street Hotel property assemblage located at 108, 110, and 114 W. Rosemary Street and 208 Pritchard Avenue to November 10, 2021.

**6.** Adopt Minutes from June 24, 2020 and July 29, 2020 and September 9 and 16, 2020 and October 7, 21, and 28, 2020 and November 4 and 18, 2020 and December 2 and 9, 2020 Meetings. [21-0764]

By adopting the resolution, the Council approves the summary minutes of past meetings which serve as official records of the meetings.

## INFORMATION

**7.** Receive Upcoming Public Hearing Items and Petition Status List. [21-0765]

By accepting the report, the Council acknowledges receipt of the Scheduled Public Hearings and Status of Petitions to Council lists.

## DISCUSSION

**8.** Close the Legislative Hearing and Consider a Conditional Zoning Application - Residence Inn and Summit Place Townhomes, 101-111 Erwin Road, Mixed Use-Village-Conditional Zoning District (MU-V-CZD). [21-0766]

PRESENTER: Becky McDonnell, Senior Planner

a. Without objection, the revised report and any other materials submitted at the hearing for consideration by the Council will be entered into the record
b. Introduction and revised recommendation
c. Receive updates from the applicant
d. Comments from the public
e. Comments and questions from the Mayor and Town Council
f. Motion to close the Legislative Hearing
g. Motion to adopt the Resolution of Consistency with the Comprehensive Plan and Statement of Reasonableness
h. Motion to enact an Ordinance to rezone the property
i. Motion to adopt the Resolution revoking the existing Special Use Permit.

RECOMMENDATION: That the Council close the legislative hearing and adopt Resolution A and Resolution B, and enact Revised Ordinance A, approving the Conditional Zoning application.

**9.** Close the Legislative Hearing and Consider an [21-0767]

Application for a Major Modification to the Development Agreement: Glen Lennox Height Modification.

PRESENTER: Anya Grahn, Senior Planner

a. Without objection, the revised report and any other materials submitted at the hearing for consideration by the Council will be entered into the record
b. Introduction and revised recommendation
c. Presentation by the applicant
d. Recommendation of the Planning Commission
e. Comments from the public
f. Comments and questions from the Mayor and Town Council
g. Motion to adjourn the legislative hearing
h. Motion to adopt the Resolution of Consistency with the Comprehensive Plan
i. Motion to enact the Ordinance to approve the request.

RECOMMENDATION: That the Council adopt the Resolution of Consistency with the Comprehensive Plan and enact the ordinance approving the height modification.

**10.** Close the Legislative Hearing and Consider a Land Use Management Ordinance Text Amendment - Proposed Changes to Section 8.5, Community Design Commission - and Updates to the Advisory Board Membership Policy. **[21-0768]**

PRESENTER: Corey Liles, Principal Planner

a. Introduction and revised recommendation
b. Recommendation of the Planning Commission
c. Comments from the public
d. Comments and questions from the Mayor and Town Council
e. Motion to adjourn the Legislative Hearing
f. Motion to adopt the Resolution of Consistency with the Comprehensive Plan
g. Motion to enact the ordinance to approve the changes to the Land Use Management Ordinance
h. Motion to adopt the Resolution amending the Advisory Board Membership Policy.

RECOMMENDATION: That the Council consider reducing the number of member seats on the Community Design Commission, and consider associated reductions to the thresholds for quorum and voting.

**11.** Receive Updated Risk Assessment for Police Station **[21-0769]**

Property.

PRESENTER: Genna Olson, Principal Geologist, Hart & Hickman

RECOMMENDATION: That the Council receive the attached presentation and report and continue to provide guidance, as needed.

**12.** Receive the Fiscal Year (FY) 2021 Affordable Housing Annual Report. **[21-0770]**

PRESENTER: Sarah Osmer Viñas, Interim Housing and Community Director
Faith Brodie, Public Housing Director
Nate Broman-Fulks, Affordable Housing Manager
Stacey Todd, Public Housing Management Analyst

RECOMMENDATION: That the Council receive the Fiscal Year 2021 Affordable Housing Annual Report.

**13.** Authorize the Town Manager to Execute a Site Development Agreement with Self-Help Ventures Fund for the 2200 Homestead Road Mixed-Income Affordable Housing Development. **[21-0771]**

PRESENTER: Nate Broman-Fulks, Affordable Housing Manager
Emily Holt, Affordable Housing Development Officer

RECOMMENDATION: That the Council authorize the Town Manager to execute a site development agreement with Self-Help Ventures Fund to prepare the land and infrastructure for the development of mixed income affordable housing at 2200 Homestead Road.

*CONCEPT PLAN REVIEW*

*Concept Plans: Presentations for Concept Plans will be limited to 15 minutes.*

*Concept Plan review affords Council members the opportunity to provide individual reactions to the overall concept of the development which is being contemplated for future application. Nothing stated by individual Council members this evening can be construed as an official position or commitment on the part of a Council member with respect to the position they may take when and if a formal application for development is subsequently submitted and comes before the Council for formal consideration.*

*As a courtesy to others, people speaking on an agenda item are normally limited to three minutes. Persons who are organizing a group presentation and who wish to speak beyond the three minute limit are requested to make prior arrangements through the Mayor's Office by calling 968-2714.*

**14.** Concept Plan Review: 5500 and 5502 Old Chapel Hill Road. **[21-0772]**

PRESENTER: Corey Liles, Principal Planner

a. Review of process
b. Presentation by the applicant
c. Comments from the Community Design Commission
d. Comments from the public
e. Comments and questions from the Mayor and Town Council
f. Motion to adopt a resolution transmitting Council comments to the applicant.

RECOMMENDATION: That the Council adopt the resolution transmitting comments to the applicant.

## REQUEST FOR CLOSED SESSION TO DISCUSS ECONOMIC DEVELOPMENT, PROPERTY ACQUISITION, PERSONNEL, AND/OR LITIGATION MATTERS

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 1., **File #:** [21-0759], **Version:** 1 **Meeting Date:** 10/13/2021

**Approve all Consent Agenda Items.**

**Staff:**
Sabrina M. Oliver, Director/Town Clerk
Amy T. Harvey, Deputy Town Clerk

**Department:**
Communications and Public Affairs

**Overview:** Items of a routine nature to be voted on in a block. Any item may be removed from the Consent Agenda by the request of the Mayor or any Council Member.

**Recommendation(s):**

That the Council adopt the various resolutions and ordinances.

**Fiscal Impact/Resources:** Please refer to each agenda item for specific fiscal notes.

**Attachments:**

- Resolution

**A RESOLUTION ADOPTING VARIOUS RESOLUTIONS AND ENACTING VARIOUS ORDINANCES (2021-10-13/R-1)**

BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby adopts the following resolutions and ordinances as submitted by the Town Manager in regard to the following:

2. Adopt a Vision Zero Resolution. (R-2)

3. Update Council and Advisory Board Policies and Procedures to Comply with Chapter 160D. (R-3)(R-4)(R-5)

4. Call a Legislative Hearing for Land Use Management Ordinance Text Amendments - Proposed Changes to Section 3.6.2 Historic Districts Related to Review Criteria on October 27, 2021. (R-6)

5. Continue the Legislative Hearing for Conditional Zoning - Amending the Chapel Hill Zoning Atlas to Rezone the Rosemary-Columbia Street Hotel Property Assemblage Located at 108, 110, and 114 W. Rosemary Street and 208 Pritchard Avenue from Residential-3 (R-3), Office/Institutional-1 (OI-1), and Town Center-2 (TC-2) to Town Center-2-Conditional Zoning District (TC-2-CZD) to November 10, 2021. (R-6.1)

6. Adopt Minutes from June 24, 2020 and July 29, 2020 and September 9 and 16, 2020 and October 7, 21, and 28, 2020 and November 4 and 18, 2020 and December 2 and 9, 2020 Meetings. (R-7)

This the 13th day of October, 2021.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By adopting the resolution, the Council can approve various resolutions and ordinances all at once without voting on each resolution or ordinance separately.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 2., **File #:** [21-0760], **Version:** 1 **Meeting Date:** 10/13/2021

**Adopt a Vision Zero Resolution**.

**Staff:**
Colleen Willger, Director
Bergen Watterson, Transportation Planning Manager
Jordan Powell, Complete Streets Specialist

**Department:**
Planning

**Overview:** At the September 29th, 2021 Council Work Session, Town staff presented information about the impact a Vision Zero strategy could have on Chapel Hill. Vision Zero is a strategy that reframes how we examine and react to roadway crashes. Vision Zero considers traffic deaths and serious injuries to be preventable, and that policy and street design should prioritize safety rather than vehicular speed and efficiency in order to lessen the severity of crashes. Safety of vulnerable road users is integral in transportation decision-making.

By adopting the Vision Zero resolution Town Council can set the tone and direction for the Town's transportation-related decisions through an official commitment to policies and practices that prioritize the safety of all road users in Chapel Hill.

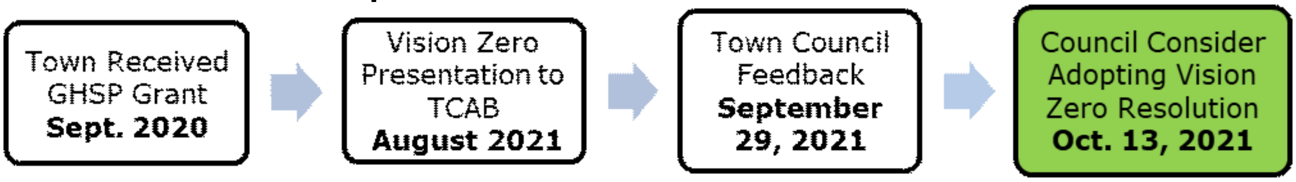
☆ **Recommendation(s):**
That the Council adopt the Vision Zero resolution.

**Key Issues:**
At the September 29th, 2021 Work Session, Council provided the following feedback:
- Add a 'Be It Resolved' to the resolution that memorializes the interest in prioritizing the safety of vulnerable road users in the development review process, including but not limited to Traffic Impact Analyses incorporating accurate analysis that prioritizes safety of vulnerable road users.
- Conduct data analysis (Chapel Hill residents, non-Chapel Hill residents, demographics, etc.) on drivers involved in speeding and failure to yield citations and crashes.
- Interest in planning for e-bike revolution and the impacts that will have on bike/ped, bike/e-bike, e-bike/car conflicts on roads.
- A way to decrease speeding on our roads is to lower the speed limits and narrow the lane widths.
- How do we look at structural issues (street infrastructure) in low-income communities based on historical disinvestment?

**Fiscal Impact/Resources:** There are no fiscal impacts associated with adopting this Vision Zero resolution. The Town has grant funding from the Governors Highway Safety Program (GHSP) to support Vision Zero activities - $67,000 in FY20-21 and $64,450 in FY21-22. The resolution would charge staff with updating the Pedestrian Safety Action Plan with recommended safety projects and cost estimates that would help the Town reach the goal of zero deaths and serious injuries by 2031.

**Item #:** 2., **File #:** [21-0760], **Version:** 1 **Meeting Date:** 10/13/2021

**Where is this item in its process?**




**Attachments:**

- Resolution

**Item #:** 2., **File #:** [21-0760], **Version:** 1 **Meeting Date:** 10/13/2021

**A RESOLUTION ADOPTING A VISION ZERO STRATEGY TO HELP ELIMINATE TRAFFIC DEATHS AND SERIOUS INJURIES BY 2031 (2021-10-13/R-2)**

WHEREAS, according to data from the National Highway Traffic Safety Administration, each year approximately 40,000 people are killed in traffic collisions in the United States; and

WHEREAS, from 2016 to 2020, three people died, five suffered severe injuries, and 135 experienced minor injuries while walking or biking on streets in Chapel Hill; and

WHEREAS, one death on Town streets is one too many, and Town and departmental leadership are dedicated to strategies that aim to eliminate deaths and serious injuries on streets in Chapel Hill; and

WHEREAS, seniors, children, people of color, people with disabilities, people in low-income communities, and vulnerable road users such as pedestrians and bicyclists face a disproportionate risk of traffic injuries and fatalities; and

WHEREAS, Vision Zero is a public health-based traffic safety strategy to reduce and eventually eliminate traffic deaths and serious injuries using a data-driven, multi-disciplinary and safe systems approach that also increases safe healthy equitable mobility for all; and

WHEREAS, the Vision Zero strategy is a tool to unite stakeholders such as Transportation, Police, Public Health, UNC, Transit, neighboring municipalities, NCDOT, developers, and others.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Town of Chapel Hill hereby adopts a goal of eliminating traffic deaths and serious injuries by 2031; and endorses Vision Zero as a comprehensive and holistic approach to achieving this goal.

BE IT FURTHER RESOLVED that the Town declares that Vision Zero is the town-wide guiding principle for transportation, planning, the design of streets and sidewalks, the maintenance of public rights-of-way, and traffic enforcement.

BE IT FURTHER RESOLVED that the Town Council requests that the Town Manager establish an interdepartmental staff Vision Zero Executive Committee charged with establishing a shared understanding of Vision Zero, reviewing progress on the Town's Vision Zero goals, as established in the Town's Pedestrian Safety Action Plan (2019), and updating this Action Plan with proposed safety projects and associated cost estimates for the Town to reach the goal of zero deaths and serious injuries by 2031.

BE IT FURTHER RESOLVED that the Town Council accepts the National Association of City Transportation Officials (NACTO) guides <https://nacto.org/publications/design-guides/> as nationally accepted best design practices, and that the Planning Department and Public Works Department shall evaluate and recommend modifications to existing roadway standards and policies.

BE IT FURTHER RESOLVED that Vision Zero principles will be integrated in the development review process, including Traffic Impact Analyses, through thorough analysis that prioritizes the safety of vulnerable road users.

BE IT FURTHER RESOLVED that Vision Zero will be implemented in an equitable manner accounting for historic inequities in transportation and safety investments across the Chapel Hill community.

BE IT FURTHER RESOLVED that the safety of all road users shall take priority over vehicular level of service and throughput, and safety of vulnerable road users shall be given top priority in transportation decisions.

This the 13th day of October, 2021.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By adopting this resolution, the Council adopts a Vision Zero strategy to help eliminate traffic deaths and serious injuries by 2031.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 3., **File #:** [21-0761], **Version:** 1 **Meeting Date:** 10/13/2021

**Update Council and Advisory Board Policies and Procedures to Comply with Chapter 160D**.

| **Staff:** | **Department:** |
|---|---|
| Colleen Willger, Director | Planning |
| Corey Liles, Principal Planner | |
| Ann Anderson, Town Attorney | Town Attorney's Office |
| Gene Poveromo, Code Enforcement Coordinator | Building and Development Services |

**Overview:** Chapter 160D of the NC General Statutes was enacted in July 2019, serving as the new enabling legislation for local planning and zoning. The Town Council recently approved amendments to the Town Code of Ordinances, including the Land Use Management Ordinance (LUMO), for compliance with Chapter 160D. Tonight's item consists of policies and procedures outside of the Town Code that also need updates based on the provisions of Chapter 160D.

☆ **Recommendation(s):**

That the Council adopt Resolutions A, B, and C to update Council and Advisory Board policies and procedures to comply with Chapter 160D.

**Summary of Updates**
Each update listed below is consistent with the provisions of Chapter 160D. Staff finds that the updates are necessary to maintain compliance with State law.

**A. Council Procedures Manual**

- Allow legislative decisions on development regulations (LUMO text amendments and zoning map amendments) to be approved on first reading by a simple majority, rather than requiring two-thirds majority on first reading

*G.S. 160D-601 <https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160d/GS_160d- and 160A-75 <https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160a/GS_160a-*

- Update references to State statute (160D rather than 160A)

**B. Code of Ethics for the Town Council** (first adopted on November 22, 2010)

- Establish conflict of interest policy consistent with State law

*G.S. 160D-109 <https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160d/GS_160d-*

- Update references to State statute (160D rather than 160A)

**C. Advisory Board Membership Policy**

- Establish conflict of interest policy consistent with State law

**Item #:** 3., **File #:** [21-0761], **Version:** 1 **Meeting Date:** 10/13/2021

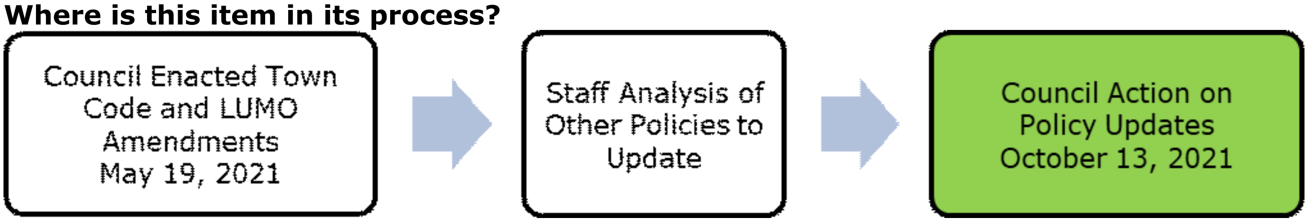
*G.S. 160D-109*
*<https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160d/GS_160d-*

- Provide representation for the Chapel Hill Extra-Territorial Jurisdiction (ETJ) on the Community Design Commission by converting one Town Resident seat to an ETJ Resident seat

*G.S. 160D-307(a)*
*<https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160d/GS_160d-*

- Update references to State statute (160D rather than 160A)

**Where is this item in its process?**




**Attachments:**

- Resolution A, Amending the Council Procedures Manual
- Resolution B, Amending the Code of Ethics for the Town Council
- Resolution C, Amending the Advisory Board Membership Policy

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By adopting Resolutions A, B, and C, the Council updates various Council and Advisory Board policies and procedures to comply with Chapter 160D.

**RESOLUTION A**
(Amending the Council Procedures Manual)

**A RESOLUTION AMENDING THE COUNCIL PROCEDURES MANUAL TO COMPLY WITH NORTH CAROLINA GENERAL STATUTE 160D (2021-10-13/R-3)**

WHEREAS, in July 2019 the North Carolina General Assembly enacted Session Law 2019-111, an act to clarify, consolidate, and reorganize the land-use regulatory laws of the State; and

WHEREAS, in June 2020 the North Carolina General Assembly enacted Session Law 2020-25, an act to complete the consolidation of land-use provisions into one chapter of the General Statutes as directed by S.L. 2019-111; and

WHEREAS, Session Laws 2019-111 and 2020-25 together establish a new section of the North Carolina General Statutes titled Chapter 160D: Local Planning and Development Regulation, intended to supersede Article 18 of Chapter 153A and Article 19 of Chapter 160A and to serve as the enabling legislation applicable to local government development regulation decisions; and

WHEREAS, the Town Council amended the Land Use Management Ordinance and other sections of the Town Code of Ordinances on May 19, 2021 to bring development regulations of the Town into compliance with Chapter 160D; and

WHEREAS, the Town Manager hereby requests that the Town Council amend Council and Advisory Board policies and procedures to comply with Chapter 160D.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council amends the Council Procedures Manual as follows:

**SECTION 1**

Section I. Meetings, Subsection E. Voting, subsection 2 is hereby amended to read as follows:

"*Ordinance.* General law provides that no ordinance (except for budget, bond order**,** ~~and~~ franchise ordinance**, and legislative decision for development regulation**) may be enacted at the meeting it is introduced unless it receives two-thirds vote. An ordinance failing to receive the requisite vote merely goes over to the next regular meeting of the Council for a second vote before becoming final. At second reading, an ordinance requires only five votes to be enacted.

1. *Budget Ordinances.* A budget ordinance may be adopted by simple majority at any regular or special meeting of the Council. This provision is designed to expedite the fiscal operations of the Town.

2. *Bond Order.* The certificate must indicate the split. A five-four split on adoption of a bond ordinance could raise serious questions with bond counsel.

3. *Franchise Ordinances.* To adopt an ordinance granting a franchise, the ordinance must be approved at two regular meetings of the Council. Such meetings need not be consecutive, but approval must be by a five vote majority vote at both such meetings.

4. ***Legislative Decisions for Development Regulation.* An ordinance amending development regulations and/or amending the Zoning Atlas may be adopted by simple majority at the same regular or special meeting of the Council where the legislative hearing is closed. The Town must permit adoption on first reading in accordance with G.S. 160A-75.**"

**SECTION 2**

Section I. Meetings, Subsection E. Voting, subsection 3 is hereby amended to read as follows:

"*Citizen Comments.* In matters involving amendments to the Zoning Ordinance, state law provides that if any resident or property owner in the Town submits a written statement regarding a proposed amendment, modification, or repeal to a zoning ordinance to the Clerk at least two business days prior to the proposed vote on such change, the Clerk must provide Council with the written statement. If the proposed change is the subject of a quasi-judicial proceeding under G.S. ~~160A-388~~ **160D-406**, the Clerk shall provide only the names and addresses of the individuals providing written comment, and the provision of such names and addresses to all Council Members shall not disqualify any Council Member from voting."

**SECTION 3**

This resolution shall be effective upon adoption.

This the 13th day of October, 2021.

**RESOLUTION B**
(Amending the Code of Ethics for the Town Council)

**A RESOLUTION AMENDING THE CODE OF ETHICS FOR THE CHAPEL HILL TOWN COUNCIL TO COMPLY WITH NORTH CAROLINA GENERAL STATUTE 160D (2021-10-13/R-4)**

WHEREAS, in July 2019 the North Carolina General Assembly enacted Session Law 2019-111, an act to clarify, consolidate, and reorganize the land-use regulatory laws of the State; and

WHEREAS, in June 2020 the North Carolina General Assembly enacted Session Law 2020-25, an act to complete the consolidation of land-use provisions into one chapter of the General Statutes as directed by S.L. 2019-111; and

WHEREAS, Session Laws 2019-111 and 2020-25 together establish a new section of the North Carolina General Statutes titled Chapter 160D: Local Planning and Development Regulation, intended to supersede Article 18 of Chapter 153A and Article 19 of Chapter 160A and to serve as the enabling legislation applicable to local government development regulation decisions; and

WHEREAS, the Town Council amended the Land Use Management Ordinance and other sections of the Town Code of Ordinances on May 19, 2021 to bring development regulations of the Town into compliance with Chapter 160D; and

WHEREAS, the Council adopted its Code of Ethics in accordance with North Carolina Session Law 2009-403 on November 22, 2010; and

WHEREAS, the Town Manager hereby requests that the Town Council amend Council and Advisory Board policies and procedures to comply with Chapter 160D.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council amends the Code of Ethics for the Town Council as follows:

**SECTION 1**

A new Section 4A., titled Conflicts of Interest, is hereby inserted as follows:

"***Section 4A. Conflicts of Interest.***

**Council members shall abide by all provisions of NC General Statute 160D-109 addressing Conflicts of Interest.**

**Council members shall not vote on any matter in which they have a conflict of interest or an interest which reasonably might appear to be in conflict with the concept of fairness in dealing with public business. A conflict of interest or a potential conflict occurs if the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.**

**Council members shall not vote on any zoning amendment if the landowner of the property subject to a rezoning petition or the applicant for a text amendment is a person with whom the member has a close familial, business, or other associational relationship.**

**In any instance of the Council opening an Evidentiary Hearing, the Council serves as a quasi-judicial body. Council members shall not participate in or vote on any quasi-judicial matter in a manner that would violate affected persons' constitutional rights to an impartial decision maker. Impermissible violations of due process include, but are not limited to, a member having a fixed opinion prior to hearing the matter that is not susceptible to change; undisclosed ex parte communications; a close familial, business, or other associational relationship with an affected person; or a financial interest in the outcome of the matter.**

**For purposes of these guidelines, a "close familial relationship" means a spouse, parent, child, brother, sister, grandparent, or grandchild. The term also includes the step, half, and in-law relationships.**

**If a Council member believes they have a conflict of interest as identified above, then that member shall recuse themself from voting on the matter. In the event a Council member does not recuse themself, any fellow Council member may raise an objection to that member's participation, either at or prior to the hearing or vote on that matter. The remaining Council members shall then by majority vote rule on the objection.**

**In cases where a Council member establishes a conflict of interest, or where the Council upholds an objection to participation, the Council member shall remove themself from the voting area.**"

**SECTION 2**

Resolution (2010-11-22/R-7) is hereby amended to document the date of this update as follows:

"Adopted this the **22nd** day of **November**, 2010.

**Updated this the 13th day of October, 2021.**"

**SECTION 3**

Exhibit A, list items 9 and 10 are hereby amended to read as follows:

"9. N.C.G.S. Sec. **160D-702(a)** ~~160A-381(a) and (d)~~ Grant of (zoning) power **https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160D/GS_160D-702.html** ~~http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_160A/GS_160A-381.html~~

10. N.C.G.S. Sec. **160D-109 Conflicts of interest** ~~160A-388(e1)Board of adjustment (voting by board or other board on~~ **(including** quasi-judicial matters; impermissible conflicts) **https://www.ncleg.net/EnactedLegislation/Statutes/HTML/BySection/Chapter_160d/GS_160d-109.html** ~~http://www.ncga.state.nc.us/EnactedLegislation/Statutes/HTML/BySection/Chapter_160A/GS_160A-388.html~~"

**SECTION 4**

This resolution shall be effective upon adoption.

This the 13th day of October, 2021.

**RESOLUTION C**
(Amending the Advisory Board Membership Policy)

**A RESOLUTION AMENDING THE ADVISORY BOARD MEMBERSHIP POLICY TO COMPLY WITH NORTH CAROLINA GENERAL STATUTE 160D (2021-10-13/R-5)**

WHEREAS, in July 2019 the North Carolina General Assembly enacted Session Law 2019-111, an act to clarify, consolidate, and reorganize the land-use regulatory laws of the State; and

WHEREAS, in June 2020 the North Carolina General Assembly enacted Session Law 2020-25, an act to complete the consolidation of land-use provisions into one chapter of the General Statutes as directed by S.L. 2019-111; and

WHEREAS, Session Laws 2019-111 and 2020-25 together establish a new section of the North Carolina General Statutes titled Chapter 160D: Local Planning and Development Regulation, intended to supersede Article 18 of Chapter 153A and Article 19 of Chapter 160A and to serve as the enabling legislation applicable to local government development regulation decisions; and

WHEREAS, the Town Council amended the Land Use Management Ordinance and other sections of the Town Code of Ordinances on May 19, 2021 to bring development regulations of the Town into compliance with Chapter 160D; and

WHEREAS, the Town Manager hereby requests that the Town Council amend Council and Advisory Board policies and procedures to comply with Chapter 160D.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council amends the Advisory Board Membership Policy as follows:

**<u>SECTION 1</u>**

The **Board Specific Policies** for the **Community Design Commission** are hereby revised to read as follows:

[In the table below, one row is removed and a new one added.]

[Note that Council will consider a separate resolution on the October 13, 2021 agenda proposing additional revisions to this table, in response to the Community Design Commission petition for a reduction of member seats.]

| "**Seat Category** | **Seat Requirements** |
|---|---|
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |

| | |
|---|---|
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| ~~**Chapel Hill Resident**~~ | ~~Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field.~~ |
| **Extra Territorial Jurisdiction (ETJ) Resident** | **Must live within the Town of Chapel Hill's Extraterritorial Jurisdiction.**" |

**SECTION 2**

The **Board Specific Policies** for the **Community Design Commission, Enabling Legislation that Impacts Membership** are hereby amended to read as follows:

"North Carolina General Statute **160D-304** ~~160A-451~~.

**Composition of Appearance Commission; Joint Commission**

**(a) Composition. - Each local government may create a special commission, to be known as the appearance commission. The commission shall consist of not less than seven nor more than 15 members, to be appointed by the governing board for terms not to exceed four years, as the governing board may by ordinance provide. All members shall be residents of the local government's area of planning and development regulation jurisdiction at the time of appointment. Where possible, appointments shall be made in such a manner as to maintain on the commission at all times a majority of members who have had special training or experience in a design field, such as architecture, landscape design, horticulture, city planning, or a related field. Members of the commission may be reimbursed for actual expenses incidental to the performance of their duties within the limits of any funds available to the commission but shall serve without pay unless otherwise provided in the ordinance establishing the commission. Membership of the commission is an office that may be held concurrently with any other elective or appointive office pursuant to Section 9 of Article VI of the North Carolina Constitution.**

**(b) Joint Commissions. - Local governments may establish a joint appearance commission. If a joint commission is established, it shall have the same composition as specified by this section, and the local governments involved shall determine the residence requirements for members of the joint commission.**

~~Membership and appointment of commission; joint commission.~~

~~Each municipality and county in the State may create a special commission, to be known as the official appearance commission for the city or county. The commission shall consist of not less than seven nor more than 15 members, to be appointed by the governing body of the municipality or county for such terms, not to exceed four years, as the governing body may by ordinance provide. All members shall be residents of the municipality's or county's area of planning and zoning jurisdiction at the time of appointment. Where possible, appointments shall be made in such a manner as to maintain on the commission at all times a majority of members who have had special training or experience in a design field, such as architecture, landscape design, horticulture, city planning, or a closely related field. Members of the commission may be reimbursed for actual expenses incidental to the performance of their duties within the limits of any funds available to the commission, but shall serve without pay unless otherwise provided in the ordinance establishing the commission. Membership of the commission is declared to be an office that may be held concurrently with any other elective or appointive office pursuant to Article VI, Sec. 9, of the Constitution.~~

~~A county and one or more cities in the county may establish a joint appearance commission. If a joint commission is established, the county and the city or cities involved shall determine the residence requirements for members of the joint commission. (1971, c. 896, s. 6; c. 1058; 1973, c. 426, s. 63.)~~

Town of Chapel Hill Land Use Management Ordinance Appendix A Article 8”

**SECTION 3**

The **Board Specific Policies** for the **Planning Commission, Enabling Legislation that Impacts Membership** are hereby amended to read as follows:

"North Carolina General Statute **160D-301** ~~160A-361b~~

**Composition of Planning Board**

**(a) Composition. - A local government may by ordinance provide for the appointment and compensation of a planning board or may designate one or more boards or commissions to perform the duties of a planning board. A planning board established pursuant to this section may include, but shall not be limited to, one or more of the following:**

**(1) A planning board of any size or composition deemed appropriate, organized in any manner deemed appropriate; provided, however, the board shall have at least three members.**

**(2) A joint planning board created by two or more local governments pursuant to Part 1 of Article 20 of Chapter 160A of the General Statutes.**

~~A board or commission created or designated pursuant to this section may include, but shall not be limited to, one or more of the following:~~

~~(1) A planning board or commission of any size (with not fewer than three members) or composition deemed appropriate, organized in any manner deemed appropriate;~~

~~(2) A joint planning board created by two or more local governments pursuant to Article 20, Part 1, of this Chapter. (1919, c. 23, s. 1; C.S., s. 2643; 1945, c. 1040, s. 2; 1955, cc. 489, 1252; 1959, c. 327, s. 2; c. 390; 1971, c. 698, s. 1; 1973, c. 426, s. 57; 1979, 2nd Sess., c. 1247, s. 35; 1997-309, s. 7; 1997-456, s. 27; 2004-199, s. 41(a).)~~

Town of Chapel Hill Land Use Management Ordinance Appendix A Article 8"

**SECTION 4**

The section on **Ethics Guidelines** is hereby amended to read as follows:

"All advisory board and commission members and applicants shall agree to comply with the following ethics guidelines adopted by the Council on March 1, 1999 and updated January 31, 2018 **and October 13, 2021**:

*Ethics Guidelines for Town Advisory Boards and Commissions*

Members of advisory boards and commissions shall not ~~discuss, advocate, or~~ vote on any matter in which they have a conflict of interest or an interest which reasonably might appear to be in conflict with the concept of fairness in dealing with public business. A conflict of interest or a potential conflict occurs if **the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.** ~~a member has a separate, private, or monetary interest, either direct or indirect, in any issue or transaction under consideration.~~

**Members of advisory boards and commissions shall not vote on any zoning amendment if the landowner of the property subject to a rezoning petition or the**

**applicant for a text amendment is a person with whom the member has a close familial, business, or other associational relationship**. **See General Statute 160D-109(b).**

In addition, members of the Historic District Commission and Board of Adjustment, when these boards are hearing cases, serve as quasi-judicial bodies. Pursuant to ~~State~~ **General** Statute **160D-109(d)** ~~160A-388(e)(2)~~, members of these boards

> "shall not participate in or vote on any quasi-judicial matter in a manner that would violate affected persons' constitutional rights to an impartial decision maker. Impermissible violations of due process include, but are not limited to, a member having a fixed opinion prior to hearing the matter that is not susceptible to change, undisclosed ex parte communications, a close familial, business, or other associational relationship with an affected person, or a financial interest in the outcome of the matter."

**The meaning of "familial relationship" shall be as defined under General Statute 160D-109(f).**

Any member who violates these Ethics Guidelines may be subject to removal from the board or commission.

If the advisory board or commission member believes he/she has a conflict of interest then that member **shall recuse himself/herself from voting on the matter**. ~~should ask the advisory board or commission to be recused from voting. The advisory board or commission should then vote on the question on whether or not to excuse the member making the request.~~

**In the event a member does not recuse himself/herself, any fellow member may raise an objection to that member's participation at or prior to the hearing or vote on that matter. The remaining members of the advisory board or commission shall then by majority vote rule on the objection in accordance with General Statute 160D-109(e).**

In cases where the individual member or the advisory board or commission establishes a conflict of interest, then the advisory board or commission member shall remove themselves from the voting area.

Any advisory board or commission member may seek the counsel of the Town Attorney on questions regarding the interpretation of these ethics guidelines or other conflict of interest matters. The interpretation may include a recommendation on whether or not the advisory board or commission member should excuse himself/herself from voting. The advisory board or commission member may request the Town Attorney respond in writing."

## SECTION 5

This resolution shall be effective upon adoption.

This the 13th day of October, 2021.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr.
Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 4., **File #:** [21-0762], **Version:** 1 **Meeting Date:** 10/13/2021

**Call a Legislative Hearing for Land Use Management Ordinance Text Amendments - Proposed Changes to Section 3.6.2 Historic Districts Related to Review Criteria on October 27, 2021.**

**Staff:**
Colleen Willger, Planning Director
Judy Johnson, Assistant Director
Anya Grahn, Senior Planner

**Department:**
Planning

**Overview:** On April 21, 2021 <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=4916685&GUID=333205B7-F0B6-490D-AD90-260BDD05566B&Options=&Search=> the Town Council approved amendments to the LUMO to reflect legislative updates in Chapter 160D of the North Carolina General Statutes and clarify the Historic District Commission's review of Certificate of Appropriateness (COA) applications. As part of these text amendments, review criteria was removed inadvertently. Staff proposes reinstating the necessary text.

**Recommendation(s):**

That the Council adopt the resolution calling for a legislative hearing on October 27, 2021, to amend the Land Use Management Ordinance (LUMO) related to the Historic Districts Review Criteria.

**Key Issues:**

- Clarifying the criteria used by the Historic District Commission in reviewing Certificate of Appropriateness applications.

**Attachments:**

- Resolution

**A RESOLUTION CALLING A LEGISLATIVE HEARING TO CONSIDER A LAND USE MANAGEMENT ORDINANCE TEXT AMENDMENT PERTAINING TO SECTION 3.6.2 HISTORIC DISTRICTS RELATED TO REVIEW CRITERIA (2021-10-13/R-6)**

WHEREAS, Legislative updates in Chapter 160D of the North Carolina General Statutes provide that the Historic District Commission shall "adopt principles and standards to guide the commission in determining congruity with the special character of the landmark or district for new construction, alterations, additions, moving, and demolition;" and

WHEREAS, on September 23, 2019, Planning Department staff provided a recommendation to the Council Committee on Boards & Commission to amend the LUMO following the adoption of the Design Principles and Standards to provide greater clarity on the legal basis for application of the Design Principles and Standards in the Commission's review of Certificate of Appropriateness (COA) applications; and

WHEREAS, on April 21, 2021 the Town Council approved amendments to the LUMO to reflect legislative updates in Chapter 160D of the North Carolina General Statutes and remove the A through J criteria used by the Historic District Commission in their review of Certificate of Appropriateness (COA) applications; and

WHEREAS, the text amendments approved on April 21, 2021, removed additional review criteria pertinent to the Historic District Commission's review of Certificate of Appropriateness (COA) applications and additional language is required to clarify the Historic District Commission's review process.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council calls a Legislative Hearing for October 27, 2021, at 7:00 p.m. to consider a possible Land Use Management Ordinance text amendment regarding Historic District Commission Review Criteria.

This, the 13th day of October, 2021.

---

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By adopting the resolution, the Council calls a Legislative Hearing to consider matters related to the Historic District Review Criteria on October 27, 2021.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr.
Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 5., **File #:** [21-0763], **Version:** 1 **Meeting Date:** 10/13/2021

**Continue the Legislative Hearing for Conditional Zoning - Amending the Chapel Hill Zoning Atlas to Rezone the Rosemary-Columbia Street Hotel Property Assemblage Located at 108, 110, and 114 W. Rosemary Street and 208 Pritchard Avenue from Residential-3 (R-3), Office/Institutional-1 (OI-1), and Town Center-2 (TC-2) to Town Center-2-Conditional Zoning District (TC-2-CZD) to November 10, 2021**.

**Staff:**
Colleen Willger, Director
Judy Johnson, Assistant Director
Anya Grahn, Senior Planner

**Department:**
Planning

**Overview:** The Town Council held a legislative hearing on June 23, 2021 <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=4990632&GUID=175615EE-6CE9-4D29-829F-C761F974CBBC> to discuss the Conditional Zoning District Application for the Rosemary-Columbia Street Hotel at 108, 110, and 114 W. Rosemary Street and 208 Pritchard Avenue. The Council continued the legislative hearing to October 13, 2021. On October 8, 2021, the applicant requested that this item be continued from the October 13, 2021 meeting to the November 10, 2021 meeting. Staff recommends that Council defer consideration to November 10, 2021, as requested by the applicant.

**Recommendation(s):**

That the Council adopt the resolution deferring consideration of the proposed conditional zoning district application to November 10, 2021.

**Attachments:**

- Resolution

**A RESOLUTION TO CONTINUE THE LEGISLATIVE HEARING TO AMEND THE CHAPEL HILL ZONING ATLAS TO REZONE THE ROSEMARY-COLUMBIA STREET HOTEL PROPERTY ASSEMBLAGE LOCATED AT 108, 110, AND 114 W. ROSEMARY STREET AND 208 PRITCHARD AVENUE FROM RESIDENTIAL-3 (R-3), OFFICE/INSTITUTIONAL-1 (OI-1), AND TOWN CENTER-2 (TC-2) TO TOWN CENTER-2- CONDITIONAL ZONING DISTRICT (TC-2-CZD) TO NOVEMBER 10, 2021 (2021 -10-13/R-6.1)**

WHEREAS, on June 23, 2021, the Town Council opened the Legislative Hearing for the Rosemary-Columbia Street Hotel Conditional Zoning District application and made a motion to continue the hearing to the Council Meeting on September 22, 2021; and

WHEREAS, on September 22, 2021, the Council continued that hearing to October 13, 2021; and

WHEREAS, on October 8, 2021, the applicant requested that the item be continued to the November 10, 2021 meeting.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council defers consideration of the Rosemary-Columbia Street Hotel Conditional Zoning District application to 7:00 p.m. on Wednesday, November 10, 2021.

This the 13th day of October, 2021.

---

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By adopting the resolution, the Council defers consideration of the proposed conditional zoning district application for the Rosemary-Columbia Street Hotel property assemblage located at 108, 110, and 114 W. Rosemary Street and 208 Pritchard Avenue to November 10, 2021.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 6., **File #:** [21-0764], **Version:** 1 **Meeting Date:** 10/13/2021

**Adopt Minutes from June 24, 2020 and July 29, 2020 and September 9 and 16, 2020 and October 7, 21, and 28, 2020 and November 4 and 18, 2020 and December 2 and 9, 2020 Meetings.**

**Staff:**
Sabrina M. Oliver, Director
Amy Harvey, Deputy Town Clerk
Nikki Catalano, Transcriptionist

**Department:**
Communications and Public Affairs

**Overview:** These minutes are prepared for the meetings listed below.

**Recommendation(s):**

That the Council approve the attached summary minutes of past meetings.

**Attachments:**

- Resolution
- June 24, 2020 Special Meeting
- July 29, 2020 Special Meeting
- September 9, 2020 Special Meeting
- September 16, 2020 Work Session
- October 7, 2020 Regular Meeting
- October 21, 2020 Work Session
- October 28, 2020 Regular Meeting
- November 4, 2020 Regular Meeting
- November 18, 2020 Regular Meeting
- December 2, 2020 Work Session
- December 9, 2020 Regular Meeting

**A RESOLUTION TO ADOPT SUMMARY MINUTES OF COUNCIL MEETINGS (2021-10-13/R-7)**

BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby adopts summary minutes for meetings held on June 24, 2020 and July 29, 2020 and September 9 and 16, 2020 and October 7, 21, and 28, 2020 and November 4 and 18, 2020 and December 2 and 9, 2020.

This the 13th day of October, 2021.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By adopting the resolution, the Council approves the summary minutes of past meetings which serve as official records of the meetings.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

| | |
|---|---|
| Mayor Pam Hemminger | Council Member Hongbin Gu |
| Mayor pro tem Michael Parker | Council Member Tai Huynh |
| Council Member Jessica Anderson | Council Member Amy Ryan |
| Council Member Allen Buansi | Council Member Karen Stegman |

**Wednesday, June 24, 2020** **7:00 PM** **Virtual Meeting**

### Virtual Meeting Notification

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_ip49EzjuTOaWcE1k3Ww7GQ After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 841 9420 6182

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ralph Karpinos, Emergency Management Coordinator Kelly Drayton, Business Management Director Amy Oland, Business Management Assistant Director Matt Brinkley, Interim Planning Director Judy Johnson, Community Resilience Officer John Richardson, Planner II Michael Sudol, Planner II Becky McDonnell, Executive Director for Community Safety/Police Chief Chris Blue, Senior Planner Anya Grahn, Deputy Town Clerk Amy Harvey, Executive Director for Technology and CIO Scott Clark, and Sabrina Oliver Communications and Public Affairs Director/Town Clerk.

### ROLL CALL

Mayor Hemminger opened the virtual meeting at 7:00 p.m. and summarized the





agenda. She called the roll, and all Council Members replied that they were present.

### OPENING

**1.** A Resolution on Developing New Community Approaches to Improve Racial Equity and Public Safety in Chapel Hill. (no attachment) **[20-0456]**

Mayor Hemminger announced a Council resolution that reaffirmed its June 3, 2020 commitment to eradicate racial bias and structural racism. Because the resolution was so extensive, Council Members Buansi and Stegman would make short statements about its goals, she said.

Council Member Buansi said that it was long past time for action, at all levels of government, to change policies that discriminate against and violate basic constitutional and human rights of people of color. He said that Chapel Hill's police chief had taken a progressive approach to public safety, but that policing as an institution had rightly been called into question for its racist roots and history of violence against people of color.

Council Member Buansi listed steps that the Town would take as it begins to re-imagine and re-examine and re-invest in community resources. These steps included prohibiting choke holds, ending regulatory traffic stops for low-level violations, authorizing deadly force only when there is a clear threat of death or serious bodily injury, and having clear accountability for officers violating such policies. He said that the Council had requested information that it needed to inform a transparent process and long-term change.

Council Member Stegman said that a Council Committee would be formed to clarify Community Policing Advisory Committee's (CPAC) and Justice in Action Committee's (JIAC) charges. That Committee would institute Chapel Hill Police Department (CHPD) data presentations and explore alternatives to having security resource officers in schools, she said. She stressed the Council's commitment to re-imagining the Town budget and reallocating resources in a way that would reflect the community's commitment to justice and equity.

Council Member Stegman said that the Town would hold a series of community-wide listening sessions and that a Community Task Force would make actionable recommendations on a range of issues related to public safety such as right sizing of the CHPD, relocating resources as necessary, and coordinating with Orange County and other jurisdictional partners to increase investments in programs that keep communities healthy and safe. The Council was committed to seeing fundamental change and looked forward to realizing a new bold vision of public safety, she said.

Hanna Schanzer, Chapel Hill resident, said that the resolution sounded promising but that not announcing it or making it available online prior to the meeting showed a lack of transparency by the Town.

Emile Charles, a Chapel Hill resident, gave examples of racial inequities that needed to be addressed both nationally and locally and reviewed a list of demands for reform. He asked the Council to not pass the budget until it had deconstructed ties and practices that support white supremacy.

Trinity Casimir, a Chapel Hill resident, advocated for a strategic defunding of the CHPD and a restructuring of the Town's public safety model. She recommended that the Council consult with community members who would be most affected by changes in policing rather than just making decisions on their behalf.

Rachel Collman, a Chapel Hill resident, agreed with previous speakers regarding the Town's lack of transparency and community involvement. She said that the Council's sense of urgency regarding the budget deadline came from an effort to maintain a status quo that was no longer working for everyone.

Maggie Blunk, a Chapel Hill native, said that the proposed resolution sounded promising but that reallocating CHPD funds to affordable housing would illustrate the Council's dedication to racial justice better than creating a task force down the road. She said that Chapel Hill was not the progressive city that it claimed to be.

Lindsay Ayling, a Chapel Hill resident, asked the Council to abolish the police rather than just taking half measures. She mentioned that a white supremacist had been discovered on the CHPD and said she wondered how many other officers shared his ideology. Ms. Ayling cited incidents in which she believed the CHPD had sided with neo-Nazis and white supremacists groups rather than anti-racist protesters.

Mary Alta Feddeman, a Chapel Hill native who lives in Durham, said that the Town's budget had not been changed in any meaningful way even though the Council had heard five hours of comments from people asking for change. She said only so many reforms could be made to something that was built on white supremacy before it would be necessary to drastically reconsider it.

Anna Richards, president of the Chapel Hill-Carrboro NAACP, said that aspects of Council's resolution were encouraging. She pointed out ways in which the NAACP agenda aligned with the Council's resolution and urged the Council to expedite the process and to take some steps immediately. The community would hold the Council accountable for what it was stating in the resolution, she said.





Mayor Hemminger thanked Ms. Richards for working with the Town and asked her to submit the NAACP's agenda.

Mackenzie Kwok, a Chapel Hill resident, concurred with previous speakers and said that putting limitations on the use of force had not reduced harm to black and brown communities. Banning choke holds had not saved Eric Garner or George Floyd, she pointed out. The council's professed ideals could not be accomplished without reallocating funds from the CHPD to community services and safety, she said.

Amelia Covington, a Chapel Hill resident, said that community policing had failed many times and that those funds should be diverted. Public safety meant investing in communities of color in a way that was decided by those communities, she said.

Delores Bailey, executive director of EmPOWERment, Inc., said that change would need to begin at the Council level. She suggested ways in which restructuring could make the CHPD more effective and said that it was time for change. EmPOWERment had worked for years to bring community and the police together through community meetings and that the conversation should begin with them, she said.

George Barrett, associate director at the Marion Cheek Jackson Center, said that reform had been talked about for years but violence against black people had not lessened. The resolution was a good step in the right direction, he said, but he urged the Council to be explicit about defunding the police and reallocating that money into community resources, especially black and brown communities.

Paris Miller, an EmPOWERment, Inc. board member, said she was speaking as vice chair of CPAC, which had not been consulted regarding the resolution. She implored the Council to include CPAC in future conversations on policing and community safety since that was its charge. She had recently sent a letter regarding those expectations to the Mayor and Council but had not received a response, she said.

Mayor Hemminger thanked Ms. Miller for the letter and said that she would reply.

Maia Donald, a Chapel Hill resident, said that the Council resolution came across as a last minute effort. The Council had not taken steps to strategically defund the CHPD, had not reached out to the community, and had not made the process transparent, she said. She asked Council Members to vote against the proposed budget and to disband the CHPD.

E. McManus, a Chapel Hill resident, agreed with other speakers' comments and said that she and others wanted more than what was being offered in the Council resolution. The Town budget should reflect what its residents want and need, she said.

Mayor Hemminger thanked the Council for caring so deeply about the issues and providing input. She thanked Council Members Buansi, Stegman and Ryan, in particular, for composing the resolution and expressed gratitude to the staff members who had worked on it. She stressed the Council's commitment to fostering trust, respect, human dignity, and equality for all and said they were eager to get conversations started.

Mayor Hemminger said that the Council would make its resolution available if it passes. She explained that the proposed process would include community voices.

The Council voted unanimously to adopt the resolution.

Mayor Hemminger announced that the Town would be partnering with the Orange County Local Reentry Coalition and neighboring municipalities to post Hearing Impacted Voices, a moderated panel discussion on Inequality, Policing and Injustice. The event would be free and open to the community, and information was available on the Town's Calendar and its Facebook page, she said.

A motion was made by Council Member Buansi, seconded by Council Member Stegman, that R-1 be adopted. The motion carried by a unanimous vote.

## PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.

1.01 Economic Development Specialist Laura Selmer Request Regarding Sole Source Purchase of Traffic Barrier Materials. [20-0474]

Economic Development Specialist Laura Selmer requested authorization to purchase traffic barriers for the purpose of increasing pedestrian space on Franklin Street.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-1.1 be adopted. The motion carried by a unanimous vote.





1.02 Norma Safransky and Sharon Bagatell Regarding Energy Innovation and Carbon Dividend Act of 2019. [20-0475]

Norma Safransky and Sharon Bagatell, Chapel Hill residents, asked the Council to approve a resolution endorsing a NC House Resolution 763 to reduce carbon emissions. The bi-partisan bill would place a fee on fossil fuels at the source and would distribute collected money among households as a monthly dividend, they explained. If passed soon, the plan would reduce carbon emissions by 40 percent in the first 12 years and by 90 percent by 2050, they explained.

Mayor Hemminger pointed out that the Council normally receives and refers resolutions to the Town Manager, Town Attorney and Mayor. However, since the current meeting was the last before the Council's recess, she recommended adopting the resolution (2020-06-24/R-1.2) with a stipulation that staff review the wording to ensure that it lined up with what the Town could normally support.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that this Petition/R-1.2 be adopted. The motion carried by a unanimous vote.

1.03 Rachel Collman Comment. [20-0476]

Rachel Collman said that she wanted to point out the hypocrisy of calling for a staff review of the resolution just passed while not allowing a review of the pervious resolution.

This item was received as presented.

1.04 Maple Osterbrink Regarding Environmental Justice Commission. [20-0477]

Maple Osterbrink, a Chapel Hill resident, reminded the Council that she had recently requested $100 for expenses related to an Environmental Justice Commission that she intended to start when in-person meetings were again allowed. She also wanted to know the legal requirements of starting a commission, she said.

Mayor Hemminger agreed to reply as soon as she could.

This item was received as presented.

## ANNOUNCEMENTS BY COUNCIL MEMBERS

1.05 Mayor Hemminger Regarding Town Attorney Ralph Karpinos' Last Meeting. [20-0478]

Mayor Hemminger noted that Town Attorney Ralph Karpinos was retiring after 32 years of working with the Town. She thanked him for his dedicated effort throughout the years and his willingness to explain things in a way that lay people could understand. She said that Mr. Karpinos would return in the fall when the Council could properly honor him.

1.06 Mayor Hemminger Regarding Mask Distribution. [20-0479]

Mayor Hemminger noted that NC Governor Cooper had announced a statewide requirement for face coverings. She said that the percentage of positive COVID-19 tests was up and the number of hospitalizations was increasing in NC. Everyone's help and participation was needed and information about when and where to get free face masks was on the Town's website, she said.

## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-2 be adopted as amended, which approved the Consent Agenda. The motion carried by a unanimous vote.

**2.** Approve all Consent Agenda Items. [20-0457]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**3.** Approve the Miscellaneous Budget Ordinance Amendment to Adjust Various Fund Budgets for FY 2019-20. [20-0458]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**4.** Authorize the Town of Chapel Hill to Participate in the North Carolina Ancillary Governmental Participant Investment Program (AGPIP). [20-0459]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**5.** Endorse a Letter from Orange County Climate Council to Governor Cooper. [20-0460]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**6.** Adopt a Calendar of Council Meetings through December 2020. [20-0461]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## INFORMATION





**7.** Receive Upcoming Public Hearing Items and Petition Status List. [20-0462]

This item was received as presented.

## DISCUSSION

**8.** Update on Town Efforts to Respond to the COVID 19 Crisis. (no attachment) [20-0463]

Emergency Management Coordinator Kelly Drayton gave an update on the Town's COVID-19 response. She said that Governor Cooper had issued an order to extend Phase II of the reopening to July 17th and would require face coverings when proper physical distancing could not be achieved. She said that North Carolina currently had more than 500 testing sites and was completing an average of 17,000 tests per day.

Ms. Drayton said that residents who had participated in a 2015 Rent and Utility Assistance Program had been returning for additional assistance. She outlined changes to the Emergency Housing Assistance Program that the Town and Orange County had proposed in order to respond to that need. The Town's Call center had been closed in June, but calls were being redirected to specific departments, she said.

Ms. Drayton said that weekly mask distribution was continuing and the Town was still accepting donations of face coverings. Staff and community partners had been distributing masks to public housing residents as well as through local food distribution networks, she said. She noted that weekly food distribution had moved to the Eubanks Park & Ride lot. Ms. Drayton said that health professionals were continuing to urge residents to practice the 3Ws: Wear a mask; Wash your hands; Wait six feet apart.

Mayor Hemminger thanked Ms. Drayton and other staff members and noted that most of the Town's department heads had been helping to distribute food. She said that there had been an increase in the number of "Food for Students" recipients, which was currently distributing at 35 sites. She thanked the staff members and community partners who had been part of the effort to help the community through the pandemic crisis.

Council Member Stegman confirmed with Town Manager Maurice Jones that a lane on Franklin Street would be closed to traffic once the Town had received the necessary barricades.

Mayor Hemminger pointed out that the Orange County Health Department's website was constantly being updated with COVID-19 information.

This item was received as presented.

**9.** Consider Land Use Management Ordinance Text Amendments - Proposed Changes to Section 3.7 and Appendix A Related to Permitting Flex Office in the Town Center Zoning Districts and Expanding Definitions Related to Types of Retail. [20-0464]

Senior Planner Anya Grahn gave a brief PowerPoint presentation on a proposed text amendment that would expand the General Business definition in the Land Use Management Ordinance (LUMO) to include Retail Sales and Retail Services. This would allow flex office space in the Town Center zoning district without having to specifically define it, she said.

Ms. Grahn proposed revising a few other definitions such as Recreation Facility and Commercial Indoor, as well as expanding the definition of Personal Services to include Performing and Culinary Arts, Physical Exercise, Crafts, and Social Customs and Activities.

Council Members confirmed that the issue of nuisance noise coming from upper stories had been addressed in the definitions section.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that R-7 be adopted. The motion carried by a unanimous vote.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that O-3 be enacted. The motion carried by a unanimous vote.

**10.** Consider an Application for Zoning Atlas Amendment -137 East Franklin Street and 136 East Rosemary Street Innovation Hub [20-0465]

Planner II Michael Sudol presented an application for a Zoning Atlas Amendment regarding an innovation hub at 137 East Franklin Street. He explained that the project would include two existing buildings on a .66-acre site that spanned a block on both East Franklin and East Rosemary Streets. The buildings exceeded the floor area ratio and height requirements of the underlying zoning districts and rezoning to Town Center-3 would bring them into compliance, he said. He noted that a rezoning would also allow a proposed 1,000 square-foot increase in floor area to enclose the Rosemary Street frontage.

Mr. Sudol said that the public hearing had been closed on June 11th and that no comments or changes had been made since then. The Planning Commission was recommending approval, he said, and he recommended that the Council adopt the Resolution of Consistency and enact Ordinance





A.

A motion was made by Council Member Ryan, seconded by Council Member Stegman, that R-9 be adopted. The motion carried by a unanimous vote.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that O-4 be enacted. The motion carried by a unanimous vote.

**11.** Consider the Final Budget and Related Items for FY 2020-21. [20-0466]

Town Manager Maurice Jones gave a PowerPoint presentation on the FY 2020-21 budget. He reviewed the process to date and pointed out that a budget must be passed by the end of June 2020. The proposed budget addressed many of the Council's strategic priorities, he said, noting that it did not include a property tax increase and would maintain core services. He pointed out that the budget did not include a pay increase for employees.

Mr. Jones said that many of the effects of COVID-19 on the budget were still unknown. He had proposed reducing or eliminating several items with the hope of restoring them in future years, he said. He explained that the Town had negotiated its percentage increase for employee health insurance down from 4 percent to 2 percent. Chapel Hill had also received a couple of fairly large grants and would be able to increase the living wage for about 20 full-time employees, he said.

Mr. Jones said that the final recommended budget (not including transfers) was a little more than $111 million. He displayed a chart that showed the total broken down by departments. He said that the Town would spend close to $11 million on affordable housing in the coming year, which would include $5 million in bond funds. Staff anticipated spending a similar amount in FY 2022 when the other half of the $10 million bond for affordable housing would be dispersed, he said.

Mr. Jones said that staff planned to examine the Town's delivery of services across all departments and would return to Council in the near future to discuss allocation of resources. He hoped to resume discussions regarding a five-year budget strategy and the goal of those discussions would be to understand community wants and needs, to make decisions regarding priorities, and to discuss how to achieve strategic goals, he said.

Council Members confirmed with staff that sales tax revenue in March was down nearly 5 percent and that April sales figures would be available on July 15th. Business Management Director Amy Oland said that average growth for the year was about 6.5 percent.

The Council also verified that hourly parking fees would increase when the Town started charging again in July or August and that this had been discussed with the Downtown Partnership.

Nancy Oates, a Chapel Hill resident, thanked the Town for fully funding its living wage commitment.

Rachel Thomas-Levy, a Chapel Hill resident, said that the CHPD budget had not changed since the Council's last meeting when citizens asked that funds be reallocated to affordable housing. She asked Council Members to listen to the community.

Mary Alta Feddeman, a Chapel Hill resident, asked to see an itemized CHPD budget, adding that black community leaders and organizers had also made that request.

Sonia D., a Chapel Hill resident, asked the Council to postpone voting on the budget and pointed out that Council Members had the power to vote against it if it did not reflect their values. She said that she had requested an itemized CHPD budget and been told that it was being worked on.

Sarah Hoffman, a Chapel Hill resident and graduate student, agreed with what others had said about the urgent need to divest from the CHPD and invest in community resources. She asked that the budget structure be changed in the next cycle in a way that would meaningfully accommodate input from constituents.

Kaori Sueyoshi, a Chapel Hill native, agreed with previous speakers regarding the CHPD. She felt encouraged by the Council's resolution but believed that voting for the proposed budget signified its satisfaction with the status quo, she said. In 2014, when she was a member of the JIAC, she had asked for information regarding race equity concerns, but that letter remained unanswered, she said.

Mr. Jones said that the CHPD budget was close to $13 million. He pointed out that Transit was the Town's largest department and emphasized that the Town would invest close to $11 million in affordable housing over the next fiscal year and another $11 million, or more, in FY 2022. The Town was mandated by law to pass a budget by the end of June in order to ensure that Town services continue, he pointed out.

Mayor Hemminger said that the Community Task Force would return with recommendations. She confirmed with Mr. Jones that the Town could amend its budget throughout the year. She acknowledged that Town documents could be confusing and pointed out that the General Fund was not the overall Town budget. Staff was looking for ways to make the





budget clearer and easier to understand, she said.

Council Member Gu said that the Council owed it to the community to move cautiously and make sure that all residents, especially the most vulnerable, were being protected. She felt encouraged by the level of citizen engagement, she said, and she assured residents that passing the budget did not mean the end of the process. Working together, everyone could make Chapel Hill an example of social justice and equality, she said.

Council Member Huynh proposed a friendly amendment stating that the Council would revisit the budget when the Community Task Force recommendations came through, but Council Member Ryan said she thought that interest was met in the resolution and that spelling it out might hamstring the process. Council Member Stegman said she thought the intent of Council Member Huynh's proposed amendment was related to issues of trust.

The Council discussed how it could make revisions throughout the year and could institute greater change when developing its five-year plan. Mayor Hemminger pointed out that the Town needed to be thoughtful about making changes since nearly three quarters of the budget consisted of people. She said that COVID-19 would affect revenues and the Town's need for services. The Council was committed to looking deeply into what the community had asked but needed to do so in a thoughtful way, she said.

Mayor Hemminger said that passing the Town budget was a beginning, not an end, and that the Council would make changes throughout the year. She confirmed with Council Member Huynh that putting the issue on an agenda for discussion in early fall would satisfy his interest, and she made a commitment to work with the Manager to do that.

The Council voted unanimously to approve the FY 2020-21 budget. Mayor Hemminger pointed out that the budget included a fine-free Public Library and other changes that would enhance equity.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that O-5 be enacted. The motion carried by a unanimous vote.

**12.** Consider Enacting a Budget Ordinance Amendment for CARES Act Funding. **[20-0467]**

Community Resilience Officer John Richardson gave a PowerPoint presentation on a budget ordinance amendment that would allow the Town to officially receive $746,000 in Coronavirus Aid Relief Economic Security (CARES) Act funding from Orange County. He explained that the aim of that $2 trillion federal economic relief package was to protect people from the public health and economic impacts of COVID-19.

Mr. Richardson said that the Town had submitted a request for funding to Orange County in May 2020 and that those funds were being allotted on a per capita basis. Chapel Hill would receive about 28 percent of Orange County's $2.6 million share from the state, he said. He recommended that the Council enact the budget amendment and said that staff would return in the fall with an update.

Mr. Richardson provided details on CARES Act requirements, which included spending funds by December 30, 2020. He presented examples of eligible expenses, summarized the proposed budget ordinance amendment, and explained how CARES dollars and FEMA funding would be coordinated.

Mr. Richardson proposed a plan for spending CARES Act funds but noted that the Council or Manager could change the spending plan at any time before December 30th. The Town and other local governments would work with a consultant to help the economic recovery and the Town's portion of that countywide effort would be $46,000, he said.

Council Members confirmed with Mr. Richardson that the consultant's fee would come from either Economic Support or the Public Information. They ascertained that the CARES Act provided funds; whereas, FEMA money was a reimbursement for up to 75 percent of expenses. Council Member Gu asked if alternative housing for isolating family members would be covered, and Mr. Jones replied that it could be discussed with the Health Department and regional partners as a potential for CARES Act funding.

Mr. Jones and Mayor Hemminger commented on efforts to educate the public on how to protect themselves. Mayor Hemminger said that she wanted preventing evictions and foreclosures to be a top priority. She understood the need for better broadcasting equipment, but preventing evictions was more important, she said.

Mr. Jones said that he did not foresee a need to choose between the two since the Town had other funding sources set aside for rental and housing assistance.

Ms. Richards stated that the NAACP would endorse the budget if the $155,250 for public information and intergovernmental affairs was directed toward human needs.

Council Members Ryan, Anderson and Parker agreed with Ms. Richards' comments. Mayor pro tem Parker confirmed with Mr. Jones that the Council could change allocations down the line. Council Member Buansi verified that the CARES Act money must be used for COVID-19 expenses.





Mr. Jones pointed out that a portion of Public Information funding was intended for providing more secure access and higher quality of broadcasting for the Council's virtual meetings. The Council certainly could consider waiting for that, but there were other alternatives for providing rental assistance, he said.

Council Member Gu stressed the importance of creating more space for outdoor activities, noting that doing so would help those who normally use public transit.

Mayor Hemminger recommended that the Council enact the ordinance with the caveat that the Town Manager would provide an update on other sources of funding and the needs.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that O-6 be enacted. The motion carried by a unanimous vote.

**13.** Consider an Application for Conditional Zoning at Weavers Grove, 7516 Sunrise Road - Proposed Change from Residential-2 (R-2) to Residential-6 Conditional Zoning (R-6-CZ) and Neighborhood Commercial Conditional Zoning (NC-CZ). **[20-0468]**

Mayor Hemminger said that the public hearing on this item had been closed, but the Council had continued to receive public comments by email. Council Members had agreed to allow some citizens to speak but would then take final action on the item without an additional waiting period, she said.

Planner Becky McDonnell provided background on Weavers Grove, a proposed residential community on 32.6 acres along Sunrise Road. The project, developed by Habitat for Humanity and Ballentine Associates, would include 243 residential units, 100 of which would be affordable, she said. She explained that the plan also included a small commercial center and community amenities throughout. The proposal was to rezone the property from Residential-2 to Residential-6 Conditional and Neighborhood Commercial Conditional, she said.

Ms. McDonnell said that the developer had agreed to construct a berm along Interstate 40 to protect Weavers Grove and adjacent properties from traffic noise. She outlined six stipulations that had been added to Ordinance A since the Council closed the public hearing. She recommended that the Council adopt the Land Use Plan amendment and the Resolution of Consistency and enact revised Ordinance A including the six new stipulations.

Council Members confirmed that a required weekly erosion control inspection would be conducted only during active construction and that

Habitat for Humanity and Ballentine Associates did not feel that the new stipulations were burdensome.

In response to Council questions, Bruce Ballentine explained that the proposed berm would be higher than Interstate 40, except where it transitioned back down to existing grade on the east and west ends. Ballentine Associates had ideas for ways to make it even taller and planned to try extending it as well, he said.

Ms. Oates recommended that the subsidized homes be interspersed among the market rate ones in each housing type since segregating the two types could lead to social justice issues. Additionally, she warned that the subsidized units being planned on marshy ground would experience expensive flooding issues for those homeowners.

Abby Zarkin, Chandlers Green Homeowners Association president, said that neighbors wanted to see specific language addressing what the berm would accomplish. She said that some of the affordable homes would be subjected to unhealthy noise levels and that a sound study needed to be performed in order to stipulate what the berm must accomplish.

Michael Murphy, a Chandlers Green resident, agreed with what Ms. Zarkin said about the berm and expressed concern about the Chandlers Greene residences that were below the ephemeral stream. The proper solution would be to not build the three houses in that wet area, he said.

Ms. Richards agreed that there were legitimate concerns about how the affordable houses would be constructed and where they would be placed. She supported Council approval but hoped that the developer would ensure an equitable distribution of housing types within the development and not create segregated areas, she said.

Donna Bell, a Chapel Hill resident, expressed confidence that the Council would be thoughtful about the affordable housing needs. She stressed what a good partner Habitat for Humanity had been over the years, and she encouraged the Council to support the project.

Douglas Call, a Habitat board member and chair of its Advocacy Committee, urged the Council to get as many affordable homes on the site as possible. Regardless of what part of the land they end up on, the children would be playing together and the families would be walking on the same walkways, he pointed out. Approving the project would be a fine start toward changing attitudes about what the Town really was, said Mr. Call.

Danny Benjamin, a Chapel Hill resident, stated that berms sometimes made noise problem worse because of the way sound travels. He requested that a sound study be done prior to approval and that the noise





target be around 66 decibels or a level that authorities accepted.

Council Members stressed the importance of working to ensure that the berm reduce noise to 67 decibels or below and of being flexible with the site plan. They praised Habitat for working with its neighbors to mitigate problems and encouraged them to address the equity concerns that speakers had raised.

Mayor Hemminger said that the Habitat model had broken the cycle of poverty for many families. She pointed out that the project was the Council's first Conditional Zoning process for residential development and said that had allowed the Council to communicate and obtain community input in a way that had not been possible under Special Use Permit process. She thought it was the way to obtain more affordable housing in the future, she said.

A motion was made by Council Member Huynh, seconded by Council Member Stegman, that R-11 be adopted. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that R-12 be adopted. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that O-7 be enacted as amended. The motion carried by a unanimous vote.

**14.** Adopt a Resolution Closing the Public Hearings for A) Authorizing an Economic Development Agreement for the East Rosemary Downtown Deck & Redevelopment Project; and B) Conditional Zoning at 125 East Rosemary Street Parking Garage from Town Center-2 (TC-2) to Town Center-2-Conditional Zoning (TC-2-C). **[20-0469]**

Mayor Hemminger said that the Council was going to close the public hearing on this project because there was no date certain for an Economic Development Agreement. She read a statement from the Town Attorney about taking items off the agenda and said that staff would re-advertise public hearings at a later time.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-14 be adopted. The motion carried by a unanimous vote.

## APPOINTMENTS

**15.** Appointment to the Board of Adjustment. **[20-0470]**

Mayor Hemminger said that appointments would be made in the fall when there were significant openings on certain boards. However, Mayor pro tem Parker and a Council Committee had interviewed some applicants, and he was going to bring their recommendation forward tonight, she said.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that Nathan Boucher be appointed to the Board of Adjustment. The motion carried by a unanimous vote.

**16.** Appointments to the Historic District Commission. [20-0471]

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that Josh Gurlitz and Duncan Lascelles be appointed to the Historic District Commission. The motion carried by a unanimous vote.

**17.** Appointment to the Orange Water and Sewer Authority Board of Directors. [20-0472]

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that Deanie Anyangwe be appointed to Orange Water and Sewer Authority Board of Directors. The motion carried by a unanimous vote.

**18.** Appointment to the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization Board. [20-0473]

Mayor Hemminger announced that Mayor pro tem Parker would represent Go Triangle at the Metropolitan Planning Organization (MPO) and that she was the Town's designee. Council Member Ryan volunteered to be the alternate, and the Council voted unanimously to appoint her to that seat.

Mayor Hemminger reminded the Council that there would be a closed session regarding candidates for the Town Attorney position at 9:00 a.m. on June 25th. She said that there might be an additional meeting at 7:00 p.m. to finish that discussion. She thanked Council Members for working hard in recent months and said she hoped they would get some much needed downtime during the summer break.

Mr. Jones expressed appreciation for the Council's thoughtfulness, support, and endurance during recent months.

Town Attorney Ralph Karpinos said that working for the Town for many years had been a wonderful experience for him and his family, and he hoped to be able to thank Council Members in person in the fall.

Mayor Hemminger pointed out that Mr. Karpinos had agreed to remain and help with the new attorney's transition.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that R-15 be adopted. The motion carried by a unanimous vote.





## ADJOURNMENT

The meeting was adjourned at 10:55 p.m.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

| | |
|---|---|
| Mayor Pam Hemminger | Council Member Hongbin Gu |
| Mayor pro tem Michael Parker | Council Member Tai Huynh |
| Council Member Jessica Anderson | Council Member Amy Ryan |
| Council Member Allen Buansi | Council Member Karen Stegman |

**Wednesday, December 2, 2020** **6:30 PM** **Virtual Meeting**

### Virtual Meeting Notification

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_2AI0lVedQJCHfXBuJXH1zg After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 885 6119 1187

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Town Attorney Ann Anderson, Planning Director Colleen Willger, Business Management Director Amy Oland, Assistant Town Manager Mary Jane Nirdlinger, LUMO Project Manager Alisa Duffey Rogers, Assistant Chief of Police Jabe Hunter, Fire Chief Vencelin Harris, Senior Planner Anya Grahn, Police Chief and Executive Director for Community Safety Chris Blue, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING

Mayor Hemminger opened the work session at 6:30 p.m. She said that the evening's three agenda items would return for a regular public hearing in the





future. Citizens were welcome to send emails or call Council Members with comments, she said.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Mayor Hemminger Regarding COVID-19 Updates. [20-0848]

Mayor Hemminger said that the rate of new, positive COVID-19 cases and hospitalizations had decreased in Orange County while rates had been increasing in surrounding communities. She said that a new vaccine would soon be distributed to healthcare workers, first responders, and other vulnerable populations. Testing was continuing each week at the R-7 parking lot on Martin Luther King Jr. Boulevard and COVID-19 updates were posted on Town's website, she said.

0.02 Mayor Hemminger Regarding Recent Ribbon Cuttings. [20-0849]

Mayor Hemminger pointed out that there were new lockers at University Place that provided a safe, contact-free and convenient way for people to pick up and return Public Library materials. She also noted that Signature Health had recently upgraded its facility and had expanded to provide more amenities.

0.03 Mayor Hemminger Regarding Upcoming Council Committee on Economic Sustainability Meeting. [20-0850]

Mayor Hemminger announced that the Council Committee on Economic Sustainability would meet on December 4, 2020 at 8:00 am. The agenda included technological information regarding the East Rosemary Street Parking Deck and a concept plan for North Chapel Hill, she said. She pointed out that meeting materials and a ZOOM link could be found on the Town's calendar page.

### AGENDA ITEMS

**1.** Discuss the History of the Municipal Services Center and Review Recent Concept Plan, 101 Weaver Dairy Road Extension (Project #20-071) [20-0834]

Assistant Town Manager Mary Jane Nirdlinger gave a PowerPoint update on the Municipal Services Center (MSC) project. She outlined the goal of housing several complimentary Town services in one location. Staff had looked at Town-owned sites on Estes Drive, at University Place, at Vilcom Center, on Millhouse Road, at the current Police Station, and at Fire Station 4, she said, and she reviewed the pros and cons of those sites.

Ms. Nirdlinger said that Fire Station 4, located at the corner of Martin Luther King Jr. Boulevard (MLK) and Weaver Dairy Road Extension (WDR) seemed like a good option because it was due for replacement and its adjacent burn tower had already been relocated. There could be an opportunity there to partner with Orange County, she said. She told the Council that staff had heard interest as well as concern from the community regarding the site and had received feedback from the Community Design Commission.

Eric Shoenagel, of Dewberry Engineering, reviewed a rough concept plan for Fire Station 4 that had been through Town review. The existing four-acre site, which included several structures and a small intermittent stream, would allow a compact building footprint on 2.99 acres, he said. He indicated a future bus rapid transit stop along MLK and said that the design included a pedestrian plaza at the corner.

Mr. Schoenagel showed a "high level" layout and discussed a possible tabletop parking deck, a stormwater management plan, planted buffers, and a multi-modal pathway along WDR. He mentioned plans to shield LED lighting and to enclose a generator to block its sound.

Council Members ascertained from staff that it was too early to give a cost estimate for Fire Station 4, but Ms. Nirdlinger said that site work would be fairly straightforward and that Orange County would pay for its share. The Council asked about building height in relation to neighbors' houses, and Mr. Shoeneagel said that early plans for 3 or 4-stories would match nearby buildings. In response to a question from Council, Ms. Nirdlinger said that the first floor probably would be higher than the first floor of apartments on WDR.

Ms. Nirdlinger pointed out that building the MSC on the current Police Department (PD) property on MLK was another possibility and that staff had been monitoring a coal ash remediation project there. She asked the Council for guidance on whether staff should pursue Fire Station 4 and/or whether they should explore the Police Department site.

The Council confirmed with Police Chief Chris Blue that the two sites would be similar from an operational standpoint. They also confirmed that it would not be possible to relocate Fire Station 4 to the PD site because the fire station was meant to cover the northern part of the city. In response to a question from Council, Fire Chief Vencelin Harris said that Fire Station 4 was slated to be redeveloped in 2023.

Council Member Buansi asked about pedestrian safety at the Fire Station 4 site, and staff outlined a preliminary plan that included multiple access points and pulling visitors to the back of the building and away from the Fire Department.

Several Council Members expressed a preference for continuing the environmental mitigation work at the PD site and locating the MSC there.





It was a more central location that would make it more accessible to residents, they said. The Council verified with staff that Orange County probably would collaborate only on the Fire Station 4 location since it already had coverage in the Downtown area.

The Council discussed ongoing coal ash mitigation efforts at the PD site. They asked staff to bring back information on the separate costs of improving Fire Station 4 if the PD site were chosen. Mayor Hemminger confirmed that the Council was in favor of putting out requests for a quote (RFQ) on the PD site while keeping options open. Mayor pro tem Parker and Council Member Buansi proposed doing a cost comparison of the two sites. Council Member Gu said that more information and discussion regarding the safety of the PD site was needed before sending out an RFQ.

Mayor Hemminger noted that the Town had spent much time and energy trying to understand what to do with that site. She asked staff to bring an update for new Council Members, and she recommended pursuing both options for the time-being and sending RFQs out on both. She pointed out that the item would come back to a public hearing at some point in the future.

This item was received as presented.

**2.** Short-Term Rentals. (updated with attachments 12/2/20) **[20-0835]**

Planner Anya Grahn asked the Council to provide feedback on a plan regarding hosted, un-hosted and dedicated short-term rentals (STRs). She said that the number of active STRs in Town had decreased, from 330 in March to 218, and that approximately 73 percent of those were whole house rentals. The others were private rooms, or units that were available for 180 days or more per year, she said. Ms. Grahn explained that the purpose of her presentation was to receive direction from the Council on an ordinance regarding short-term rentals.

Rebecca Badgett, a UNC-CH School of Government attorney, cited a "Wilmington Case" that had found rental registries for short- or long-term properties to be unlawful in North Carolina. She asked for feedback from Council on regulating dedicated STRs and presented the following four options for consideration: 1) Don't allow any kind of dedicated STRs; 2) Allow established, dedicated STRs and classify them as legal non-conformities; 3) Implement a lottery system where a total number of STR zoning permits would be awarded; 4) Allow all dedicated STRs. Mayor Hemminger confirmed with Ms. Badgett that NC towns were still allowed to offer Home Occupation Permits. If Chapel Hill decided to regulate STRs, it would do so through its planning and zoning powers, the Mayor said. She reminded Council Members that they were merely being asked to express a preference and that the item would eventually come before Council for a full public hearing.

The Council indicated support for Option 2, and Mayor pro tem Parker confirmed that it would have the same effect as grandfathering and would not allow any new STRs. Council Member Ryan verified with Ms. Badgett that regulations could be layered. Council Member Anderson cautioned against incentivizing a huge rush of people registering to be grandfathered in before the Town implemented a cap.

Ms. Badgett asked if there were any zoning districts where dedicated STRs should not be allowed, and Council Members discussed how density was the issue. Ms. Badgett confirmed that Council Members were more interested in having a zone-by-zone density cap than in issuing a total number of zoning permits.

Council Members Ryan and Buansi spoke in favor of having a town-wide cap in order to protect affordable housing efforts, but Council Member Gu said that she was not sure about a total, town-wide cap. STRs had been holding strong during the pandemic, and the Town needed to adapt to market trends, she said.

Mayor Hemminger pointed out that beginning a permitting process would allow staff to learn more about existing STRs before any discussion about studying a total cap. She expressed concern that neighborhoods could be overrun by STRs and noted that the Town had already received a proposal for an entire floor.

Council Member Anderson asked if there was any way to prevent STRs from taking over entire buildings or floors but still allow more in higher density areas. Ms. Badgett replied that she had seen regulations preventing no more than two units per building. Mayor pro tem Parker commented, though, that residents of a multi-unit building might prefer having all of the STRs on a single floor. Mayor Hemminger said that an attorney would need to advise the Council regarding those legal issues.

Ms. Badgett said that the Council seemed to have decided on a combination of Options 3 and 4, which would allow some dedicated STRs with some type of a cap or limit by zoning district and perhaps a total cap once there was more information. The Council seemed to also want to consider how to address multi-unit buildings in the future, she said.

Mayor Hemminger recommended that staff work on a permitting process and return with proposals. The Council would like to give existing STRs some sort of preferential treatment, and some Council Members had concerns about an overall cap and wanted to see information about what other communities had done, she said.

Ms. Badgett asked if the Council wanted to implement a health and safety checklist for STRs, but she noted that there was no requirement to do so.





The Council generally agreed to the idea of having a safety check list for fire extinguishers, carbon monoxide detectors, correct capacity, etc. Mayor pro tem Parker suggested clarifying what "health" meant and finding out if Orange County would be involved in regulating that.

Ms. Grahn said that Planning Department staff would continue consulting with Emergency Services staff and working with the Town Attorney to develop a health and safety checklist. She reminded the Council that it had directed staff in June to conduct short-term enforcement efforts regarding STR nuisances (such as litter, noise, parking violations) and an educational campaign on any new standards adopted prior to implementation. She asked Council Members if they still supported that approach.

Mayor Hemminger replied that the Council had actually wanted to look into changing nuisance violations, in general, from a criminal offense to a civil one that had been separate from the STR discussion, but it could be tied in with it, she said. Mayor Hemminger requested that the Town Attorney pursue that, and she pointed out that other cities had, and had good outcomes with such an approach.

Council Member Anderson confirmed with Ms. Grahn that there had been only a few formal complaints about STRs. Ms. Grahn offered to bring back information on what those complaints had been.

Mayor Hemminger expressed appreciation to the STR Task Force members for their work. The market had been moving in the direction of STRs and each community was handling it differently, she pointed out. She said that the Council had wanted to understand more about dedicated STRs, and to regulate safety, but did not want to over-regulate them.

Mayor Hemminger said that the Council wanted to protect neighborhoods while also encouraging people to visit Chapel Hill and was trying to find that balance. The Town was moving toward trying to get STRs permitted, and was making progress toward understanding what it actually had, she said.

Council Member Ryan raised a concern about accessory dwelling units being pulled out of the rental market, and Ms. Grahn agreed to provide more information on that when she returned.

This item was received as presented.

**3.** Financial Update. **[20-0836]**

Director of Business Management Amy Oland presented a financial update on the Town's General Fund and Enterprise Funds for the first quarter (Q1) of FY 2021. She discussed the effect of COVID-19 on Q1 General Fund revenues and discussed reducing the Town's fund balance to offset any shortfall. She hoped the Town would not need to use any of that, she said.

Ms. Oland reported that property taxes collected in Q1 were in line with the previous five years but that sales tax had been one of the areas most impacted by COVID-19. Over the last five-to-six years, there had been about a 5 percent growth in sales tax, but staff had projected a 10 percent decrease in Q1 due to the pandemic, she said. However, the Town had actually taken in $460,000 more than anticipated during the last four months of FY 2020, due to surprisingly large increases in June and July, she said. As a result, there had been a positive 6 percent growth, she said.

Ms. Oland reported that hotel, motel and Airbnb occupancy taxes had all been significantly impacted by COVID-19 and that the Town had seen a drastic reduction in tax revenues in those areas. She said that growth continued to be slow and that the impacts of the pandemic would likely extend into the coming year.

Ms. Oland said that department fees had been negatively impacted by the pandemic as well. The Parks and Recreation Department had been hit the hardest because it had to close facilities and cancel programs, she said.

Ms. Oland said that she anticipated expenditures to be reduced in all areas. She pointed out that instituting a hiring freeze in April 2020 had saved the Town $702,000 in Q1. Currently, the Town had 110 vacancies (compared to the normal number of 60-70), she said, and she acknowledged that holding such a large number of vacancies could not be a long-term solution. However, it had helped to offset revenue shortfalls during the pandemic, she said.

In response to a comment by Mayor pro tem Parker, Ms. Oland said that about 70 percent of the Town's budget was for personnel and a little less than 30 percent was for operations. Mayor pro tem Parker confirmed with her that some Town services had continued had been modified. There had been weekly meetings with the Town Manager to discuss departmental needs as well as the costs and benefits of filling positions, she said.

Ms. Oland discussed the Town's Enterprise Funds. With regard to transit, she said that Q1 property tax collection had been comparable with other years but that inter-government revenues had been lower due to the timing of federal and state funding. She said that contract negotiations with the University of North Carolina at Chapel Hill (UNC-CH) had been slow due to COVID-related logistics as well, and that the State of NC had eliminated $2.4 million in maintenance aid. However, transit had received $5.5 million in federal Coronavirus Aid Relief and Economic Security (CARES) funding to offset some of those shortfalls, and some appropriated fund balance was being carried forward from the prior year, she said.





Ms. Oland said that parking was the Enterprise Fund that had been most impacted by COVID-19. UNC-CH not holding in-person classes and the Town stopping parking fees from March to July had a negative effect, she pointed out. However, the Town had begun charging new hourly and monthly rates on August 1, 2020, and the Finance Department was monitoring parking expenses to help reduce costs, she said.

Ms. Oland said that Housing Fund revenue during Q1 had been fairly consistent with previous years. Federal grant funding from HUD had been held up, but that was currently flowing and more revenue was being taken in during the second quarter, she said. She noted that Stormwater Fund collections and expenditures had been in line with prior years.

Ms. Oland said that she was tentatively scheduled to return to the Council on January 27, 2021 to talk about FY 2020 year-end results and give a 2021 Q2 financial update. She listed other tentative dates for budget-related discussions and said that would culminate with a presentation of the Manager's Recommended Budget on May 5, 2021.

The Council confirmed with Ms. Oland that staff had been monitoring the NC General Assembly with regard to possible additional stimulus money. They asked about indicators for relaxing the hiring freeze, and she replied that staff wanted to see more stable tax revenue and what property taxes would look like before doing that. She would have a better sense of where the Town stood in that regard when she returned to the Council in January 2021 with numbers through the end of December, she said.

This item was received as presented.

## PUBLIC COMMENT FOR ITEMS ON THE AGENDA

Alexa Nota and Anthony Carey, STR Task Force co-chairs, provided extensive comments. Ms. Nota said that the Task Force supported the discussion about town wide or "by zone" density caps and had no problem with reasonable safety requirements. She also proposed having hosts create a walk-through video based on the safety checklist. Mr. Carey pointed out the ways in which Chapel Hill was different from other communities, and he discussed several possible approaches to regulation.

BJ Warshaw, an STR operator, shared his positive experiences with running an Airbnb and an access dwelling unit. He praised a recommendation to include accessory dwelling units in the hosted and un-hosted categories and expressed gratitude for the plan to grandfather STRs. The Town already had ways of addressing civic disturbances and did not need to institute overly-restrictive measures for STRs, he said.

Eric Plow, 20-year owner of a Chapel Hill building that includes seven separate STRs, said that no complaints had ever been filed against his rental business.

He pointed out that Airbnb and other similar firms had self-review processes that blacklisted owners or guests who do not maintain standards. Legally, any safety regulations the Town imposed would need to be applied to all rentals equally, he said.

Gwen Stephens, a Chapel Hill resident, said that STRs provide a service that typical rental models had difficulty accommodating and she mentioned various circumstances that lead to people renting STRs. She thanked the Town for receiving feedback from operators and for the plan to grandfather existing STRs. Ms. Stephens expressed support for a safety checklist and made several additional requests and recommendations.

Manish Atma, a Chapel Hill hotel developer and owner, spoke against grandfathering units that had been operating illegally. Doing so would be punishing those, like him, who had been abiding by STR rules, he said. He hoped the Council would conclude that STRs needed to be regulated and would limit their numbers and locations, he said.

Mayor Hemminger said that staff would take the Council's and citizens' comments and return with recommendations at a future public hearing.

## ADJOURNMENT

The meeting was adjourned at 9:10 p.m.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

Mayor Pam Hemminger
Mayor pro tem Michael Parker
Council Member Jessica Anderson
Council Member Allen Buansi
Council Member Hongbin Gu
Council Member Tai Huynh
Council Member Amy Ryan
Council Member Karen Stegman

**Wednesday, December 9, 2020** **7:00 PM** **Virtual Meeting**

**Virtual Meeting Notification**

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_l_NhzdvoRP2OIe6xzTeGqg After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 846 3793 0751

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Planning Director Colleen Willger, Operations Manager Judy Johnson, LUMO Project Manager Alisa Duffey Rogers, Business Management Director Amy Oland, Economic Development Officer Dwight Bassett, Emergency Management Coordinator Kelly Drayton, Police Chief/Community Safety Executive Director Chris Blue, Senior Planner Anya Grahn, Principal Planner Corey Liles, Planner II Michael Sudol, Urban Designer Brian Peterson, Executive Director for Technology and CIO Scott Clark, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING





Mayor Hemminger opened the virtual meeting at 7:00 p.m. and welcomed the public. She said that Spanish interpreters would be participating from the beginning of the meeting to the end of Item 10.

Mayor Hemminger called the roll and all Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Mayor Hemminger and Council Vote Regarding Continuing Items 14 and 15 to January 27, 2021. [20-0877]

**14.** Close the Public Hearing to Consider a Request to Close a Portion of an Unmaintained and Unimproved Monroe Street Public Right-of-Way. [20-0867]

A motion was made by Council Member Ryan, seconded by Council Member Anderson, that Item 14's Public Hearing was continued to January 27, 2021, as the applicant had requested. The motion carried by a unanimous vote.

**15.** Continue the Public Hearing: Conditional Zoning Application for Columbia Street Annex, 1150 S. Columbia Street, from Residential-2 (R-2) to Mixed Use-Village-Conditional Zoning District (MU-V-CZD). [20-0868]

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that Item 15's Public Hearing was continued to January 27, 2021, as the applicant had requested. The motion carried by a unanimous vote.

0.02 Mayor Hemminger Regarding Event Honoring Start of Exploring Pathway of James Cates. [20-0878]

Mayor Hemminger explained that the Town would begin exploring a case regarding James Cates, a former community member who had been killed on November 21, 1970, at the age of 22. The Council wanted to acknowledge the loss and to obtain a full accounting of the events that had led to an attack on him at the University of North Carolina at Chapel Hill (UNC-CH), all that occurred afterward, and what role the Town had played in those events, she said.

Council Member Buansi confirmed with Mayor Hemminger that the Town would allow investigations of Town records and would help witnesses participate in interviews. The Town was committed to being open and transparent about all discoveries made, the Mayor said.

0.03 Proclamation: Ron Stutts Day. [20-0879]

Mayor Hemminger said that the Council was proclaiming December 18, 2020 to be Ron Stutts Day in Chapel Hill. Mr. Stutts, who had been "The Voice" of Chapel Hill and Carrboro for the past 43 years would retire from WCHL on December 18, 2020, and the Council wanted to thank him for his many contributions to the community, she said.

0.04 Mayor Hemminger Regarding Concept Plan at 150 East Rosemary Street Moving to December 14 Community Design Commission Meeting. [20-0880]

Mayor Hemminger said that a Community Design Commission (CDC) meeting regarding the 150 East Rosemary Street concept plan had been moved from December 10 to December 14, 2020, at 6:30 pm. More information and supporting documents were available on the Town's website, she said.

0.05 Mayor Hemminger Regarding First 2021 Council Meeting on January 6. [20-0881]

Mayor Hemminger said that the Council's next meeting would be held on January 6, 2021.

## PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.

0.06 Edmund Burke Regarding Short Term Rentals. [20-0882]

Edmond Burke, a Chapel Hill resident, expressed concern that short-term rentals would threaten the character and charm of Chapel Hill's residential areas, and he made several recommendations for regulation.

**1.** East West Partners Request for Murray Hill Limited Scope SUP Modification. [20-0855]

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that this be received and referred to the Mayor and Town Manager. The motion carried by a unanimous vote.





## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Council Member Anderson, seconded by Council Member Buansi, that R-1 be adopted, which approved the Consent Agenda. The motion carried by a unanimous vote.

**2.** Approve all Consent Agenda Items. [20-0856]

**3.** Revise Sections III. D. and III. E.1. of the Council Procedures Manual Regarding Naming Policies and the Acceptance of Gifts and Donations. [20-0857]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**4.** Adopt a Resolution Supporting an Application for Transportation Demand Management (TDM) Grant. [20-0858]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**5.** Continue the Discussion of a Land Use Management Ordinance Text Amendment for Townhomes in the Blue Hill District to February 24, 2021. [20-0859]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## INFORMATION

**6.** Receive Upcoming Public Hearing Items and Petition Status List. [20-0860]

This item was received as presented.

**7.** Update on the Airport Hazard District Land Use Management Ordinance Text and Map Amendment. [20-0840]

This item was received as presented.

## DISCUSSION

**8.** Update on Town Efforts to Respond to the COVID-19 Crisis. (no attachment) [20-0861]

Mayor Hemminger said that UNC-CH would update the Council on January 13th regarding its 2021 spring semester plans.

Emergency Manager Kelly Drayton provided an update on the Town's COVID-19 response. She pointed out that Governor Cooper had announced a modified stay-at-home order from 10 p.m. to 5:00 a.m. to be in effect through January 8, 2021.

Ms. Drayton outlined new measures regarding non-essential businesses and alcohol sales and discussed precautions that citizens should take during the holiday season. The Town's winter message was, "Spread Joy, Not Illness", she said, and she emphasized the importance of continuing to wear masks, wash hands regularly, and wait safe distances apart.

Ms. Drayton said that North Carolina would receive its first shipment of COVID-19 vaccines on December 14th and would follow a four-phase distribution schedule from the National Academy of Science, Engineering and Medicine. She reported that the Town had served more than 46,000 individuals at its Food Bank during the pandemic, had distributed almost 24,000 masks, and had provided assistance to 400 households through its Emergency Housing Assistance Program.

Ms. Drayton mentioned several additional Town efforts to assist families and said that communication campaigns had been translated into Spanish, Mandarin, Burmese and Karen. The Town would retain many of those strategies and be even stronger when the pandemic was over, she said.

Mayor Hemminger pointed out that Food for Students had distributed more than 750,000 meals during COVID-19. She said that people of all ages had gotten involved in supporting the community. Individuals could check the Town's website for information on how to make donations for rental assistance and could also go to the Orange Water and Sewer Association (OWASA) webpage for information on how to help people with utility payments, she said.

The Mayor and Council discussed how North Carolina's counties and towns could institute rules that were more restrictive than the governor's orders -- but not any that were more lenient. Mayor Hemminger said that UNC-CH would be better able to plan for isolation and quarantine because it had not filled the number of single-occupancy dorm rooms that it had planned. She expressed pride in how Orange County and local communities had worked together during the pandemic and how local businesses had stepped up to create safe environments.

This item was received as presented.

**9.** Open the Public Hearing for Conditional Zoning - Phi Gamma Delta at 108 W. Cameron Avenue from Office/Institutional-1 (OI-1) to Office/Institutional-3-Conditional Zoning. (OI-3-CZ) **[20-0862]**

Planner Anya Grahn presented a rezoning application from the Phi Gamma





Delta, fraternity, located on the northwest corner of Cameron Avenue and Columbia Street in the Cameron-McCauley Historic District. She explained that the applicant had exceeded its allowed floor area when enclosing a back porch in 2019 and was seeking to replace a 2010 SUP with Conditional Zoning in order to allow the additional 1,044 square feet.

Ms. Grahn said that the Chapel Hill Fire Department had said that bollards in the shared driveway would not likely impede access and the Town's Inspections Department had confirmed that the building included a sprinkler system and fire alarm. She recommended the Council open public hearing, receive comments, and enact Ordinance A on January 13, 2021.

Kevin Hornik, an attorney with Brough Law Firm, said that Phi Gamma Delta had originally been advised, incorrectly, that installing glass windows would not affect the floor area ratio of its porch. He said that the purpose of the current request was to bring the site, in its current condition, into compliance with the Town's Land Use Management Ordinance (LUMO).

A motion was made by Council Member Buansi, seconded by Council Member Huynh, to close the public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote.

**10.** Public Hearing Continued: Conditional Zoning for 1200 & 1204 Martin Luther King Jr. Blvd. from Residential-4 (R-4) and Neighborhood Commercial (NC) to Office/Institutional-2-Conditional Zoning District (OI-2-CZD) and Neighborhood Commercial Conditional Zoning District (NC-CZD) (Project #19-065). **[20-0863]**

Planner Michael Sudol outlined the plan for the 13.9-acre site on Martin Luther King Jr. Boulevard, which included converting an original Special-Use Permit (SUP) to a Conditional Zoning (CZ) process. The site was currently zoned Residential-4 and Neighborhood Commercial and the applicant was requesting a rezoning to Office Institutional-2-Conditional for a self-storage facility and mobile home park, he explained. He said that expanding to Neighborhood Commercial Conditional as well would allow the applicant to demolish and reconstruct a gas station and convenience store.

Mr. Sudol reviewed conditions pertaining to signage, notification of available lots, new fencing, buffers, rents, and an option to convert to annual leases. He addressed the length of time that mobile homes must be retained onsite. He said that conditions allowed seven of the new units to be placed in the Resource Conservation District (RCD) and others to be moved around on the site.

Mr. Sudol said that existing conditions included 73 mobile home units that were scattered across the site. He showed where a proposed bus rapid transit (BRT) station would be located and provided additional information about how that would conflict with the applicant's proposed right-in/right-out entrance. He said that the applicant had agreed to remove the right-in lane when the BRT stop was constructed.

Mr. Sudol said that about 16 of the mobile units would be impacted and that 10 new units were being proposed. The applicant was committing to keeping units on site for 15 years and had agreed to an option that would allow conversion to annual leases within 30 days of entitlement, he said. He showed a list of proposed modifications and noted that three Town advisory boards had recommended approval, with conditions, and two boards had recommended denial. He recommended that the Council close the public hearing, receive comments, and consider the item at its January 13, 2021 meeting.

Developer Dan Jewel, of Coulter Jewell Thames, said that the applicant, Stackhouse Properties LLC, was committed to all Mr. Sudol had outlined. He reviewed changes regarding the driveway, relocation and purchase of mobile home units, and the proposed location of a playground. He said that three of the four units could not be moved until a Zoning Compliance Permit had been approved. If the Council would allow seven additional units in the RCD, the total number would be 82 mobile home units, he said.

Mr. Jewell provided responses to questions and issues that the community had raised at a November 18, 2020, neighborhood meeting. These pertained to tree removal, pot holes, road width, lighting, signage, and speed limits. He requested that a rear-door loading area be allowed to stay open until 10:00 p.m.

Council Member Stegman said that much uncertainty remained regarding long term safety and security of mobile home park residents and that the Council should consider more ideas before finalizing the negotiation. She asked if the applicant was willing to meet with staff to explore the following: 1) More creative options for joint management, perhaps with a non-profit partner; 2) Giving the Town first right of first refusal if the applicant decided to sell; 3) Determine whether the parcel that the mobile homes were on could be treated differently.

Mr. Jewell replied that he was always happy to talk with staff. However, he had not discussed those issues with Stackhouse Properties and could not say what their response might be, he said.

Council Member Huynh asked if the applicant would be open to adding speed tables on the mobile home park streets, and Mr. Jewell agreed to talk with Stackhouse and the Town's Fire Department about doing so.

Council Member Huyhn asked about the motivation for having a Real





Estate agent do a market analysis only once every four years, and Mr. Jewell said that it seemed to be a good duration for looking at market changes. Council Member Huynh asked about the thinking behind having the enrollment period for annual leases be 30 days for current tenants, and Mr. Jewell said it was to allow any new residents to default to standard monthly leases.

Council Member Buansi asked if all of the applicant's commitments would be written as stipulations, and Mr. Jewell said that they could be. Council Member Buansi asked about typical yearly tenant turnover, and Mr. Jewell agreed to provide that information.

Council Member Ryan confirmed with Mr. Sudol that any of the proposed impacts to the RDC would be in the outer 20 feet of the Jordan Buffer. She verified with Mr. Jewell that any rents that were more than 15 percent higher than what the market analysis had shown would be reduced. She also confirmed with him that a mobile home would be removed and the pad made available for someone else if a tenant left before 15 years. She ascertained that taxes were paid with monthly rent and would increase if rents increased.

Council Member Gu asked about projected increases in traffic volume, and Mr. Jewell replied that there would be 169 new peak hour trips. She replied that she wanted to know the current number as well in order to determine the percentage of increase. She raised questions about residents' safety while the right in/right out driveway was operating, and Mr. Jewell replied that large truck deliveries would be infrequent. He pointed out that the driveway would be widened and that new pedestrian crossings would be added as well.

Council Member Gu confirmed that a 15-year lease condition would run with the land. She verified with him that the applicant's market rate analysis had been based on a sampling of mobile home parks in the Raleigh and Charlotte metro areas.

In response to a question from Council Member Anderson, Mr. Jewell said that a new prohibition against having certain play equipment in front yards had been based on standard rules in the mobile home park industry. She confirmed as well that anyone who moved in from another mobile home park would have access to an annual lease.

Mayor pro tem Parker proposed discussing provisions to ensure that the same standard of maintenance continued over the lifespan of the mobile home park. In addition, what protections against eviction if the property were sold would Stackhouse accept, he asked. He stressed the need for a process of negotiation and dispute resolution for when changes were made.

Jaclyn Gilstrap, Justice in Action Committee chair, expressed concern about the potential long-term impacts on current residents who would eventually be "pushed out" of the park. She pointed out that Council Members who had run on a platform of affordable housing had an opportunity before them to maintain that promise.

Delores Bailey, executive director of EmPOWERment, Inc., said that some of the concerns she had sent to Council had not been addressed. She wondered how additional, possibly larger, units would have any privacy when units already were positioned so closely together. Ms. Bailey also told the Council that rules were being sent to residents periodically, without explanation, and that residents had no way to talk with anyone about that.

Nathaly Grijalva, a Tarheel Mobile Home Park resident, said that she had received inconsistent messages about rules and had gotten a confusing message when she responded. Receiving messages and not being able to talk with anyone about them was common, she said, and she requested clarification from Stackhouse Properties about that.

Melissa Ginsberg, a Tarheel Mobile Home Park resident, also emphasized the need for better and more consistent communication between the landlord and tenants. However, she did appreciate what Stackhouse had done to help her and her daughter move into one of the new units and was happy about the plan for signage and speed limits, she said.

Mayor Hemminger stressed the Council's commitment to supporting residents of mobile home park communities and to keeping families in Chapel Hill. However, the Council was also voting on a Future Land Use Map that would support higher density and different land uses along the BRT route, she pointed out. She said that both issues were important and that the Council wanted staff to bring a more nuanced plan forward that would help mobile home park residents transition if and when the land were redeveloped.

Mayor Hemminger encouraged the applicant to hold another community meeting and proposed that the Council continue the public hearing to January 2021 in order to see if there were options that had not been considered. Doing so would allow time to implement what management had committed to doing, get residents' reactions, hear back from staff on a plan for transitions, and process what it really would mean to lock the property down for 15 years, she said.

Mr. Jewell commented that no other mobile home park in Town had the protections and guarantees that Stackhouse was offering. Stackhouse Properties believed its proposal was the only financially viable way to own and operate a mobile home park in Chapel Hill, given the current price of land, he said.





Mr. Jewell pointed out that there would be no guarantee that anyone else would come forward with any plan other than de-populating the mobile home park, if his client were to sell the land. He agreed to provide the requested information and said he appreciated how the Council was trying to do the best for Town residents.

Council Members generally agreed with Mayor Hemminger's statement and stressed the importance of working with Town partners to prioritize and create an overall plan for mobile home parks.

Council Member Buansi urged the applicant to engage in conversations about options, such as public/private partnerships, to continue managing the property if it were sold.

Council Member Huynh emphasized the need for more speed tables, more frequent rental market analyses, and staff follow-up on residents' statements regarding the inconsistency of rules. He pointed out that residents had not asked for a playground but had said that they wanted a space that met current residents' needs. He asked that the enrollment period be extended beyond the proposed 30 days and said he was not in favor of adding units in the RCD.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, to continue the Public Hearing to January 27, 2021. The motion carried by a unanimous vote.

**11.** Charting Our Future - Consideration for the Adoption of the Future Land Use Map - Update to Chapel Hill 2020. [20-0864]

Land Use Management Ordinance (LUMO) Project Manager Alisa Duffey Rogers presented minor modifications to the Future Land Use Map (FLUM) update to the Chapel Hill 2020-2050 comprehensive plan. She outlined the three proposed modifications that UNC-CH and UNC Health had requested: 1) Include "auxiliary hospitals" in the Commercial Office land-use category; 2) Change the Institutional/Civic character type name to include University in its title and include minor changes to its definition; 3) Make the Civic character type for the NC 54 Focus Area primary rather than secondary in one area.

Ms. Duffey Rogers also outlined a staff recommendation to reduce street frontage height to four stories in the South Columbia Gateway Focus Area. She said that all other aspects of Chapel Hill 2020-2050 would remain unchanged. She recommended that the Council consider the minor changes and adopt the new FLUM, which would replace the current one.

The Mayor and Council praised Ms. Duffey Rogers for the vast amount of detail that she had processed over the past three years. They confirmed with her that specifying "hospital" in the FLUM would not obligate the

Town to approve a small hospital as a use.

Kimberly Brewer, a Chapel Hill resident, expressed appreciation for the recommendation to reduce building height in the South Columbia Street area but pointed out that neighbors had previously argued that a four-story development was also incompatible due to environmental and traffic constraints. She encouraged the Council to make that location a Special Gateway Area rather than a focus area.

Julie McClintock, a Chapel Hill resident, called on the Council to develop a Gateway Entranceway Plan for the north and south ends of Highway 15-501. She stressed the importance of ensuring that future zoning retain the college town character. The Town should evaluate whether the proposed four-story structure could be supported by safe transportation, meet storm water requirements and environmental standards, and retain existing affordable housing in the area, she said.

Council Members said that they liked the change to four stories and the proposed gateway idea. They discussed the need to balance various concerns and look at the South Columbia Street area in more detail during the upcoming LUMO rewrite. They agreed to a proposal by Council Member Ryan that a statement on the South Columbia Street page state that the Council would be refining its decision regarding that area in Phase 2.

A motion was made by Council Member Huynh, seconded by Council Member Stegman, that R-5 be adopted. The motion carried by a unanimous vote.

**12.** Consider an Application for Conditional Zoning for Bridgepoint at 2214 and 2312 Homestead Road from Residential-5-Conditional (R-5-C) to Residential-5-Conditional Zoning District (R-5-CZD). **[20-0865]**

Planner Anya Grahn gave a PowerPoint presentation on a Conditional Rezoning request for Bridgepoint, a 9.2-acre site on Homestead Road. The property was currently zoned Residential-5 Conditional Use and the applicant, Capkov Ventures, was asking to rezone it to Residential-5 Conditional Zoning District, she explained. She said that the application had been through multiple advisory board and staff reviews and that the Council had last seen it at a public hearing on November 18, 2020.

Ms. Grahn outlined the proposal to relocate two dwelling units, demolish associated buildings, and construct 54 townhomes and a stormwater retention system. She showed the location and surrounding landmarks on an area map and indicated a perennial stream in the northern portion of the site. She described a proposal for new public streets, which would connect to a Town-owned property at 2200 Homestead Road.

Ms. Grahn explained how the applicant had worked with staff to reduce





the amount of land disturbance in an RCD managed use zone down to 22 percent. The applicant had also been working to reduce disturbance in the upland zone, she said, and she provided reasons why staff believed the applicant was headed in the right direction. Capkov Ventures had committed to working with Town stormwater staff to further reduce total land disturbance before submitting a final plan, she said.

Ms. Grahn reviewed the applicant's proposal to disturb 55 percent of the steep slopes. She noted that the LUMO limited disturbance to 25 percent of areas with a slope of 25 percent or more. However, only 2,133 square feet of disturbance would occur on a natural slope, with the remainder being on man-made slopes, she pointed out.

Ms. Grahn noted that the proposal for five affordable units was 15 percent of the number required by the Town's Inclusionary Zoning Ordinance. She discussed parking regulations, street signage, stream water improvements, and a right-of-way conveyance for a future, multi-modal Town project. She recommended that the Council adopt the resolution abandoning the 2010 SUP, adopt the resolution of consistency, and enact the ordinance approving the Conditional Zoning Atlas Amendment.

Eric Chupp, representing Capkov Ventures Inc., discussed the history of the application and asked for the Council's approval. He said that the improved plan was specifically designed to address the housing needs of middle income families. He provided details about townhome prices and features, parking, landscaping, elevations, sidewalks, public green spaces, street signals and lighting, bicycle facilities, and more.

Mr. Chupp said that Capkov Ventures would make an estimated $25,000 payment in lieu to the Town's Parks and Recreation Department for any deficiency in active recreation. He said that the five affordable homes would be evenly dispersed throughout the community. Three of them would be for people making 80 percent or less of the area median income (AMI) and two would be for those making 65 percent AMI or less, he said. All of the affordable homes would be conveyed to the Community Home Trust for perpetual affordability, Mr. Chupp said.

Mayor Hemminger asked about preventing units from becoming short-term rentals, and Mr. Chupp agreed to add covenants and conditions that would prohibit leases shorter than a year.

Council Member Ryan clarified with Mr. Chupp that a previous higher estimate of RCD encroachment had been a miscalculation on the applicant's part. She ascertained that the applicant would dedicate land for future construction of a greenway but was not constructing that. She confirmed that the applicant would clear and grade the area carefully and in consultation with the Town's arborist.

Council Member Anderson pointed out that the improved project was another example of why review by the Town's urban designer was so important, and she implored staff to integrate that review at the beginning of the process. She also asked staff to look into modifying the Inclusionary Zoning Ordinance in a way that would allow adjustment for different price points.

Council Member Gu encouraged the applicant to be conscious of improving the internal environment and the appearance of the development from Homestead Road.

Council Member Ryan explained that she voted against the resolution because she remained troubled about the stormwater plan and its effects on the RCD.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-6 and R-7 be adopted and that O-1 be enacted as amended to approve the rezoning with a stipulation that the applicant include language preventing short-term rentals in its covenants. The motion carried by the following vote:

**Aye:** 7 - Mayor Hemminger, Mayor pro tem Parker, Council Member Anderson, Council Member Buansi, Council Member Gu, Council Member Stegman, and Council Member Huynh

**Nay:** 1 - Council Member Ryan

**13.** Consider a Petition to Annex Property at 7000 Millhouse Road. [20-0866]

Planner Corey Liles gave a brief PowerPoint presentation on the annexation of 9.76 acres on Millhouse Road to allow Carolina Donor Services to build a 51,000 square-foot office and lab facility in the recently-created Millhouse Enterprise Zone.

Mr. Liles said that a revenue estimate staff had previously presented would not apply if Orange County agreed to grant the property 501(c)(3) exemption status. However, there would be a cost for services, a one-time Fire District payment, and other possible opportunities to collect property taxes, he said. He recommended that the Council enact the ordinance, pointing out that annexation at any later point would be at the property owner's discretion.

Mayor Hemminger mentioned that the Enterprise Zone had attracted a great deal of interest. The Town was excited about Carolina Donor Services making its state headquarters in Chapel Hill and bringing jobs to Town, she said.





A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that O-2 be enacted. The motion carried by a unanimous vote.

**14.** Close the Public Hearing to Consider a Request to Close a Portion of an Unmaintained and Unimproved Monroe Street Public Right-of-Way. [20-0867]

This item was moved to the January 27, 2021 meeting.

**15.** Continue the Public Hearing: Conditional Zoning Application for Columbia Street Annex, 1150 S. Columbia Street, from Residential-2 (R-2) to Mixed Use-Village-Conditional Zoning District (MU-V-CZD). [20-0868]

This item was moved to the January 27, 2021 meeting.

**16.** East Rosemary Parking Deck Update. [20-0869]

Economic Development Manager Dwight Bassett gave a PowerPoint update on the East Rosemary Redevelopment Parking Deck. He said that an opinion of probable costs from Walker Consultants had been in line with other estimates that were on the Town's website. He presented renderings and provided more information about proposed materials and about changes to the facade's design.

Mr. Bassett said that a traffic impact analysis had been completed and that the Town had made an offer to purchase property on North Street. Staff was continuing to explore options for solar technology and would share those recommendations in the future, he said.

Mr. Bassett said that the Town had also submitted a letter of interest to UNC-CH and was working on a final draft of the Wallace Deck lease. The final review of management and site license agreements was beginning, he said. He noted that the Town's review of financial projections based on occupancy and demand had been more conservative than Walker Consulting's estimates.

Mr. Bassett said that Walker Consulting's recent presentation at a Council Committee on Economic Sustainability meeting had proposed three parking deck options for consideration: 1) A license plate recognition system that would use the Town's existing technology and a gate counter ($250,000); 2) A gate and license plate reader with pay stations ($750,000); 3) A system that would be mostly all technology with limited monitoring by staff ($1.3 million). Mr. Bassett said that the Town's current budget could cover up to ($750,000). With Council approval, staff would begin to negotiate a contract and return in February 2021 with additional financial information on the overall construction budget, he said

Council Members confirmed with Mr. Bassett that there were sufficient resources in the Town's contingency budget to spend up to $750,000 and still maintain a 5 percent contingency. In response to the Council's questions, he said that staff intended to negotiate both Options 2 and 3.

Council Members Ryan and Anderson expressed discomfort with the idea of using contingency funds, which were for unexpected occurrences, so early in the process. Council Member Anderson asked staff to bring back examples of how the Town had financed other decks, such as 140 west and to explain why they were looking at 5 percent rather than 10 percent contingency. Council Members said they supported having a separate line item and not using a contingency fund.

Council Members expressed a general preference for Option 2, if the cost of Option 3 could not be reduced. Council Member Gu confirmed with Mr. Bassett that maintenance costs would be an estimated $17,000 to $20,000 for Option 2 and $50,000 to $60,000 for Options 3. Council Member Huynh proposed getting information on the cost of using only one camera for several parking spots in Option 3, and Mr. Bassett agreed to determine the cost difference.

Mayor Hemminger stressed the importance of being fiscally conscious. She asked Mr. Bassett to provide the names of nearby parking decks that Council Members could look at.

Mr. Bassett said he hoped to return with a final construction budget in February 2021. He might also return in January so that the Council could authorize a letter of intent with UNC-CH, he said.

This matter was received and filed.

## ADJOURNMENT

The meeting was adjourned at 10:46 p.m.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

Mayor Pam Hemminger
Mayor pro tem Michael Parker
Council Member Jessica Anderson
Council Member Allen Buansi
Council Member Hongbin Gu
Council Member Tai Huynh
Council Member Amy Ryan
Council Member Karen Stegman

**Wednesday, July 29, 2020** **7:00 PM** **Virtual Meeting**

**Virtual Meeting Notification**

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_vo8FOI0rSd-D7Lqs3JS6kQ After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 847 4013 3468

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ralph Karpinos, Town Attorney Ann Anderson, Fire Chief Vencelin Harris, Emergency Operations Manager Kelly Drayton, Business Management Director Amy Oland, Transportation Planning Manager Bergen Watterson, Manager of Engineering and Infrastructure Chris Roberts, Senior Engineer Ernest Odei-Larbi, Public Works Director Lance Norris, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING

Mayor Hemminger opened the virtual meeting at 7:00 p.m. and reviewed the





agenda. She called the roll, and all Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Proclamation: The Voting Rights Act and The Fifteenth Amendment. [20-0521]

Mayor Hemminger introduced a proclamation to recognize the 55th anniversary of the Voting Rights Act and the 150th anniversary of the 15th Amendment to the US Constitution.

Council Member Buansi read the proclamation, which explained that Amendments 13, 14 and 15 had given African Americans their freedom, citizenship, and voting rights, but that subsequent Jim Crow laws had stripped those rights for nearly 100 years. In 1965, President Lyndon B. Johnson signed the Voting Rights Act into law, but a 2013 US Supreme Court decision had enabled measures that suppressed the vote, Council Member Buansi read. The proclamation urged all citizens to exercise their right to vote in the November 2020 election.

Mayor Hemminger expressed gratitude to the organizations that educate the public on when and where to vote. The Council would make sure that people know how to do so safely during the current pandemic, she said.

This item was received as presented.

0.02 Mayor Hemminger Regarding Juneteenth Proclamation. [20-0522]

Mayor Hemminger said that the Council had proclaimed June 19, 2020, as Juneteenth, in celebration of the day in 1865 when African Americans in Galveston, Texas learned that slaves had been freed. She said that there had been many requests for the Town to adopt Juneteenth as a holiday and that the Council planned to hold a community conversation regarding that idea.

This item was received as presented.

0.03 Mayor Hemminger Regarding Census. [20-0523]

Mayor Hemminger pointed out that only 68.2 percent of Orange County residents had responded to the US Census. She urged residents to fill it out, stressing that local appropriations and representation depended on it. Information would not be tracked or stored, but merely counted, she said.

This item was received as presented.

### CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that R-1 be adopted, which approved the Consent Agenda. The motion carried by a unanimous vote.

**1.** Approve all Consent Agenda Items. [20-0502]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**2.** Approve the Miscellaneous Budget Ordinance Amendment to Adjust Various Fund Budgets for FY 2020-21. [20-0503]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## DISCUSSION

**3.** Consider a Resolution to Appoint a New Town Attorney for the Town of Chapel Hill. [20-0504]

Mayor Hemminger announced that Ann Anderson, of the UNC School of Government, would officially become Chapel Hill's new Town Attorney on September 1, 2020. Ms. Anderson had stood out from a pool of strong candidates because of the depth and breadth of her knowledge, her familiarity with local government, and her understanding of Chapel Hill's community values, the Mayor said. The current Town Attorney, Ralph Karpinos, who was retiring after 32 years with the Town, would work with Ms. Anderson during the transition, and the Council would hold a celebration to honor him in the fall, Mayor Hemminger said.

Attorney Anderson thanked the Council for the opportunity, which she said would be a new highlight in her career. She was looking forward to working with the Council in a town that she loved, she said.

Mr. Karpinos congratulated the Mayor and Council for their outstanding choice and said he looked forward to working with Ms. Anderson during the transition period.

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that R-2 be adopted. The motion carried by a unanimous vote.

**3.01** 3.01 Update on Town Efforts to Respond to the COVID-19 Crisis. [20-0524]

Emergency Management Coordinator Kelly Drayton gave a PowerPoint





presentation on the Town's ongoing COVID-19 response. She discussed Orange County Department of Housing and Community Development's efforts to administer emergency assistance and said that half of the 365 households that had received assistance were in Chapel Hill.

Ms. Drayton reported on The Interfaith Council's continuing efforts to provide safety for its shelter residents. She discussed how the Town was partnering with numerous organizations to provide critical resources to the community. She said that more than 18,000 masks had been distributed and that the Food Bank had been serving 250-300 households per week.

Ms. Drayton noted that childcare had emerged as a major challenge. She pointed out that Chapel Hill-Carrboro schools would be virtual for more than 12,000 students and said that the Town and county had been addressing options for childcare.

Ms. Drayton said that a section of Franklin Street had been closed in order to add capacity for sidewalk dining and sales, and to give more space for physical distancing. She said that the Town was continuing to work with its partners and consultants on a long-term recovery plan and that an impact assessment should be disseminated the following week. The Town was also working with stakeholders to launch a website that would become a central portal for recovery resources and information, she said.

Council Members confirmed that the Franklin Street lane closure could be extending beyond October and that school closures were currently planned for nine weeks. With regard to childcare, they verified with Mr. Jones that staff had been working with the county, the school system and non-profits regarding how to accommodate the most vulnerable residents.

Mayor Hemminger said that moratoriums on evictions and utility bills were expected to be lifted within the next few days and that the Town was expecting an increase in requests. Staff had been working to coordinate a community response, she said, noting that information on how to make a donation was on the Town website.

Mayor Hemminger said that a USDA extension for food was set to expire at the end of August and that she would keep the Council informed about efforts by mayors across the state to get state support. Food for Students had been serving children who normally received free or reduced lunches at school, and the Council wanted that to continue, she said. She pointed out that Liz Cartano, of Child Nutrition Services, and others, had been delivering food to children at 36 sites.

This item was received as presented.

**4.** University of North Carolina at Chapel Hill Roadmap for [20-0505]

Re-Opening. (no attachment)

University of North Carolina at Chapel Hill (UNC-CH) Provost Bob Blouin provided an update on a "Carolina Together" road map for reopening UNC's campus during the COVID-19 pandemic. He said that UNC had worked closely with the Orange County Department of Public Health, the UNC System Office, and others to develop the plan.

Provost Blouin explained that the road map included directives to wear masks, to keep a physical distance, and to wash hands on a regular basis, standards that were consistent with CDC regulations and cutting edge research and data on best practices. He said that UNC-CH had been monitoring campus adherence to community standards and guidelines, hospital capacity, and the availability of rapid and accurate testing and contact tracing. Students were being required to sign off on specific COVID-related standards as a condition of their enrollment, he said.

Provost Blouin said that both Labcorp and NC Healthcare would conduct the testing. He explained how the University had reduced dormitory density. He said that Town and University police chiefs had been working together regarding areas in the community where students lived off campus.

Dr. Kurt Ribisl, Gillings School of Global Public Health chair, reviewed how a multi-disciplinary committee had studied best messages and channels for reaching students about taking precautions. He said that UNC-CH would provide students with masks, sanitizers and thermometers. He discussed plans for role modeling, peer-to-peer communication, crowd sourcing, and other means of promoting messages and showed examples of signage and videos that were part of the "Carolina Together" campaign.

Dr. Allison Lazard, associate professor at the UNC Hussman School of Journalism and Media, discussed barriers and misunderstandings related to mask wearing and stressed the importance of getting accurate information onto social media. Overall, there had been high compliance by young adults, she said. She recommended that UNC include "Masks Required" signage to reinforce State, University, and Town expectations.

Mayor Hemminger said that the Town had requested that UNC's messaging address the community and not just the UNC campus and to convey the idea of one community trying to be safe together.

In response to questions from Council, Provost Blouin characterized UNC's working relationship with the Orange County Health Department as "terrific" and said that the two had common expectations and that the University had sought recommendations from the County regarding testing, quarantining and isolating.

Council Member Buansi asked how students who live off campus and test





positive would be monitored and cared for. Provost Blouin said that this would be addressed on a case-by-case basis. Some students might stay where they live; whereas, others might want to go home, he said. Remedies could include quarantine or isolation on campus, he said, but pointed out that most who were living off campus would probably not come back for that.

With regard to a question about accountability for those who violate community standards, Provost Blouin said that students would sign and attest to being fully aware of the consequences for violations and that UNC expected them to comply wherever they were.

Council Member Anderson asked about triggers for terminating the plan, and Provost Blouin said that decisions would be made by chancellors of the 17-campus system, the System Office leadership, and the Board of Governors. Criteria would include testing availability/turnaround and quarantine/isolation space, he said.

In response to a question about testing criteria, Provost Blouin said that UNC was following CDC recommendations and was testing only those with symptoms (with the exception of those in the athletics program who were undergoing asymptomatic testing because of their additional risk). He said that testing everyone could create a false sense of security that could discourage students from wearing masks.

With regard to Council questions about students living off campus, Provost Blouin said that Town and UNC police had been in close contact regarding events that violate state mandates for mask wearing and group size. He pointed out that fraternities and sororities were located on private properties that were under the Town's legal jurisdiction.

In response to a question about students going to COVID-19 hot spots on weekends and bringing the virus back with them, Provost Blouin said that UNC had tried to minimize travel by eliminating breaks. However, the University had no legal right to hold students on campus unless NC Governor Cooper issued a stay-at-home order, he pointed out.

Council Member Anderson asked if UNC could make not traveling a condition of enrollment, and Provost Blouin agreed to discuss that with UNC-CH's road-map committee.

Council Member Gu pointed out that asymptomatic students could spread the virus, and Provost Blouin replied that UNC-CH had been educating students and expected them to follow the rules. Council Member Gu confirmed with him that there had been a cluster of COVID-19 cases due to student athletes not maintaining those standards. She said that some students might not have the same level of awareness as others and asked what triggers would lead to UNC-CH closing its campus.

Provost Blouin replied that the trigger probably would be more connected to the rate of change than to the absolute number of cases. If UNC were to have a few large clusters of positive cases, that would be a challenge, he said. He said that the University would be launching a dashboard that would track the ratio of positive cases to the number of tests.

In response to questions about special precautions for vulnerable populations, Provost Blouin said that UNC-CH was encouraging those who were older than 60, those with susceptible family members, and those with childcare issues to work remotely. The University was equipping employees from high-risk populations with personal protective equipment and education programs for every member of UNC-CH's housekeeping staff, he said.

Council Member Stegman asked if UNC-CH was helping Orange County with contact tracing of students and staff who live off campus, and Provost Blouin replied that he would raise that issue at an upcoming meeting with the County. She asked about a policy or standard regarding Greek life and off-campus parties, and he said that UNC had limited authority to regulate that but had been requiring fraternities and sororities to state how they would address issues such as parties. There was an expectation that they would be good citizens, he said.

Council Member Stegman and Mayor Hemminger discussed recent efforts to find alternatives to calling 911 to report people who were not wearing face coverings. Council Member Stegman said that the issue might pose an opportunity for Town/University collaboration.

Council Member Huynh asked how UNC would track off-campus repeat offenders and what the consequences for noncompliance would be. Provost Blouin replied that UNC-CH was not in a position to enforce community standards off campus.

Mayor pro tem Parker expressed skepticism about UNC-CH's ability to isolate and quarantine students. In addition, active monitoring would be required in the community, rather than merely relying on masks and a complaint-driven system, he said.

Provost Blouin replied that UNC-CH did not have the resources to police what students living in the community did; whereas, the Town did have some authority regarding compliance with mask wearing and physical distancing. He pledged to work with the Town on a week-to-week basis and to monitor whether circumstances rose to a level that required the University's attention.

Council Members suggested that the University work with the Town to explore monitoring neighborhoods that contain significant clusters of students. They confirmed with Provost Blouin that UNC Healthcare had been returning test results in 24-36 hours and had indicated support for





doing more than 200 tests per day. UNC-CH had only been testing those who were symptomatic and/or had been in contact with someone who tested positive, he said.

The Council confirmed that UNC-CH was expecting a 30 percent reduction in its normal total of 8,500-8,700 dormitory students. Provost Blouin pointed out that UNC-CH would need to be home for some students even if it changed to total remote learning. The Council verified with him that UNC would continue to pay individuals who needed to be quarantined or isolated, regardless of their level within the organization.

Council Member Ryan said that bringing 20,000 people into Town would stretch the testing resources that were currently available to the community, but Provost Blouin replied that UNC Hospitals would triple testing capacity. Council Member Ryan recommended that the University batch test some student groups since testing was inadequate.

James Talantino, a UNC student, spoke about at-risk populations such as elderly African Americans, who reside in neighborhoods where off-campus students would live. He stressed the importance of having a system in place to protect permanent residents.

Diane Bloom, a School of Public Health adjunct but speaking for herself, proposed only admitting students who could provide evidence that they had been tested and were negative. UNC's plan seemed headed for disaster because the University was not capable of controlling viral spread, she said.

Provost Blouin commented that UNC would not allow guests in student dorms. He said that not wearing a mask would only be permitted when students were eating in the dining room or in their rooms with only a dorm mate. Students living in suites would be expected to wear masks at all times, he said. Provost Blouin said that employing the campus police would be a last resort because UNC-CH was trying to minimize such authoritarian action.

Lea Metcalf, a UNC graduate student, said that it was not possible to open safely and that attempting to do so would lead to deaths. She encouraged citizens to put pressure on other agencies that could reduce the financial burden that UNC would incur if it did not open. She characterized the road map as "bordering on delusional", since it depended on converting people to wearing masks, who do not want to be converted, and masks were not panaceas, since they only decrease risk by 65 percent, she said.

Louie Rivers, a Planning Commission member, said that UNC had inadvertently created a regressive road map that was setting students up to fail and shifted the burden to those with the least amount of power. What resources would the Town have in the face of significant COVID-19 spread, he asked. He stated that the University's efforts to reach out to the community had been shallow.

Mr. Rivers asked if UNC-CH had the authority to take an off ramp, and Provost Blouin replied that such a decision would be made in consultation with the UNC System Office. He expected constant communication between UNC, the Board of Governors, and the Board of Trustees and critical indicators would be monitored and shared across the UNC system in collaboration with other universities within the region, he said.

Lindsay Ayling, a UNC student, pleaded with UNC-CH to refuse the Board of Governors' directive to not embark on a course of action that would lead to people dying. She proposed going to remote education for one more semester and raising money to make up that cost.

Logan Pratico, a Town resident and recent UNC graduate, said he felt stunned by the decision to hold in-person classes while the pandemic was increasing. He characterized allowing 20,000 mostly asymptomatic 18-22 year-olds from all over the country to walk around Town as terrifying. Students would not remain socially distanced no matter how many videos UNC put out and Town residents would suffer the consequences, he said. Mr. Pratico said that UNC should be ashamed of itself for prioritizing money over citizens' lives.

Greear Webb, a UNC sophomore, said he agreed with the previous speakers and believed the proposed road map would mean welcoming the deaths of students, faculty members, and essential campus workers. He asked Provost Blouin and Mayor Hemminger where they stood on a recommendation from the Student Commission on Campus Equality and Student Equity to hold a mock academic day with simulations that would test the policies outlined in the road map.

Provost Blouin replied that UNC had not acted on that recommendation, mainly due to timing, but that he was willing to talk more about it at another time. Mayor Hemminger said that it was the first she had heard the idea and that she would look into it.

Molly McConnell, a Chapel Hill resident, said she agreed with the previous speakers. The Board of Governors should be held accountable for an "appalling and disturbing mistake", she said, adding that, at the very least, there should be no students living off campus.

George Barrett, executive director at Marion Cheeks Jackson Center, said that Town residents had been modeling good behavior and making a lot of sacrifices to stay safe. However, there had already been large student parties in the Northside neighborhood, and students had been gathering in large groups without wearing masks, he said. Mr. Barrett pointed out that this was a public health issue and also one of racial equity.





Lamar Richards, chair of the Commission on Campus Equality and Student Equity, said that the majority of UNC-CH students lived off campus, where the greater community would be at risk if UNC-CH followed its current road map. He said that UNC had not effectively communicated its expectations to students and had been constantly changing its plan. He said that students and housekeeping staff had attested to a lack of personal protective equipment and guidance.

Mayor Hemminger thanked citizens for their comments and acknowledged that the Council did have concerns about the campus reopening. She agreed that some residents would have higher risk and exposure and said that the Town needed to concentrate on mitigating that. She encouraged UNC to be proactive, rather than reactive. The Town understood that UNC-CH did not have complete control but voices could influence decisions, she said.

Mayor Hemminger explained that the current meeting was not set up for Council motions, but that the Council would continue to address the issue and would bring the item back again. She pointed out that residents who had additional comments could send them in writing to the Town Manager.

This item was received as presented.

**5.** Authorize the Town Manager to Finalize Arrangements for Construction of the Elliott Road Extension Project. **[20-0506]**

Transportation Planning Manager Bergen Waterson gave a PowerPoint presentation on the status of the Elliott Road Extension, a project that would connect Fordham Boulevard to Ephesus Church Road and include a roundabout. The road improvement was expected to carry about 7,800 vehicles daily and would relieve congestion at that intersection, she said.

Ms. Waterson said that the projected total budget for the project had been $8.8 million ($3.8 million for Phase I and $5 million for Phase II) in 2011. The Town had borrowed $4.7 million in 2016, $900,000 of which was allocated for Phase II, and had planned to borrow $2.6 million more, she said. However, the price of right-of-way acquisition had been higher than expected, so the total current cost of Phase II construction was $6.88 million, she said.

Ms. Waterson explained that, in addition, some funds for Phase II had been channeled to other more urgent capital projects (DHIC Greenfield Commons and the Hamilton Road Fire Station), so there was currently only $3 million available. The Town was awaiting a $434,000 reimbursement from the NC Department of Transportation (DOT) for Phase 1 improvements, she said.

Ms. Waterson said that the developer had received bids in January 2020 that put the total cost at $7.53 million, leaving the Town with a $4.53 million funding gap (or $4.1 million if the DOT reimbursement is considered). Therefore, staff had decided to manage construction on its own and had received three bids, the lowest of which was $6.88 million, she said. She pointed out that managing the project itself saved about $650,000, leaving the funding gap at $3.88 million.

Ms. Waterson recommended that the Council adopt Resolution-3, authorizing the Town Manager to execute a contract with Conti Enterprises, Inc. for $6,047,442 to construct the Elliott Road Extension. She also recommended that the Council adopt Resolution-4, which would declare the Town's intent to reimburse itself for project expenditures.

Business Management Director Amy Oland summarized the plan for debt financing, which included using $3.4 million intended for a Municipal Services Center that the Town was not yet ready to begin. She said that current lower interest rates would bring additional savings as well, and she outlined a borrowing plan that she would bring back in October/November for Council approval. Ms. Oland pointed out that Resolution-4 would allow staff to be reimbursed for any expenditures that it might incur from moving forward with the contract before having the borrowing in place.

Mayor Hemminger praised staff for saving money by rebidding the project.

Rita May, a Chapel Hill resident, spoke about the financial repercussions from COVID-19. She asked the Council to halt the proposed expenditure and to reconsider all non-essential Transit funding until the Town's revenue situation became clearer.

Julie McClintock, representing CHALT (Chapel Hill Alliance for a Livable Town), said that citizens saw no good reason to spend taxpayer money on the Elliott Road Extension and summarized a list of concerns about flooding that had been included in a recent letter from them to the Town. She requested a new cost/benefit analysis for the Blue Hill District (BHD) and said that CHALT objected to the resolution that empowered the Manager to borrow more money for a road that would bring no demonstrable value to the Town.

Nancy Oates, a Chapel Hill resident, pointed out that construction costs for its 2022 Homestead Road affordable housing project might increase as well and encouraged the Council to plan ahead.

Mayor Hemminger confirmed with Ms. Oland that the Town would be able to reimburse the $4 million that it borrowed from tax increment financing in the BHD, which was intended to help pay for road infrastructure over time. She pointed out that there would be an increase in property taxes





from three large apartment complexes that were being constructed. Mayor Hemminger said that the additional funding would come from the Town's Debt Fund, which had a surplus because the Municipal Services Center building was being delayed.

Mayor Hemminger confirmed with Town Attorney Ralph Karpinos that he had reviewed original documents, and the Council's 2019 resolution, and had concluded that the Town was obligated to move forward with the project. She confirmed with Ms. Waterson that an Ephesus-Fordham Small Area Plan and a traffic impact analysis for the area had both recommended the Elliott Road Extension.

Mayor Hemminger verified with Chad Beck, project manager for Kimley Horn & Associates, that culverts under Elliot Road and Fordham Boulevard had been designed to meet FEMA regulations and standards. The project had achieved a "No Rise" certification and there would be no increase in flood elevation, Mr. Beck said.

Mayor Hemminger verified with Ms. Oland that borrowing an additional $3.8 million would push the repayment schedule from 12 to 20 years. She emphasized that the Town would not be taking money from other projects or from operating expenses. The Council was being asked to vote on whether it would take the Town Attorney's advice and move forward, she said.

Council Member Anderson and Mr. Jones discussed ways to better anticipate and communicate about cost changes in the future. Mayor Hemminger pointed out that the Elliott Road Extension project had begun before the current Council and Manager were with the Town.

Council Member Stegman pointed out that the Elliott Road Extension would take pressure off Highway 15-501 and add pedestrian and bike improvements.

Council Member Ryan ascertained from Ms. Waterson that large planting strips and wide sidewalks were required frontages in the BHD and that the previous Council had negotiated for the raised bike lanes. She suggested that the current Council examine whether or not those frontages were realistic and if the bike and pedestrian facilities were what the Town could afford.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that R-3 be adopted. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that R-4 be adopted. The motion carried by a unanimous vote.

## REQUEST FOR CLOSED SESSION TO DISCUSS ECONOMIC DEVELOPMENT, PROPERTY ACQUISITION, PERSONNEL, AND/OR LITIGATION MATTERS

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that this be entered Into closed session as authorized by General Statute Section 143-318.11(a)(4), to consider an economic development matter. The motion carried by a unanimous vote.

## ADJOURNMENT

The meeting was recessed at 11:48 p.m., the Council went into closed session and the meeting adjourned at the end of the closed session.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

Mayor Pam Hemminger
Mayor pro tem Michael Parker
Council Member Jessica Anderson
Council Member Allen Buansi
Council Member Hongbin Gu
Council Member Tai Huynh
Council Member Amy Ryan
Council Member Karen Stegman

**Wednesday, September 9, 2020 7:00 PM Virtual Meeting**

**Virtual Meeting Notification**

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_urVomoszTye2bi7qssLdqg After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 894 3763 1900

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Interim Planning Director Judy Johnson, Emergency Management Coordinator Kelly Drayton, Fire Chief Vencelin Harris, Executive Director for Community Safety and Police Chief Chris Blue, Housing and Community Executive Director Loryn Clark, Housing and Community Assistant Director Sarah Vinas, Economic Development Officer Dwight Bassett, Business Management Director Amy Oland, LUMO Project Manager Alisa Duffey Rogers, Planner II Becky McDonnell, Planner II Michael Sudol, Public Works Director Lance Norris, Traffic Engineering Manager Kumar Neppalli, Fire Marshal Tommy Gregory, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING





Mayor Hemminger opened the virtual meeting at 7:00 p.m. and called the roll. All Council Members replied that they were present.

**1.** Recognize Ralph Karpinos for his Years of Service. (no attachment) [20-0564]

Mayor Hemminger recognized retiring Town Attorney Ralph Karpinos, who had worked with the Town for 35 years and provided legal advice to eight mayors, five town managers, and more than 50 council members. She noted the many ways in which Mr. Karpinos had been a state leader and had earned the respect of his colleagues across North Carolina.

Former Mayor Kenneth Broun commented on Mr. Karpinos's strong ethical sense and loyalty and described him as the best municipal lawyer in North Carolina. Former Mayor Rosemary Waldorf said that Mr. Karpinos had brought an unwavering moral sense to work every day, and Former Mayor Kevin Foy commented on his calm demeanor, candor, truthfulness and dry sense of humor.

Former Mayor Mark Kleinschmidt noted Mr. Karpinos's strong ethical sense and said that his guidance had led the Town to achieve greatness. Orange County Commission Chair Penny Rich shared personal anecdotes of how Mr. Karpinos had helped her grow when she was a Chapel Hill Town Council Member. Mayor Hemminger said that a number of former Council Members regretted that the current COVID-19 pandemic was preventing them from celebrating with Mr. Karpinos in person.

The Council proclaimed September 9, 2020 to be Ralph Karpinos Day in Chapel Hill and Mayor Hemminger said that he would be sorely missed. She presented him with a key to the city for his strong commitment to the community and his work to uphold its values of social justice and equity. She said that Mr. Karpinos had asked for any donations to be made to the James Karpinos Scholarship Fund at UNC Asheville and the Chapel Hill Emergency Housing Assistance Program, she said.

Mr. Karpinos thanked the Council for the resolution and recognition and commended current and former mayors and councils for their dedication and commitment to Town. He encouraged Town leaders to continue demonstrating how well local government works.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

1.01 Mayor Hemminger Regarding Upcoming Meetings. [20-0601]

Mayor Hemminger announced that a virtual public information meeting on a concept plan for the Town's Municipal Services Center at 101 Weaver Dairy Road Extension would be held on September 15th at 5:15 p.m. She said that the Carolina North Development Agreement annual meeting and update would also be held virtually on September 17 at 5:30 p.m. Dates and times for other advisory board virtual meetings were on the Town website, she said, noting that the public was welcome to attend.

1.02 Mayor Hemminger Regarding Virtual September 11 Memorial Meeting. [20-0602]

Mayor Hemminger said that a memorial for the September 11, 2001 attacks would be held virtually due to the COVID-19 pandemic. Following her announcement, the Council held a moment of silence for those who had lost their lives while helping others on that tragic day.

1.03 Council Member Anderson Regarding Census. [20-0603]

Council Member Anderson said that the deadline for filling out the Census had been extended. She pointed out that the final count would determine federal funding and state representation at the federal level for the next decade. Only 60 percent of North Carolina residents had returned their forms, she said.

1.04 Council Member Anderson Regarding Voting Options. [20-0604]

Council Member Anderson described North Carolina's voting options, which included voting by mail.

1.05 Julie McClintock Regarding FLUM. [20-0605]

Julie McClintock, a Chapel Hill resident, petitioned the Council to delay its vote on the Future Land Use Map (Agenda Item 23), which she said needed to be reevaluated due to COVID-19 considerations.

Mayor Hemminger pointed out that the normal process was to receive and refer petitions but that the Council would wait and bring the request up during Item 23.

## PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.





**2.** Town Manager's Office Request for Concept Plan Review. [20-0565]

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that this Petition be received and referred to the Town Manager and Mayor. The motion carried by a unanimous vote.

## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that R-1 be adopted as amended, which approved the Consent Agenda. The motion carried by a unanimous vote.

**3.** Approve all Consent Agenda Items. [20-0566]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**4.** Enact the Annual Budget Ordinance Amendment to Re-appropriate Funds for Prior Year Encumbrances and Other Commitments. [20-0567]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**5.** Consider a Minor Modification to the 2019-2020 Community Development Block Grant Program Plan. [20-0568]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**6.** Adopt the Corrected FY 2020-21 Fee Schedule. [20-0569]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**7.** Adopt a Resolution Supporting a Grant Application to the Governor's Highway Safety Program. [20-0570]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**8.** Designate Juneteenth an Official Town Holiday. [20-0571]

Mayor Hemminger said that the Council had voted to make June 19th ("Juneteenth") an official Town holiday, effective June 21, 2020. She said she was pleased to be able to do so with partners in Orange County, she said.

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**9.** Authorize the Sale of Public Housing Property at 605 Oak Avenue. [20-0572]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**10.** Approve the Town Manager's Employment Contract Extension. [20-0573]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**11.** Call a Public Hearing for Conditional Zoning at 125 and 135 East Rosemary Street Parking Garage from Town Center-2 (TC-2) to Town Center-2-Conditional Zoning District (TC-2-CZD) on September 30, 2020. [20-0574]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**12.** Call a Public Hearing for September 30, 2020 to Consider Text Amendments that Expand Opportunities for Special Use Permit Applications to be considered under Conditional Zoning Review. [20-0575]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**13.** Call a Public Hearing on October 7, 2020 for Land Use Management Ordinance Text Amendment to Table 3.7-1: Use Matrix Pertaining to Allowed Uses in Planned Development-Mixed Use (PD-MU). [20-0576]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**14.** Call a Public Hearing on October 7, 2020 for Land Use Management Ordinance Text Amendment to Section 5.14.4 Pertaining to Signs Exempt from Regulation. [20-0577]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**15.** Call a Public Hearing for October 7, 2020 to Consider a Request to Close a Portion of an Unmaintained and Unimproved Public Right-of-Way of Monroe Street. [20-0578]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**16.** Adopt a Revised Meeting Schedule to Hold Meetings in a Virtual Environment through October 31, 2020 or Until the Orange County Stay At Home Order is Lifted. [20-0579]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**17.** Adopt Minutes from January 8, and 22, 2020 and February 12, and 19, 2020 Meetings. [20-0580]





This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## INFORMATION

**18.** Receive Upcoming Public Hearing Items and Petition Status List. [20-0581]

This item was received as presented.

## DISCUSSION

**19.** Update on Town Efforts to Respond to the COVID-19 Crisis. (no attachment) [20-0582]

Emergency Management Coordinator Kelly Drayton gave a PowerPoint update on the Town's COVID-19 response. She said that Phase 2.5 of a Safer at Home Plan had gone into effect statewide and explained the changes included in that plan, which would last until October 2, 2020. Orange County's order differed from the state in that it would continue to limit crowd size to 10 indoors and 25 outdoors, she said.

Ms. Drayton said that Orange County was continuing to administer Emergency Housing Assistance Program funds on behalf of the Town. As of August 20, more than $368,000 had been used to assist 230 Town residents, and the County had reported a steady decrease in evictions since June, she said. She reported that the Town had distributed more than 20,000 face masks thus far.

Ms. Drayton said that a USDA extension of eligibility waivers was allowing students up to 18 years of age to be served, so the Town's Food for Students initiative would continue. She pointed out that staff had been hosting a weekly food drive at the Eubanks Park and Ride and had served an average of 270 households each week over the summer.

Ms. Drayton said that Scholastic Support Centers, a new program partnership between the Town, Chapel Hill-Carrboro YMCA, and the Chapel Hill-Carrboro City Schools, would offer academic support and childcare at the Community Center on Estes Drive and at the Hargraves Center.

Ms. Drayton noted that a new collaboration of county, state and local partners would offer free COVID-19 testing on Wednesdays from 10:00 am to 2:00 p.m. at 725 Martin Luther King Jr. Boulevard. She provided information about a University of North Carolina at Chapel Hill (UNC-CH) plan to revert to online education and said that UNC-CH and Town staff had been meeting weekly.

Ms. Drayton said that residents could report minor violations, such as an individual not wearing a face covering, or a small group not following physical distancing rules, through the Chapel Hill Police Department's non-emergency line. More serious violations, such as large gatherings, should be directed to 911 for an immediate response, she said.

The Council discussed safety procedures and protocols with the Town Manager, who offered to provide a comprehensive list. They confirmed that staff had been working closely with regional partners on a campaign to promote flu shots.

Mayor Hemminger suggested clarifying some language in the Town's state of emergency order. She also noted that Orange County's COVID-19 dashboard was linked to UNC-CH's.

This item was received as presented.

**20.** Consider a Structure for the Task Force on Developing New Community Approaches to Improve Racial Equity and Safety. **[20-0583]**

Town Manager Maurice Jones recommended that the Council consider a structure, composition and general charge for a 13-member Re-imagining Community Safety Task Force. Additionally, he recommended that the Council form a subcommittee to refine the Task Force's charge prior to its first meeting.

Mr. Jones discussed a resolution that the Council had passed on June 24, 2020 regarding a plan to enhance racial equity and community safety in Town and to create a task force to lead that effort. He presented a proposed charge for Council consideration, which he said had been revised to include more specific language that Mayor pro tem Parker had recommended. Mr. Jones proposed a timeline that included a September 24th deadline for Task Force applications and an October 7th date for the subcommittee's recommendations to Council.

Chapel Hill Police Chief Chris Blue noted that the Council's June resolution had included several changes to Police Department (PD) policies related to use of deadly force, choke holds, and the duty to intervene if a fellow employee violated PD policy. The Council had requested that PD policies include clear accountability for officers who violate those rules, he said. Chief Blue said that the Council's resolution had also ended the use of regulatory traffic stops for low-level, non-moving violations.

Chief Blue said that the PD had made the recommended changes and distributed them to employees. He pointed out that the PD's policies had already been aligned with those in a national Eight Can't Wait campaign, but said that recent policy updates had made those alignments clearer.

Chief Blue noted that the Council's resolution had requested that the





Town Manager collect information and data that would help inform community discussions and provide more transparency and accountability. That information had been put on the Town's website, he said, adding that the website was evolving and that he welcomed feedback.

Executive Director of Community and Housing Loryn Clark gave a general overview of a plan to work with community partners and faith-based organizations to hold facilitated listening sessions and information gathering events in the community. She described an approach and tools that the Task Force would use and outlined a process for developing racial equity strategies.

Mr. Jones said that a request for proposals from consultants would be posted within a week with the goal of having a response before the Task Force began its work. He recommended that the Council approve revised Resolution 15, which would create the task force.

Mayor Hemminger said that all Council Members had expressed interest in being part of the process; therefore, there would be two subcommittees: one to work on the Task Force's charge, and the other to review applicants, she said.

Council Member Stegman asked why a ban on the use of choke holds that had been included in the Council's resolution had not been specifically stated in the revised PD policy manual.

Chief Blue replied that the way it was written was consistent with what other towns across the country had stated to ensure that choke holds would not be a matter of normal arrest-making techniques. That would not completely eliminate what an officer might need to use to protect him/herself in a deadly situation, he said.

Council Members pointed out that their interest had been to completely ban choke holds. They said that many cities across the country had done so and pointed out that a change regarding regulatory stops had been made despite how some communities had not banned those. The Council asked for more information about the PD's reasoning. They expressed concern about the item coming back without any questions being raised. It was inappropriate for staff to unilaterally change something that the Council had extensively debated, Mayor pro tem Parker said.

Council Member Huynh suggested posting the PD's quarterly report on the data site, and Council Member Anderson asked the Manager to look into having the facilitator provide input on the final charge and timeline.

Miriam Thompson, a Chapel Hill resident and community activist, commended the Council for the effort and said she supported the charge to the Manager to integrate racial equity and public safety into every aspect of Town operations. She recommended that the Task Force have the broadest, deepest and most diverse participation possible. Ms. Thompson stressed the importance of recruiting people of color, immigrants, young people, those of low wealth, and others.

Paris Miller, vice chair of the Chapel Hill Community Policing Advisory Committee (CPAC), stressed the importance of including CPAC on the front end of all conversations regarding law enforcement and community safety resolutions. CPAC wanted to play a key role in those discussions, she said.

James Williams, Orange Bias-Free Policing Coalition chair, asked to be informed about any opportunity for his Coalition to provide assistance. A number of people on the Coalition had expertise related to policing and equity, he said.

Anna Richards, Chapel Hill-Carrboro NAACP president, said she concurred with having the consultant look at the charge. She recommended finding a way to measure implementation and progress along the way and expressed concern about the tight closing date for Task Force applications.

The Mayor and Council discussed extending the application deadline and talked with Mr. Jones about a possible order and timing of the process. Mr. Jones said that the Task Force probably would not begin its work until the week of October 12th at the earliest. He raised the idea of getting feedback from the Government Alliance on Race and Equity (GARE) on the charge and on providing that to the consultant for review.

Council Member Ryan proposed changing "prioritizing appointment by those who represent impacted communities" to "taking care to ensure broad participation by those who represent..." in a paragraph regarding prioritizing.

Some Council Members suggested naming additional groups that should be included on the Task Force, but others thought that would become too complicated. The Council finally agreed, stating "ensuring broad participation" would be sufficient.

The Council agreed to a 13-member Task Force with two alternates. Mayor Hemminger proposed two subcommittees: Council Members Buansi, Parker, Ryan and Stegman would work on the charge; Council Members Huynh, Gu and Anderson would interview applicants. She proposed designating the two liaisons when the Council appointed the Task Force.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-15 be adopted as amended. The motion carried by a





unanimous vote.

**21.** Open a Public Hearing and Consider Authorizing an Economic Development Agreement for the East Rosemary Downtown Deck & Redevelopment Project. **[20-0399]**

Agenda items 21 and 22 will be considered together.

Mr. Jones provided background information on an economic development agreement (EDA) and possible property exchange between the Town and Grubb Properties to support a parking deck and redevelopment project on East Rosemary Street. The proposed project included having the Town build a 1,100-space parking garage and Grubb Properties building a 200,000 square-foot office building with wet labs, he said.

Mr. Jones described the proposed plan to exchange the Town-owned Wallace Deck and land for properties at 125 and 135 East Rosemary Street and to build a new parking deck at 135 East Rosemary Street. Grubb Properties would construct a new office building/wet lab that had a projected value of $80 million, he said.

Mr. Jones showed aerial views of the area and renderings of proposed buildings. He discussed streetscape and parking improvements and pointed out that the plan included new green space and a pocket park. The project would align with Town goals of attracting and retaining companies that create jobs and would make Downtown a destination, he said. Mr. Jones said that public comment could be received for the next 24 hours and that the item would return to the Council for a vote on September 30, 2020.

Economic Development Officer Dwight Bassett provided additional views and drawings of the site and discussed public input since December 2019.

Attorney Bob Jessup, of Sanford Holshouser LLP, gave an overview of the EDA, which followed a structure that had been laid out in an April 2020 memo of understanding. The EDA accomplished the Council's goals and the Council understood the risks and benefits, he said. He outlined the terms of the agreement and said he hoped the project would be beginning in early 2021. He discussed the advantages for both parties, and noted the Town's limited right to repurchase if construction did not proceed in a timely manner. Only a few, very narrow areas of disagreement remained, Mr. Jessup said.

Business Management Director Amy Oland explained that design, construction, and land swap would total $32.9 million, which the Town would borrow over a 20-year term. She reviewed financing and cash flow projections for that period and explained the staff's assumption that Parking Fund revenues would sufficiently cover debt payments.

Ms. Oland said that it would take five years for the Town to generate positive cash flow. However, if the Town used the $2.4 million that UNC would pay upfront for its 100 parking spaces, it would see positive cash flows in year two, she said. She pointed out that the Town had recently increased its downtown parking rates. Twenty-year projections showed a $24.9 million positive cash flow, if occupancy rates remain consistent, she said.

Mr. Bassett pointed out that the Town would also ultimately gain 250 new spaces (not including the 100 spaces reserved for UNC). The Town had also raised parking fees and was being more strategic on parking management, he said. He outlined a schedule leading up to the Council's September 30, 2020 vote. After that, the Council would consider authorization of the debt for the parking deck, he said.

Mr. Bassett projected deck construction beginning in April or May 2021. He recommended that the Council open the public hearing, consider authorizing the EDA, close the public hearing, and allow a 24-hour comment period and then consider swapping 150 East Rosemary Street for 125 and 135 East Rosemary Street on September 30th.

Mayor pro tem Parker requested a provision stating that the Town would not be obligated to build the deck if the guaranteed maximum price came in over a certain amount. He also questioned a provision in the EDA that exempted Grubb Properties from the agreement if it did not get an entitlement for the office building by the end of November 2021 but requires the Town to wait two to three years for a reversion provision to kick in. If Grubb Properties decided not to proceed, then the Town should not have to let the project sit there, he argued.

After some discussion among the parties, Mr. Bassett said that an "out" provision regarding the guaranteed maximum price would be included in the final EDA draft that the Council would see on September 30th. Grubb Properties also agreed to address the reversion concern.

Council Member Gu asked questions about the length of time for public comment, ongoing negotiations over property acquisition, and third party appraisals of four lots included in the land exchange. She confirmed with Mr. Jessup that the Town would pay $30,000 per month to lease the Wallace Deck during the construction period and with Ms. Oland that the Town would continue to pay for the Wallace Deck until 2024.

Mayor Hemminger pointed out that the Town would generate about $1 million a year in revenues from the Wallace Deck, but Council Member Gu replied that she had seen that 2016 revenues had been $500,000 and less than that in 2017. She asked about the terms of UNC's commitment, and Mr. Bassett said final comments from UNC were expected soon. The current terms were that UNC would pay the Town's net cost of constructing 100 spaces, roughly $2.9 million and would contribute to





annual maintenance of the deck, he said.

Council Member Gu asked about options if Grubb Properties could not proceed, and Mr. Jessup explained the circumstances under which the Town would have the right to buy the property back. If the building were not built, the Town would have consolidated and expanded downtown parking, opened up a parcel for development, and facilitated redevelop, he said. Mr. Jessup said there would be no direct financial risk to the Town as long as it was satisfied with its projections for operations of the parking deck.

Council Member Gu and Mayor Hemminger discussed the basis for revenue projections, with Council Member Gu raising concern based on past revenues and Mayor Hemminger noting changes that should increase revenues in the future. Council Member Gu said that she had not seen any analysis that had convinced her that the project was feasible.

Julie McClintock, representing Chapel Hill Alliance for a Livable Town (CHALT), said that CHALT members were enthusiastic about the project but thought there was insufficient documentation to show that the Town would not be left with a $30,000 white elephant if Grubb Properties decided to not construct the office building. She urged the Council to refrain from voting to incur considerable financial risk until the EDA stated that Grubb agreed to construct the building. Ms. McClintock recommended that the Town hire a knowledgeable real estate attorney with construction contract experience to view the agreement before moving forward with it.

Matt Gladdek, Downtown Partnership director, said that downtown businesses were grateful for the Council's continued effort to move the project forward.

Donna Bell, a Chapel Hill resident, requested that conversations regarding the new parking infrastructure include bike and pedestrian mobility.

Mayor Hemminger said that the Town had an opportunity to get a new commercial building that would bring jobs and opportunities. She said that Chapel Hill had been losing research and technology companies because it had no places to put them. She expressed confidence that the new deck would pay for itself and stressed the importance of being ready to rebound when the COVID-19 pandemic was over.

Council Member Gu repeated her desire to see a more objective analysis from a third party before moving to the next step. She had concerns about the viability of the project and did not want to put the Town in a difficult situation two or three years down the road, she said.

Mayor pro tem Parker and Council Member Ryan expressed agreement with

Mayor Hemminger's position. Mayor pro tem Parker said that safeties had been built into the project and Council Member Ryan said that the Council had looked at data and numbers and had much expert help with that. It was a risk for the Town, but it was a carefully-considered one that had a very big upside for the future, Council Member Ryan said.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, to close the public hearing and receive comment for an additional 24-hours. The motion carried by the following vote:

**Aye:** 7 - Mayor Hemminger, Mayor pro tem Parker, Council Member Anderson, Council Member Buansi, Council Member Stegman, Council Member Huynh, and Council Member Ryan

**Nay:** 1 - Council Member Gu

**22.** Open a Public Hearing and Consider Exchanging 150 E. Rosemary for 125 and 135 E. Rosemary to Support the East Rosemary Redevelopment Project and Parking Deck. **[20-0584]**

This item was considered with item 21.

**23.** Charting Our Future - Update on Future Land Use Map (FLUM) Engagement & Consideration of Changes to the Proposed FLUM. **[20-0585]**

Land Use Management Ordinance (LUMO) Project Manager Alisa Duffy Rogers gave a PowerPoint presentation on the Charting Our Future project, which mapped Chapel Hill land use to the year 2049. She said that there had been approximately 84 opportunities for community members to learn about the project and that she had reported on it to the Council at least 20 times during the past 2.5 years.

Ms. Duffy Rogers reviewed elements of the Future Land Use Map, summarized feedback from Town boards and commissions, and described proposed changes to several focus area maps as well as the document's introduction. She reviewed next steps, which would lead to the Council considering adoption on October 28, 2020. Ms. Duffy Rogers recommended that the Council authorize the Town Manager to make the recommended changes.

Harvey Krasny, a Summerfield Crossing resident, said that the proposed land use map for the North 15-501 area had incorrectly stated the heights of structures in sub-area C and contradicted three previous versions. He said that six subdivisions, totaling 578 homeowners in that area, did not wish to be overtaken by mixed-use development, which would destroy





their investments and degrade their quality of life. He asked the Council to correct the map and return Summerfield Crossing and the adjacent 5-acre, undeveloped property to all residential homes or townhomes of two to three stories, as had been depicted in the 2019 draft map.

Michael Hoppa, a Chapel Hill resident, expressed concerns about the North 15-501 area becoming less appealing with higher density housing and mixed-use development dominating the corridor. He hoped that protecting and not encroaching upon existing neighborhoods would become an explicit part of the plan, he said.

Margo Ginsberg, an Erwin Village Community resident, expressed objections to increasing story heights and building more multi-family residential properties in an area that was mainly comprised of single-family homes and townhomes.

Weijin Wu, an Old Oxford Road resident, pointed out that the Council had unanimously voted against a proposal by Summit Properties to build a four-story apartment complex in the area less than two years prior. He said that the current FLUM seemed to totally disregard the consensus of the residents and Town Council. Mr. Wu asked that the five-acre undeveloped property west of Irwin Road be designated for residential homes or townhomes of two-story height only.

Council Member Ryan and Mayor Hemminger confirmed with Ms. Duffey Rogers that an additional meeting for the Council to look more closely at the recommended changes would be held prior to the close of the public hearing. Mayor Hemminger encouraged Council Members to meet with Ms. Rogers in the near future to go over any concerns and comments.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that R-18 be adopted. The motion carried by a unanimous vote.

**24.** Receive Wegmans Traffic Calming Report and Consider Authorizing Traffic Calming Improvements. **[20-0586]**

Senior Planner Judy Johnson gave a PowerPoint presentation on a traffic calming plan for Wegmans, which had been approved in October 2017 and was under construction. She said that Wegmans had been working hard to reach a community consensus regarding traffic impacts.

Ms. Johnson displayed a map showing an area at the intersection of Old Durham Road where Wegmans planned to divert traffic to reduce conflicts. She pointed out that the ordinance addressed "No Thru Truck Traffic" signs, stops signs, and electronic speed signs at two locations and crosswalks. The goal was to implement the traffic calming plan before the Certificate of Occupancy was issued in December 2020 or January 2021, she said. She recommended that the Council adopt Resolution A and enact Ordinances A and B.

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, that R-19 be adopted. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that O-2 and O-3 be enacted. The motion carried by a unanimous vote.

*SPECIAL USE PERMIT(S)*

Special Use Permit: The Application for a Special Use Permit is Quasi-Judicial. Persons wishing to speak are required to take an oath before providing factual evidence relevant to the proposed application.

Witnesses wishing to provide an opinion about technical or other specialized subjects should first establish that at the beginning of their testimony.

**25.** Open the Public Hearing: Application for Special Use Permit - Christ Community Church, 141 Erwin Road (Project #19-119). [20-0587]

Planner Becky McDonnell presented a special use permit (SUP) application for Christ Community Church and gave an overview of the proposed 11,000 square-foot development on a 2.8-acres site at the corner of Old Oxford and Erwin Roads. She explained that stormwater controls would be under a 117-space parking lot, indicated two entrances, and said that the plan included new bike lane and sidewalks. The site was currently zoned Residential 2, she said, noting that places of worship were permitted uses in all residential districts.

Ms. McDonnell pointed out that the applicant had requested several modifications to regulations. These included allowing a shed to remain on the property and permitting an eight-foot fence to be part of the buffer. Another request pertained to sharing a buffer along the southern property line, she said.

Ms. McDonnell said that the applicant was requesting a 9.75-inch increase in the maximum building height to accommodate a portion of a planned cupola. In addition, the applicant had asked to extend the construction start and completion deadlines to five and eight years, respectively, she said. Ms. McDonnell said that all Town boards and commissions had recommended approval and recommending that the Council open the public hearing and continue it to October 7, 2020 for possible action.

Council Member Ryan asked about an agreement to discharge stormwater onto the adjacent southern property. Ms. McDonnell recommended discussing that with the applicant. Council Member Ryan asked Ms.





McDonnell to bring back information on whether or not that neighbor would be prevented from discharging the water farther downstream.

Council Member Stegman clarified the terms of the shared buffer agreement and confirmed with Ms. McDonnell that any subsequent developers would be bound by its requirements as well.

Developer Phil Post, speaking for the applicant, reviewed the site plan and provided details about the buffer agreement, land exchange, and plan to drain stormwater into Summit Properties' underground facility and ultimately into its pond. He said that the applicant had agreed to build a berm at the edge of the parking lot that would force water into a stormwater chamber. Ultimately, water detention would be about 15 percent greater than the Town required, said Mr. Post.

Mr. Post explained that an existing shed would be used for gardening tools. He said that the applicant had consolidated parking and reduced impervious surface by about 20 percent since the Council had last seen the plan. He pointed out that a traffic study had concluded that the project would have no impact on intersections and conformed to all R-3 zoning requirements.

Bo Harrison showed views of the building from four different directions and described its architecture and features. He explained that the leading edge of the cupola would be 9-3/4 inches above the allowable height and said that lowering it would change the building's character.

Christ Community Church Pastor Byron Peters spoke about the church's presence in the community and his enthusiasm for the project.

Council Member Ryan asked staff to check on what protections would be in place for when stormwater reached Summit Properties.

Council Member Gu confirmed with Mr. Post that extensive discussions with two neighbors had led to working out some issues. The applicant had also worked closely with Summit Hospitality to coordinate stormwater plans and implement agreements, Mr. Post said. He pointed out that the Town's Stormwater Advisory Board had unanimously approved Stipulation 7, regarding the stormwater plan.

Mr. Krasny expressed strong opposition to the development of a house of worship on land that had been zoned for low density residential development. He and 577 other homeowners had bought homes in the area with the full understanding and that it would remain residential, he said. He listed several adverse effects that the proposed structure and parking lot would have and said that the project would not enhance resale values of homes in the neighborhood.

Mr. Hoppa pointed out that there already were five churches within a square mile of the site. However, three of those churches were one-story buildings and the other two were set back from the residential areas, he said. He argued that Council approval of the SUP would set a precedent for allowing non-residential buildings and businesses to increasingly encroach.

Rebecca Smith, Windover Homeowners Association (HOA) president, Lindsey Garrison, and Margo Ginsberg, Erwin Village HOA vice president, each expressed concern about the church being granted an SUP for an area that was marked low density residential on the Town's land use map. They argued that the building would overwhelm neighboring houses, increase traffic at dangerous intersections and increase stormwater run-off. The proposed church would not meet the SUP requirement of maintaining or enhancing the value of contiguous property, they said. Scott Radway, representing Summit Hospitality, said that Summit had worked cooperatively for approximately 18 months to facilitate good stormwater management by accepting water from the church site. He said that the proposed land swap would keep more trees on both sites of the boundary. He said that the church would be a good addition to the community and pointed out that Summit Hospitality did not have any development application in process.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that Council recess the public hearing to October 7, 2021. The motion carried by a unanimous vote. Council Member Anderson had been disconnected from the virtual meeting and was unable to vote.

Mayor Hemminger reminded all that the SUP process prevented Council Members from conversing with anyone about the item until October 7th.

**26.** Open the Public Hearing: Application for Special Use Permit Minor Modification-Charterwood, 1701 Martin Luther King Jr. Blvd. [20-0588]

Planner Michael Sudol presented an SUP application for a minor modification that would extend the Charterwood SUP construction completion from June 25, 2020 to June 25, 2022. He showed an aerial view of the seven-building, mixed use development and indicated the uncompleted portion. He recommended that the Council open the public hearing, receive evidence, and continue the public hearing to October 7, 2020.

George Richley, president of Ballentine Associates, explained how high construction costs and the COVID-19 pandemic had caused State





Employees Credit Union (SECU) to delay its plans for that portion of Charterwood. However, if the Council granted an extension, SECU had authorized pre-renovation work on the Old Altemeuller House, which had been an important part of the 2012 SUP approval, he said.

The Council vote unanimously to close the public hearing, and Town Attorney Anderson pointed out that there would be a 24-hour public comment period on the item.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that the Council close this Special Use Permit public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote. Council Member Anderson did not vote on the item as she lost connection during the previous item.

## ADJOURNMENT

The meeting was adjourned at 11:36 p.m.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

| | |
|---|---|
| Mayor Pam Hemminger | Council Member Hongbin Gu |
| Mayor pro tem Michael Parker | Council Member Tai Huynh |
| Council Member Jessica Anderson | Council Member Amy Ryan |
| Council Member Allen Buansi | Council Member Karen Stegman |

**Wednesday, September 16, 2020 6:30 PM Virtual Meeting**

### Virtual Meeting Notification

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_OGt2YnL_QjGahT6b5gDSwQ After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 833 8110 5144

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Interim Planning Director Judy Johnson, Emergency Management Coordinator Kelly Drayton, Fire Chief Vencelin Harris, Police Chief/Community Safety Executive Director Chris Blue, Senior Planner Adam Nicholson, Principal Planner Corey Liles, LUMO Project Manager Alisa Duffey Rogers, Interim Zoning Enforcement Manager Gene Poveromo, Housing Director Faith Brodie, Housing and Community Executive Director Loryn Clark, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING





Mayor Hemminger opened the meeting at 6:30 p.m. and reviewed the agenda. She called the roll, and all Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Proclamation: Constitution Week. [20-0627]

Council Member Huynh read a proclamation for Constitution Week September 17-23, 2020. It said that the U.S. Constitution stood as a testament to the tenacity of Americans throughout history to maintain their liberties, freedoms, and inalienable rights. The proclamation pointed out that some members of the U.S. still lacked equal protection under the law due to systemic and institutional racism.

0.02 Proclamation: Diaper Need Awareness Week. [20-0628]

Council Member Anderson described how some families struggle to afford adequate supplies of diapers. She read a proclamation that designated September 21-27, 2020 as Diaper Needs Awareness Week and encouraged all to thank and support the Diaper Bank of North Carolina for its work.

0.03 Mayor Hemminger Regarding Advisory Board Virtual Meetings. [20-0629]

Mayor Hemminger pointed out that Town advisory boards had been continuing to meet virtually during the COVID-19 pandemic. The public was always welcome to attend those meetings, she said, adding that information on how to do so was on the Town's website.

0.04 Mayor Hemminger Regarding Carolina North Development Agreement Meeting. [20-0630]

Mayor Hemminger said that information regarding a virtual meeting on the Carolina North Development Agreement was available on the Town's website.

0.05 Mayor Hemminger Regarding Meeting with Staff and UNC Leaders about COVID-related Issues. [20-0631]

Mayor Hemminger said that she, the Town Manager, and Chapel Hill Police Chief Chris Blue had recently met with the University of North Carolina at Chapel Hill (UNC) to talk about issues related to COVID-19, student behavior, and upcoming Halloween celebrations. She said that UNC hoped to make a final decision about its spring semester by November 1, 2020.

0.06 Mayor Hemminger Regarding Orange County Recovery Visioning Meetings. [20-0632]

Mayor Hemminger said that Orange County Recovery visioning meetings related to human services were scheduled for the next day. She urged residents to check the Town website for information.

## AGENDA ITEMS

**1.** Update on Town Efforts to Respond to the COVID-19 Crisis. (no attachment) [20-0606]

Emergency Management Coordinator Kelly Drayton gave an update on the Town's COVID-19 response and long-term recovery efforts. She said that an impact assessment survey would be finalized later in the month and then used as part of recovery strategies. Staff would provide additional information on the long-term process at the Council's September 30, 2019 meeting, she said. She noted that a draft long-term recovery plan would be available for public review in early November.

Ms. Drayton said that the Orange County Health Department would work with state and local partners to offer free COVID-19 testing from 10:00 a.m. to 2:00 p.m. on Wednesdays at 725 Martin Luther King Jr. Boulevard. Additional information could be found at Orange County's website, she said.

Ms. Drayton pointed out that September was National Preparedness Month and that the current theme was "Disasters Don't Wait, Make Your Plan Today". Information was available at ready.gov in September, she said. She urged all who were able to do so to get an annual flu shot and stressed the importance of wearing a mask, washing hands, and waiting a safe distance away from others in order to avoid contracting COVID-19.

This matter was received and filed.

**2.** Continued Discussion of Chapter 160D Updates to Land Use Management Ordinance and Town Code of Ordinances. [20-0607]

Land Use Management Ordinance (LUMO) Project Manager Alisa Duffy Rogers provided background on 2019 state legislation that had led to Session Law 2019-111 (Land Use Law 160D). She said that the LUMO and other Town regulations would need to be brought into alignment with 160D by July 1, 2021 and that Conditional Use District Zoning (CUDZ) would not be allowed after that date.

Ms. Duffy Rogers explained that state legislators viewed CUDZ as problematic because it combined the legislative action of rezoning with the quasi-judicial special use permit (SUP) process. Under 160D, all CUDZ districts would need to become CZ districts by December 31, 2020, she said. She outlined how the change would affect projects currently in process and pointed out that CUDZ areas, Residential 3-C and Residential 4-C, lacked parallel CZ districts.





Ms. Duffy Rogers asked the Council to decide whether to create parallel CZ districts in areas Residential 3-C and 4-C only, or create CZ districts for all existing CUDZ districts. Either choice would bring the Town into conformance with 160D by the end of the year, she said.

The Mayor and Council agreed by consensus to convert all districts to CZ and create a Residential Special Standards Commission Zoning District and a Mixed-Use Village Conditional Zoning District. They said that CZ was a good tool for having the kind of oversight the Town wanted. They stressed the importance of communicating to the public that the change would not remove the Town's legislative prerogatives.

Council Members confirmed with Ms. Duffy Rogers that any conditions existing under an SUP would automatically convert to CZ conditions on December 31, 2020 and that the Town would not have to notify landowners or property owners of that change. She noted that conversion would include making a LUMO text change in a public process.

Principal Planner Corey Liles said that the Town would still be able to do SUPs for some special uses such as drive-thrus and gas stations that need case-by-case reviews due to their potential impacts on surrounding areas. Exceptions would include projects exceeding 20,000 square feet of building space and/or 40,000 square feet of land disturbance, he said.

Mr. Liles explained that 160D would change the SUP review process by disallowing advisory board recommendations as a basis for Council decisions. He said that Town boards could continue reviewing SUPs, but their recommendations would not be sent to the Council during SUP hearings.

Mr. Liles said that the Council could either amend the LUMO or completely discontinue advisory board review. He pointed out that boards would be allowed to continue making recommendations to the Council during a CZ process, however, and that the Council would be conducting more of those due to its decision to convert.

Council Member Anderson inquired about the reasons for the change, and Mr. Liles said that receiving outside information during a quasi-judicial SUP process could create uncertainty about how the decision was made. The Mayor and Council verified with him that board chairs could not provide an opinion and that boards would no longer be allowed to comment on rezonings unless those were fully separate from SUPs.

Mayor pro tem Parker said that the long-term goal should be to phase SUPs out while building what is important about them into the CZ process. Council Member Stegman agreed and said that CZs were more effective, led to better outcomes, and allowed for the community input that everyone wanted.

Council Member Buansi stressed the importance of educating advisory boards on their changed role, and Council Member Ryan commented on the usefulness of board recommendations. She wondered if there would be a correct and legal way for those opinions to still work their way into the process, perhaps through staff, she said.

Council Member Gu asked if board members could provide expert testimony at hearings, and Mr. Liles characterized that as an interesting consideration that staff could delve into. Mayor Hemminger said, in summary, that Council Members wanted to stick with CZ as much as possible but still wanted information from advisory boards communicated to them in some manner that was legal.

Mr. Liles said that 160D included a new option in which appeals of Historic District Commission (HDC) decisions on Certificates of Appropriateness would bypass the Board of Adjustment (BOA) and go directly to the NC Superior Court. He said that the Council could amend the LUMO accordingly but that staff had found many reasons to not do that and just maintain the status quo.

Council Member Anderson argued for keeping things as they were, stating that she was not aware of any tensions between the HDC and the BOA. Council Members agreed by consensus to leave things as they were, but Mayor Hemminger asked for feedback on what BOA members thought about the idea.

Mr. Liles said that the text amendment would come back to Council for adoption before the July 1, 2021 deadline and that next steps would include a work session on definition changes in October 2020. Staff would report back with any new information, he said.

This matter was received and filed.

**3.** Discuss the Concept Plan Review Process. **[20-0608]**

Planner Adam Nicholson gave a PowerPoint update on information staff had gathered regarding the concept plan review (CPR) process. He said that it took an average of 320 days from submission to when Council reviewed a concept plan and that applicants had expressed concern about the complexity of the process and the amount of time and resources it required. Chapel Hill's CPR process was different from other jurisdictions, most of which had staff review concept plans, he pointed out.

Mr. Nicholson presented ideas that included having a preliminary staff review by a technical team, an urban design team, and/or a long-range planning team. Additional reviews could include the Planning Commission





and/or other boards, which might work together or individually, he said. He said that quarterly reports could then be provided to the Council regarding individual concept plan applications.

Council Member Anderson pointed out that the Community Design Commission had petitioned the staff report. Mayor Hemminger said that staff had been specifically asked at a Council Committee on Economic Sustainability (CCES) meeting in June to obtain feedback from the CDC.

Mr. Nicholson replied that staff could certainly follow up and get that feedback. He asked Council Members to describe their goals for CPR and to state whether they thought there should be evaluation criteria. He began to propose a potential pilot review process, but Mayor pro tem Parker said that the presentation seemed to be laying out changes without knowing what the goals were or if current goals were being met. That seemed backwards because it was starting with a solution and working back to the problem, he said.

Mr. Nicholson replied that he was trying to make the Council aware of the conversations staff had been having and to get Council feedback on what the goals for CPR should be.

In response to a question from Council Member Buansi about how and why the CPR process had begun, Mr. Nicholson explained that a group of designers in the 1990s had proposed that the CDC review a "back of napkin sketch" to help determine whether or not a proposed project would be feasible, viable, and successful.

Council Member Ryan said that she thought the original goal had been to give applicants a "toe the waters" sense of how a project might be received before doing all of the work that goes into a formal submission. It was designed to be a simple process that would give an idea of whether spending money to develop the project would be worth doing, she said.

Council Members said it would be especially useful to have comments on concept plans from Urban Designer Brian Petersen during CPR process. They agreed that it was important for them to determine goals. Council Member Anderson said that a joint board meeting probably would not be well-attended and would hamper board-specific conversations. Council Member Ryan spoke in favor of having the Stormwater Advisory Board look at concept plans to determine if there would be issues.

Council Members thought it would be worth exploring and having the Planning Commission review projects, if its members chose to be involved. They said that the CDC could provide information about how a project fit into a small area plan. Council Member Huynh proposed exploring the potential for more joint board meetings, and Mayor Hemminger suggested that CDC or PC forum might include ways to engage other boards and the public.

The Mayor and Council expressed support for some, high level, staff involvement, and they agreed that existing Town traffic data should be available during the CPR process. They spoke in favor of an early and strong staff review of the design, of what the project would offer the Town, and of how the concept fit into the Town's long-range plans.

The Council discussed providing a check list that developers could answer to show they understood Town plans and strategies before presenting their concept plan. They agreed that the goal of a CPR was to determine whether a project was the right type of use for the location and if it comported with the goals for that part of Town. A standardized list of questions and some staff involvement would help guide that, they said.

Mayor Hemminger proposed that the Council consider moving CPRs to Council work sessions in order to avoid hearing them late at night at the end of regular meetings.

This matter was received and filed.

**4.** Receive an Update on Public Housing Activities. **[20-0609]**

Public Housing Director Faith Brodie gave a PowerPoint presentation on the Town's "scattered site" public housing model, which included 336 apartments. She said that the model avoided having housing developments with large concentrations of low-income families. She described improvements that had been made prior to March 2020 and the start of the COVID-19 pandemic.

Ms. Brodie said that COVID-19 had brought significant changes for staff and residents and that a decrease in resident income had led to decreases in rental payments and an increase in weekly food distribution. As of September 15, 2020, approximately 46 percent of households had not paid rent and staff's focus had shifted from restoration and maintenance to keeping staff and residents informed and safe, she said.

Ms. Brodie noted that the Town had a contract with the U.S. Department of Housing and Urban Development (HUD) regarding its largest public housing neighborhoods: South Estes, Craig Gomains, and Trinity Court. She explained that a HUD management assessment had designated the Town as "troubled" in November 2019 because 40 units at Trinity Court had been empty since March 2018. Those units had been empty for safety reasons and the Town would not have received the troubled status if they had been demolished, she pointed out.

Ms. Brodie said that HUD had created a recovery agreement with the Town





that included performance targets and strategies and that staff had been working to meet and exceed those. She pointed out that demolition of Trinity Court would remove those 40 unoccupied units and lead to a better assessment from HUD. She said that staff would begin bringing quarterly reports to the Council and would present a report covering the first two quarters on February 2, 2021.

The Council said that closing Trinity Court was the right choice and they confirmed with Ms. Brodie that HUD was pleased with the steps the Town was taking to move out of its troubled status. Council Member Buansi confirmed with her that the factors that had contributed to the troubled status had been remedied and that the Town had been granted an extension for residents to complete a training program. He also confirmed with her that staff typically conducted at least three surveys a year to determine what residents want.

Council Member Gu asked for the community survey response rate, and Ms. Brodie agreed to provide that. Council Member Gu also asked about the possibility of safely doing face-to-face surveys, and Ms. Brodie replied that residents would be unlikely to want that. Council Member Gu said that extra phone calls might be necessary to determine changes in employment status and other concerns.

Council Member Gu ascertained from Ms. Brodie that staff had not notified HUD about Trinity Court earlier than they did because they had been told to wait and see what the Town's Rental Assistance Demonstration (RAD) application would look like before starting demolition. In response to a comment by Council Member Gu, Ms. Brodie said that she did not believe that the community's confidence in her department had been undermined.

The Council confirmed with Ms. Brodie that hiring a maintenance supervisor and an additional contractor had facilitated the building rehabilitation process. The Council asked about recruiting residents for an advisory council, and Ms. Brodie explained that the deterrents included time, dedication to serve, and a commitment to the entire public housing portfolio rather than just one's own neighborhood.

Council Members discussed how residents were more willing to share concerns with peers than with staff and they confirmed with Ms. Brodie that a Residents Advisory Board had only three members out of 12 communities. Council Member Stegman raised the possibility of providing stipends and confirmed with staff that grant funds that had been used in the past were available.

This matter was received and filed.

**5.** Future Items for Discussion. (no attachment) **[20-0610]**

Susanna Dancy, a CCES member, thanked the Council for its meaningful discussion regarding the CPR process (Item 3). She thought the Community Design Commission (CDC) would endorse the idea of checklists for developers and a standardization of submission materials, she said. She said that the goal of the CDC petition had been to make the process more productive and relevant.

Ms. Dancy noted that two additional options for reworking CPRs had not been included in the staff presentation: 1) keep the review with the CDC, Housing Advisory Board, and Council, but change what goes into it; and 2) improve the application, checklist and materials, but have a Planning Commissions/CDC joint meeting to review those together.

## REQUEST FOR CLOSED SESSION TO DISCUSS ECONOMIC DEVELOPMENT, PROPERTY ACQUISITION, PERSONNEL, AND/OR LITIGATION MATTERS

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that Council enter Into closed session as authorized by General Statute Section 143-318.11(a)(3) to discuss, give instructions, and preserve attorney-client privilege regarding litigation brought by Chandler's Green, Ltd. against the Town of Chapel Hill, Habitat for Humanity of Orange County, NC, Inc., and Ballentine Associates, P.A. At the conclusion of the closed session, the Council will adopt a single motion to end the closed session and adjourn the meeting without taking further action.. The motion carried by a unanimous vote.

## ADJOURNMENT

The meeting was recessed at 9:06 p.m., the Council went into closed session and the meeting adjourned at the end of the closed session.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

Mayor Pam Hemminger
Mayor pro tem Michael Parker
Council Member Jessica Anderson
Council Member Allen Buansi
Council Member Hongbin Gu
Council Member Tai Huynh
Council Member Amy Ryan
Council Member Karen Stegman

**Wednesday, October 7, 2020 | 7:00 PM | Virtual Meeting**

### Virtual Meeting Notification

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_BfGkHbGoTjOGa-_yY9P4jg After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 861 4979 1964

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Parks and Recreation Director Phil Fleischmann, Public Works Director Lance Norris, Affordable Housing Manager Nate Broman-Fulks, Fire Chief Vencelin Harris, Emergency Management Coordinator Kelly Drayton, Planner II Becky McDonnell, Planner II Michael Sudol, Housing and Community Executive Director Loryn Clark, Senior Planner Jake Lowman, Police Chief and Executive Director for Community Safety Chris Blue, Assistant Town Manager Mary Jane Nirdlinger, Housing and Community Assistant Director Sarah Vinas, Manager of Engineering and Infrastructure Chris Roberts, Interim Planning Director Judy Johnson, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.





### OPENING

Mayor Hemminger opened the virtual meeting at 7:00 p.m. and reviewed the agenda. She called the roll, and all Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Proclamation: Skip Single Use Plastics Month. [20-0694]

Mayor Hemminger encouraged all residents to request "no utensils" when ordering take-out meals. She said that the Town had been encouraging businesses to reduce single-use plastics since October 2018.

0.02 Mayor Hemminger Regarding Public Information Meeting for West Rosemary Street Hotel. [20-0695]

Mayor Hemminger announced a public information meeting regarding a proposed hotel on West Rosemary Street. The meeting would be held virtually on Oct 15, 2020, from 5:15 to 6:00 p.m., she said.

0.03 Mayor Hemminger Regarding Upcoming Advisory Board Meetings. [20-0696]

Mayor Hemminger pointed out that the Library Board, Community Policing Advisory Committee, Historic District Commission, Environmental Stewardship Advisory Board, and Justice in Action Committee were all scheduled to meet the following week. Specifics were on the Town website, she said.

0.04 Mayor Hemminger Regarding Fall Safety during COVID. [20-0697]

Mayor Hemminger encouraged residents to observe the 3Ws (Wear a mask, Wash your hands, Wait a safe distance apart) when participating in fall activities during the current COVID-19 pandemic. She noted that state and county websites had posted guidance for creative ways to celebrate Halloween and that the Town's Parks and Recreation Department was holding 31 days of safe activities throughout October. She stressed the importance of wearing the right kind of mask and urged everyone to also get flu shots as well.

0.05 Council Member Ryan Regarding Election Deadlines. [20-0698]

Council Member Ryan encouraged all citizens to get out and vote in the upcoming national election. She reviewed voting information and stressed the importance of wearing a mask. Safety protocols would be in place at polling places, she said.

0.06 Council Member Anderson Regarding 2020 Census. [20-0699]

Council Member Anderson pointed out that the time for responding to the 2020 Census was running out. She said that people could fill out those forms online or by phone and that related information was available at my2020census.gov.

Mayor Hemminger commented that only about 70 percent of Chapel Hill's residents had responded to the Census. She explained that those numbers would affect how much federal funding the Town received over the next 10 years. Students who were living in Town on April 1, 2020 should also be counted, even if Chapel Hill was not their primary residences, she said.

## PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.

0.07 Julie McClintock Request Regarding Rescheduling October 26 Information Session on Aura Project to Mid-November. **[20-0700]**

Julie McClintock, a Chapel Hill resident, presented a petition from herself and three others that requested an October 26th public information session on the Aura Project be rescheduled to mid-November. She provided several reasons for the request and said that rescheduling would allow staff more time to inform a larger audience about possible changes on Estes Drive.

Town Manager Maurice Jones replied that staff had already begun the process of rescheduling that meeting to after the national election.

0.08 Celeste Clamage Comments Regarding Budget. **[20-0701]**

Celeste Clamage, a Chapel Hill resident, inquired about the Town's plans to follow through on the Mayor's June 24, 2020 commitment to address the Chapel Hill Police Department's budget in the fall. She recommended that the item be put on a near future agenda and that the public be allowed to provide input.

Mayor Hemminger replied that a task force would begin meeting soon and





that the Council would be sharing related information.

## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, that R-1 be adopted, which approved the Consent Agenda. The motion carried by a unanimous vote.

**1.** Approve all Consent Agenda Items. **[20-0663]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**2.** Temporarily Suspend Certain Ordinances and Authorize the Town Manager to Continue Temporary Measures to Aid Retail and Restaurant Use during the COVID-19 Pandemic State of Emergency. **[20-0664]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**3.** Approve an Affordable Housing Funding Request from the Compass Center. **[20-0665]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**4.** Call a Public Hearing for November 4, 2020 to Consider Annexing Property at 7000 Millhouse Road. **[20-0666]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**5.** Call a Public Hearing on November 4, 2020 for Land Use Management Ordinance Text Amendment to Section 5.9.2 Pertaining to Methods to Providing Required Parking and Loading. **[20-0667]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## INFORMATION

**6.** Receive Upcoming Public Hearing Items and Petition Status List. **[20-0668]**

This item was received as presented.

**7.** Receive Annual Compliance Reports for July 1, 2019 - June 30, **[20-0669]**

2020 for the Carolina North, Glen Lennox, and Obey Creek Development Agreements.

This item was received as presented.

## DISCUSSION

**8.** Update on Town Efforts to Respond to the COVID 19 Crisis. (no attachment) [20-0670]

Emergency Management Coordinator Kelly Drayton gave an update on the Town's COVID-19 pandemic response. She discussed a new "Slow COVID NC" app for tracing the virus and noted cancellations of some Town-sponsored festivals and special events. She said that Orange County had posted a list of high, medium and low risk activities for Halloween through fall.

Ms. Drayton mentioned the launch of Neighborhood Support Circles, a collaborative effort with the Refugee Community Partnership, which would bring academic and childcare support to low-income families. She said that an Emergency Housing Assistance Program, which was a partnership among Orange County and local towns, had served more than 300 Chapel Hill residents with housing assistance since January.

Ms. Drayton said that information on where and when testing was available across Orange County could be found at: Townofchapelhill.orgcoronavirus. She noted that October was Cyber Security Awareness Month and encouraged residents to go to staysafeonline.org for information on how to enhance cyber security.

Ms. Drayton stressed the importance of continuing to follow the 3Ws and said that October was the best month to get a flu shot since flu season typically peaks in February.

Ms. Drayton said that Orange County's rate of positive COVID-19 cases had been hovering at about 2 percent. Mayor Hemminger added that hospitalizations due to COVID-19 had been low and were holding steady.

This item was received as presented.

**9.** Receive the FY20 Affordable Housing Annual Report. [20-0671]

Assistant Director of Housing and Community Sara Viñas presented results from the Town's Affordable Housing Annual Report. She said that the Council had awarded $6.1 million, which included $5 million in bond funding to community partners to be used for affordable housing (AH) projects. The Town had developed an AH preservation strategy, had provided emergency housing assistance to 150 households, and had selected a potential development partner for a Town-owned AH project at





2200 Homestead Road, she said.

Ms. Viñas said that the Town's Affordable Housing Development Reserve had awarded $11.1 million to support projects in the community over the last five years. The Town had already surpassed its five-year target to support by almost 400 percent, she pointed out.

Affordable Housing Manager Nate Broman-Fulks gave an update on key Town initiatives. He noted a dramatic increase in the need for rent, utility, and mortgage assistance due to COVID-19. Those impacts were ongoing and the number of households being assisted continued to rise, he said. He said that more than $900,000 from federal funds had gone toward those needs through the Town's Emergency Housing Assistance Program.

Mr. Broman-Fulks highlighted nine new townhomes in the Chandler Woods neighborhood and said that those would be made permanently affordable through the Community Home Trust. He discussed four new homes in the Southgrove neighborhood and mentioned a family that had transitioned there from public housing. He said that the first $5 million in AH bond funds would go to five projects and that a total of 275 projects would be developed with partners through that allocation.

With regard to redevelopment, Mr. Broman-Fulks said that significant progress was being made on Town-owned land at 2200 Homestead Road and that staff expected a development application to be submitted in a few weeks. He said that a memo of understanding would be executed with a partner for a Jay Street project soon and that the community visioning plan for the Bennett Road site would move forward when in-person community engagement could resume.

Mr. Broman-Fulks said that staff anticipated approximately 15 new and 400 preserved homes in the current year, with the majority of those preserved units coming through the Emergency Housing Assistance Program. In the coming year, staff expected to make progress on the Town-owned land, to increase the inventory of transitional housing, and to continue providing emergency assistance, he said.

The Council confirmed with Mr. Broman-Fulks that AH projects were being designed to serve a variety of income levels, from extremely low to moderate. The Mayor and Council praised staff for their work and for going beyond the norm during the recent pandemic.

Mayor Hemminger encouraged residents to continue contributing to the Emergency Housing Fund, and she confirmed with Ms. Viñas that the Finance Department had been looking into enabling donations online. Mayor Hemminger proposed that staff get information out to let people know how they could donate.

This item was received as presented.

**10.** Orange County Food Council Update. [20-0672]

Ms. Viñas reminded Council Members that a 2019 memo of understanding (MOU) among Orange County and local governments in support of the Orange County Food Council was set to expire in March 2021.

Food Council Coordinator Ashley Hager gave a PowerPoint update on the Food Council's work in FY 2019-2020 and its scope of work for the coming two years. She said that activities since 2019 included developing a regional collaborative, facilitating partnerships, developing a Farmer Food Share Program, assembling a community food resource guide, making presentations, and designing information that illustrates the relationship between food security, AH, and systemic racism.

Ms. Hagar said that the Food Council had partnered with local schools and Orange County Solid Waste to start a composting pilot program. It had organized a report regarding food security and had hosted social justice and racial equity workshops, she said. She said that the Food Council had made progress in all identified areas and that its primary scope of work over the next year would be to develop a food policy agenda, recruit new members, and create a racial equity community data index.

Ms. Hagar described the Food Council's philosophic basis and said that "racial equity" referred to its work on systemic issues that cause barriers to access. She said that the purpose of a food policy agenda was to provide recommendations on practices and policies for improving the food system. Accountability and transparency were key to that process, she said.

Council Member Buansi noted that only 3 percent of Carrboro Farmers' Market farmers were people of color, and he asked about the process for participating there. Ms. Hager explained that farmers' market board members process applications and determine who becomes a permanent vendor and that this reflected a history of racism and increased barriers for non-white farmers. The Food Council had begun collaborating with the Health Equity Council and the Human Rights Commission to explore what a comprehensive racial equity community data index would look like, she said. She offered to follow up by providing examples of what the Food Council had been looking at.

Council Member Anderson asked how barriers to food access would be removed. She was having difficulty understanding what actual outcomes the Food Council was targeting and what it had achieved, she said.





Ms. Hager explained that the primary outcome had been to build trust and relationships with agencies that had been on the front lines and with community members who were experiencing food insecurity. The Food Council had been working with agencies to understand how they were delivering food in order to ensure that it was being delivered where it was wanted and being used effectively, she said. Ms. Hagar pointed out that building relationships took time. The Food Council wanted to understand the purpose and practices across agencies and would then move into looking at solutions to end hunger, she said.

Council Member Anderson asked what the Food Council had done to help get food out to marginalized communities during COVID-19. Ms. Hager replied that a number of Food Council Members had volunteered to connect local farmers and cooperatives in order to increase access to fresh, nutritious food.

Mayor Hemminger asked what the Food Council could do to become more of a partner in that effort, and Ms. Hagar said that it had recently begun discussing that with local social service and health agencies. She pointed out that the Food Council was not a direct service provider. The Food Council wanted to help facilitate types of food and how services are delivered but was entirely open to how it could be more supportive, she said.

Mayor Hemminger proposed that the Food Council consider helping agencies with grant writing, and Ms. Hagar agreed to raise the issue during the next food system coordination conference call.

Council Member Anderson recalled that non-profit food suppliers had wanted a Food Council that could help them with sharing resources, writing grant proposals, and making other broader connections. It was not clear to her how effective the Food Council had been after two years, she said. She commented on how the Food Council's agenda for the next couple of years seemed to be developing a food policy agenda when the current need was for immediate help during a pandemic.

Ms. Hagar replied that the Food Council had been participating in the long-term recovery process and was trying to be a bridge to food access providers. Acting out of urgency and not out of a commitment to equity values, might mean missing a time to work on a deeper level, she said. She said that the Food Council was available for immediate planning at the same time that it was moving forward with its food policy agenda.

Council Member Stegman remarked that she had understood from the start that the Food Council would be intentionally focused on a model that differed from that of direct service food providers. The idea was to get to the root causes of barriers to equity in order to inform and advise others on how to address those over the long term, she said. She characterized the amount of Food Council engagement with work groups in the community as impressive.

Council Member Huynh left the meeting.

This item was received as presented.

**11.** Presentation: University of North Carolina at Chapel Hill Semi-Annual Campus Development Report. [20-0673]

Evan Yassky, executive director of Facilities Planning and Design at the University of North Carolina at Chapel Hill (UNC-CH), provided a semi-annual update on UNC-CH's Capital Projects Program.

Mr. Yassky pointed that he had sent information to the Town regarding projects that had been put on hold due to COVID-19. He said that HVAC and other improvements had been completed at three residence halls and that the completion date for a surgical tower for UNC Healthcare had been pushed to late 2023 or early 2024.

Mr. Yassky reported that a Central Generation Plant being built on behalf of UNC-CH Healthcare was still early in construction. He noted that Berry Hall had been demolished and would be replaced by a UNC Medical Education Building and that the Curtis Media Center was being constructed as part of the School of Journalism and Media.

Mr. Yaasky said that Porthole Alley remained highly important but that design had been slowed due to the COVID-19 pandemic. He said that UNC-CH had moved to a new method for The Horace Williams Solar and Energy Storage Project and hoped to complete construction on that by next spring.

This item was received as presented.

**12.** Open a Public Hearing to Consider a Request to Close a Portion of an Unmaintained and Unimproved Public Right-of-Way on Monroe Street. [20-0674]

Manager of Engineering and Infrastructure Chris Roberts presented a request to close a portion of a currently unmaintained and unpaved street. He reviewed the state statute regarding public street and alleyway closings and noted that it provided an appeal process if the Council were to adopt the resolution.

Mr. Roberts showed the area on a map and indicated where the closing would isolate part of a right-of-way (ROW) on Monroe Street. He explained how the closure would isolate one property, which was currently accessed by a private driveway. He said that the developer had proposed





a full public access easement to provide reasonable legal access to that parcel, but the property owner, Zalman Joffe, had argued that the plan would not provide reasonable vehicular access to his property.

Mr. Roberts said that staff would work on the next legal steps to protect the current Monroe Street ROW and stop the closure process if an associated project, Columbia Street Annex, were to fail. He said that the developer understood and agreed to that. He recommended that the Council open the public hearing, allow public comment for 24 hours, and consider taking action on October 28, 2020.

At Mayor Hemminger's request, Mr. Roberts showed Mr. Joffe's property on the map. She confirmed with him that the ROW off South Columbia included steep slopes and crossed a perennial stream that was unused and in poor condition. The Mayor also confirmed that the easement was not currently being walked along or used it in any way.

Mayor pro tem Parker verified with Mr. Roberts that the entire section of Monroe Street being shown on the map was not being used. He raised the possibility of waiting to address the closure along with the Columbia Street Annex project, which might or might not be approved.

Mr. Roberts replied that the applicant had wanted to see if the ROW would be approved as a first step to the larger project.

Mayor pro tem Parker proposed having a provision in the resolution that would automatically have the closure go away if the Columbia Street Annex were not approved, and Mr. Roberts agreed to discuss that with the Town Attorney.

Council Members raised questions about making a decision without a traffic impact analysis or information about the larger development and without knowing what the NC Department of Transportation's (NC-DOT) planned to do in the area.

Architect Wendi Ramsden, representing Coulter Jewell Thames, argued that the closure would not deprive Mr. Joffe of reasonable access to his property. She said that her firm had offered Mr. Joffe an option for connecting to Columbia Street, and she provided background on negotiations with NC-DOT.

Council Member Gu verified with Ms. Ramsden that the Transportation and Connectivity Advisory Board had not commented on the closure but had not been supportive of the larger development.

Zalman Joffe stated that the proposed closure would completely block him from using two or three of his four lots. Proceeding with the closure would lead to changing the RCD, which would mean that he would be able to expand his property as well, he said.

Mayor Hemminger asked staff if Mr. Joffe's comment about the RCD was accurate, and Mr. Roberts said that he would need to refer that to the Planning Department.

Ms. Ramsden emphasized that her firm had no plans to remove or change the RCD, and Mayor Hemminger confirmed with her that the requested variance was only for managed and upper zones on the east side of the stream.

Mayor pro tem Parker asked about the size of the encroachment in feet, but Ms. Ramsden did not know off hand. She pointed out that the Town's planning and stormwater departments had seen fit to move the request forward.

Mayor Hemminger asked if it was accurate that Mr. Joffe's would be able to develop more units, but Planning staff replied that they had not done an in-depth evaluation because a ROW closure was not a Planning process. Planner Jake Lowman speculated that an unimproved ROW would not allow for a subdivision without much being improved. He said that the RCD would still be in place and that the distance from stream rule would still apply. He noted several constraints and hurdles that Mr. Joffe would need to overcome in order to gain more lots.

Mayor Hemminger said that several Council Members wanted the item to come in conjunction with the overall project, and Council Members requested more information on items such as where the RCD was in relation to the properties, how traffic would be affected, and what Mr. Joffee's redevelopment options would be if the request for closure were approved.

Ms. Ramsden proposed also exploring what the applicant would need to do to undo the process if the development did not go forward.

Council Member Anderson recommended that staff provide more holistic views that include input from traffic engineering and planning in the future.

Mayor Hemminger said that Council Member Huynh had left the meeting due to illness but wanted to be recorded as voting in favor.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, to continue the Public Hearing to November 4. The motion carried by a unanimous vote. Council Member Huynh did not vote.





## *SPECIAL USE PERMIT(S)*

Special Use Permit: The Application for a Special Use Permit is Quasi-Judicial. Persons wishing to speak are required to take an oath before providing factual evidence relevant to the proposed application.

Witnesses wishing to provide an opinion about technical or other specialized subjects should first establish that at the beginning of their testimony.

**13.** Consider an Application for Special Use Permit -Christ Community Church, 141 Erwin Road. **[20-0675]**

Planner Becky McDonnell presented a special use permit (SUP) application for Christ Community Church, a proposed 11,000 square-foot place of worship on approximately three acres at the corner of Erwin and Old Oxford Roads. She said that the area was zoned Residential 2, and she pointed out that places of worship were permitted uses in residential zoning districts.

Ms. McDonnell said that 117 parking spaces would be included and that stormwater controls would be located under the parking lot. There would be two entrances and bike lanes and that sidewalks would be improved, she said. She summarized recently included information about a proposed stormwater discharge point on the adjacent property to the south. She recommended that the Council consider enacting Resolution A, to approve the SUP.

Developer Phil Post, representing the applicant, pointed out that the Town Manager and five advisory boards had agreed that the application met the four findings of fact for approval. He asked the Council to adopt Resolution A.

Council Member Ryan pointed out that the Planning Commission had requested a 20-foot buffer on either side of the property boundary, but Mr. Post replied that the ordinance allowed those 20 feet to be shared with 10 feet on each side. Sharing the buffer would preserve hardwoods and facilitate the discharge of stormwater from Church property, he said. He pointed out that the adjacent property would not be required to cooperate regarding stormwater otherwise.

Harvey Krasny, a neighboring resident, expressed opposition to having any house of worship or institutional structure at the site. His objections were based on traffic concerns and building height, he said, adding that the church would tower over the surrounding 578 residential homes. He said that the proposed church would not maintain or enhance the value of contiguous properties and would not conform to general plans for the physical development of the area as low density residential use only.

Rebecca Smith, Michael Hoppa, and Emily Johnson outlined some of the concerns listed in a petition from 49 of their neighbors who had requested that the Council deny the SUP. These concerns related to character and value of surrounding neighborhoods, setting a precedent for encroachment, building height, increasing traffic, and worsening stormwater runoff.

Margo Ginsberg, Erwin Village Homeowners Association vice president, predicted worsening traffic hazards at McGregor Drive and said that the project would set a dangerous precedent for her neighborhood. Thirty-nine Erwin Village residents had signed a petition imploring the Council to deny the SUP, she said.

Scott Radway, representing Summit Properties, said that Summit had agreed to be fully responsible for the stormwater discharge in accordance with Town rules. The proposed buffer alignment would provide a better way to save trees on the southwest corner of the applicant's property, and Summit supported the application as drawn, he said.

Council Members pointed out that Chapel Hill had traditionally considered houses of worship to be congruent with the character of single-family neighborhoods. They noted that Town ordinances required stormwater to be managed. Church traffic would not have a great impact since it would occur mostly on Sundays, they said.

The Council verified that the applicant was willing to accept a Planning Commission stipulation that a shed be taken out of the buffer, if moved at all. They noted that no rezoning was being considered, so approval would not lead to other projects. Council Member Gu said that reducing impervious surface would improve the project. Mayor Hemminger said that the proposal was much better than others the Council had seen for the site.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, to close the public hearing. The motion carried by a unanimous vote. Council Member Huynh did not vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Ryan, that R-5 be adopted as amended. The motion carried by a unanimous vote. Council Member Huynh did not vote.

**14.** Consider an Application for Special Use Permit Minor Modification - Charterwood, 1701 Martin Luther King Jr. Blvd. [20-0676]

Planner Michael Sudol presented a request to extend the construction completion date for Charterwood from June 25, 2020 to June 25, 2022. He said that the SUP had been granted in September 2012 and the Town Manager had already allowed a one-year administrative extension. The





requested modification would extend that for an additional year, he said.

Mr. Sudol showed an aerial view of the site, which was located at the intersection of Martin Luther King Jr. Boulevard and Weaver Dairy Road. He explained that the request pertained only to the southern portion.

Mayor Hemminger commented that the Council should, at some point, discuss authorizing the Town Manager to approve such items as well. She raised the possibility of reducing impervious surface and other issues, and Mr. Sudol replied that the applicant was open to having that discussion.

The Mayor and Council discussed whether or not to continue the item until the applicant could be present and ultimately decided to ask the applicant to share his thoughts before or at the October 28, 2020 Council meeting.

A motion was made by Council Member Ryan, seconded by Council Member Anderson, to continue the Public Hearing to October 28, 2020. The motion carried by a unanimous vote. Council Member Huynh did not vote.

**Aye:** 4 - Mayor Hemminger, Council Member Anderson, Council Member Gu, and Council Member Ryan

**Nay:** 3 - Mayor pro tem Parker, Council Member Buansi, and Council Member Stegman

**Excused:** 1 - Council Member Huynh

**15.** Open the Public Hearing: Land Use Management Ordinance Text Amendment - Table 3.7-1: Use Matrix - Self-Storage Facility, Conditioned. [20-0677]

Development Planner Jake Lowman presented a Land Use Management Ordinance text amendment (TA) that responded to a request from Adam Golden, on behalf of NR Edge Property Owner LLC. He explained that the applicant was seeking to modify an existing SUP for Carraway Village in order to allow a self-storage facility as a special use in a Planned Mixed Use development. That use had not been allowed at the time of the applicant's original SUP and was currently only allowed in Office Institutional 2 and Conditional Zoning districts, he explained.

Mr. Lowman said that the proposed change would add an "S" under Planned Development Mixed Use in the Town's Land Use Management Ordinance use table. He recommended that the Council open the public hearing, receive comments for 24 hours, and schedule action for November 4, 2020.

Mayor pro tem Parker confirmed that any Council decision would not affect a separate request for conditioned self storage.

Chad Love, Ramsley subdivision HOA president, commented on the difference between the applicant's original drawings for Carraway Village and what was being proposed. He pointed out that Carraway Village was at a gateway location and said that proposals for a gas station, self storage, go-carts, and so forth was short-sighted and seemed to be grasping at what could be gotten at the moment. Mr. Love encouraged the Council to think about the long-term effect on those who live at the north side of Town.

Adam Golden, representing NR Edge and Northwood Ravin, emphasized that the requested change would pertain only to Block G, which was at the most northwestern edge of the parcel, 900 feet away from Eubanks Road.

Council Member Gu confirmed with Mr. Lowman that Council approval of the text amendment would not automatically approve self-storage for Carraway Village or automatically grant conditional self-storage use to others in the future.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, to close the public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote. Council Member Huynh did not vote.

**16.** Open the Public Hearing: Limited Scope Special Use Permit Modification - Carraway Village, 3000 Eubanks Road. **[20-0678]**

Mr. Lowman presented a SUP modification request for Carraway Village. He reminded Council Members that they had resolved in early March 2020 to limit the request's scope to the following five changes: adjust permitted uses to allow conditioned storage on Block G only, allow service stations in blocks A, B, and C as a primary use, adjust regulations for commercial signs, and consider terminating Public Street A off Eubanks Road at the edge of Block G.

Mr. Lowman provided additional details on each of the requested changes and indicated on a map what each would entail. He said that staff had evaluated the application and had reported to the Community Design Commission and Planning Commission. He recommended that the Council open the public hearing, receive comments, and continue the public hearing to November 4, 2020.

Council Member Ryan confirmed with Mr. Golden that Council approval would merely modify the number of tenant panels allowed on the gateway sign and would not allow additional signs. Council Member Gu confirmed with him that gas stations were currently allowed as an accessory use anywhere on the project but that he was proposing to add it as a primary





stand-alone use. If the Council were to approve the request, a gas station and convenience store would be put on only one of those three locations, he said.

Council Members pointed out the 4- to 5-acre area where storage was being proposed was large enough to allow more than one facility. They verified with Mr. Lowman that the applicant would not be limited to only one facility unless the Council made that a specific part of approval.

Mr. Golden gave a presentation on how the SUP modification would help to further the project's economic development goals and set the project up for success. He said that self storage was one of only a few possible viable uses for Block G, and he pointed out that it would generate less traffic than would other uses.

Mr. Golden noted that the current SUP allowed a gas station as a secondary use anywhere on the project. The current proposal was to make it a primary use but only on Block A, B or C, he said.

With regard to Public Street A, Mr. Golden explained that a large Resource Conservation District (RCD) and floodplain was very close to where the road would connect to the adjacent property. Making that connection would be extremely expensive, require extensive permitting, and did not seem viable, he said.

Council Member Huynh returned to the meeting.

Mr. Love commented that neighbors were willing to accept changes that were done in the right way. He characterized how Carraway Village was developing as not reflecting Chapel Hill and not what the first impression of the Town should be. Neighbors wanted to support development but did not feel that Carraway Village was becoming what had been promised and thought the Town should require better, he said.

Mayor Hemminger said that she had remaining concerns about the gas station being visible from the highway and being near the RCD. She pointed out that the Council had approved several self storage units that had never been built.

A motion was made by Council Member Ryan, seconded by Council Member Stegman, to continue the Public Hearing to November 4, 2020. The motion carried by a unanimous vote.

**17.** Open the Public Hearing: Land Use Management Ordinance Text Amendment - Proposed Changes to Section 5.14.4 (Campaign Signs). **[20-0679]**

Planner Becky McDonnell opened the public hearing for a text amendment to update the Town's campaign sign regulations. She said that state law required a 30-day period after an election until political signs could be removed without penalty. That differed from the Town's 40-day period, so staff had developed language to update the Towns ordinance to comply, she said.

Ms. McDonnell recommended that the Council open the public hearing, receive comments for 24 hours and continue the item for possible action on November 4, 2020.

A motion was made by Council Member Anderson, seconded by Council Member Buansi, to close the public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote.

*CONCEPT PLAN REVIEW(S)*

Concept Plans: Presentations for Concept Plans will be limited to 15 minutes.

Concept Plan review affords Council members the opportunity to provide individual reactions to the overall concept of the development which is being contemplated for future application. Nothing stated by individual Council members this evening can be construed as an official position or commitment on the part of a Council member with respect to the position they may take when and if a formal application for development is subsequently submitted and comes before the Council for formal consideration.

As a courtesy to others, people speaking on an agenda item are normally limited to three minutes. Persons who are organizing a group presentation and who wish to speak beyond the three minute limit are requested to make prior arrangements through the Mayor's Office by calling 968-2714.

**18.** Concept Plan Review: Municipal Services Center, 101 Weaver Dairy Road Extension. [20-0680]

This matter was deferred to the October 28, 2020 Council meeting.

**19.** Council Vacancy Update. (no attachment) [20-0681]

Mayor Hemminger explained that this process had been put on hold due to COVID-19 and the national elections. The Council wanted to wait until the public could be more involved because filling a Council seat and discussions about whether or not to reduce the number of Council Members deserved broad public input, she said.

This item was received as presented.

**APPOINTMENTS**





**20.** Appointments to the Community Design Commission. [20-0682]

The Council reappointed Ted Hoskins to the Community Design Commission.

appointed.

**21.** Appointments to the Housing Advisory Board. [20-0683]

The Council appointed Dustin Mills to the For-Profit Developer seat; Susan Hunter to the Homeowner or Tenant seat; Mark Shelburne to the Housing, Planning or Public Policy Expert seat; and reappointed Anne Hoole to the Real Estate Broker seat on the Housing Advisory Board.

appointed.

**22.** Appointments to the Planning Commission. [20-0684]

The Council appointed Elizabeth Losos in the Community Design Commission Champion seat and John Rees in the Transportation and Connectivity Advisory Board Champion seat.

**23.** Appointments to the Reimagining Community Safety Task Force. [20-0685]

The Council appointed Delores Bailey, Robert Campbell, Jemesha Cannon-Phillips, Marcus Farrow, Emma Ferriola-Bruckenstein, Desmond Frierson, Paris Miller, Heather Nash, Eliazar Posada, Ehmu Ra, Jeremy Roberson, Matthew Sullivan, and Shugong Wang to the Reimagining Community Safety Task Force.

The Council appointed Jaclyn Gilstrap and Malcom Hunter as alternates to the Reimagining Community Safety Task Force.

Mayor Hemminger read a list of appointments to the Reimagining Community Safety Task Force and said that the liaisons would be Council Members Stegman and Huynh, with Council Member Buansi as the alternate. The item would return to Council at its October 28, 2020 meeting, she said.

**24.** Appointments to the Transportation and Connectivity Advisory Board. [20-0686]

The Council appointed Katherine Huge and Denise Matthews to a Chapel Hill seat on the Transportation and Connectivity Advisory Board.

**ADJOURNMENT**

The meeting was adjourned at 11:03 p.m.

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

| | |
|---|---|
| Mayor Pam Hemminger | Council Member Hongbin Gu |
| Mayor pro tem Michael Parker | Council Member Tai Huynh |
| Council Member Jessica Anderson | Council Member Amy Ryan |
| Council Member Allen Buansi | Council Member Karen Stegman |

**Wednesday, October 21, 2020** **6:30 PM** **Virtual Meeting**

**Virtual Meeting Notification**

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_fgPYF1uzTXOTxMpnprT8VQ After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 890 9053 7187

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Interim Planning Director Judy Johnson, LUMO Project Manager Alisa Duffey Rogers, Community Resilience Officer John Richardson, Principal Planner Corey Liles, Interim Zoning Enforcement Manager Gene Poveromo, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING

Mayor Hemminger opened the virtual meeting at 6:30 p.m. Mayor Hemminger called the roll and all Council Members, with the exception of Jessica Anderson,





replied that they were present. Council Member Anderson arrived at 6:46 p.m.

ANNOUNCEMENTS BY COUNCIL MEMBERS [20-0721]

0.01 Mayor Hemminger Regarding Governor Cooper's Extension of Phase 3. [20-0722]

Mayor Hemminger announced that Governor Cooper had extended Phase 3 of COVID-19 restrictions for three more weeks due to an increasing number of cases and hospitalizations. Orange County's positivity rate remained at 3 percent or less, but other counties were experiencing 5 percent and higher, she said.

0.02 Mayor Hemminger Regarding Celebrating Halloween Differently This Year. [20-0723]

Mayor Hemminger said that downtown streets would not be closed for Halloween this year because social gatherings contribute to the spread of COVID-19. She reminded residents to continue observing the 3Ws: Wear a proper mask, wash hands frequently, and wait six feet apart during Halloween as well.

0.03 Mayor Hemminger Regarding Grant for Launch Business Accelerator. [20-0724]

Mayor Hemminger announced that a $230,000 grant from Lemore Capital Company would expand programming at the Launch Business Accelerator in Chapel Hill. The grant would enable Launch to invest in software and technology, expand its start-up support services, and hire a community manager, she said.

### AGENDA ITEMS

**1.** Progress Report on Climate Action Plan. [20-0708]

Community Resiliency Officer John Richardson gave a PowerPoint presentation on the Town's Climate Action Plan. He reported that Town operations made up about 2 percent of Chapel Hill's total annual carbon emissions, while the larger community made up about 98 percent. He noted the importance of acting collectively and said that the Town had been doing fairly well when compared with other cities.

Mr. Richardson said that actions outlined in the Climate Action Plan would lead to a reduction in emissions over time. He noted that community emissions levels had dropped by about 3 percent from 2005 to 2017 and said that the Town was well positioned to meet its goal of 26-28 percent reduction by 2025 if that trend continued.

Mr. Richardson provided details on actions the Town could take to further lower emissions. These included having a cleaner electricity grid, carbon neutral new construction, more electric vehicles, EV charging stations, and green building retrofits. He provided information on costs and on how such actions would affect Town goals.

Mr. Richardson said that responses to a Town climate action survey on accessibility and affordability had pointed to the need for a social justice/social equity focus. He discussed the need for partnerships and incentives to help drive behavioral changes in the community.

Mr. Richardson said that the Town had converted nearly 2,000 street lights to LED in recent months, cutting street light emissions in half. Staff had been looking at doing the same with Town parks, he said. Greening the grid, designing for more carbon neutrality in new construction, and transitioning to electric vehicles were the most impactful steps the Town could take, he said.

Mr. Richardson pointed out that three electric Town buses would be on the road in the first half of 2021 and that the Town would be in a position to purchase up to seven more due to a federal grants. Transit was expecting to expand electric vehicle charging opportunities as well, he said. He noted that a grant from Duke Energy Foundation had enabled the Town to plant trees in public housing neighborhoods and said that more trees would be planted during Arbor Day celebrations.

Mr. Richardson said that staff would move forward with implementation, and he described a plan for virtual public engagement during the pandemic. He would share the final Plan with the Council in early November and then return in January 2021 with a final version to be considered for adoption, he said.

Council Member Anderson joined the meeting at 6:58 p.m. She explained that she had been delayed due to a family injury.

Council Members confirmed with Mr. Richardson that "greening the grid" could include retrofitting existing structures and that adding solar to Town buildings could be part of the overall plan. Mayor pro tem Parker recommended that staff think broadly about state advocacy, and he emphasized the importance of spreading the benefits of going green equitably.

The Council confirmed that calculations regarding vehicle mile reductions would be more clearly highlighted in the plan. They confirmed that the Town would remain informed regarding changes in technology, governmental policies, grant and partnership opportunities. Mr. Richardson agreed to include recommendations in the Plan for things the Town should do when rewriting its Land Use Management Ordinance.



Town Council Meeting Minutes - Draft October 21, 2020

Council Member Stegman asked about including more concrete guidelines for what the Council could request in new development, and Mr. Richardson replied that merely holding new development to the same AIA 2030 standard as Town buildings would do a lot to achieve reductions. He said that staff had been thinking about exploring incentives as well.

Council Member Gu asked for more quantitative details and a prospective tool that would show the environmental impact of different development choices. She also noted the value of including multiple departments when making improvements so that upgrades could be done simultaneously.

Council Members confirmed that demographic information would be included with survey data and that preserving natural land would be included in the Action Plan. They discussed how the Town had the potential to work with other local jurisdictions through Orange County Climate Council meetings and said that the University of North Carolina at Chapel Hill (UNC-CH) was a member of that group as well.

Mayor Hemminger said that green stormwater infrastructure should be listed in Town building codes and in all development plans going forward. She recommended that the Climate Action Plan include information about waste reduction and composting, and she proposed telling the story better about planting trees. She said that Duke Energy had not moved fast enough and that she wanted the Council to advocate for it to accelerate its plan.

Mayor Hemminger spoke in favor of converting all Town lights to LED. She praised the idea of having a dashboard to easily show the public what Chapel Hill was doing. She asked if putting community solar on top of parking decks would be an option and stressed the importance of having the business community convert their parking lot lights to LED.

Mayor Hemminger confirmed with Mr. Richardson that members of the public could reach him at: jrichardson@townofchapelhill.org or sustainability@townofchapelhill.org.

This item was received as presented.

**2.** Continue Discussion of Chapter 160D Updates to Land Use Management Ordinance and Town Code of Ordinances. **[20-0709]**

Planner Corey Liles provided background information on Chapter 160D, a section of N.C. general statutes, and discussed provisions that would come into effect by July 2021 or once the Town adopted the necessary updates in its Land Use Management Ordinance (LUMO) and Town code.

Mr. Liles pointed out that 160D would prohibit the Council from using advisory board recommendations when deciding on special use permits

(SUPs) and said that it probably would not be wise to transmit board recommendations to the Council during SUP hearings.

Mr. Liles said that the Council had previously raised the idea of having advisory boards report to staff, which could then do an unbiased evaluation of that input and include appropriate conditions in recommendations for Council approval. That approach would allow advisory boards to raise issues about an SUP proposal, but it would add time to the review process, he said.

Mr. Liles said that staff wondered how advisory boards and the public would feel about having staff evaluate board input. He asked Council Members if they thought that seemed like a good approach, and, if so, if advisory boards should continue to hear from the public on community concerns.

Most Council Members expressed concern about having staff decide what input to move forward. Mayor Hemminger wondered if the Council might review action minutes from board meetings and/or if board members would be allowed to speak before the Council.

Mr. Liles replied that reviewing action minutes probably would be okay since those were public record. With regard to board members speaking at SUP hearings, however, he pointed out that the Council needed to avoid the perception that board members were inserting themselves into the discussion.

Council Members raised the idea of having some board members appear as expert witnesses, but Town Attorney Ann Anderson pointed out that qualifying for an advisory board did not, in and of itself, mean that a person was qualified as an expert witness.

Mayor pro tem Parker commented on how the Town had been phasing SUPs out and how most SUPs would be modifications. The Council might be trying to solve a problem that would ultimately take care of itself, he said.

Mr. Liles agreed that the Town expected to see more Conditional Zoning in the future and that the current volume of SUPs was expected to go down.

Mayor Hemminger said that the Council wanted Town advisory boards to be involved in reviews and needed guidelines for such a path. She asked Mr. Liles to research whether Council Members could read action minutes from advisory board meetings and to work with the Town Attorney to find out what could legally be done to incorporate board input.

Mr. Liles agreed and added that he would also ask for advisory boards' reactions to having staff evaluate their input.





LUMO Project Manager Alisa Duffey Rogers discussed development approvals with vested rights, the right of an applicant to continue a development as it has been approved even if regulations are amended after the approval was granted, and pointed out that vested rights were time limited. Under 160D, most approvals were valid for one year, but 160D did provide for site-specific vesting plans that have terms ranging from two to five years, she said.

Ms. Duffey Rogers said that the Town's form district permits, Blue Hill District and its SUPs, were considered site specific vesting plans. She asked if the Council wanted to continue specifying those as such and if there were any other development approvals that it should include. In addition, if there were any other approvals such as Conditional Zoning that should merit a longer vesting term, she asked.

After a brief discussion, the Council decided to continue its current practice with the Blue Hill District and SUPs, and perhaps add Conditional Zoning. Council Member Ryan confirmed with Ms. Duffy Rogers that the Town had been mistaken when it put a one-year time limit on SUPs, which should have been two years. Deciding to call it a "site-specific vesting plan" would mean changing it to what the Town's actual practice had been, Council Member Ryan said.

Mayor pro tem Parker confirmed with Ms. Duffey Rogers that 160D also broadened a concept called "permit choice", which would allow someone who currently filed a complete application to lock in the pre-160D rule and have an opportunity to mix and match new and old rules all the way through the process.

Ms. Duffey Rogers noted that there was an opportunity for a term lasting three to five years, but she confirmed that Council wanted to keep the 1-2 year term, with an opportunity to extend. She said that the next step would be to hold a virtual meeting with development review boards and that she would return in December 2020 or January 2021 to talk about zoning topics. Staff would then work toward making all necessary updates by spring 2021, Ms. Duffy Rogers said.

This item was received as presented.

**3.** Discuss Processes for Developing Council Initiated Resolutions. (no attachment) **[20-0710]**

Facilitator Maggie McGlynn opened a discussion of steps the Council might take to respond to emerging issues in ways that would be inclusive and create equitable, high-quality policy decisions. She had been asked to help develop a process in which the Council would engage each other and the public regarding Council-initiated petitions and resolutions, she said.

Ms. McGlynn said that she had interviewed all Council Members and had heard that Council-initiated petitions and resolutions could be "a bit messy" due to a lack of clarity regarding the process. She could offer steps that would add clarity when bringing such initiatives forward, she said.

Ms. McGlynn asked Council Members if they felt comfortable putting written procedures and understandings in place and with looking at the issues such as communication, transparency, and shared beliefs that were laid out in a document she had submitted.

Several Council Members said that they had just received Ms. McGlynn's document and had not had time to digest it. Mayor pro tem Parker said he felt confused about what was actually being proposed. Council Member Huynh said he was in favor of setting up processes and having transparency but could not endorse the process that Ms. McGlynn had sent because there had not been enough time to read it.

Council Member Buansi asked if the current conversation was being driven by a June resolution regarding policing that the Council passed following the killing of George Floyd by police in Minneapolis.

Ms. McGlynn replied that the resolution had been the impetus for looking at the process but that she had heard the word "messy" applied to a number of Council-initiated resolutions and petitions. The general impetus for the current conversation was the manner of doing Council work together, she said.

Council Members generally agreed that the discussion should address resolutions as well as petitions. The focus should be more "granular" and should address issues of clarity, transparency, streamlining, and flexibility, some said. They expressed interest in having a subcommittee address the issue, and Mayor Hemminger verified that three or four Council Members would be interested in serving on one.

Council Member Stegman said that she felt proud of the Council for passing the resolution in June when there was a need to take action. Though not an ideal process, it was critically important and much appreciated by the community, she said.

Mayor pro tem Parker and Council Member Buansi proposed having at least one more full Council discussion before forming a subcommittee. That would help the subcommittee have a better understanding of what the full Council thought, Mayor pro tem Parker said.

Council Member Huynh raised the idea of having another facilitated session as well, and Ms. McGlynn said she would be happy to set up a matrix, offer additional ideas, and facilitate another session. She would wait to hear from the Council about next steps, she said.

This item was received as presented.





## REQUEST FOR CLOSED SESSION TO DISCUSS ECONOMIC DEVELOPMENT, PROPERTY ACQUISITION, PERSONNEL, AND/OR LITIGATION MATTERS

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that the Council enter Into a closed session as authorized by General Statute Section 143-318.11(a)(6), to discuss an employee matter. At the conclusion of the closed session, the Council will adopt a single motion to end the closed session and adjourn the meeting without taking further action. The motion carried by a unanimous vote.

## ADJOURNMENT

The Council recessed the meeting at 9:07 p.m. and adjourned the meeting at the conclusion of the closed session.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

| | |
|---|---|
| Mayor Pam Hemminger | Council Member Hongbin Gu |
| Mayor pro tem Michael Parker | Council Member Tai Huynh |
| Council Member Jessica Anderson | Council Member Amy Ryan |
| Council Member Allen Buansi | Council Member Karen Stegman |

**Wednesday, October 28, 2020 7:00 PM Virtual Meeting**

**Virtual Meeting Notification**

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_y8whWrG_RtiChm4ZFTlE0g After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 828 5855 2338

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Interim Planning Director Judy Johnson, LUMO Project Manager Alisa Duffey Rogers, Emergency Management Coordinator Kelly Drayton, Fire Chief Vencelin Harris, Economic Development Officer Dwight Bassett, Planner II Michael Sudol, Transportation Planning Manager Bergen Watterson, Principal Planner Corey Liles, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING

Mayor Hemminger opened the virtual meeting at 7:00 p.m. and read the





agenda. Mayor Hemminger called the roll, and all Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Mayor Hemminger Regarding Justice in Action Meeting on Thursday. [20-0748]

Mayor Hemminger said that the Justice in Action Committee would continue discussing its charge and structure at a 6:00 p.m. virtual meeting on November 5th. The public was encouraged to attend and provide input, she said.

0.02 Mayor Hemminger Regarding Upcoming Council Meetings. [20-0749]

Mayor Hemminger said that the Council's next virtual meeting would be held at 7:00 p.m. on November 4th, and the Council Committee on Economic Sustainability would meet on November 6th at 8:00 a.m. She said that the public was welcome to attend those meetings virtually.

0.03 Mayor Hemminger Regarding Early Voting in Orange County. [20-0750]

Mayor Hemminger pointed out that more than 41,000 Orange County residents had already voted in the national election and that early voting would continue until 3:00 p.m. on October 31, 2020. She urged citizens to vote early in order to avoid long lines on Election Day.

### PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.

**1.** Stormwater Management Utility Advisory Board Recommendations Regarding the Development Review Process. [20-0725]

Pamela Schultz, representing the Stormwater Management Utility Advisory Board (SWAB), presented a petition asking that the SWAB be alerted to projects of five acres or more that included Resource Conservation District land at the same time that the Community Design Commission reviews them.

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, that this Petition be received and referred to the Mayor and Town Manager. The motion carried by a unanimous vote. Council Member Gu did not vote.

**2.** Residents of Dixie Drive Request to Rename Dixie Drive. [20-0726]

Mayor Hemminger said that Barry Nakell, a Chapel Hill resident, had presented a petition from his neighborhood to change the name of Dixie Lane.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, that this Petition be received and referred Mayor and Town Manager. The motion carried by a unanimous vote.

**3.** Eva Hagan Request to Endorse H.R. 763 (Energy Innovation and Carbon Dividend Act). [20-0727]

Mayor Hemminger pointed out that the Council had voted on June 24, 2020 to take action on the Energy Innovation and Carbon Dividend Act (HR 763).

This item was received as presented.

## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that R-1 be adopted, which approved the Consent Agenda. The motion carried by a unanimous vote.

**4.** Approve all Consent Agenda Items. [20-0728]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**5.** Approve the Miscellaneous Budget Ordinance Amendments to Adjust Various Fund Budgets for FY 2020-21. [20-0729]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**6.** Authorize the Sale of Property in the Oakwood Public Housing Neighborhood. [20-0730]





This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**7.** Amend Chapters 12, 17, and 21 of the Code of Ordinances that Regulate Parks and Greenways, Sidewalk Sales, and Bicycling. [20-0731]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**8.** Adopt a Charge for the Reimagining Community Safety Task Force. [20-0732]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**9.** Adopt a Revised Meeting Schedule to Hold Meetings in a Virtual Environment through December 31, 2020 or Until the Orange County Stay At Home Order is Lifted. [20-0733]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## INFORMATION

**10.** Receive Upcoming Public Hearing Items and Petition Status List. [20-0734]

This item was received as presented.

## DISCUSSION

**11.** Update on Town Efforts to Respond to the COVID 19 Crisis. (no attachment) [20-0735]

Emergency Management Coordinator Kelly Drayton provided an update on the Town's COVID-19 pandemic response. She said that N.C. Governor Cooper had issued an executive order that had clarified and extended a U.S. Center for Disease Control prohibition against landlords evicting some tenants.

Ms. Drayton said that North Carolina would remain in Phase 3 of its reopening until November 13th because pandemic trends had been moving in the wrong direction. She urged residents to continue practicing the 3Ws: wear a mask, wash hands regularly, wait six feet apart. She described a new SlowCOVIDNC exposure notification app, which could notify residents if they had been in close contact with someone whose positive test result had been listed.

Ms. Drayton reminded all residents to get a flu shot. She advised people to limit the size of gatherings on Halloween and said that ideas for celebrating safely could be found on the Orange County website. She said that a full database of testing locations was listed at orangecountync.govtesting. She discussed Neighborhood Support Circles, which serve families from both English-speaking and non-English speaking communities.

Council Members confirmed with Ms. Drayton that more than 100,000 people had downloaded the exposure notification app, and she agreed to provide them with information about its effectiveness. A Council Member proposed having someone from the Chapel Hill-Carrboro School System provide an update on school plans. The Council asked if homeowners' associations were trying to limit trick-or-treating to their own neighborhoods, and Ms. Drayton agreed to report back on that. Council Member Buansi cautioned that imposing such limits could be discriminatory.

Mayor Hemminger said that she hoped the University of North Carolina at Chapel Hill (UNC-CH) would reveal its spring semester plans on November 4th. The University had purchased equipment to ramp up its testing capabilities, but other parts of its plan were still being developed, she said.

Mayor Hemminger praised the community's efforts during the pandemic. She said that Metro Mayors had learned from the N.C. Department of Health and Human Services that viral spikes, which were mostly occurring in rural communities, could get worse during the upcoming winter. The Governor would consider scaling back indoor and outdoor gathering numbers if cases continued to rise, she said.

Mayor Hemminger reported on Metro Mayors' discussions about mandating masks in public places and removing alcohol licenses from non-complying restaurants. The mayors preferred an incentive approach and had agreed that a national election was not the best time to come out with new protocols, she said.

This item was received as presented.

**12.** Consider an Application for Conditional Zoning at 125 East Rosemary Street Parking Garage from Town Center-2 (TC-2) to Town Center-2-Conditional Zoning District (TC-2-CZD). **[20-0736]**

Town Manager Maurice Jones gave a PowerPoint update on the East Rosemary Street Parking Garage project. He said that an economic development agreement (EDA) had been signed between the Town and Grubb Properties and that the two entities would exchange properties by the end of May 2021 if no issues arose during the due diligence phase.

Mr. Jones said that the process would include entitling the new deck, finalizing the design, having a preliminary staff review, and holding a concept plan hearing for a new office building. He pointed out that the Town had a repurchase option that would apply if Grubb Properties failed





to secure entitlement of the office building by November 2020.

Mr. Jones said that the current due diligence period would run through November 23, 2020, and he described the team of people who were working on that. He said that items being finalized included: a letter of inquiry to UNC-CH concerning the 100 parking spaces that they plan to pay for in the garage; a Wallace Deck lease with Grubb Properties; a temporary license agreement to allow site lay down for the projects; and an improvements agreement regarding the construction process. Mr. Jones outlined the schedule up to the start of construction in May 2021. He said that complete information was available at: townofchapelhill.org/businesses/eastrosemarystreetredevelopmentproject.

Planner Judy Johnson presented the Conditional Zoning application from Grubb Properties (in partnership with the Town) for 125-135 East Rosemary Street. She noted that a September 30, 2020 public hearing had included an additional 24-hour comment period. She explained that the parking deck would be part of a larger redevelopment project on East Rosemary Street.

Ms. Johnson outlined the proposal to build a seven-story deck with about 1,100 parking spaces on a two-parcel site. The project would include rezoning to Town Center-2-Conditional to accommodate those improvements, she said. She noted a plan for full access in and out of North Street. She showed where a Police Department substation could be located and indicated where a retail "Front Porch" was proposed to be built. She showed a rendering of a crosswalk/refuge island on East Rosemary Street.

Ms. Johnson noted that modifications included an increase in building height an additional buffer on the North Street side. Ordinance A also required that improvements to the North Street/Columbia Street/Martin Luther King Jr. Boulevard intersection be done in conjunction with N.C. Department of Transportation approvals, she said. She recommended that the Council adopt the Resolution of Consistency and enact Ordinance A.

Council Members confirmed with staff that citizens would be able to learn and comment on construction traffic plans at a February 2021 meeting and that there would be open houses regarding traffic-calming measures. They verified that the Town would pay for widening a section of North Street and asked Ms. Johnson to bring back a timeline regarding North Street changes. The Council agreed to amend Ordinance A to say "consideration" of bike lanes because they were still being discussed.

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, that R-14 be adopted. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, that O-9 be enacted as amended. The motion carried by a unanimous vote.

12.01 Celebrating Successes Video: Greenfield Community Award Ceremony.

The Council viewed a Celebrating Successes video regarding a 2020 Housing North Carolina award to the Town for its Greenfield Community development in the Blue Hill District. The video explained that Greenfield Place and Greenfield Commons included 149 affordable apartments for families and seniors who make 60 percent, or less, of the area median income. The $24 million project was built on nine acres of donated Town land and was financed with federal low income housing tax credits awarded by the NC Housing Finance Agency, the narrator said. The video provided a tour of the Greenfield Community and pointed out its easy access to schools, employment, transportation and medical facilities.

**13.** Charting Our Future - Public Hearing for the Adoption of the Future Land Use Map - Update to Chapel Hill 2020. **[20-0737]**

Land Use Management Ordinance (LUMO) Project Manager Alisa Duffey Rogers opened the public hearing for adopting Future Land-Use Map (FLUM) updates to the Chapel Hill 2020 Comprehensive Plan (CH 2020).

Consultant Sal Musarra, of Kimley Horn and Associates, described the effort to build flexibility into the Town's 30-year Land-Use Plan in order to allow course corrections in response to changing conditions. He characterized the Future Land-Use Plan as a living document that would provide strong guidance and a good framework for decision-making in the future.

Ms. Duffey Rogers said that there had been much public engagement since a 2018 "Charting Our Future" kickoff to the FLUM rewrite during which community members had provided much input. She reviewed elements of the document and said that it embodied community values, aligned with the Council's strategic goals, and would replace the current Land-Use Plan in CH 2020.

Ms. Duffey Rogers summarized recent requests from UNC-CH and UNC Healthcare to change specific aspects of the FLUM. She recommended that the Council open the public hearing, receive comments, close the hearing and allow public comments for 24 hours, and consider adopting the FLUM on November 18, 2020.

In response Council Members' questions, Ms. Duffey Rogers addressed UNC-CH and UNC Healthcare's requested changes. She did not think it would be appropriate to label University properties as such on focus area maps because there no longer were any specific parcels identified on





those maps, she said. With regard to a request for a University character type, UNC-CH's uses could be accommodated within existing character types but the Council could create one if it so chose, she said. Staff did not have issues with UNC Healthcare's requests as long as the Council concurred with those, she said.

Council Member Ryan expressed concern about the implications of a request from UNC Healthcare to make hospitals a commercial use. She confirmed with staff that there would be an opportunity to look into that more deeply before the Council's final vote. Ms. Duffey Rogers pointed out that the Commercial Office land-use category was only used outside the focus areas and that fewer than 10 parcels were designated that way on the map.

Town Attorney Ann Anderson commented that Council Members might want to reconsider closing the public comment period after 24 hours if it expected to have considerable discussion at a subsequent meeting.

Katie Loovis, representing the Chamber for a Greater Chapel Hill-Carrboro, praised the thoughtful and inclusive process but said that the proposed Future Land-Use Plan missed some opportunities. She said that Town land abutting Chatham County to the south and Durham County to the north should be designated as "future study areas". She recommended increasing the density along transit corridors, especially around bus stops on Martin Luther King Jr. Boulevard, and she made several recommendations regarding density, set-backs and building heights.

Anna Wu, Vice Chancellor for Facilities Services at UNC-CH, noted that the University's chancellor had sent a letter outlining concerns. She recommended that the FLUM reflect property owned by UNC-CH and UNC Endowment Foundation and Real Estate Holdings. Recognizing those properties was helpful to the community and developers because it provided a cross-reference to parcels included in UNC's campus master plan, she said.

Ms. Wu said that UNC requested changes to the university land-use category would better reflect the variety of uses necessary to support its mission and provide flexibility to accommodate future uses. She read a long list of recommended university land-use categories and requested inclusion of "university land use" in the matrix of character types and all focus areas that include UNC-CH parcels. To designate its development as either mixed use or commercial office would significantly impact the University's ability to fully utilize its land beyond the main campus, she said.

Simon George, Assistant Vice President for Real Estate and Development for UNC Healthcare, expressed concern about the FLUM, as presented. He said that UNC Healthcare had requested more specific language with regard the land-use categories and he listed the changes that they had requested. He said that UNC Healthcare supported the revisions regarding UNC-CH that Ms. Wu had outlined, and he asked that future conversations regarding the FLUM include UNC Healthcare.

Holly Fraccaro, CEO of the Home Builders Association (HBA) of Durham, Orange and Chatham Counties, thanked staff for incorporating feedback from the HBA over recent years. However, the 30-year FLUM missed some opportunities to be clearer about the Town's vision, she said, adding that she agreed with what Ms. Loovis had said. She noted that the rewrite presented an opportunity to consider unique affordable housing opportunities, such as tiny homes and pocket neighborhoods.

Ms. Fraccaro pointed out that having focus areas that make up only 20 percent of the Town's geographic area would leave 80 percent without a vision for 30 years. She hoped that a missing middle scan that staff intended to include in the next phase would justify including much more of the Town, she said. She recommended several changes to be made during the LUMO rewrite and advocated for including best practices regarding green building and stormwater management.

Julie McClintock said that the Chapel Hill Alliance for a Livable Town (CHALT) had submitted a petition in July 2020 that asked the Council to refrain from voting on the FLUM for one to two years because so many changes were occurring due to COVID-19. In addition, the Town should obtain community benefits from developers by setting maximum building heights and offering additional stories as a density bonus, she said. Ms. McClintock said that CHALT had submitted extensive comments regarding proposed areas for development, and she commented on some of those.

Council Members asked staff to return with more information regarding the implications of UNC-CH's and UNC Healthcare's requested changes and more clarity on UNC-CH's definitions. The Council had not had enough time to process information received just that day and not enough detail to know what the proposed land-use category and character type would actually mean, said Mayor pro tem Parker. He asked staff to bring back a recommendation.

After a discussion with the Town Attorney about the implications of keeping the public hearing open beyond 24 hours, the Council voted.

A motion was made by Council Member Anderson, seconded by Council Member Ryan, to continue the Public Hearing to November 18, 2020. The motion carried by a unanimous vote.

**14.** Consider a Land Use Management Ordinance Text Amendment - Proposed Changes to Articles 3, 5, and Appendix A Definitions pertaining to Conditional Zoning. **[20-0738]**

Ms. Duffy Rogers presented a LUMO amendment that would allow





development applications to be converted from a quasi-judicial Special-Use Permit (SUP) process to a legislative process using Conditional Zoning (CZ). She pointed out that CZ did not have the same notification requirement as SUPs and said that many applications had been delayed because of that requirement. The proposed amendment would also bring the LUMO into compliance with new state legislation (160D), she said.

Ms. Duffey Rogers noted that the proposed amendment would also change the definition of "S" in the LUMO use matrix to permit special uses, such as drive-in windows, as part of a CZ application. She said that another proposed revision would allow permitted uses within the RCD to be considered as part of a CZ application. The proposed amendment was consistent with a CH 2020 goal of creating a clear and consistent decision-making process for development, she said, and she recommended that the Council adopt the Resolution of Consistency and enact Ordinance A.

A motion was made by Council Member Anderson, seconded by Council Member Stegman, that R-16 be adopted. The motion carried by a unanimous vote.

A motion was made by Council Member Anderson, seconded by Council Member Ryan, that O-10 be enacted. The motion carried by a unanimous vote.

## SPECIAL USE PERMIT(S)

Special Use Permit: The Application for a Special Use Permit is Quasi-Judicial. Persons wishing to speak are required to take an oath before providing factual evidence relevant to the proposed application.

Witnesses wishing to provide an opinion about technical or other specialized subjects should first establish that at the beginning of their testimony.

**15.** Consider an Application for Special Use Permit Modification - Charterwood, 1701 Martin Luther King Jr. Blvd. **[20-0739]**

Planner Michael Sudol presented a SUP modification application to extend Charterwood's completion date to June 15, 2022. He noted that the item was being continued from an October 7, 2020 Council meeting because Council Members' had questions regarding parking spaces and impervious surface.

Mr. Sudol explained that the Town Manager had already approved a one-year administrative extension, which expired on 6/25/2020. He showed an aerial view of the site, indicated the area in question at the intersection of Martin Luther King Jr. Boulevard and Weaver Dairy Road, and reviewed elements of the original 2012 SUP. Mr. Sudol recommended that the Council adopt Resolution A, which would extend the completion date to June 25, 2022.

George Retschle, representing Ballentine Associates, explained that the applicant had eliminated a drive-through lane and reduced impervious surface at the State Employees Credit Union (SECU) location in response to neighbors' requests. Charterwood itself was very low in impervious surface and had a large buffer between it and its neighbors, he said.

Jamie Applequist, representing SECU, noted the importance of having drive-through lanes during the pandemic. He said that SECU had tried to make every concession regarding its site and had run out of time to build within its original time-frame.

Council Member Gu commented that the pandemic had also led to people going to banks less frequently. She asked about reducing the parking area further, but the applicant expressed a reluctance to do so.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-18 be adopted. The motion carried by a unanimous vote.

*CONTINUED DISCUSSION*

**16.** Consider an Application for Conditional Zoning for Bridgepoint at 2214 and 2312 Homestead Road from Residential-5-Conditional (R-5-C) to Residential-5-Conditional Zoning District (R-5-CZD). [20-0740]

At the applicant's request, this item was postponed to the Council's November 18, 2020 meeting.

**17.** Adopt Updates to the Mobility and Connectivity Plan. [20-0741]

Mayor Hemminger said that the Town had received a presentation from Triangle Bikeway for a proposed bike and greenway connection from Chapel Hill through Durham all the way to Raleigh. She commended the vision and said that the project would begin in 2035.

Transportation Planning Manager Bergen Watterson presented proposed updates to the Town's 2017 Mobility and Connectivity Plan (M&C Plan). She said that the Town was on track to reach its goal of increasing alternative commuting to 35 percent by 2025 with an approximate one percent increase each year. Data regarding how COVID-19 had affected that would be in 2020 Census information, she pointed out.

Ms. Watterson said that the M&C Plan was being updated due to a commitment by NC DOT's 2019 Complete Streets policy which would pay





for facilities along its roads if they are in adopted plans. NC DOT would also pay for transit facilities, such as landing pads and bus pull-outs, so staff had included those as well, she said.

Ms. Watterson noted that staff had identified all facilities being proposed on NC DOT roads and had discussed how to improve them in the case of a major NC DOT construction project. She said that information regarding that was in the Council's packets and on the Mobility and Connectivity Plan website. Recommendations for transit facilities, as well as a 2019 NC-54 Bike and Pedestrian Safety Plan, were included as appendices to the M&C Plan, she said.

Ms. Watterson reported that staff had met with Town advisory boards, had held a virtual public meeting, and had allowed two days of virtual office hours. She recommended that the Council approve Resolution 23, which would adopt the proposed updates to the 2017 Mobility and Connectivity Plan.

Council Member Gu clarified with Ms. Watterson that roads listed in the M&C Plan had not been updated since 2017 and that the Town probably would do a new study within three-to-five years. She asked for more information regarding local roads, and Ms. Watterson said that many were typically implemented in conjunction with development.

Ms. Watterson described projects on Estes Road, Fordham Boulevard, and Estes Drive Extension that were currently funded. The Town continued to submit projects to NC DOT through its prioritization process and had its own Capital Improvement Projects process as well, she said.

Council Member Gu proposed incorporating the M&C Plan every time the Town repaved a road, and Ms. Watterson replied that those were flagged in the Public Works Department's five-year plan.

Mayor Hemminger verified with Ms. Watterson that a NC-DOT re-striping project, which would begin on the "west end" next summer, would include buffered bike lanes. The Mayor and Council praised Ms. Bergen and her staff for their work in general and for developing the Connectivity and Mobility website.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that R-23 be adopted. The motion carried by a unanimous vote.

**18.** Consider an Amendment to the Water and Sewer Service Area Boundary (WASMPBA Amendment). [20-0742]

Planner Cory Liles gave a PowerPoint presentation on a possible amendment to the Town's water and sewer service area boundary agreement (WASMPBA) that would allow services to be extended to two homes on Bayberry Drive in the Hunts Reserve neighborhood at the southern end of Town. He showed the area on a map and said that the two property owners had petitioned the Town for the extension.

Mr. Liles explained that the 2001 WASMPBA, an agreement among the Towns of Chapel Hill, Carrboro and Hillsborough, the Orange Water and Sewer Authority (OWASA) and Orange County, had set boundaries for where service could be provided. The five parties had agreed that the WASMPBA could be amended with the consent of all, he explained.

Mr. Liles said that Bayberry Lane landowners had petitioned the Council in February 2020 to consider amending the boundary. If Council approved, then the item would go to the other four partners for consideration, he said. OWASA had already stated that providing water and sewer to those lots would be feasible, since service had already been extended to nine homes in the same area, he pointed out. He recommended that the Council adopt Resolution 24 to amend the OWASA Primary Service Area boundary in the WASMPBA agreement.

Council members confirmed with Mr. Liles that the amount of added land probably would be less than 32 acres. They ascertained from him that the precedent for allowing the amendment was a 2017 case involving the Town of Carrboro and properties on Smith Level Road. Mr. Liles said that WASMPBA amendments had been accomplished through separate resolutions adopted by all five parties.

Some Council Members wondered if granting the request would set a precedent, and Mr. Liles replied that the current case was distinct because water and sewer lines were already in place in the neighborhood. Service for the other nine residents of Hunts Reserve had been grandfathered in when WASMPBA was created and the request was to hook up two more properties, he explained.

The Council and Mr. Liles discussed having a policy discussion in the future regarding procedures related to the scope of other amendments that might be proposed.

Ms. McClintock, a former OWASA chair, said that the requested amendment would directly contradict Town and OWASA policies. When the same situation had occurred in the past, OWASA had issued a policy, in consultation with the Town Council, against permitting extension of water and sewer connections beyond the Town's urban service area, she said. She read that statement and said that the Town policy mirrored the same content.

Ms. McClintock said that WASMPBA had been created because too many exceptions were being made to former land use agreements. While the





current request was for only two lots, the Council would be setting a precedent and would feel beholden when the next landowner asked for the same thing, she said.

Mayor Hemminger confirmed with Mr. Liles that the boundary would unlikely ever be extended beyond the requested area because there was a nature preserve on the other side. Council Member Gu verified with him that each of the two lots was about 5.5 acres and that they were limited to being single-family homes by the zoning. She expressed concern, though, that each lot might enable more than one house. She expressed concern about how much potential development a Council approval would be authorizing.

Mr. Liles said that the applicants had not shared their plans. However, existing approval was for single family and the applicants would need to come to the Council for a rezoning if they wanted to do otherwise, he said.

Council Member Ryan asked the Town Attorney if Council approval would enable a developer who buys a parcel outside the OWASA line to go to the Board of Adjustment or courts and prevail if the Council denied service.

Ms. Anderson replied that she agreed with Mr. Liles's characterization of the request being specific to its facts. Council approval would not set a hard precedent, she said.

A motion was made by Council Member Stegman, seconded by Mayor pro tem Parker, that R-24 be adopted. The motion carried by the following vote:

**Aye:** 7 - Mayor Hemminger, Mayor pro tem Parker, Council Member Anderson, Council Member Buansi, Council Member Stegman, Council Member Huynh, and Council Member Ryan

**Nay:** 1 - Council Member Gu

## APPOINTMENTS

**19.** Appointments to the Board of Adjustment and Adopt a Resolution for Orange County Seat. **[20-0743]**

The Council reappointed Brian Godfrey and appointed Geoffrey Green and Betty Sapp to the Board of Adjustment.

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that R-25 be adopted to recommend that the Orange County Board of Commissioners reappoint Thomas Wortman to the County position. The motion carried by a unanimous vote.

**20.** Appointments to the Chapel Hill Public Library Advisory Board. [20-0744]

The Council reappointed Tiffany Allen and June Dunnick and appointed Ruth Morgan to the Chapel Hill Public Library Advisory Board.

**21.** Appointments to the Environmental Stewardship Advisory Board. [20-0745]

The Council reappointed Adrienne Tucker, and appointed Julie Gras-Najjar for a Chapel Hill resident seat, Marirosa Molina for the Regional Collaboration seat, Lucy Vandercamp for the Greenways Advocate seat, and recommends Grace Elliott for the UNC-Chapel Hill Student seat.

**22.** Appointments to the Human Services Advisory Board. [20-0746]

The Council reappointed Mary Andrews and Carolyn Fanelli and appointed Katina Welch to the Human Services Advisory Board.

**23.** Appointments to the Parks, Greenways and Recreation Commission and Adopt a Resolution for Orange County Seat. [20-0747]

The Council appoints Leah Boucher and Tyler Steelman to the Parks Greenways and Recreation Commission.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-26 be adopted to recommend that the Orange County Board of Commissioners reappoint Alice Armstrong to the County position. The motion carried by a unanimous vote.

## ADJOURNMENT

This meeting was adjourned at 10:06 p.m.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

Mayor Pam Hemminger
Mayor pro tem Michael Parker
Council Member Jessica Anderson
Council Member Allen Buansi
Council Member Hongbin Gu
Council Member Tai Huynh
Council Member Amy Ryan
Council Member Karen Stegman

**Wednesday, November 4, 2020 — 7:00 PM — Virtual Meeting**

**Virtual Meeting Notification**

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_SuXp0Y89S2SJLzszDwAlTQ After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 851 3265 3999

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Planning Operations Manager Judy Johnson, Community Resilience Officer John Richardson, Transit Director Brian Litchfield, Traffic Engineering Manager Kumar Neppalli, Planner II Michael Sudol, Senior Planner Jake Lowman, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING

Mayor Hemminger opened the virtual meeting at 7:00 p.m. and pointed out that Item 5 had been removed from the Consent Agenda. She said that interpreters





would be translating portions of the meeting.

Mayor Hemminger called the roll and all Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Mayor Hemminger Regarding Election. [20-0779]

Mayor Hemminger congratulated recently elected state officials and noted that the U.S. Presidential race and some North Carolina races were still undecided. She expressed appreciation to local and national election boards for ensuring a legal and fair election.

0.02 Mayor Hemminger Regarding Street Path Survey. [20-0780]

Mayor Hemminger said that staff had identified five temporary pathways that would provide extra walking and biking space in Town. She encouraged residents to participate in a Street Path Survey that was on the Town website.

0.03 Mayor Hemminger Regarding Council Committee on Economic Sustainability Meeting. [20-0781]

Mayor Hemminger announced a Council Committee on Economic Sustainability virtual meeting on November 6, 2020 at 8:00 a.m. The Committee would discuss the Town's economic recovery effort and the East Rosemary Street Parking Deck design and traffic impact analysis, she said, adding that the public was welcome to attend via a link on the Town website.

0.04 Council Member Buansi Regarding Poet Laureate. [20-0782]

Council Member Buansi encouraged residents to view "In The Aftermath", by Chapel Hill's Poet Laureate CJ Suitt, on the Town website. He said that the poem was a great piece that was fitting for the current times. Mayor Hemminger agreed with that characterization and said that she would bring the poem forward at a future Council meeting.

### PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.

**1.** Barbara Driscoll Request for a Leave the Leaves Campaign. **[20-0755]**

Barbara Driscoll, New Hope Audubon Society president, petitioned the Council regarding a "Leave the Leaves" campaign to educate the public on the benefits of letting leaves remain on their properties rather than having the Public Works Department come and take them away. She outlined the environmental and economic benefits of doing so and said that no staff positions would be eliminated as a result of the change.

A motion was made by Council Member Anderson, seconded by Council Member Stegman, that this Petition be received and referred to the Mayor and Town Manager. The motion carried by a unanimous vote.

1.01 Adrienne Tucker Support of Leave the Leaves Campaign. **[20-0783]**

Adrienne Tucker, Environmental Stewardship Advisory Board chair, expressed support for the "Leave the Leaves" petition in Item 1. The proposal was a "no-brainer" that would have a large environmental impact, she said.

This item was received as presented.

**2.** Residents in the area of Mason Farm Rd., Whitehead Circle, and Purefoy Rd Request Improvements to Neighborhood Infrastructure to Promote Safe Walking and Biking and Improved Connectivity to Adjacent Neighborhoods and Campus. **[20-0756]**

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that this Petition be received and referred to the Mayor and Town Manager. The motion carried by a unanimous vote.

2.01 Paris Miller Regarding Support for Affordable Housing. **[20-0784]**

Paris Miller, an EmPOWERment, Inc. board member, thanked the Council for its commitment to affordable housing. She said that EmPOWERment would bring 10 new affordable rental units to the Pine Knolls neighborhood, as part of the Parish Empowerment Affordable Community Housing (PEACH) project, and that Town funding would help them to





continue improving that neighborhood.

This item was received as presented.

2.02 Delores Bailey Regarding Support for Affordable Housing. **[20-0785]**

Delores Bailey, executive director of EmPOWERment, Inc., thanked the Council for helping the Northside community during the COVID-19 pandemic. She began to thank the Town for supporting the PEACH project as well, but the call ended abruptly due to a bad phone connection.

This item was received as presented.

2.03 Danita Mason-Hogans Support for Affordable Housing. **[20-0786]**

Danita Mason-Hogans, an EmPOWERment, Inc. board member, thanked the Council for its support and dedicated service to the community.

This item was received as presented.

## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that R-1 be adopted as amended, which approved the Consent Agenda. The motion carried by a unanimous vote.

**3.** Approve all Consent Agenda Items. **[20-0757]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**4.** Approve the Housing Advisory Board's Recommended Funding Plan for the Affordable Housing Development Reserve. **[20-0758]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**5.** Revise Sections III. D. and III. E.1. of the Council Procedures Manual Regarding Naming Policies and the Acceptance of Gifts and Donations. **[20-0759]**

This item was removed.

**6.** Continue the Public Hearing on a Land Use Management Ordinance Text Amendment for Townhomes in the Blue Hill District to November 18, 2020. **[20-0760]**

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**7.** Call a Public Hearing for a Conditional Zoning Application for Columbia Street Annex, 1150 S. Columbia Street, from Residential-2 (R-2) to Mixed Use - Village - Conditional Zoning District (MU-V-CZD) and Continue the Public Hearing for the Closure of an Unmaintained Portion of the Monroe Street Right-of-Way to November 18, 2020. [20-0761]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**8.** Adopt a Resolution Closing the Public Hearing for the Land Use Management Ordinance Text Amendment to Article 5 Regarding Parking Limitations in Town Center and Town Code Chapter 11A Regarding Off-Street Parking and a Council Policy on Parking. [20-0762]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

## INFORMATION

**9.** Receive Upcoming Public Hearing Items and Petition Status List. [20-0763]

This item was received as presented.

**10.** Government Alliance on Race and Equity Update. [20-0764]

Mayor Hemminger said that Item 10 would return for Council discussion when all the necessary information had been assembled, and Town Manager Maurice Jones added that staff planned to return in January 2021.

This item was received as presented.

## DISCUSSION

**11.** Update on Town Efforts to Respond to the COVID-19 Crisis. (no attachment) [20-0765]

Town Manager Maurice Jones gave a PowerPoint update on the Town's COVID-19 response. He said that the Chapel Hill-Carrboro School System (CHCCS) was engaging in remote learning but had presented different options for the spring semester. The University of North Carolina at Chapel Hill (UNC-CH) was finalizing its plans for the spring semester and Town staff had been meeting with them to coordinate plans, he said.

Mr. Jones provided information from the U.S. Center for Disease Control regarding the effects of influenza. He encouraged all to get vaccinated as soon as possible and stressed the importance of reducing any additional burden on the healthcare system during the COVID-19 pandemic.





Mr. Jones reported that community testing for COVID-19 was continuing, both weekly and daily, and that information regarding times and locations could be found at orangecountync.gov/testing. He provided details on a new "Slow Covid NC" app as well. He reminded all to continue following the 3Ws (wear a mask, wash hands regularly, wait six feet apart from others).

Council Member Ryan confirmed with Mr. Jones that UNC-CH would inform the Council of its spring semester plans but had not yet set a date for that briefing.

This item was received as presented.

**12.** Receive Progress Report on County-wide Long Term Recovery Plan. [20-0766]

Community Resilience Officer John Richardson introduced members of Hagerty Consulting to share additional information on the county-wide Long-Term Recovery Plan, about which he had updated the Council in September.

In a PowerPoint presentation, Kayla Slater, senior managing associate at Hagerty Consulting, outlined the goal of determining the pandemic's impact on the Town's economy, community, health, social services, and housing. She said that information about the planning process was available at orangencforward.org

Ms. Slater said that Hagerty had provided training on how to navigate funding streams such as public assistance and federal CARES act funds in October. She described a working group of about 130 diverse stakeholders and a project management team that was a mix of representatives from Orange County's three jurisdictions. There had been two large group meetings and a series of focus groups sessions, she said.

Ms. Slater mentioned working with the Department of Human Rights and Relations to schedule meetings with non-English-speaking groups. She said that an impact assessment had determined a disproportionate level of COVID-19 infection among Black and Latinx communities. Job loss in Orange County was lower than the national average, but many families were struggling to juggle childcare, virtual learning, and work, she said.

Ms. Slater said that the following five goals would provide the backbone of the plan and a related document's organization: addressing fundamental needs of all residents, creating stable affordable housing solutions, promoting dynamic sustainable economic recovery, streamlining access to community resources, and combating the negative effects of social distancing. She reviewed next steps and said that a first draft of the plan would be circulated for public comment in January 2021.

Council Members asked about plans to target initiatives such as food distribution in various areas of Chapel Hill, Carrboro and Hillsborough. Ms. Slater replied that the current effort was to understand those differences and that a matrix for mapping strategies to specific jurisdictions was being discussed.

The Council confirmed with Ms. Slater that the initiative was being coordinated with the Town's long-term recovery plan and that discussions were underway about streamlining resident access to programs through a "one-stop" entry point. Council Members asked for more demographic information about the 311 respondents that were mentioned in an economic impact assessment report. They verified that additional surveys were being planned to reach populations that had not adequately responded the first time.

In response to a question from the Council about efforts to reach out to small and minority-owned businesses and other groups, Ms. Slater said that Hagerty Consulting probably would not conduct any additional focus groups at the current time, given its timeline and budget restrictions.

Mayor Hemminger noted that several members of Town staff and the community had been serving on Hagerty Consulting and Town committees and she encouraged ongoing collaboration.

This item was received as presented.

**13.** Open a Public Hearing: Conditional Zoning for 1200 & 1204 Martin Luther King Jr. Blvd. from Residential-4 (R-4) and Neighborhood Commercial (NC) to Office/Institutional-2-Conditional Zoning District (OI-2-CZD) and Neighborhood Commercial Conditional Zoning District (NC-CZD) (Project #19-065). **[20-0767]**

Planner Michael Sudol opened a public hearing on a request to rezone property at 1200 Martin Luther King Jr. Boulevard (MLK) to Conditional Zoning to allow the 12.9-acre site to accommodate a self-storage facility, mobile-home park and expanded gas station/store. He reviewed the site plan and noted a substantial amount of Resource Conservation District (RCD) at the northern end of the property.

Mr. Sudol outlined the proposal to demolish an existing gas station and replace it with the new buildings. He explained that about 16 of 73 mobile homes would be relocated on site and that the applicant would propose adding 10 more. The applicant had asked to work with staff regarding a bus stop and pedestrian improvements, he said, and he outlined several additional modification requests.





Mr. Sudol pointed out that the NC Department of Transportation (NC-DOT) and the Town did not support a proposed right in/right out entrance at the site and that staff had recommended a right out only solution. He reported that the Community Design Commission (CDC) and Planning Commission (PC) had both recommended denial and that other Town boards had recommended approval with conditions.

Mr. Sudol recommended that the Council open the public hearing, receive comments, close the public hearing, and move to consider the item for action on December 9, 2020.

Dan Jewell, of Coulter Jewell Thames, explained that the plan, proposed by applicant Stackhouse Properties LLC, would do the following: eliminate the need to demolish homes, accommodate a planned bus rapid transit (BRT) station and a multi-use path, upgrade and modernize a 1970s-style convenience store, improve a dangerous intersection, provide stormwater management where none currently existed, potentially provide more housing on site, and maintain the current mobile homes for at least 10 years.

Mr. Jewell said that Stackhouse Properties had held multiple meetings with the current Tar Heel Mobile Home Park residents and had found a way to keep all of them on the property. Stackhouse had determined how to move 17 units and could add about seven more in the outer edges of the RCD, if the Council approved that, he said. He said that mobile homes were currently located in the RCD because there had been no ordinance prohibiting that in 1980 when the original SUP for the park was approved.

Mr. Jewell discussed storage facility hours (6:00 a.m. to 10 p.m.) and said that low-level security lighting along the back of the building would not affect the residential units. He estimated the storage building's height to be 3-3.5 stories and said that the proposed plan would add a playground for residential use.

Mr. Jewell showed an aerial view of existing conditions in the area and indicated where four driveways onto MLK created an unsafe situation and challenges for residents going in and out of the property. The applicant would continue working with NC-DOT and Chapel Hill Transit to design a secondary driveway configuration that would safely accommodate bus rapid transit (BRT) and a proposed multi-use trail, he said.

In response to Council Members' questions, Mr. Jewell agreed to find out whether the park tenants would be offered annual leases. He clarified that no residents had been required to buy new mobile homes since there had been an adequate number of vacant ones on the property. Some residents had moved on site and others had bought new units that Stackhouse provided, he said.

Council Members determined from Mr. Jewell that the RCD was the only place additional units could go. They verified that neither he nor the applicant had met with homeowners in the last six or seven months but that they did have regular communication with them. The Council also confirmed that repairs, such as paving and pothole remediation, would be done as part of the larger project.

Council Members asked about tree removal plans and about discussions with residents regarding a possible fence between the park and the self-storage facility. They confirmed with Mr. Jewell that the three-story storage building would be a maximum of 35-feet tall.

Council Member Huynh asked what would happen if the older units aged out before 10 years, and Mr. Jewell said that the applicant had not thought that far ahead. Council Member Huynh asked about the possibly of building a gathering space for residents, and Mr. Jewell agreed to return with a response from the applicant.

The Council confirmed that monthly rent for trailer pads was $455, including property taxes. Mr. Jewell said that he could not commit to a rent freeze but that typical annual rent increases would be $20 to $25. Several Council Members proposed putting a cap on rent increases, and Mr. Jewell agreed to raise that idea with the Stackhouse Properties.

Council Member Buansi asked for information on whether some landlords in North Carolina allowed longer than month-to-month leases, and Mayor pro tem Parker proposed that the applicant consider extending the lease term to 15 years.

The Council confirmed with Town Traffic Engineer Kumar Neppalli that a traffic impact analysis had recommended adding a four-way traffic signal at the location. Both Mr. Neppalli and Transit Director Brian Litchfield expressed concern about locating a right in/right out driveway in the BRT lane. Mr. Neppalli said he thought a solution could be worked out soon and that he hoped to propose options before the Council's December 9, 2020 meeting.

The Council confirmed with Mr. Jewell that residents had seen the latest plan and that community meetings had included translators. Council Member Gu proposed that the applicant offer residents a written "community agreement" that would include specific details regarding the playground, the multi-use path, the amount of rent increases, the storage facility's operating hours, the plans for pothole repair, and more.

Council Member Gu asked Mr. Litchfield if he saw a potential conflict between the applicant's proposal and the Town's vision for the BRT, and he replied that staff continued to have concerns about the right in/right out driveway using the BRT lane. He said that a gas station and storage facility would not likely generate a significant amount of ridership but that





the corridor already had sufficient density to support the BRT. The trade-off was to allow Tar Heel Mobile Home Park to remain for another 10 years, Mr. Litchfield pointed out.

In response to Council Members' questions about the RCD, Mr. Sudol explained that a perennial stream ran through it but there had been no issues with flooding. The primary concern involved maintaining state-required, 50-foot stream buffers, he said. When questioned further, Mr. Sudol said that the RCD had been put in place to maintain water quality and stream environment and that any development would have some impact on it.

Mayor Hemminger asked the Town Attorney to bring back information on whether fair housing laws would prohibit the Town from giving preference to those who already have homes in Chapel Hill, if more space became available in the RCD.

Tar Heel Mobile Home Park residents Melissa Ginsberg, Ernest Mondeco, Raphael [unknown last name], Vivian Velazque, Trinidad Cervantes, Ari Compose and Judy Harrell reported positive experiences living at Tar Heel Mobile Home Park and asked the Council to approve the project.

Pat Garavaglia, who resides behind the park, said that adding 2,000 more trips to the already dangerous intersection would be "horrifying". She questioned the need for another gas station, since there already were two across the street. She predicted that lighting from the gas station would be a problem and asked if a foul-smelling dumpster at the back of the trailer park would be removed. Ms. Garavaglia said she could not see any area for a playground on the applicant's plans. She questioned a plan to use an existing buffer since not much buffer currently existed.

Mayor Hemminger recommended that the applicant contact Ms. Garavaglia and discuss her concerns.

Jason Klaitman, an Estes Hills resident, said that the project would provide a needed service, increase tax revenue, provide a great convenience store, and remain committed to affordable housing. He suggested that an eventual partnership with DHIC, or Habitat for Humanity, could increase affordable housing at the location.

Susanna Dancy, representing the Community Design Commission (CDC), said that the proposed plan was inconsistent with the BRT and would undermine the Council's land-use goals for that transit corridor. She pointed out that the CDC had voted to deny the application. However, if the Council did decide to go forward with the gas station, the building should not have its back to the public realm, she said.

Ms. Dancy said that the CDC was concerned about the height of the storage facility and how its position right up against the trailer park would create shadows and limit light and air movement. She encouraged the Council to find a way to keep the park a bit longer while not allowing the gas station and self-storage facility there.

Natahaly Grijalva, a Tar Heel Mobile Home Park resident, said that not everyone had been given an option to buy a new mobile home and that some had been given 90 days to take their homes and leave the park. She said that leases were month-to-month and that residents had received a packet of tenants' rules but nothing about management's responsibilities. She believed that some residents had not expressed their concerns because they were afraid of being kicked out of the park if they did, she said.

Melissa McCullough, a Planning Commission (PC) member, said that the PC had voted to deny the application and that she wanted to offer her personal perspective. She cautioned against setting a precedent by changing the Town's Land Use Management Ordinance to allow self storage as a primary use. Having self-storage in front would diminish the value of the trailer park land and set the stage for something else that would not meet the Town's goals for the area, she said.

Council Members agreed that having a gas station and self-storage facility on a future BRT corridor did not align with the Town's future land use plans for the area. However, the proposal would protect a vulnerable community from being displaced, they pointed out. It would not make sense to approve a project that did not support the Town's long-term goals unless it had stronger protections for residents, Mayor pro tem Parker said.

The Council expressed concern about the lease agreement, and Council Member Buansi asked the applicant to provide a copy of the packet of rules that Ms. Grijalva said had been given to residents. Council Members stressed the importance of having stable and affordable housing at that location and requested more information about the amount and frequency of rent increases. Council Members asked the applicant to develop an agreement with residents on how those increases would be determined.

Council Members Stegman and Buansi asked the applicant to consider 15-20 year leases, rather than 10 years, and Council Member Huynh asked for information about any arbitrary rules where residents could be kicked off their lots. Council Member Ryan proposed substantially more tree cover, a building design that would blend in and not look like self-storage, and a signage plan. Council Member Stegman said that issues regarding noise and lighting needed to be worked out, and Council Member Anderson asked the applicant to resolve the pot hole issue as soon as possible.

Council Member Ryan expressed concern about putting units in the RCD. Council Member Anderson said she could support a very minimal





encroachment if it would mean fitting more people in or keeping communities together. Council Member Gu commented on how the Council would need to take a holistic view while addressing competing needs. Council Member Huynh stressed the importance of having a more robust Town strategy regarding mobile home parks rather than constantly reacting and choosing between bad options.

Mayor Hemminger pointed out that land prices and pressures for growth had affected the community and that all of the Town's mobile home parks had been pressured to become something else. The Council had been working toward a strategy for those families and had a few more options to offer mobile home park residents, she said.

Mayor Hemminger characterized the application as a short-term solution until two Town-sponsored affordable housing projects were further along in development. She agreed that the Council would not normally want to put such a project along a high density corridor but pointed out that there were other low intensity uses along MLK as well.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, to continue the Public Hearing to December 9, 2020. The motion carried by a unanimous vote.

**14.** Consider a Proposal for a Land Use Management Ordinance Text Amendment - Proposed Changes to Section 5.14.4 (Campaign Signs). **[20-0768]**

Planner Corey Liles explained that the proposed LUMO text amendment would create a 30-day period after which political signs would be considered abandoned property and could be removed.

A motion was made by Council Member Stegman, seconded by Mayor pro tem Parker, that R-7 be adopted. The motion carried by a unanimous vote.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that O-1 be enacted. The motion carried by a unanimous vote.

**15.** Consider Land Use Management Ordinance Text Amendment - Proposed Changes to Table 3.7-1: Use Matrix - Self-Storage Facility, Conditioned. **[20-0769]**

Planner Jake Lowman presented a LUMO text amendment (TA) that would add an "S" to the use table and allow conditioned self-storage facilities as a special use in Planned Mixed-Use developments. He pointed out that the Council had held a public hearing on the item on October 7, 2020 and that one comment had been submitted during the following 24 hours. He recommended that the Council adopt the Resolution of Consistency and enact Ordinance A.

Council Members Ryan and Gu asked about the PC's concern that approving the TA would set a precedent and open up more areas in Town for self-storage.

Mr. Lowman replied that any future Planned Development would need to come before the Council for a Special Use Permit and would be decided on a case-by-case basis.

Mayor pro tem Parker pointed out that self-storage would be in the use matrix as a special, not a permitted use. Any conditioned self-storage would ultimately require Council approval, he said.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that R-9 be adopted. The motion carried by the following vote:

**Aye:** 6 - Mayor Hemminger, Mayor pro tem Parker, Council Member Anderson, Council Member Buansi, Council Member Stegman, and Council Member Huynh

**Nay:** 2 - Council Member Gu, and Council Member Ryan

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, that O-2 be enacted. The motion carried by the following vote:

**Aye:** 6 - Mayor Hemminger, Mayor pro tem Parker, Council Member Anderson, Council Member Buansi, Council Member Stegman, and Council Member Huynh

**Nay:** 2 - Council Member Gu, and Council Member Ryan

*SPECIAL USE PERMIT(S)*

Special Use Permit: The Application for a Special Use Permit is Quasi-Judicial. Persons wishing to speak are required to take an oath before providing factual evidence relevant to the proposed application.

Witnesses wishing to provide an opinion about technical or other specialized subjects should first establish that at the beginning of their testimony.

**16.** Consider an Application for Limited Scope Special Use Permit Modification - Carraway Village, 3000 Eubanks Road. **[20-0770]**

Mr. Lowman opened the continuation of a public hearing on a Special Use Permit (SUP) modification request for Carraway Village. He said that the Council had adopted a resolution on March 4, 2020 that would limit the scope of the current request to the following: permitting self-storage





facilities in Block G; allowing service stations as a stand-alone use in Blocks A, B, and C; minor signage changes; and terminating Public Street A. Mr. Lowman showed those locations on a map and recommended that the Council open and then close the public hearing and adopt Resolution A for approval.

Applicant Adam Golden, of NR Edge Properties, gave a PowerPoint presentation in which he showed the Carraway Village site plan and reviewed the reasons for the requested SUP modifications. He said that power easements precluded having residential uses in Block G, where the proposed conditioned self-storage would go. Block G would allow a 1.5-acre facility in the first phase and a 2-acre site for a possible second phase, he said.

Mr. Golden showed a photo of modern storage facilities and assured the Council that he was not proposing to build five facilities on Block G. In addition, he described the three areas where a service station could go.

Council Member Ryan confirmed that the applicant would "absolutely" consider putting parking under the power lines and that Carraway Village's signage would reflect existing Town code except for the signs facing Interstate 40.

Mayor pro tem Parker clarified that the applicant agreed to having only one gas station operating at any one time. He said that the approval language did not quite state that, and he asked the Town Attorney to ensure that the resolution fully addressed what the Council had agreed to.

Council Members Ryan and Gu proposed approving only one phase of self-storage at the current time and waiting to see if something better than a second facility could be built there in the future.

Council Member Ryan pointed out that some neighbors had complained about the gas station being located too close to their homes. She expressed concerned about it being the first thing a person would see coming into Town from Interstate 40. She asked for stipulations that would require substantial visual screening between the gas station and the highway.

Mr. Golden agreed to only one gas station but asked to not have to return to Council for approval regarding the three acres in Block G.

Mayor pro tem Parker moved to close the public hearing and adopt revised Resolution-A, as amended to clarify that only one gas station would be allowed to operate at a time and that the buffers Council Member Ryan requested be included if the gas station is built on Block A.

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, to close the public hearing. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that Resolution of Consistency be adopted. The motion carried by a unanimous vote.

A motion was made by Mayor pro tem Parker, seconded by Council Member Buansi, that this Special Use Permit Modification R-12 be adopted as amended. The motion carried by the following vote:

**Aye:** 7 - Mayor Hemminger, Mayor pro tem Parker, Council Member Anderson, Council Member Buansi, Council Member Gu, Council Member Stegman, and Council Member Huynh

**Nay:** 1 - Council Member Ryan

*CONTINUED DISCUSSION*

**17.** Public Forum: Housing and Community Development Needs Assessment for the Community Development Block Grant Program. **[20-0771]**

Affordable Housing Manager Nate Broman-Fulks opened the first of two public forums regarding priorities for using FY 2020-21 Community Development Block Grant (CDBG) funds. He said that the second forum was planned for March.

Mr. Broman-Fulks gave an overview of the U.S. Department of Housing and Urban Development (HUD) program and said that Chapel Hill was an entitlement community that received an annual allocation. He explained the qualifications and eligible activities for CDBG funding.

Mr. Broman-Fulks said that funding applications would be due to the Town in January and that an Application Review Committee would review those and make recommendations to the Council. A second public forum would be held in March, the Council would approve a funding plan in April, and the Town would submit the final plan to HUD in May 2021, he said.

Council Member Stegman said that holding a forum at 11:30 p.m. did not reflect that the Town cared about getting public comment. She proposed thinking about how the Council could have more meaningful community input.

Mr. Broman-Fulks replied that the process was just kicking off and that further discussions and engagement would take place over several





months. Staff would do its best to spread the word throughout the community, he said.

Mayor Hemminger agreed with the suggestion to schedule forums earlier in Council meetings.

This item was received as presented.

**18.** Open the Public Hearing and Consider a Petition to Annex Property at 7000 Millhouse Road. **[20-0772]**

Planner Corey Liles opened the public hearing on a proposed voluntary annexation of a 9.76-acre site and adjacent right-of-way on Millhouse Road. The annexation would add the property to the Town's corporate limits and make it eligible for Town services, he said.

Mr. Liles explained that the site had been rezoned for Light Industrial Conditional Use in 2017 and that an application from Carolina Donor Services had been approved in June 2020. He said that estimated Town revenues from annexation would be more than $17,235 annually and that the applicant would be required to make a one-time $123 payment to the New Hope Fire District. Mr. Liles recommended that the Council receive any public comment for 24 hours and consider action on Dec 9, 2020.

A motion was made by Council Member Anderson, seconded by Council Member Huynh, to close the public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote.

**APPOINTMENTS**

**19.** Appointments to the Chapel Hill Downtown Partnership. **[20-0773]**

The Council reappointed Mark Sherburne to the Chapel Hill Downtown Partnership Town Resident Seat.

**20.** Appointments to the Community Policing Advisory Committee. **[20-0774]**

The Council appointed Shiala Baldwin, Julius Coulter, Clarke French, Sarah Hoffman, Tracy Miller, Cynthia Watkins to the Community Policing Advisory Committee.

**21.** Appointments to the Cultural Arts Commission **[20-0775]**

The Council reappointed Justin Haslett, Jennifer Lawson, Dianne Pledger, Iana Vazquez and Megan Winget to the Cultural Arts Commission.

**22.** Appointments to the Orange Water and Sewer Authority Board of Directors **[20-0776]**

The Council reappointed John Morris and appointed Kevin Leibel to the

Orange Water and Sewer Authority Board of Directors. The Council continues to seek applicants to this board.

## ADJOURNMENT

This meeting was adjourned at 11:43 p.m.

# TOWN OF CHAPEL HILL

## Town Council

## Meeting Minutes - Draft

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

| | |
|---|---|
| Mayor Pam Hemminger | Council Member Hongbin Gu |
| Mayor pro tem Michael Parker | Council Member Tai Huynh |
| Council Member Jessica Anderson | Council Member Amy Ryan |
| Council Member Allen Buansi | Council Member Karen Stegman |

**Wednesday, November 18, 2020 — 7:00 PM — Virtual Meeting**

### Virtual Meeting Notification

Town Council members will attend and participate in this meeting remotely, through internet access, and will not physically attend. The Town will not provide a physical location for viewing the meeting.

The public is invited to attend the Zoom webinar directly online or by phone. Register for this webinar: https://us02web.zoom.us/webinar/register/WN_6xp3NdDFSWC3-xf09ksWfg After registering, you will receive a confirmation email containing information about joining the webinar in listen-only mode. Phone: 301-715-8592, Meeting ID: 892 8049 3974

View Council meetings live at https://chapelhill.legistar.com/Calendar.aspx – and on Chapel Hill Gov-TV (townofchapelhill.org/GovTV).

### Roll Call

**Present:** 8 - Mayor Pam Hemminger, Mayor pro tem Michael Parker, Council Member Jessica Anderson, Council Member Allen Buansi, Council Member Hongbin Gu, Council Member Karen Stegman, Council Member Tai Huynh, and Council Member Amy Ryan

### Other Attendees

Town Manager Maurice Jones, Deputy Town Manager Florentine Miller, Town Attorney Ann Anderson, Planning Operations Manager Judy Johnson, Principal Planner Corey Liles, Senior Engineer Ernest Odei-Larbi, Urban Designer Brian Peterson, Senior Planner Anya Grahn, Manager of Engineering & Infrastructure Chris Roberts, Emergency Management Coordinator Kelly Drayton, Traffic Engineering Manager Kumar Neppalli, Public Works Director Lance Norris, Fire Chief Vence Harris, Planning Director Colleen Willger, Executive Director for Technology and CIO Scott Clark, Communications and Public Affairs Director/Town Clerk Sabrina Oliver, and Deputy Town Clerk Amy Harvey.

### OPENING





Mayor Hemminger opened the virtual meeting at 7:00 p.m. and called the roll. All Council Members replied that they were present.

### ANNOUNCEMENTS BY COUNCIL MEMBERS

0.01 Salute: Carolina Athletics & National Youth Sports Public Health Strategy. [20-0820]

Mayor Hemminger recognized Carolina Athletics and National Youth Sports for signaling its support for national, state and local efforts to expand youth participation in sports. She pointed out that North Carolina ranked 18th in the country for childhood obesity.

University of North Carolina at Chapel Hill (UNC-CH) Athletics Director Bubba Cunningham thanked the Town for the proclamation. He said that UNC was delighted to be the first NCAA school to support the National Fitness Foundation initiative.

0.02 Mayor Hemminger Regarding Small Business Saturday. [20-0821]

Mayor pro tem Parker read a proclamation declaring November 28, 2020 to be Small Business Saturday in Chapel Hill. Small businesses accounted for 65 percent of the new jobs created in the U.S. between 2000 and 2019, he read. He pointed out that small businesses had been deeply impacted by COVID-19 and that Small Business Saturday would be more important than ever in 2020.

Epilogue Book Store owner Jaime Sanchez described the difficulties that his Franklin Street business had been confronting during COVID-19 and mentioned many safety features that the store had incorporated. Mr. Sanchez said that the Chapel Hill-Carrboro Chamber of Commerce and the Downtown Partnership wanted to remind everyone that buying locally mattered more than ever. He pointed out that 60 percent of every dollar spent locally stayed in the community.

0.03 Mayor Hemminger Regarding Care to Share. [20-0822]

Council Member Anderson announced that November 19, 2020 would be Care to Share Day in Orange County. She explained that an Orange Water and Sewer Association (OWASA) program provided assistance to those who needed it to pay their bills during the pandemic. Town residents could help others by adding a donation when paying their OWASA bills, she said, adding that more information was available on OWASA's website.

0.04 Mayor Hemminger Regarding New Planning Director. [20-0823]

Town Manager Maurice Jones introduced new Planning Director Colleen Willger and shared some of her professional background. Ms. Willger thanked the Town Council for the opportunity to serve, and Mayor Hemminger said that she was looking forward to meeting Ms. Willger in person when the pandemic ended.

0.05 Mayor Hemminger Regarding 2200 Homestead Road Project Public Information Meeting. [20-0824]

Mayor Hemminger announced that a virtual public information session on a proposed residential project at 2200 Homestead Road would be held on November 19, 2020 from 5:15 p.m. to 6:00 p.m.

0.06 Mayor Hemminger Regarding Arbor Day. [20-0825]

Mayor Hemminger said that the Town would celebrate Arbor Day at 9:45 a.m. on November 20th by planting trees near Town Hall. Information about the event was on the Town Calendar, she said.

## PUBLIC COMMENT FOR ITEMS NOT ON PRINTED AGENDA AND PETITIONS FROM THE PUBLIC AND COUNCIL MEMBERS

Petitions and other similar requests submitted by the public, whether written or oral, are heard at the beginning of each regular meeting. Except in the case of urgency and unanimous vote of the Council members present, petitions will not be acted upon at the time presented. After receiving a petition, the Council shall, by simple motion, dispose of it as follows: consideration at a future regular Council meeting; referral to another board or committee for study and report; referral to the Town Manager for investigation and report; receive for information. See the Status of Petitions to Council webpage to track the petition. Receiving or referring of a petition does not constitute approval, agreement, or consent.

## CONSENT

Items of a routine nature will be placed on the Consent Agenda to be voted on in a block. Any item may be removed from the Consent Agenda by request of the Mayor or any Council Member.

*Approval of the Consent Agenda*

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, that R-1 be adopted, which approved the Consent Agenda. The motion carried by a unanimous vote.

**1.** Approve all Consent Agenda Items. [20-0802]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.

**2.** Adopt a Calendar of Council Meetings through June 2021. [20-0803]

This resolution(s) and/or ordinance(s) was adopted and/or enacted.





## INFORMATION

**3.** Receive Upcoming Public Hearing Items and Petition Status List. [20-0804]

This item was received as presented.

**4.** Receive the First Quarter Fiscal Year (FY) 2021 Affordable Housing Report. [20-0805]

This item was received as presented.

## DISCUSSION

**5.** COVID-19 Update - UNC's Spring Semester Planning. (no attachment) [20-0806]

Darrell Jeter, director of emergency management and planning at UNC-CH, gave an overview of spring semester plans. He said that a new Campus and Community Advisory Committee would recommend a course of action for providing students with safe living and dining services. The Committee, which included Town representation, would also look at off-campus student living and Greek life and would address COVID-19 testing, tracing, and patient care, he said.

Mr. Jeter said that spring semester classes would begin on January 19, 2020. There would be no spring break, but there would be shorter breaks throughout the semester, he said. He said that classes were expected to end on May 5, 2021, followed by final exams, and then commencement would be on May 16th. He pointed out, however, that those dates would depend on health risks at the time.

Mr. Jeter described five different modes of instruction and discussed changes in student housing arrangements. UNC-CH anticipated housing about 3,500 students on campus, he said. He said that a "Carolina Together" website and dashboard would be the primary COVID information resource. Students would be required to sign safety and testing protocols as well as community standards that UNC-CH would aggressively promote, he said.

In response to Council Members' questions, Mr. Jeter agreed to bring back more information on the following: penalties for students who violate standards; UNC-CH's testing, tracing and quarantining capacity; the number of students who would be living off campus in the spring semester; UNC's plans to vaccinate students; and when the spring 2020 class would finally have its commencement ceremony.

Council Member Anderson requested that data regarding community standard violations be released more often than quarterly. She asked about efforts to target super-spreader events and/or repeat offenders, and Mr. Jeter said that the Department of Student Affairs and the Campus Police had been educating students about the consequences of non-compliance both on and off campus.

Council Member Anderson asked about an off-ramp to the plan, and Mr. Jeter said that UNC-CH would monitor information from state and county health experts, which would help inform them whether they needed to modify operations.

Council Member Huynh recommended having a more frequent, perhaps a daily, process for making sure that students comply with community standards.

Council Member Stegman confirmed that UNC-CH had been collaborating with Duke University, and Mr. Jeter mentioned aspects of Duke's testing and tracing strategies that UNC-CH had added to its own protocols. Council Member Stegman confirmed that UNC-CH's strategy would include mandatory testing for certain populations while others would be encouraged to test routinely.

The Council strongly urged UNC-CH to test and track as widely as possible and stressed the importance of mandatory testing for off-campus students as well as those living on campus. The Council asked UNC-CH to emphasize a "whole community" message that would teach students to continue wearing masks when they went off campus.

Emergency Management Coordinator Kelly Drayton said that the Town had been engaging in vaccination planning conversations. The state had been working with third-party contractors to address vaccinating highly vulnerable populations, she said. She said that the vaccination plan would include UNC-CH and UNC Health and that she would provide the Council with more information on November 20th.

This item was received as presented.

**6.** Charting Our Future - Resumption of the Public Hearing for the Adoption of the Future Land Use Map - Update to Chapel Hill 2020. **[20-0807]**

Land Use Management Ordinance (LUMO) Project Manager Alisa Duffey Rogers began the continuation of a public hearing on adoption of the Future Land Use Map (FLUM) update to the Chapel Hill 2020 Comprehensive Plan (CH 2020). She described the FLUM's contents and said that its focus area maps would replace the CH 2020 land-use plan but all other aspects of CH 2020 would remain.

Ms. Duffey Rogers said that staff did not concur with a request that UNC Health had made at an October 28 public hearing to include "Hospitals" in





the Commercial Office Planned Use category, but staff did agree with a requested change to the Commercial Office character type definition. She listed several changes that UNC-CH had requested as well, and said that those could be accommodated if the Council so desired.

Ms. Duffey Rogers recommended that the Council resume the public hearing, receive additional comments, close the public hearing and allow written comments for 24 hours, and to consider adopting the FLUM on December 9, 2020.

Council Member Anderson confirmed with Ms. Duffy Rogers that a discussion of the Downtown area would probably occur during the next phase of the project.

Kimberly Brewer, a Purefoy neighborhood resident, recommended that the Council remove South Columbia Street as a focus area and develop a land-use map and ordinance that would encourage preservation of Merritt's Grill, maintain a diversity of affordable housing (AH), and be in harmony with that historic entrance to Town. She said that making the location focus area would encourage redevelopment there.

Claire Horne, a Westood neighborhood resident, asked the Council to remove the South Columbia focus area from the FLUM and said that the proposed scale of development contradicted the Town's stated goals. She asked the Council to provide data on why numerous six-story buildings at the southern gateway would be of greater benefit than smaller buildings would be.

Anna Wu, associate vice chancellor for Facilities Services at UNC-CH, asked the Council to consider extending the public hearing to December 9th and taking a final vote on the FLUM in January 2021. She said that the University needed more time to try to reach a resolution with the Town staff that would clarify the Commercial Office and Institutional Civic character types.

Aris Buinevicius, a Westwood neighborhood resident, pointed out that the Town had stood with neighbors for decades to get bike lanes installed despite huge pressure from UNC-CH and the NC Department of Transportation (NC-DOT). However, the current Council had been ignoring neighborhood objections to the proposed gateway zone, he said, and he urged the Council to not let the proposal move forward at its current scale.

Simon George, assistant vice president for Real Estate Development at UNC Health, expressed gratitude to the Town for accepting and modifying many of the changes that UNC Health had suggested. He said that the Town, UNC-CH, and UNC Health were close to finalizing a document that would include the goals and priorities of all three. He asked the Council to consider including "Support Hospital" or "Supporting Hospital" if

"Hospital" was not acceptable and to continue the public hearing to December 9, 2020.

Nancy Oates, a Chapel Hill resident, said that the plan, as presented, left no place for essential workers to live because affordable and workforce neighborhoods would be replaced with luxury apartments. In addition, there needed to be an assessment of the topography and carrying capacity of land to make sure that high density areas could realistically be built upon, she said.

Julie McClintock, a Chapel Hill resident, endorsed Ms. Brewer's and Ms. Oates's comments. If the proposed building heights were not reduced, the Town would lose a distinctive historic area and college town ambiance, she said. Ms. McClintock provided background on previous attempts to change the area and said that former Councils had persevered and succeeded in protecting it. She proposed that the Council remove the focus area from the FLUM and initiate an entryway plan that values the history of that location.

Ruchir Vora, and OWASA board member, who owns property in the neighborhood, said that he had always been told he could not build on his land because of slope and stream regulations. Requirements should be consistent, and the Town should not make exceptions for developers, he said.

Mayor pro tem Parker read a statement from Chapel Hill resident Kari Moskovisi, which stated that the Council should adhere to existing Resource Conservation District (RCD) regulations and only make exceptions for exceptional situations.

Jennifer Strauss, a Westwood neighborhood resident, said that she and her husband shared the neighbors' concerns about the scale of the proposed project.

Council Members expressed support for staff recommendations and opposition to adding "Hospital" to the definitions unless it was modified to be more specific such as "Support Hospital". Some spoke in favor of removing the South Columbia Focus Area from the FLUM, while others said there had not been enough time or information for the Council to consider doing that. Town Attorney Ann Anderson said she was not comfortable making such a change without receiving broader community input.

The Council confirmed with Ms. Duffey Rogers that moving the date for adoption to January would not be detrimental to the overall schedule. Council Member Anderson spoke in favor of closing the public hearing, adding any minor definition changes and voting on December 9, 2020, and Council Member Gu agreed. The FLUM was a living document that could be revised and made more specific in the future, Council Member Gu said.





Mayor Hemminger confirmed with Attorney Anderson that the process could continue while changes were being made and that making changes would not affect the schedule if they were not too extensive. She confirmed with Ms. Duffey Rogers that creating a new character type would be a major change, while UNC's other requests would be minor. Mayor Hemminger said she agreed with Council Member Gu that the FLUM was a living document that could ebb and flow. However, the South Columbia Street area had been under a lot of duress and she would be happy leaving it off the FLUM, she said.

A motion was made by Council Member Anderson, seconded by Council Member Ryan, to remove the South Columbia Street small area from the FLUM, close the public hearing, and receive comment for an additional 24-hours. The motion failed by the following vote:

**Aye:** 3 - Mayor Hemminger, Council Member Anderson, and Council Member Ryan

**Nay:** 5 - Mayor pro tem Parker, Council Member Buansi, Council Member Gu, Council Member Stegman, and Council Member Huynh

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, to move forward with the FLUM, as is, but direct staff to look closer at the South Columbia Street small area in Phase 2 and address stakeholder concerns, close the public hearing, and receive comment for an additional 24-hours. The motion carried by the following vote:

**Aye:** 6 - Mayor Hemminger, Mayor pro tem Parker, Council Member Buansi, Council Member Gu, Council Member Stegman, and Council Member Huynh

**Nay:** 2 - Council Member Anderson, and Council Member Ryan

**7.** Blue Hill Semiannual Report #12. **[20-0808]**

Planner Corey Liles presented a fall 2020 Blue Hill District (BHD) update. He discussed a Booker Creek Basin Park project that would reduce flooding and deliver recreational amenities. He said that pre-construction meetings were underway for the Elliott Road Extension and that TRU Hotel and the Park Apartments Phase 1 were in the early stages of construction. Trilogy Apartments and Elliott Apartments were at or near completion, he said.

Mr. Liles said that a potential redevelopment of the University Inn site was still under review. He commented on facade renovations at the

Sheraton Hotel and noted where other existing buildings might be renovated or expanded.

Mr. Liles said that the total tax value of properties in the district had increased from $154 million in 2014 to more than $302 million in 2020 and that it was projected to reach $457 million in the next few years. BHD revenue would exceed debt service payments for the first time in 2020 and was estimated to exceed expenditures in future years, he said.

Mr. Liles showed an aerial view of parcels on the south side of Elliott Road that were in the BHD but exempt form-based code because former Council Members had wanted to incentivize affordable housing there. He said that staff could study how to customize zoning standards for that area if the Council was interested.

Mayor pro tem Parker and Council Member Anderson expressed interest in trying to figure out how to get AH in those parcels, but Mayor Hemminger recommended proceeding with caution. She pointed out that there was already much commercial development in the area and said that replacing it with AH could change a balance in the community. She would not want to see existing AH developed into luxury apartments, she said.

Council Member Stegman raised the option of putting revenues back into the district by funding a master leasing program or creating an AH fund, for example.

Council Member Gu confirmed with Mr. Liles that other BHD needs such as road and transportation improvements would be other ways to use additional property tax revenue.

Council Member Ryan said that investing in parking infrastructure would be crucial with 2.7 million new square feet of residential space.

Ms. McClintock reminded the Council to assess the cost of services. Moreover, the Town wanted more AH, but to consider replacing an area with wonderful little businesses that people loved was alarming, she said. Why would the Town want to eliminate the very limited commercial that it has in the BHD, she asked.

Mayor Hemminger pointed out that there were several years of net negative revenue still to make up for. It was a balancing act and it would take a while to work out all the numbers, she said.

Town Manager Maurice Jones commented that staff was in the process of looking at different models for calculating the cost of operating services. Staff was trying to find something that works for the BHD that might also be applied to other parts of Town in the future, he said.





This item was received as presented.

**8.** Continue the Public Hearing: Land Use Management Ordinance Text Amendment - Proposed Changes to Section 3.11 for Townhomes in the Blue Hill District. **[20-0809]**

Mr. Liles gave a PowerPoint presentation on the continuation of a public hearing on a LUMO text amendment (TA) regarding townhome opportunities in the BHD. He reviewed a March 2018 from Council regarding BHD improvements and a massing TA that staff had forward in response in early 2020. He said that a further study on townhomes had then been carried out and that staff was returning to present revised standards.

Mr. Liles said that staff had previously proposed exempting small townhome projects from non-residential requirements, reducing nonresidential requirements for medium townhome projects, and adjusting lot requirements and some thresholds. The Council had raised questions about whether the thresholds might lead to unintended outcomes and had asked staff to study things further, he said.

Mr. Liles presented the following recommended TAs: 1) Exempt "small" townhome projects from nonresidential requirements; 2) Reduce nonresidential requirements for "medium" townhome projects; 3) Adjust lot requirements to better reflect townhomes. He recommended that the Council open the public hearing, receive comments, close the public hearing, receive written comment for 24 hours, and consider taking action on December 9, 2020.

Council Member Ryan agreed with the recommendation to eliminate the commercial requirement, but proposed adding a requirement or an incentive for including accessory units within some townhomes. That would meet a significant community interest in providing more affordable space, she said. She confirmed with Mr. Liles that staff could look into how that would fit into the framework he was proposing.

Mayor pro tem Parker said that much of what was being proposed seemed restrictive. Capping townhomes at two acres, while requiring them to include commercial space posed the question of whether the Council wanted to actively encourage townhomes or merely tolerate them, he said.

Mr. Liles replied that staff believed the Council wanted to encourage that missing middle housing and a broader variety of housing types. However, the Council had also expressed interest in getting more commercial space in the BHD, he pointed out.

Mayor pro tem Parker asked if there were any 2- or 2.5-acre townhome developments in Chapel Hill or Carrboro, but no one knew for sure. He asked if there had been any conversations with townhome developers regarding the viability of the proposed regulations, and Mr. Liles replied that staff had used a Noell Consulting study as a guidepost.

Council Member Gu pointed out that stacking townhomes on top of each other still created large buildings, and Mr. Liles agreed but pointed out that a typical 4-story townhome would be lower than others in the BHD.

Council Member Gu asked if townhome buildings would wrap around parking garages, and Mr. Liles said that might be part of a larger project where parking would support other uses. She pointed out that the Council was concerned about that with residential apartment buildings and had wanted more diverse housing options and commercial development.

Mr. Liles replied that staff's main focus had been on the massing standards the Council had developed in February 2020. He did not know that townhomes would lead to improved massing scale in the BHD, but it would add more variety, he said.

Ms. Oates pointed out that the Town ordinance allowed accessory units to be used as Airb&b and urged the Council to correct that. Council Member Ryan asked about exploring the accessory unit issue, and Mayor Hemminger suggested that she propose doing so as a friendly amendment at the December 9th Council meeting.

A motion was made by Council Member Anderson, seconded by Mayor pro tem Parker, to close the public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote.

**9.** Reopen the Public Hearing: Application for Conditional Zoning at Bridgepoint, 2214 and 2312 Homestead Road. **[20-0752]**

Planner Anya Grahn reviewed a Conditional Zoning request for Bridgepoint, a 9.2-acre site on Homestead Road. She said that the applicant had asked to rezone a 2010 special-use permit (SUP) from Residential-5 Conditional Use to Residential 5-C Zoning District. The proposal included relocating two existing dwellings, demolishing outbuildings, and constructing 54 townhouses, she said.

Ms. Grahn explained that the project had been through multiple rounds of staff and advisory board reviews and that the Council had last addressed it on September 30, 2020. The applicant had requested a continuation in order to consider Community Design Commission (CDC) comments and was currently presenting a revised site plan, she said.

Town Urban Planner Brian Peterson discussed changes that he had proposed to the site plan design. These included rearranging the placement of buildings and garages, shortening the length of building





units, adding green spaces, and shortening some streets. He explained how the project would connect with nearby properties to create a neighborhood feel.

Ms Grahn pointed out that the new site plan included an increase in the number of units, a very slight increase in the amount of impervious surface, increased open space and tree canopy, a decrease in land disturbance, and an increase in overflow parking. She recommended that the Council reopen the public hearing, receive comments, allow written comments for 24 hours, and consider enacting the ordinance on December 9, 2020.

Mayor Hemminger said that the proposal had been much improved, but Council Member Ryan confirmed that there would still be a 79 percent incursion into the upland portion of the RCD.

The Council asked what the experience from the street would be like, and Mr. Peterson explained that having the sides of townhomes facing the street allowed windows and other architectural features to break up that facade. Increasing the number of end units would allow more openness and daylight on some homes, he said.

Linda Wells, a Vineyard Square resident, said she had not been notified about the hearing. Staff had answered some of her questions, but she remained concerned. She asked for additional information about a pipe that would discharge into the pond and said she did not understand why all of the area between that and her home needed to be cleared.

Developer Eric Chupp, representing Capkov Ventures, Inc., showed drawings of what some of the elevations would look like. He said that the plan would conform with the Town's ordinance for the first 100 feet of Resource Conservation District (RCD) and that encroachment into the last 50 feet would be for adding a pond that would improve water quality. The plan was to save trees on the Vineyard Square side of the creek, he said.

Mayor Hemminger praised the CDC and Mr. Petersen for the proposed changes and thanked the applicant for being open to them.

Mayor pro tem Parker read a question from a resident about bike lanes in that section of Homestead Road, and Mr. Chupp said that there would be a five-foot bike lane on both sides as part of a Homestead Improvement Project. In addition, there would be a 10-foot multi-use trail and a 400-foot extension of the five-foot bike path southward along Weaver Dairy Road, he said.

Council Members asked about the justification for incursion into the RCD, and civil engineer Cameron Rice, with Advanced Civil Design, explained that the applicant did not envision being able to get down to 40 percent because only half of the entire 300-foot RCD buffer was on its lot. He said that the LUMO allowed stormwater ponds in the managed and upland zones up to 40 percent. If the manged area and upland were combined, they would be almost right at 40 percent, he pointed out.

Mr. Rice said that the applicant understood the Town's concern and would continue to work with staff and adjacent property owners to reduce RCD encroachment. He pointed out that nearby sites did have buildings in the upland area. For example, Weaver Dairy Road was in the upland zone, he said. He also pointed out that Weaver Dairy Road was impervious surface while the applicant was merely trying to install a pond.

Council Member Anderson asked about feedback from the Stormwater Advisory Board, and Mr. Chupp said they had never been asked to appear before that board. He stressed the work they had done with Town staff over the past two years and how they had agreed to many changes. However, they could not reduce the number of units, which was the only way to get below 40 percent, he said.

The Mayor and Council agreed that the plan was greatly improved. Council Member Ryan said she was still troubled by the requested amount of RCD incursion, which would not be a good precedent for the Town to set. She and Council Member Buansi said they hoped the applicant would landscape the pond and treat it as an amenity, if the project were approved.

Mayor Hemminger said she did not like going into RCD but she acknowledged that exceptions had been made for roads and some buildings. Putting in a pond was an interesting request, she said. She encouraged the applicant and staff to continue working to minimize that and to preserve as many trees as possible.

Mayor pro tem Parker asked about the practical implications of incursion, and Town engineer Ernest Odei-Larbi explained that water quality might be okay but that wildlife habitats might not return. He said that the Town would make sure the pipe was stable and would minimize erosive flow into the stream. He pointed out that the Town required post-development runoff to be the same as pre-development.

Council Member Buansi and Mayor Hemminger expressed enthusiasm about the project's missing middle and affordable housing possibilities.

A motion was made by Mayor pro tem Parker, seconded by Council Member Stegman, to close the public hearing and receive comment for an additional 24-hours. The motion carried by a unanimous vote.





**10.** Open the Public Hearing: Conditional Zoning Application for Columbia Street Annex, 1150 S. Columbia Street, from Residential-2 (R-2) to Mixed Use - Village - Conditional Zoning District (MU-V-CZD). **[20-0810]**

Town Planner Jake Lowman said that staff was responding to a Council request for more information on the relationship between Agenda Items 10 and 11 and that Item 10 would be a joint presentation on both. He said that final actions on the two would be distinct, however.

Mr. Lowman provided details on the proposal to rezone the four-acre South Columbia Street Annex site from Residential 2 to Mixed Use Village Conditional Zoning District. He outlined the proposal for a six-story building that would include 57,000 square feet of residential space, 4,000 square feet of commercial space, and underground parking. There would be a maximum of 52 units, eight of which would be affordable, or 18 percent, which would be above the Town's 15 percent requirement, he said.

Mr. Lowman discussed proposed traffic improvements for the area. He showed the Monroe Street ROW on a map and described it as an undeveloped, wooded site with a perennial stream running through the middle of its RCD. He explained that the current Land Use category was Low Residential (1-4 units per acre) and the applicant was proposing High Residential (8-15 units per acre), which would require an amendment to the Town's land use plan.

Mr. Lowman noted that the applicant had requested modifications to steep slope regulations, RCD encroachment, landscaping standards, and the required percentage of commercial space. He recommended that the Council open the public hearing for Item 10 (the South Columbia Street annex), receive comments on that and Item 11 (the Monroe Street ROW closure), close the public hearing, allow written public comment for 24 hours, and approve the project on December 9, 2020. However, the Council could also continue the matter to another meeting and push enactment to January, 2021, he said.

Manager of Engineering and Infrastructure Chris Roberts provided additional information on the request to close an unpaved and un-maintained portion of the Monroe Street ROW. He showed the area on a map, reviewed state requirements regarding such closings, and discussed the process thus far. The Council could decide on December 9th whether or not to approve that closure, he said.

Mr. Roberts said that a full public easement would reconnect an isolated part of the Monroe Street ROW and be dedicated before the ROW was officially closed. He showed a series of pictures of the current status of the area and said that the closure would isolate one property, which was currently accessed by a private driveway to the paved portion of Monroe

Street. The developer had proposed a full public access easement to connect the Monroe Street ROW that would provide reasonable legal access to the parcel, Mr. Roberts said.

Mr. Lowman also discussed the opposition of one property owner, Zalman Joffe. He said that Mr. Joffe would have access to his property via Dawes Street or by connecting to an access easement through the proposed development.

Architect Phil Szostak said that a stream in the area had been considered intermittent but was changed to perennial in 2017. He said that restoring the stream would improve water quality. He also said that a wildlife survey had found that the man-made steep slopes and an invasive species on the east side of the creek were not wildlife compatible.

Mr. Szostak reviewed the proposed building design. He said that a plaza area would solve erosion problems, and he showed renderings of how the massing would be broken up on the exposed area. He said that the project would generate minimal traffic, and he noted that the Town had already performed several traffic analyses of the area. He showed a proposed underground stormwater storage area. He said that electric vehicle (EV) conduit would serve 14 spaces (20 percent) and there would be one indoor bike space per unit.

Mr. Jewell characterized the design as an elegant way to create a street level experience. He said that landscape buffers in the front would bring an urban plaza experience out to the street. He pointed out that the RCD had expanded into the property's footprint in 2017. He hoped that preserving 60 percent of the site, adding stormwater management, and exceeding the tree coverage requirement would be a suitable balance to any RCD disturbance, he said.

Mr. Jewell argued that concentrating the development on the east side of the stream and up against the street would buffer the residential neighborhood to the west and bring people to where public transportation was located. He said that the building would create a beautiful gateway to Chapel Hill.

Council Member Ryan verified with the applicant that retaining walls holding the driveway on the west side were 8-11 feet tall and that "double loaded" underground parking meant two cars would be parked end-to-end in one space with access from only one side.

Council Member Ryan also confirmed with Mr. Jewell that the Town had waived doing a traffic impact analysis (TIA) but that one had been done six years prior and another would be conducted for the Zoning Compliance Permit. She was sorry that the Council would not see a TIA prior to being asked to vote on the project, she said.





Council Members confirmed with staff that there would be no barriers to public use of the plaza. They ascertained that the RCD had been expanded in 2016 when the stream was re-categorized as perennial. The new category meant that 100-foot buffers were required and that the RCD was divided into three zones.

The Council asked for a response to the Transportation and Connectivity Advisory Board's (TCAB) recommendation for denial due to traffic safety concerns, and Mr. Jewell replied that he felt perplexed by that determination. He said that the NC-DOT had supported the plan and that the 2014 TIA had found that the project would not cause any change in level of service. Council Members confirmed that Mr. Jewell had met the Community Home Trust.

Council Member Gu said that the TCAB's primary concern was the traffic pattern, not volume. The new full-service entrance would significantly increase the complexity of conflicts between different modes of traffic, she said. Mr. Jewell offered to meet with the Town's bicycle and pedestrian staff regarding that concern, and Council Member Huynh asked him to return with a response to the TCAB's six or seven recommendations for increasing bike and pedestrian safety.

Council Member Parker ascertained from Mr. Szostak that the 4,000 square feet of commercial was based on a plan for live-work units, which would likely cost in the middle $300,000 range. He also confirmed that the pedestrian crossing would be signalized but that NC-DOT would not allow a signal at Purefoy Road.

Ms. Brewer said that the proposed development would add affordable units while leading to the loss of existing ones. It proposed to restore a stream channel while paving 20 percent and disturbing 40 percent of the RCD, she said. The plan would lead to the loss of iconic Merritt's Grill, worsen traffic safety problems, discredit the stream buffer protection ordinance, and create a domino effect of high-rise, mixed-use development along South Columbia Street, she said.

Ms. Brewer argued that any new residential development should be a maximum of three stories tall. It should be in harmony with the historic entranceway and have a traffic light at the Purefoy/Columbia Street intersection, she said.

Ms. McClintock endorsed Ms. Brewers's comments and said that the Chapel Hill Alliance for a Livable Town had sent a letter to the Council asking them to deny the rezoning due to environmental protection and public safety concerns. She said the Environmental Safety Advisory Board had approved the project with the understanding that the Stormwater Advisory Board would review it. That did not happen, she said.

Ms. Horne asked the Council to reject the project. She said that neighbors and previous Council Members had consistently raised concerns over the years about its large scale and potential traffic issues.

Mr. Vora advised the Council to not find ways to get around the Town's RCD requirements. He characterized the area's traffic problem as a conundrum and said he did not see a way around that.

Martin Johnson, a Westwood neighborhood resident, expressed support for the project. The Town needed more housing for moderate-income families and the proposal was in keeping with Chapel Hill 2020 and the FLUM, he said. Mr. Johnson said that the development's car-free and one-car households would advance the Towns climate-change goals and diversify the neighborhood.

Sam Eberts, a Westwood neighborhood resident, said that no intelligent person could say that the proposed "six-story monstrosity" overlooking historic homes would not add traffic to the area. If the goal was for residents to walk and bike everywhere, then the developer should limit parking, he said. Mr. Eberts added that he resented the developer's implication that residents wanted an urban plaza in their historic neighborhood.

Martin Feinstein, a Coolidge/Columbia Street resident, said that the area did not need "an imposing, multi-story box" in it. He argued against setting a precedent of giving variances to RCD and steep slope requirements without a compelling reason.

Deborah Barrett, a Westwood neighborhood resident, said that the current site was not a particularly pretty or useful piece of land. Having a place for essential workers, staff, and others that encouraged walking and biking sounded promising, she said.

Zalman Joffe, the property owner who objected to the Monroe Street ROW closing, said that a 16-foot retaining wall associated with this project would block him completely. He objected to the project unless access to his property could be insured, he said.

Mayor Hemminger asked the Town's Stormwater Department to return with more information about the effects of development on the area. Council Members requested more information regarding traffic, especially with regard to safety for cars coming out of Purefoy Road and turning left down South Columbia Street. They said that merely including conduit for 20 percent of the parking spaces would not meet the need for electric vehicle charging stations down the road. The Council also asked to see options for reducing the number of parking spaces.

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, to continue the Public Hearing to December 9, 2020. The motion carried by a unanimous vote.





**11.** Close the Public Hearing to Consider a Request to Close a Portion of an Unmaintained and Unimproved Monroe Street Public Right-of-Way. [20-0811]

A motion was made by Mayor pro tem Parker, seconded by Council Member Huynh, to continue the Public Hearing to December 9, 2020. The motion carried by a unanimous vote.

**12.** Update on the Airport Hazard District Land Use Management Ordinance Text and Map Amendment. [20-0812]

This item was moved to another meeting.

**13.** Open the Public Hearing: Application for Conditional Rezoning - Phi Gamma Delta at 108 W. Cameron Avenue. [20-0813]

This item was continued to December 9, 1020.

A motion was made by Mayor pro tem Parker, seconded by Council Member Anderson, to continue the Public Hearing to December 9, 2020. The motion carried by a unanimous vote.

## APPOINTMENTS

**14.** Appointments to the Grievance Hearing Board. [20-0814]

The Council reappointed Annie Brayboy and appointed Matthew Tulchin to the Grievance Hearing Board.

**15.** Appointments to the Historic District Commission. [20-0815]

The Council reappointed Sean Murphy, and appointed Polly Van de Velde to the Historic District Commission. The Council held one position vacant for further consideration.

**16.** Appointments to the Justice in Action Committee. [20-0816]

The Council reappointed Shiala Baldwin and Elisabeth Flake and appointed Aida Al-akhdar, Tracy Miller, Nul L Oh and Sarah Cheek to the Justice in Action Committee.

**17.** Appointments to the Stormwater Management Utility Advisory Board. [20-0817]

The Council reappointed Stephan Hern and Pamula Schultz and appointed Janet Clarke to the Stormwater Management Utility Advisory Board.

## ADJOURNMENT

The meeting was adjourned as 12:09 am on Thursday, November 19, 2020.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 7., **File #:** [21-0765], **Version:** 1 **Meeting Date:** 10/13/2021

**Receive Upcoming Public Hearing Items and Petition Status List.**

**Staff:**
Sabrina Oliver, Director and Town Clerk
Amy Harvey, Deputy Town Clerk

**Department:**
Communications and Public Affairs

**Recommendation(s):**

That the Council accept the reports as presented.

**Background:**
Two pages on our website have been created to track:

- public hearings scheduled for upcoming Council meetings; and
- petitions received, including their status and who you can call for information.

The goal is to provide, in easily available spaces, information that allows people to know when Council will be seeking their comments on a particular topic of development and to know the status of a petition submitted at Council meetings.

In addition to being on the website, these pages will be included in each agenda for Council information,

**Fiscal Impact/Resources:** Staff time was allocated to create the semi-automated web pages, and additional staff time will be needed for maintenance.

**Attachments:**

- Scheduled Public Hearings <https://www.townofchapelhill.org/government/mayor-and-council/council-minutes-and-videos/scheduled-public-hearings>
- Status of Petitions to Council <https://www.townofchapelhill.org/government/mayor-and-council/how-to-submit-a-petition/petition-status>

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

By accepting the report, the Council acknowledges receipt of the Scheduled Public Hearings and Status of Petitions to Council lists.

# SCHEDULED PUBLIC HEARINGS

This webpage lists public hearings that are scheduled for a *specific Council meeting date*, although periodically, some may be continued to a future date. Public hearings may relate to the Land Use Management Ordinance (LUMO), Residential or Commercial Development, Budget, Transportation, or Housing issues. Meeting materials are posted at Council Meeting Agendas, Minutes and Videos.

Interested in a development project not yet scheduled for Council review? See the Development Activity Report for the project's current status.

October 13

- Close the Legislative Hearing and Consider the Rosemary/Columbia Street Hotel, 110 West Rosemary Street Conditional Zoning Application (PROJECT 20-076)
- Close a Legislative Hearing and Consider an Application for a Major Modification to the Glen Lennox Development Agreement
- Close the Legislative Hearing and Consider the Conditional Zoning: 101-111 Erwin Road (Project #20-082)
- Close the Legislative Hearing and Consider a Land Use Management Ordinance Text Amendment to Section 8.5 Revising Rules of the Community Design Commission
- CONCEPT PLAN REVIEW: 5500 OLD CHAPEL HILL ROAD (Planning Project #21-055)

October 27

- Close the Legislative Hearing and Consider a Land Use Management Ordinance Text Amendment to Section 3.11, Blue Hill Form District, Regarding Short-Term Rental Standards
- Close the Legislative Hearing and Consider Land Use Management Ordinance Text Amendments Proposed Changes to Sections 4.4 Zoning Amendments, 4.5 Special Use Permits, 4.7 Site Plan Review, and 4.8 Master Land Use Plan Related to Extending the Time Extension Periods Granted by the Town Manager

# STATUS OF PETITIONS TO COUNCIL

Petitions submitted during the Town Council meetings are added to the list below, typically within five business days of the meeting date.

To contact the department responsible, click on the department name. Meeting materials are posted on the Council Meetings calendar.

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 09/22/2021 | Joan Rehm and Karin Nelson | Request Regarding Downtown Exhaust Noise. | Police<br>Chris Blue,<br>Police Chief<br>Phone: 919-968-2766 | Staff is preparing information to respond to this request. |
| 09/22/2021 | Barry Nakell | Request to Rename Dixie Lane | Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | Staff will work with the Council to respond to this request. |
| 09/22/2021 | Council Members | Regarding Long Range Planning for Future Growth | Planning & Development Services | Staff is preparing information to respond to this request. |
| 09/22/2021 | Makeda Ma'at | Request Regarding Community Home Trust. | Housing & Community<br>Sarah Vinas,<br>Interim Director<br>Phone: 919-969-5079 | Staff is preparing information to respond to this request. |
| 09/22/2021 | Kate Sayre | Request To Build A Splash Pad in Chapel Hill | Parks & Recreation<br>Phillip Fleischmann,<br>Parks and Recreation Director<br>Phone: 919-968-2785 | The Council will discuss this at an upcoming work session. |
| 09/22/2021 | Council Members Stegman, Huynh, Buansi, and Parker | Regarding Affordable and Missing Housing | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707<br><br>Housing & Community<br>Sarah Vinas,<br>Interim Director<br>Phone: 919-969-5079 | Staff is preparing information to respond to this request. |
| 09/01/2021 | Laurin Easthom | Request Regarding Gun Use Regulation on Land Owned by Multiple Jurisdictions. | Police<br>Chris Blue,<br>Police Chief<br>Phone: 919-968-2766 | Staff is preparing information to respond to this request. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 09/01/2021 | Tamra Finn | Request to Amend Town Code to Permit Golf Cart Use on Neighborhood Streets. | Town Manager<br>Ross Tompkins, Assistant to the Town Manager<br>Phone: 919-968-2707 | Staff is preparing information to respond to this request. |
| 09/01/2021 | Joe Patterson | Request for Modifications to the Town of Chapel Hill Noise Control Code. | Police<br>Chris Blue, Police Chief<br>Phone: 919-968-2766 | Staff is preparing information to respond to this request. |
| 06/28/2021 | Council Member Ryan on Behalf of Mayor Hemminger, Council Member Stegman, and Council Member Gu | Request Regarding Stormwater Storage Basin Projects. | Public Works<br>Lance Norris, Public Works Director<br>Phone: 919-969-5100 | The Town has paused proposed stormwater projects pending a broader community discussion. The Town hosted a community information meeting about the flood storage projects identified in the Lower Booker Creek Subwatershed Study on 09/13/2021. |
| 06/23/2021 | Molly McConnell | Request Regarding Amending the LUMO to Allow 30 Feet Buffer from Roadway. | Planning & Development Services | Staff is preparing information to respond to this request. |
| 06/23/2021 | Robert Beasley | Request Regarding Affordable Housing at Trinity Court. | Housing & Community<br>Sarah Vinas, Interim Director<br>Phone: 919-969-5079 | Staff provided information about the project to the petitioner via email. In 2022, the Town will apply for Low Income Housing Tax Credits and the Council will consider a development application for the project. |
| 06/16/2021 | Rachel Gray | Request Regarding West Chapel Hill Cemetery. | Town Manager<br>Ross Tompkins, Assistant to the Town Manager<br>Phone: 919-968-2707<br>Housing & Community<br>Sarah Vinas, Interim Director<br>Phone: 919-969-5079 | Staff reviewed the 2011 report with its author and does not recommend conducting an investigation of whether there are unmarked or undocumented burials on the 110 Jay Street parcel. |
| 06/16/2021 | Robert Beasley | Request Regarding Proposed Jay Street Apartments and Affordable Housing Development on Public Land Planning Process. | Housing & Community<br>Sarah Vinas, Interim Director<br>Phone: 919-969-5079 | The feasibility of developing affordable housing on Town properties, including Jay Street, was evaluated several times against a number of factors, dating back to 2017. Staff will continue to work with legal experts to adhere to all relevant statutes. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 06/16/2021 | Pamela Cooper | Request Regarding Stormwater Study for Jay Street Site. | Housing & Community<br>Sarah Vinas,<br>Interim Director<br>Phone: 919-969-5079<br><br>Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | Once the site plan is finalized, the development team will create a stormwater management plan. Although not required, the development team plans to present the plan to the Stormwater Advisory Board before submitting a Conditional Zoning Application. |
| 06/09/2021 | Council Members Parker, Ryan, Huynh, Stegman, and Gu | Request Regarding Comprehensive Review of Stormwater Regulations. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707<br><br>Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | The Council will discuss this at an upcoming work session. |
| 06/09/2021 | Elizabeth Youseff on Behalf of the Borgen Project | Request to Send Letter to State Leaders Regarding Global Development Programs. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | The Council received and referred this request to the Mayor and Town Manager for consideration. |
| 06/09/2021 | Parks, Greenways and Recreation Commission | Request that the Council Authorize a $100,000 Match towards a North Carolina Land and Water Conservation Trust Fund Grant Application | Parks & Recreation<br>Phillip Fleischmann,<br>Parks and Recreation Director<br>Phone: 919-968-2785 | Staff is preparing information to respond to this request. |
| 06/09/2021 | Deborah Fulghieri | Request that Town Staff Bring Forward Historical and Environmental Information for the Town-Owned Property at Mt. Carmel Church Road and Bennett Road. | Housing & Community<br>Sarah Vinas,<br>Interim Director<br>Phone: 919-969-5079 | The Town used open space bond funds to pay closing costs for the land donation. There is no legal conflict with considering alternate uses of a site the Town acquired in this way. Council prioritized the parcel for affordable housing in September 2019. |
| 06/09/2021 | Robert Beasley | Request Regarding Jay Street Land Tract Development Project Funding. | Housing & Community<br>Sarah Vinas,<br>Interim Director<br>Phone: 919-969-5079 | 110 Jay Street was one of five parcels purchased in 2005 with open space bond funding. Town Attorneys and outside counsel have advised there is no legal conflict with repurposing the site for affordable housing after this purchase. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 05/26/2021 | Mary Cummings | Request to Ban Gas-Powered Leaf Blowers | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Staff is preparing information to respond to this request. |
| 05/26/2021 | Edson Freeman | Request to Allow Miniature Pigs as Pets | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Staff is preparing information to respond to this request. |
| 05/19/2021 | Chapel Hill Public Library Advisory Board | Request for a Working Group on Equitable Library Funding. | Mayor<br>Pam Hemminger,<br>Mayor<br>Phone: 919-968-2714<br>Library<br>Susan Brown,<br>Library Director<br>Phone: 919-969-2034<br>Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Staff will reach out to Orange County to follow up on this request. |
| 05/19/2021 | Council Members Stegman and Parker | Request Regarding Tax Equity Fund. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Staff is preparing information to respond to this request. |
| 05/19/2021 | Phil Post | Request to Refer the April 21 Petition Related to 160D to the Planning Commission. | Planning & Development Services<br>Planning Commission | Staff is reviewing this request. |
| 05/05/2021 | Mayor pro tem Parker, Council Member Buansi, and Council Member Stegman | Request Regarding Chapel Hill Increasing its Minority and Women Business Enterprise/Disadvantaged Business Enterprise (MWBE/DBE) Contracting Targets. | Business Management<br>Amy Oland,<br>Business Management Director<br>Phone: 919-969-5017<br>Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Based on Council direction, staff will build increased targets into the upcoming work on the East Rosemary Parking Deck project. Staff will continue working to respond to the broader request. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 04/21/2021 | Brown & Bunch, PLLC | Request for Permission to Proceed with Presentation of Proposal for a Columbarium at the Old Chapel Hill Cemetery. | Parks & Recreation<br>Phillip Fleischmann,<br>Parks and Recreation Director<br>Phone: 919-968-2785 | Staff is preparing information to respond to this request. |
| 04/07/2021 | Paul Snow and others | Request Regarding Traffic Model in the Area of Estes and MLK. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | On 05/03/21, the Town Council held a public information meeting on this topic. The public hearing for the Aura development project closed 05/26/21. The Council's final vote on the project was 06/28/21. |
| 03/24/2021 | Mayor Hemminger | Request Regarding Self Storage | Planning & Development Services | Staff is preparing information to respond to this request. |
| 03/24/2021 | Council Member Anderson | Request Regarding Manufactured Home Parks | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707<br><br>Housing & Community<br>Sarah Vinas,<br>Interim Director<br>Phone: 919-969-5079 | Staff will coordinate with Orange County and Carrboro to respond to this request. |
| 02/24/2021 | Linda Brown | Regarding 101-111 Development on Erwin Road. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | The project applicant voluntarily submitted a request to receive feedback from the Stormwater Mgmt Utility Advisory Board. The project was discussed at the 04/27/2021 and 05/25/2021 SMUAB meetings. |
| 02/24/2021 | Parks, Greenways, and Recreation Commission | Request Regarding Facilities Repair. | Business Management<br>Amy Oland,<br>Business Management Director<br>Phone: 919-969-5017 | This request will be evaluated during the upcoming two-thirds bond issuance and the FY22 budget development process. |
| 11/04/2020 | Residents in the area of Mason Farm Rd., Whitehead Circle, and Purefoy Rd | Request Improvements to Neighborhood Infrastructure to Promote Safe Walking and Biking and Improved Connectivity to Adjacent Neighborhoods and Campus. | Planning & Development Services<br><br>Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | Staff is preparing information to respond to this request. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 10/28/2020 | Stormwater Management Utility Advisory Board | Recommendations Regarding the Development Review Process. | Planning & Development Services<br>Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | The Council Committee on Boards and Commissions has discussed this request. The Council is scheduled to consider this change in September 2021. |
| 06/10/2020 | Community Design Commission | Request to Create a Downtown Design District. | Planning & Development Services | Staff will coordinate with the Council Committee on Boards and Commissions to respond to this request. |
| 05/20/2020 | Parks, Greenways, and Recreation Commission | Request to Designate all 36.2 Acres of the American Legion Property for Use as a Community Park. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | This request will be incorporated into the public engagement process for the future use of the site. |
| 05/20/2020 | Elaine McVey | Request to Amend the Land Use Management Ordinance Related to Deer Fencing. | Planning & Development Services | Staff will work to bring forward a LUMO Text Amendment for Council consideration at a future date. |
| 02/26/2020 | Carlisle Willard | Request Regarding Proposed Anti-Corruption Resolution. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | The Council received and referred this request to the Mayor and Town Manager for consideration. |
| 02/19/2020 | Steve Moore | Request Regarding Cemetery Needs. | Parks & Recreation<br>Phillip Fleischmann,<br>Parks and Recreation Director<br>Phone: 919-968-2785<br>Communications & Public Affairs<br>Sabrina Oliver,<br>Communications & Public Affairs Director<br>Phone: 919-968-2757 | Staff is in contact with the petitioner and is working to respond to the items raised in the petition. The driveways in Old Chapel Hill Cemetery were resurfaced in July 2021. |
| 01/08/2020 | Renuka Soll | Request for an Improved Petition Process. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Additional effort is being made to track and update petition status on this website so that the public has access. Petitioners can contact the Mgr.'s office or responding department if they have questions after reviewing updates. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 11/20/2019 | John Morris | Request Regarding Local & Regional Transit Planning. | Transit<br>Brian Litchfield,<br>Transit Director<br>Phone: 919-969-4908 | The Town continues to work with its transit partners and neighboring agencies to keep community goals at the forefront of local transit planning efforts. |
| 10/02/2019 | Daniel Dunn | Request Regarding Government Transparency. | Technology Solutions<br>Scott Clark,<br>CIO<br>Phone: 919-968-2735<br>Communications & Public Affairs<br>Sabrina Oliver,<br>Communications & Public Affairs Director<br>Phone: 919-968-2757 | This information is readily available via a public records request in order to assure accuracy and maintain the security of personally identifiable information. |
| 09/11/2019 | East Franklin Neighborhood Steering Committee & Neighbors | Request Regarding Neighborhood Preservation. | Police<br>Chris Blue,<br>Police Chief<br>Phone: 919-968-2766<br>Planning & Development Services | While this request did not fall within the scope of the Short Term Rental Task Force, staff will continue to work with residents, the University, and other community members on concerns related to student rental housing. |
| 06/26/2019 | Community Design Commission | Request for Modifications to the Concept Plan Review Process. | Planning & Development Services | The Council most recently discussed this at their 09/16/2020 work session. Staff is piloting new ways to present Concept Plans to boards, using Town projects as subjects. |
| 06/26/2019 | Julie McClintock | Request Regarding the Blue Hill Form Based Code. | Planning & Development Services | The Council and staff continue to evaluate and update the Blue Hill Form Based Code. |
| 04/24/2019 | Board of Adjustment | Request Regarding Neighborhood Conservation District Ordinances. | Planning & Development Services | The Town is currently in the process of updating its Land Use Management Ordinance. This idea is under consideration as a part of this process. |
| 04/17/2019 | Amy Ryan for Planning Commission | Commission Regarding Site Plan Review Process. | Planning & Development Services | Staff will coordinate with the Council Committee on Boards and Commissions to consider this request. |
| 02/13/2019 | Citizens | Request Regarding Coal Use and Coal Ash. | Town Manager<br>Ross Tompkins,<br>Assistant to the Town Manager<br>Phone: 919-968-2707 | Remediation work is almost complete along the Bolin Creek Trail near the Police Department. UNC is expected to release their Climate Action Plan in 2021, which is expected to address UNC coal use in the future. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 09/19/2018 | Julie McClintock of CHALT | Regarding Land Use Intensification. | Planning & Development Services<br>Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | On 6/12/2019, Council received a presentation on the Town's Stormwater program. On 12/9/2020 Council adopted the use of FEMA Flood Resiliency Maps. In 2/2021,Council received more info on Stormwater programs LUMO update will consider other ideas. |
| 06/27/2018 | Susanne Kjemtrup / Brian Hageman | Transportation and Connectivity Advisory Board Request for an Electric Vehicle Provision in the Land Use Management Ordinance. | Planning & Development Services | The Town is currently in the process of updating its Land Use Management Ordinance. These ideas are under consideration as a part of this process. |
| 06/13/2018 | Ondrea Austin | CHALT's Request to Revise the Tree Ordinance. | Planning & Development Services | The Town is currently in the process of updating its Land Use Management Ordinance. This idea is under consideration as a part of this process. |
| 06/13/2018 | Mayor pro tem Jessica Anderson | Request to Amend Bus Advertising Policy. | Transit<br>Brian Litchfield,<br>Transit Director<br>Phone: 919-969-4908 | At their 01/22/19 meeting, the Chapel Hill Transit Public Transit Committee considered the draft nonpublic forum transit advertising policy in order to provide feedback to the Chapel Hill Town Council on the option of amending the policy. |
| 06/13/2018 | Mayor Pam Hemminger | Regarding Reviewing Policies, Procedures, and Practices for Development. | Planning & Development Services | A Town web page with TIA exemption requests is available. Staff continues to look for ways to apply the LUMO clearly and consistently for all stakeholders in the development process. |
| 03/14/2018 | Council Members Anderson, Gu, and Schaevitz | Request Regarding Addressing Blue Hill District Community Interests. | Planning & Development Services | Council enacted ordinance amendments pertaining to stormwater management, affordable housing, and non-residential development, as well as building size, massing, and permeability. Council considered amendments for townhomes and deferred action. |

| Meeting Date | Petitioner | Petition Request | Departments Responsible | Petition Status |
|---|---|---|---|---|
| 11/07/2016 | Mayor Hemminger | Regarding Parking and Transit Needs in Downtown Area. | Planning & Development Services<br>Police<br>Chris Blue,<br>Police Chief<br>Phone: 919-968-2766<br>Public Works<br>Lance Norris,<br>Public Works Director<br>Phone: 919-969-5100 | Recent actions include replacing parking pay stations, implementing Downtown Ambassadors program, and including additional parking with required Wallace Parking Deck repairs. Next steps include parking payments-in-lieu and public/private partnerships. |

Last modified on 10/8/2021 3:15:05 AM

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr.
Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 8., **File #:** [21-0766], **Version:** 1 **Meeting Date:** 10/13/2021

**Close the Legislative Hearing and Consider a Conditional Zoning Application - Residence Inn and Summit Place Townhomes, 101-111 Erwin Road, Mixed Use-Village-Conditional Zoning District (MU-V-CZD)**.

See Summary Report on next page.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Becky McDonnell, Senior Planner

a. Without objection, the revised report and any other materials submitted at the hearing for consideration by the Council will be entered into the record
b. Introduction and revised recommendation
c. Receive updates from the applicant
d. Comments from the public
e. Comments and questions from the Mayor and Town Council
f. Motion to close the Legislative Hearing
g. Motion to adopt the Resolution of Consistency with the Comprehensive Plan and Statement of Reasonableness
h. Motion to enact an Ordinance to rezone the property
i. Motion to adopt the Resolution revoking the existing Special Use Permit.

RECOMMENDATION: That the Council close the legislative hearing and adopt Resolution A and Resolution B, and enact Revised Ordinance A, approving the Conditional Zoning application.

# CONSIDER AN APPLICATION FOR CONDITIONAL ZONING APPLICATION FOR RESIDENCE INN AND SUMMIT PLACE TOWNHOMES LOCATED AT 101-111 ERWIN ROAD (PROJECT #20-082)

**SUMMARY REPORT** TOWN OF CHAPEL HILL PLANNING DEPARTMENT
Colleen Willger, Director
Judy Johnson, Assistant Director
Becky McDonnell, Senior Planner

| **PROPERTY ADDRESS** | **MEETING DATE** | **APPLICANT** |
|---|---|---|
| 101-111 Erwin Road | October 13, 2021 | Scott Radway, Radway Design on behalf of Summit Hospitality Group, LLC (SHG, LLC) and Chapel Hill R I, LLC |

## TOWN MANAGER RECOMMENDATION

That the Council close the legislative hearing and receive the Town Manager's recommendation and consider adoption Resolution A, the Resolution of Consistency and Reasonableness, and Resolution B, revoking the existing Special Use Permit, and enacting Revised Ordinance A, approving the Conditional Zoning application. Please see the attached revisions and technical report describing updates from the applicant.

## UPDATES SINCE THE SEPTEMBER 1, 2021 LEGISLATIVE HEARING

At the September 1 Legislative Hearing, there was discussion regarding construction of a drainage swale within the 100-foot buffer between the hotel property and the adjacent Summerfield Crossing development. The plans before Council this evening are similar to those presented at the September 1 hearing. Staff anticipates that the applicant will present information tonight regarding the proposed swale. The revised plans show reduced number of parking spaces such that a modification to parking regulations is no longer requested; and provide an easement for a future multi-use path ranging from 19.1 feet to 30 feet along Dobbins Drive.

## PROCESS

Conditional Zoning is a legislative process that allows the Council to review the rezoning application for consistency with the Comprehensive Plan.

## DECISION POINTS

The proposed development requests a Modification to Regulations for the following:

- Steep slope disturbance limitations

## ZONING

*Existing*: Residential-2 (R-2) and Residential–3-Conditional Zoning District (R-3-CZD)
*Proposed*: Mixed Use-Village-Conditional Zoning District (MU-V-CZD)

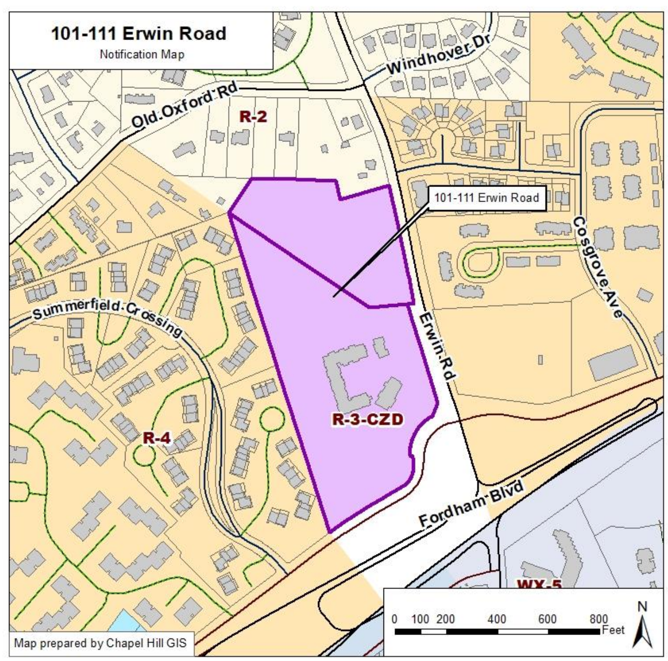
## PROJECT OVERVIEW

The Residence Inn Hotel has a Special Use Permit, approved in 2003. The applicant proposes abandoning this SUP and applying a Mixed Use-Village Conditional Zoning District (MU-V-CZD) to the entire site.

The applicant proposes to develop a townhouse neighborhood with 52 dwelling units, including seven affordable units. The applicant also proposes expanding the existing Residence Inn Hotel by adding 54 hotel rooms.

The site currently consists of two parcels totaling 770,566 sq. ft. (17.7 acres). The northern 6.1-acre parcel will accommodate the Summit Place Townhomes and contains an existing farm pond. The southern 11.6-acre parcel contains the existing Residence Inn Hotel with 108 hotel rooms and a two-story office/residential building. The office/residential building will be replaced by a four-story building with the 54 new hotel rooms.

## PROJECT LOCATION



| | |
|---|---|
| **ATTACHMENTS** | 1. Technical Report and Project Details<br>2. Draft Staff Presentation<br>3. Resolution A, Resolution of Consistency and Reasonableness<br>4. Resolution B (Revoking the Special Use Permit)<br>5. Ordinance A (Approving the Application)<br>6. Resolution C (Denying the Application)<br>7. Revised Applicant Materials |

# TECHNICAL REPORT

## PROJECT OVERVIEW

| | |
|---|---|
| March 23, 2003 | Town Council approved a Special Use Permit for a three-story hotel building containing 108 lodging units, known as the Marriott Residence Inn Hotel. |
| September 12, 2018 | Town Council reviewed a concept plan for 150,000 sq. ft. of floor area for two three-story buildings with 140 dwelling units. |
| December 29, 2020 | Applicant submitted a Conditional Zoning District Permit Application for a hotel addition and development of a 52-unit townhouse neighborhood, along with a request to revoke the 2003 Special Use Permit. |
| June 23, 2021 | Town Council opened the Legislative Hearing for consideration of the Conditional Zoning Application. |
| September 1, 2021 | Town Council continued the Legislative Hearing to receive updates on the proposed project. |

The application proposes rezoning from Residential-2 (R-2) and Residential-3-Conditional Zoning District (R-3-CZD) to a Mixed Use-Village–Conditional Zoning District (MU-V-CZD) for the site to accommodate a 52-unit townhouse neighborhood development. It also proposes adding 54 hotel rooms to the existing Residence Inn Hotel. The project seeks to develop two (2) contiguous parcels on the west side of Erwin Road, north of Dobbins Drive and Fordham Boulevard. More details about the proposed development can be found in the applicant's narrative and statement of justification.

Information about the site and proposed zoning districts can be found below, as well as a list of proposed Modifications to Regulations, other important considerations that staff have identified, and an analysis of the project's consistency with the Comprehensive Plan and relevant Findings of Fact.

## SITE CONTEXT

Staff have identified the following physical and regulatory characteristics of the land which are relevant to consideration of a Zoning Atlas Amendment:

- The site is adjacent to the following uses and zoning districts
  - The Residential–2 (R-2) zoning district to the north contains single-family homes.
  - The Residential-4 (R-4) zoning district to the east and west, including across Erwin Road, contains multifamily developments.

  - Dobbins Drive and Fordham Boulevard are located to the south, with Walkable Mixed-Use–5 (WX-5) and Walkable Mixed-Use–7 (WX-7) zoning districts, part of the Blue Hill Form District, located to the south of Fordham Boulevard, containing various commercial uses.

- The southern parcel is zoned Residential–3–Conditional Zoning District (R-3-CZD) and contains the existing Residence Inn Hotel.

- The northern parcel is zoned Residential–2 (R-2) and contains a farm pond that the applicant proposes to drain and remove. A new stormwater basin will be constructed to serve both the hotel and the townhome development, as well as stormwater from the Christ Community Church site to the north.

- Areas of manmade steep slopes have been identified around the pond. The applicant describes the site as "sloped away from Erwin Road in a fairly uniform 8-10 percent slope from the northeast corner to the southwest corner".

- The site fronts on Erwin Road, north of its intersection with Dobbins Drive and Fordham Boulevard, and various improvements are proposed in accordance with the Traffic Impact Assessment.

# PROPOSED ZONING

The applicant has submitted a Conditional Zoning application, which allows review of the development proposal in conjunction with the rezoning. It also allows site-specific standards to be formulated and applied as conditions through a legislative process. The Conditional Zoning application provides an opportunity to establish conditions that modify use, intensity, and development standards in order to address impacts reasonably expected to be generated by development. Conditions can also address conformance of the development with town regulations and adopted plans. A –CZD suffix would be added to the zoning district designation to incorporate the approved conditions. The applicant has proposed a Conditional Zoning district for the site, as shown on the site plan: Mixed-Use Village–Conditional Zoning District (MU-V-CZD).

> The intent of the Mixed-Use Village – Conditional Zoning District (MU-V-CZD) is "*to provide for the coordinated development of office, commercial, and residential uses and their necessary support functions in the vicinity of key highway intersections and transit corridors in Chapel Hill. The district is designed to facilitate stated public policies to encourage design which emphasizes lively, people-oriented environments and compatible, visually interesting development. This district provides areas where moderate scale mixed use centers can locate with an emphasis on development of a balance of residential, office and commercial uses.*
>
> *It is further intended that the mixed-use districts shall encourage development within which mutually supporting residential, commercial and office uses are scaled, balanced and located to reduce general traffic congestion by providing housing close to principal destinations, and convenient pedestrian and bicycle circulation systems and mass transit to further reduce the need for private automobile usage. Mixed-use districts are intended to encourage development that allows multiple destinations to be achieved with a single trip. These standards encourage a design such that uses within a mixed-use district are*

*arranged in a manner that encourages internal vehicular trip capture and the development patterns that encourage walking, transit and bicycling as alternatives to automotive travel.*

*When such districts adjoin residential development or residential zoning districts, it is intended that arrangement of buildings, uses, open space, and vehicular or pedestrian and bicycle access shall be such as to provide appropriate transition and reduce potentially adverse effects."*[1]

# PROPOSED MODIFICATIONS TO REGULATIONS

1) **Section 5.3.2(f) – Steep Slopes – Disturbance limitations:** The applicant proposes modifying the maximum disturbance area of steep slopes from 25 percent to 89 percent. The site contains 11,366 square feet of steep slopes that are subject to a disturbance limitation of 25 percent. The maximum disturbance allowed is 2,841 square feet. The applicant proposes to disturb 10,133 square feet, which is approximately 89 percent of this area, and exceeds the limit by 7,291 square feet.

   *Staff Comment:* Staff believes the Council could find a public purpose for the increased disturbance of steep slopes, as some of the existing steep slopes are due to an existing stormwater control facility and a farm pond. The intent is to provide additional residential dwelling units, including affordable dwelling units.

***Council Findings and Public Purpose:*** The Council has the ability to modify the regulations according to Section 4.4.5 of the Land Use Management Ordinance. Staff believes that the Council could modify the regulations if it makes a finding in this particular case that public purposes are satisfied to an equivalent or greater degree. If the Council chooses to deny a request for modifications to regulations, the developer's alternative is to revise the proposal to comply with the regulations.

For additonal information on the proposed modifications, please refer to the applicant's attached materials.

# RESPONSES TO COUNCIL QUESTIONS

**Council Question:** Can the placement of a drainage swale [channel] on the hotel property within the 100 feet wide existing buffer provide additional flood relief for the owners of 108 – 118 Woodbridge Lane?

*Staff Response:* Yes, the proposed designed swale would capture and reroute stormwater runoff from about 75 percent of the existing upstream drainage area from impacting these properties. The captured water would be routed to the stream to the east of 108 Woodbridge Lane. Town staff would ensure the designed swale meets the requirements stipulated in the Town's Engineering Design Manual. Staff anticipates the applicant will provide additional information this evening regarding the swale for Council's consideration.

---

[1] LUMO 3.4.6 (https://library.municode.com/nc/chapel_hill/codes/code_of_ordinances?nodeId=CO_APXALAUSMA_ART3ZODIUSDIST_3.4CODI)

*Applicant Response:* Short answer is Yes. A swale could reduce the amount of stormwater flowing to the Summerfield Crossing in this area from Summit property by 75-80 percent for all storm events.

The applicant's design team obtained additional topographic and tree survey information within the buffer and on Summerfield Crossing HOA property to study this situation as recommended by the Stormwater Management Utility Advisory Board and Town Council.

Because the Mixed Use-Village-Conditional Zoning District (MU-V-CZD) application does not propose any new development that would affect this area, we have provided a "stand-alone" study of this issue to the town stormwater staff for review. Our analysis provides a swale solution that will reduce the flow from the Residence Inn hotel property to the property line behind 108 – 118 Woodbridge Lane by approximately 75-80 percent. The swale, approximately 325 feet in length and 25 feet in width, is located no closer than 25 feet from the shared property line. Some existing trees in the buffer will need to be removed to construct the proposed low impact swale.

This swale would function independently from the already designed/proposed stormwater management system that improves conditions for the Summerfield properties located north of this location. That system exceeds town requirements for the 1, 2, 10, 25 and 100-year twenty-four hour storm events.

**Council Question:** Can the townhome parking be reduced to meet town standards and encourage use of alternative methods of transportation and reduce impervious surface?

*Staff Response:* The applicant has updated parking for the townhomes such that a modification to regulations is no longer requested.

*Applicant Response:* We no longer request a modification of regulations for parking for the townhome portion of the site. Our revised plan provides 97 parking spaces that meet the standards in the LUMO and Design Manual, 4 less than the maximum allowed of 101 spaces allowed. Please see table below.

- All fifty-two (52) townhomes have one parking space per townhome at the townhome
    - Forty (40) of these are garaged spaces tucked under the main living floor of the townhomes and by their design location have already reduced impervious surface dedicated to parking.
    - Twelve (12) of these are apron parking spaces at the townhomes.
- Nine (9) of the surface parking spaces are used one day per week as Orange County Recycling material pick-up locations.
- Twenty-nine (29) of the forty-five (45) surface parking spaces will be constructed as pervious pavement meeting the NC DEQ Design Standards.

| | Total Parking Spaces | Impervious Surface | Pervious Pavement per NC DEQ Design Standards |
|---|---|---|---|
| **52 Townhomes Parking at TH Unit** | 52 | 52 | |
| **Resident Surface Parking Behind Buildings 9 & 10** | 15 | 5 | 10 |
| **Loop Road Surface** | 21 | 2 | 19 |

| | | | |
|---|---|---|---|
| **Parking<br>Interior Curb Location** | | | |
| **Loop Road Surface Parking<br>Outside Curb Location** | 9 | 9 | |
| **Total** | 97 | 68 | 29 |

**Council Question:** What is the distance between the proposed homes that face Erwin Road and the road? They seem close and tall.

*Staff Response:* The townhomes meet the setback and height standards of the Land Use Management Ordinance (LUMO), as described by the applicant below.

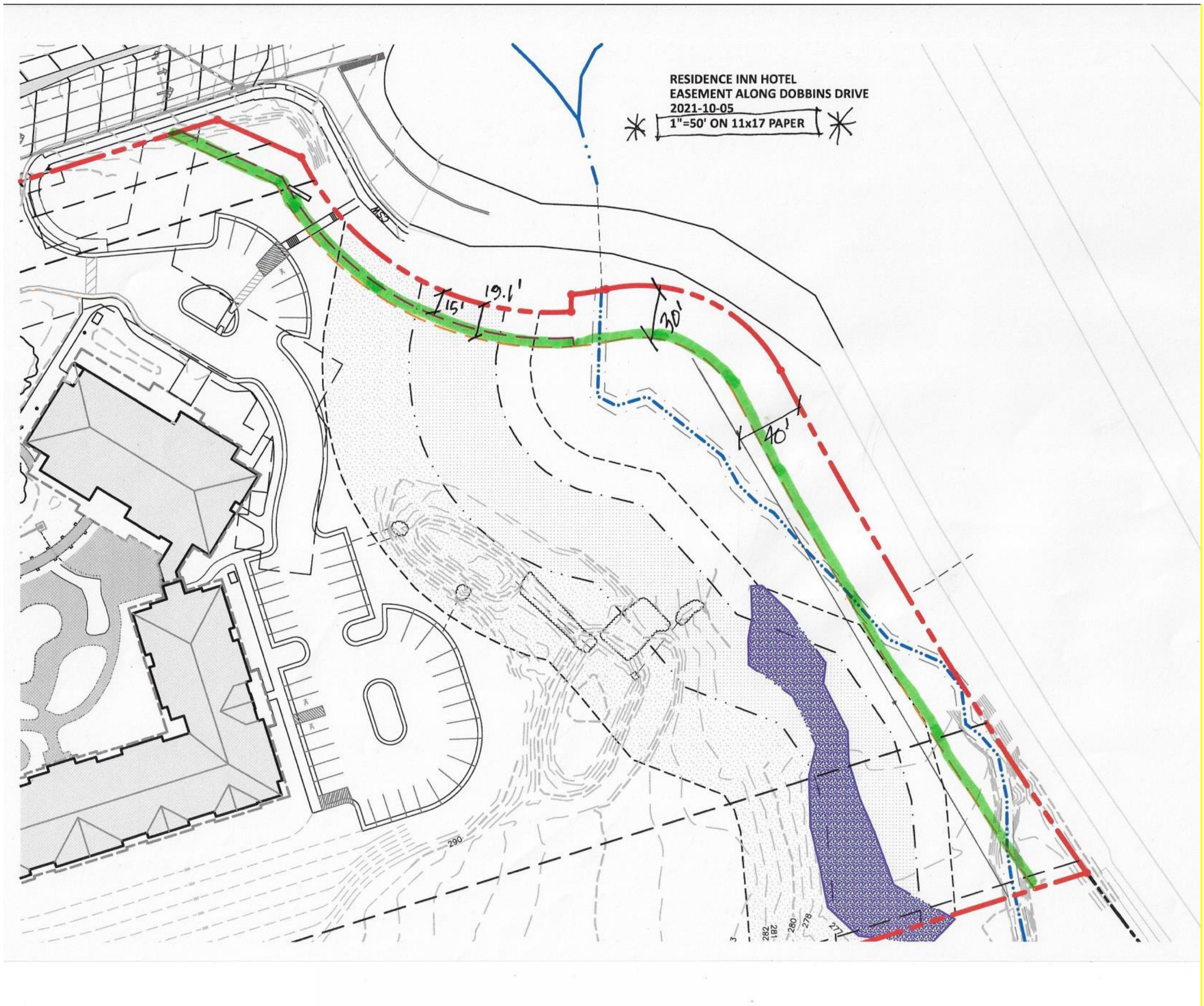
*Applicant Response:*
- The proposed townhomes are located 30 feet from the street right of way (ROW) line.
- The minimum required setback is 22 feet from the street right of way (ROW) line.
    - On the townhome side of this ROW line there is a 5’ wide sidewalk and a 25’ landscaped buffer.
    - On the street side of the ROW there is an 8.5’ wide tree planting lawn/buffer with canopy trees that meet Town of Chapel Hill and NCDOT requirements for spacing and sight lines.
- This configuration results in the fronts of the townhomes being 38 feet from the curb line.
- The maximum height permitted at the minimum setback line is 35’.
- The top of a townhome parapet is 26’ – 30’ above the elevation of Erwin Road depending upon which specific unit is being measured. [A typical 2 story house with a peaked roof reaches a height of about 30’].

| | Setback from Street Line | Height |
|---|---|---|
| LUMO | 22’ | 35’ |
| Proposed Development | 38’ | 26-28’ |

**Council Question:** Can you address the Town’s request for a construction easement for a future multi-purpose path on the south side of the applicant property adjoining Dobbins Drive?

*Staff Response:* While Town staff would still prefer a 30-foot easement, staff have agreed to the applicant's proposal for a 19.1-foot construction easement by Erwin Road and a 30-foot construction easement further down Dobbins Drive, as specified by the exhibit below. Staff aim to incorporate the agreement into a condition prior to Wednesday's meeting.

*Applicant Response:* In response to the Town’s request for a construction easement only along Dobbins Drive, the revised plans include one 19.1-foot wide easement area and one 30-foot easement area, as depicted below. The town staff has not yet determined if a multi-use path is possible along Dobbins Drive, but these easements provide the opportunity to do so in the future.




Under separate cover, the applicant has provided proposed easement use, access and restoration stipulations for the protection of both areas, but particularly for Easement Area A which is the front door visual setting for the existing hotel.

**<u>Council Question:</u>** Why are you proposing only two bedroom dwelling units for your affordable housing component?

*Staff Response:* The Inclusionary Zoning ordinance states that affordable housing units shall have a mix of bedrooms in the approximate same proportion as market rate units. However, the ordinance has flexibility built into it for negotiation between the Town Council and the developer, and is "intended to provide a structure for cooperative participation." The applicant has proposed a mix of 29 two- and 16 three-bedroom market rate units, which would equate to 4.5 two- and 2.5 three-bedroom affordable units.

*Applicant Response:* The applicant is proposing seven [7] two-bedroom townhomes which matches the recommendation of the Housing Advisory Board and fills an upcoming hole in the supply of ownership affordable homes.

In the past few years, the Council has approved a significant number of rental multi-family developments, but few new home ownership residential communities. These private sector

[For profit and non-profit] ownership developments are shown in the following table.

*Current town approved private sector development plans with ownership affordable housing units yet to be built*

| Development | Type of Unit | Studio | 1-BR | 2-BR | 3-BR | 4-BR |
|---|---|---|---|---|---|---|
| Aura | Townhomes | - | - | - | 8 | - |
| Columbia St. Annex | Flats | 4 | 3 | - | - | - |
| Bridgepoint | Townhomes | - | - | - | 5 | - |
| Weavers Grove | Duplex & Townhomes* | - | - | - | 76 | 25 |
| Total | | 4 | 3 | 0 | 91 | 25 |

*The mix of duplex and townhome dwelling units is estimated by Habitat for Humanity to be 75% 3-BR and 25% 4-BR

<u>*Summit Place proposes to expand the type of families [households] that can access affordable dwelling units by providing 2-BR townhomes.*</u>

**<u>Council Question:</u>** What does "intermediate hazard" mean in the context of the dam removal?

*Staff Response*: The hazard classifications are determined based on possible damage to property, roads, utilities, and loss of life if the dam were to fail. North Carolina Administrative Code 15A NCAC 02K. 0105 has defined the three classes of dam hazard classifications. Dams are classified into low, intermediate, and high hazard dams.

On December 20, 2017, The NC Division of Energy, Mineral, and Land Resources (NCDEMLR) (now the NC Department of Environmental Quality (NCDEQ)) assigned an intermediate hazard classification to the dam in its existing condition. The state agency issued a notice of exemption from the North Carolina Dam Safety Law of 1967. This issuance allows the property owner to remove the dam and thus the farm pond with appropriate notifications and permits. Town staff have provided certain conditions to the property owner for removing the pond. These conditions include obtaining an erosion and control permit, pumping through a silt bag, establishing maximum discharge rates, disallowance of pumping within 48 hours of a rainfall event, and dissipating the water at the point of discharge.

*Applicant Response:* N/A

# CONSISTENCY WITH THE COMPREHENSIVE PLAN AND OTHER DOCUMENTS

Town staff has reviewed this application for compliance with the themes from the 2020 Comprehensive Plan[2], the standards of the Land Use Management Ordinance[3], and the Town of Chapel Hill, NC : Design Manual and Standard Details[4] and believes the proposal complies with several themes of the 2020 Comprehensive Plan:

---

[2] http://www.townofchapelhill.org/home/showdocument?id=15001
[3] https://www.municode.com/library/#!/nc/chapel_hill/codes/code_of_ordinances?nodeId=CO_APXALAUSMA
[4] http://www.townofchapelhill.org/town-hall/departments-services/public-works/engineering/design-manual-and-standard-details

***Comprehensive Plan Themes:*** The applicant has indicated that this project meets the following themes from the 2020 Comprehensive Plan, adopted June 25, 2012:

| | | | |
|---|---|---|---|
| ☒ | Create a Place for Everyone | ☒ | Develop Good Places, New Spaces |
| ☒ | Support Community Prosperity | ☒ | Nurture Our Community |
| ☒ | Facilitate Getting Around | ☐ | Grow Town and Gown Collaboration |

***Future Land Use Map:*** The Future Land Use Map (FLUM) envisions the 15-501 North Focus Area as a dynamic mix of higher-intensity uses, including places to shop and reside. The FLUM indicates a range of appropriate Primary and Secondary uses for the Sub-Area C where this site is located. Townhouses and Residences is considered a Primary Use, with Commercial/Office being a Secondary Use. The proposed townhouse community falls within the Townhouse and Residences category, and the existing hotel and proposed expansion falls within the Commercial/Office category, and the proposed rezoning aligns with the character envisioned by the FLUM. The FLUM also calls for:

- ACTIVATED STREET FRONTAGES. Activated street frontages are encouraged to create vibrancy and ensure pedestrian activity over time. The 15-501 North Focus Area calls for activated street frontages along 15-501. While the site does not front 15-501, the applicant proposes locating the townhouses close to Erwin Road with no off-street parking in between the street frontage and the townhouses.
- TRANSITIONAL AREA. Along the northern site boundary, the 15-501 North Focus Area strives for harmonious transitions to adjacent neighborhoods. Transitions can include less-intense uses, reduced height, landscape buffers, and other measures.

***Staff Evaluation:*** North Carolina General Statute Section 160D-605 requires the Council to approve a statement describing whether its action is consistent with an adopted comprehensive plan and any other applicable officially adopted plan when adopting or rejecting any zoning amendment.

Staff provides the following evaluation of this application's consistency with the 2020 Comprehensive Plan and other adopted plans:

- The proposed rezoning aligns with the land use character envisioned by the FLUM. The MU-V-CZD district would allow all of the uses that the FLUM indicates are appropriate. The Conditional Zoning application proposes townhouses and a hotel expansion that would fall within the 'Townhouse and Residences' and 'Commercial/ Office' categories.
- Zoning conditions would be useful to ensure that development follows FLUM guidance for the Transitional Area. Current proposal indicates two-story townhouses in the Transitional Area.

# FINDINGS OF FACT

In order to establish and maintain sound, stable, and desirable development within the planning jurisdiction of the Town, it is intended that the Land Use Management Ordinance (as stated in Section 4.4) shall not be amended except:

**1)** To correct a manifest error in the chapter; or

**2)** Because of changed or changing conditions in a particular area or in the jurisdiction generally; or

**3)** To achieve the purposes of the Comprehensive Plan.

All information submitted at the public hearing will be included in the record of the hearing.

**1) Finding #1:** The proposed zoning amendment is necessary to correct a manifest error.

*Arguments in Support:* To date, no arguments in support have been submitted or identified by staff.

*Arguments in Opposition:* To date, no arguments in opposition have been submitted or identified by staff.

*Staff Response:* We believe, based on the information entered into the record to date, that there is no manifest error in the Town's Zoning Atlas Amendment related to the project site.

**2) Finding #2:** The proposed zoning amendment is necessary because of changed or changing conditions in a particular area or in the jurisdiction generally.

*Arguments in Support:* The applicant states that the proposed townhouse and hotel expansion "and their relationship to the surrounding existing townhome development match precisely the adopted FLUM."

*Arguments in Opposition:* To date, no arguments in opposition have been submitted or identified by staff.

*Staff Response:* We believe, based on the information entered into the record to date, that the Council could make the finding that the proposed zoning amendment is necessary because of changing conditions in the 15-501 North Focus Area.

**3) Finding #3:** The proposed zoning amendment is necessary to achieve the purposes of the comprehensive plan.

*Arguments in Support:* The applicant's Statement of Consistency states that the application is in accordance with the following elements of the 2020 Comprehensive Plan:

- A range of housing options for current and future residents (A Place for Everyone.3)
- Promote a safe, vibrant, and connected (physical and in-person) community (Community Prosperity and Engagement.3)
- A connected community that links neighborhoods, businesses, and schools through the provision of greenways, sidewalks, bike facilities, and public transportation (Getting Around.2)
- Connect to a comprehensive regional transportation system (Getting Around.3)
- A transportation system that accommodates transportation needs and demands while mitigating congestion and promoting air quality, sustainability, and energy conservation (Getting Around.6)
- Low density, green Rural Buffers that exclude urban development and minimize sprawl (Good Places New Spaces.1)
- A range of neighborhood types that addresses residential, commercial, social, and cultural needs and uses while building and evolving Chapel Hill's character for residents, visitors, and students (Good Places New Spaces.5)
- Maintain and improve air quality and water quality, and manage stormwater to

heal local waterways and conserve biological ecosystems within the town boundaries and the Extra Territorial Jurisdiction (Nurturing Our Community.2)

- Support the Parks and Recreation Master Plan and the Greenways Master Plan to provide recreation opportunities and ensure safe pedestrian and bicycle connections (Nurturing Our Community.4)
- Protect neighborhoods from the impact of development such as stormwater runoff, light and noise pollution, and traffic (Nurturing Our Community.8)

*Arguments in Opposition:* To date, no arguments in opposition have been submitted or identified by staff.

*Staff Response:* We believe, based on the information entered into the record to date, that the Council could make the finding that the proposed zoning amendment is necessary to achieve the purposes of the Comprehensive Plan.

# PROJECT FACT SHEET

## Overview

| Site Description | |
|---|---|
| **Project Name** | Residence Inn – Summit Place Townhomes |
| **Address** | 101-111 Erwin Road |
| **Property Size (GLA)** | 770,566 sq. ft. (17.69 acres) |
| **Existing** | Existing Residence Inn hotel on southern parcel, existing farm pond on northern parcel |
| **Orange County Parcel Identifier Numbers** | 9799-48-1814 and 9799-48-0252 |
| **Existing Zoning** | Residential-3-Conditional Zoning District (R-3-CZD) and Residential-2 (R-2) |
| **Proposed Zoning** | Mixed-Use Village-Conditional Zoning District (MU-V-CZD) |

## Site Design

| Topic | Comment | Status |
|---|---|---|
| **Use/Density** (Sec 3.7) | 52 townhouse units and 54 hotel rooms | ✓ |
| **Dimensional Standards** (Sec. 3.8) | Comply with LUMO Section 3.8 | ✓ |
| **Floor area** (Sec. 3.8) | *Maximum:* 855,187 sq. ft.<br>*Proposed:* 211,913 sq. ft. | ✓ |
| **Inclusionary Zoning** (Sec. 3.10) | 7 affordable dwelling units proposed (13 percent of total units) | ✓ |
| | **Landscape** | |
| **Buffer – North** (Sec. 5.6.2) | *Required:* 20' Type "C" and 10' Type "B"<br>*Proposed:* 35' Type "C" and shared 10' Type "C" | ✓ |
| **Buffer – East** (Sec. 5.6.2) | *Required:* 30' Type "D"<br>*Proposed:* 20' Type "C" (reduced intensity along street frontage) and 50' Type "D" | ✓ |
| **Buffer – South** (Sec. 5.6.2) | *Required:* 30' Type "D"<br>*Proposed:* 30' Type "D" | ✓ |
| **Buffer - West** (Sec. 5.6.2) | *Required:* 20' Type "C"<br>*Proposed:* 60' Type "B" | ✓ |
| **Tree Canopy** (Sec. 5.7) | *Required:* 30%<br>*Proposed:* 30% | ✓ |
| **Landscape Standards** (Sec. 5.9.6) | Application must comply | ✓ |

| | | |
|---|---|---|
| **Environment** | | |
| **Resource Conservation District** (Sec. 3.6) | Perennial stream located on southern portion of site; no disturbance proposed | ✓ |
| **Erosion Control** (Sec. 5.3.1) | Orange County Erosion Control permit required | ✓ |
| **Steep Slopes** (Sec. 5.3.2) | *Required:* Disturb < 25% of slopes greater than 25% slope<br>*Proposed:* 26.7% (7,271 sq. ft. total) | **M** |
| **Stormwater Management** (Sec. 5.4) | 1 acre stormwater management facility to treat both parcels, as well as runoff from Christ Community Church site to the north | ✓ |
| **Land Disturbance** | 363,425 sq. ft. (8.34 acres) | ✓ |
| **Impervious Surface** (Sec. 3.8) | 267,125 sq. ft. (34.7% of gross land area) | ✓ |
| **Solid Waste & Recycling** | Applicant requests curbside solid waste collection | ✓ |
| **Jordan Riparian Buffer** (Sec. 5.18) | No disturbance proposed | ✓ |
| **Access and Circulation** | | |
| **Road Improvements** (Sec. 5.8) | Improvements in accordance with TIA findings including:<br>• New primary entrance between existing hotel entrance and McGregor Drive<br>• Existing hotel entrance to become right-in/right-out<br>• Internal vehicular and pedestrian connections | ✓ |
| **Vehicular Access** (Sec. 5.8) | Primary access will be a new entrance on Erwin Road between the existing hotel entrance and McGregor Drive | ✓ |
| **Bicycle Improvements** (Sec. 5.8) | Bicycle lanes proposed along Erwin Road frontage; Multi-use easement along Dobbins Drive | ✓ |
| **Pedestrian Improvements** (Sec. 5.8) | Internal sidewalk connections throughout the site, as well as along connection to Christ Community Church site to the north | ✓ |
| **Traffic Impact Analysis** (Sec. 5.9) | TIA Executive Summary attached | ✓ |
| **Transit** (Sec. 5.8) | Bus shelter pad to be installed for future bus shelter construction | ✓ |
| **Bicycle Parking** (Sec. 5.9) | *Required:* 26 spaces<br>*Proposed:* 71 spaces | ✓ |
| **Parking Lot Standards** (Sec. 5.9) | 97 parking spaces for Summit Place Townhomes and 139 parking spaces for Residence Inn Hotel | ✓ |
| **Technical** | | |
| **Fire** | Meet Town Standards | ✓ |
| **Site Improvements** | 54 hotel rooms and 52 townhomes with associated parking | ✓ |

| | | |
|---|---|---|
| **Recreation Area** (Sec. 5.5) | *Required:* 12,224 sq. ft.<br>*Proposed:* 13,089 sq. ft. (comprised of a payment-in-lieu, sports courts, and sports support area) | ✓ |
| **Lighting Plan** (Sec. 5.11) | Maximum of 0.3 foot-candles at property line | ✓ |
| **Homeowners Association** (Sec. 4.6) | Required at Final Plans | **FP** |
| **Adequate Public Schools** (Sec. 5.16) | Certificate of Adequacy of Public Schools (CAPS) required at Final Plans | **FP** |

## Project Summary Legend

| Symbol | Meaning |
|---|---|
| ✓ | Meets Requirements |
| **M** | Seeking Modification |
| **C** | Requires Council Endorsement |
| **FP** | Required at Final Plan |
| **NA** | NA |

# TOWN COUNCIL

CONDITIONAL ZONING
2021.10.13

## Residence Inn and Summit Place Townhomes

101-111 Erwin Road. Chapel Hill, NC

# PROCESS

Staff Review → Advisory Boards and Commissions Review → Open Public Hearing → Update → Council Action

# RECOMMENDATION

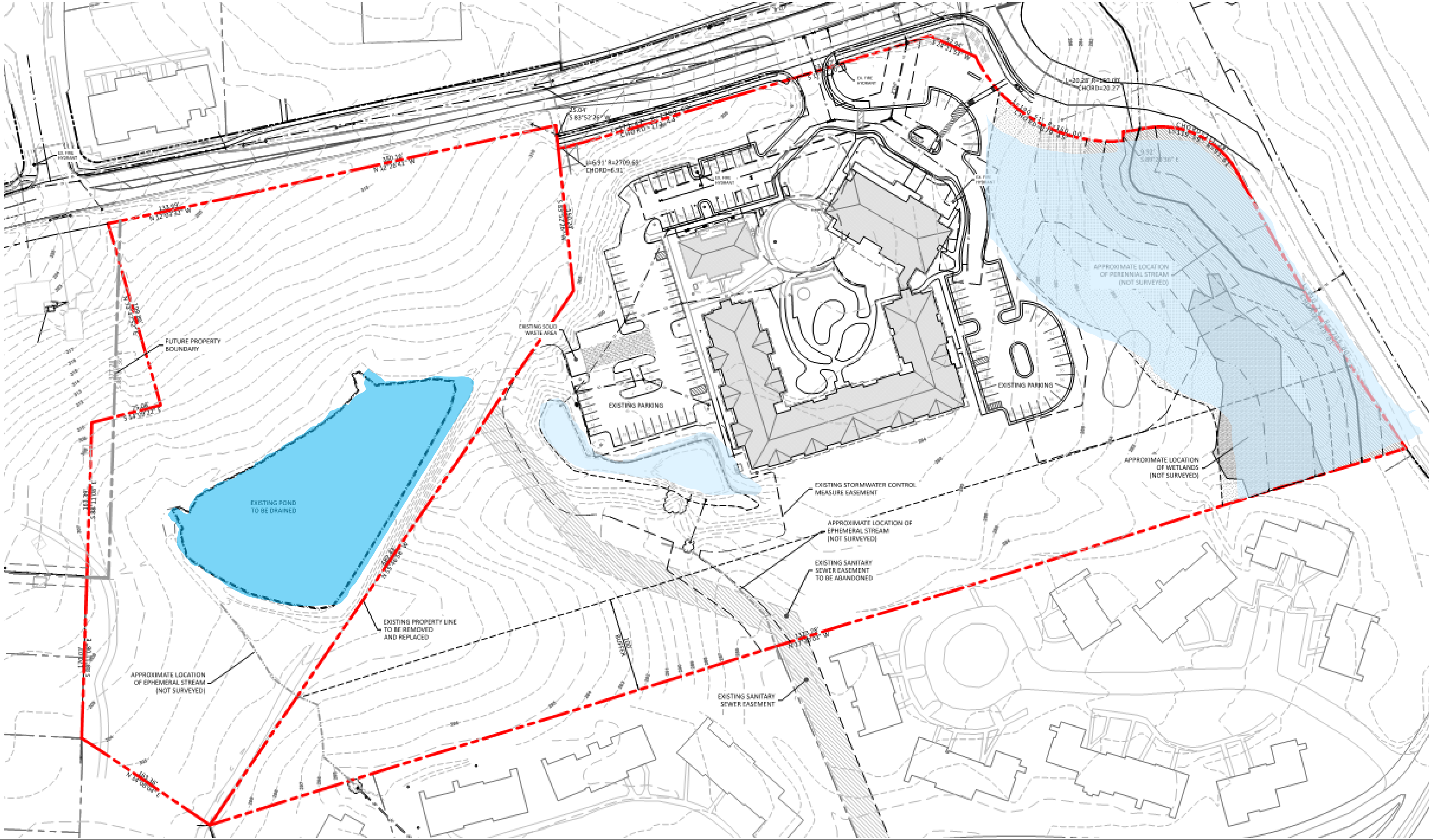
- ❑ Close Legislative Hearing
- ❑ Adopt Resolution A (Resolution of Consistency)
- ❑ Adopt Resolution B (Revoking Special Use Permit)
- ❑ Enact Ordinance A (Approving Conditional Zoning Application)


DRAFT

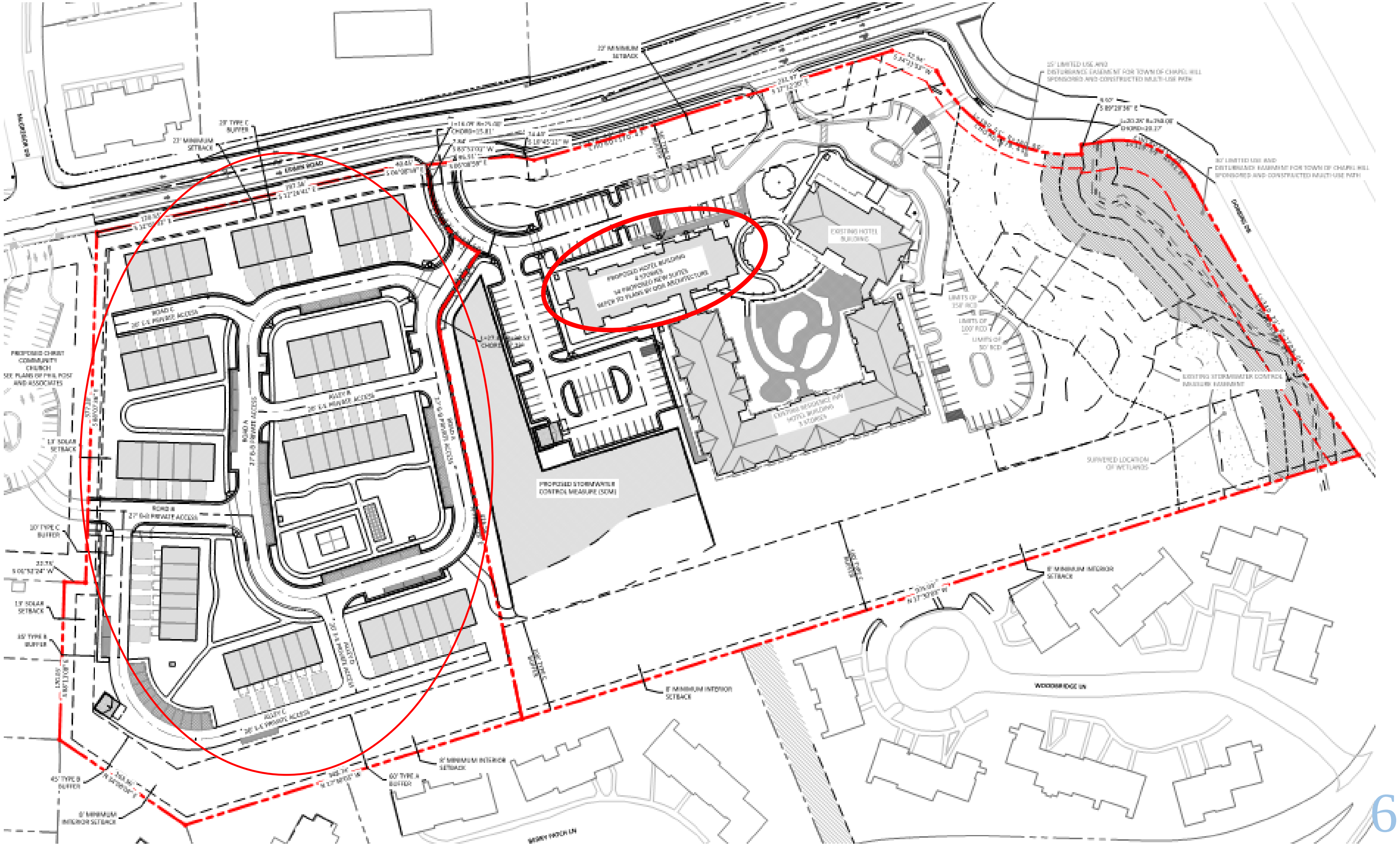
# PROJECT SUMMARY

- 17.7-acre site
- Conditional Zoning
- Currently R-3-CZD and R-2
- Proposing MU-V-CZD
- Existing Residence Inn
- Construct additional 54 hotel rooms and 52 townhomes

# EXISTING CONDITIONS



# SITE PLAN


PROPOSED STORMWATER CONTROL MEASURE (SCM)
EXISTING HOTEL BUILDING
WOODBRIDGE LN

# PROPOSED MODIFICATIONS

DRAFT

The applicant is requesting modifications to regulations:

- ~~Modify maximum parking spaces from 101 to 117 spaces~~
- Increased disturbance of steep slopes

# UPDATES SINCE SEPTEMBER 1

- Additional tree and topographic information provided
- Updated Stormwater Impact Analysis
- Analysis of swale feasibility completed
- Updated easement for multiuse path

DRAFT

# RECOMMENDATION

- Close Legislative Hearing
- Adopt Resolution A (Resolution of Consistency)
- Adopt Resolution B (Revoking Special Use Permit)
- Enact Ordinance A (Approving Conditional Zoning Application)


DRAFT

**Resolution A**
(Resolution of Consistency and Reasonableness)

**A RESOLUTION REGARDING THE APPLICATION FOR CONDITIONAL ZONING ATLAS AMENDMENT AT THE PROPERTY LOCATED AT 101-111 ERWIN ROAD TO MIXED USE VILLAGE-CONDITIONAL ZONING DISTRICT (MU-V-CZD) IS REASONABLE AND CONSISTENCY WITH THE COMPREHENSIVE PLAN (2021-10-13/R-10)**

WHEREAS, Scott Radway, Radway Design, has filed an application for Conditional Zoning Atlas Amendment on behalf of Summit Hospitality Group, LLC (SHG, LLC) and Chapel Hill R I, LLC, to rezone a 17.69-acre site located at 101-111 Erwin Road and identified as Orange County Parcel Identifier Numbers 9799-48-1814 and 9799-48-0252 to Mixed Use Village - Conditional Zoning District (MU-V-CZD) to allow an expansion to the existing Residence Inn and development of a condominium community; and

WHEREAS, the Town staff have completed a review of the application for compliance with the Land Use Management Ordinance, Town Code, and for Consistency with the Comprehensive Plan; and

WHEREAS, the Planning Commission reviewed the application on June 15, 2021 and recommended that the Council enact the Zoning Atlas Amendment rezoning the property; and

WHEREAS, the Council of the Town of Chapel Hill has considered the application for Conditional Zoning Atlas Amendment on behalf of Summit Hospitality Group, LLC, to rezone and finds that the amendment if enacted, is reasonable and in the public's interest and is warranted to achieve the purposes of the Comprehensive Plan, as explained by, but not limited to, the following goals of the Comprehensive Plan:

- A range of housing options for current and future residents (A Place for Everyone.3)
- Promote a safe, vibrant, and connected (physical and in-person) community (Community Prosperity and Engagement.3)
- A connected community that links neighborhoods, businesses, and schools through the provision of greenways, sidewalks, bike facilities, and public transportation (Getting Around.2)
- Connect to a comprehensive regional transportation system (Getting Around.3)
- A transportation system that accommodates transportation needs and demands while mitigating congestion and promoting air quality, sustainability, and energy conservation (Getting Around.6)
- Low density, green Rural Buffers that exclude urban development and minimize sprawl (Good Places New Spaces.1)
- A range of neighborhood types that addresses residential, commercial, social, and cultural needs and uses while building and evolving Chapel Hill's character for residents, visitors, and students (Good Places New Spaces.5)
- Maintain and improve air quality and water quality, and manage stormwater to heal local waterways and conserve biological ecosystems within the town boundaries and the Extra Territorial Jurisdiction (Nurturing Our Community.2)
- Support the Parks and Recreation Master Plan and the Greenways Master Plan to provide recreation opportunities and ensure safe pedestrian and bicycle connections (Nurturing Our Community.4)
- Protect neighborhoods from the impact of development such as stormwater runoff, light and noise pollution, and traffic (Nurturing Our Community.8)

WHEREAS, the Council of the Town of Chapel Hill has considered the application for Conditional Zoning Atlas Amendment to rezone and finds that the amendment if enacted, is reasonable and in the public's interest, as explained by, but not limited to

- While the proposed zoning would allow more intense development compared to existing zoning, the zoning conditions provide an opportunity to limit intensity and to establish standards that address any impacts on surrounding properties
- The site is located on an arterial road, near the intersection with a US Highway, and has access to existing bus service
- The site is surrounded by residential and mixed-use zoning districts at varying densities that appear to transition well to the site, particularly given the proposed arrangement of uses on the site
- The proposed zoning is consistent with the Future Land Use Map (FLUM) character for the Focus Area, and with the list of appropriate uses. Even with expansion of the hotel, the overall use mix of North 15-501 Sub-Area C would remain predominately residential as envisioned
- Height limits proposed in the application are consistent with FLUM guidance
- The arrangement of uses appears compatible with FLUM guidance for a Transitional Area at the north of the site

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby finds the proposed Conditional Zoning Atlas Amendment to be reasonable and consistent with the Town Comprehensive Plan.

This the 13th day of October, 2021.

**RESOLUTION B**
(Revocation of Special Use Permit)

**A RESOLUTION REVOKING THE 101 ERWIN ROAD SITE FROM THE EXISTING MARRIOT RESIDENCE INN SPECIAL USE PERMIT (2021-10-13/R-11)**

WHEREAS, on March 24, 2003, the Chapel Hill Town Council approved a Special Use Permit for a three-story hotel building containing 108 lodging units, known as the Marriott Residence Inn Hotel, encumbering 578,935 square feet and approximately 13.3 acres, which was recorded at the Orange County Register of Deeds in Deed Book 3808, Page 334, identified as Orange County Parcel Identifier Number 9799-48-0252; and

WHEREAS, Section 4.5.5(f)(2) of the Land Use Management Ordinance has been met as the request for revocation has been made in conjunction with an application for approval of a development other than that authorized by the Marriot Residence Inn Hotel Special Use Permit; and

WHEREAS, on October 17, 2018, the Town Council reviewed a concept plan for 101-111 Erwin Road Mixed-Use Development for a multifamily residential development and expansion to the Residence Inn Hotel; and

WHEREAS, on December 23, 2020, the applicant requested to replace the Special Use Permit, with a Conditional Zoning permit application and requested a revocation of the existing 2003 Special Use Permit.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby revokes the 2003 Special Use Permit for 101 Erwin Road, known as the Marriott Residence Inn Hotel, as it pertains to the 13.3-acre parcel, for which the Residence Inn and Summit Place Townhomes Conditional Zoning Permit is currently proposed. The revocation of the Special Use Permit would be such that the subject parcel for the Residence Inn and Summit Place Townhomes Conditional Zoning (PIN 9799-48-0252), would no longer be encumbered by the Special Use Permit.

BE IT FURTHER RESOLVED that the applicant shall record the affidavit for revocation for the parcel identified as Orange County Parcel Identifier Number 9799-48-0252, for the Marriott Residence Inn Hotel Special Use Permit, dated March 24, 2003.

This the 13th day of October, 2021.

**ORDINANCE A**
(Approving the Conditional Zoning Application)

**AN ORDINANCE AMENDING THE CHAPEL HILL ZONING ATLAS TO REZONE THE RESIDENCE INN – SUMMIT PLACE PROPERTY LOCATED AT 101-111 ERWIN ROAD FROM RESIDENTIAL-2 (R-2) AND RESIDENTIAL-3-CONDITIONAL ZONING DISTRICT (R-3-CZD) TO MIXED–USE VILLAGE-CONDITIONAL ZONING DISTRICT (MU-V-CZD) (PROJECT #20-082) (2021-10-13/O-2)**

WHEREAS, the Council of the Town of Chapel Hill has considered the application for Conditional Zoning submitted by Scott Radway, Radway Design, on behalf of owners Summit Hospitality Group, LLC (SHG, LLC) and Chapel Hill R I, LLC, to rezone a 17.69-acre parcel located at 101-111 Erwin Road and identified as Orange County Parcel Identifier Numbers 9799-48-1814 and 9799-48-0252 to Mixed-Use Village - Conditional Zoning District (MU-V-CZD) to allow an expansion to the existing Residence Inn and development of a townhouse community and finds that the amendment if enacted, is reasonable and in the public's interest and is warranted to achieve the purposes of the Comprehensive Plan, as explained by, but not limited to, the following goals of the Comprehensive Plan:

- A range of housing options for current and future residents (A Place for Everyone.3)
- Promote a safe, vibrant, and connected (physical and in-person) community (Community Prosperity and Engagement.3)
- A connected community that links neighborhoods, businesses, and schools through the provision of greenways, sidewalks, bike facilities, and public transportation (Getting Around.2)
- Connect to a comprehensive regional transportation system (Getting Around.3)
- A transportation system that accommodates transportation needs and demands while mitigating congestion and promoting air quality, sustainability, and energy conservation (Getting Around.6)
- Low density, green Rural Buffers that exclude urban development and minimize sprawl (Good Places New Spaces.1)
- A range of neighborhood types that addresses residential, commercial, social, and cultural needs and uses while building and evolving Chapel Hill's character for residents, visitors, and students (Good Places New Spaces.5)
- Maintain and improve air quality and water quality, and manage stormwater to heal local waterways and conserve biological ecosystems within the town boundaries and the Extra Territorial Jurisdiction (Nurturing Our Community.2)
- Support the Parks and Recreation Master Plan and the Greenways Master Plan to provide recreation opportunities and ensure safe pedestrian and bicycle connections (Nurturing Our Community.4)
- Protect neighborhoods from the impact of development such as stormwater runoff, light and noise pollution, and traffic (Nurturing Our Community.8)

WHEREAS, the application, if rezoned to Mixed-Use Village - Conditional Zoning District (MU-V-CZD) according to the district-specific plan last revised September 15, 2021, would address the impacts reasonably expected to be generated by the development or use of the site and the conditions listed below would:

1) Conform with the applicable provisions of the Land Use Management Ordinance and Town Code
2) Conform with the Comprehensive Plan

3) Be compatible with adjoining uses
4) Mitigate impacts on surrounding properties and the Town as a whole
5) Be harmonious with existing and proposed built systems including utility infrastructure, transportation facilities, police and fire coverage, and other public services and facilities
6) Be harmonious with natural systems such as hydrology, topography, and other environmental constraints

## MODIFICATIONS TO REGULATIONS

WHEREAS, the Council of the Town of Chapel Hill finds, in this particular case, that the proposed development with the following requested modifications to regulations satisfies public purposes to an equivalent or greater degree:

1. **Section 5.3.2(f) – Steep Slopes – Disturbance limitations:**
   Modify the maximum disturbance area of steep slopes from 25 percent to 89 percent. The site contains 11,366 square feet of steep slopes that are subject to a disturbance limitation of 25 percent. The maximum disturbance allowed is 2,841 square feet. The modified maximum disturbance shall be 10,133 square feet, which is approximately 89 percent of this area, and exceeds the limit by 7,291 square feet.

   This finding is based on a determination that the public purposes are satisfied to an equivalent or greater degree as some of the existing steep slopes are due to existing stormwater control facilities and a farm pond, and the intent of disturbing these areas is to provide additional residential dwelling units, including affordable dwelling units.

## CONDITIONAL ZONING DISTRICT

BE IT ORDAINED by the Council of the Town of Chapel Hill finds, in this particular case, the proposed rezoning with the following uses, subject to the conditions below, satisfies the purposes of Mixed-Use Village–Conditional Zoning District (MU-V-CZD).

BE IT FURTHER ORDAINED by the Council of the Town of Chapel Hill that the Chapel Hill Zoning Atlas be amended as follows:

## <u>SECTION I</u>

The following Orange County parcels identified by Parcel Identifier Numbers (PIN) 9799-48-1814 and 9799-48-0252, described below, shall be rezoned to Mixed-Use Village – Conditional Zoning District (MU-V-CZD) including to the midpoint of the adjoining Erwin Road right-of-way:

Beginning at a rebar set on the western right of way of Erwin Road (S.R. 1734) (Variable Width Public Right of Way), said rebar set being South 53°38'02" West 62.27 feet from an existing spike in the concrete sidewalk near the southern right of way intersection of McGregor Drive (Public Right of Way) and the eastern right of way of Erwin Road (S.R. 1734) (Variable Width Public Right of Way), said spike having N.C. Grid Coordinates (NAD83/2011) of N=799,116.07, E=1,994,256.42, thence from said Beginning point and leaving said right of way South 88°07'36" East 30.91 feet to a point on the centerline of Erwin Road (S.R. 1734) (Variable Width Public Right of Way), thence with said centerline South 12°03'32" East 113.01 feet to a point, thence South 12°26'41" East 353.38 feet to a point, thence leaving said centerline South 83°52'26" West 30.19 feet to an existing spike on the western right of way of Erwin Road (S.R. 1734) (Variable Width Public Right of Way), thence continuing along said right of way South 83°52'26" West 25.04 feet to an existing right of way disk on the western right of way of Erwin Road (S.R. 1734) (Variable Width Public Right of Way), thence with said right of way along a curve to the left, having an arc length of 178.38 feet, a radius of 2,709.69 feet, and a chord bearing and distance of South 16°37'37" East 178.35 feet to a rebar set, thence South 17°12'20" East 231.97 feet to a rebar set at the turnout right of way intersection of Dobbins Drive (S.R. 1740) (Variable Width Public Right of Way) and Erwin Road (S.R. 1734) (Variable Width Public Right of Way), thence continuing along Erwin Road (S.R. 1734) (Variable Width Public Right of Way) South 24°21'53" West 52.94 feet to an existing iron pipe on the northern right of way of Dobbins Drive (S.R. 1740) (Variable Width Public Right of Way), thence with said right of way along a curve to the left, having an arc length of 190.51 feet, a radius of 160.00 feet, and a chord bearing and distance of South 29°50'50" West 179.45 feet to an existing iron pipe, thence South 89°20'36" East 9.92 feet to a rebar set, thence with a curve to the left, having an arc length of 20.28 feet, a radius of 150.00 feet, and a chord bearing and distance of South 08°33'23" East 20.28 feet to a rebar set, thence with a curve to the right, having an arc length of 119.59 feet, a radius of 91.61 feet, and a chord bearing and distance of South 24°58'04" West 111.28 feet to a rebar set, thence with a curve to the left, having an arc length of 340.23 feet, a radius of 2,705.00 feet, and a chord bearing and distance of South 58°33'04" West 340.01 feet to an existing disturbed iron pipe, thence leaving Dobbins Drive (S.R. 1740) (Variable Width Public Right of Way) North 17°30'03" West 1,323.78 feet to an existing concrete monument, thence North 34°08'04" East 163.36 feet to an existing concrete monument, thence South 88°11'08" East 170.03' to an existing concrete monument, thence South 01°52'24" West 22.73' to a rebar set, thence South 88°07'36" East 377.28' to the point and place of Beginning containing 16.742 Acres more or less.

**SECTION II**

BE IT FURTHER ORDAINED by the Council of the Town of Chapel Hill that the following conditions are hereby incorporated by reference:

1. Expiration of Conditional Zoning Atlas Amendment: An application for Zoning Compliance Permit must be filed by October 13, 2023 (2 years from the date of this approval) or the land shall revert to its previous zoning designation. [LUMO 4.4.5(f)]

2. Consent to Conditions: This approval is not effective until the property owners provide written consent to the approval. Written consent must be provided within ten (10) days of enactment by the Town Council.

3. Land Use Intensity: This Conditional Zoning Atlas Amendment authorizes the following:

| **Land Use Intensity<br>Hotel Development and Residential Dwelling Units** | |
|---|---|
| Gross Land Area | 770,566 sf (17.69 acres) |
| Maximum Floor Area | 211,913 sf |
| Hotel Rooms | 54 new rooms (162 total) |
| Residential Units | 52 townhouse units |
| Affordable Residential Units | 7 townhouse units |
| Total Impervious Surface | 267,125 sf |
| Maximum Land Disturbance | 363,425 sf |
| Bicycle Parking | 71 spaces |
| Parking Spaces | 97 spaces for Summit Place Townhomes<br>139 spaces for Residence Inn Hotel |

4. Affordable Housing Plan/Performance Agreement: Prior to the issuance of a Zoning Compliance Permit, the developer must submit an Affordable Housing Plan to be incorporated into an Affordable Housing Performance Agreement to be executed by the developer and the Town Manager (or designee). The Affordable Housing Plan will contain the following information:

   General information about the nature and scope of the covered development, including:
   a. Four (4) affordable for sale dwelling units for households earning 80 percent of AMI and three (3) affordable for sale dwelling units for households earning 65 percent of AMI.
   b. The Plan will include information on:
      i. The total number of market rate units and Affordable Dwelling Units in the development.
      ii. The number of bedrooms and bathrooms in each Affordable Dwelling Unit.
      iii. The approximate square footage of each Affordable Dwelling Unit.
      iv. Documentation and plans regarding the exterior appearance, materials and finishes of the development for each of the Affordable Dwelling Units.
   c. Half of the affordable dwelling units shall be completed prior to Zoning Final Inspection of half of the market rate dwelling units. The remaining affordable dwelling units shall be completed prior to Zoning Final Inspection of 90 percent of the market rate dwelling units.
   d. The affordable dwelling units shall be substantially indistinguishable from the market-rate units on the exterior.
   e. Any and all other information that the Town Manager may require that is needed to demonstrate compliance with the Council's Affordable Housing Policies.

5. Landscape Bufferyards: The following landscape bufferyards shall be provided:

| **Location** | **Required Buffer** |
|---|---|
| North | 35' Type "C" and shared 10' Type "C" |
| East | 20' Type "C" (reduced intensity along street frontage) and 50' Type "D" |
| South | 30' Type "D" |
| West | 60' Type "B" and variable width Type "D" |

6. Dam Breach/Removal: Prior to any dam breach/removal, the developer shall provide receipt from the following agencies regarding notification of the dam removal: NC Division of Energy, Mineral, and Land Resources, North Carolina Floodplain Mapping Program of the Department of Public Safety, and the North Carolina Department of Transportation. This is the procedure laid out for dams identified as a low or intermediate hazard dam in the North Carolina Dam Safety Law of 1967 per §143-215.27(c).

7. Stormwater Runoff Agreement: Prior to the issuance of a Zoning Compliance Permit, the developer will provide a binding agreement with the legal property owner at 141 Erwin Road to accept stormwater from that site via connecting infrastructure. Due to the unsure timelines of these projects, this site will provide a grading plan to capture the runoff from the property at 141 Erwin for sheet flow conditions in case the development at 141 Erwin does not get built as intended.

8. Landscape Buffer Encroachment: No encroachment or land disturbance is permitted

within the 100-foot buffer without additional approval from the Town Council.

9. Stormwater Facility Management: Prior to issuance of a Zoning Compliance Permit, the developer will provide a draft agreement regarding the shared costs and management for the stormwater facility between the Residence Inn Hotel and the Townhomes.

10. ADA Accommodations: Prior to issuance of a Zoning Compliance Permit, the developer shall submit plans showing ADA accommodations at all driveways or street intersections. Final design and construction details must be approved by the Town Manager.

11. Signing System: Prior to issuance of a Zoning Compliance Permit, the developer shall submit plans showing a signing system, which may include sharrow markings, on all internal access streets. The developer shall include the specs and dimensions of all signage on the site details sheets.

12. Electric Vehicle Parking Spaces: Prior to issuance of a Zoning Compliance Permit, the developer shall submit plans showing the installation a minimum of four (4) electric vehicle charging stations including additional spaces to be made electric vehicle ready with dedicated electric circuits and underground conduits at the Hotel expansion site. In addition, the developer shall include a minimum of two (2) electric vehicle charging stations behind Building 9 and Building 10 including the installation of necessary circuitry for electric vehicle charging stations for each townhouse. Final design and construction details must be approved by the Town Manager.

13. Electric Vehicle Charging Stations: Prior to issuance of a Zoning Compliance Permit, the developer shall submit plans showing the specs and dimensions of the electric vehicle charging stations. The developer shall include the specs and dimensions of the electric vehicle charging signage on the site details sheets. Final design and construction details must be approved by the Town Manager.

14. Bicycle Fix-It Stations: Prior to issuance of a Zoning Compliance Permit, the developer shall submit plans showing the location of the bicycle fix-it station at the Hotel site. The developer shall include the specs and dimension on the site details sheets.

15. Transportation Management Plan: Prior to issuance of a Zoning Compliance Permit, the developer shall submit a Transportation Management Plan (TMP). The developer shall continue to coordinate with Town staff for all TMP requirements.

16. Energy Efficiency Plan: Prior to issuance of a Zoning Compliance Permit, an energy efficiency plan shall incorporate a “20 percent more energy efficient” feature relative to the 90.1 energy efficiency standard of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), as amended and in effect at the time of Conditional Zoning District approval. Comparable standards generally recognized as applicable to building energy consumption, as amended and in effect at the time of building permit issuance, may be used by the applicant when incorporating the “20 percent more energy efficient” feature into the final plans. An energy model or prescriptive calculation method should be used to demonstrate that the design will meet the aforementioned energy performance target. [Town Policy April 2007]

17. Temporary Construction Easement: Prior to ZCP, the applicant shall grant the Town a temporary construction easement along Dobbins Drive for the construction of a multi-use path. This easement shall range from 19.1 feet to 30 feet wide, as depicted in

Exhibit A in the applicant's materials. The easement will permit the relocation and reconstruction of a stream corridor within the easement. As part of the easement dedication, the Town agrees to:

a. Provide plans to the property owner for review prior to public engagement;
b. Not place any portion of a multi-use path within the easement;
c. Assume all liability for work in the easement and to assume responsibility for post-construction re-landscaping, and;
d. Not construct any man-made structures [e.g. retaining wall, pedestrian lighting fixtures] in the re-landscaped easement area without prior written approval of the property owner.

**TOWN OF CHAPEL HILL – CONDITIONAL ZONING STANDARD CONDITIONS**

The following standard conditions are supplemental to site-specific conditions as set by Town Council-approved ordinance. Unless modified by the site-specific conditions noted above, these standards apply to all development permitted by Conditional Zoning.

Access

1. Accessibility Requirements: Prior to issuance of a Certificate of Occupancy, the developer shall provide the minimum required handicapped infrastructure according to the Americans with Disabilities Act and associated codes and standards.

Transportation

2. Transportation Management Plan: Prior to issuance of a Zoning Compliance Permit, the developer shall submit a Transportation Management Plan, subject to Town Manager approval. The Transportation Management Plan shall include monitoring of electric vehicle parking spaces usage. [LUMO 4.5.2]

3. Bicycle Parking: Prior to issuance of a Zoning Compliance Permit, the developer shall provide dimensioned details that comply with the Town parking standards for required and/or proposed bicycle parking spaces. Bicycle parking spaces should be placed near building entrances and located in well-lit and visible areas. The spaces must comply with the Spring 2010 Association of Pedestrian and Bicycle Professionals Guidelines and the Class I and Class II bicycle parking standards required by the Town Design Manual. [LUMO 5.9.7 and Town of Chapel Hill Design Manual]

4. Parking Lot: Any newly proposed parking lots, including additions to existing parking lots, shall be constructed to Town standards for dimensions and pavement design. [LUMO 5.9.5 and Town of Chapel Hill Design Manual]

5. Parking Lot Landscape and Screening: The parking lot landscape design shall adhere to the standards of the Chapel Hill Land Use Management Ordinance. [LUMO 5.9.6]

6. Lighting: Prior to issuance of a Zoning Compliance Permit, the developer shall design and install street lighting along the site frontage. Design and construction details must be approved by the Town Manager and the North Carolina Department of Transportation (NCDOT).

7. Driveway Permit: The developer must obtain an approved driveway permit and/or encroachment agreement(s) prior to beginning any proposed work within the NCDOT right-of-way. As a condition of the permit, the permittee shall be responsible for the

design and construction of stipulated improvements in accordance with NCDOT requirements. An approved permit will be issued upon receipt of approved roadway and signal construction plans, inspection fees, and any necessary performance and indemnity bonds.

8. Pavement Markings: Any pavement markings proposed within the public street rights-of-way shall be long life thermoplastic and conform to the standards of the Manual on Uniform Traffic Controls Devises (MUTCD). Pavement markings shall be installed if they previously existed on the roadways. [Town of Chapel Hill Design Manual]

9. Off-Site Construction Easements: Prior to any development that involves land disturbance on abutting properties, the developer shall provide documentation of approval from the affected property owner(s). [LUMO 5.8.1]

10. Sight Distance Triangles: Prior to issuance of a Certificate of Occupancy, the developer shall provide the Town of Chapel Hill with standard sight distance triangles at the proposed driveway locations. [Town of Chapel Hill Design Manual]

11. Low Vision Design Features: Any proposed pedestrian facilities should incorporate low vision design features as feasible.

12. Repairs in Public Right-of-Way: Prior to issuance of a Certificate of Occupancy, the developer shall repair all damage for work in the public right-of-way related to the construction of this project, which may include pavement milling and overlay. The design of such repairs must be reviewed and approved by the Town Manager and NCDOT prior to issuance of a Zoning Compliance Permit. [Town Code 17-40]

13. Street Closure Plan: Prior to issuance of a Zoning Compliance Permit, the developer shall provide a street closure plan, subject to Town Manager and NCDOT approval, for any work requiring street, sidewalk, or lane closure(s). [Town Code 21-7.1]

14. Work Zone Traffic Control Plan: Prior to issuance of a Zoning Compliance Permit, the developer shall provide a Work Zone Traffic Control Plan and a Construction Management Plan for approval by the Town Manager and NCDOT. The Work Zone Traffic Control Plan shall comply with the U.S. Department of Transportation Manual on Uniform Traffic Control Devices and include appropriate accommodations for bicycles and pedestrians. The Construction Management Plan shall provide staging, construction worker parking, construction vehicle routes, and hours of construction. [Town Code 17-47]

Landscaping and Building Elevations

15. Invasive Exotic Vegetation: Prior to issuance of a Zoning Compliance Permit, the developer shall identify on the planting plan any known invasive exotic species of vegetation, as defined by the Southeast Exotic Pest Plant Council (SE-EPPC), and provide notes indicating removal of these species from the landscape buffer areas prior to planting. [Town Design Manual]

16. Alternate Buffer: Prior to issuance of a Zoning Compliance Permit, review shall be required from the Community Design Commission for any proposed alternate buffer. [LUMO 5.6.8]

17. Landscape Protection: Prior to issuance of a Zoning Compliance Permit, a detailed Landscape Protection Plan shall be approved. The plan shall include a complete and currently updated tree survey showing critical root zones of all rare and specimen trees and labeled according to size and species. The plan shall also indicate which trees will be removed and which will remain. The plan shall also include standard notes, tree protection fencing details, and location of tree protection fencing. [LUMO 5.7.3]

18. Tree Protection Fencing: Prior to issuance of a Zoning Compliance Permit, the developer shall provide a detail of a tree protection fence and a note on the Final Plans indicating that tree protection fencing will be installed prior to land-disturbing activity on the site. The plans shall include continuous tree protection fencing around construction limits and indicated construction parking and materials staging/storage areas, and Town standard landscaping protection notes, subject to Town Manager approval. [LUMO 5.7.3]

19. Landscape Planting Plan: Prior to issuance of a Zoning Compliance Permit, the developer shall provide a detailed Landscape Planting Plan with a detailed planting list, subject to Town Manager approval. [LUMO 4.5.3]

20. Tree Canopy: A minimum of tree canopy coverage shall be provided through a combination of retained and replanted trees, unless a modification to regulations is approved. Calculations demonstrating compliance with Chapel Hill Land Use Management Ordinance Section 5.7.2 shall be included. [LUMO 5.7.2]

21. Retaining Wall Construction: If applicable, the final design and location of all retaining walls shall be approved by the Town Manager prior to issuance of a Zoning Compliance Permit.

22. Demolition Plan: Prior to beginning any proposed demolition activity, the developer must obtain demolition permits from both the Planning and Inspections departments. While the demolition component may be submitted to Planning in tandem with the Zoning Compliance Permit for new construction, a separate stand-alone demolition permit shall be issued prior to an Inspection's Demolition permit. Further, prior to the issuance of a demolition permit for all existing structures 500 square feet or larger, Orange County Solid Waste staff shall conduct a deconstruction assessment pursuant to the County's Regulated Recyclable Materials Ordinance (RRMO).

23. Lighting Plan Approval: Prior to issuance of a Zoning Compliance Permit, the Community Design Commission shall review a lighting plan and shall take additional care during review to ensure that the proposed lighting plan will minimize upward light pollution and off-site spillage of light. [LUMO 8.5.5]

24. Community Design Commission/Historic District Commission Review: The Community Design Commission shall review the building elevations, including the location and screening of all HVAC/Air Handling Units for the site, prior to issuance of a Zoning Compliance Permit. [LUMO 8.5.5] Within the Town's historic districts, the Historic District Commission will act in place of the Community Design Commission. [LUMO 8.4.6]

Environment

25. Stormwater Management Plan: Development projects must comply with *Section 5.4 Stormwater Management* of the Chapel Hill Land Use Management Ordinance. [LUMO 5.4]

26. Phasing Plan: If phasing of the project is proposed, then the applicant shall provide a Phasing Plan as part of the Zoning Compliance Permit. The Phasing Plan also shall detail which public improvements and stormwater management structures will be completed in each phase prior to requesting a Certificate of Occupancy. Construction for any phase shall not begin until all public improvements in previous phases have been completed, and a note to this effect shall be provided on the final plans. [LUMO 4.4]

27. Erosion Control Bond: If one acre or more is to be uncovered by land-disturbing activities for the project, then a performance guarantee in accordance with *Section 5-97.1 Bonds* of the Town Code of Ordinances shall be required prior to final authorization to begin land-disturbing activities. [Town Code 5-98]

28. Sediment Control: The developer shall take appropriate measures to prevent and remove the deposit of wet or dry sediments on adjacent roadways. [Town Code 5-86]

29. Erosion Control Inspections: In addition to the requirement during construction for inspection after every rainfall, the developer shall inspect the erosion and sediment control devices daily, make any necessary repairs or adjustments to the devices, and maintain inspection logs documenting the daily inspections and any necessary repairs. [Orange County Erosion Control]

30. Erosion Control: The developer shall provide a copy of the approved erosion and sediment control permit from Orange County Erosion Control Division prior to receiving a Zoning Compliance Permit. During the construction phase, additional erosion and sediment controls may be required if the proposed measures do not contain the sediment. Sediment leaving the property is a violation of the Town's Erosion and Sediment Control Ordinance. [Town Code 5-98]

31. Stormwater Control Measure: The proposed stormwater control measures for the site shall be designed to meet the current North Carolina Division of Environmental Quality Design Manual and Town of Chapel Hill Public Works Engineering Design Manual. [LUMO 5.4.3]

32. Storm Drain Inlets: The developer shall provide pre-cast inlet hoods and covers stating, "Dump No Waste! Drains to Jordan Lake", in accordance with the specifications of the Town Standard Detail SD-4A, SD-5A, SD-5C include all applicable details*, for all new inlets for private, Town and State rights-of-way. [Town of Chapel Hill Design Manual]

33. On-Site/Adjacent Stormwater Features: The final plans shall locate and identify existing site conditions, including all on-site and adjacent stormwater drainage features, prior to issuance of a Zoning Compliance Permit. The final plans must provide proper inlet protection for the stormwater drainage inlets on or adjacent to the site to ensure the stormwater drainage system will not be obstructed with construction debris. [Town of Chapel Hill Design Manual]

34. Repair/Replacement of Damaged Stormwater Infrastructure: Existing stormwater infrastructure that is damaged as a result of the project demolition or construction must be repaired or replaced, as specified by the Stormwater Management Engineer, prior to requesting a Certificate of Occupancy. [Town of Chapel Hill Design Manual]

35. Performance Guarantee: A performance and maintenance guarantee in an amount satisfiable to the Town Manager shall be provided to meet the requirement of Section 4.9.3 of the Land Use Management Ordinance prior to the approval of final plat

recordation. The performance guarantees and maintenance guarantees shall be satisfactory as to their form and manner of execution, and as to the sufficiency of their amount in securing the satisfactory construction, installation, or maintenance of the required stormwater control measure. The performance surety shall be an amount equal to one hundred and twenty-five percent (125%) of the total cost of uncompleted stormwater control measure(s) and conveyances prior to final plat recordation. The total cost of the storm water control measure(s) and conveyance(s) shall include the value of all materials, piping with size at least 12 inches and other structures, seeding and soil stabilization, design and engineering, grading, excavation, fill, and other work. The applicant shall submit unit cost information pertaining to all storm water control measure(s) and/or bids from the grading contractor hired to perform the work and any change orders related thereto as a method to determine the basis for cost of the work. The final cost determination shall be made by the Stormwater Management Division, taking into consideration any additional costs as deemed necessary for completion of the stormwater control measure(s) and conveyance(s).

Upon completion of the storm water control measures(s) and related stormwater improvements and acceptance by the Town after final site inspection, the one hundred and twenty-five percent (125%) of the performance surety shall be released to the developer and a maintenance bond in an amount of twenty-five (25) percent of the construction cost estimate shall submitted by the developer prior to the issuance of certificate of occupancy. No sooner than one year after the recording date of the deed(s), easements and maintenance agreement, the owner may request release of the remainder of the maintenance bond. Upon request by the owner, the Stormwater Management Division shall inspect the stormwater control measures and conveyance to determine that they are performing as required by this Ordinance. The Stormwater Management Division, upon determining that the storm water control measures(s) and conveyances are performing as required by this Ordinance, and after any repairs to the storm water infrastructures are made by the owner, shall release the remaining maintenance bond.

Following the release of the maintenance bond, the developer and/or Homeowners Association shall continue to have a responsibility and obligation to inspect and maintain the stormwater infrastructure as required by the Town's Land Use Management Ordinance.

36. <u>Sediment</u>: Sediment leaving the property is a violation of the Town's Erosion and Sediment Control Ordinance. [Town Code 5-98]

37. <u>Stormwater Control Measure</u>: The proposed stormwater control measures for the site shall be designed to meet the current North Carolina Division of Environmental Quality Design Manual and Town of Chapel Hill Public Works Engineering Design Manual. [LUMO 5.4.3]

38. <u>Storm Drain Inlets</u>: The developer shall provide pre-cast inlet hoods and covers stating, "Dump No Waste! Drains to Jordan Lake", in accordance with the specifications of the Town Standard Detail SD-4A, SD-5A, SD-5C include all applicable details*, for all new inlets for private, Town and State rights-of-way. [Town of Chapel Hill Design Manual]

39. <u>On-Site/Adjacent Stormwater Features</u>: The final plans shall locate and identify existing site conditions, including all on-site and adjacent stormwater drainage features, prior to issuance of a Zoning Compliance Permit. The final plans must provide proper inlet protection for the stormwater drainage inlets on or adjacent to the site to ensure the stormwater drainage system will not be obstructed with construction debris. [Town of Chapel Hill Design Manual]

40. <u>Repair/Replacement of Damaged Stormwater Infrastructure</u>: Existing stormwater infrastructure that is damaged as a result of the project demolition or construction must be repaired or replaced, as specified by the Stormwater Management Engineer, prior to requesting a Certificate of Occupancy. [Town of Chapel Hill Design Manual]

41. <u>Performance Guarantee</u>: A performance and maintenance guarantee in an amount satisfiable to the Town Manager shall be provided to meet the requirement of Section 4.9.3 of the Land Use Management Ordinance prior to the approval of Constructional plans. The performance guarantees and maintenance guarantees shall be satisfactory as to their form and manner of execution, and as to the sufficiency of their amount in securing the satisfactory construction, installation, or maintenance of the required stormwater control measure. The performance surety shall be an amount equal to one hundred and twenty-five percent (125%) of the total cost of uncompleted stormwater control measure(s) and conveyances prior to final plat recordation. The total cost of the storm water control measure(s) and conveyance(s) shall include the value of all materials, piping and other structures, seeding and soil stabilization, design and engineering, grading, excavation, fill, and other work. The applicant shall submit unit cost information pertaining to all storm water control measure(s) and/or bids from the grading contractor hired to perform the work and any change orders related thereto as a method to determine the basis for cost of the work. The final cost determination shall be made by the Stormwater Management Division, taking into consideration any additional costs as deemed necessary for completion of the stormwater control measure(s) and conveyance(s).

    Upon completion of the storm water control measures(s) and other improvements and acceptance by the Town after final site inspection, the one hundred and twenty-five percent (125%) of the performance surety shall be released to the developer and a maintenance bond in an amount of twenty-five (25) percent of the construction cost estimate shall submitted by the developer prior to the issuance of certificate of occupancy. No sooner than one year after the recording date of the deed(s), easements and maintenance agreement, the owner may request release of the remainder of the maintenance bond. Upon request by the owner, the Stormwater Management Division shall inspect the storm water control structure(s) to determine that the storm water measure(s) are performing as required by this Ordinance. The Stormwater Management Division, upon determining that the storm water control(s) are performing as required by this Ordinance, and after any repairs to the storm water control structure(s) are made by the owner, shall release the remaining maintenance bond. [LUMO 4.9.3]

42. <u>Energy Efficiency</u>: Prior to issuance of a Zoning Compliance Permit, an energy efficiency plan shall incorporate a "20 percent more energy efficient" feature relative to the 90.1 energy efficiency standard of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), as amended and in effect at the time of Special Use Permit issuance. Comparable standards generally recognized as applicable to building energy consumption, as amended and in effect at the time of building permit issuance, may be used by the applicant when incorporating the "20 percent more energy efficient" feature into the final plans. An energy model should be used to demonstrate that the design will meet the aforementioned energy performance target. [Town Policy April 2007]

43. <u>Energy Management Plan</u>: Prior to issuance of a Zoning Compliance Permit, the developer shall submit an Energy Management Plan (EMP) for Town approval. The plan shall: a) consider utilizing sustainable energy, currently defined as solar, wind,

geothermal, biofuels, hydroelectric power; b) consider purchase of carbon offset credits and green power production through coordination with the NC GreenPower program; c) provide for 20 percent more efficiency that also ensures indoor air quality and adequate access to natural lighting, and allows for the proposed utilization of sustainable energy in the project; and (d) if requested, provide for the property owner to report to the Town of Chapel Hill the actual energy performance of the plan, as implemented, during the period ending one year after occupancy. [Town Policy April 2007]

Recreation

44. Recreation Space (Multi-Family): A minimum of 25 percent of the required Recreation Space for the project shall be provided in the form of a payment in lieu. The payment in lieu shall be paid prior to the issuance of a Zoning Compliance Permit.

45. Recreation Area (Subdivision): A minimum of 25 percent of the required Recreation Area for the project shall be provided in the form of a payment in lieu. The payment in lieu shall be paid prior to the issuance of a Zoning Compliance Permit.

Water, Sewer, and Other Utilities

46. Utility/Lighting Plan Approval: The final utility/lighting plan shall be approved by Orange Water and Sewer Authority (OWASA), Duke Energy Company, other applicable local utility service providers, and the Town Manager before issuance of a Zoning Compliance Permit. The developer shall be responsible for assuring that these utilities can continue to serve the development. In addition, detailed construction drawings shall be submitted to OWASA for review/approval prior to issuance of a Zoning Compliance Permit. [LUMO 5.12]

47. Lighting Plan: Prior to issuance of a Zoning Compliance Permit, the developer shall submit site plans, sealed by a Professional Engineer, for Town Manager approval, as well as other required documents to satisfy the lighting requirements of Section 5.11 of the Land Use Management Ordinance including: submission of a lighting plan; providing for adequate lighting on public sidewalks, including driveway crossings; and demonstrating compliance with Town standards. [LUMO 5.11]

48. Water/Sewer Line Construction: All public water and sewer plans shall be approved by and constructed according to OWASA standards. Where sewer lines are located beneath drive aisles and parking areas, construction methods approved by OWASA shall be employed to ensure that sewer lines will not be damaged by heavy service vehicles. [LUMO 5.12.1]

49. OWASA Approval: Prior to issuance of a Zoning Compliance Permit, any easement plats and documentation as required by OWASA and the Town Manager shall be recorded. [LUMO 5.12]

50. Irrigation: If permanent irrigation is proposed to support landscaping, an irrigation plan shall be submitted which includes the use of smart technologies to conserve water and energy.

Homeowner Association

51. Homeowners' Association: A Homeowners' Association shall be created that has the capacity to place a lien on the property of a member who does not pay the annual

charges for maintenance of all common areas, however designated. The Homeowners' Association documents shall be approved by the Town Manager prior to recordation at the Orange County Register of Deeds Office and shall be cross-referenced on the final plat. The Homeowners' Association documents shall comply with Section 4.6.7 of the Land Use Management Ordinance. That the Homeowners' Association covenants shall not exclude home occupation businesses as regulated by the Town of Chapel Hill.

52. Homeowners' Association Responsibilities: The Homeowners' Association shall be responsible for the maintenance, repair, and operation of required bufferyard(s), open space, recreation areas, paths, community garden, and shared stormwater management facilities.

53. Dedication and Maintenance of Common Area to Homeowners' Association: The applicant shall provide for Town Manager review and approval, a deed conveying to the Homeowners' Association all common areas, however designated, including the community garden, recreation space, open space and common areas, the bufferyards, and stormwater management facilities. The Homeowners' Association shall be responsible for the maintenance of the proposed internal subdivision roads until the NCDOT or the Town assumes ownership of the internal streets. These documents shall be reviewed and approved by the Town Manager prior to recordation at the Orange County Register of Deeds Office and cross-referenced on the final plat.

54. Solar Collection Devices: The Homeowners' Association, or similar entity, shall not include covenants or other conditions of sale that restrict or prohibit the use, installation, or maintenance of solar collection devices, including clotheslines.

Fire Safety

55. Fire Sprinklers: The developer shall install sprinklers under the North Carolina Fire Protection Code (NC FPC) prior to issuance of a Certificate of Occupancy. Prior to issuance of a Zoning Compliance Permit, the plans shall show all proposed fire department connections to such systems. [TOWN CODE 7-56]

56. Gates and Barricades: Where required or authorized by the fire code official and permanent or temporary (construction), any gates across fire apparatus access roads shall be a minimum width of 20 feet, be of swinging or sliding type, have an emergency means of operation, shall be openable by either forcible entry or keyed, capable of being operated by one person, and shall be installed and maintained according to UL 325 and ASTM F 2200. [NC FPC 2018, 503.5, 503.6, D103.5]

57. Grade and Approach: Fire apparatus access roads shall not exceed 10 percent in grade unless approved by the fire chief, and all approach and departure angles shall be within the limits established based on the Fire Department's apparatus. [NC FPC -2018, 503.2.7, 503.2.8 and D103.2]

58. Fire Protection and Utility Plan: A fire flow report for hydrants within 500 feet of each building shall be provided and demonstrate the calculated gallons per minute with a residual pressure of 20 pounds per square inch. The calculations should be sealed by a professional engineer licensed in the State of North Carolina and accompanied by a water supply flow test conducted within one year of the submittal. Refer to the Town Design Manual for required gallons per minute.

59. Fire Department Connections and Standpipes: When the building being constructed requires standpipes, a temporary standpipe connection will be constructed with ready Fire Department Access when the building is not more than 40 feet in height. Such standpipes shall provide usable connections adjacent to the stairs and shall continue with building progression always being not more than one floor below the highest floor of the building. [NC FPC 912 & NC FPC 2018 3313]

60. Fire Command Center: Where required in the North Carolina Fire Protection Code and in all high rise buildings, a fire command center must be constructed in accordance with Section 508, NC FPC 2018.

61. Aerials: Where a building exceeds 30 feet in height OR 3 stories above the lowest level of Fire Department Access, overhead power and utility lines shall not be allowed within the aerial apparatus access roadway and the roadway shall have an unobstructed width of 26 feet exclusive of the shoulders. At least one of the apparatus access roadways shall be located within a minimum of 15 feet and maximum of 30 feet from one complete side of the building. [NC FPC 2018 D105.1, D105.2, D105.3, D105.4]

62. Fire Apparatus Access Road: Any fire apparatus access roads (any public/private street, parking lot access, fire lanes and access roadways) used for fire department access shall be all-weather and designed to carry the imposed load of fire apparatus weighing at least 80,000 lbs. Fire apparatus access roads shall have a minimum width of 20 feet exclusive of shoulders with an overhead clearance of at least 13 feet 6 inches for structures not exceeding 30 feet in height and shall provide access to within 150 feet of all exterior portions of the building. Structures exceeding 30 feet in height shall be provided with an aerial apparatus access road 26 feet in width in the immediate vicinity of the building or portion thereof and shall provide at least one of the required access roads to be located not less than 15 feet and not more than 30 feet from the structure parallel to one entire side of the structure. [NC FPC 2018 502.1,503.1.1, 503.2.1, D102.1 SECOND ACCESS DEPENDENT UPON NORTH CAROLINA DEPARTMENT OF TRANSPORTATION APPROVAL]

63. Dead End Access Roads: Dead end fire apparatus access roads exceeding 150 feet shall have a designated turn around. The turnaround shall meet one of the design standards of NC FPC 2018, Appendix D table D 103.4.

64. Building Height: Buildings exceeding 30 feet or three stories in height must have at least two means of fire apparatus access separated by at least one half the diagonal distance of the building. [NC FPC 2018, D104.1, D104.3 DEPENDENT UPON NORTH CAROLINA DEPARTMENT OF TRANSPORTATION APPROVAL]

65. Fire Access: Prior to issuance of a Certificate of Occupancy, fire access shall be reviewed and approved by the Town of Chapel Hill.

66. Fire Apparatus Access Road Authority: The fire code official shall have the authority to increase the minimum access widths where they are deemed inadequate for fire and rescue operations. [NC FPC 2018 503.2.2]

67. Hydrants Active: The developer shall provide active fire hydrant coverage, acceptable to the Fire Department, for any areas where combustible construction materials will be stored or installed, prior to having such materials delivered to the site. All required fire hydrants must be installed, active, and accessible for the Fire Department use prior to the arrival of combustible materials on site. Fire protection systems shall be installed

according to Town Ordinance, the NC Fire Protection Code, and National Fire Protection Association Standard #13. [NC Fire Protection Code 2018 Section 501.1 & 3312]

68. Fire Hydrant and FDC Locations: The Final Plans shall indicate the locations of existing and proposed fire hydrants and Fire Department Connections (FDC). Fire Department Connections shall be located on the street side of the building within 100 feet of a hydrant. Hydrant spacing shall comply with the Town Design Manual. Design shall be reviewed and approved by the Town Manager prior to issuance of a Zoning Compliance Permit. [NC FPC 2018 Section 501.5.1.1]

69. Firefighting Access During Construction: Vehicle access for firefighting shall be provided to all construction or demolition sites including vehicle access to within 100 feet of temporary or permanent fire department connections and hydrants. Vehicle access shall be provided by either temporary or permanent roads capable of supporting vehicle loading under all weather conditions. [NC FPC 2018, Section 3310.1]

70. Premise Identification: Approved building address numbers, placed in a position acceptable to the fire code official, shall be required on all new buildings. [NC FPC 2018, 505.1]

71. Key Boxes: Where required by the fire code official, a secure key box, mounted on the address side of the building, near the main entrance, shall be provided to ensure adequate access to the building based on life safety and/or fire protection needs. [NC FPC 2018, 506]

72. Automatic Fire Sprinkler System Required: An automatic fire sprinkler system meeting the requirements of NFPA Standard #13 and Town Code 7-56 is required to be installed in non-residential construction.

73. Fire Department Connections, Locations: Any required FDCs for any buildings shall meet the design and installation requirements for the current, approved edition of NFPA 13, 13D, 13R, or 14 of the NC FPC 2018 and Town Code 7-38 for location. FDCs shall be installed within 100 feet of a hydrant or unless otherwise approved by the fire code official and shall not be obstructed or hindered by parking or landscaping. FDCs shall be equipped with National Standard Thread (NST) and be a 2.5" siamese.

74. Fire Department Connections, Installation: A working space of not less than 36 inches in width and depth and a working space of 78 inches in height shall be provided on all sides with the exception of wall mounted FDCs unless otherwise approved by the fire code official. The FDCs where required must be physically protected from impacts by an approved barrier. [NC FPC 2018, 912.1, 912.2 912.2.1, 312]

75. Fire Apparatus Access for Chapel Hill Fire Department: All fire department access determinations shall be based upon Chapel Hill Fire Department apparatus specifications (data specifications provided by Office of the Fire Marshal/Life Safety Division) and field verification. All proposed fire department access designs shall be reviewed and shall also pass field inspection.

76. Fire Flow Report: The Final Plan application shall include a fire flow report sealed by an Engineer registered in the State of North Carolina. An OWASA flow test must be provided with the report. Fire flow shall meet the 20 psi or exceed the requirements set forth in the Town Design Manual. The Fire Flow Report shall be reviewed and approved

by the Town Manager prior to issuance of a Zoning Compliance Permit. [Town of Chapel Hill Design Manual]

77. Fire Lane: Prior to issuance of a Certificate of Occupancy, any fire lane shall be marked and signed in accordance with Town standards, with the associated plans approved by the Town Manager prior to issuance of a Zoning Compliance Permit. [NC FPC, Sections 2018 503.3, D103.6, D103.6.1, D103.2]

78. Emergency Responder Radio Coverage in New Buildings: All new buildings shall have approved radio coverage for emergency responders within the building based upon the existing coverage levels of the public safety communication systems of the jurisdiction at the exterior of the building. This section shall not require improvement of the existing public safety communication systems. [NC FPC 2018 Section 510.1]

Solid Waste Management and Recycling

79. Solid Waste Management Plan: Prior to issuance of a Zoning Compliance Permit, a detailed Solid Waste Management Plan, including a recycling plan and a plan for managing and minimizing construction debris, shall be approved by the Town Manager and Orange County Solid Waste (OCSW). The plan shall include dimensioned, scaled details of any proposed refuse/recycling collection areas, associated screening, and protective bollards, if applicable. Each bulk waste container shall be labeled as to type of material to be collected. If a refuse compactor is proposed or if the collection enclosure is not accessible by Town vehicles, the developer shall provide documentation of an agreement for solid waste collection by a private provider prior to issuance of a Zoning Compliance Permit. [Orange County Solid Waste]

80. Construction Waste: Clean wood waste, scrap metal and corrugated cardboard (Regulated Recyclable Materials), all present in construction waste, must be recycled. All haulers of construction waste containing Regulated Recyclable Materials must be properly licensed with Orange County Solid Waste. The developer shall provide the name of the permitted waste disposal facility to which any land clearing or demolition waste will be delivered. [Orange County Solid Waste]

81. Deconstruction Assessment: For any existing structure 500 square feet or larger a deconstruction assessment shall be conducted by OCSW staff prior to the issuance of a demolition permit pursuant to the County's Regulated Recyclable Materials Ordinance (RRMO). Prior to any demolition or construction activity on the site, the developer shall hold a pre-demolition/pre-construction conference with Solid Waste staff. This may be held at the same pre-construction meeting held with other development/enforcement officials.

State and Federal Approvals

82. State or Federal Approvals: Any required State or federal permits or encroachment agreements (e.g., 401 water quality certification, 404 permit) shall be approved and copies of the approved permits and agreements be submitted to the Town of Chapel Hill prior to the issuance of a Zoning Compliance Permit.

83. North Carolina Department of Transportation Approvals: Prior to issuance of a Zoning Compliance Permit, plans for any improvements to State-maintained roads or in associated rights-of-way shall be approved by NCDOT.

Miscellaneous

84. Construction Management Plan: A Construction Management Plan shall be approved by the Town Manager prior to issuance of a Zoning Compliance Permit. The construction management plan shall: 1) indicate how construction vehicle traffic will be managed, 2) identify parking areas for on-site construction workers including plans to prohibit parking in residential neighborhoods, 3) indicate construction staging and material storage areas, 4) identify construction trailers and other associated temporary construction management structures, and 5) indicate how the project construction will comply with the Town's Noise Ordinance. [Town Design Manual Chapter 10]

85. Traffic and Pedestrian Control Plan: The developer shall provide a Work Zone Traffic Control Plan for movement of motorized and non-motorized vehicles on any public street that will be disrupted during construction. The plan must include a pedestrian management plan indicating how pedestrian movements will be safely maintained. The plan must be reviewed and approved by the Town Manager prior to the issuance of a Zoning Compliance Permit. At least 5 working days prior to any proposed lane or street closure the developer must apply to the Town Manager for a lane or street closure permit. [Town of Chapel Hill Design Manual]

86. Construction Sign Required: The developer shall post a construction sign at the development site that lists the property owner's representative and telephone number, the contractor's representative and telephone number, and a telephone number for regulatory information at the time of issuance of a Building Permit, prior to the commencement of any land disturbing activities. The construction sign may have a maximum of 32 square feet of display area and maximum height of 8 feet. The sign shall be non-illuminated. Prior to the issuance of a Zoning Compliance Permit, a detail of the sign shall be reviewed and approved by the Town Manager. [LUMO 5.14.4]

87. Schools Adequate Public Facilities Ordinance: If applicable, the developer shall provide the necessary Certificates of Adequacy of Public School Facilities or an exemption prior to issuance of a Zoning Compliance Permit. [LUMO 5.16]

88. Open Burning: The open burning of trees, limbs, stumps, and construction debris associated with site development is prohibited without a permit from the Town's Fire Marshal. [Town Code 7-7]

89. Detailed Plans: Prior to the issuance of a Zoning Compliance Permit, final detailed site plans, grading plans, utility/lighting plans, stormwater management plans (with hydrologic calculations), landscape plans, and landscape maintenance plans shall be approved by the Town Manager. Such plans shall conform to plans approved by this application and demonstrate compliance with all applicable regulations and the design standards of the Chapel Hill Land Use Management Ordinance and the Design Manual. [LUMO 4.5.3]

90. Certificates of Occupancy: No Certificates of Occupancy shall be issued until all required public improvements are complete. A note to this effect shall be placed on the final plats.

    If the Town Manager approves a phasing plan, no Certificates of Occupancy shall be issued for a phase until all required public improvements for that phase are complete, and no Building Permits for any phase shall be issued until all public improvements required in previous phases are completed to a point adjacent to the new phase. A note to this effect shall be placed on the final plats.

91. Traffic Signs: The developer shall be responsible for placement and maintenance of temporary regulatory signs before issuance of any Certificates of Occupancy.

92. New Street Names and Numbers: The name of the development and its streets and house/building numbers shall be approved by the Town Manager prior to issuance of a Zoning Compliance Permit.

93. As-Built Plans: Prior to the issuance of a Certificate of Occupancy, the developer shall provide certified as-built plans for building footprints, parking lots, street improvements, storm drainage systems and stormwater management structures, and all other impervious surfaces, and a tally of the constructed impervious area. The as-built plans should be in DXF binary format using State plane coordinates and NAVD 88. [Town of Chapel Hill Design Manual]

94. Vested Right: This Conditional Zoning constitutes a site specific development plan (and is defined as such in the Chapel Hill Land Use Management Ordinance) establishing a vested right as provided by N.C.G.S. Section 160A-385.1 and the Chapel Hill Land Use Management Ordinance. During the period of vesting this permit may be subject to subsequent changes to Town regulations to the extent such regulations have been enacted under authority other than the Town's zoning authority.

95. Continued Validity: Continued validity and effectiveness of this approval shall be expressly conditioned on the continued compliance with the plans and conditions listed above.

96. Non-Severability: If any of the above conditions is held to be invalid, approval in its entirety shall be void.

97. Non-Comprehensive: The listing of these standard stipulations and the specific stipulations applicable to this Permit, are not intended to be comprehensive and do not exclude other state and local laws and regulations which may be applicable to this Permit and development project.

BE IT FURTHER ORDAINED that the Council hereby approves the application for a Conditional Zoning at the Residence Inn – Summit Place property located at 101-111 Erwin Road.

This the 13th day of October, 2021.

**RESOLUTION C**
(Denying the Conditional Zoning Application)

**A RESOLUTION DENYING AN AMENDMENT OF THE CHAPEL HILL ZONING ATLAS TO REZONE THE RESIDENCE INN – SUMMIT PLACE PROPERTY LOCATED AT 101-111 ERWIN ROAD FROM RESIDENTIAL-3-CONDITIONAL ZONING DISTRICT (R-3-CZD) TO MIXED USE-VILLAGE-CONDITIONAL ZONING DISTRICT (MU-V-CZD) (PROJECT #20-082) (2021-10-13/R-12)**

BE IT RESOLVED by the Council of the Town of Chapel Hill that it finds that a Conditional Zoning application, submitted by Scott Radway, Radway Design, on behalf of owners Summit Hospitality Group, LLC and Chapel Hill R I, LLC, to rezone a 17.71 acre parcel located at 101-111 Erwin Road and identified as Orange County Parcel Identifier Numbers 9799-48-1814 and 9799-48-0252 to Mixed Use-Village–Conditional Zoning District (MU-V-CZD) according to the rezoning plan dated October 29, 2020 and last revised September 16, 2021, and the conditions listed below would not:

a) Conform with the applicable provisions of the Land Use Management Ordinance and Town Code

b) Conform with the Comprehensive Plan

c) Be compatible with adjoining uses

d) Mitigate impacts on surrounding properties and the Town as a whole

e) Be harmonious with existing and proposed built systems including utility infrastructure, transportation facilities, police and fire coverage, and other public services and facilities

f) Be harmonious with natural systems such as hydrology, topography, and other environmental constraints

BE IT FURTHER RESOLVED that the Council hereby denies the application for an amendment of the Chapel Hill Zoning Atlas to rezone the property located at 101-111 Erwin Road to Mixed Use-Village–Conditional Zoning District (MU-V-CZD).

This the 13th day of October, 2021.

# CONDITIONAL ZONING APPLICATION

**TOWN OF CHAPEL HILL**
**Planning Department**
405 Martin Luther King Jr. Blvd.
(919) 968-2728 *fax* (919) 969-2014
www.townofchapelhill.org

Parcel Identifier Number (PIN): 9799-48-1814 & 9799-48-0252 Date: 12/23/2020

## Section A: Project Information

Project Name: Residence Inn - Summit Place

Property Address: 101-111 Erwin Road Zip Code: 27514

Use Groups (A, B, and/or C): A & B Existing Zoning District: R-2 & R-3C

Project Description: Addition to Hotel and development of 52 townhomes

## Section B: Applicant, Owner, and/or Contract Purchaser Information

**Applicant Information** (to whom correspondence will be mailed):

Name: Scott Radway, Radway Design

Address: 2627 Meacham Avenue

City: Chapel Hill State: NC Zip Code: 27516

Phone: 919-880-5579 Email: scott@radwaydesign.com

The undersigned applicant hereby certifies that, to the best of their knowledge and belief, all information supplied with this application and accurate.

Signature: Scott Radway Date: 12/23/2020

**Owner/Contract Purchaser Information:**

☒ **Owner** ☐ **Contract Purchaser**

Name: SHG LLC.

Address: 3141 John Humphries Wynd, #200

City: Raleigh State: NC Zip Code: 27612

Phone: 919-576-2822 Email: ceick@shgltd.com

The undersigned applicant hereby certifies that, to the best of their knowledge and belief, all information supplied with this application and accurate.

Signature: Date: 12/23/2020

**Click here for application submittal instructions.**

# CONDITIONAL ZONING APPLICATION SUBMITTAL REQUIREMENTS

**TOWN OF CHAPEL HILL**
**Planning Department**

The following must accompany your application. Failure to do so will result in your application being considered incomplete. For assistance with this application, please contact the Chapel Hill Planning Department (Planning) at (919) 968-2728 or at planning@townofchapelhill.org.

| | | | |
|---|---|---|---|
| X | **Application fee** (including Engineering Review fee) (refer to fee schedule) | Amount Paid $ | $ 52,644.87 |
| X | **Pre-application meeting** –with appropriate staff | | |
| X | **Digital Files –** provide digital files of all plans and documents | | |
| X | **Recorded Plat or Deed of Property** | | |
| X | **Project Fact Sheet** | | |
| X | **Traffic Impact Statement** – completed by Town's consultant (or exemption) | | |
| N/A | **Description of Public Art Proposal,** if applicable | | |
| X | **Statement of Justification** | | |
| X | **Response to Community Design Commission and Town Council Concept Plan comments, if applicable** | | |
| X | **Affordable Housing Proposal, if applicable** | | |
| X | **Statement of Consistency with Comprehensive Plan or request to amend Comprehensive Plan** | | |
| X | **Mailing list of owners of property within 1,000 feet perimeter of subject property** (see GIS notification tool) | | |
| X | **Mailing fee for above mailing list (mailing fee is double due to 2 mailings)** | Amount Paid $ | In Above Fee |
| X | **Written Narrative describing the proposal, including proposed land uses and proposed conditions** | | |
| √ | **Resource Conservation District, Floodplain, & Jordan Buffers Determination** – necessary for all submittals | | |
| X | **Jurisdictional Wetland Determination – if applicable** | | |
| N/A | **Resource Conservation District Encroachment Exemption or Variance (determined by Planning)** | | |
| N/A | **Jordan Buffer Authorization Certificate or Mitigation Plan Approval (determined by Planning)** | | |
| N/A | **Reduced Site Plan Set (reduced to 8.5" x 11")** | | |

## **Stormwater Impact Statement** (1 copy to be submitted)

a) Written narrative describing existing & proposed conditions, anticipated stormwater impacts and management structures and strategies to mitigate impacts
b) Description of land uses and area (in square footage)
c) Existing and proposed impervious surface area in square feet for all subareas and project area
d) Ground cover and uses information
e) Soil information (classification, infiltration rates, depth to groundwater and bedrock)
f) Time of concentration calculations and assumptions
g) Topography (2-foot contours)
h) Pertinent on-site and off-site drainage conditions
i) Upstream and/or downstream volumes
j) Discharges and velocities
k) Backwater elevations and effects on existing drainage conveyance facilities
l) Location of jurisdictional wetlands and regulatory FEMA Special Flood Hazard Areas
m) Water quality volume calculations
n) Drainage areas and sub-areas delineated
o) Peak discharge calculations and rates (1, 2, and 25-year storms)
p) Hydrographs for pre- & post-development without mitigation, post-development with mitigation
q) Volume calculations and documentation of retention for 2-year storm

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

## Residence Inn Hotel & Summit Place Townhomes - Combined Fact Sheet Data (Revised 8/9/2021)

### Section A: Project Information

| | | | |
|---|---|---|---|
| **Use Type:** | Office/Institutional | | |
| | **Residential** | X | |
| | Mixed-Use | | |
| | **Hotel** | **X** | |

| | | | |
|---|---|---|---|
| **Overlay District:** | Historic District | | |
| | Neighborhood Conservation | | |
| | Airport Hazard Zone | | |
| | | | |

| | | | |
|---|---|---|---|
| **FLUM Corridor Designation** | **North 15-501 Sub Area C** | **X** | **Permitted Primary & Secondary Use Types - Townhomes and Hospitality/Commercial** |

### Section B: Land Area

| | | | SQ. FT. | ACRES |
|---|---|---|---|---|
| **Net Land Area (NLA): Area within zoning lot boundary** | | **NLA =** | 713,930 | 16.39 |
| Chose one or both of the following (a or b), not to exceed 10% of NLA | a) Credited Street Area (total adjacent street frontage) x 1/2 width of public right of way | CSA = | **56,636** | **1.30** |
| | b) Credited Permanent Open Space (total adjacent frontage x 1/2 public or dedicated open space | COS = | 0 | 0.00 |
| **TOTAL: NLA + CSA and/or COS = Gross Land Area (Not to exceed NLA + 10%)** | | **GLA =** | **770,566** | **17.69** |

### Section C: Special Protection Areas, Land Disturbance, and Impervious Area

| | | | |
|---|---|---|---|
| **Special Protection Areas** (Check All That Apply) | **Jordan Buffer** | **X** | |
| | **Resource Conservation District** | **X** | Southern portion of site per LUMO & Perennial Stream Designation |
| | 100 Year Floodplain | | |
| | Watershed Protection District | | |

| **Land Disturbance** | | **Total (SF)** |
|---|---|---|
| Area of Land Disturbance: (Includes: Footprint of proposed activity plus work area envelope, staging area for materials, access/equipment paths, and all off-site clearing) | | **363,425** |
| Area of Land Disturbance within RCD | | 0 |
| Area of Land Disturbance within Jordan Buffer. | | 0 |

| **Impervious Areas** | Existing SF | Demolition SF | Proposed SF | Total SF |
|---|---|---|---|---|
| Impervious Surface Area (ISA) | 111,700 | 0 | **155,425** | **267,125** |
| Impervious Surface Ratio: Percent of Impervious Surface Area of Gross Land Area (ISA/GLA)% | | | | **34.7 %** |
| If located in Watershed Protection District, % of impervious surface on 7/1/1993 | N/A | N/A | N/A | N/A |

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

# Residence Inn Hotel (Updated 8/9/2021)

## Section A: Project Information

| | | | |
|---|---|---|---|
| **Use Type:** | Office/Institutional | | |
| | Residential | | |
| | Mixed-Use | | |
| | **Hotel** | X | |

| | | | |
|---|---|---|---|
| **Overlay District:** | Historic District | | |
| | Neighborhood Conservation | | |
| | Airport Hazard Zone | | |
| | | | |

| | | | |
|---|---|---|---|
| **FLUM Corridor Designation** | **North 15-501 Sub Area C** | X | **Permitted Secondary Use Type - Commercial/Office** |
| | | | |

## Section B: Land Area

| | | | SQ. FT. | ACRES |
|---|---|---|---|---|
| **Net Land Area (NLA): Area within zoning lot boundary** | | **NLA =** | **448,708** | **10.30** |
| Chose one or both of the following (a or b), not to exceed 10% of NLA | a) Credited Street Area (total adjacent street frontage) x 1/2 width of public right of way | CSA = | **44,871** | **1.03** |
| | b) Credited Permanent Open Space (total adjacent frontage x 1/2 public or dedicated open space | COS = | 0 | 0.00 |
| **TOTAL: NLA + CSA and/or COS = Gross Land Area (Not to exceed NLA + 10%)** | | **GLA =** | **493,579** | **11.33** |

## Section C: Special Protection Areas, Land Disturbance, and Impervious Area

| | | |
|---|---|---|
| **Special Protection Areas** (Check All That Apply) | Jordan Buffer | X |
| | Resource Conservation District | X |
| | 100 Year Floodplain | |
| | Watershed Protection District | |

| **Land Disturbance** | | **Total (SF)** |
|---|---|---|
| Area of Land Disturbance: (Includes: Footprint of proposed activity plus work area envelope, staging area for materials, access/equipment paths, and all off-site clearing) | Does not include work in Erwin Rd. Right of Way | **119,500** |
| Area of Land Disturbance within RCD | | 0 |
| Area of Land Disturbance within Jordan Buffer. | | 0 |

| **Impervious Areas** | Existing SF | Demolition SF | Proposed SF | Total SF |
|---|---|---|---|---|
| Impervious Surface Area (ISA) | 111,700 | 0 | **14,850** | **126,550** |
| Impervious Surface Ratio: Percent of Impervious Surface Area of Gross Land Area (ISA/GLA)% | | | | **25.6%** |
| If located in Watershed Protection District, % of impervious surface on 7/1/1993 | N/A | N/A | N/A | N/A |

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

# Residence Inn Hotel. (Updated 8/9/2021)

## Section D: DIMENSIONS

| **Dimensional Units (SF)** | | **Existing SF** | **Demolition SF** | **Proposed SF** | **Total SF** |
|---|---|---|---|---|---|
| Existing Building / Proposed Buildings | 3/3 | 79,120 | 6,000 | 40,493 | 113,613 |
| Number of Floors | 2, 3, & 4 | | | | |
| | | | | | |
| Recreational Space | | 7,000 | | | 7,000 |

## Section D: Dimensions - RESIDENTIAL DEVELOPMENT

| **Dimensional Units (SF)** | | **Studio** | **1BR** | **2BR** | **3BR+** |
|---|---|---|---|---|---|
| **Proposed Building(s)** | | | | | |
| Total Number Dwelling Units | | | | | |
| Number Market Rate Units | | | | | |
| Number Affordable Units | | | | | |

| **Dimensional Units (SF)** | | Studio | 1BR | 2BR | 3BR+ |
|---|---|---|---|---|---|
| Floor Area Heated (All Units) | | | | | |
| Floor Area Unheated (All Units) | | | | | |
| Total SF All Units | | | | | |
| Total SF Affordable Units | | | | | |
| | | | | | |

## Section D: Dimensions - NON-RESIDENTIAL DEVELOPMENT

| **Use Type** | **Existing SF** | **Demolition SF** | **Proposed SF** | **Total SF** | |
|---|---|---|---|---|---|
| Commercial | | | | | |
| Restaurant | | | | | |
| Government | | | | | |
| Institutional | | | | | |
| Medical | | | | | |
| **Office** | **3,000** | **(3,000)** | | | |
| **Hotel** | **73,120** | **0** | **40,493** | **113,613** | |
| Industrial | | | | | |
| Place of Worship | | | | | |
| **Other/(Residential in Mixed Use)** | **3,000** | **(3,000)** | | | |
| **TOTAL** | **79,120** | **(6,000)** | **40,493** | **113,613** | |

## Section D: Dimensions - BUILDING HEIGHT & SETBACKS - Assumes Non-Residential Transitional Standards LUMO § 3.8.4(b)

| **Requirement _ LUMO** | | **Required** | **Existing SUP** | **Existing** | **Proposed** |
|---|---|---|---|---|---|
| **Setbacks - Minimum** | Street | 22' | 100' | 108' | 108' |
| Shared with Summerfield Crossing | Interior P/L | 8' | 175' | 182' | 182' |
| Shared with Summit Townhomes | Solar (North) | 9' | N/A | N/A | 65' |
| **Height - Maximum** | Primary - Perimeter | 35' | N/A | N/A | N/A |
| | Secondary | 114' | 45' | 42' | 49' |
| **Street** | Frontage | 80' | 40' | 410' | 520" |
| | Width | 62' | 50' | 500' | 580' |

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

# Residence Inn Hotel (Updated 8/9/2021)

## Section F: ADJOINING OR CONNECTING STREETS AND SIDEWALKS

| Street Name | Right-of-Way Width | Pavement Width | Number of Lanes | Existing Sidewalk* | Existing Curb/Gutter |
|---|---|---|---|---|---|
| Erwin Road | 65' | 52± Variable | 2 | Partial | Partial |
| Dobbins Drive | 200' Plus | 26' | 2 | YES | YES |
| | | | | | |

| Proposed Points of Access |
|---|
| New Entrance Road on Erwin Road that will serve both Summit Place Townhomes and Residence Inn Hotel |

* If existing siedwalks do not exist and/or applicant is adding sidewalks, please provide the following information

| Sidewalk Information | | | | | |
|---|---|---|---|---|---|
| **Street Name** | **Dimensions** | **Surface** | | **Handicapped Ramps** | |
| Erwin Road - New Sidewalk | 5' x 80 ' | Concrete | | YES | |
| | | | | | |

## Section G: PARKING INFORMATION

| Parking Spaces | Minimum | Maximum | Proposed | Comment |
|---|---|---|---|---|
| Regular Spaces | 146 | 203 | 128 | 14 of these will be EV Ready |
| EV Spaces | | | 4 | Ready at CO |
| ADA Spaces | 5 | 7 | 7 | |
| **Total Vehicular Spaces** | **141** | **196** | **139** | |
| | | | | |
| | | | | |
| | | | | |
| Bicycle Spaces | 12 | | 13 | |
| | | | | |
| Pavement Surface(s) | Asphalt | | | |
| | | | | |
| Loading Spaces | Provided from Parking Space Allocation During Non-Peak Parking Hours | | | |
| | | | | |

## Section H: LANDSCAPE BUFFERS

| Location | Minimum Width LUMO | Existing SUP Required | Existing | Proposed | Alternate or Modified Buffer |
|---|---|---|---|---|---|
| North - Summit Place Townhomes | 0 | N/A | N/A | 15' | NO |
| | | | | | |
| West - Summerfield Crossing | 20' | 100' | 100' | 100' | NO |
| | | | | | |
| South - Dobbins Drive | 20' | 30' | 30 - 120' | 30 - 120' | N/A |
| | | | | | |
| East - Erwin Road | 30' | 50' | 52' | 50' | NO |

8/9//2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

# Residence Inn Hotel. (Updated 8/9/2021)

## Section I: LAND USE INTENSITY

| Zoning - Area - Ratio | | | Impervious Surface Thresholds | | | Minimum & Maximum Limitations | |
|---|---|---|---|---|---|---|---|
| Zoning District | Floor Area Ratio (FAR) | Recreation Space Ratio (RSR) | Low Density Residential (0.24) | High Density Residential (0.50) | Non-Residential (0.70) | Maximum Floor Area (MFA) = FAR x GLA | Minimum Recreation Space (MRS) = RSR x GLA |
| | | | | | | | |
| MU-V Arterial | 1.2 | | | | **345,505** | **485,034** | |
| | | | | | | | |
| | | | | | | | |
| RCD Streamside | 0.01 | | | | | 384 | |
| RCD Managed | 0.19 | | | | | 4,664 | |
| RCD Upland | 1.2 | | | | | 31,801 | |
| | | | | | | | |
| | | | | | | | |
| **TOTAL** | | | | | **345,505** | **521,883** | |

## Section J: UTILITY SERVICE

Identify Provider

| | | | |
|---|---|---|---|
| Water | **Owasa** | | |
| Sewer | **Owasa** | | |
| Electrical | **Duke Energy** | | |
| Telephone | **Underground** | | |
| Other Communication | **Underground Satellite** | | |
| Solid Waste | **TOCH** | | |
| Recycling | **Orange CO** | | |
| Gas | **Dominion Energy** | | |
| | | | |

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

## Summit Place Townhomes (Updated 8/9/2021)

### Section A: Project Information

| | | | |
|---|---|---|---|
| **Use Type:** | Office/Institutional | | |
| | **Residential** | X | |
| | Mixed-Use | | |
| | Other | | |

| | | | |
|---|---|---|---|
| **Overlay District:** | Historic District | | |
| | Neighborhood Conservation | | |
| | Airport Hazard Zone | | |
| | | | |

| | | | |
|---|---|---|---|
| **FLUM Designation** | **FLUM Corridor** | **X** | **15-501 C Predominate Use Type - Residential Townhomes** |
| | | | |

### Section B: Land Area

| | | | SQ. FT. | ACRES |
|---|---|---|---|---|
| **Net Land Area (NLA): Area within zoning lot boundary** | | **NLA =** | **265,222** | **6.088** |
| Chose one or both of the following (a or b), not to exceed 10% of NLA | a) Credited Street Area (total adjacent street frontage) x 1/2 width of public right of way | CSA = | 11,765 | 0.27 |
| | b) Credited Permanent Open Space (total adjacent frontage x 1/2 public or dedicated open space | COS = | 0 | 0.00 |
| **TOTAL: NLA + CSA and/or COS = Gross Land Area (Not to exceed NLA + 10%)** | | **GLA =** | **276,987** | **6.358** |

### Section C: Special Protection Areas, Land Disturbance, and Impervious Area

| | | |
|---|---|---|
| **Special Protection Areas** (Check All That Apply) | Jordan Buffer | |
| | Resource Conservation District | |
| | 100 Year Floodplain | |
| | Watershed Protection District | |

| **Land Disturbance** | **Total (SF)** |
|---|---|
| Area of Land Disturbance: (Includes: Footprint of proposed activity plus work area envelope, staging area for materials, access/equipment paths, and all off-site clearing) | **243,925** |
| Area of Land Disturbance within RCD | 0 |
| Area of Land Disturbance within Jordan Buffer. | 0 |

| **Impervious Areas** | Existing SF | Demolition SF | Proposed SF | Total SF |
|---|---|---|---|---|
| Impervious Surface Area (ISA) | 0 | 0 | **140,575** | **140,575** |
| Impervious Surface Ratio: Percent of Impervious Surface Area of Gross Land Area (ISA/GLA)% | | | | **50.8%** |
| If located in Watershed Protection District, % of impervious surface on 7/1/1993 | N/A | N/A | N/A | N/A |

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

## Summit Place Townhomes. (Updated 8/9/2021)

**Section D: Dimensions - RESIDENTIAL DEVELOPMENT**

**Residential Density Proposed**

| **Dimensional Units (SF)** | | **Existing SF** | **Demolition SF** | **Proposed SF** | **Total SF** |
|---|---|---|---|---|---|
| **Existing Building(s)** | 0 | 0 | 0 | | |
| | | | | | |
| **Proposed Building(s)** | 10 | | | 98,300 | 98,300 |
| Number of Floors | 2 & 3 | | | | |
| Recreational Space | | | | | |

| **Dimensional Units (SF)** | | **Studio** | **1BR** | **2BR** | **3BR+** |
|---|---|---|---|---|---|
| **Proposed Building(s)** | | | | | |
| Total Number Dwelling Units | 52 | | | 36 | 16 |
| Number Market Rate Units | 45 | | | 29 | 16 |
| Number Affordable Units | 7 | | | 7 | |

| **Dimensional Units (SF)** | | Studio | 1BR | 2BR | 3BR+ |
|---|---|---|---|---|---|
| Floor Area Heated (All Units) | | | | 56,804 | 32,560 |
| Floor Area Unheated (All Units) | | | | - | - |
| Total SF All Units | | | | 56,804 | 32,560 |
| Total SF Affordable Units | | | | 9,820 | - |
| | | | | | |

**Section D: Dimensions - NON-RESIDENTIAL DEVELOPMENT**

| **Use Type** | **Existing SF** | **Demolision SF** | **Proposed SF** | **Total SF** | |
|---|---|---|---|---|---|
| Commercial | | | | | |
| Restaurant | | | | | |
| Government | | | | | |
| Institutional | | | | | |
| Medical | | | | | |
| Office | | | | | |
| Hotel | | | | | |
| Industrial | | | | | |
| Place of Worship | | | | | |
| Other/Residential | | | | | |
| **TOTAL** | | | | | |

**Section D: Dimensions - BUILDING HEIGHT & SETBACKS**

| **Requirement _ LUMO** | **R-4 District Standards** | | **Required** | **Existing** | **Proposed** |
|---|---|---|---|---|---|
| **Setbacks - Minimum** | Street | | 22' | n/a | 30' |
| | Interior P/L | Residence Inn | 8' | n/a | 50' |
| | Interior P/L | Summerfield Crossing | 8' | n/a | **112'** |
| | Solar (North) | Church/1F Lots | 9' | n/a | 30' |
| **Height - Maximum** | Primary | | 35' | n/a | n/a |
| | Secondary | | 114' | n/a | 36' |
| **Street** | Frontage | | 80' | n/a | 362' |
| | Width | | 62' | n/a | 362' |

**Section E:** ***DOES NOT EXIST IN APPLICATION***

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

# Summit Place Townhomes (Updated 8/9/2021)

## Section F: ADJOINING OR CONNECTING STREETS AND SIDEWALKS

| Street Name | Right-of-Way Width | Pavement Width | Number of Lanes | Existing Sidewalk* | Existing Curb/Gutter |
|---|---|---|---|---|---|
| Erwin Road | 65' | 22' - 33' | 2 | NO | NO |
| | | | | | |
| | | | | | |

| Proposed Points of Access |
|---|
| New Entrance Road on Erwin Road that will serve both Summit Place Townhomes and Residence Inn Hotel |

* If existing siedwalks do not exist and applicant is adding sidewalks, please provide the following information

| Sidewalk Information | | | | | |
|---|---|---|---|---|---|
| Street Name | Dimensions | Surface | | Handicapped Ramps | |
| Erwin Road | 5' x 360±' | Concrete | | YES | |
| | | | | | |

## Section G: PARKING INFORMATION

| Parking Spaces | Minimum | Maximum | Proposed | Comment |
|---|---|---|---|---|
| Regular Spaces | 79 | 99 | 91 | |
| EV Spaces | - | - | 2 | |
| Handicap Spaces | 2 | 2 | 4 | |
| **Total Residential Parking Spaces** | **81** | **101** | **97** | |
| | | | | |
| Bicycle Spaces | 14 | | 58 | |
| Short Term | 2 | | 6 | |
| Long Term | 12 | | 52 | |
| Loading Spaces | N/A | | NA | Not Necessary |
| | | | | |

## Section H: LANDSCAPE BUFFERS

| Location | | Minimum Width | Proposed Width | Alternate Buffer | Modified Buffer |
|---|---|---|---|---|---|
| North - Christ Community Church | "B" | 10' | 10' | NO | NO |
| North - Single Family Home | "B" | 10' | 35' | NO | NO |
| | | | | | |
| West - Summerfield Crossing | "B" | 10' | **60'** | NO | NO |
| | | | | | |
| South - Hotel | NA | - | N/A | N/A | N/A |
| | | | | | |
| East - Erwin Road | "C" | 20' | 20' | NO | NO |

8/9/2021

**PROJECT FACT SHEET**

**TOWN OF CHAPEL HILL, NC**
**Planning Department**

# Summit Place Townhomes (Updated 8/9/2021)

## Section I: LAND USE INTENSITY

| Zoning - Area - Ratio | | | Impervious Surface Thresholds | | | Minimum & Maximum Limitations | |
|---|---|---|---|---|---|---|---|
| Zoning District | Floor Area Ratio (FAR) | Recreation Space Ratio (RSR) | Low Density Residential (0.24) | High Density Residential (0.50) | Non-Residential (0.70) | Maximum Floor Area (MFA) = FAR x GLA | Minimum Recreation Space (MRS) = RSR x GLA |
| | | | | | | | |
| MU-V Collector | 1.2 | | | | **193,890** | **332,384** | **12,741** |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

## Section J: UTILITY SERVICE

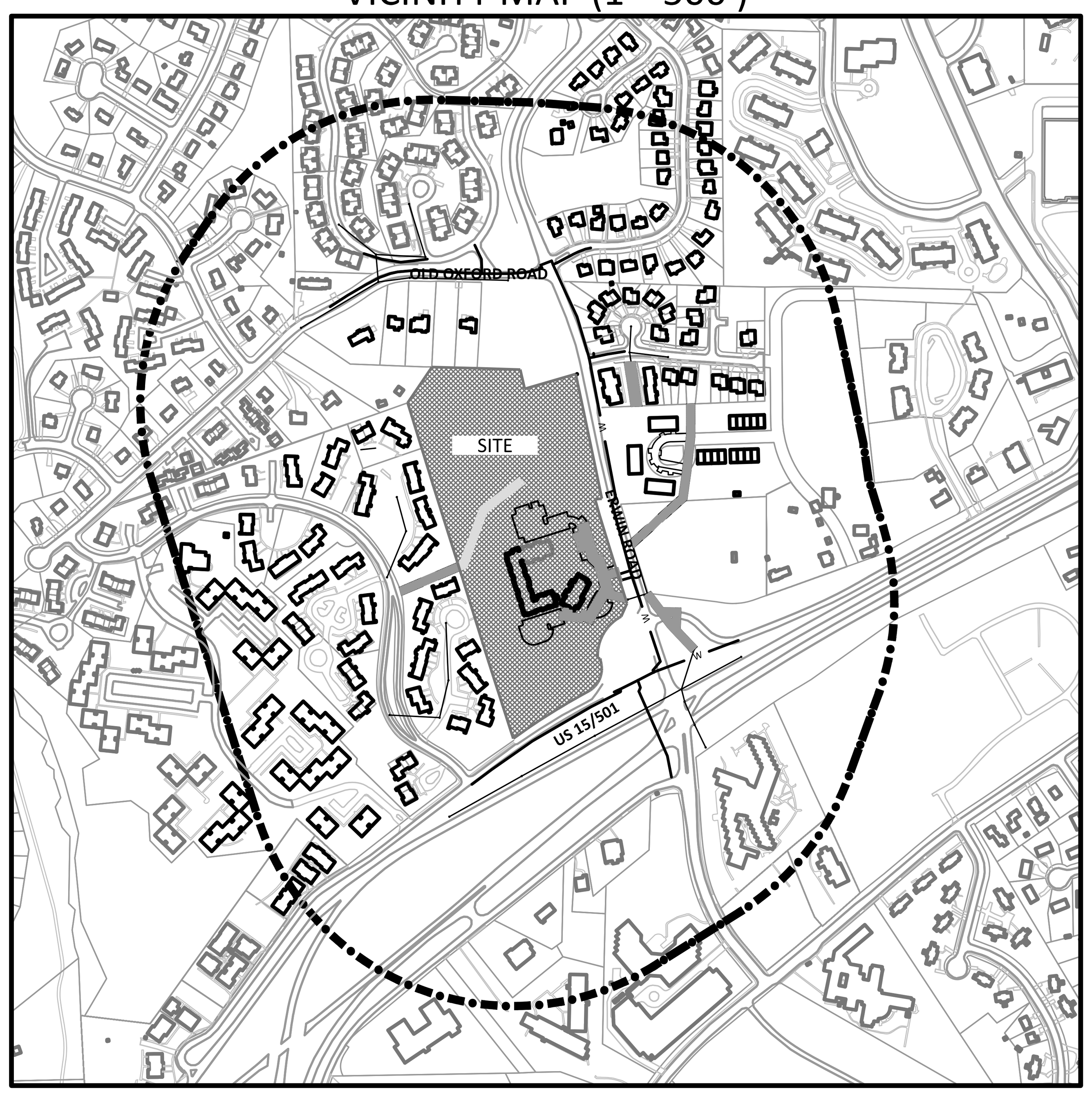
Check all that apply:

| | | | |
|---|---|---|---|
| Water | **Owasa** | | |
| Sewer | **Owasa** | | |
| Electrical | **Duke Energy** | | |
| Telephone | **Underground** | | |
| Other Communication | **Underground Satellite** | | |
| Solid Waste | **TOCH** | | |
| Recycling | **Orange CO** | | |
| Gas | **Dominion Energy** | | |
| | | | |

184

# RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES

VICINITY MAP (1"=500')




101-111 ERWIN ROAD
CHAPEL HILL, NC
PARCEL PINs:
9799-48-1814
9799-48-0252

OCTOBER 29, 2020
REVISED FEBRUARY 4, 2021
REVISED MARCH 26, 2021
REVISED MAY 10, 2021
REVISED AUGUST 9, 2021
REVISED SEPTEMBER 16, 2021

APPLICANT/PROPERTY OWNER

SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

**SHEET INDEX**

| SHEET NO. | SHEET NAME | MOST CURRENT REVISION DATE |
|---|---|---|
| C1.0 | AREA PLAN | 3/26/2021 |
| C1.1 | EXISTING CONDITIONS PLAN | 9/16/2021 |
| C1.2 | SLOPE ANALYSIS PLAN | 5/10/2021 |
| C2.0 | OVERALL LAYOUT PLAN | 9/16/2021 |
| C2.1 | HOTEL LAYOUT PLAN | 9/16/2021 |
| C2.2 | RESIDENTIAL LAYOUT PLAN | 9/16/2021 |
| C2.3 | HOTEL EASEMENT PLAN | 9/16/2021 |
| C2.4 | RESIDENTIAL EASEMENT PLAN | 9/16/2021 |
| C2.5 | RECREATION EXHIBIT | 8/9/2021 |
| C3.0 | OVERALL UTLITY PLAN | 9/16/2021 |
| C3.1 | HOTEL UTILITY PLAN | 9/16/2021 |
| C3.2 | RESIDENTIAL UTILITY PLAN | 9/16/2021 |
| C4.0 | OVERALL GRADING-DRAINAGE PLAN | 9/16/2021 |
| C4.1 | HOTEL GRADING PLAN | 9/16/2021 |
| C4.2 | RESIDENTIAL GRADING PLAN | 9/16/2021 |
| C5.1 | EROSION CONTROL PLAN | 9/16/2021 |
| C6.0 | ROAD WIDENING PLAN | 8/9/2021 |
| C7.1 | CONSTRUCTION SEQUENCING PLAN | 8/9/2021 |
| C8.0 | POND GRADING AND DETAILS | 8/9/2021 |
| DA1.0 | PRE-DEVELOPMENT DRAINAGE AREA PLAN | 9/16/2021 |
| DA2.1 | POST-DEVELOPMENT CONDITION 1 DRAINAGE AREA PLAN | 9/16/2021 |
| DA2.2 | POST-DEVELOPMENT CONDITION 2 DRAINAGE AREA PLAN | 9/16/2021 |
| D1.1 | SITE DETAILS | 10/29/2020 |
| D2.1 | STORM DRAINAGE DETAILS | 10/29/2020 |
| D3.1 | EROSION CONTROL DETAILS | 10/29/2020 |
| D4.1 | OWASA WATER DETAILS | 10/29/2020 |
| D5.1 | OWASA SEWER DETAILS | 10/29/2020 |

**PLANS BY SITE COLLABORATIVE**

| SHEET NO. | SHEET NAME | MOST CURRENT REVISION DATE |
|---|---|---|
| L400 | LANDSCAPE PROTECTION PLAN | --- |
| L401 | LANDSCAPE PROTECTION PLAN | --- |
| L402 | EASEMENT EXHIBIT | --- |
| L403 | LANDSCAPE PROTECTION PLAN (RESIDENTIAL) | --- |
| L404 | LANDSCAPE PROTECTION PLAN (HOTEL) | --- |
| L500 | LANDSCAPE PLAN (RESIDENTIAL) | --- |
| L501 | LANDSCAPE PLAN (HOTEL) | --- |
| L502 | LANDSCAPE DETAILS AND NOTES | --- |

**PLANS BY J DAVIS ARCHITECTS**

| SHEET NO. | SHEET NAME | MOST CURRENT REVISION DATE |
|---|---|---|
| A1.01 | TOWNHOME HEIGHT/BULK SECTIONS | 2/4/2021 |
| A1.02 | TOWNHOME AND HOTEL HEIGHT/BULK SECTIONS | 2/4/2021 |

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS

9/16/2021

JDAVIS

SITE COLLABORATIVE
analysis + engagement + planning + design
www.sitecollaborative.com

RADWAY DESIGN ASSOCIATES, PA

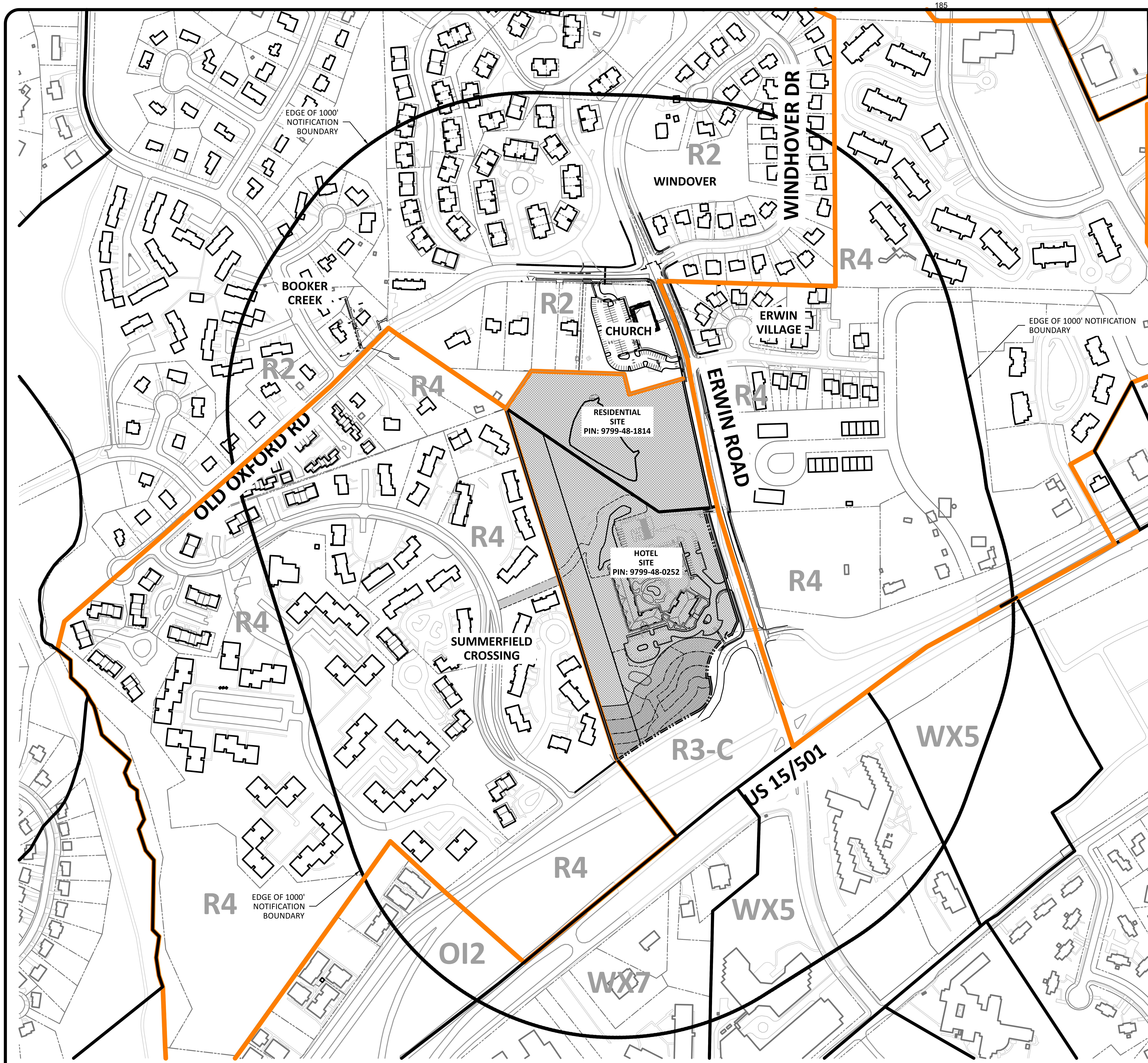
2627 Meacham Road
Chapel Hill NC 27516

City Planning and Land Development Consultants

The Nau Company
Consulting Civil Engineers

PO Box 810 | Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION




200 0 100 200 400

SCALE: 1"=200'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION


The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751


CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

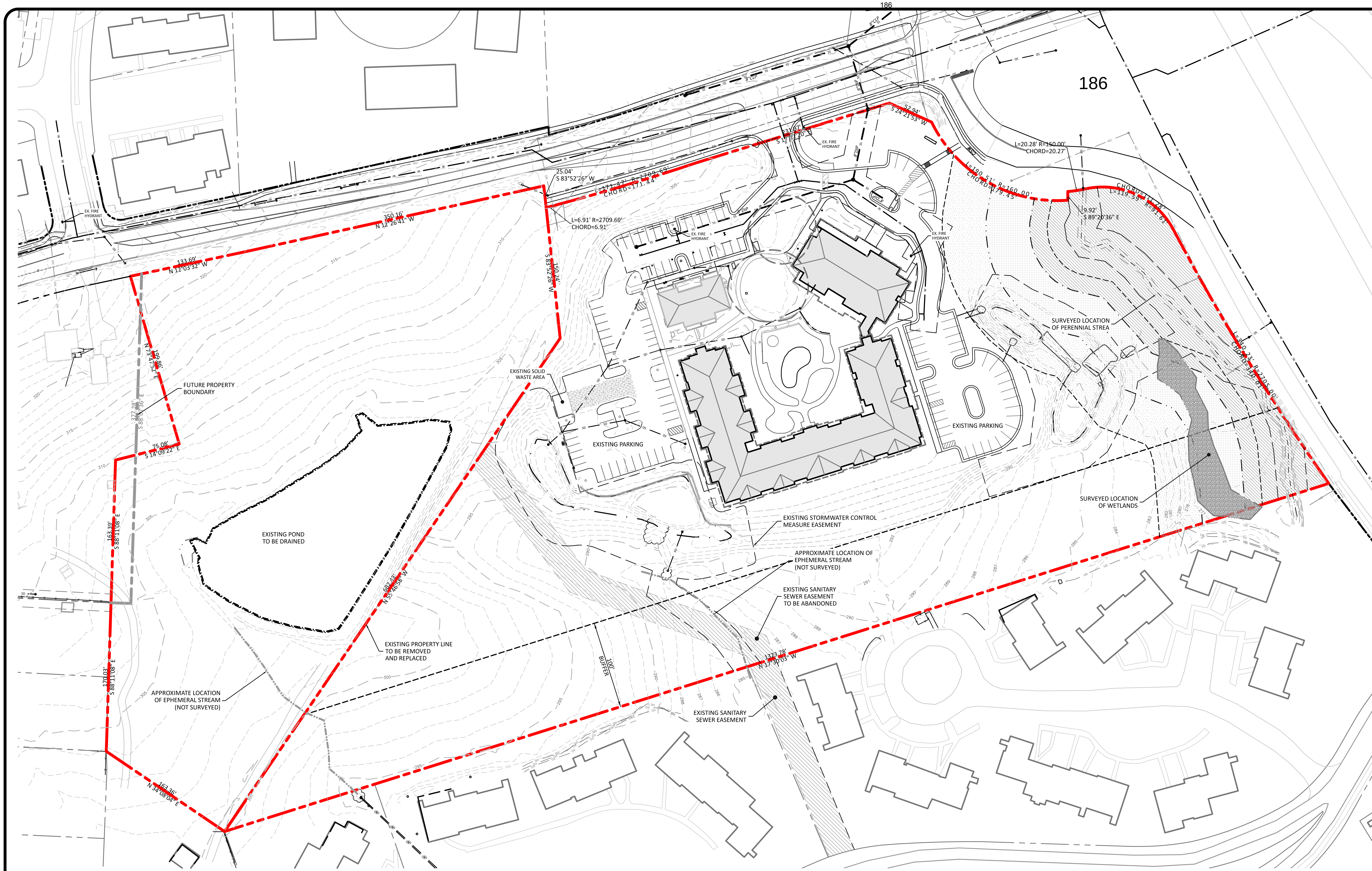
| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

AREA MAP

| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | 1"=200' |
| DATE: | 2020-10-29 |
| SHEET NO: | C1.0 |




## EXISTING CONDITIONS SOURCES

1. THE PROPERTY BOUNDARY WAS TAKEN FROM AN ELECTRONIC CAD FILE PROVIDED BY: ROBINSON AND PLANTE LAND SURVEYING
2. EXISTING TOPOGRAPHY WAS TAKEN FROM AN ELECTRONIC CAD FILE PROVIDED BY: ROBINSON AND PLANTE LAND SURVEYING. TOPOGRAPHY OUTSIDE THE LIMITS OF THE FIELD SURVEY HAVE BEEN SUPPLEMENTED WITH GIS TOPOGRAPHY WITH A 2 FOOT CONTOUR INTERVAL.
3. EXISTING STORM DRAINAGE AND SANITARY SEWER LOCATIONS AND INVERTS WERE TAKEN FROM A CAD FILE PROVIDED BY: ROBINSON AND PLANTE LAND SURVEYING
4. EXISTING BUILDINGS, PARKING AREAS, SIDEWALKS AND OTHER SIMILAR SITE FEATURES WERE TAKEN FROM CAD FILES PROVIDED BY ROBINSON AND PLANTE LAND SURVEYING AS WELL AS DESIGN FILES AND AS-BUILT FILES FOR THE EXISTING RESIDENCE INN SITE PROVIDED BY OTHERS

## ENVIRONMENTAL CONDITIONS NOTES

1. PARCEL 9799-48-1814 EPHEMERAL STREAM DETERMINATION BY TOWN OF CHAPEL HILL, NC. 9/19/2016 - LETTER SUBMITTED WITH APPLICATION
2. PARCEL 9799-48-1814 THERE ARE NO WATERS OF THE US INCLUDING WETLANDS PRESENT ON THIS PARCEL BASED ON THE US ARMY CORPS OF ENGINEERS NOTICE OF JURISDICTIONAL DETERMINATION ACTION ID SAW-2016-01347 DATED NOVEMBER 8, 2016
3. FOR PARCEL 9799-48-0252, THE EPHEMERAL STREAM & PERENNIAL STREAMS ARE SUBJECT TO JORDAN LAKE BUFFER RULES AS DETERMED BY THE TOWN OF CHAPEL HILL, NC IN LETTER DATED 2/9/2021. THIS LETTER WAS SUBMITTED WITH THE APPLICATION
4. STREAM LOCATIONS ARE APPROXIMATE AND BASED UPON TOWN OF CHAPEL HILL MAPPING
5. THIS PROPERTY IS NOT LOCATED IN A FLOODPLAIN PER FEMA MAP # 3710979900L DATED JANUARY 19, 2019
6. WETLANDS AS DETERMINED BY U.S. ARMY CORPS OF ENGINEERS (USACE), VERIFIED BY DELINEATION IN A MAY 5, 2021 EMAIL TO BOB ZARZECKI, SOIL & ENVIRONMENTAL CONSULTANTS, PA. A DETERMINATION MADE PURSUANT TO A REQUEST BY THE PROPERTY OWNER FOR A WETLANDS DETERMINATION AND JURISDICTIONAL DETERMINATION FOLLOWING THE RECEIPT OF A TOWN OF CHAPEL HILL STREAM DETERMINATION AS DETAILED IN NOTE #3 ABOVE. THE WETLAND BOUNDARY IS STAKED AND FLAGGED. A SURVEY IS SCHEDULE FOR THE END OF MAY TO COINCIDE WITH THE COMPLETION OF AND INSPECTION OF THE IMPROVEMENTS TO EXISTING STORMWATER BASIN #2.

60 0 30 60 120
SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

| REVISIONS | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

EXISTING CONDITIONS PLAN

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=60'
DATE: 2020-10-29
SHEET NO: C1.1


## STEEP SLOPE NOTES

1. STEEP SLOPES IN AREAS A, B, C & D WERE CREATED BY FARM ROADS
2. STEEP SLOPES IN AREA 3 WERE CREATED WHEN THE FARM POND WAS CREATED
3. STEEP SLOPES IN AREAS 1 & 2 ARE THE RESULT OF PARKING LOT AND STORMWATER MANAGEMENT FACILITY CONSTRUCITON FOR THE EXISTING RESIDENCE IN HOTEL

**STEEP SLOPES DATA**

| | SLOPES AT DRIVES, PARKING, MAN MADE POND AND STORMWATER BASINS | | | FREE STANDING STEEP SLOPED AREAS | | | | |
|---|---|---|---|---|---|---|---|---|
| CATEGORY OF SLOPE | AREA 1 | AREA 2 | AREA 3 | AREA A | AREA B | AREA C | AREA D | TOTAL |
| AREA 15% TO 25% | 5,322 | 8,788 | 2,627 | 0 | 0 | 1,147 | 487 | 18,371 |
| AREA >25% | 3,047 | 4,972 | 7,502 | 581 | 481 | 1,549 | 1,253 | 19,385 |
| TOTAL STEEP SLOPE | 8,369 | 13,760 | 10,129 | 581 | 481 | 2,696 | 1,740 | 37,756 |
| EXEMPT STEEP SLOPE PER LUMO 5.3.2(c)(3) | 8,369 | 13,760 | 0 | 0 | 0 | 0 | 0 | 22,129 |
| AREA SUBJECT TO 25% SLOPE DISTURBANCE LIMITATION | | | 7,502 | 581 | 481 | 1,549 | 1,253 | 11,366 |
| PROPOSED STEEP SLOPE DISTURBANCE | | | 7,502 | 581 | 481 | 1,549 | 0 | 10,113 |
| DISTURBANCE IN EXCESS OF 25% | | | | | | | | 7,271 |
| * ALL AREAS IN SQUARE FEET | | | | | | | | |

SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

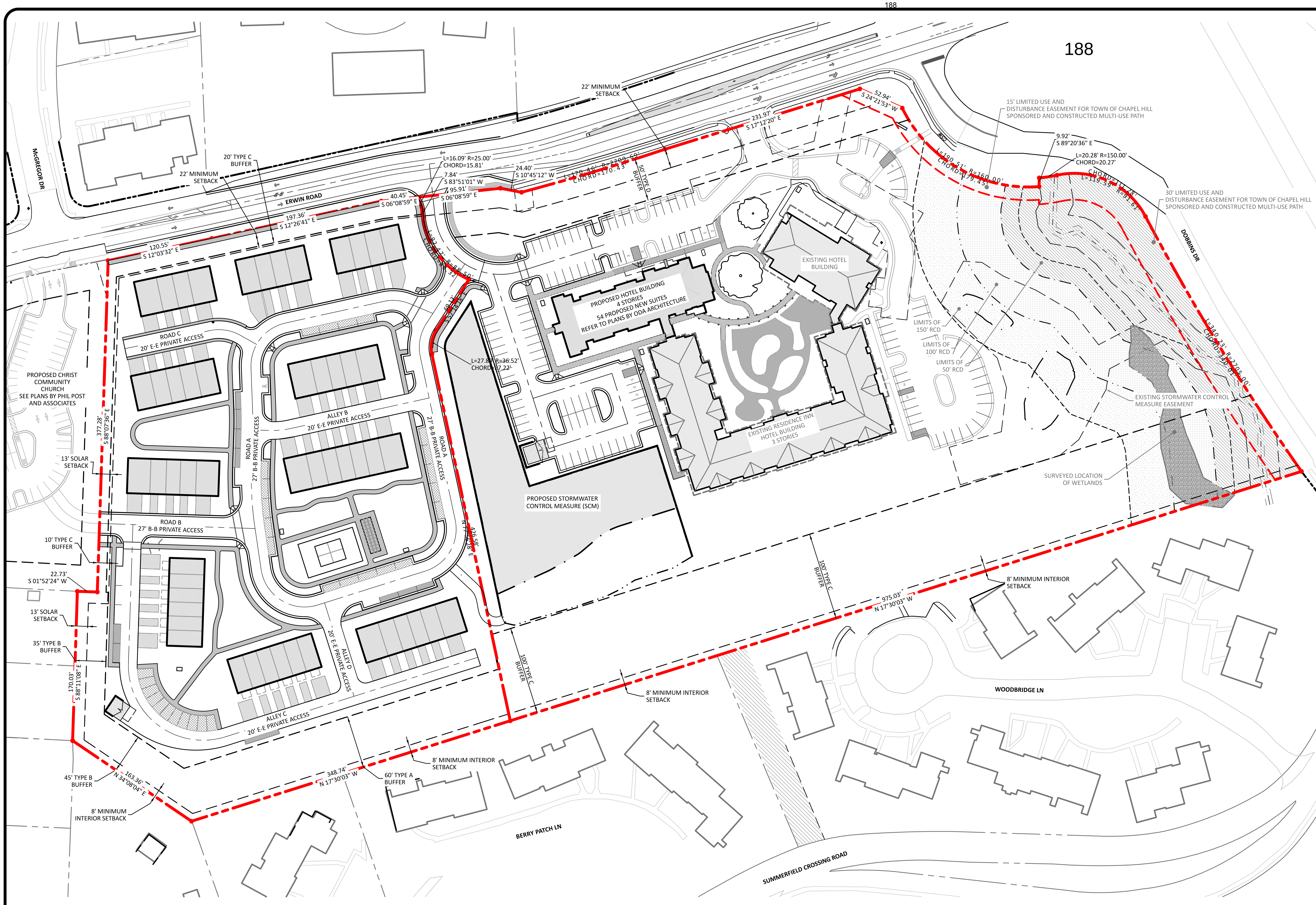
| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

SLOPE ANALYSIS PLAN

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=60'
DATE: 2020-10-29
SHEET NO: C1.2




## GENERAL NOTES

1. THE BUILDING FOOTPRINT FOR THE HOTEL BUILDING WAS TAKEN FROM A CAD FILE PROVIDED BY ODA ARCHITECTURE
2. THE BUILDING FOOTPRINTS FOR THE RESIDENTAIL BUILDINGS WERE TAKEN FROM INFORMATION PROVIDED BY JDAVIS ARCHITECTS
3. THE LAYOUT FOR THE CHRIST COMMUNITY CHURCH PARCEL WAS TAKEN FROM A CAD FILE PROVIDED BY PHIL POST AND ASSOCIATES

## TOWN INSPECTION NOTES

1. A FIRE HYDRANT WILL BE REQUIRED WITHIN 100 FEET OF THE FIRE DEPARTMENT CONNECTION (FDC) ON THE NEW BUILDING. THE LOCATION OF THE FDC WILL BE DETERMINED AS ARCHITECTURE IS DEVELOPED FOR THE NEW HOTEL BUILDING.
2. WRITTEN APPROVAL FROM OWASA WILL BE REQUIRED FOR THE INSTALLATION OF BACKFLOW PREVENTERS, GREASE TRAPS, OIL/WATER SEPARATORS, WATER METERS, OR ELEVATOR SUMP PUMPS.
3. ANY RETAINING WALLS OVER 5 FEET HIGH SHALL BE PERMITTED SEPARATELY FROM THE BUILDINGS AND MUST BE SIGNED BY A QUALIFIED DESIGN PROFESSIONAL
4. ONSITE PARKING FOR INSPECTORS WILL BE REQUIRED FOR THE DURATION OF THE CONSTRUCTION PROJECT.
5. A TIRE WASH FOR TRUCKS WILL BE PROVIDED DURING CONSTRUCTION.
6. CURB AND GUTTER AND THE FIRST LIFT OF ASPHALT WILL BE INSTALLED BEFORE BUILDING CONSTRUCTION.
7. PRIOR TO AN ISSUANCE OF A CERTIFICATE OF OCCUPANCY, HANDICAP PARKING SPACES, RAMPS, CROSSWALKS AND ASSOCIATED INFRASTRUCTURE DESIGNED IN ACCORDANCE WITH ADA STANDARDS WILL BE PROVIDED.
8. A SEPARATE SUBMITTAL AND PERMIT ARE REQUIRED FOR A CONSTRUCTION TRAILER
9. THE NEW HOTEL BUILDING MUST HAVE SPRINKLER PROTECTION
10. AN EXTERIOR DOOR WILL BE REQUIRED FOR ACCESS TO THE FIRE SPRINKLER RISER ROOM.
11. A FIRE SPRINKLER SYSTEM WILL BE INSTALLED IN EACH NEW BUILDING
12. A FIRE DEPARTMENT KEY BOX WILL BE REQUIRED IN EACH RISER ROOM
13. THE BUILDING TO BE DEMOLISHED SHALL HAVE ASBESTOS TETSING/ABATEMENT PER NORTH CAROLINA STATE LAW
14. THE NEW HOTELS AND COMMON AREAS FOR TOWNHOMES MUST BE ACCESSIBLE

## TOWN ENGINEERING DEPARTMENT NOTES

1. ROADS WITHCURB AND GUTTER AND THE FIRST LIFT OF ASPHALT SHALL BE IN PLACE BEFORE CONBUSTUBLES ARE ON SITE IN ORDER TO MEET REQUIREMENTS FROM FIRE CODE, STORMWATER AND OWASA
2. AREAS WITH ACTIVE CONSTRUCTION SHALL HAVE WORKING FIRE HYDRANTS

## STORMWATER ACCESS NOTE

ACCESS TO THE BERM FOR THE STORMWATER CONTROL MEASURE WILL BE THROUGH THE RESIDENTIAL AREA AT THE SOUTH END OF ALLEY C

## DEVELOPMENT DATA

| | TOTAL | HOTEL | TH |
|---|---|---|---|
| EXISTING ZONING | -- | R-3 C | R-2 |
| PROPOSED ZONING | MU-V CZ ARTERIAL | MU-V CZ ARTERIAL | MU-V CZ ARTERIAL |
| NET LAND AREA | 713,930 SF | 448,708 SF | 265,222 SF |
| GROSS LAND AREA | 770,566 SF | 493,579 SF | 276,987 SF |
| CURRENT LAND USE | -- | HOTEL | -- |
| CURRENT LAND USE GROUP | B | B | -- |
| PROPOSED LAND USE GROUP | A&B | B | A |
| EXISTING FLOOR AREA | 79,120 SF | 79,120 SF | 0 |
| FLOOR AREA TO BE DEMOLISHED | 6,000 SF | 6,000 SF | 0 |
| PROPOSED TOTAL FLOOR AREA | 211,913 SF | 113,613 SF | 98,300 SF |
| PROPOSED HOTEL SUITES | 162 | 162 | -- |
| PROPOSED TOWNHOMES | 52 | -- | 52 |
| PROPOSED PARKING SPACES | 236 | 139 | 97 |
| REGULAR | 219 | 128 | 91 |
| ADA | 11 | 7 | 4 |
| EV STATIONS AT CO | 6 | 4 | 2 |
| HOTEL: 12 "REGULAR" AND 2 ADA SPACES WILL BE PREPARED WITH CONDUIT FOR EV | | | |
| ALL 52 TOWNHOMES WILL BE EV STATION READY AT CO | | | |
| REQUIRED BICYCLE PARKING | 25 | 12 | 13 |
| PROPOSED BICYCLE PARKING | 71 | 13 | 58 |
| CLASS 1 - PROVIDED (REQ) | 16 (11) | 10 (9) | 6 (2) |
| CLASS 2 - PROVIDED (REQ) | 55 (15) | 3 (3) | 52 (12) |
| EXISTING IMPERVIOUS | 111,700 SF | 111,700 SF | -- |
| PROPOSED IMPERVIOUS | 267,125 SF | 126,550 SF | 140,575 SF |
| PERCENT OF SITE IMPERVIOUS | 34.7% | 25.6% | 50.8% |
| TOTAL DISTURBED AREA ONSITE | 363,425 SF | 119,500 SF | 243,925 SF |
| TOTAL DISTURBED AREA IN R/W FOR ROAD IMPROVEMENTS | 51,600 SF | -- | -- |

## BUILDING SETBACK STANDARDS AND PROPOSED SETBACKS

| FROM | TO | MINIMUM | PROPOSED |
|---|---|---|---|
| RESIDENCE INN HOTEL | DOBBINS DR | 0' | 135' |
| RESIDENCE INN HOTEL | SUMMERFIELD CROSSING | 8' | 182' |
| RESIDENCE INN HOTEL | ERWIN ROAD | 22' | 108' |
| SUMMIT TOWNHOMES | SUMMERFIELD CROSSING | 8' | 112' |
| SUMMIT TOWNHOMES | OLD OXFORD SF HOMES | 13' | 105' |
| SUMMIT TOWNHOMES | CHRIST COMMUNITY CHURCH | 13' | 30' |
| SUMMIT TOWNHOMES | ERWIN ROAD | 22' | 30' |

## BUFFER STANDARDS - TYPE AND WIDTHS

| FROM | TO | TYPE | MINIMUM | PROPOSED |
|---|---|---|---|---|
| RESIDENCE INN HOTEL | DOBBINS DR/FORDHAM | D | 30' | 35'-250' |
| RESIDENCE INN HOTEL | SUMMERFIELD CROSSING | C | 20' | 100' |
| RESIDENCE INN HOTEL | ERWIN ROAD | D | 30' | 50' |
| SUMMIT TOWNHOMES | SUMMERFIELD CROSSING | B | 10' | 60' |
| SUMMIT TOWNHOMES | OLD OXFORD SF HOMES | B | 10' | 35' |
| SUMMIT TOWNHOMES | CHRIST COMMUNITY CHURCH | C | 10' ** | 10' |
| SUMMIT TOWNHOMES | ERWIN ROAD | C | 20' | 20' |

** PER LUMO 5.6.5 - RESPONSIBILITY FOR BUFFER

SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

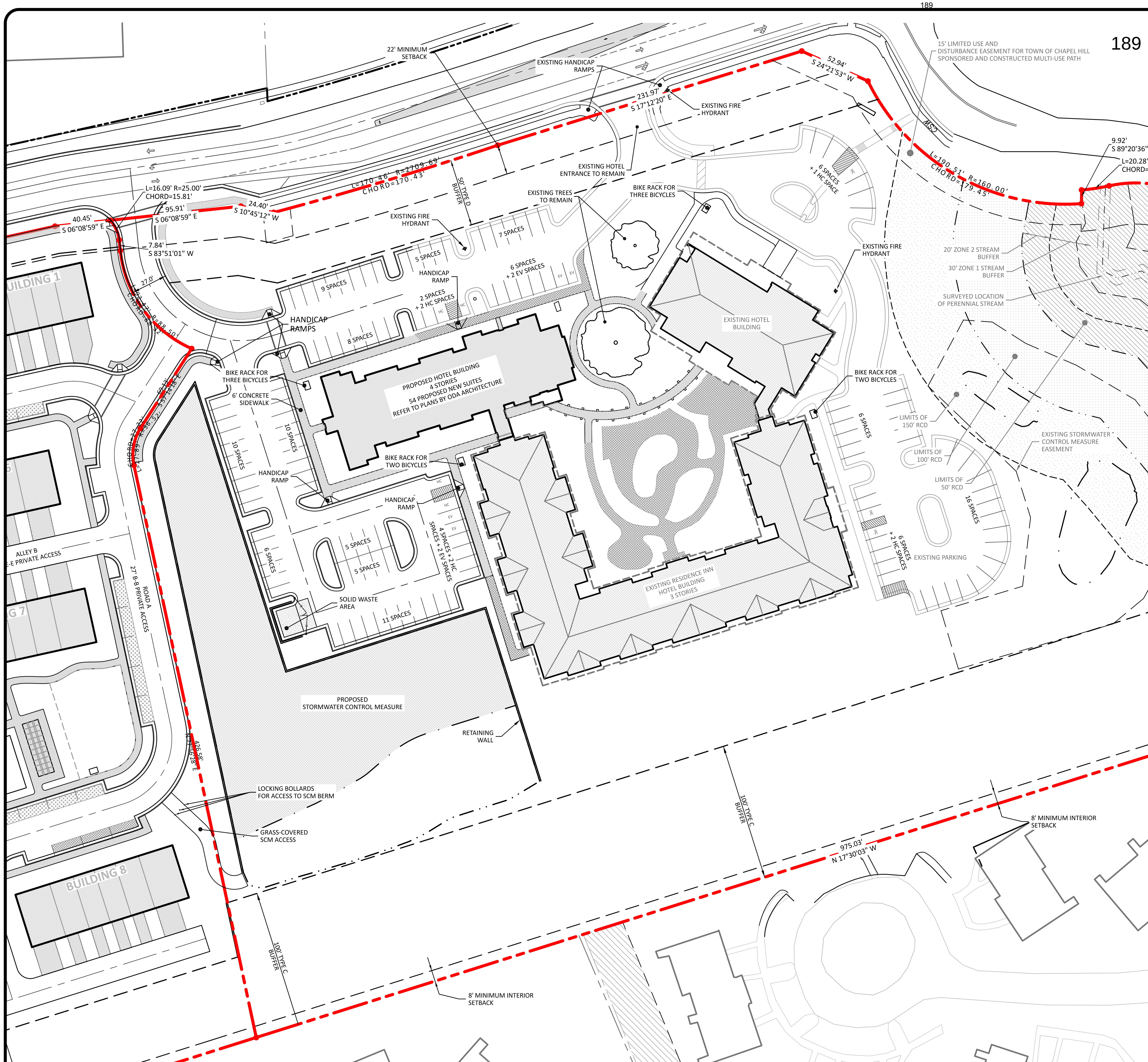
| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC

# OVERALL LAYOUT PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=60'
DATE: 2020-10-29
SHEET NO: C2.0




SITE PLAN LEGEND

- PROPERTY BOUNDARY
- PERIMETER BUFFER
- PARKING LOT CENTERLINE

## GENERAL NOTES

1. THE BUILDING FOOTPRINT FOR THE HOTEL BUILDING WAS TAKEN FROM A CAD FILE PROVIDED BY ODA ARCHITECTURE
2. THE BUILDING FOOTPRINTS FOR THE RESIDENTAIL BUILDINGS WAS TAKEN FROM A CAD FILE PROVIDED BY JDAVIS ARCHITECTS
3. THE LAYOUT FOR THE CHRIST COMMUNITY CHURCH PARCEL WAS TAKEN FROM A CAD FILE PROVIDED BY PHIL POST AND ASSOCIATES

## ELECTRIC VEHICLE NOTES

DUE TO THE RAPIDLY CHANGING TECHNOLOGY FOR ELECTRIC VEHICLE CHARGING, MODELS AND SPECIFICATIONS FOR CHARGING STATIONS WILL BE PROVIDED AT A DATE CLOSER TO THE INSTALLATION OF THE CHARGING STATIONS.

## DEVELOPMENT DATA

| | TOTAL | HOTEL | TH |
|---|---|---|---|
| EXISTING ZONING | -- | R-3 C | R-2 |
| PROPOSED ZONING | MU-V CZ ARTERIAL | MU-V CZ ARTERIAL | MU-V CZ ARTERIAL |
| NET LAND AREA | 713,930 SF | 448,708 SF | 265,222 SF |
| GROSS LAND AREA | 770,566 SF | 493,579 SF | 276,987 SF |
| CURRENT LAND USE | -- | HOTEL | -- |
| CURRENT LAND USE GROUP | B | B | -- |
| PROPOSED LAND USE GROUP | A&B | B | A |
| EXISTING FLOOR AREA | 79,120 SF | 79,120 SF | 0 |
| FLOOR AREA TO BE DEMOLISHED | 6,000 SF | 6,000 SF | 0 |
| PROPOSED TOTAL FLOOR AREA | 211,913 SF | 113,613 SF | 98,300 SF |
| PROPOSED HOTEL SUITES | 162 | 162 | -- |
| PROPOSED TOWNHOMES | 52 | -- | 52 |
| PROPOSED PARKING SPACES | 236 | 139 | 97 |
| REGULAR | 219 | 128 | 91 |
| ADA | 11 | 7 | 4 |
| EV STATIONS AT CO | 6 | 4 | 2 |
| HOTEL: 12 "REGULAR" AND 2 ADA SPACES WILL BE PREPARED WITH CONDUIT FOR EV | | | |
| ALL 52 TOWNHOMES WILL BE EV STATION READY AT CO | | | |
| REQUIRED BICYCLE PARKING | 25 | 12 | 13 |
| PROPOSED BICYCLE PARKING | 71 | 13 | 58 |
| CLASS 1 - PROVIDED (REQ) | 16 (11) | 10 (9) | 6 (2) |
| CLASS 2 - PROVIDED (REQ) | 55 (15) | 3 (3) | 52 (12) |
| EXISTING IMPERVIOUS | 111,700 SF | 111,700 SF | -- |
| PROPOSED IMPERVIOUS | 267,125 SF | 126,550 SF | 140,575 SF |
| PERCENT OF SITE IMPERVIOUS | 34.7% | 25.6% | 50.8% |
| TOTAL DISTURBED AREA ONSITE | 363,425 SF | 119,500 SF | 243,925 SF |
| TOTAL DISTURBED AREA IN R/W FOR ROAD IMPROVEMENTS | 51,600 SF | -- | -- |

## BUILDING SETBACK STANDARDS AND PROPOSED SETBACKS

| FROM | TO | MINIMUM | PROPOSED |
|---|---|---|---|
| RESIDENCE INN HOTEL | DOBBINS DR | 0' | 135' |
| RESIDENCE INN HOTEL | SUMMERFIELD CROSSING | 8' | 182' |
| RESIDENCE INN HOTEL | ERWIN ROAD | 22' | 108' |
| SUMMIT TOWNHOMES | SUMMERFIELD CROSSING | 8' | 112' |
| SUMMIT TOWNHOMES | OLD OXFORD SF HOMES | 13' | 105' |
| SUMMIT TOWNHOMES | CHRIST COMMUNITY CHURCH | 13' | 30' |
| SUMMIT TOWNHOMES | ERWIN ROAD | 22' | 30' |

## BUFFER STANDARDS - TYPE AND WIDTHS

| FROM | TO | TYPE | MINIMUM | PROPOSED |
|---|---|---|---|---|
| RESIDENCE INN HOTEL | DOBBINS DR/FORDHAM | D | 30' | 35'-250' |
| RESIDENCE INN HOTEL | SUMMERFIELD CROSSING | C | 20' | 100' |
| RESIDENCE INN HOTEL | ERWIN ROAD | D | 30' | 50' |
| SUMMIT TOWNHOMES | SUMMERFIELD CROSSING | B | 10' | 60' |
| SUMMIT TOWNHOMES | OLD OXFORD SF HOMES | B | 10' | 35' |
| SUMMIT TOWNHOMES | CHRIST COMMUNITY CHURCH | C | 10' ** | 10' |
| SUMMIT TOWNHOMES | ERWIN ROAD | C | 20' | 20' |

** PER LUMO 5.6.5 - RESPONSIBILITY FOR BUFFER

40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION


The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751


CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

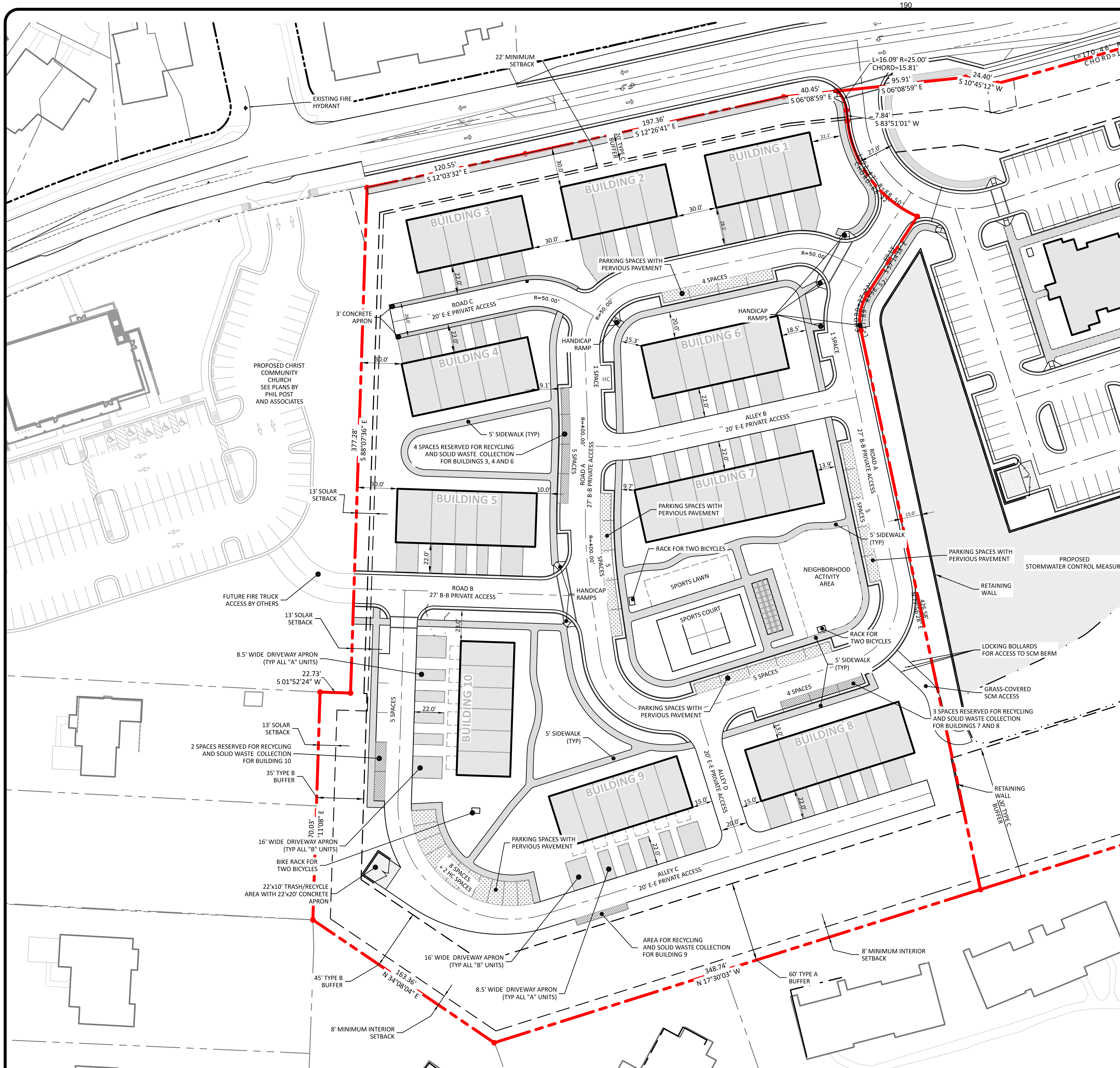
REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC
HOTEL LAYOUT PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=40'
DATE: 2020-10-29
SHEET NO: C2.1




190

SITE PLAN LEGEND

| | |
|---|---|
| PROPERTY BOUNDARY | |
| PERIMETER BUFFER | |
| ROAD CENTERLINE | |

## GENERAL NOTES

1. THE BUILDING FOOTPRINT FOR THE HOTEL BUILDING WAS TAKEN FROM A CAD FILE PROVIDED BY ODA ARCHITECTURE
2. THE BUILDING FOOTPRINTS FOR THE RESIDENTAIL BUILDINGS WAS TAKEN FROM A CAD FILE PROVIDED BY JDAVIS ARCHITECTS
3. THE LAYOUT FOR THE CHRIST COMMUNITY CHURCH PARCEL WAS TAKEN FROM A CAD FILE PROVIDED BY PHIL POST AND ASSOCIATES

## ELECTRIC VEHICLE NOTES

DUE TO THE RAPIDLY CHANGING TECHNOLOGY FOR ELECTRIC VEHICLE CHARGING, MODELS AND SPECIFICATIONS FOR CHARGING STATIONS WILL BE PROVIDED AT A DATE CLOSER TO THE INSTALLATION OF THE CHARGING STATIONS.

## DEVELOPMENT DATA

| | TOTAL | HOTEL | TH |
|---|---|---|---|
| EXISTING ZONING | -- | R-3 C | R-2 |
| PROPOSED ZONING | MU-V CZ ARTERIAL | MU-V CZ ARTERIAL | MU-V CZ ARTERIAL |
| NET LAND AREA | 713,930 SF | 448,708 SF | 265,222 SF |
| GROSS LAND AREA | 770,566 SF | 493,579 SF | 276,987 SF |
| CURRENT LAND USE | -- | HOTEL | -- |
| CURRENT LAND USE GROUP | B | B | -- |
| PROPOSED LAND USE GROUP | A&B | B | A |
| EXISTING FLOOR AREA | 79,120 SF | 79,120 SF | 0 |
| FLOOR AREA TO BE DEMOLISHED | 6,000 SF | 6,000 SF | 0 |
| PROPOSED TOTAL FLOOR AREA | 211,913 SF | 113,613 SF | 98,300 SF |
| PROPOSED HOTEL SUITES | 162 | 162 | -- |
| PROPOSED TOWNHOMES | 52 | -- | 52 |
| PROPOSED PARKING SPACES | 236 | 139 | 97 |
| REGULAR | 219 | 128 | 91 |
| ADA | 11 | 7 | 4 |
| EV STATIONS AT CO | 6 | 4 | 2 |
| HOTEL: 12 "REGULAR" AND 2 ADA SPACES WILL BE PREPARED WITH CONDUIT FOR EV | | | |
| ALL 52 TOWNHOMES WILL BE EV STATION READY AT CO | | | |
| REQUIRED BICYCLE PARKING | 25 | 12 | 13 |
| PROPOSED BICYCLE PARKING | 71 | 13 | 58 |
| CLASS 1 - PROVIDED (REQ) | 16 (11) | 10 (9) | 6 (2) |
| CLASS 2 - PROVIDED (REQ) | 55 (15) | 3 (3) | 52 (12) |
| EXISTING IMPERVIOUS | 111,700 SF | 111,700 SF | -- |
| PROPOSED IMPERVIOUS | 267,125 SF | 126,550 SF | 140,575 SF |
| PERCENT OF SITE IMPERVIOUS | 34.7% | 25.6% | 50.8% |
| TOTAL DISTURBED AREA ONSITE | 363,425 SF | 119,500 SF | 243,925 SF |
| TOTAL DISTURBED AREA IN R/W FOR ROAD IMPROVEMENTS | 51,600 SF | -- | -- |

## BUILDING SETBACK STANDARDS AND PROPOSED SETBACKS

| FROM | TO | MINIMUM | PROPOSED |
|---|---|---|---|
| RESIDENCE INN HOTEL | DOBBINS DR | 0' | 135' |
| RESIDENCE INN HOTEL | SUMMERFIELD CROSSING | 8' | 182' |
| RESIDENCE INN HOTEL | ERWIN ROAD | 22' | 108' |
| SUMMIT TOWNHOMES | SUMMERFIELD CROSSING | 8' | 112' |
| SUMMIT TOWNHOMES | OLD OXFORD SF HOMES | 13' | 105' |
| SUMMIT TOWNHOMES | CHRIST COMMUNITY CHURCH | 13' | 30' |
| SUMMIT TOWNHOMES | ERWIN ROAD | 22' | 30' |

## BUFFER STANDARDS - TYPE AND WIDTHS

| FROM | TO | TYPE | MINIMUM | PROPOSED |
|---|---|---|---|---|
| RESIDENCE INN HOTEL | DOBBINS DR/FORDHAM | D | 30' | 35'-250' |
| RESIDENCE INN HOTEL | SUMMERFIELD CROSSING | C | 20' | 100' |
| RESIDENCE INN HOTEL | ERWIN ROAD | D | 30' | 50' |
| SUMMIT TOWNHOMES | SUMMERFIELD CROSSING | B | 10' | 60' |
| SUMMIT TOWNHOMES | OLD OXFORD SF HOMES | B | 10' | 35' |
| SUMMIT TOWNHOMES | CHRIST COMMUNITY CHURCH | C | 10' ** | 10' |
| SUMMIT TOWNHOMES | ERWIN ROAD | C | 20' | 20' |

** PER LUMO 5.6.5 - RESPONSIBILITY FOR BUFFER

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

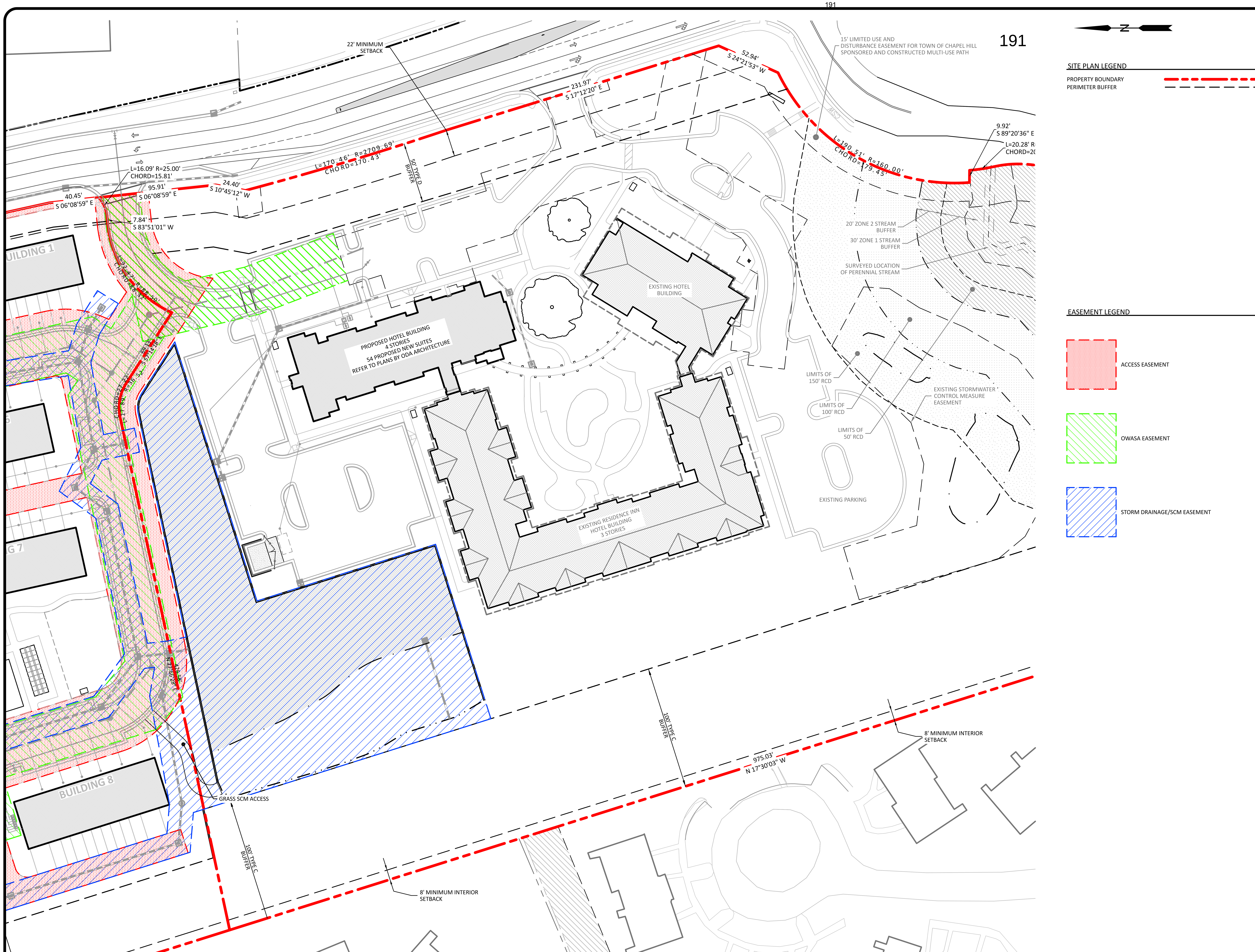
| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 4 | 2021-08-09 | REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC

RESIDENTIAL LAYOUT PLAN

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=40'
DATE: 2020-10-29
SHEET NO: C2.2




40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

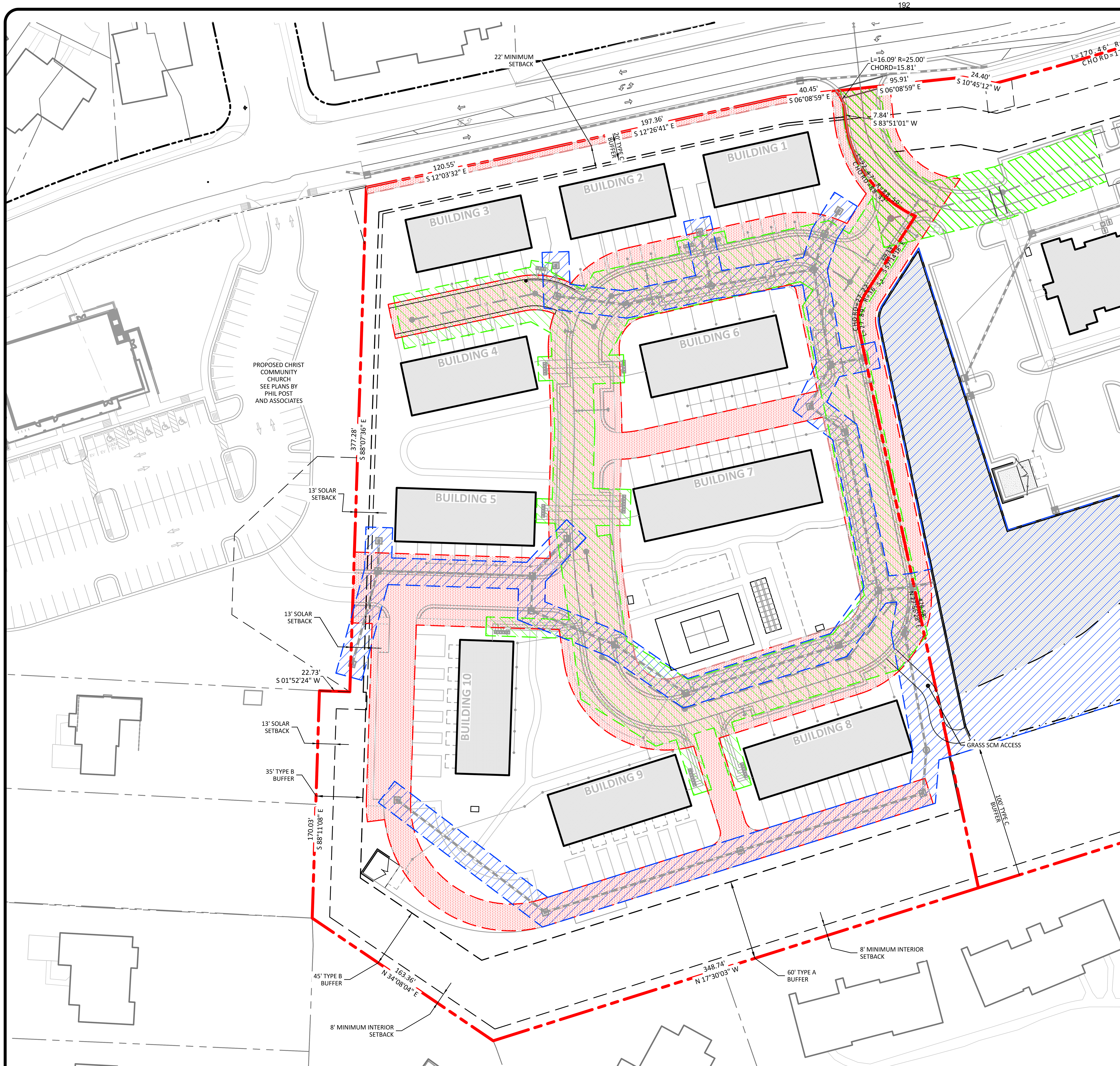
RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

# HOTEL EASEMENT PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 24342 JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=40'
DATE: 2020-10-29
SHEET NO: C2.3




192

SITE PLAN LEGEND

PROPERTY BOUNDARY

PERIMETER BUFFER

EASEMENT LEGEND

ACCESS EASEMENT

OWASA EASEMENT

STORM DRAINAGE/SCM EASEMENT

40 0 20 40 80

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

RESIDENTIAL EASEMENT PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL JONATHAN P. EAKINS

09/15/2021

PROJECT NO: ---

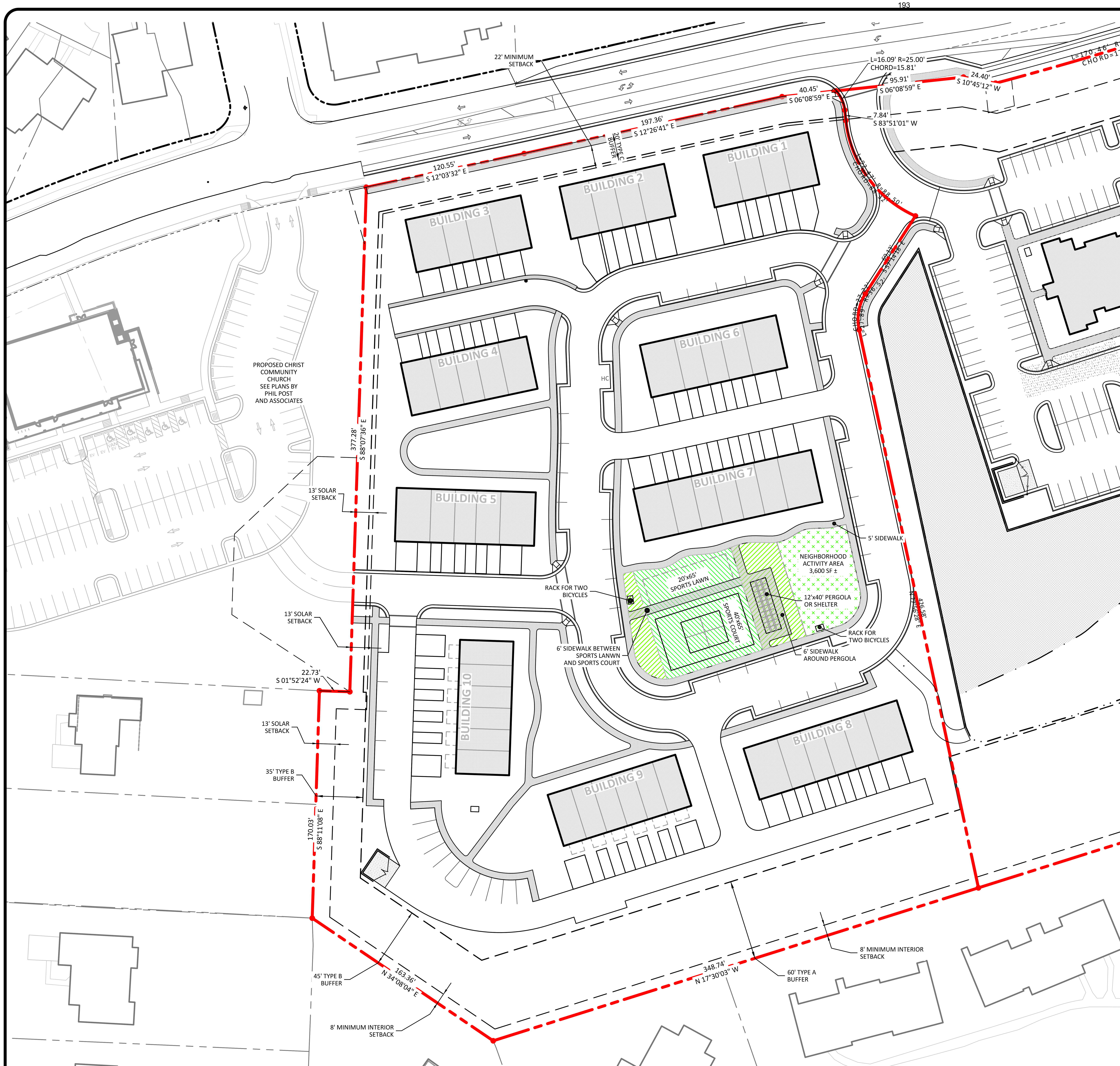
DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=40'

DATE: 2020-10-29

SHEET NO: C2.4




| RECREATION AREA DATA | |
|---|---|
| REQUIRED RECREATION AREA<br>276,987 GLA x 0.046) | 12,741 SF |
| RECREATION PER LUMO REQUIREMENTS | |
| SPORTS COURTS | 6,155 SF |
| MAX. ALLOWABLE RECREATION SUPPORT AREAS<br>(PER LUMO 30% MAX) | 3,882 SF |
| RECREATION SUPPORT AREAS PROVIDED | 3,749 SF |
| PAYMENT IN LIEU<br>25% MINIMUM PER COUNCIL POLICY<br>25% MINIMUM PER COUNCIL POLICY | 3,185 SF |
| TOTAL RECREATION PROVIDED<br>6,155 + 3,749 + 3,185 | 13,089 SF |

SPORTS COURT AREA

RECREATION SUPPORT AREA

NEIGHBORHOOD ACTIVITY AREA
(NOT INCLUDED IN RECREATION AREA CALCULATIONS)

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

RECREATION EXHIBIT

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 
JONATHAN P. EAKINS
08/09/2021

PROJECT NO: ---

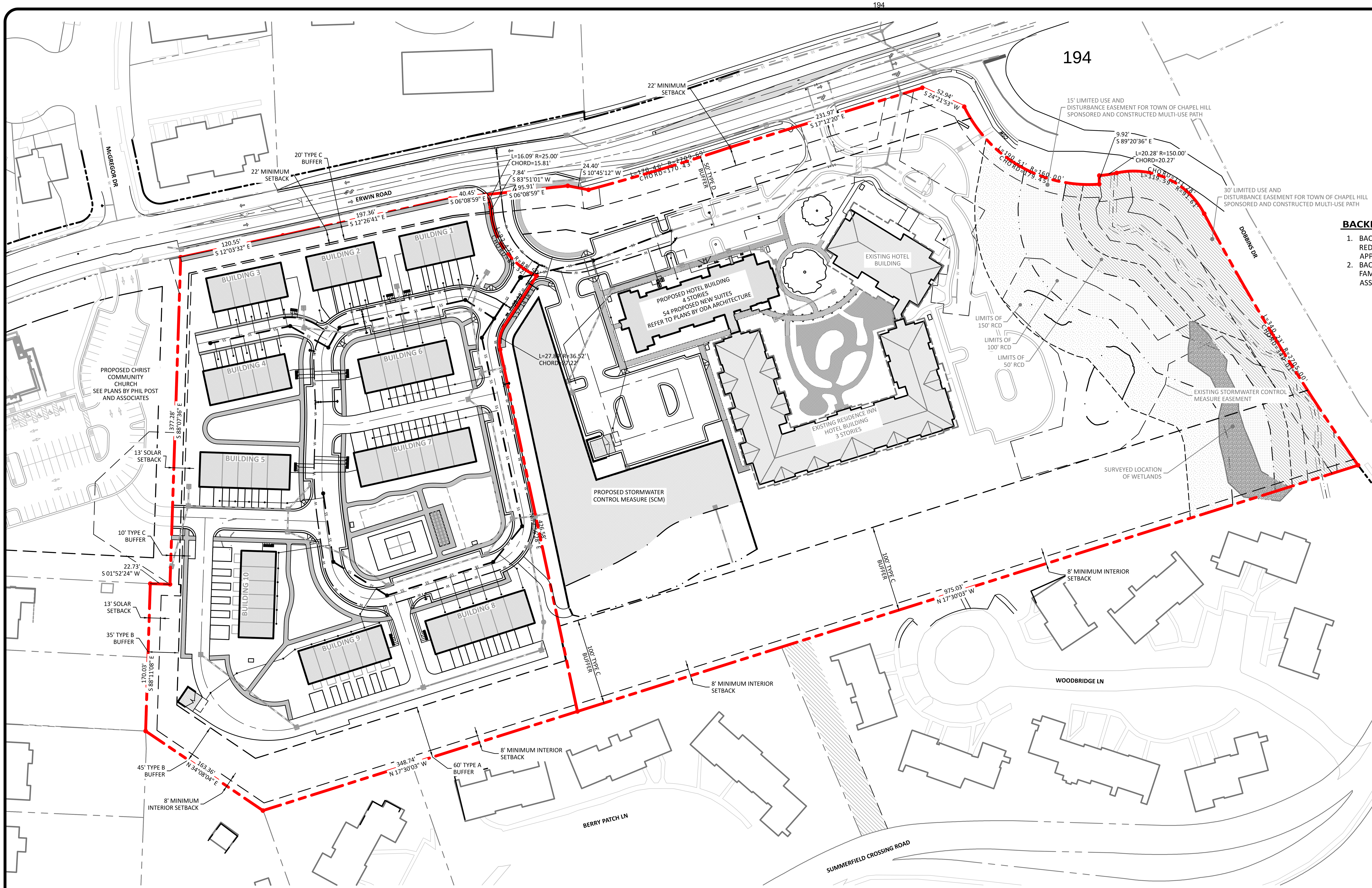
DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=40'

DATE: 2020-10-29

SHEET NO: C2.5




## BACKFLOW PREVENTION NOTES

1. BACKFLOW PREVENTERS FOR DOMESTIC LINES FOR THE HOTEL WILL BE REDUCED PRESSURE PRINCIPLE ASSEMBLY (RP) WATTS LF909 OR APPROVED EQUAL
2. BACKFLOW PREVENTERS FOR FIRE LINES FOR THE HOTEL AND SINGLE FAMILY RESIDENTAIL WILL BE REDUCED PRESSURE PRINCIPLE DETECTOR ASSEMBLY (RPDA) WATTS 909RPDA OR APPROVED EQUAL

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

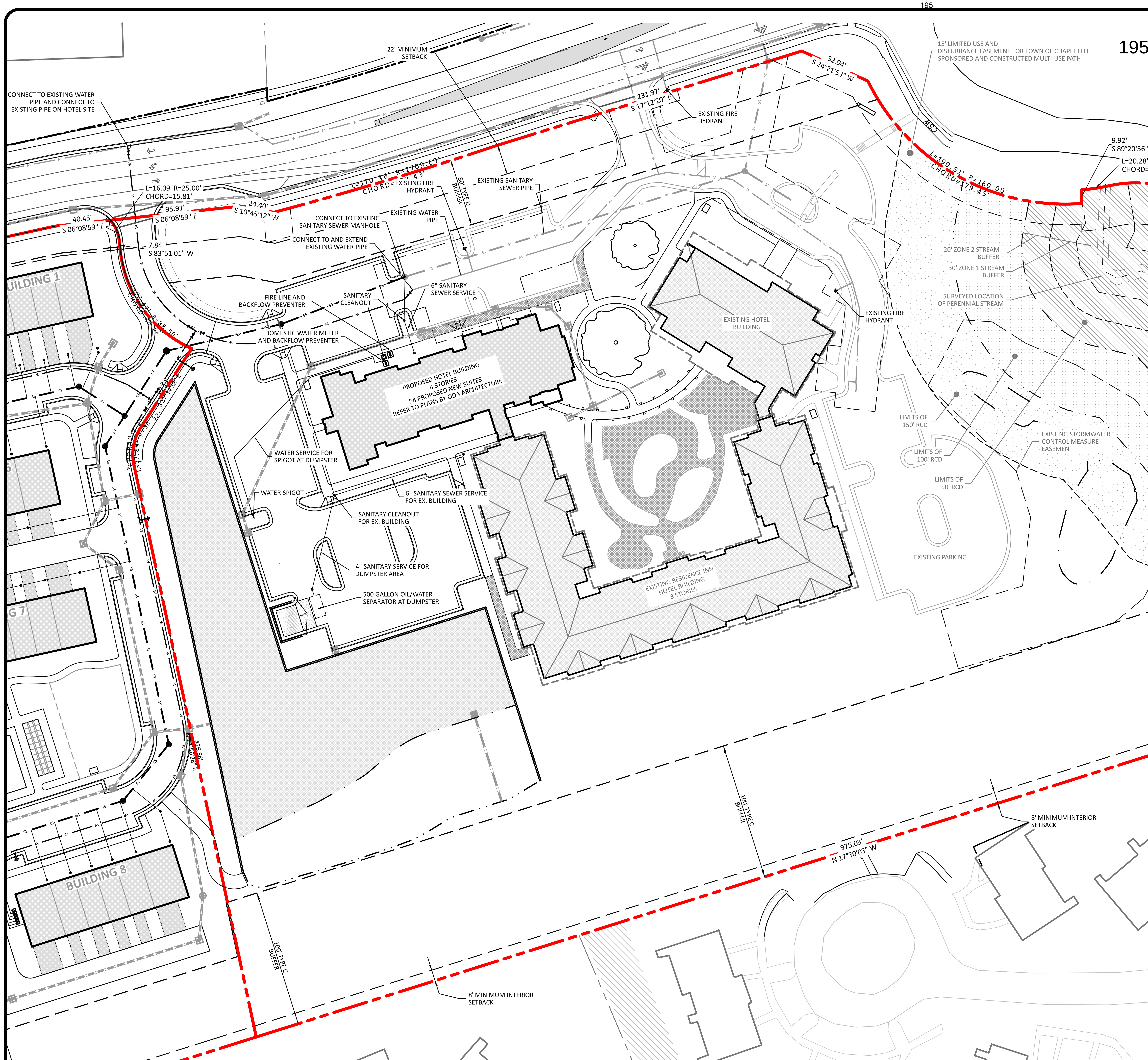
| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC

# OVERALL UTILITY PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 034642 JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=60'
DATE: 2020-10-29
SHEET NO: C3.0




### UTILITY PLAN LEGEND

- SANITARY SEWER PIPE
- SANITARY SEWER MANHOLE
- WATER PIPE
- FIRE HYDRANT
- WATER SERVICE/METER
- SANITARY SEWER SERVICE/CLEANOUT

### HOTEL DEVELOPMENT UTILITY NOTES

1. WATER AND FIRE SERVICE LINES FOR THE EXISTING HOTEL BUILDING ARE LOCATED ON THE SOUTH SIDE OF THE BUILDING
2. WATER AND FIRE SERIVCE LINES FOR THE PROPOSED HOTEL WING WILL BE PROVIDED OFF THE WATER LINE BEING EXTENDED TO THE EXISTING WATER MAIN IN ERWIN ROAD
3. SANITARY SEWER SERVICE FOR THE EXISTING HOTEL WING WILL NEED TO BE RELOCATED AROUND THE PROPOSED HOTEL WING

### DRY UTILITIES

LOCATIONS OF DRY UTILITIES (ELECTRIC, GAS, CABLE ETC.) WILL BE COORDINATED WITH THE APPROPRIATE UTILITY AS CONSTRUCTION DRAWINGS ARE DEVELOPED.

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION


The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751


CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

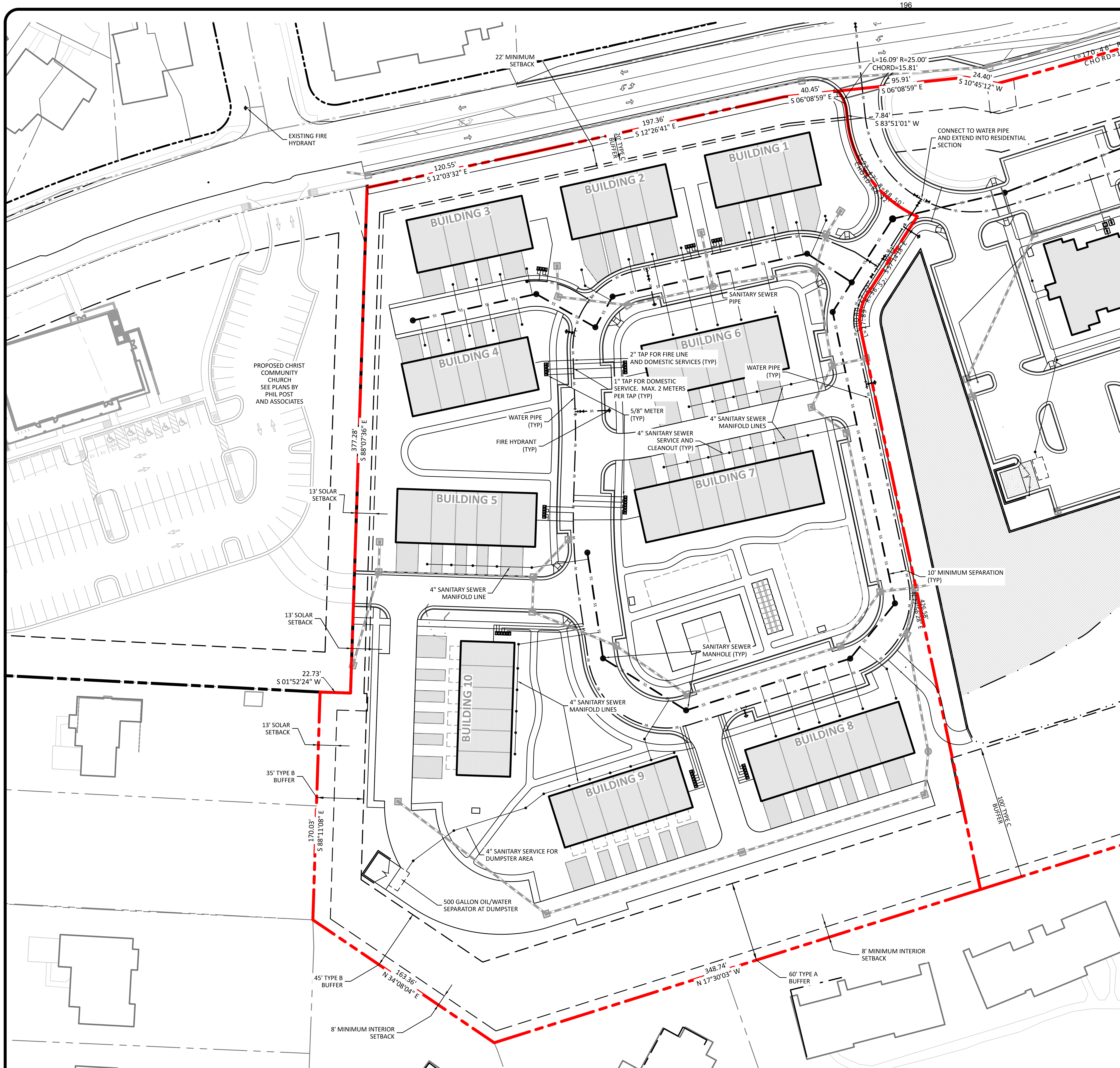
| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC

HOTEL UTILITY PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 042642 JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=40'
DATE: 2020-10-29
SHEET NO: C3.1




N

196

UTILITY PLAN LEGEND

SANITARY SEWER PIPE
SANITARY SEWER MANHOLE
WATER PIPE
FIRE HYDRANT
WATER SERVICE/METER
SANITARY SEWER SERVICE/CLEANOUT

## TOWNHOME UTILITY NOTES

1. ONE TAP WILL BE MADE FOR EACH TOWNHOME BUILDING. EACH TAP WILL BE SPLIT FOR A METER FOR EACH UNIT AND ONE BRANCH OF THE TAP WILL TIE TO THE RISER ROOM(S) FOR THE TOWNHOME BUILDING. THE WATER SERVICE/FIRE SERVICE CONFIGURATION VARIES FOR EACH BUILDING BASED ON THE GEOMETRY OF THE SITE.
2. SANITARY SEWER SERVICES FOR BUILDINGS 1-8 WILL TIE DIRECTLY INTO THE SANITARY SEWER MAIN.
3. THREE OF THE SIX SANITARY SERVICES FOR BUILDING 9 WILL TIE DIRECTLY INTO THE SANITARY SEWER MAIN. THE OTHER THREE SERVICES FOR BUILDING 9 WILL TIE INTO A MANIFOLD LINE WHICH WILL CONNECT TO THE MANHOLE.
4. ALL SANITARY SEWER SERVICES FOR BUILDING 10 WILL TIE INTO A MANIFOLD LINE. THE MANIFOLD LINE WILL CONNECT TO THE MANHOLE.

## DRY UTILITIES

LOCATIONS OF DRY UTILITIES (ELECTRIC, GAS, CABLE ETC.) WILL BE COORDINATED WITH THE APPROPRIATE UTILITY AS CONSTRUCTION DRAWINGS ARE DEVELOPED.

40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

RESIDENTIAL UTILITY PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL JONATHAN P. EAKINS

09/15/2021

PROJECT NO: ---

DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=40'

DATE: 2020-10-29

SHEET NO: C3.2


PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 4 | 2021-08-09 | REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

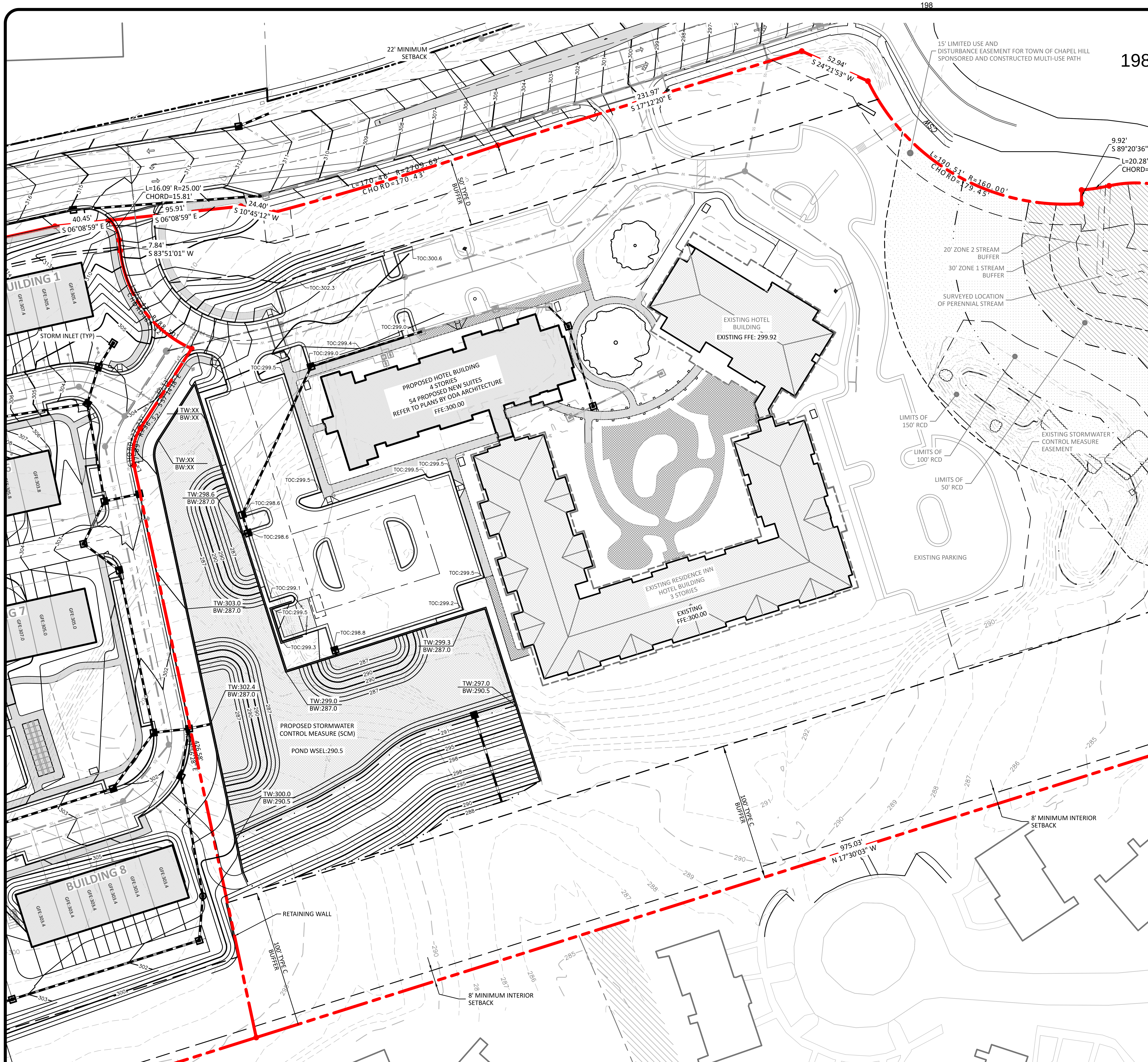
CHAPEL HILL, NC

OVERALL GRADING-DRAINAGE PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=60'
DATE: 2020-10-29
SHEET NO: C4.0

198




N

GRADING-DRAINAGE PLAN LEGEND

| | |
|---|---|
| MAJOR CONTOUR (5') | |
| MINOR CONTOUR (1') | |
| STORM DRAINAGE PIPE | |
| STORM STRUCTURE | |

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

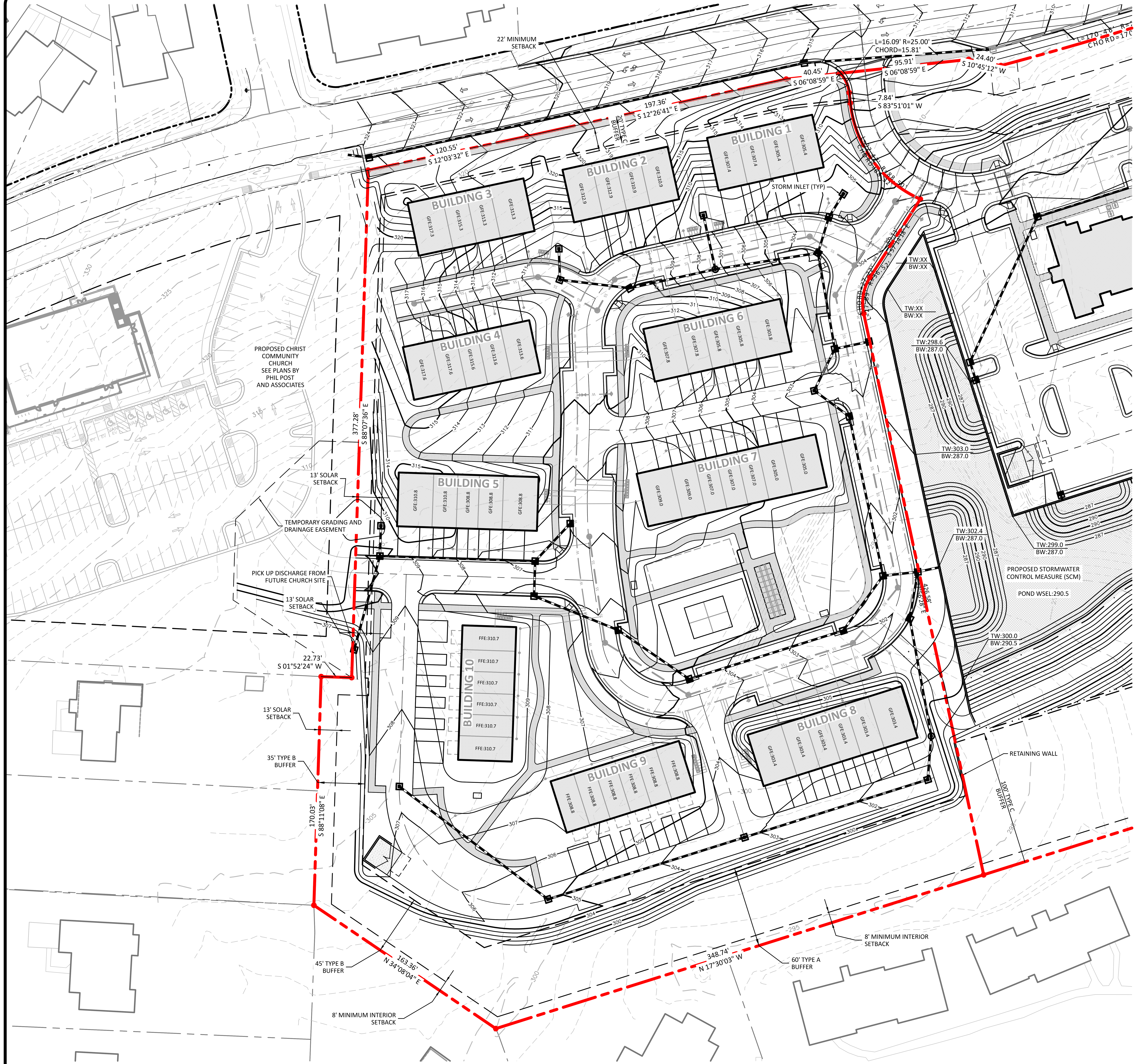
CHAPEL HILL, NC

HOTEL GRADING PLAN

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS

09/15/2021

| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | 1"=40' |
| DATE: | 2020-10-29 |
| SHEET NO: | C4.1 |




199

GRADING-DRAINAGE PLAN LEGEND

MAJOR CONTOUR (5')
MINOR CONTOUR (1')
STORM DRAINAGE PIPE
STORM STRUCTURE

## TOWNHOME NOTES

1. THE GFE REPORTED FOR EACH TOWNHOME BUILDING IS THE GARAGE FLOOR ELEVATION AT THE LOCATION WHERE THE GARAGE ADJOINS THE DRIVEWAY

40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

RESIDENTIAL GRADING PLAN

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER ... AN P. EAKINS

09/15/2021

PROJECT NO: ---

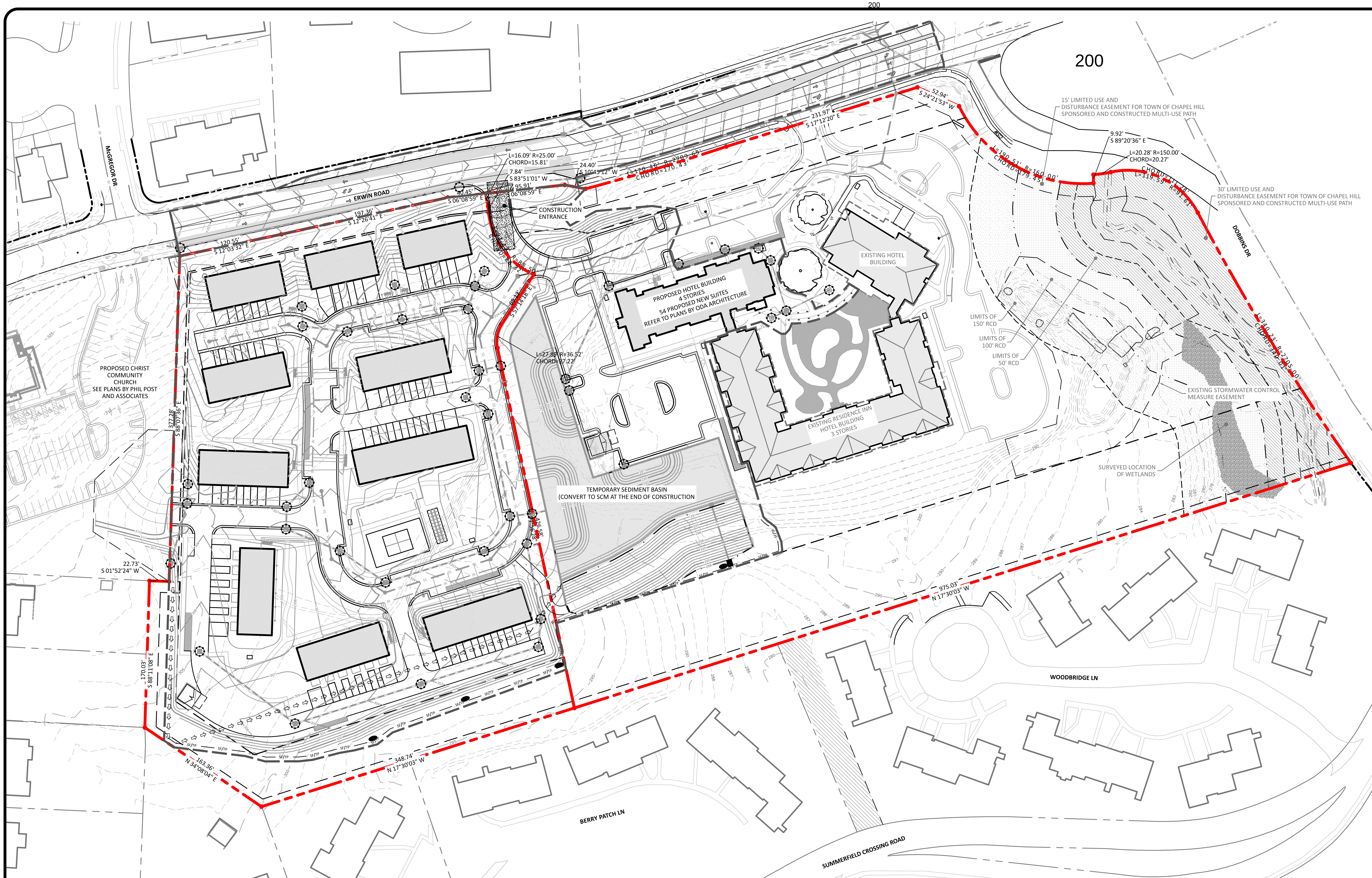
DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=40'

DATE: 2020-10-29

SHEET NO: C4.2




## EROSION CONTROL LEGEND

| | |
|---|---|
| LIMITS OF DISTURBANCE | |
| SILT/TREE PROTECTION FENCE | SF/TP |
| SILT FENCE | SF |
| TREE PROTECTION FENCE | TP |
| DIVERSION DITCH | |
| INLET PROTECTION | |
| SILT FENCE OUTLET | |
| RIPRAP OUTLET PROTECTION | |

## EROSION CONTROL NOTES

THE EROSION AND SEDIMENT CONTROL SHOWN ON THIS PLAN IS SCHEMATIC. INSTALLATION OF SEDIMENT AND EROSION CONTROL DEVICES WILL BE PHASED WITH CONSTRUCTION AND WILL BE ADJUSTED AS CONSTRUCTION PROGRESSES ON THE SITE.

60 0 30 60 120

SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

**The Nau Company**
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

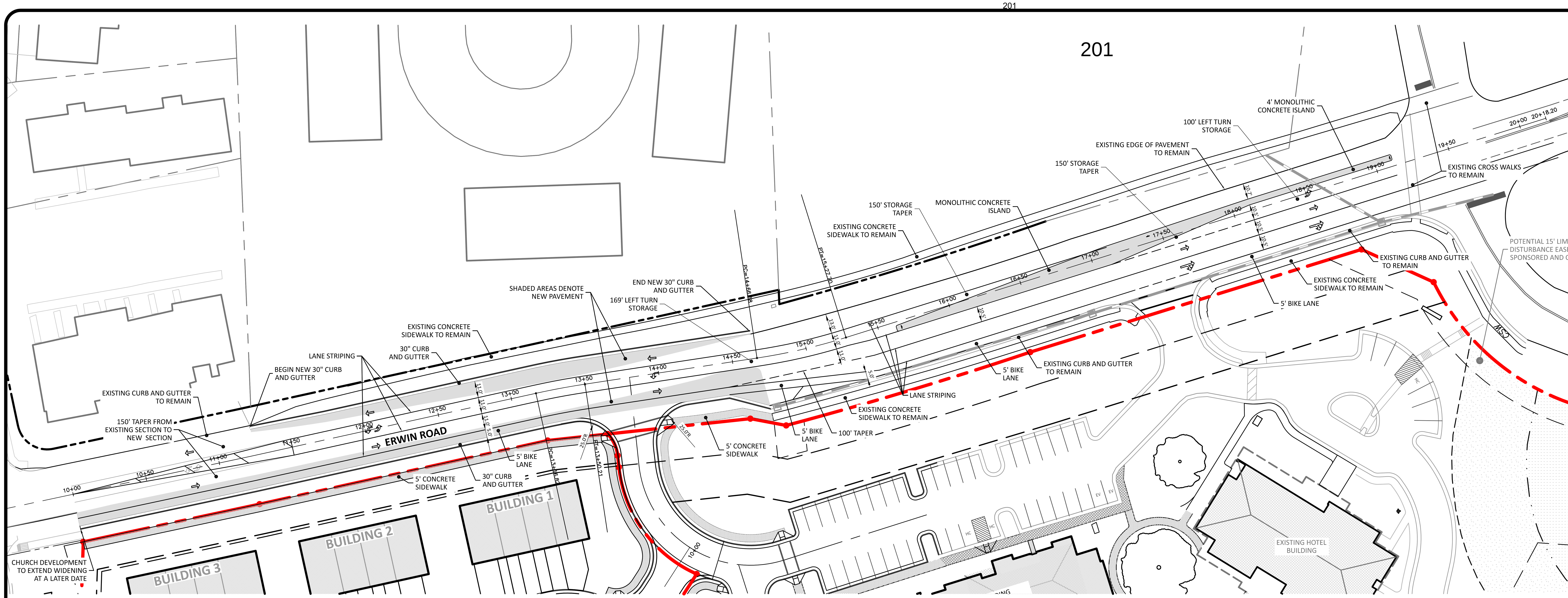
CHAPEL HILL, NC

# EROSION CONTROL PLAN

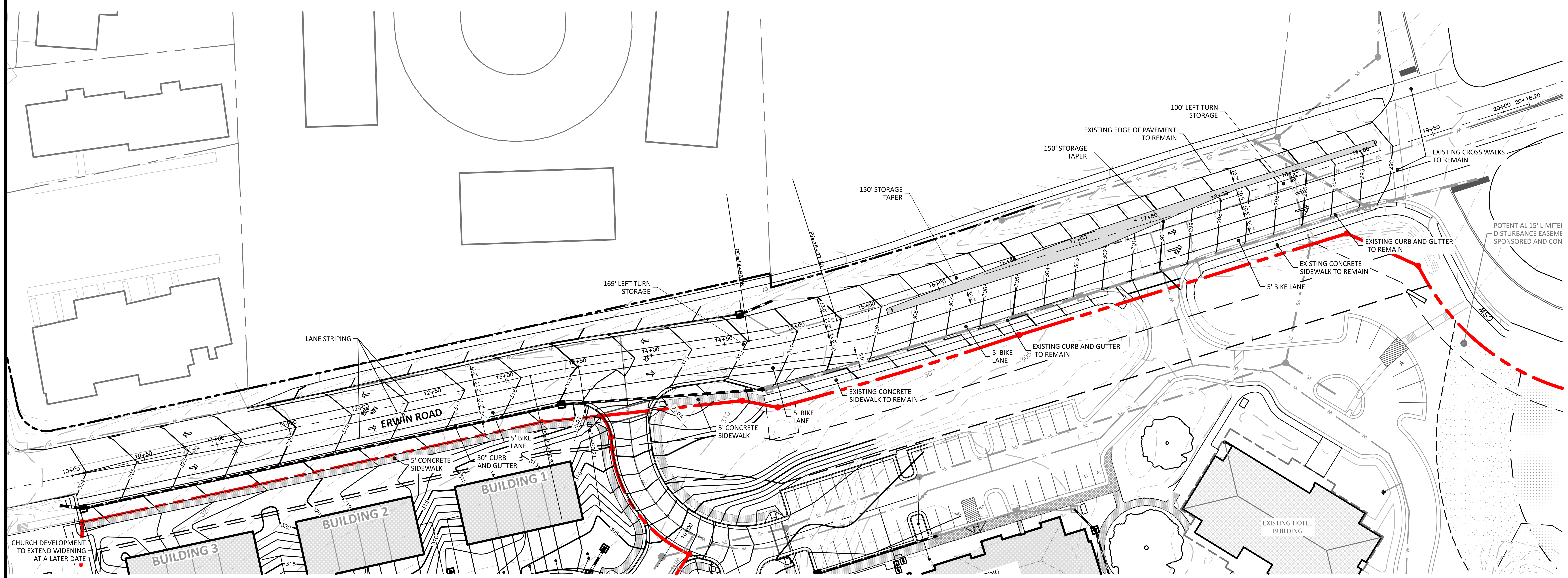
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
JONATHAN P. EAKINS
09/15/2021

| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | 1"=60' |
| DATE: | 2020-10-29 |
| SHEET NO: | C5.1 |

201




WIDENING LAYOUT PLAN




WIDENING GRADING PLAN

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC

ROAD WIDENING PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — JONATHAN P. EAKINS

08/09/2021

PROJECT NO: ---

DESIGN BY: JPE

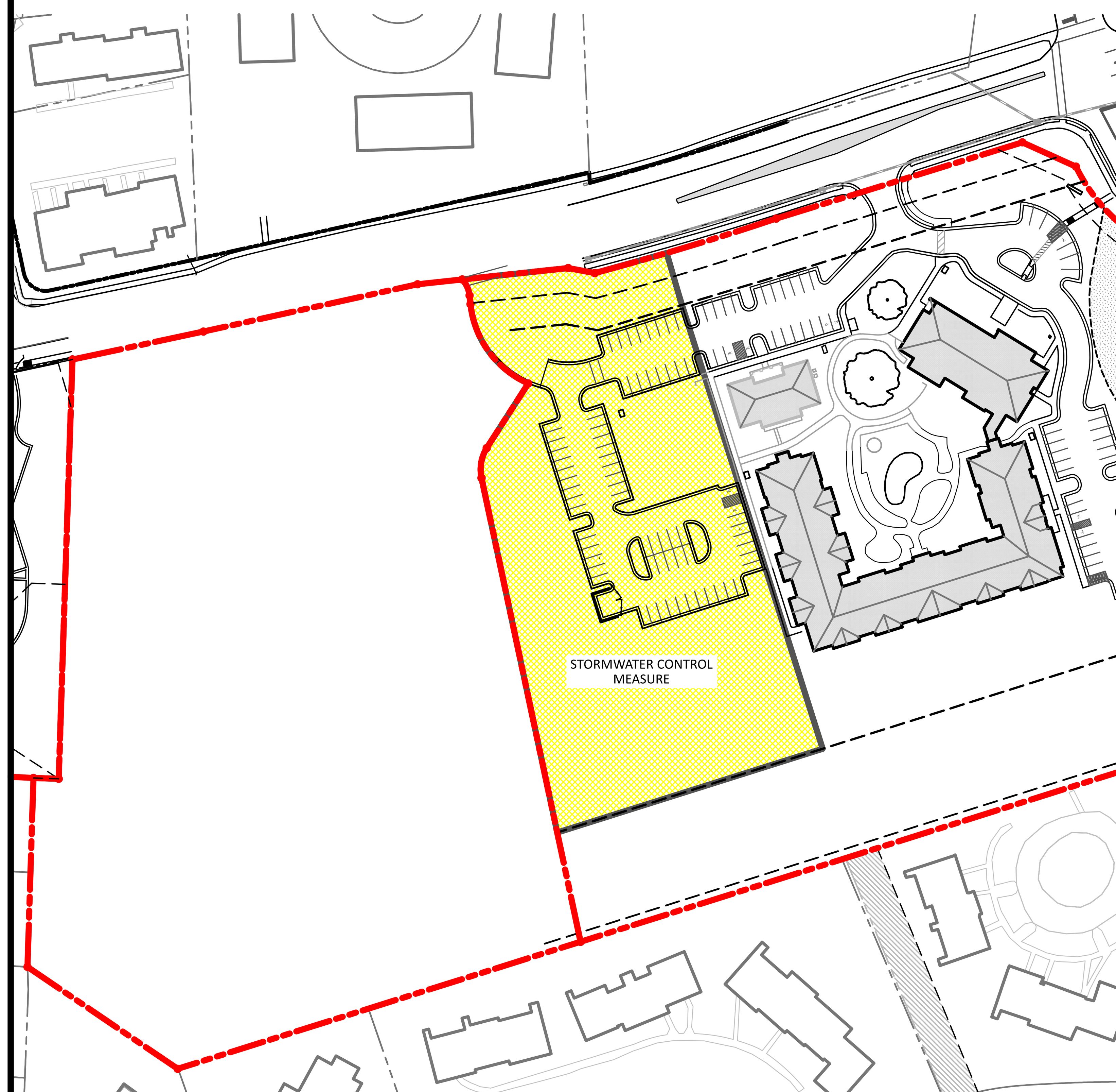
DRAWN BY: JPE

SCALE: 1"=40'

DATE: 2020-10-29

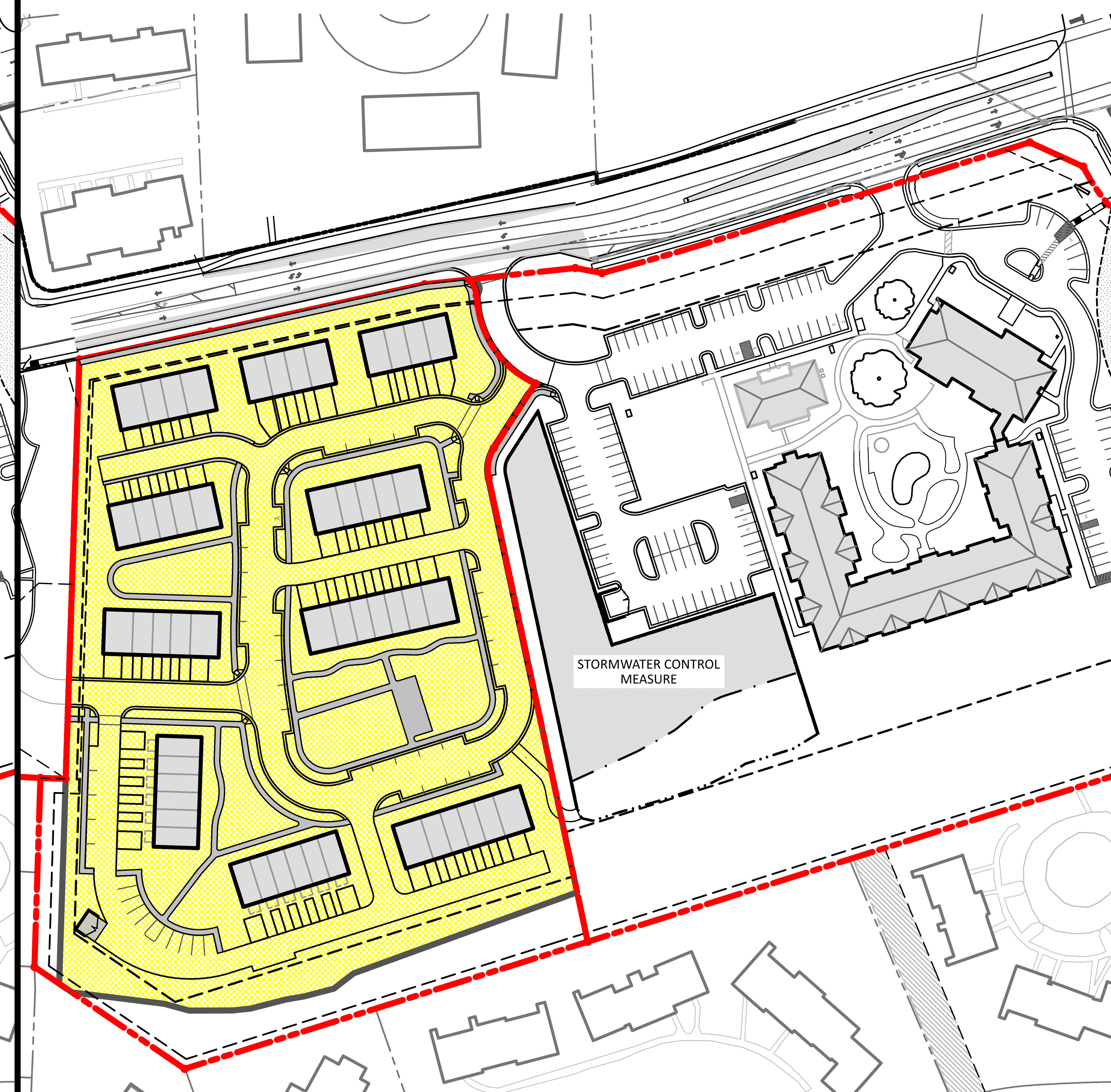
SHEET NO: C6.0

202



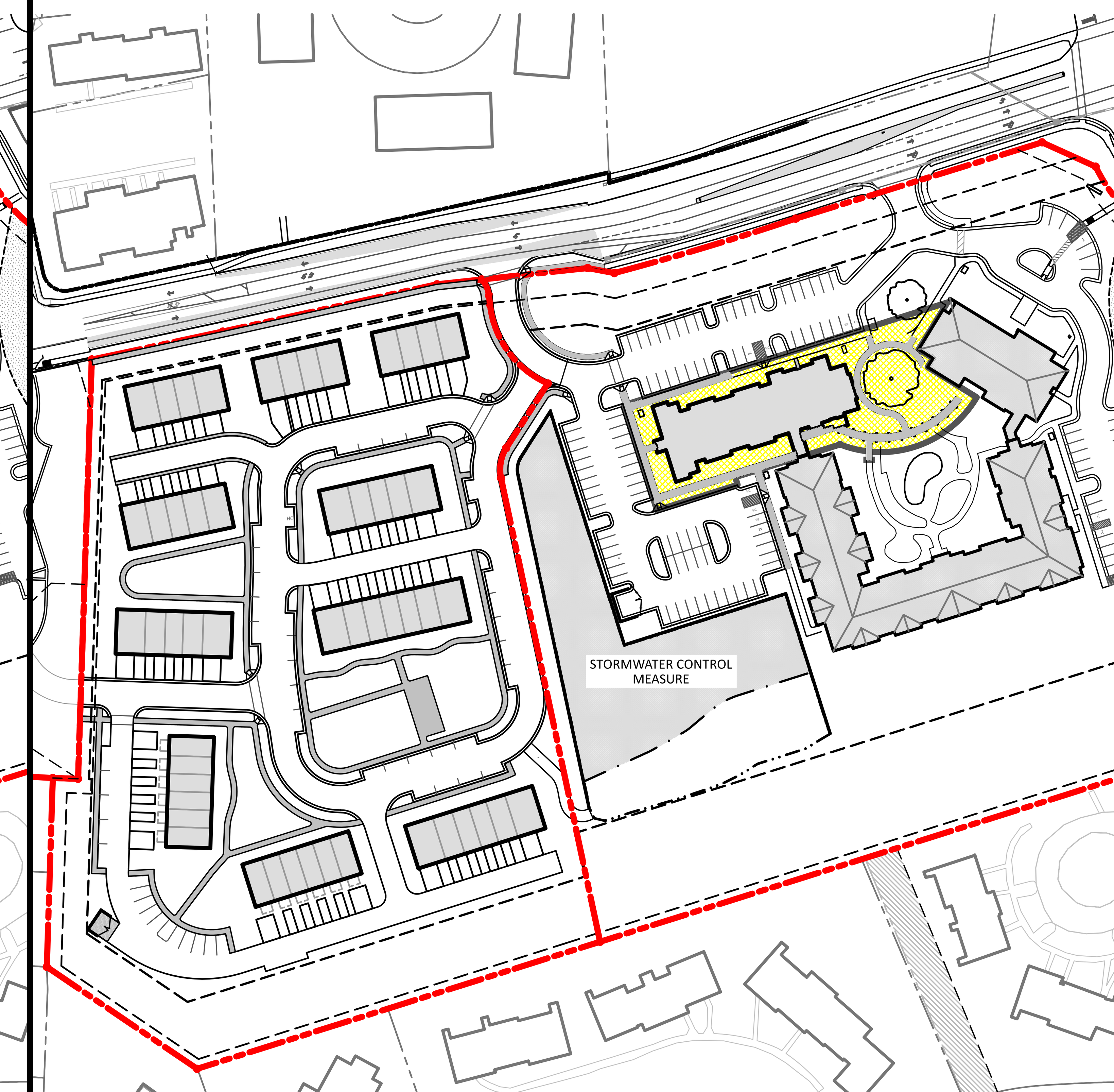

## CONSTRUCTION SEQUENCE STAGE 1

ELEMENTS OF STAGE 1 CONSTRUCTION
1. BUILD NEW ENTRANCE TO ERWIN ROAD
2. BUILD NEW STORMWATER CONTROL MEASURE AND USE AS A TEMPORARY SEDIMENT AND EROSION CONTROL DEVICE
3. BUILD PARKING FOR HOTEL ADJACENT TO NEW STORMWATER CONTROL MEASURE AND ALONG NEW ENTRANCE TO ERWIN ROAD
4. BEGIN ERWIN ROAD WIDENING




## CONSTRUCTION SEQUENCE STAGE 2

ELEMENTS OF STAGE 2 CONSTRUCTION
1. CONNECT RESIDENTIAL STREET TO ERWIN ROAD ENTRANCE
2. BUILD INFRASTRUCTURE FOR TOWNHOME DEVELOPMENT
3. CONTINUE TO USE PROPOSED STORMWATER CONTROL MEASURE AS A SEDIMENT AND EROSION CONTROL DEVICE
4. COMPLETE ERWIN ROAD WIDENING AND LANE REALIGNMENT




## CONSTRUCTION SEQUENCE STAGE 3

ELEMENTS OF STAGE 2 CONSTRUCTION
1. REMOVE EXISTING 2 STORY RESIDENTIAL/OFFICE BUILDING
2. CONSTRUCT NEW HOTEL WING AND COVERED CONNECTION TO HOTEL OFFICE AND GUEST ENTRANCE BUILDING
3. CONVERT SCM FACILITY FROM USE AS A TEMPORARY SEDIMENT AND EROSION CONTROL MEASURE TO THE FINAL STORMWATER CONTROL MEASURE

100 0 50 100 200

SCALE: 1"=100'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

DEVELOPMENT SEQUENCE

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS
08/09/2021

PROJECT NO: ---

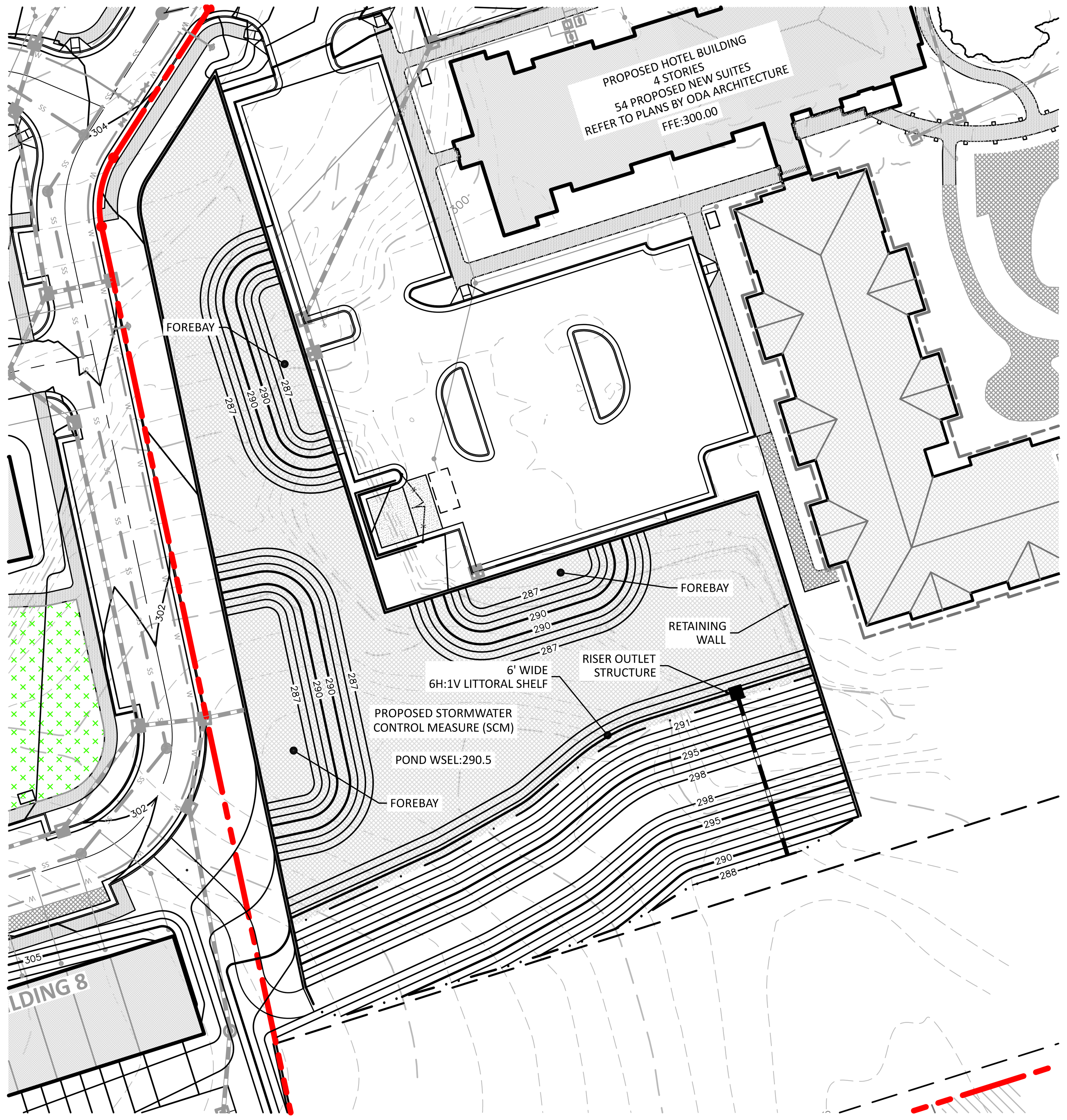
DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=100'

DATE: 2020-10-29

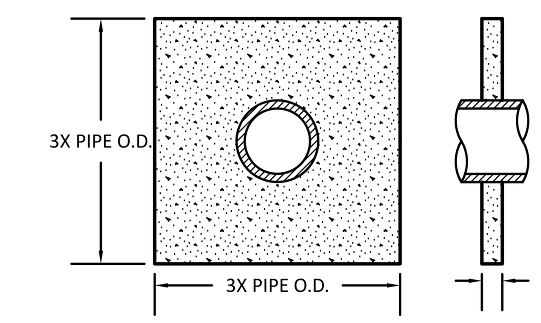
SHEET NO: C7.1




## POND GRADING

SCALE: 1"=40'

203




## ANTI-SEEPAGE COLLAR

NOT TO SCALE

### NOTES

1. THE CONCRETE COLLAR SHALL HAVE A MINIMUM 28-DAY STRENGTH OF 3000 PSI.
2. ANTI-SEEPAGE COLLARS SHALL BE CONNECTED TO THE BARREL PIPE WITH A WATER TIGHT JOINT.
3. INSTALL ANTI-SEEPAGE COLLAR AT THE CENTER OF THE EMBANKMENT.
4. ANTI-SEEPAGE COLLARS SHALL BE INSTALLED AT LEAST 2 FEET FROM ANY PIPE JOINT.

### AQUATIC SHELF PLANTINGS

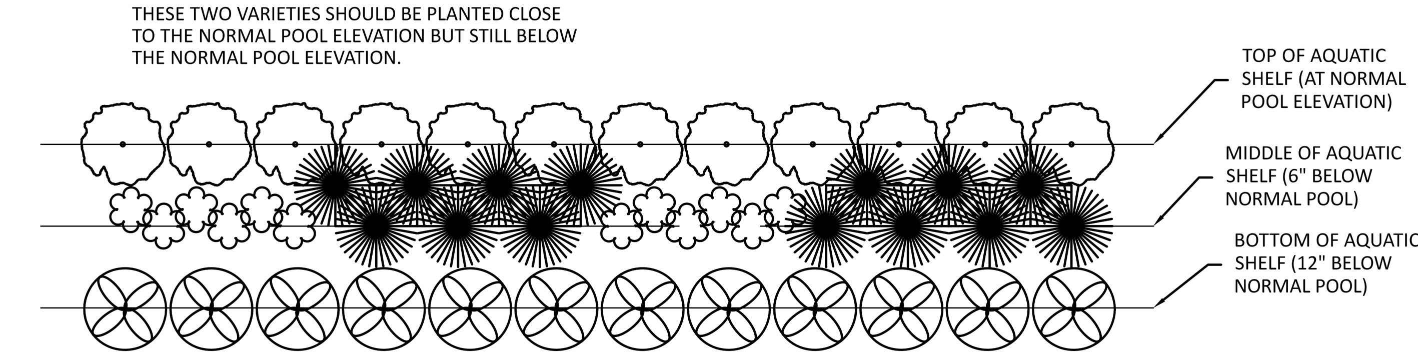
| SYMBOL | TOTAL | BOTANICAL NAME | COMMON NAME |
|---|---|---|---|
| | XXX | PONTEDERIA CORDATA | PICKERELWEED |
| | XXX | IRIS VIRGINICA | BLUE FLAG IRIS |
| | XXX | JUNCUS EFFUSUS var SOLUTUS | SOFT RUSH |
| | XXX | HIBISCUS COCCINEUS | SCARLET ROSE MALLOW |

AQUATIC PLANTING DATA TO BE COMPLETED FOR FINAL DESIGN

| | |
|---|---|
| AREA OF SHELF | XXX SF |
| REQUIRED PLANTING RATE | 50 PER 200 SF OF SHELF AREA |
| PLANTINGS REQUIRED | XXX |
| PLANTINGS PROVIDED | XXX |

### NOTES

1. BLUE FLAG IRIS AND SOFT RUSH PERFORM BEST WHEN PLANTED IN 0" TO 2" OF WATER. THEREFORE THESE TWO VARIETIES SHOULD BE PLANTED CLOSE TO THE NORMAL POOL ELEVATION BUT STILL BELOW THE NORMAL POOL ELEVATION.




## TYPICAL 200 SQUARE FOOT AQUATIC SHELF PLANTINGS

NOT TO SCALE

### SEEDING SPECIFICATIONS

COMPLETE GRADING BEFORE PREPARING SEEDBEDS, AND INSTALL ALL NECESSARY EROSION CONTROL PRACTICES SUCH AS, DIKES, WATERWAYS, AND BASINS. MINIMIZE STEEP SLOPES BECAUSE THEY MAKE SEEDBED PREPARATION DIFFICULT AND INCREASE THE EROSION HAZARD. IF SOILS BECOME COMPACTED DURING GRADING, LOOSEN THEM TO A DEPTH OF 6-8 INCHES USING A RIPPER, HARROW, OR CHISEL PLOW.

SEEDBED PREPARATION
GOOD SEEDBED PREPARATION IS ESSENTIAL TO SUCCESSFUL PLANT ESTABLISHMENT. A GOOD SEEDBED IS WELL-PULVERIZED, LOOSE, AND UNIFORM. WHERE HYDROSEEDING METHODS ARE USED, THE SURFACE MAY BE LEFT WITH A MORE IRREGULAR SURFACE OF LARGE CLODS AND STONES.

- LIMING—APPLY LIME ACCORDING TO SOIL TEST RECOMMENDATIONS. IF THE PH (ACIDITY) OF THE SOIL IS NOT KNOWN, AN APPLICATION OF GROUND AGRICULTURAL LIMESTONE AT THE RATE OF 1 TO 1 1/2 TONS/ACRE ON COARSE-TEXTURED SOILS AND 2-3 TONS/ACRE ON FINETEXTURED SOILS IS USUALLY SUFFICIENT. APPLY LIMESTONE UNIFORMLY AND INCORPORATE INTO THE TOP 4-6 INCHES OF SOIL. SOILS WITH A PH OF 6 OR HIGHER NEED NOT BE LIMED.
- FERTILIZER—BASE APPLICATION RATES ON SOIL TESTS. WHEN THESE ARE NOT POSSIBLE, APPLY A 10-10-10 GRADE FERTILIZER AT 700-1,000 LB/ACRE. BOTH FERTILIZER AND LIME SHOULD BE INCORPORATED INTO THE TOP 4-6 INCHES OF SOIL. IF A HYDRAULIC SEEDER IS USED, DO NOT MIX SEED AND FERTILIZER MORE THAN 30 MINUTES BEFORE APPLICATION.
- SURFACE ROUGHENING—IF RECENT TILLAGE OPERATIONS HAVE RESULTED IN A LOOSE SURFACE, ADDITIONAL ROUGHENING MAY NOT BE REQUIRED, EXCEPT TO BREAK UP LARGE CLODS. IF RAINFALL CAUSES THE SURFACE TO BECOME SEALED OR CRUSTED, LOOSEN IT JUST PRIOR TO SEEDING BY DISKING, RAKING, HARROWING, OR OTHER SUITABLE METHODS. GROOVE OR FURROW SLOPES STEEPER THAN 3:1 ON THE CONTOUR BEFORE SEEDING (PRACTICE 6.03, SURFACE ROUGHENING).

PLANT SELECTION
SELECT AN APPROPRIATE SPECIES OR SPECIES MIXTURE FROM TABLE 6.10A FOR SEEDING IN LATE WINTER AND EARLY SPRING, TABLE 6.10B FOR SUMMER, AND TABLE 6.10C FOR FALL. IN THE MOUNTAINS, DECEMBER AND JANUARY SEEDINGS HAVE POOR CHANCES OF SUCCESS. WHEN IT IS NECESSARY TO PLANT AT THESE TIMES, USE RECOMMENDATIONS FOR FALL AND A SECURELY TACKED MULCH.

SEEDING
EVENLY APPLY SEED USING A CYCLONE SEEDER (BROADCAST), DRILL, CULTIPACKER SEEDER, OR HYDROSEEDER. USE SEEDING RATES GIVEN IN TABLES 6.10A-6.10C. BROADCAST SEEDING AND HYDROSEEDING ARE APPROPRIATE FOR STEEP SLOPES WHERE EQUIPMENT CANNOT BE DRIVEN. HAND BROADCASTING IS NOT RECOMMENDED BECAUSE OF THE DIFFICULTY IN ACHIEVING A UNIFORM DISTRIBUTION. SMALL GRAINS SHOULD BE PLANTED NO MORE THAN 1 INCH DEEP, AND GRASSES AND LEGUMES NO MORE THAN 1/2 INCH. BROADCAST SEED MUST BE COVERED BY RAKING OR CHAIN DRAGGING, AND THEN LIGHTLY FIRMED WITH A ROLLER OR CULTIPACKER. HYDROSEEDED MIXTURES SHOULD INCLUDE A WOOD FIBER (CELLULOSE) MULCH.

MULCHING
THE USE OF AN APPROPRIATE MULCH WILL HELP ENSURE ESTABLISHMENT UNDER NORMAL CONDITIONS, AND IS ESSENTIAL TO SEEDING SUCCESS UNDER HARSH SITE CONDITIONS (PRACTICE 6.14, MULCHING). HARSH SITE CONDITIONS INCLUDE:

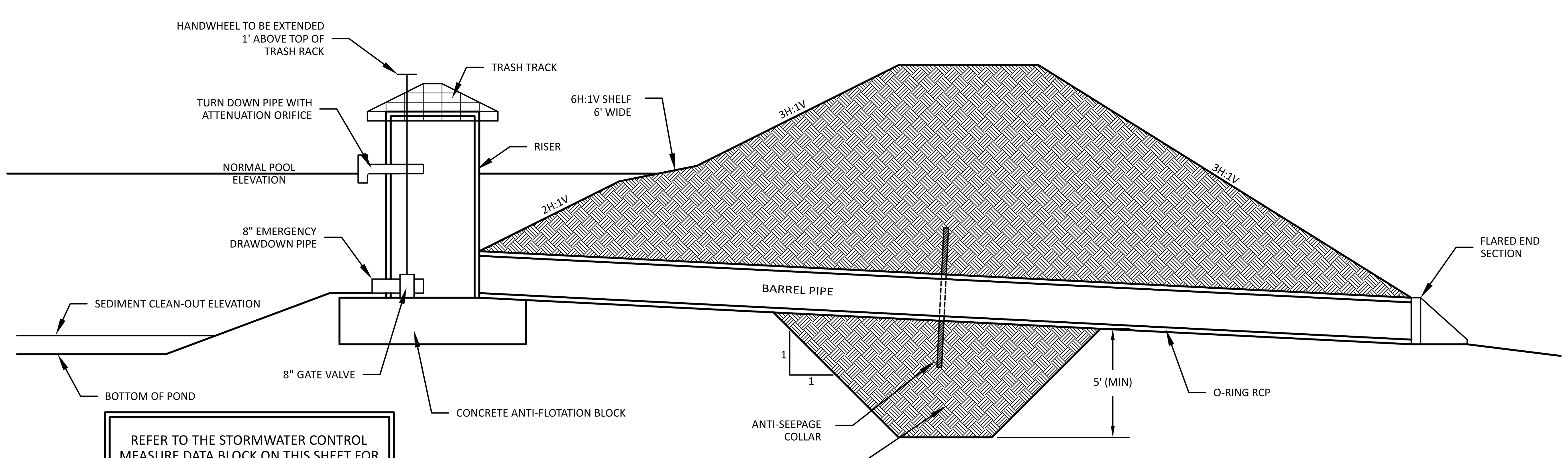
- SEEDING IN FALL FOR WINTER COVER (WOOD FIBER MULCHES ARE NOT CONSIDERED ADEQUATE FOR THIS USE),
- SLOPES STEEPER THAN 3:1,
- EXCESSIVELY HOT OR DRY WEATHER,
- ADVERSE SOILS (SHALLOW, ROCKY, OR HIGH IN CLAY OR SAND), AND
- AREAS RECEIVING CONCENTRATED FLOW.

IF THE AREA TO BE MULCHED IS SUBJECT TO CONCENTRATED WATERFLOW, AS IN CHANNELS, ANCHOR MULCH WITH NETTING (PRACTICE 6.14, MULCHING).

*FROM: DEMLR EC MANUAL SECTION 6.10 REVISED 5/13*

| CONSTRUCTION DESIGN DATA | | |
|---|---|---|
| DESIGN PARAMETER | DESIGN VALUE | AS-BUILT VALUE |
| TOP OF DAM ELEVATION | XXX | XXX |
| SEDIMENT CLEANOUT ELEV. | XXX | XXX |
| BOTTOM OF POND ELEVATION | XXX | XXX |
| RISER CREST ELEV. | XXX | XXX |
| RISER SIZE | 48"x48" I.D SQUARE | XXX |
| NORMAL POOL ELEVATION | XXX | XXX |
| ORIFICE ELEVATION | XXX | XXX |
| BARREL DIAMETER | XXX | XXX |
| BARREL UPSTREAM INV. | XXX | XXX |
| BARREL DOWNSTREAM INV. | XXX | XXX |
| BARREL LENGTH | XXX | XXX |
| ANTI-FLOTATION BLOCK SIZE | XXX | XXX |
| ANTI-SEEPAGE COLLAR SIZE | XXX | XXX |
| CALCULATED POND DATA | | |
| SURFACE AREA REQUIRED | XXX | XXX |
| SURFACE AREA PROVIDED | XXX | XXX |
| WQ RAINFALL VOLUME | XXX | XXX |
| ELEV. AT WQ VOLUME | XXX | XXX |
| Q(1) DISCHARGE | XXX | XXX |
| Q(1) ELEV. | XXX | XXX |
| Q(2) DISCHARGE | XXX | XXX |
| Q(2) ELEV. | XXX | XXX |
| Q(10) DISCHARGE | XXX | XXX |
| Q(10) ELEV. | XXX | XXX |
| Q(25) DISCHARGE | XXX | XXX |
| Q(25) ELEV. | XXX | XXX |
| Q(100) DISCHARGE | XXX | XXX |
| Q(100) ELEV. | XXX | XXX |

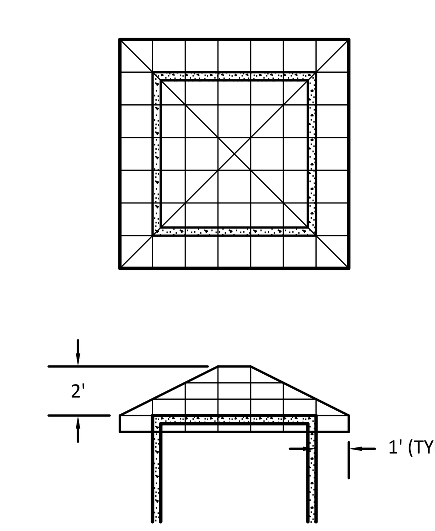
POND CONSTRUCTION DATA AND CALCULATED POND DATATO BE COMPLETED FOR FINAL DESIGN




REFER TO THE STORMWATER CONTROL MEASURE DATA BLOCK ON THIS SHEET FOR ELEVATIONS, SIZES AND DIMENSIONS OF THE ELEMENTS SHOWN ON THIS SECTION

## TYPICAL DAM CROSS SECTION

NOT TO SCALE

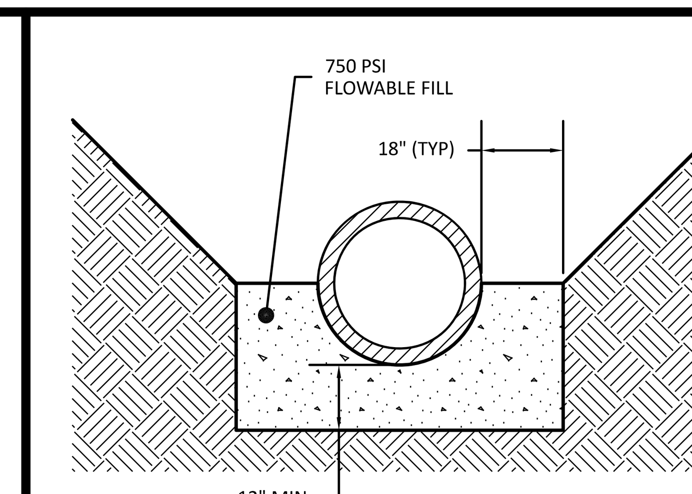



## TRASH RACK DETAIL

NOT TO SCALE

### NOTES

1. THE TRASH RACK SHALL BE CONSTRUCTED OF #4 REBAR
2. THE TRASH RACK SHALL BE ATTACHED TO THE RISER WITH FOUR EQUALLY SPACED HOT-DIPPED GALVANIZED STEEL CLAMPS.
3. THE TRASH RACK WILL BE PROVIDED WITH A HINGED ACCESS HATCH PROVIDED BY THE FABRICATOR.




## CONCRETE CRADLE DETAIL

NOT TO SCALE

### CONCRETE CRADLE NOTES

1. EXCAVATE TRENCH FOR THE CONCRETE CRADLE AND BARREL PER THE DIMENSIONS ON THE CONCRETE CRADLE DETAIL.
2. PLACE BARREL PIPE ON CONCRETE BLOCKS TO ACHIEVE SLOPE AND INVERTS NOTED ON THE POND DETAIL SHEET.
3. PLACE 2 FOOT WIDE STRIPS OF FILTER FABRIC OVER PIPE JOINTS BEFORE PLACING FLOWABLE FILL
4. PLACE FLOWABLE FILL AS ONE LIFT UP TO THE SPRINGLINE OF THE PIPE.
5. ALLOW CRADLE TO CURE FOR AT LEAST 7 DAY SBEFORE USING ANY VIBRATING EQUIPMENT IN THE VECINITY OF THE PIPE.

### CONCRETE CRADLE ALTERNATE

THE CONTRACTOR MAY CHOOSE TO ELIMINATE THE CONCRETE CRADLE AND USE COMPACTED BACKFILL. IF THE CONCRETE CRADLE IS NOT USED THE COMPACTED BACKFILL MUST BE PLACED PER THE GEOTECHNICAL ENGINER'S RECOMMENDATIONS.

### POND CERTIFICATION REQUIREMENTS

THE CONTRACTOR SHALL NOTE THAT THE FOLLOWING DOCUMENTATION IS REQUIRED FOR CERTIFICATION OF THIS POND. ADDITIONAL ITEMS MAY BE REQUIRED DEPENDING ON THE REVIEWING AUTHORITY.

1. AN AS-BUILT SURVEY WITH BARREL PIPE INVERTS AND DIAMETER, RISER DIMENSIONS AND CREST ELEVATION, ORIFICE ELEVATION(S) AND DIAMETER(S)
2. AN AS-BUILT TOPOGRAPHIC SURVEY OF THE POND AT ONE FOOT CONTOUR INTERVALS, INCLUDING THE TOP OF EMBANKMENT AND DOWNSTREAM SLOPE(S) OF THE EMBANKMENT
3. COMPACTION TESTS PERFORMED PER THE GEOTECHNICAL ENGINEER'S RECOMMENDATIONS. THIS SHOULD INCLUDE COMPACTION TESTS OF SOIL UNDER THE BARREL PIPE IF THE CONCRETE CRADLE WAS NOT USED.
4. VERIFICATION OF ANTI-SEEPAGE COLLAR SIZE AND INSTALLATION
5. VERIFICATION OF ANTI-FLOTATION BLOCK DIMENSIONS AND INSTALLATION

40 0 20 40 80

SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION


The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

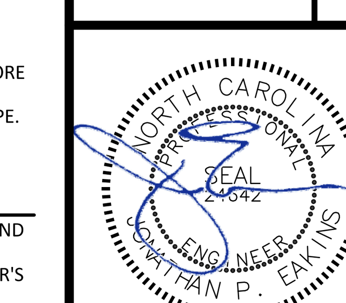

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

| | | REVISIONS |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

## POND GRADING AND DETAILS




08/09/2021

| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | 1"=40' |
| DATE: | 2020-10-29 |
| SHEET NO: | C8.0 |

## 2-YEAR STORMWATER VOLUME SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT |
|---|---|---|
| SITE AREA | 713,950 SF | |
| IMPERVIOUS AREA | 111,700 SF | 249,475 |
| CURVE NUMBER | 81 | 86 |
| 2-YR 24-HR RUNOFF VOLUME | 100,825 CF | 122,410 CF |
| 2-YR 24-HR VOLUME INCREASE | 21,585 CF | |

## ONSITE IMPERVIOUS AREA SUMMARY

| AREA TYPE | PRE-DEVELOPMENT | POST-DEVELOPMENT |
|---|---|---|
| BUILDINGS | 34,200 SF | 81,325 SF |
| ROADS/PARKING | 57,600 SF | 124,500 SF |
| SIDEWALK/PATIOS/CONCRETE | 19,900 SF | 61,300 SF |
| MISC IMPERVIOUS | 0 SF | 0 SF |
| TOTALS | 111,700 SF | 267,125 SF |

## DRAINAGE AREA SUMMARY

| | | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|---|
| DA1 | DRAINAGE AREA | 5.13 AC | 0.81 | 0.81 |
| | CN | 78 | 79 | 79 |
| | TIME OF CONCENTRATION | 22.8 MIN | 5.0 MIN | 5.0 MIN |
| DA2 | DRAINAGE AREA | 2.74 AC | 12.12 AC | --- |
| | CN | 84 | 87 | --- |
| | TIME OF CONCENTRATION | 13.1 MIN | 5.0 MIN | --- |
| DA2.1 | DRAINAGE AREA | --- | --- | 1.72 AC |
| | CN | --- | --- | 94 |
| | TIME OF CONCENTRATION | --- | --- | 10.0 MIN |
| DA2.2 | DRAINAGE AREA | --- | --- | 10.32 AC |
| | CN | --- | --- | 88 |
| | TIME OF CONCENTRATION | --- | --- | 5.0 MIN |
| DA3 | DRAINAGE AREA | 3.16 AC | 1.51 AC | 1.51 AC |
| | CN | 78 | 79 | 79 |
| | TIME OF CONCENTRATION | 23.4 MIN | 5.0 MIN | 5.0 MIN |
| DA4 | DRAINAGE AREA | 3.54 AC | --- | --- |
| | CN | 88 | --- | --- |
| | TIME OF CONCENTRATION | 5.0 MIN | --- | --- |

NOTES:
1. THE DRAINAGE AREA, CN AND TIME OF CONCENTRATION FOR DA2.1 WERE TAKEN FROM CALCULATIONS FOR THE CCC SITE DATED FEBRUARY 4, 2020

## AP1 DISCHARGE SUMMARY

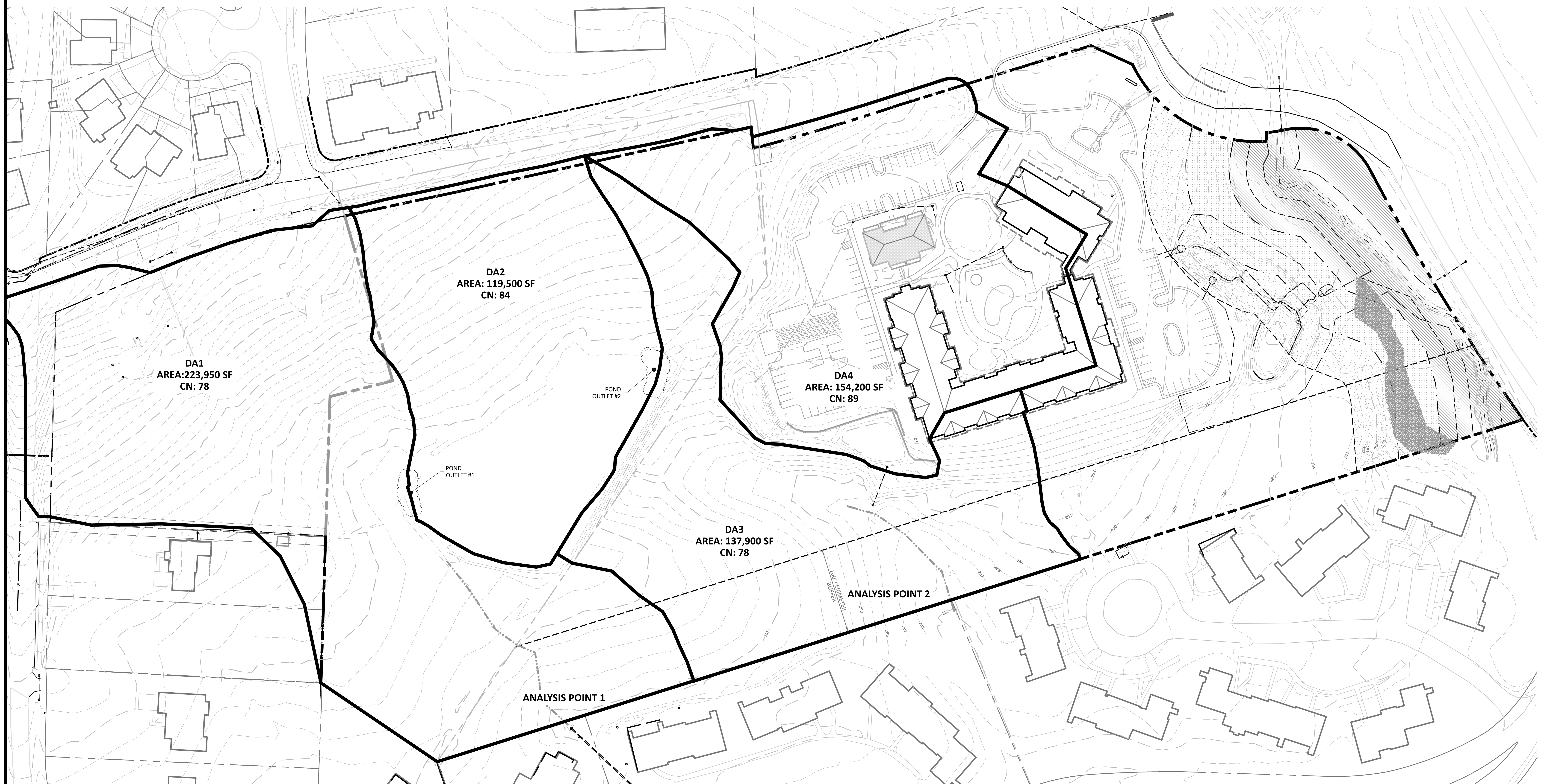
| | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|
| 1-YR 24-HR DISCHARGE (CFS) | 8.3 | 2.0 | 2.0 |
| 2-YR 24-HR DISCHARGE (CFS) | 10.4 | 2.5 | 2.5 |
| 10-YR 24-HR DISCHARGE (CFS) | 20.7 | 4.6 | 4.6 |
| 25-YR 24-HR DISCHARGE (CFS) | 26.9 | 5.9 | 5.9 |
| 100-YR 24-HR DISCHARGE (CFS) | 36.6 | 8.0 | 8.0 |

## AP2 DISCHARGE SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|
| 1-YR 24-HR DISCHARGE (CFS) | 15.2 | 4.0 | 3.9 |
| 2-YR 24-HR DISCHARGE (CFS) | 19.0 | 5.0 | 4.9 |
| 10-YR 24-HR DISCHARGE (CFS) | 33.9 | 9.1 | 9.1 |
| 25-YR 24-HR DISCHARGE (CFS) | 42.8 | 11.5 | 11.5 |
| 100-YR 24-HR DISCHARGE (CFS) | 55.7 | 30.2 | 28.6 |

NOTES
1. PER TOCHDM THE 1-YEAR, 24-HOUR DISCHARGE IS 80% OF THE 2-YEAR, 24-HOUR DISCHARGE

204




60 0 30 60 120
SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

PRE-DEVELOPMENT DRAINAGE AREA PLAN

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---

DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=60'

DATE: 2020-10-29

SHEET NO: DA1.0

### 2-YEAR STORMWATER VOLUME SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT |
|---|---|---|
| SITE AREA | 713,950 SF | |
| IMPERVIOUS AREA | 111,700 SF | 249,475 |
| CURVE NUMBER | 81 | 86 |
| 2-YR 24-HR RUNOFF VOLUME | 100,825 CF | 122,410 CF |
| 2-YR 24-HR VOLUME INCREASE | 21,585 CF | |

### ONSITE IMPERVIOUS AREA SUMMARY

| AREA TYPE | PRE-DEVELOPMENT | POST-DEVELOPMENT |
|---|---|---|
| BUILDINGS | 34,200 SF | 81,325 SF |
| ROADS/PARKING | 57,600 SF | 124,500 SF |
| SIDEWALK/PATIOS/CONCRETE | 19,900 SF | 61,300 SF |
| MISC IMPERVIOUS | 0 SF | 0 SF |
| TOTALS | 111,700 SF | 267,125 SF |

### DRAINAGE AREA SUMMARY

| | | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|---|
| DA1 | DRAINAGE AREA | 5.13 AC | 0.81 | 0.81 |
| | CN | 78 | 79 | 79 |
| | TIME OF CONCENTRATION | 22.8 MIN | 5.0 MIN | 5.0 MIN |
| DA2 | DRAINAGE AREA | 2.74 AC | 12.12 AC | --- |
| | CN | 84 | 87 | --- |
| | TIME OF CONCENTRATION | 13.1 MIN | 5.0 MIN | --- |
| DA2.1 | DRAINAGE AREA | --- | --- | 1.72 AC |
| | CN | --- | --- | 94 |
| | TIME OF CONCENTRATION | --- | --- | 10.0 MIN |
| DA2.2 | DRAINAGE AREA | --- | --- | 10.32 AC |
| | CN | --- | --- | 88 |
| | TIME OF CONCENTRATION | --- | --- | 5.0 MIN |
| DA3 | DRAINAGE AREA | 3.16 AC | 1.51 AC | 1.51 AC |
| | CN | 78 | 79 | 79 |
| | TIME OF CONCENTRATION | 23.4 MIN | 5.0 MIN | 5.0 MIN |
| DA4 | DRAINAGE AREA | 3.54 AC | --- | --- |
| | CN | 88 | --- | --- |
| | TIME OF CONCENTRATION | 5.0 MIN | --- | --- |

NOTES:
1. THE DRAINAGE AREA, CN AND TIME OF CONCENTRATION FOR DA2.1 WERE TAKEN FROM CALCULATIONS FOR THE CCC SITE DATED FEBRUARY 4, 2020

### AP1 DISCHARGE SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|
| 1-YR 24-HR DISCHARGE (CFS) | 8.3 | 2.0 | 2.0 |
| 2-YR 24-HR DISCHARGE (CFS) | 10.4 | 2.5 | 2.5 |
| 10-YR 24-HR DISCHARGE (CFS) | 20.7 | 4.6 | 4.6 |
| 25-YR 24-HR DISCHARGE (CFS) | 26.9 | 5.9 | 5.9 |
| 100-YR 24-HR DISCHARGE (CFS) | 36.6 | 8.0 | 8.0 |

### AP2 DISCHARGE SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|
| 1-YR 24-HR DISCHARGE (CFS) | 15.2 | 4.0 | 3.9 |
| 2-YR 24-HR DISCHARGE (CFS) | 19.0 | 5.0 | 4.9 |
| 10-YR 24-HR DISCHARGE (CFS) | 33.9 | 9.1 | 9.1 |
| 25-YR 24-HR DISCHARGE (CFS) | 42.8 | 11.5 | 11.5 |
| 100-YR 24-HR DISCHARGE (CFS) | 55.7 | 30.2 | 28.6 |

NOTES
1. PER TOCHDM THE 1-YEAR, 24-HOUR DISCHARGE IS 80% OF THE 2-YEAR, 24-HOUR DISCHARGE

205


60 0 30 60 120
SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

POST-DEVELOPMENT CONDITION 1 DRAINAGE AREA

NORTH CAROLINA
SEAL
ENGINEER
... AN P. EAKINS
09/15/2021

PROJECT NO: ---

DESIGN BY: JPE

DRAWN BY: JPE

SCALE: 1"=60'

DATE: 2020-10-29

SHEET NO: DA2.1

206

## 2-YEAR STORMWATER VOLUME SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT |
|---|---|---|
| SITE AREA | 713,950 SF | |
| IMPERVIOUS AREA | 111,700 SF | 249,475 |
| CURVE NUMBER | 81 | 86 |
| 2-YR 24-HR RUNOFF VOLUME | 100,825 CF | 122,410 CF |
| 2-YR 24-HR VOLUME INCREASE | 21,585 CF | |

## ONSITE IMPERVIOUS AREA SUMMARY

| AREA TYPE | PRE-DEVELOPMENT | POST-DEVELOPMENT |
|---|---|---|
| BUILDINGS | 34,200 SF | 81,325 SF |
| ROADS/PARKING | 57,600 SF | 124,500 SF |
| SIDEWALK/PATIOS/CONCRETE | 19,900 SF | 61,300 SF |
| MISC IMPERVIOUS | 0 SF | 0 SF |
| TOTALS | 111,700 SF | 267,125 SF |

## DRAINAGE AREA SUMMARY

| | | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|---|
| DA1 | DRAINAGE AREA | 5.13 AC | 0.81 | 0.81 |
| | CN | 78 | 79 | 79 |
| | TIME OF CONCENTRATION | 22.8 MIN | 5.0 MIN | 5.0 MIN |
| DA2 | DRAINAGE AREA | 2.74 AC | 12.12 AC | --- |
| | CN | 84 | 87 | --- |
| | TIME OF CONCENTRATION | 13.1 MIN | 5.0 MIN | --- |
| DA2.1 | DRAINAGE AREA | --- | --- | 1.72 AC |
| | CN | --- | --- | 94 |
| | TIME OF CONCENTRATION | --- | --- | 10.0 MIN |
| DA2.2 | DRAINAGE AREA | --- | --- | 10.32 AC |
| | CN | --- | --- | 88 |
| | TIME OF CONCENTRATION | --- | --- | 5.0 MIN |
| DA3 | DRAINAGE AREA | 3.16 AC | 1.51 AC | 1.51 AC |
| | CN | 78 | 79 | 79 |
| | TIME OF CONCENTRATION | 23.4 MIN | 5.0 MIN | 5.0 MIN |
| DA4 | DRAINAGE AREA | 3.54 AC | --- | --- |
| | CN | 88 | --- | --- |
| | TIME OF CONCENTRATION | 5.0 MIN | --- | --- |

NOTES:
1. THE DRAINAGE AREA, CN AND TIME OF CONCENTRATION FOR DA2.1 WERE TAKEN FROM CALCULATIONS FOR THE CCC SITE DATED FEBRUARY 4, 2020

## AP1 DISCHARGE SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|
| 1-YR 24-HR DISCHARGE (CFS) | 8.3 | 2.0 | 2.0 |
| 2-YR 24-HR DISCHARGE (CFS) | 10.4 | 2.5 | 2.5 |
| 10-YR 24-HR DISCHARGE (CFS) | 20.7 | 4.6 | 4.6 |
| 25-YR 24-HR DISCHARGE (CFS) | 26.9 | 5.9 | 5.9 |
| 100-YR 24-HR DISCHARGE (CFS) | 36.6 | 8.0 | 8.0 |

## AP2 DISCHARGE SUMMARY

| | PRE-DEVELOPMENT | POST-DEVELOPMENT CONDITION 1 | POST-DEVELOPMENT CONDITION 2 |
|---|---|---|---|
| 1-YR 24-HR DISCHARGE (CFS) | 15.2 | 4.0 | 3.9 |
| 2-YR 24-HR DISCHARGE (CFS) | 19.0 | 5.0 | 4.9 |
| 10-YR 24-HR DISCHARGE (CFS) | 33.9 | 9.1 | 9.1 |
| 25-YR 24-HR DISCHARGE (CFS) | 42.8 | 11.5 | 11.5 |
| 100-YR 24-HR DISCHARGE (CFS) | 55.7 | 30.2 | 28.6 |

NOTES
1. PER TOCHDM THE 1-YEAR, 24-HOUR DISCHARGE IS 80% OF THE 2-YEAR, 24-HOUR DISCHARGE


60 0 30 60 120
SCALE: 1"=60'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION


The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751


CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

| | | |
|---|---|---|
| 1 | 2021-02-04 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 2 | 2021-03-26 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 3 | 2021-05-10 | REVISIONS PER TOWN AND NCDOT COMMENTS |
| 4 | 2021-08-09 | LAYOUT REVISIONS AND REVISIONS PER TOWN COMMENTS |
| 5 | 2021-09-15 | REVISIONS PER TOWN COMMENTS AND UPDATED FIELD SURVEY |

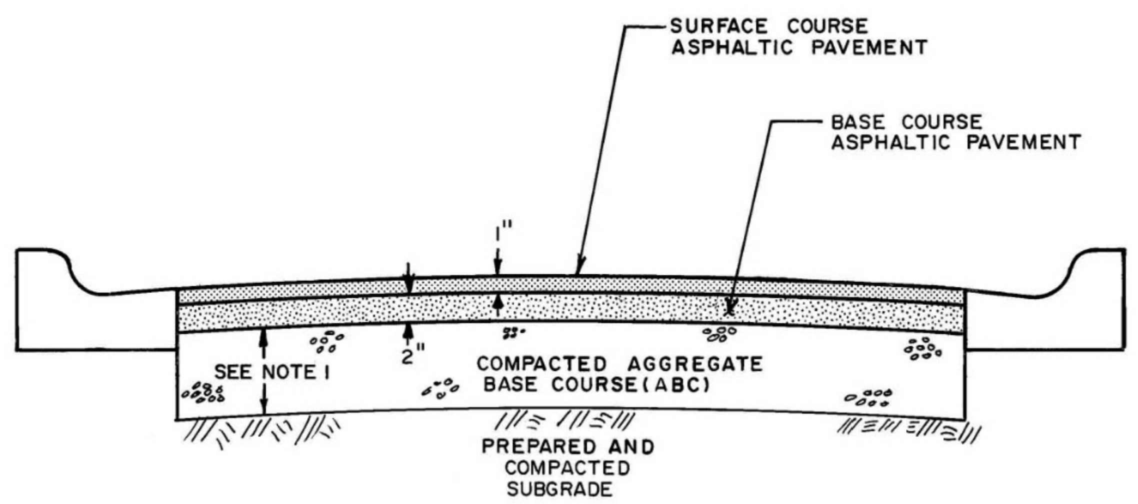
RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

CHAPEL HILL, NC

POST-DEVELOPMENT CONDITION 2 DRAINAGE AREA

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL
JONATHAN P. EAKINS
09/15/2021

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: 1"=60'
DATE: 2020-10-29
SHEET NO: DA2.2



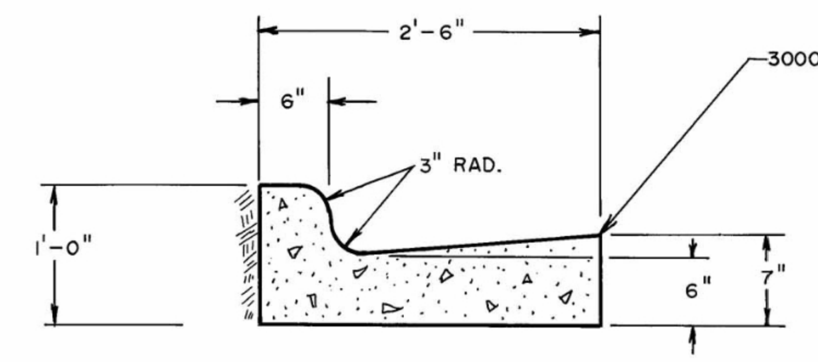

NOTE:
1. AGGREGATE BASE COURSE THICKNESS SHALL BE 8" IN TYPE I AREA; 10" IN TYPE II AREA.(SEE AREA MAP IN DESIGN MANUAL.)
2. TOWN STREETS SHALL TYPICALLY BE CONSTRUCTED USING TWO-COURSE PAVING IN ACCORDANCE WITH THE DESIGN MANUAL.

NO SCALE

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE: TYPICAL PAVEMENT THICKNESS FOR TYPE I AND TYPE II CONSTRUCTION AREAS | REVISIONS NO DATE BY | DET.NO. ST-1G SH. 8 of 8 |
|---|---|---|

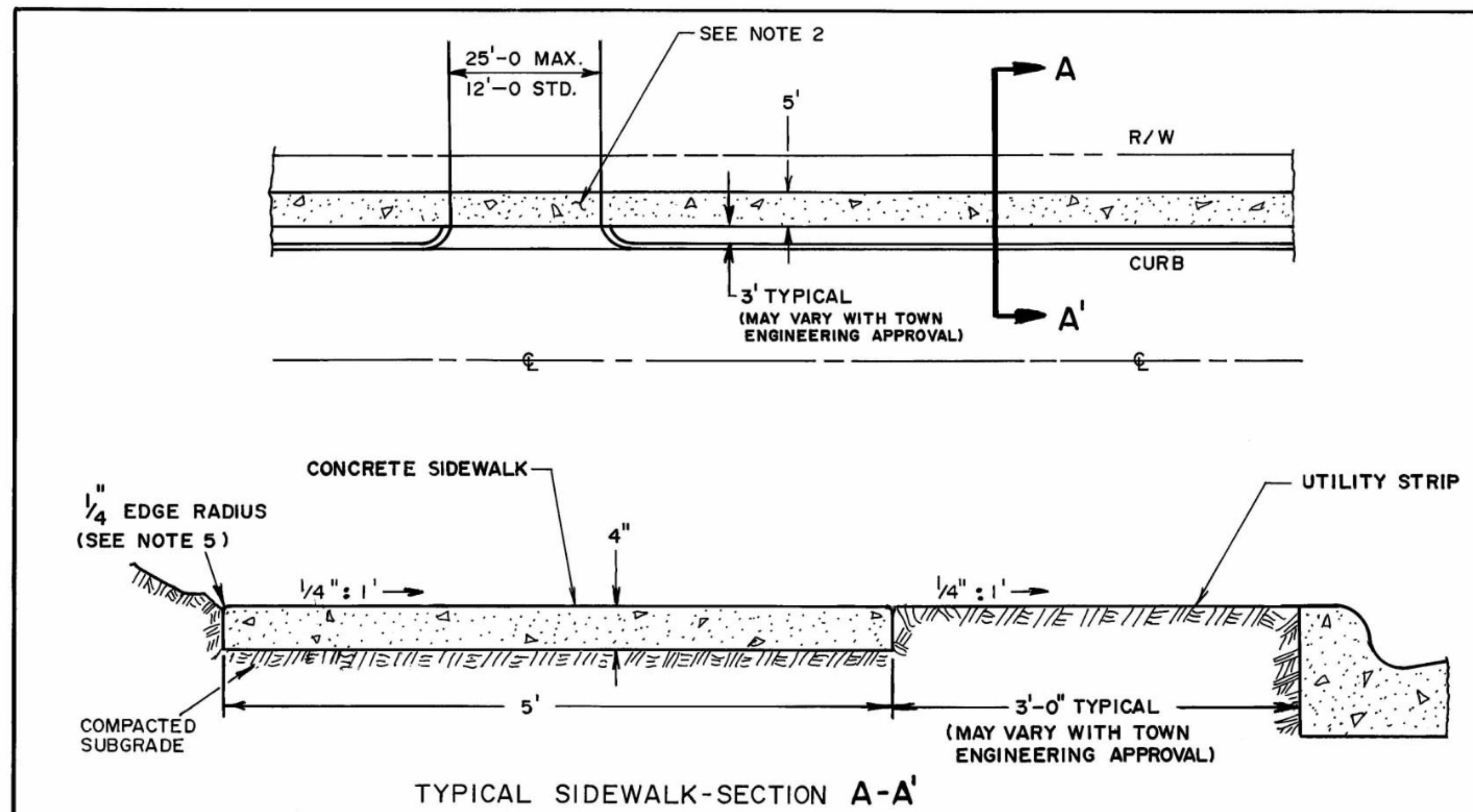
207




SCALE: 1"=1'-0"

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE CURB & GUTTER SECTION | REVISIONS NO DATE BY | DET.NO. ST-2 |
|---|---|---|



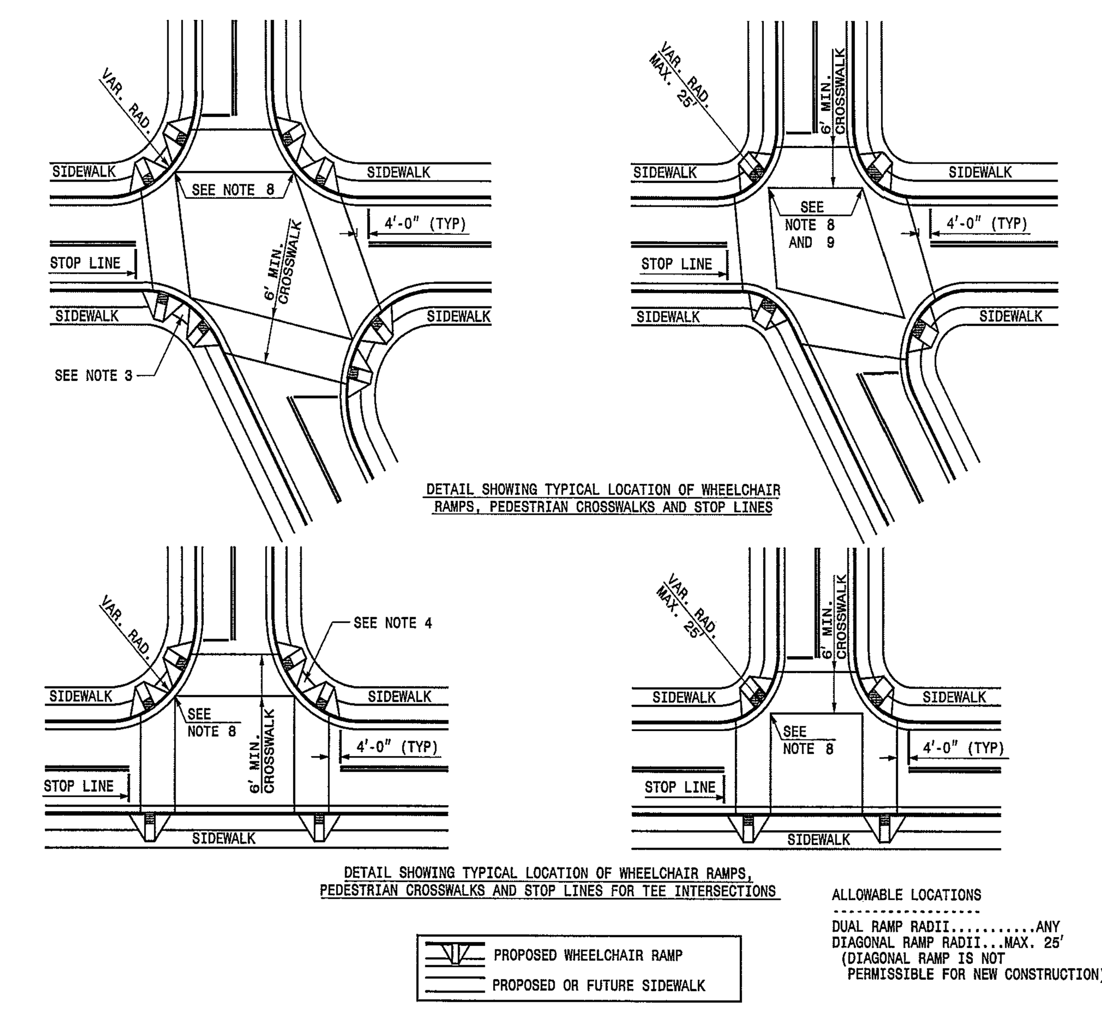

TYPICAL SIDEWALK-SECTION A-A'

NOTES:
1. ALL CONCRETE 3000 PSI.
2. SEE STANDARD DETAIL "D-1" FOR THROUGH DRIVEWAY SPECIFICATIONS.
3. EXPANSION JOINTS 50' APART MAXIMUM.
4. CONTROL JOINT EVERY 5 FEET.
5. ALL SIDEWALKS SHALL BE CONSTRUCTED WITH TOOLED 1/4" EDGE RADIUS.
6. IF UTILITY STRIP IS COMPLETELY ELIMINATED, SIDEWALK SHALL BE PLACED DIRECTLY AT BACK-OF-CURB, WITH 1/4" EDGE RADIUS.

NO SCALE

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE TYPICAL SIDEWALK | REVISIONS NO DATE BY | DET.NO. ST-4 SH. 1 of 3 |
|---|---|---|




NOTE: DRAWING NOT TO SCALE
SOURCE: NCDOT STANDARD DRAWINGS

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE: | REVISIONS | | DET.NO. |
|---|---|---|---|
| ACCESSIBLE RAMP | 09/03 | JH | ST - 5.2 |


2627 Meacham Road
Chapel Hill NC 27516
RADWAY DESIGN ASSOCIATES, PA
City Planning and Land Development Consultants

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751


CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

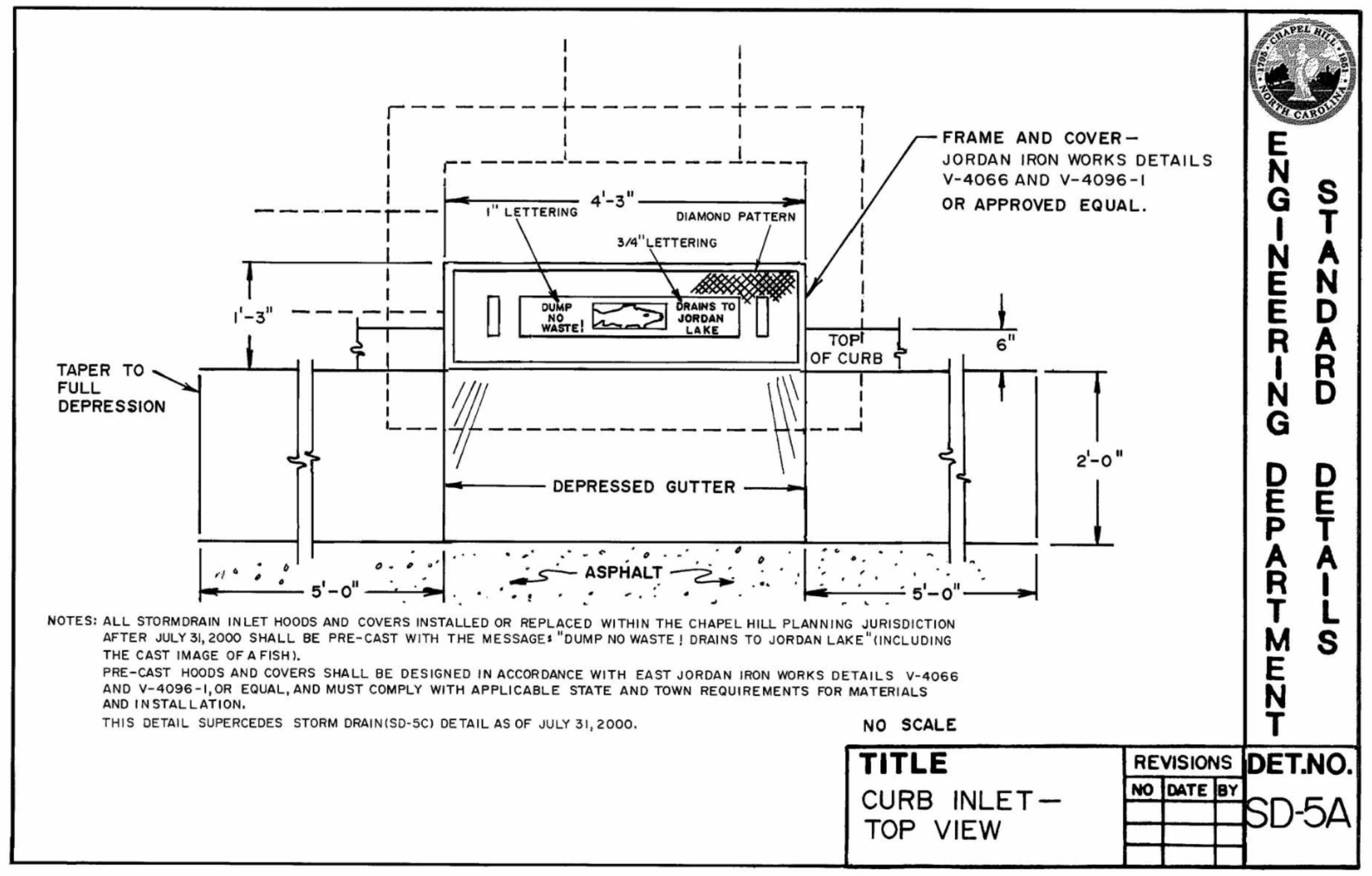
REVISIONS

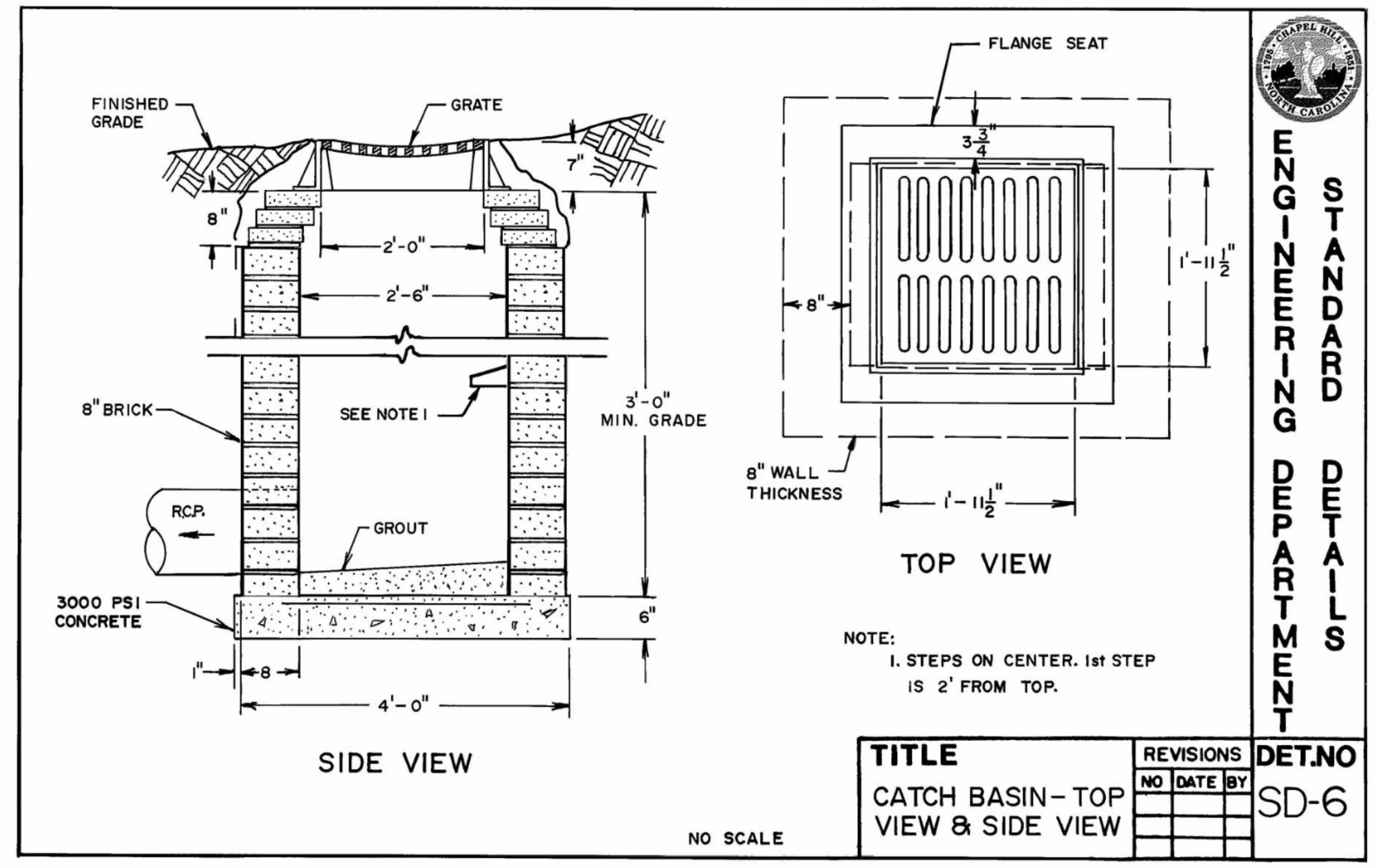
RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC
SITE DETAILS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS
10/29/2020

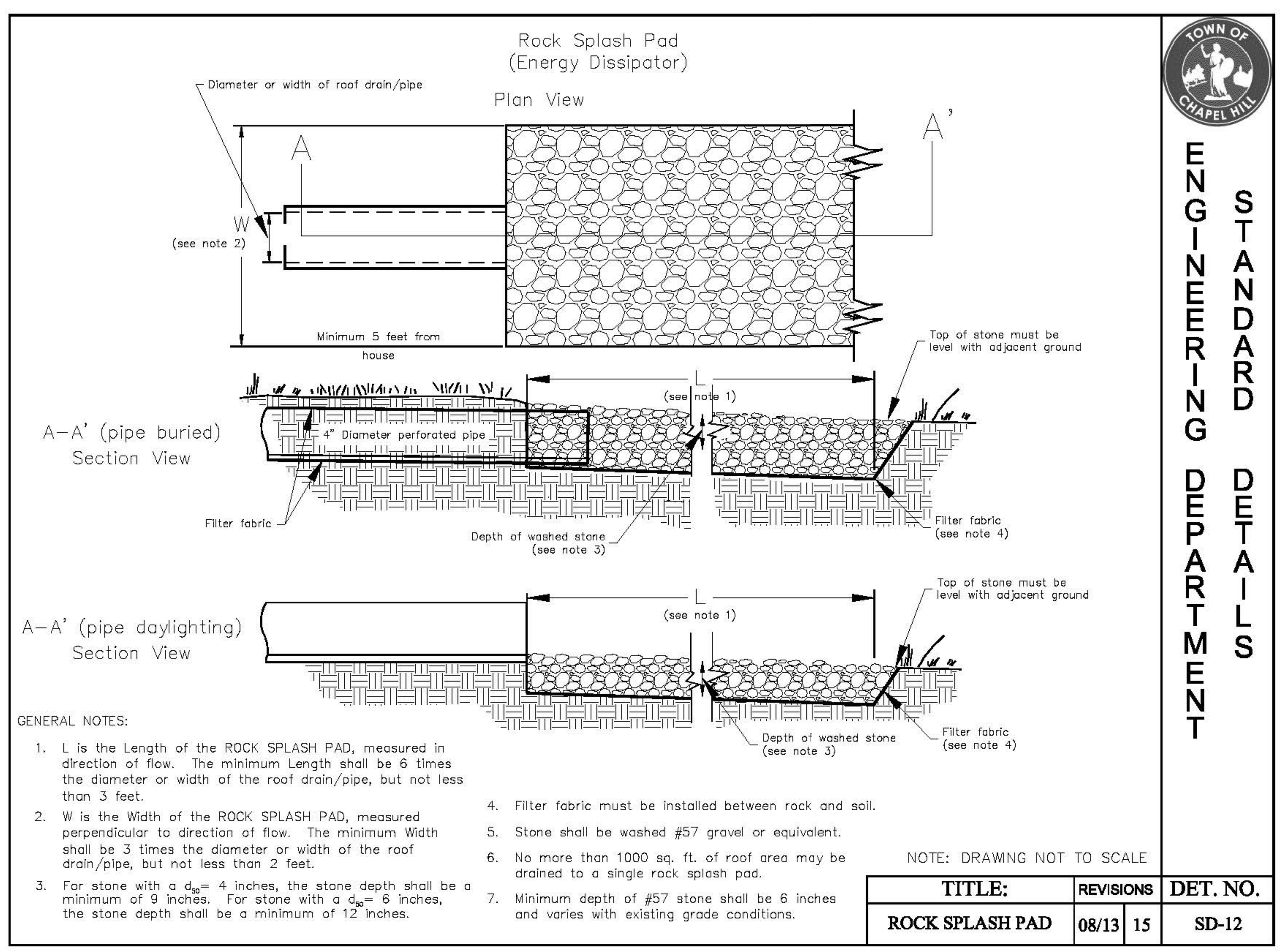
| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | NTS |
| DATE: | 2020-10-29 |
| SHEET NO: | D1.1 |

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION




208




2627 Meacham Road
Chapel Hill NC 27516

RADWAY DESIGN ASSOCIATES, PA
City Planning and Land Development Consultants

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS

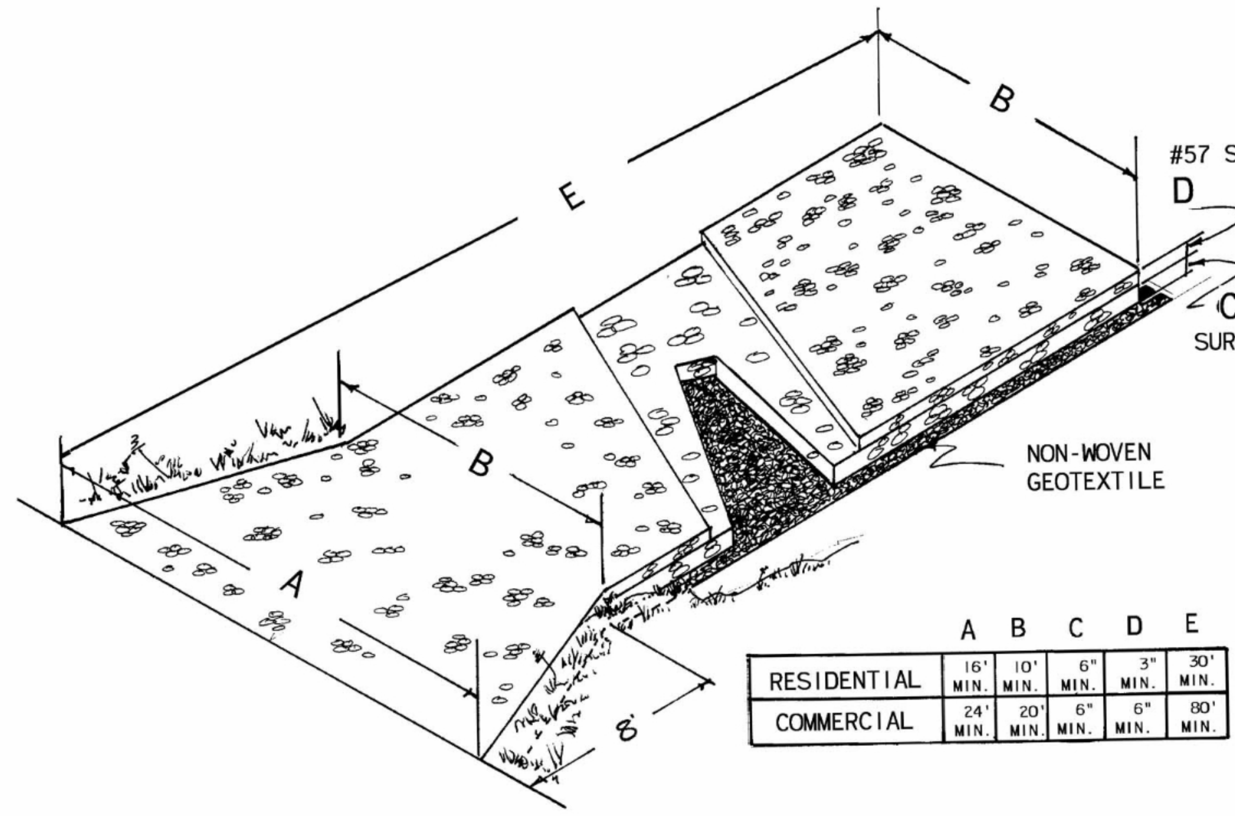
CHAPEL HILL, NC

STORM DRAINAGE DETAILS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS
10/29/2020

| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | NTS |
| DATE: | 2020-10-29 |
| SHEET NO: | D2.1 |

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

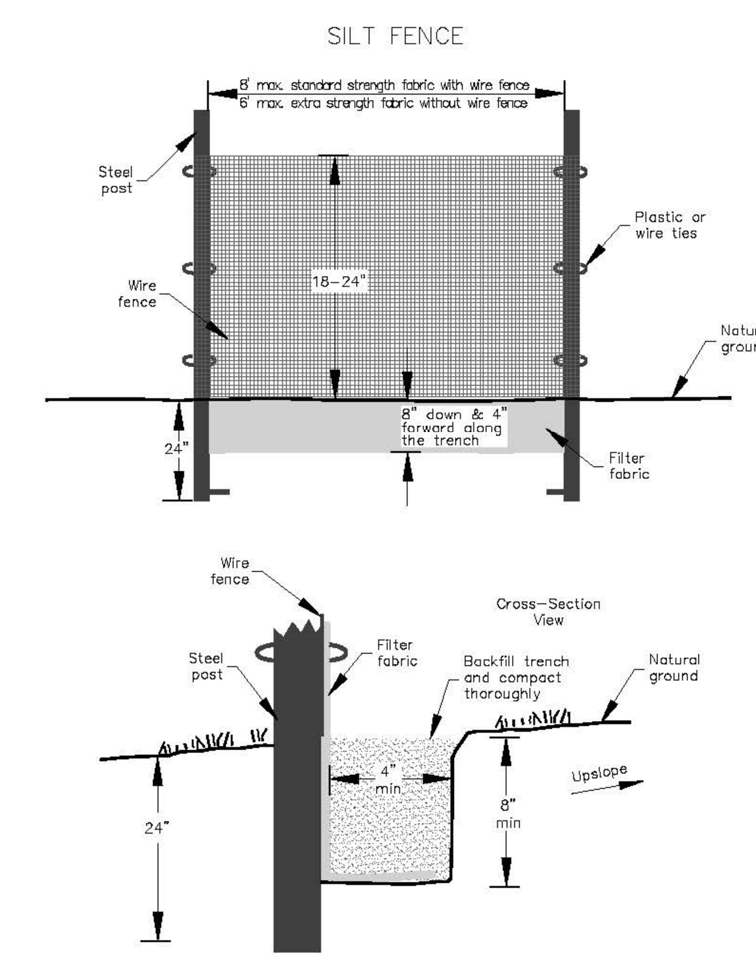



| | A | B | C | D | E |
|---|---|---|---|---|---|
| RESIDENTIAL | 16' MIN. | 10' MIN. | 6" MIN. | 3" MIN. | 30' MIN. |
| COMMERCIAL | 24' MIN. | 20' MIN. | 6" MIN. | 6" MIN. | 80' MIN. |

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE | REVISIONS | | | DET.NO. |
|---|---|---|---|---|
| | NO | DATE | BY | |
| GRAVEL CONSTRUCTION ENTRANCE | | | | E-1 |

SILT FENCE




GENERAL NOTES:

1. Use silt fence only when drainage area does not exceed ¼ acre and never in areas of concentrated flow.
2. Silt fence shall not be removed unless site is stabilized and inspected by Town of Chapel Hill staff.

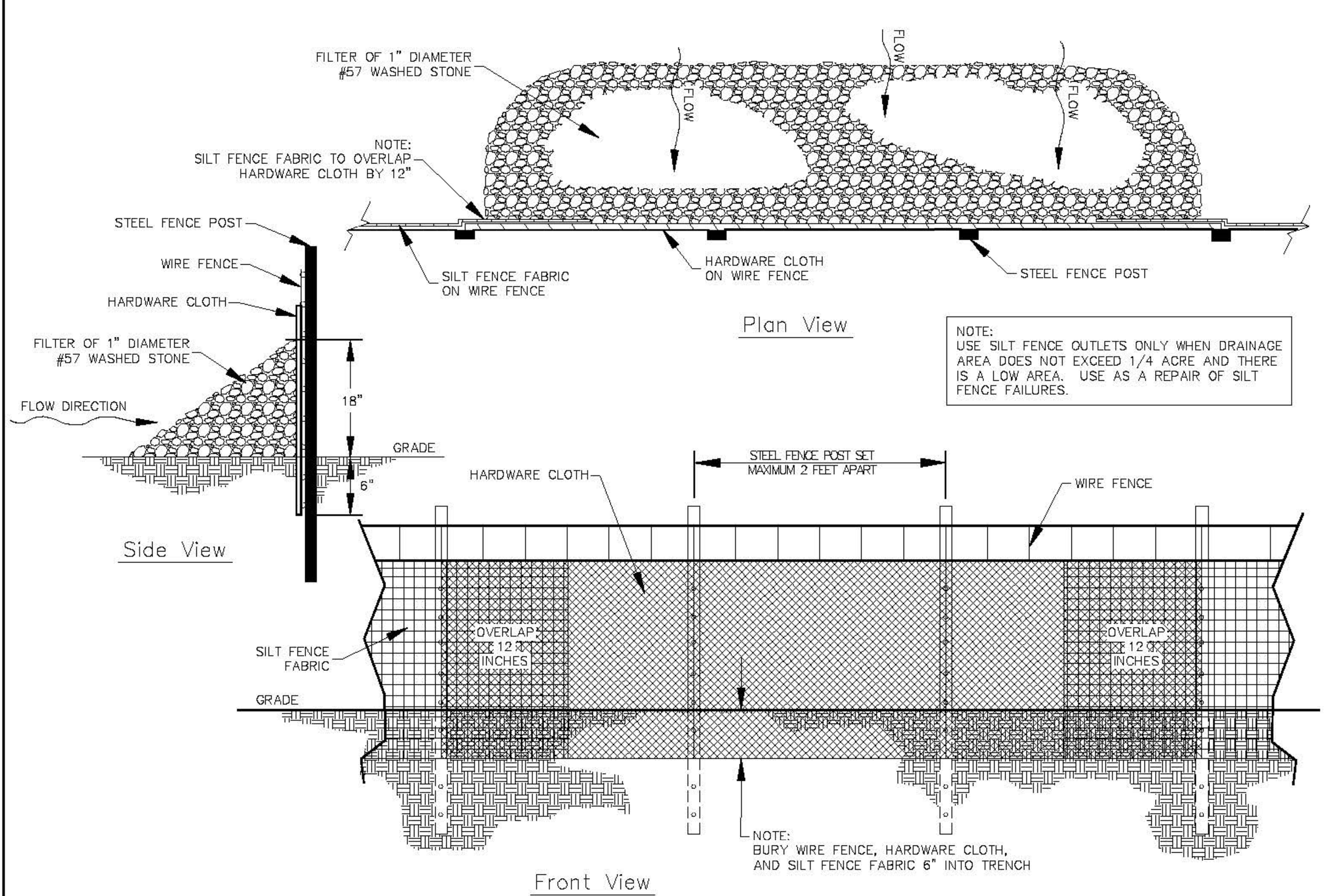
NOTE: DRAWING NOT TO SCALE

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE: | REVISIONS | | DET. NO. |
|---|---|---|---|
| SILT FENCE | 08/13 | 15 | SD-18 |

209

SILT FENCE OUTLET



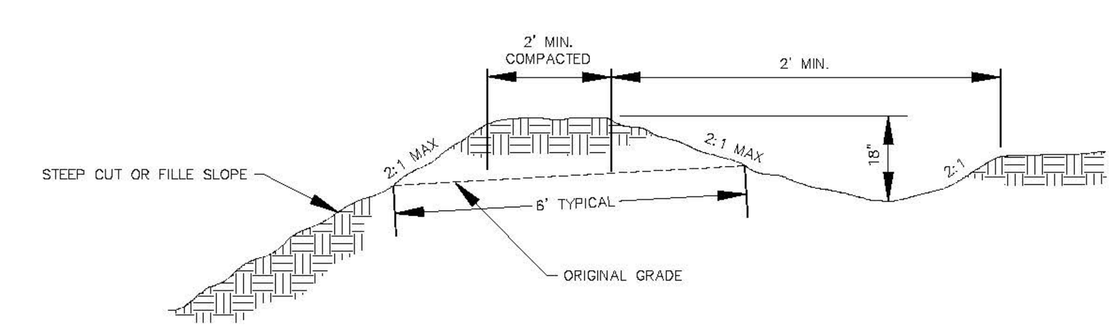

NOTE: USE SILT FENCE OUTLETS ONLY WHEN DRAINAGE AREA DOES NOT EXCEED 1/4 ACRE AND THERE IS A LOW AREA. USE AS A REPAIR OF SILT FENCE FAILURES.

NOTE: DRAWING NOT TO SCALE

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE: | REVISIONS | | DET. NO. |
|---|---|---|---|
| SILT FENCE OUTLET | 08/13 | 15 | SD-19 |

Diversion Ditch




Cross-Section View

GENERAL NOTES:

1. At a minimum, seed, straw, & tack required for site inspection approval.
2. Stabilize diversion ditch based on design velocity.

NOTE: DRAWING NOT TO SCALE

ENGINEERING DEPARTMENT STANDARD DETAILS

| TITLE: | REVISIONS | | DET. NO. |
|---|---|---|---|
| Diversion Ditch | 08/13 | 15 | SD-20 |

2627 Meacham Road
Chapel Hill NC 27516
RADWAY DESIGN ASSOCIATES, PA
City Planning and Land Development Consultants

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

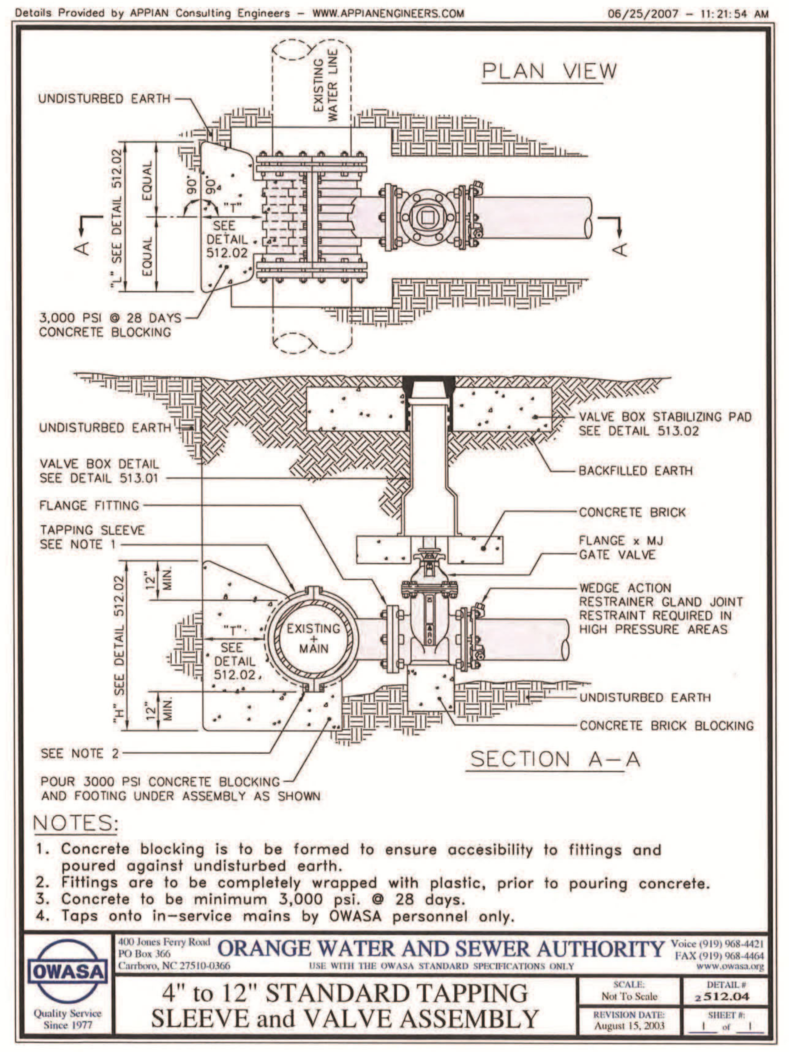
RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC
EROSION CONTROL DETAILS

NORTH CAROLINA PROFESSIONAL SEAL ENGINEER JONATHAN P. EAKINS
10/29/2020

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: NTS
DATE: 2020-10-29
SHEET NO: D3.1

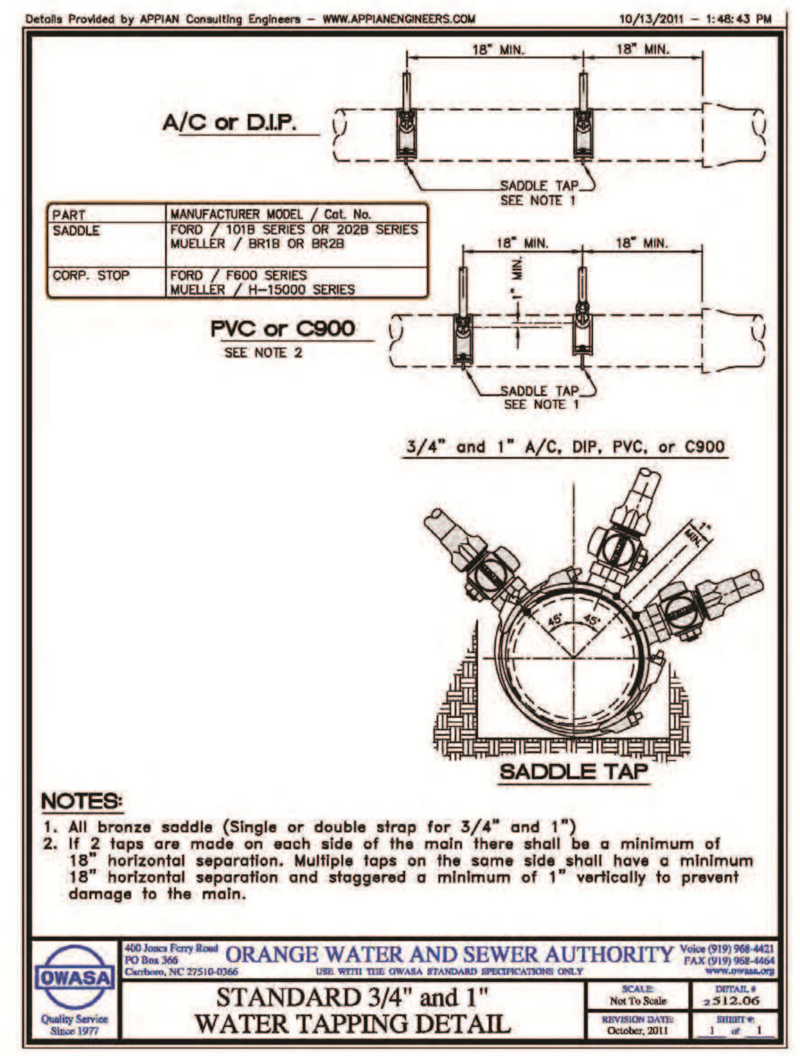
PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

Return to Table of Details





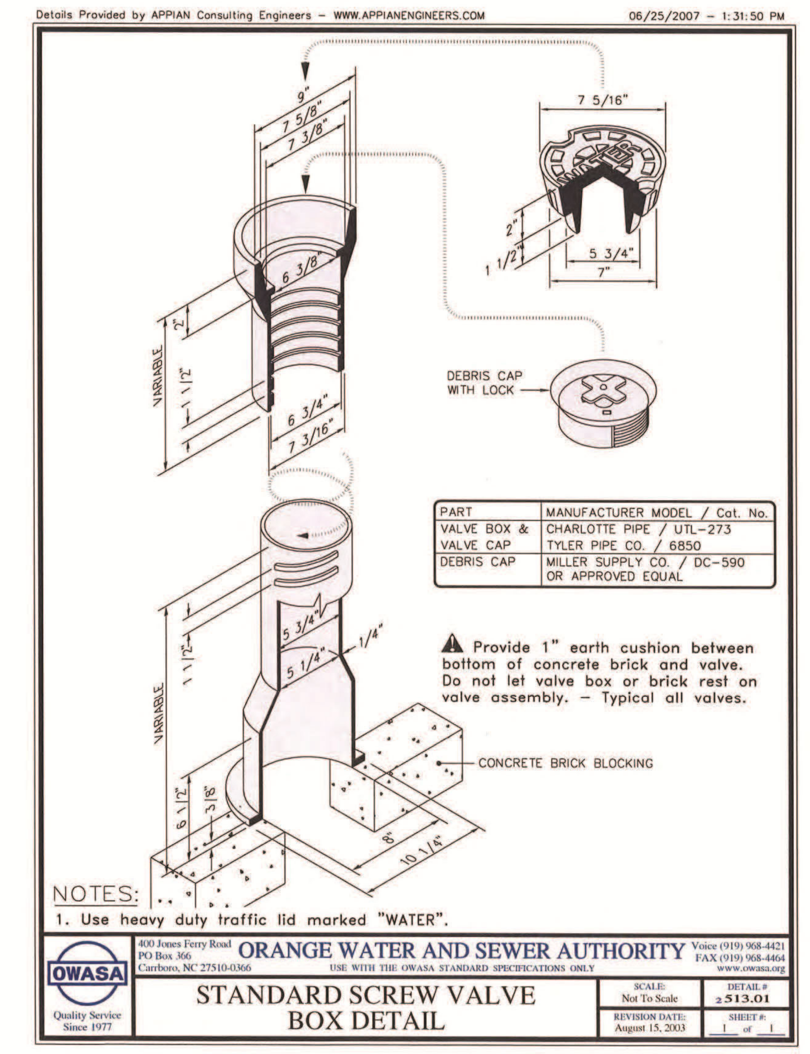

Return to Table of Details





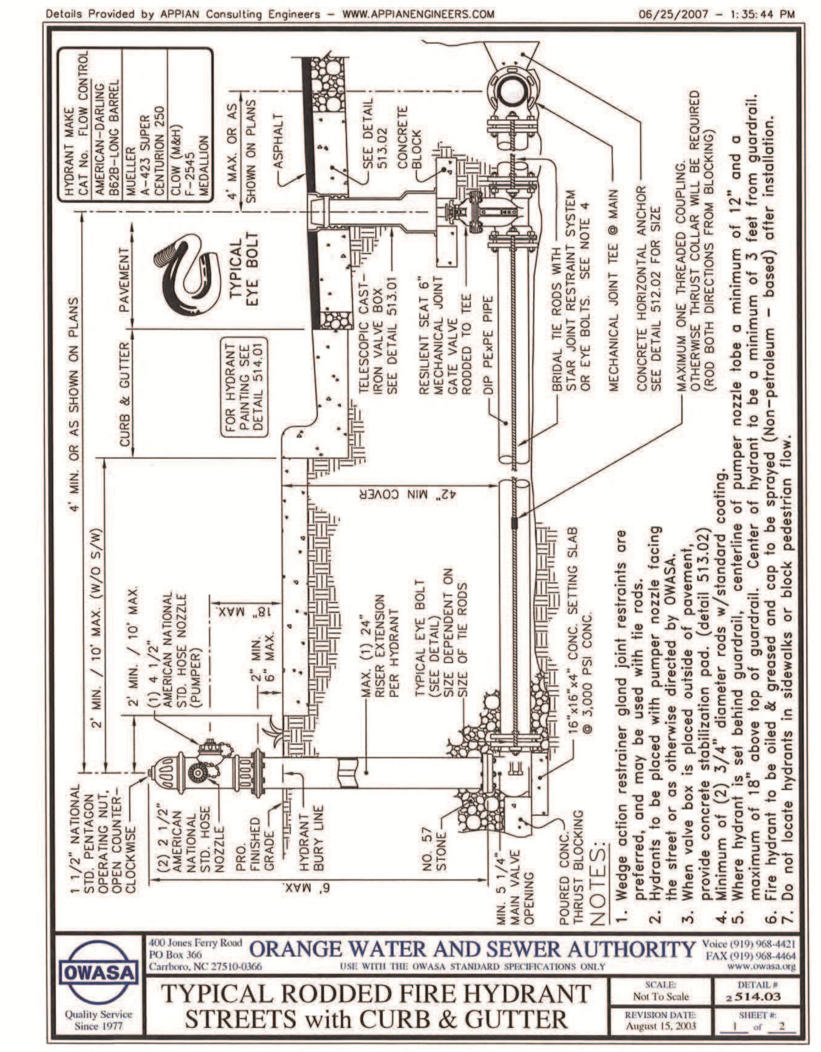

Return to Table of Details

210



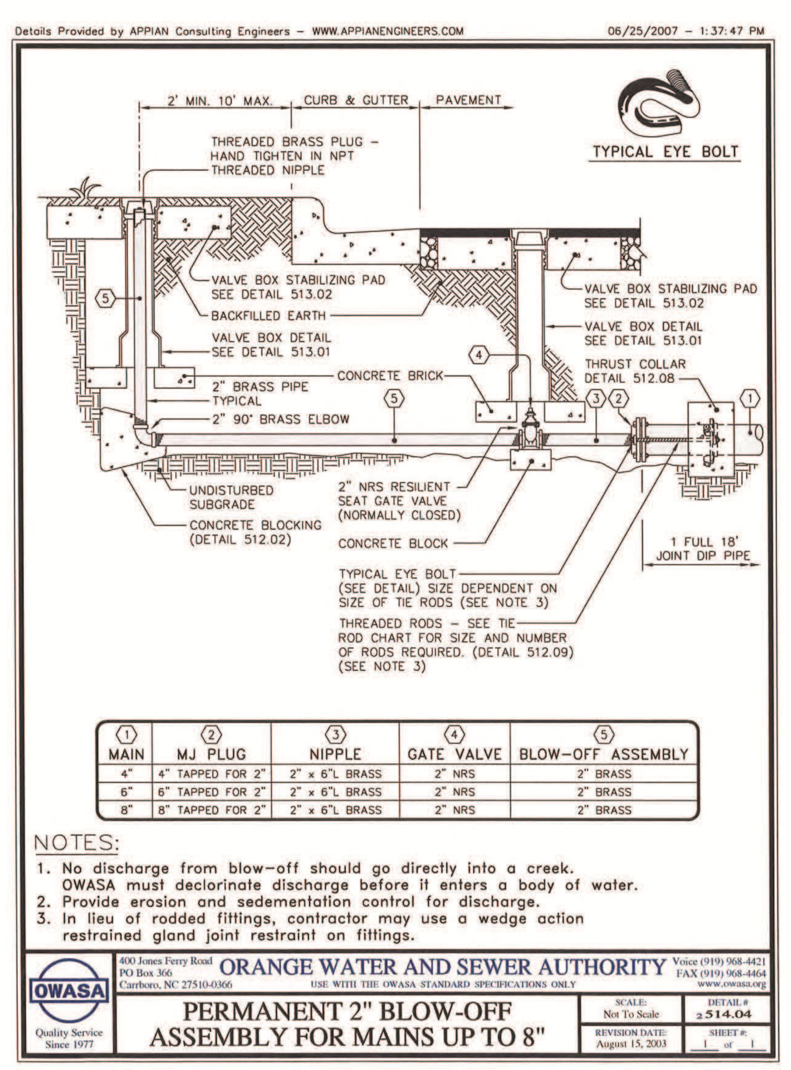



Return to Table of Details



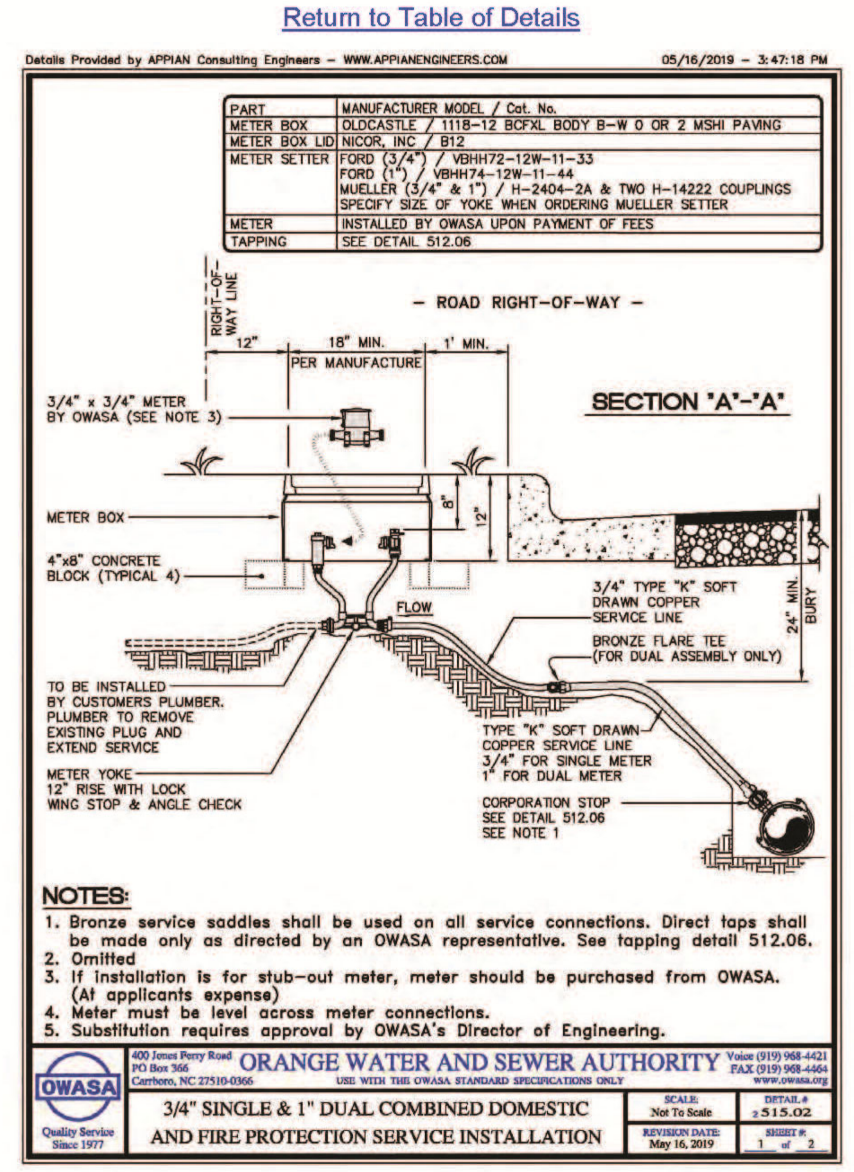



Return to Table of Details



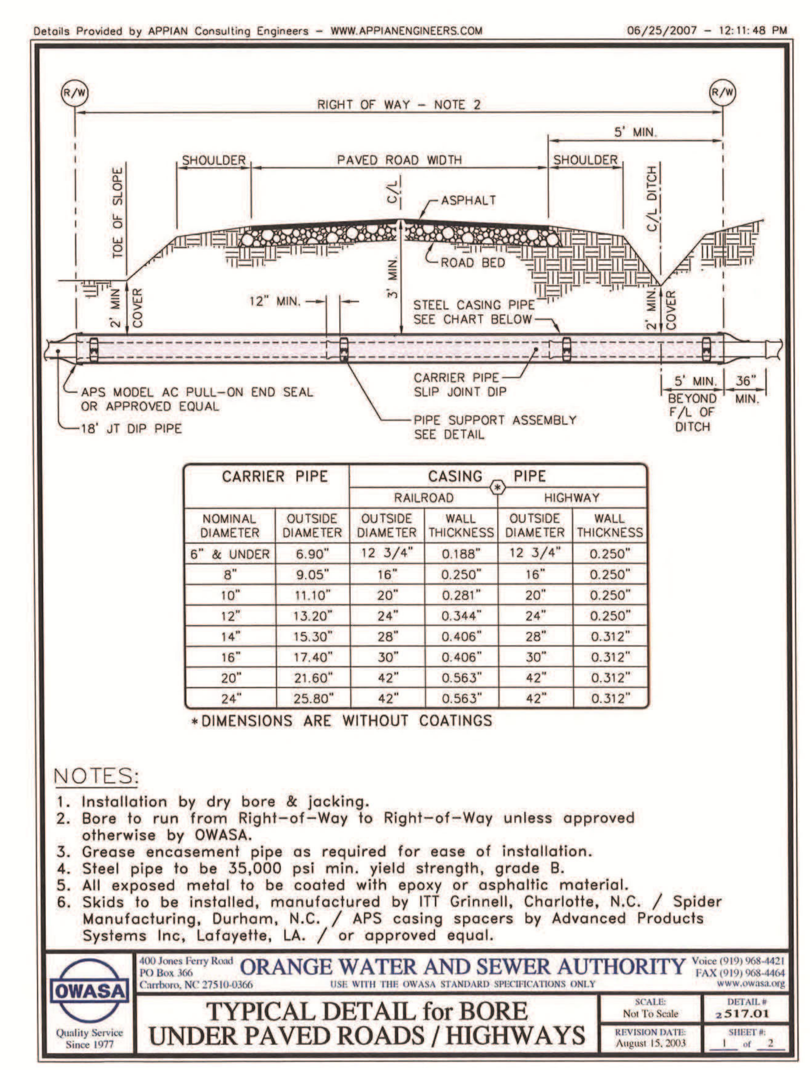



Return to Table of Details






Return to Table of Details






RADWAY DESIGN ASSOCIATES, PA
2627 Meacham Road
Chapel Hill NC 27516
City Planning and Land Development Consultants

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMIT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

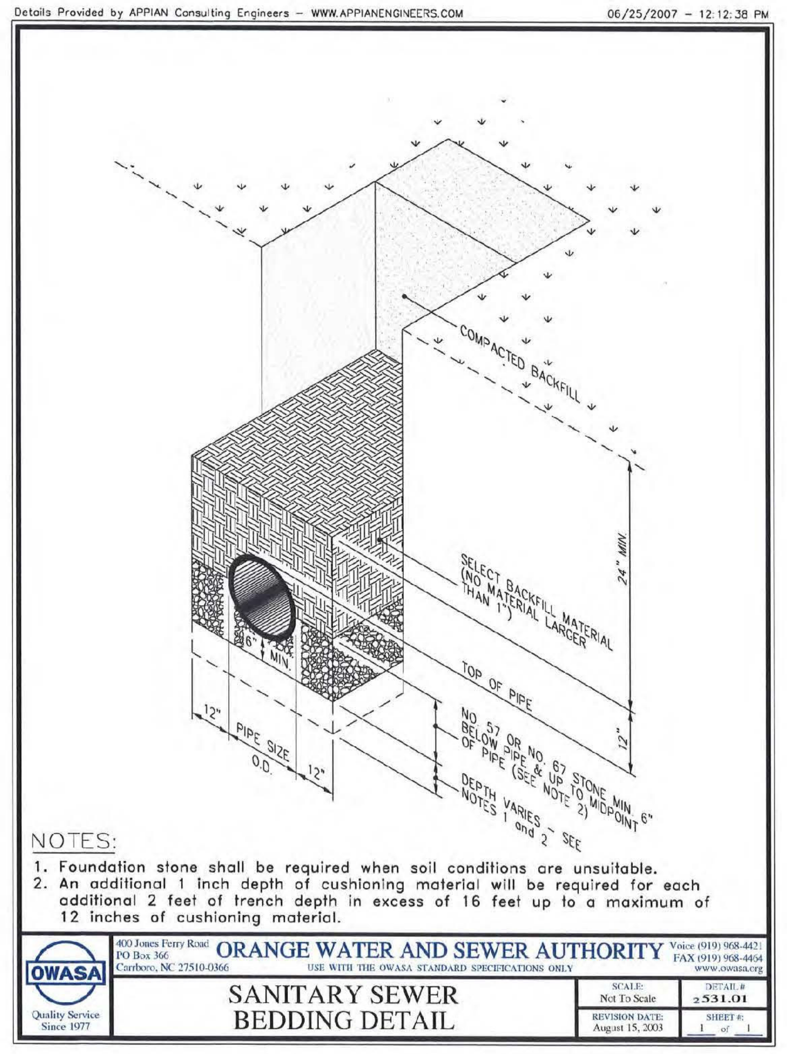
RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC
OWASA WATER DETAILS

10/29/2020

PROJECT NO: ---
DESIGN BY: JPE
DRAWN BY: JPE
SCALE: NTS
DATE: 2020-10-29
SHEET NO: D4.1

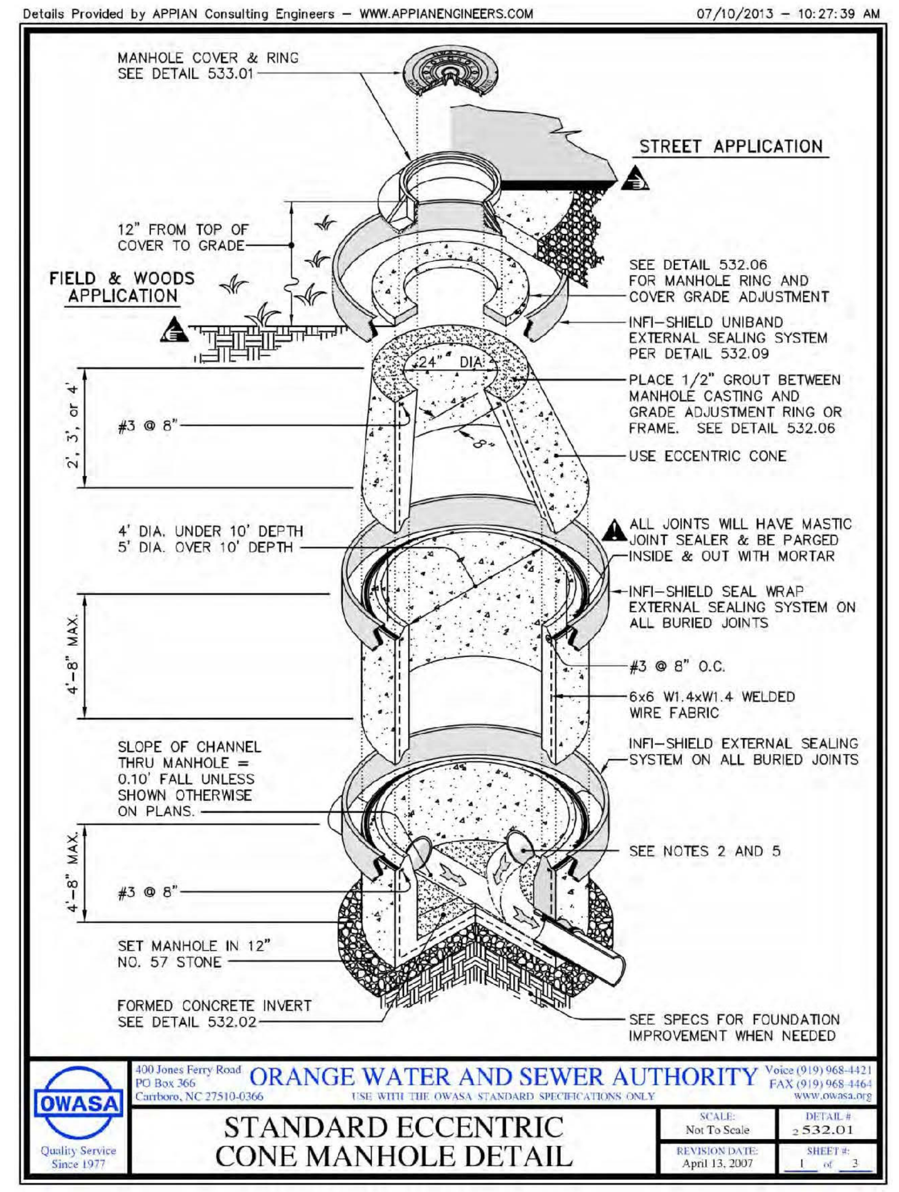
PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

Return to Table of Details



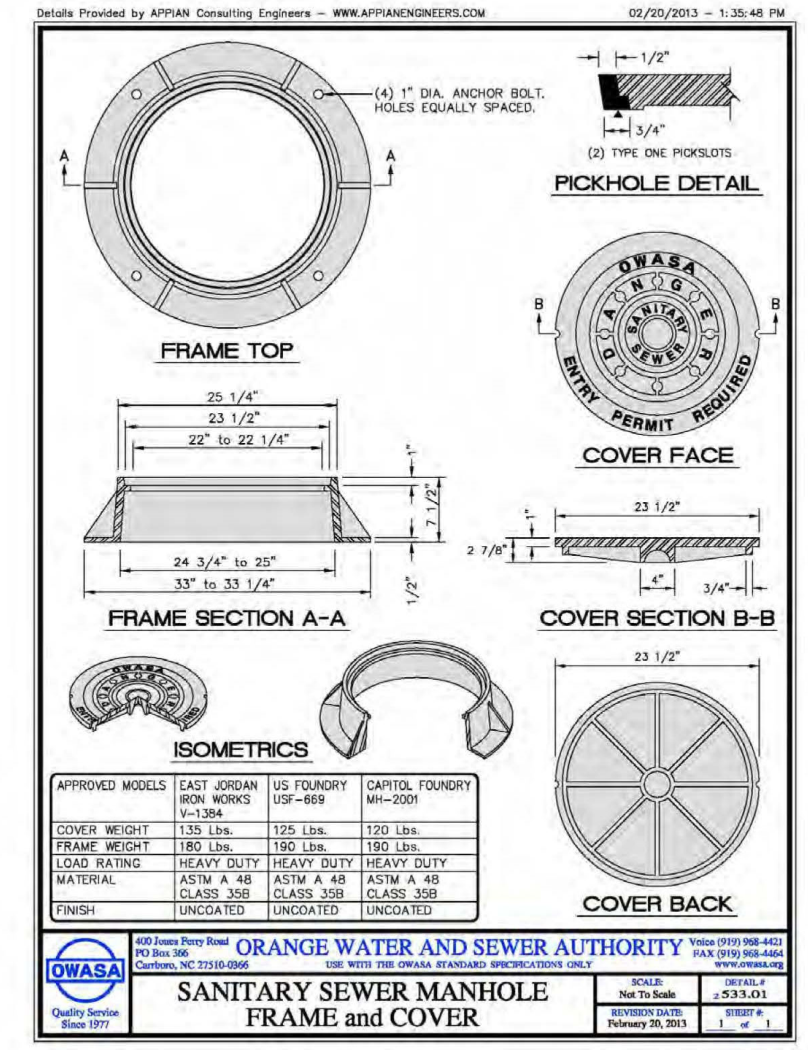



Return to Table of Details





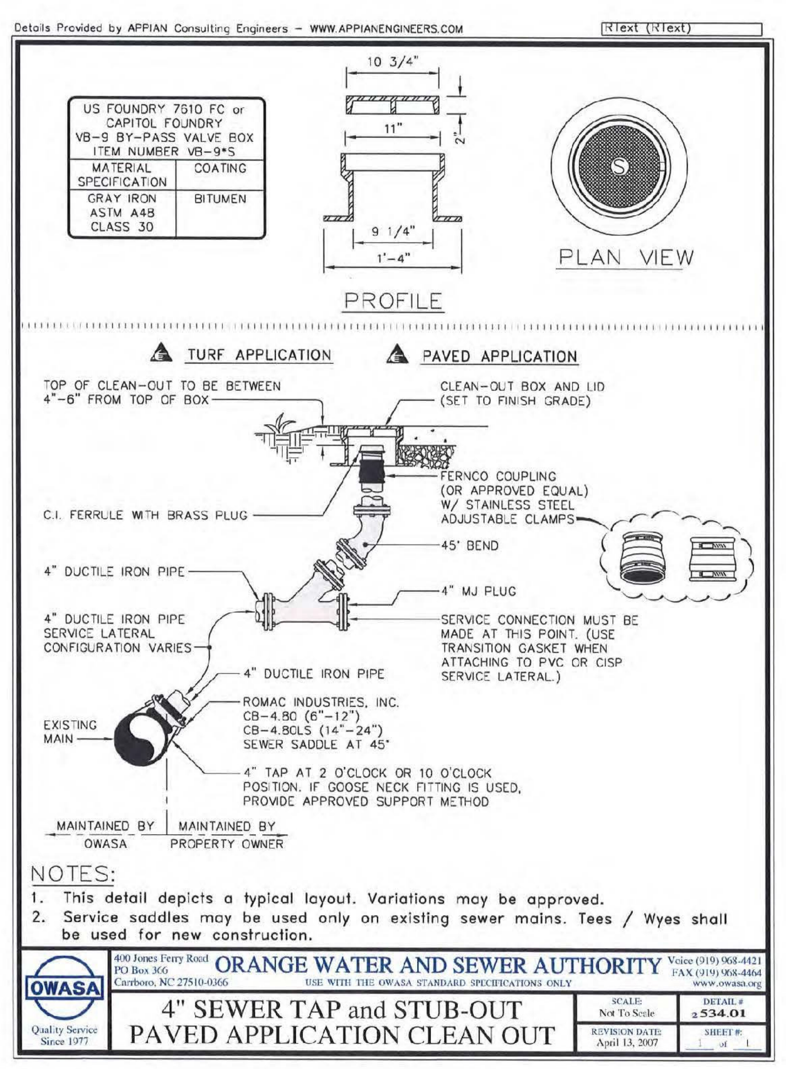

Return to Table of Details





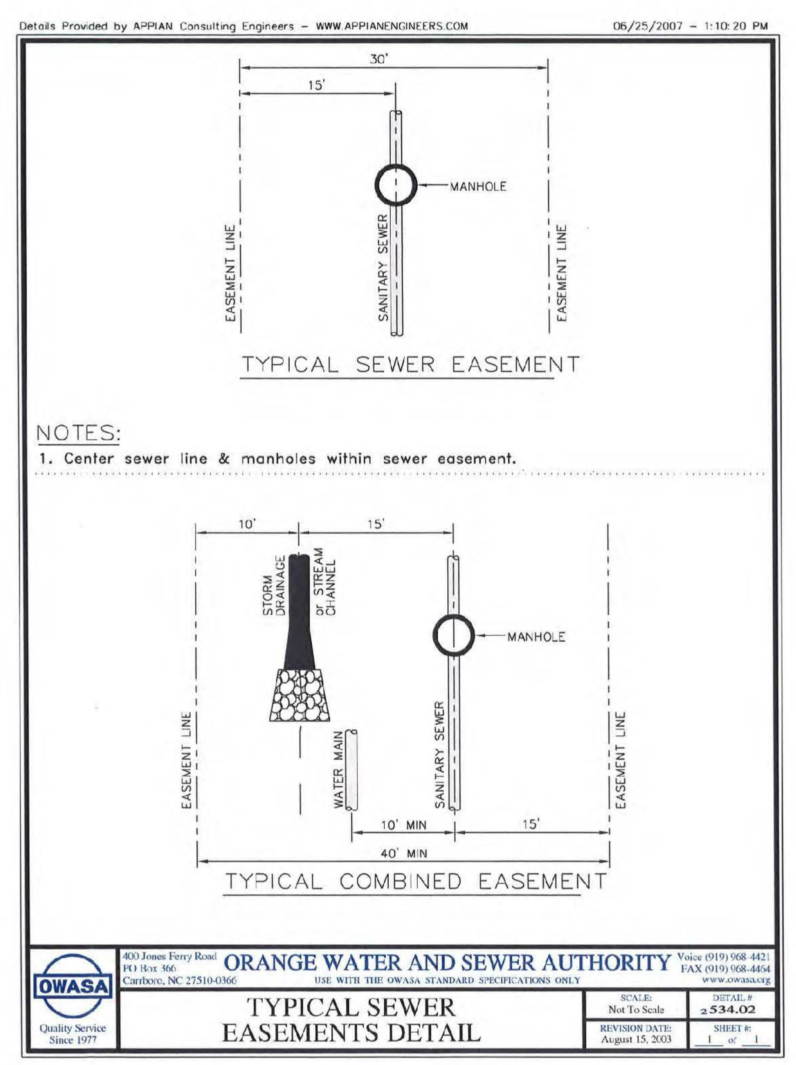

211

Return to Table of Details






Return to Table of Details






RADWAY DESIGN ASSOCIATES, PA
2627 Meacham Road
Chapel Hill NC 27516
City Planning and Land Development Consultants

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
SUMMINT HOSPITALITY GROUP, LLC
3141 JOHN HUMPHRIES WYND #200
RALEIGH, NC 27612

REVISIONS

RESIDENCE INN HOTEL - SUMMIT PLACE TOWNHOMES
ZONING PLANS
CHAPEL HILL, NC
OWASA SEWER DETAILS

10/29/2020

| | |
|---|---|
| PROJECT NO: | --- |
| DESIGN BY: | JPE |
| DRAWN BY: | JPE |
| SCALE: | NTS |
| DATE: | 2020-10-29 |
| SHEET NO: | D5.1 |

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 9., **File #:** [21-0767], **Version:** 1 **Meeting Date:** 10/13/2021

**Close the Legislative Hearing and Consider an Application for a Major Modification to the Development Agreement: Glen Lennox Height Modification.**

See the Summary Report on the next page.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Anya Grahn, Senior Planner

a. Without objection, the revised report and any other materials submitted at the hearing for consideration by the Council will be entered into the record
b. Introduction and revised recommendation
c. Presentation by the applicant
d. Recommendation of the Planning Commission
e. Comments from the public
f. Comments and questions from the Mayor and Town Council
g. Motion to adjourn the legislative hearing
h. Motion to adopt the Resolution of Consistency with the Comprehensive Plan
i. Motion to enact the Ordinance to approve the request.

RECOMMENDATION: That the Council adopt the Resolution of Consistency with the Comprehensive Plan and enact the ordinance approving the height modification.

## CONSIDER AN APPLICATION FOR A MAJOR MODIFICATION TO THE DEVELOPMENT AGREEMENT– GLEN LENNOX HEIGHT MODIFICATION

**SUMMARY REPORT**

TOWN OF CHAPEL HILL PLANNING DEPARTMENT
Colleen Willger, Director
Judy Johnson, Assistant Director
Anya Grahn, Senior Planner

| PROPERTY ADDRESS | DATE | APPLICANT |
|---|---|---|
| 1201 Raleigh Road | October 13, 2021 | Grubb Properties on behalf of Glen Lennox LLC |

**TOWN MANAGER RECOMMENDATION**

I have reviewed and discussed key issues with Town staff. Based on the information in the record to date, I believe the Council could make the findings required to approve the proposal, and therefore could approve Ordinance A.

**UPDATES SINCE SEPTEMBER 22, 2021 HEARING**

An additional public information meeting was held October 11, 2021 with notifications going to property owners as well as residents within 1,000 feet of the site.

**STAFF RECOMMENDATION**

That the Town Council continue the recessed hearing and receive comment on the proposed major modification to the Glen Lennox Development Agreement (GLDA). That the Council then close the legislative hearing and make a motion to approve the proposed major modification to the GLDA, by adopting the Resolution of Consistency, and enacting Ordinance A, approving the major modification request.

**PROCESS**

The applicant requests approval of a Major Modification to the Glen Lennox Development Agreement (GLDA)[1]. Section 4.10 Amendment and Modification states that a major modification to the development agreement (DA) includes a change in maximum building height as illustrated on page 138 of the GLDA recorded with the Orange County Register of Deeds at Book 5883, Page 11. Grubb Properties presented a proposal for additional height during the Council work session on March 17, 2021.[2]

Per the GLDA, in the event the Town Manager determines that a request to amend the GLDA is a Major Modification, the Town Manager shall require the filing of an application for approval of an amendment (see page 13 of the recorded GLDA).

In 2014, the Town entered into a development agreement with FCP Glen Lennox, LLC and Glen Lennox Shopping Center, LLC by Grubb Fund Management, LLC and by Grubb Management, Inc.. The purpose of the GLDA is to facilitate the development of the property in a way that best realizes the public benefits to the Town and the Developer Owners. The GLDA outlines the development review and approval process for site plans, urban design elements, land uses, and on- and off-site improvements. For more information, see the recorded Glen Lennox Development Agreement.

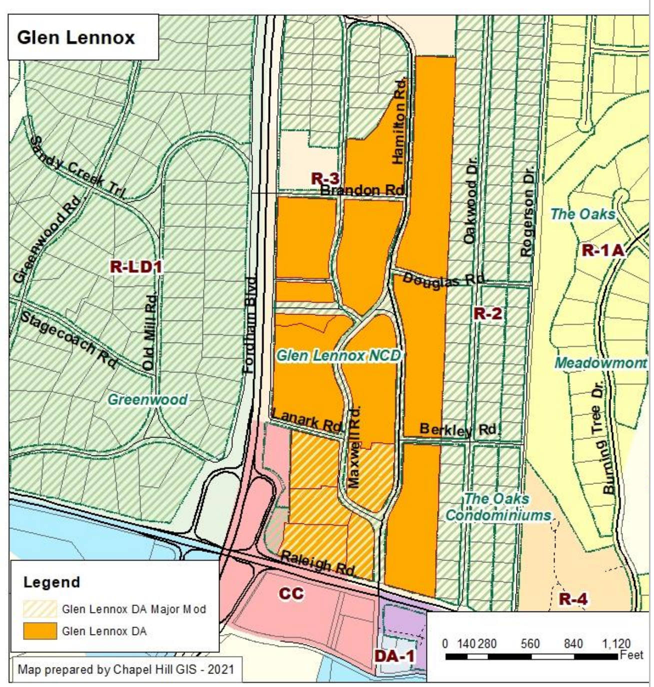
**PROJECT OVERVIEW**

The applicant proposes increasing building height. The proposal provides a transition in building height between Fordham Blvd. east to the Oakwood neighborhood and allows greater building height in the center of the development between NC 54 and Lanark Road. In response to the feedback received at the Public Information Meeting on September 2, 2021, the applicant is requesting additional building height in Blocks 4 and 9; Block 3 is no longer part of this request.

**DECISION POINTS**

The applicant requests a Major Modification to the Glen Lennox Development Agreement to allow additional building height for developments in Blocks 4 and 9.

**PROJECT LOCATION**




*(This map is based on current property boundaries)*

[1] https://www.townofchapelhill.org/home/showpublisheddocument/36461/636360722320830000
[2] https://chapelhill.legistar.com/LegislationDetail.aspx?ID=4853297&GUID=6A7C5DE7-B189-4AE5-BA81-77F3275AFC20

| | |
|---|---|
| **ATTACHMENTS** | 1. Draft Staff Presentation<br>2. Resolution A, Resolution of Consistency<br>3. Ordinance A approving the request<br>4. Resolution B, denying the request<br>5. Planning Commission Recommendation<br>6. Applicant Materials |

# TOWN COUNCIL

2021.10.13

## Land Use Management Ordinance Text Amendment

Sections 4.4, 4.5. 4.6. and 4.8

# RECOMMENDATION

- ❑ Close the Public Hearing
- ❑ Adopt the Resolution of Consistency
- ❑ Enact Ordinance A, approving the Major Modification to the Glen Lennox Development Agreement

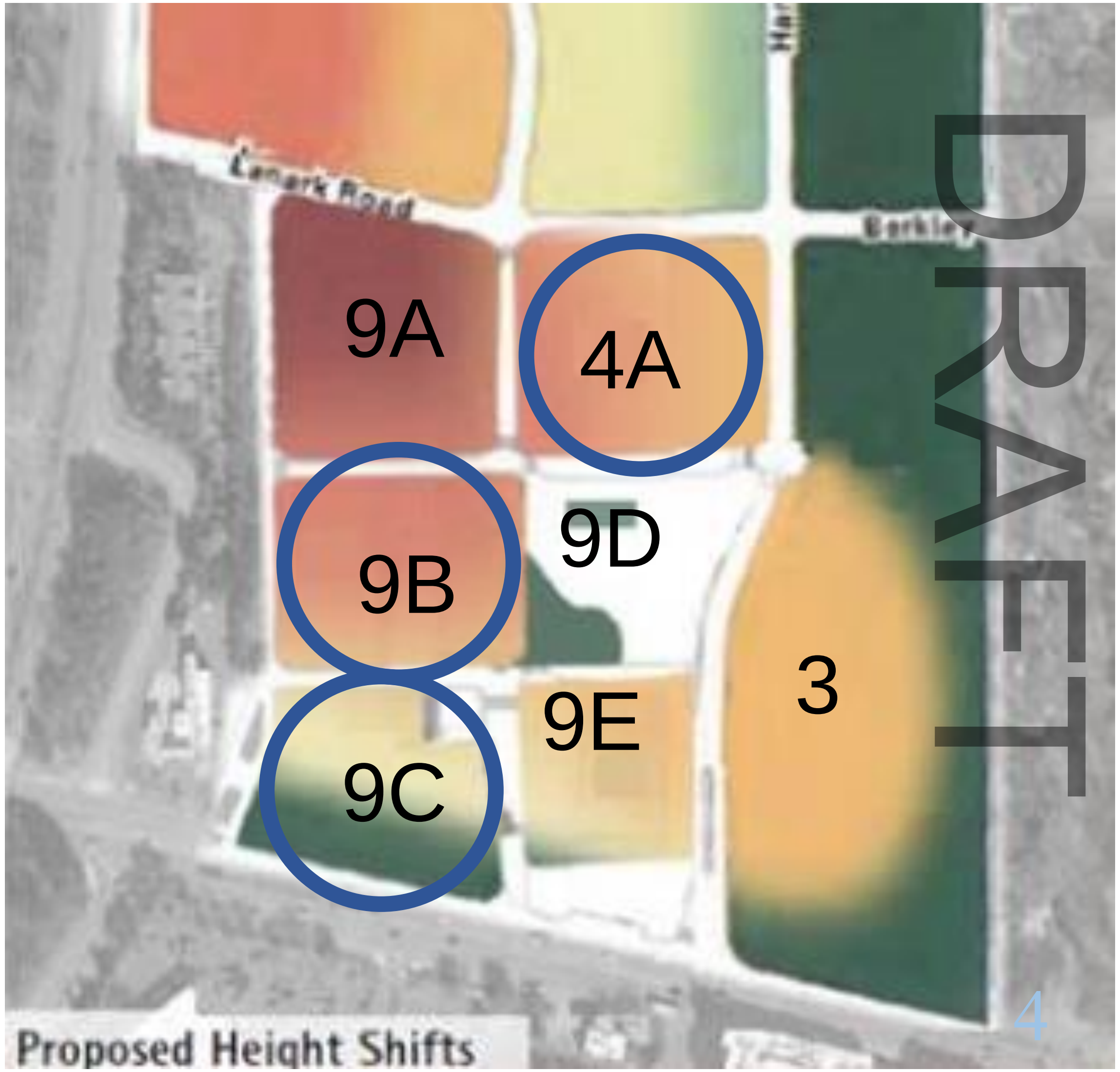
# PROCESS

Staff Review → Planning Commission Review → Town Council Review → Council Action

DRAFT

# Project Summary

| Height Modification Request | | | |
|---|---|---|---|
| Block | Stories | | |
| | Current Req | Added | Total |
| 4 | 5 | +1 | 6 |
| 9B | 4 | +2 | 6 |
| 9C | 4 | +1 | 5 |



# Background

**2014 Recorded Glen Lennox Development Agreement**

- Outlined the required allowable heights
- Taller buildings located near highway interchange
- Lower heights approaching Oakwood neighborhood

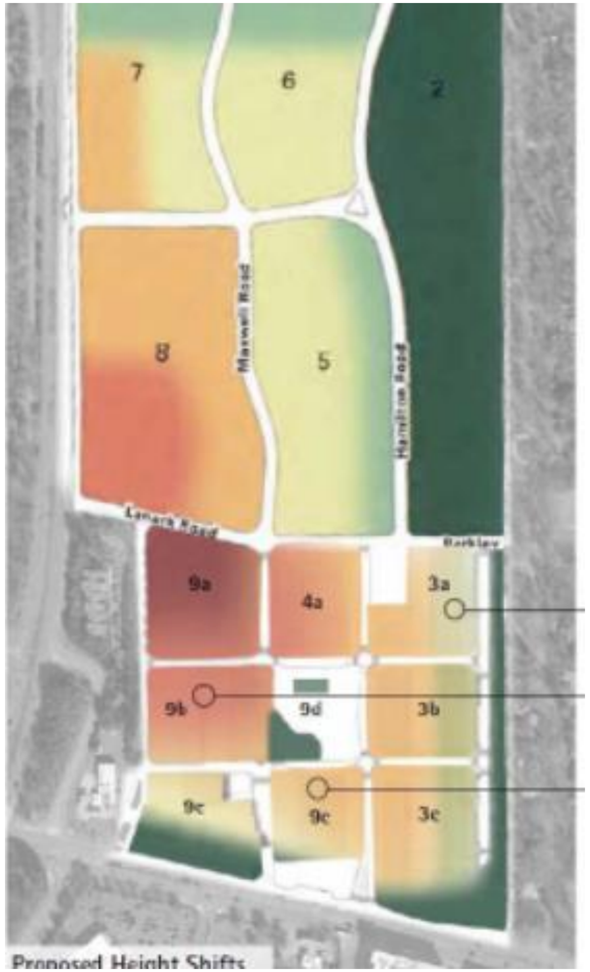
# Background

**March 17, 2021, Town Council Work Session:**

- Support for placemaking
- Provide updated traffic studies as uses change and road networks
- Maintain the green feeling of the neighborhood
- Understand how increased height impacted the number of units and floor area

DRAFT

# Background




**September 2, 2021 PIM:**

- Concerns for increased height adjacent to Oakwood neighborhood

**September 7, 2021 Planning Commission Meeting**

- More greenspace
- Less parking spaces

**Applicant eliminated request for additional height on Block 3**

DRAFT

# September 22, 2021 Public Hearing

- Interest in more opportunities for public comment
- October 11, 2021 Public Information Meeting
- In favor of more green space and less car dependency

DRAFT

# RECOMMENDATION

- ❑ Close the Public Hearing
- ❑ Adopt the Resolution of Consistency
- ❑ Enact Ordinance A, approving the Major Modification to the Glen Lennox Development Agreement

**RESOLUTION A**
**Resolution of Consistency**

**A RESOLUTION REGARDING THE APPLICATION FOR A MAJOR MODIFICATION TO THE GLEN LENNOX DEVELOPMENT AGREEMENT RELATED TO ADDITIONAL BUILDING HEIGHT AND CONSISTENCY WITH THE COMPREHENSIVE PLAN (2021-10-13/R-13)**

WHEREAS, in 2014, the Town entered into a development agreement with Glen Lennox, LLC and Glen Lennox Shopping Center, LLC to facilitate the development of the property in a way that best realizes the public benefits to the Town and the Developer Owners; and

WHEREAS, the Glen Lennox Development Agreement outlines the development review and approval process for site plans, urban design elements, land uses, and on- and off-site improvements; and

WHEREAS, the Town of Chapel Hill has received a request from Grubb Properties on behalf of Glen Lennox, LLC, for a Major Modification to the 2014 Glen Lennox Development Agreement; and

WHEREAS, on July 9, 2021, the Town of Chapel Hill received a request from Grubb Properties on behalf of Glen Lennox, LLC, for a Major Modification to the 2014 Glen Lennox Development Agreement. The proposal requested additional height within Blocks 3, 4 and 9 and identified as Orange County Parcel Identifier Numbers 9798-35-1887, 9798-25-5743, 9798-25-8721, 9798-26-5134, and 9798-26-8189 in order to create a transition in building height between Fordham Blvd. east to the Oakwood neighborhood and allows greater building height in the center of the development between NC 54 and Lanark Road; and

WHEREAS, the Chapel Hill Planning Department held a public information meeting with the applicant on September 2, 2021, and heard public concern for the additional height proposed on Block 3; and

WHEREAS, the Planning Commission reviewed the application on September 7, 2021 and recommended that the Council enact the major modification to the Glen Lennox Development Agreement to allow additional height on Blocks 3, 4, and 9; and

WHEREAS, Grubb Properties withdrew their request for additional building on Block 3 in response to the feedback they received from community members; and

WHEREAS, the Council of the Town of Chapel Hill has considered the application for the major modification to the Glen Lennox Development Agreement and finds that the amendment if enacted, is reasonable and in the public's interest and is warranted to achieve the purposes of the Comprehensive Plan, as explained by, but not limited to, the following goals of the Comprehensive Plan:

- Family-friendly, accessible exterior and interior places throughout the town for a variety of active uses (*Goal: A Place for Everyone.1*)
- A range of housing options for current and future residents (*Goal: A Place for Everyone.3*)
- Promote a safe, vibrant, and connected (physical and person) community (*Goal: Community Prosperity and Engagement.3*)

- A well-conceived and planned, carefully thought out, integrated, and balanced transportation system that recognizes the importance of automobiles but encourages and facilitates the growth and use of other means of transportation such as bicycle, pedestrian, and public transportation options (*Goal: Getting Around.1*)
- A connected community that links neighborhoods, businesses, and schools through the provision of greenways, sidewalks, bike facilities, and public transportation (*Goal: Getting Around.2*)
- Made an adaptable transportation system to support both dense and suburban development(*Goal: Getting Around.4*)
- A range of neighborhood types that addresses residential, commercial, social, and cultural needs and uses while building and evolving Chapel Hill's character for residents, visitors, and students (*Goal: Good Places, New Spaces.5*)
- Future land use, form, and density that strengthen the community, social equity, economic prosperity, and natural environment. (*Goal: Good Places, New Spaces.8*)
- Support the Parks and Recreation Master Plan and the Greenways Master Plan to provide recreation opportunities and ensure safe pedestrian and bicycle connections (*Goal: Nurturing Our Community.4*)
- Protect neighborhoods from the impact of development such as stormwater runoff, light and noise pollution, and traffic (*Goal: Nurturing Our Community.8*)
- Housing for students that is safe, sound, affordable, and accessible and meets a demonstrated need conducive to educational and maturational needs of students, and housing for Town, University, and the Health Care System employees that encourages them to reside in the community (*Goal: Town and Gown Collaboration.4*)
- Promote access for all residents to health-care centers, public services, and active lifestyle opportunities (*Goal: Town and Gown Collaboration.6*)

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby finds the proposed major modification to the Glen Lennox Development Agreement to be reasonable and consistent with the Town Comprehensive Plan.

This the 13$^{th}$ day of October, 2021.

**Ordinance A**
(Approving the Request)

**AN ORDINANCE APPROVING AN APPLICATION FOR A MAJOR MODIFICATION TO THE GLEN LENNOX DEVELOPMENT AGREEMENT (2021-10-13/O-3)**

WHEREAS, in 2014, the Town entered into a development agreement with Glen Lennox, LLC and Glen Lennox Shopping Center, LLC to facilitate the development of the property in a way that best realizes the public benefits to the Town and the Developer Owners; and

WHEREAS, the Glen Lennox Development Agreement outlines the development review and approval process for site plans, urban design elements, land uses, and on- and off-site improvements; and

WHEREAS, on July 9, 2021, the Town of Chapel Hill received a request from Grubb Properties on behalf of Glen Lennox, LLC, for a Major Modification to the 2014 Glen Lennox Development Agreement. The proposal requested additional height within Blocks 4 and 9 and identified as Orange County Parcel Identifier Numbers 9798-35-1887, 9798-25-5743, 9798-25-8721, 9798-26-5134, and 9798-26-8189 in order to create a transition in building height between Fordham Blvd. east to the Oakwood neighborhood and allows greater building height in the center of the development between NC 54 and Lanark Road.; and

WHEREAS, the Chapel Hill Planning Department held a public information meeting (PIM) on September 2, 2021, and heard concerns about the additional height proposed on Block 3; and

WHEREAS, the Planning Commission reviewed the application on September 7, 2021 and recommended that the Council enact the major modification to the Glen Lennox Development Agreement to allow additional height on Blocks 3, 4, and 9; and

WHEREAS, Grubb Properties withdrew their request for additional building on Block 3 in response to the feedback they received from community members; and

WHEREAS, the Council of the Town of Chapel Hill has considered the proposed major modification to the Development Agreement to allow additional heights within Blocks 4 and 9 and identified as Orange County Parcel Identification Numbers as Orange County Parcel Identifier Numbers 9798-25-5743, 9798-25-8721, 9798-26-5134, and 9798-26-8189. The Council finds that the modification, if granted, is reasonable and in the public's interest and is warranted, to achieve the purposes of the Chapel Hill 2020 Comprehensive Plan.

**Section I**
BE IT ORDAINED by the Council of the Town of Chapel Hill that the following conditions are hereby incorporated by reference.

1. Increased Building Height: The major modification to the Glen Lennox Development Agreement authorizes the following as an amendment to the "Height Plan" on page 138 of the recorded Glen Lennox Development Agreement:

| Height Modification | | |
|---|---|---|
| Block | Stories | |
| | Added | Total |
| 4 | +1 | 6 |
| 9B | +2 | 6 |
| 9C | +1 | 5 |

**Section II**

2. Recording Major Modification: Prior to issuance of any future Development Agreement Compliance Permit (DACP) for development on Lots 4, 9B, or 9C, the developer shall record this agreement with the Orange County Register of Deeds.

BE IT FURTHER ORDAINED that the Council hereby approves the application for a major modification to the Glen Lennox Development Agreement for additional building height.

This the 13th day of October, 2021.

**RESOLUTION B**
**(Denying the Request)**

**A RESOLUTION DENYING AN APPLICATION FOR A MAJOR MODIFICATION TO THE GLEN LENNOX DEVELOPMENT AGREEMENT (2021-10-13/R-14)**

WHEREAS, in 2014, the Town entered into a development agreement with Glen Lennox, LLC and Glen Lennox Shopping Center, LLC to facilitate the development of the property in a way that best realizes the public benefits to the Town and the Developer Owners; and

WHEREAS, the Glen Lennox Development Agreement outlines the development review and approval process for site plans, urban design elements, land uses, and on- and off-site improvements; and

WHEREAS, on July 9, 2021, the Town of Chapel Hill received a request from Grubb Properties on behalf of Glen Lennox, LLC, for a Major Modification to the 2014 Glen Lennox Development Agreement. The proposal requested additional height within Blocks 4 and 9 and identified as Orange County Parcel Identifier Numbers 9798-35-1887, 9798-25-5743, 9798-25-8721, 9798-26-5134, and 9798-26-8189 in order to create a transition in building height between Fordham Blvd. east to the Oakwood neighborhood and allows greater building height in the center of the development between NC 54 and Lanark Road; and

WHEREAS, the Chapel Hill Planning Department held a public information meeting (PIM) on September 2, 2021, and heard concerns about the additional height proposed on Block 3; and

WHEREAS, the Planning Commission reviewed the application on September 7, 2021 and recommended that the Council enact the major modification to the Glen Lennox Development Agreement to allow additional height on Blocks 3, 4, and 9; and

WHEREAS, Grubb Properties withdrew their request for additional building on Block 3 in response to the feedback they received from community members; and

WHEREAS [Reasons for denial]

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby denies the major modification to the Glen Lennox Development Agreement for additional building height.

This the 13th day of October, 2021.

# PLANNING COMMISSION

*The charge of the Planning Commission is to assist the Council in achieving the Town's Comprehensive Plan for orderly growth and development by analyzing, evaluating, and recommending responsible town policies, ordinances, and planning standards that manage land use and involving the community in long-range planning.*

## RECOMMENDATION
## FOR A MAJOR MODIFICATION TO THE DEVELOPMENT AGREEMENT- GLEN LENNOX HEIGHT MODIFICATION

September 7, 2021

**Recommendation:** **Approval ☐** **Approval with Conditions ☑** **Denial ☐**

**Motion:** Neal Bench moved and John Rees seconded a motion to recommend that the Council adopt Resolution A (Resolution of Consistency).

**Vote:** 7 – 1

**Yeas**: Michael Everhart (Chair), James Baxter (Vice-Chair), Neal Bench, Elizabeth Losos, John Rees, Louie Rivers, Stephen Whitlow

**Nays**: Jon Mitchell

**Special Considerations:**
- That the Council and developer continue to look at opportunities for additional greenspace as a community amenity and for reducing the number of parking spaces.

**Reasons for Nay Votes:**
- Interest in knowing why the current building heights were set as part of the original Development Agreement before approving a motion to modify the height limits.

Prepared by: Anya Grahn, Senior Planner

230

# HELLO

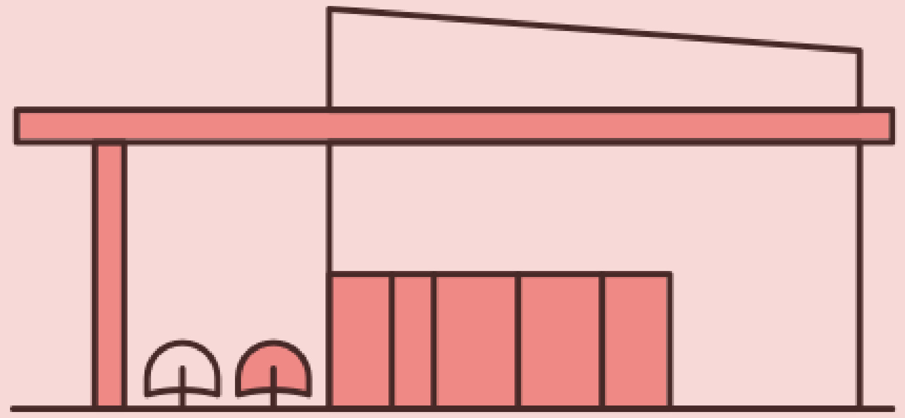
# GLEN LENNOX

GRUBB PROPERTIES

Town Council Meeting 9/22/2021

231

# An Enduring Vision



## We are Community Builders

Setting out to build a
neighborhood that is
nostalgic yet forward-thinking

232

We believe design focused on vibrant outdoor gathering spaces will allow us to embrace and emphasize what makes Glen Lennox special

GLEN LENNOX

233

# Character · Culture · Community

## Natural beauty

Celebrate the splendour of Glen Lennox and the surrounding Chapel Hill community

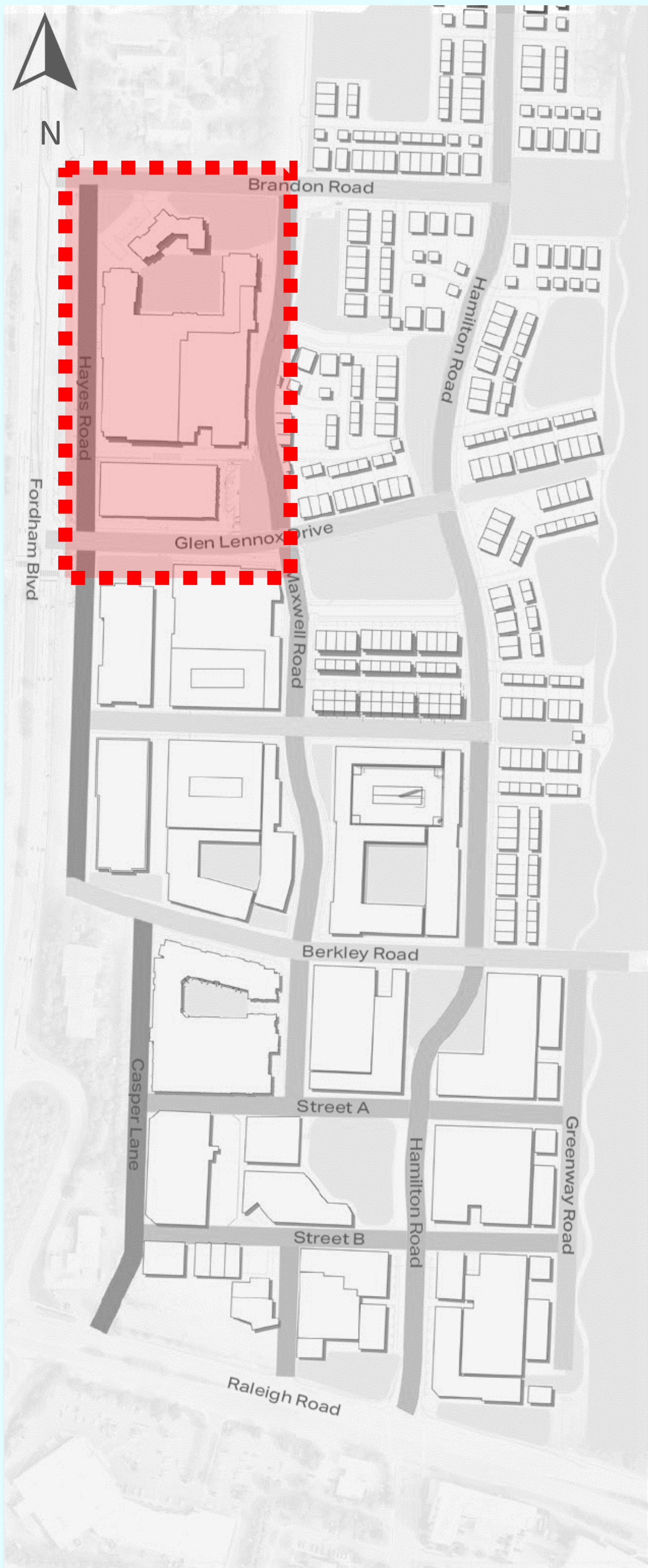

## Walkable and bikeable

Link eastward past Meadowmont and westward to Chapel Hill's Downtown and UNC


## Shared Heritage

Continue our tradition of a collegial and aspiring atmosphere

# Delivered with Care





Link Linden
Delivered Q1 2021

The first phase of Glen Lennox delivered over the last year including 215 units of residential, 107,000 sf of office and a 3,000 sf café slated to open in Q3. These buildings are reflective of the quality Grubb brings to every community.

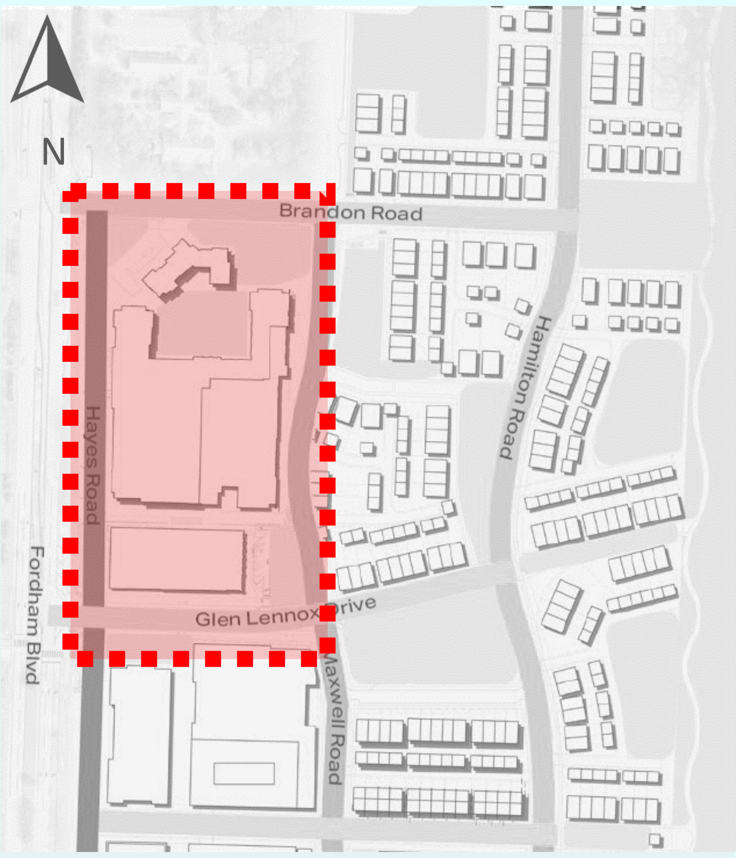
# Phase 1


The Gwendolyn
Delivered Q2 2021

235

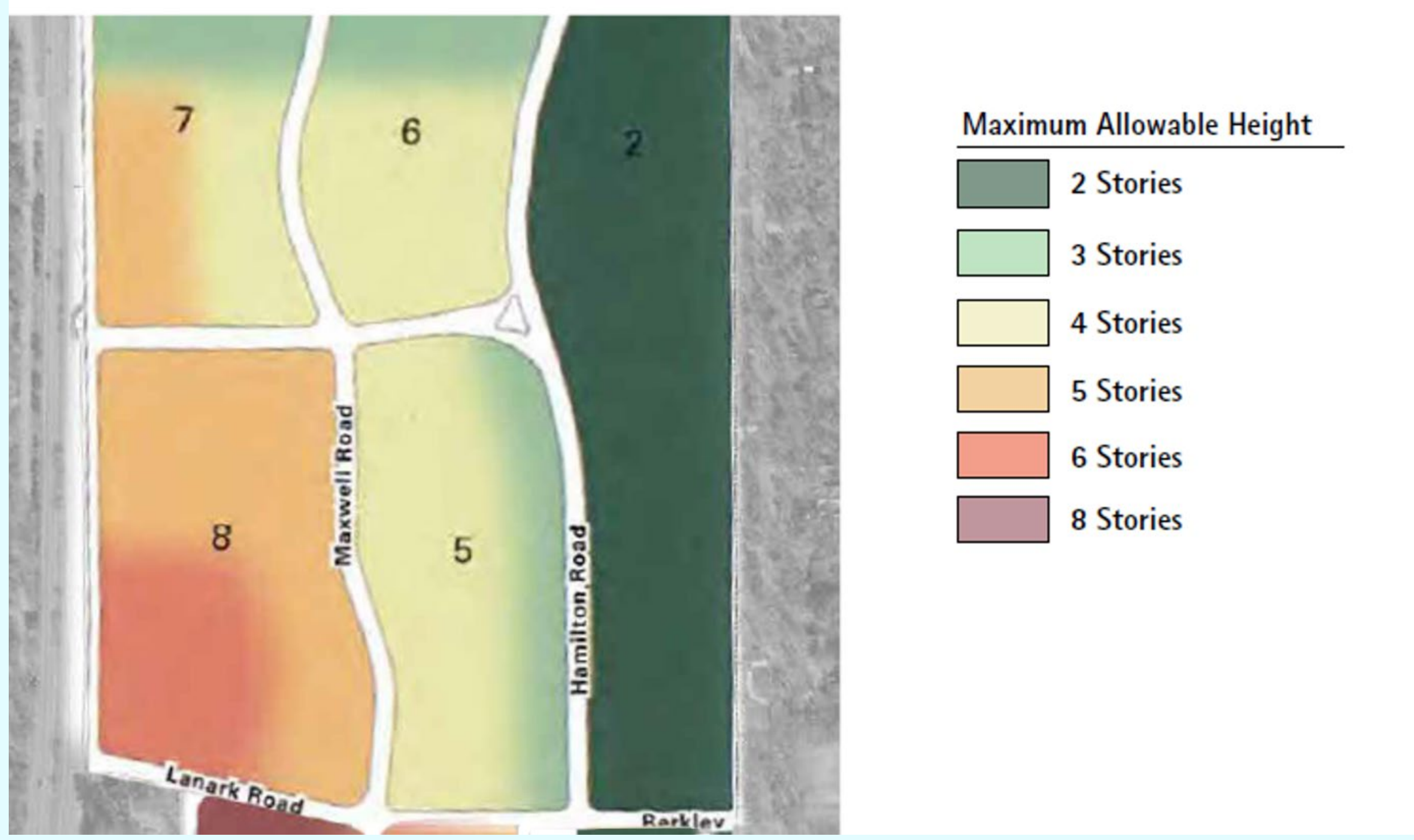

DELIVERED WITH
CARE OF PLACE

# Phase 1




**Height Allowance Summary**

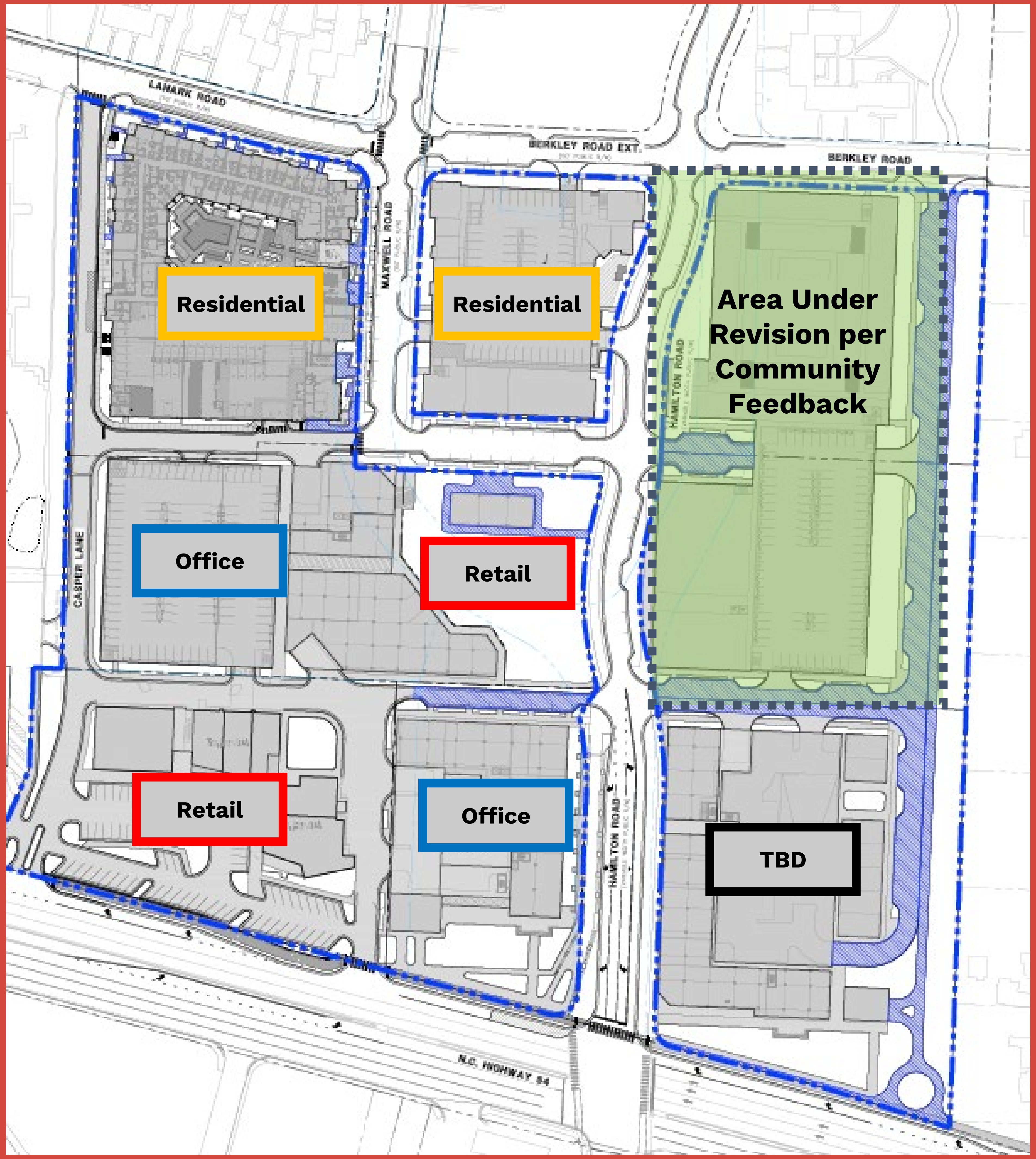
| | | STORIES | | |
|---|---|---|---|---|
| | Block | DA | **Built** | **Δ** |
| Phase I | 7 - Gwendolyn | 5 | 4 | **-1** |
| | 7 - Linden | 5 | 5 | 0 |




The 4-Story Gwendolyn office building was constructed 1-story below the height limit, while only the 5-story parking deck of Link Apartments® Linden met the full height limit.

236

# Phase 2





GLEN LENNOX MASTER PLAN

*This plan is representative and subject to change

237

# Context and Request

In 2014 the Chapel Hill Town Council set forth a Development Agreement for Glen Lennox as a framework of the principles governing the land use, public infrastructure and amenities.

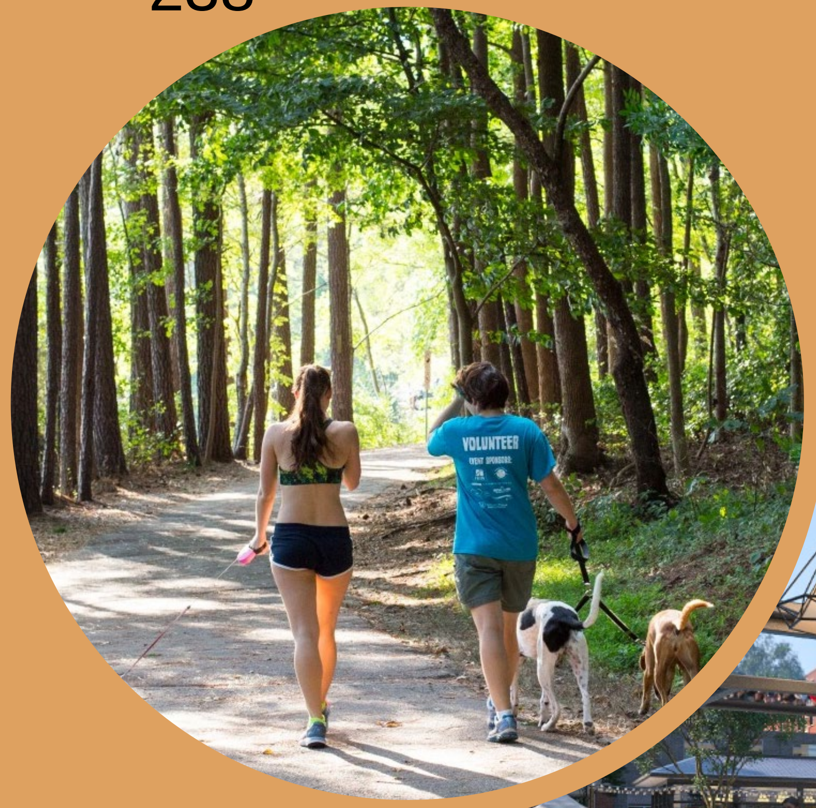
As Grubb Properties proceeds toward the next phase of development, we are requesting a modification to the allowable development height in order to achieve a successful mixed-use core envisioned by the Development Agreement.

The requested shift is intended to promote balance over the mixed-use district, with a specific focus on respecting the downward transition of density toward the eastern edge with the Oakwood Community with an established network of open green spaces.

238

# Guiding Principles

| **Principle** | ***Action: Modification Request*** |
|---|---|
| Transition and Vary Density & Heights | Shifted density west to maintain and respect a gentle transition between GL and Oakwood. Request to increase height limits on Blocks 9B, 9C, and 4. |
| **Principle** | ***Matured Design Intention*** |
| Preserve the Street Network | Establishing the street grid within the commercial core in order to enhance pedestrian and bicyclist safety. |
| **Create and Maintain Public Open Space** | **Progressed open space plans with 2.23 acres of park space south of Lanark Rd – 0.73 acres more than required in all of Glen Lennox.** |
| Create an Effective Transportation Strategy | Connected bike and pedestrian paths throughout the site. Shared parking facilities within the mixed-use core. |
| Encourage Community Sustainability | Reviewed stormwater management alternatives – underground detention, permeable pavement. |
| **Ongoing Principles** | |
| *Balance Development with Tree Preservation* | *Value the History of the Neighborhood* |
| *Provide Landscaped Buffers for Sensitive Neighbors* | *Preserve the Church of the Holy Family's Visibility & Accessibility* |
| *Keep a Portion of the Buildings* | *Encourage and Support Community Diversity* |

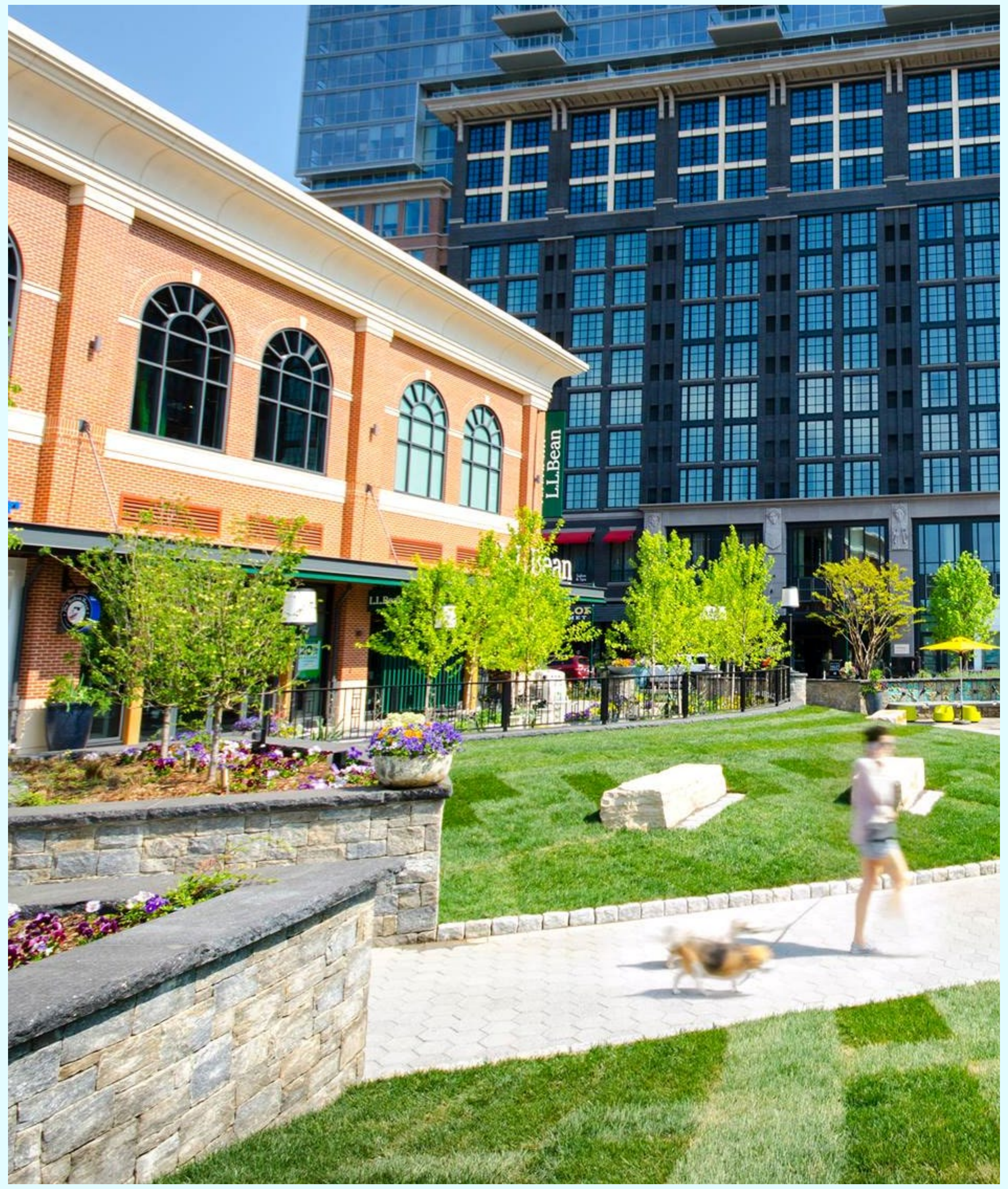


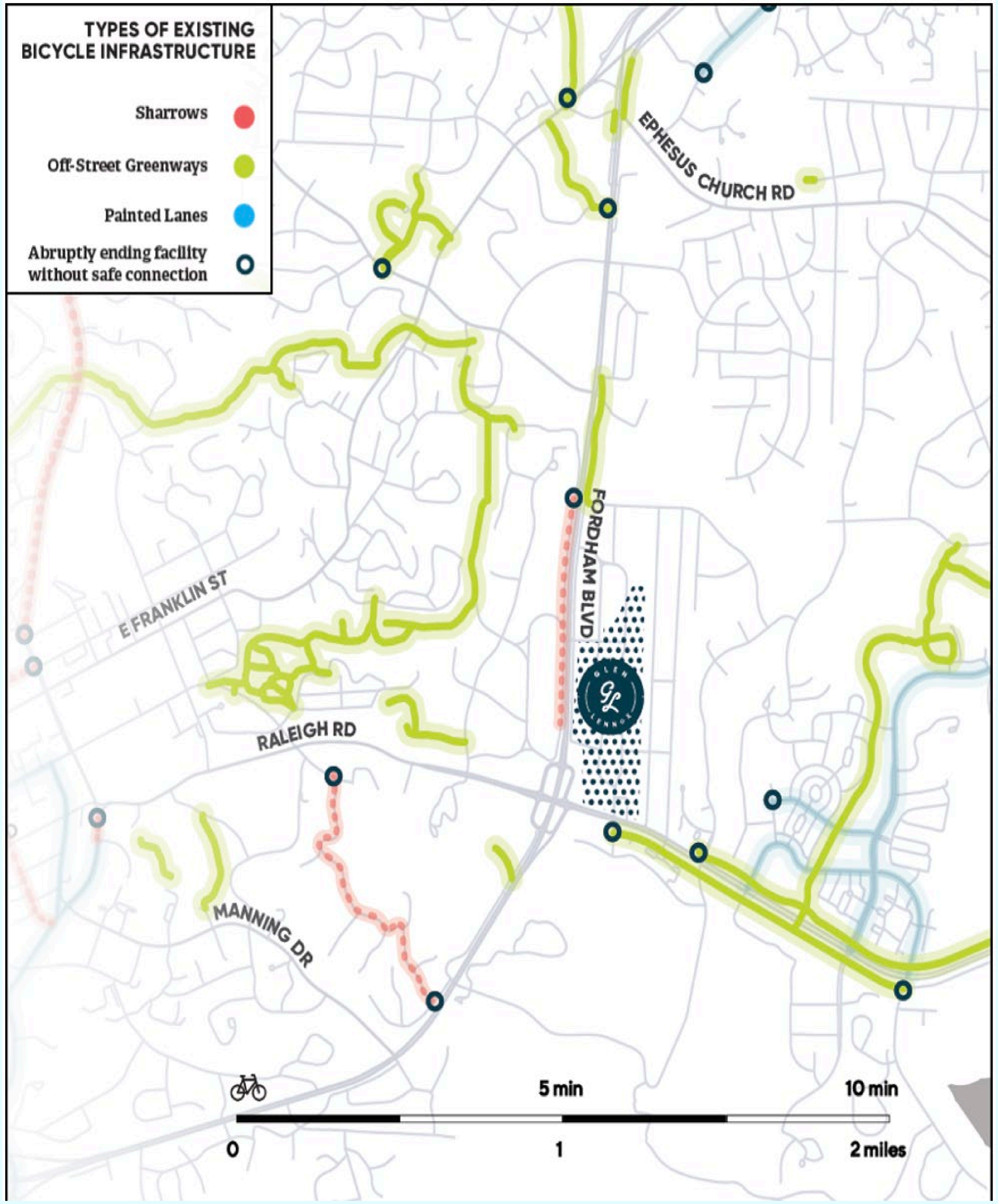
239

# Greenway + Greenspaces

The updated plan shifts commercial density to the west to respect and maintain a graceful transition between Glen Lennox and Oakwood.

The Chapel Hill Greenway Trail will be extended, acting as a buffer and community amenity while keeping the required setback for the eastern edge of the property.

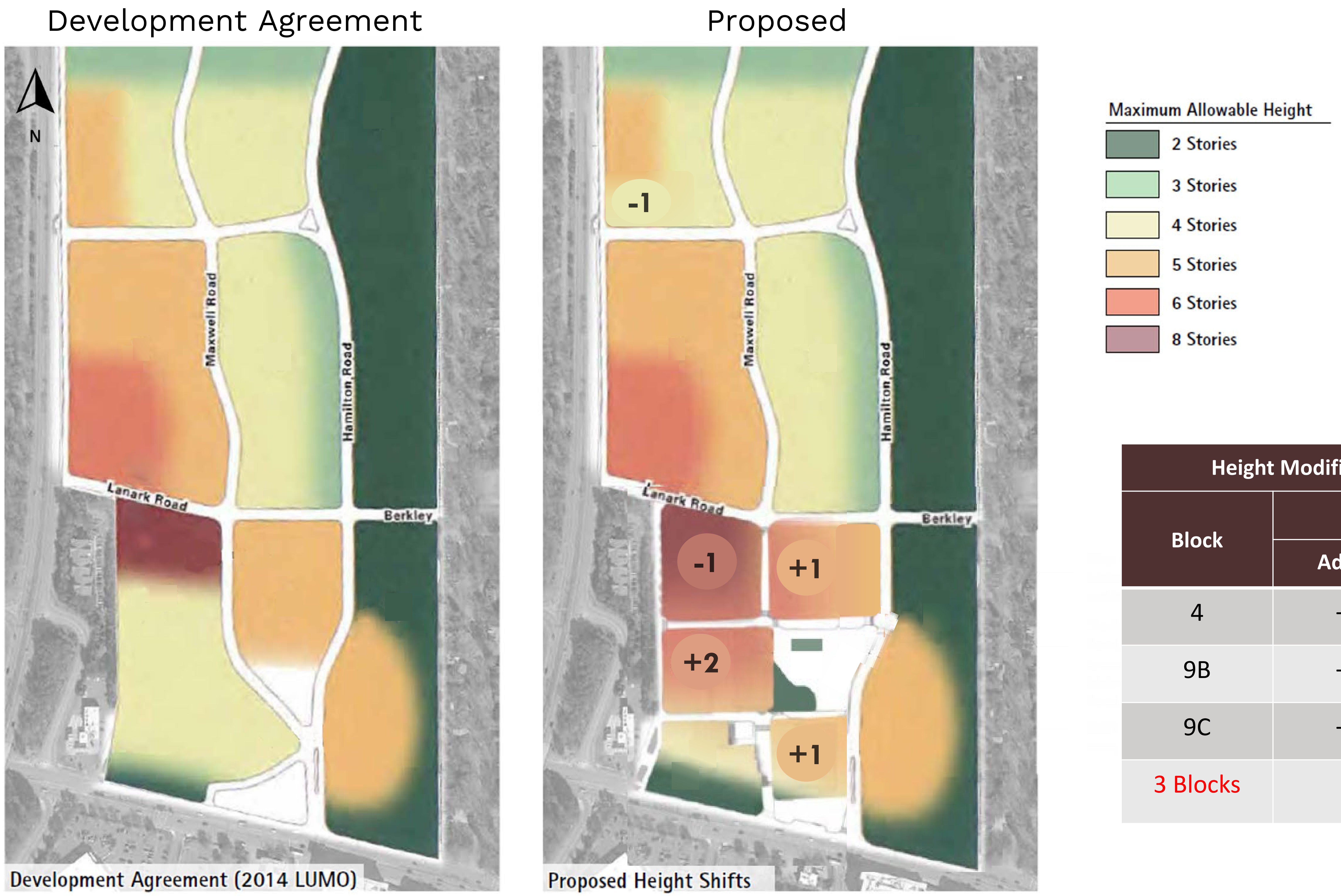



WALKABLE & BIKABLE

240

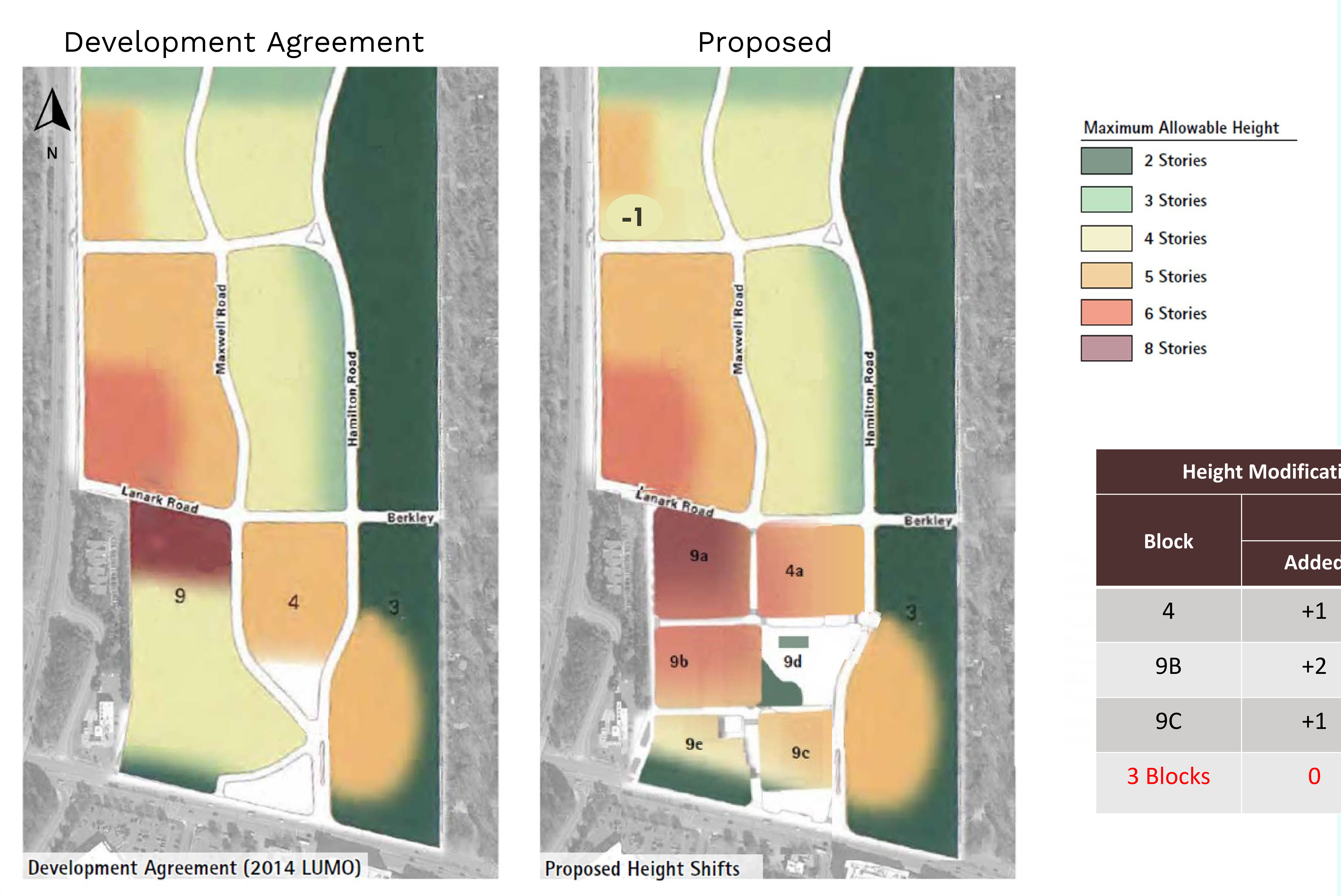
# Height Limit Modification Request




| Height Modification Request | | |
|---|---|---|
| Block | Stories | |
| | Added | Total |
| 4 | +1 | 6 |
| 9B | +2 | 6 |
| 9C | +1 | 5 |
| 3 Blocks | 0 | No Change |

241

# Height Limit Modification Request




| Height Modification Request | | |
|---|---|---|
| Block | Stories | |
| | Added | Total |
| 4 | +1 | 6 |
| 9B | +2 | 6 |
| 9C | +1 | 5 |
| 3 Blocks | 0 | No Change |

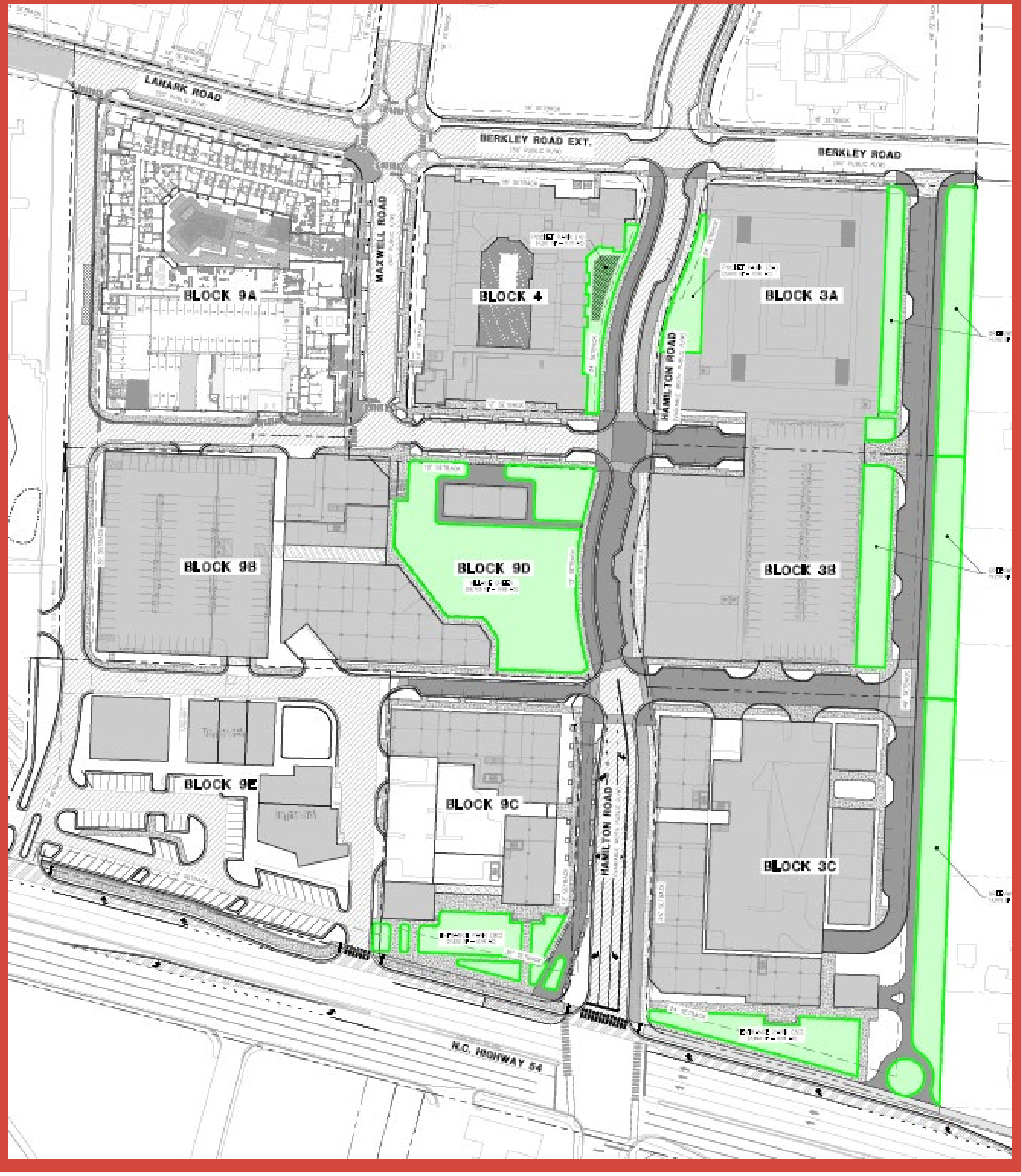
# Incremental Density

The density proposed in the Glen Lennox Master plan is a reduction of over 400k SF from the maximum allowed in the development agreement
*(as calculated by max. coverage area projected to max. height).*

Reduced building footprints within the 18-acre mixed-use district allow for 2.23 acres of open space including a community green, transit hub, greenway, and 3 pocket parks.

This represents a 48% increase in open space over the 1.5 acres required across <u>all</u> 70 acres of Glen Lennox.


DEVELOPMENT AGREEMENT MAXIMUM




PROPOSED GLEN LENNOX MASTER PLAN

| BLOCK # | Use | Parking Deck | MAX BUILDING Footprint (SF)* | PROPOSED BUILDING Footprint (SF)* | DA BUILDING Height (Floors) | PROPOSED BUILDING Height (Floors) | MAX BUILDING AREA (SF) | MAX BUILDING DENSITY (Units) | PROPOSED BUILDING AREA (SF) | PROPOSED BUILDING DENSITY (Units) | Shortfall BUILDING AREA (SF) | Shortfall BUILDING DENSITY (Units) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BLOCK 3A | Townhouses | Garages | 45,192 | 9,526 | 2 | 2 | 90,384 | 110 | 19,052 | 12 | -71,332 | -98 |
| BLOCK 3C | Multifamily | Yes | 58,475 | 43,702 | 5 | 5 | 292,377 | 355 | 218,510 | 265 | -73,867 | -90 |
| BLOCK 4 | Multifamily | Yes | 54,284 | 40,573 | 5 | 6 | 271,420 | 330 | 243,438 | 296 | -27,982 | -34 |
| BLOCK 9A | Multifamily | Yes | 36,554 | 36,554 | 8 | 7 | 292,432 | 355 | 255,878 | 311 | -36,554 | -44 |
| **Residential Totals** | | | | | | | **946,612** | **1,149** | **736,878** | **884** | **-209,734** | **-266** |

| BLOCK # | Use | Parking Deck | MAX BUILDING Footprint (SF)* | PROPOSED BUILDING Footprint (SF)* | DA BUILDING Height (Floors) | PROPOSED BUILDING Height (Floors) | MAX BUILDING AREA (SF) | MAX BUILDING DENSITY (RSF) | PROPOSED BUILDING AREA (SF) | PROPOSED BUILDING DENSITY (RSF) | Shortfall BUILDING AREA (SF) | Shortfall BUILDING DENSITY (RSF) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BLOCK 3B | Office / Retail | No | 53,243 | 51,673 | 5 | 5 | 266,214 | 226,282 | 258,365 | 219,610 | -7,849 | -6,672 |
| BLOCK 9B | Office / Retail | Yes | 55,504 | 50,237 | 4 | 6 | 222,016 | 188,714 | 301,422 | 256,209 | 79,406 | 67,495 |
| BLOCK 9C | Office / Retail | No | 58,128 | 37,950 | 4 | 5 | 232,512 | 197,635 | 189,750 | 161,288 | -42,762 | -36,348 |
| BLOCK 9D | Office / Retail | No | 28,150 | 3,150 | 5 | 2 | 140,750 | 119,638 | 6,300 | 5,355 | -134,450 | -114,283 |
| BLOCK 9E | Office / Retail | No | 57,983 | 19,541 | 2 | 2 | 115,966 | 98,571 | 29,312 | 24,915 | -86,655 | -73,656 |
| **Commercial Totals** | | | | | | | **977,458** | **830,840** | **785,149** | **667,376** | **-192,310** | **-163,463** |

**Less footprint of parking, where applicable*

| | | | | | |
|---|---|---|---|---|---|
| **Cumulative Totals** | **1,924,070** | **831,989** | **1,522,027** | **668,260** | **-402,044** |

*Glen Lennox Master Plan is representative and subject to change

243

# OPEN SPACE NETWORK

- PRIVATE COURTYARDS
- NEIGHBORHOOD PARK
- GREENWAY
- GATEWAY PARK
- POCKET PARK
- URBAN PARK/PLAZA
- PROPOSED BIKE PATH
- PROPOSED PEDESTRIAN NETWORK

Gateway Park

Pocket Park

Urban Park

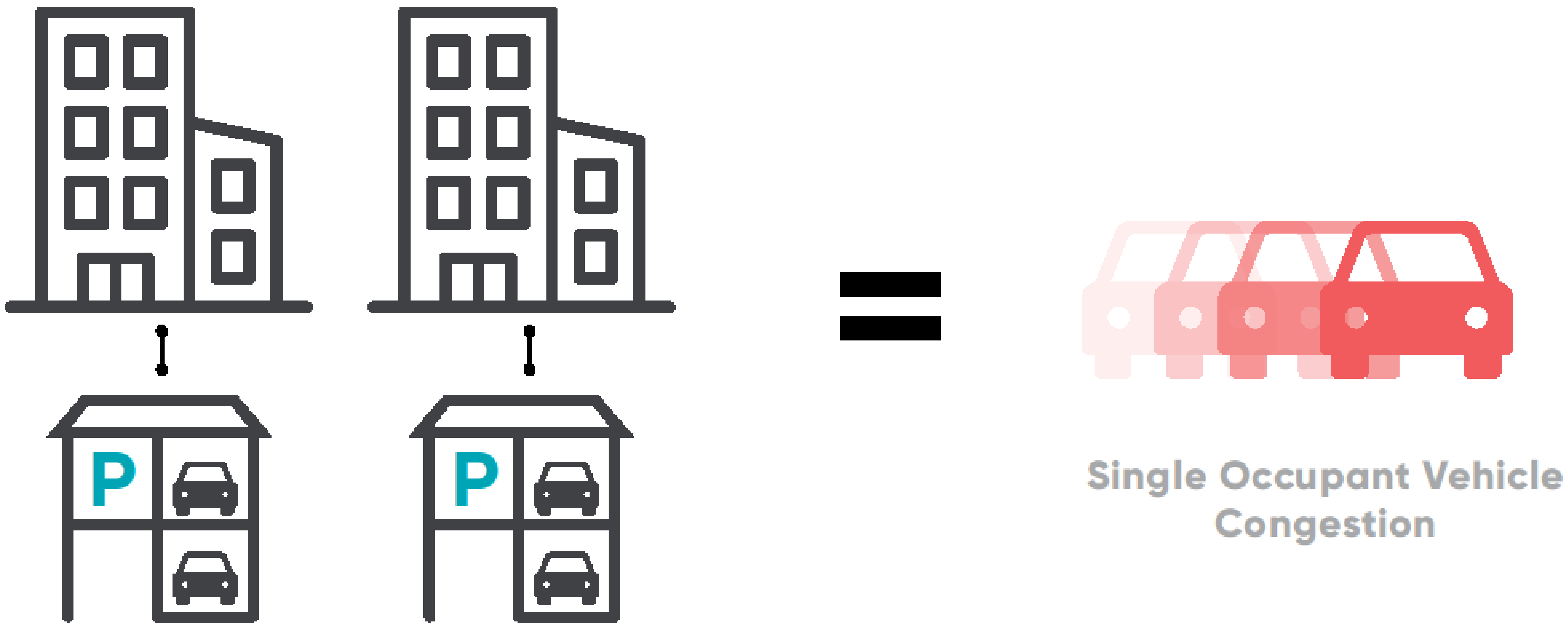

Neighborhood Park

Greenway

244

# Conventional Density

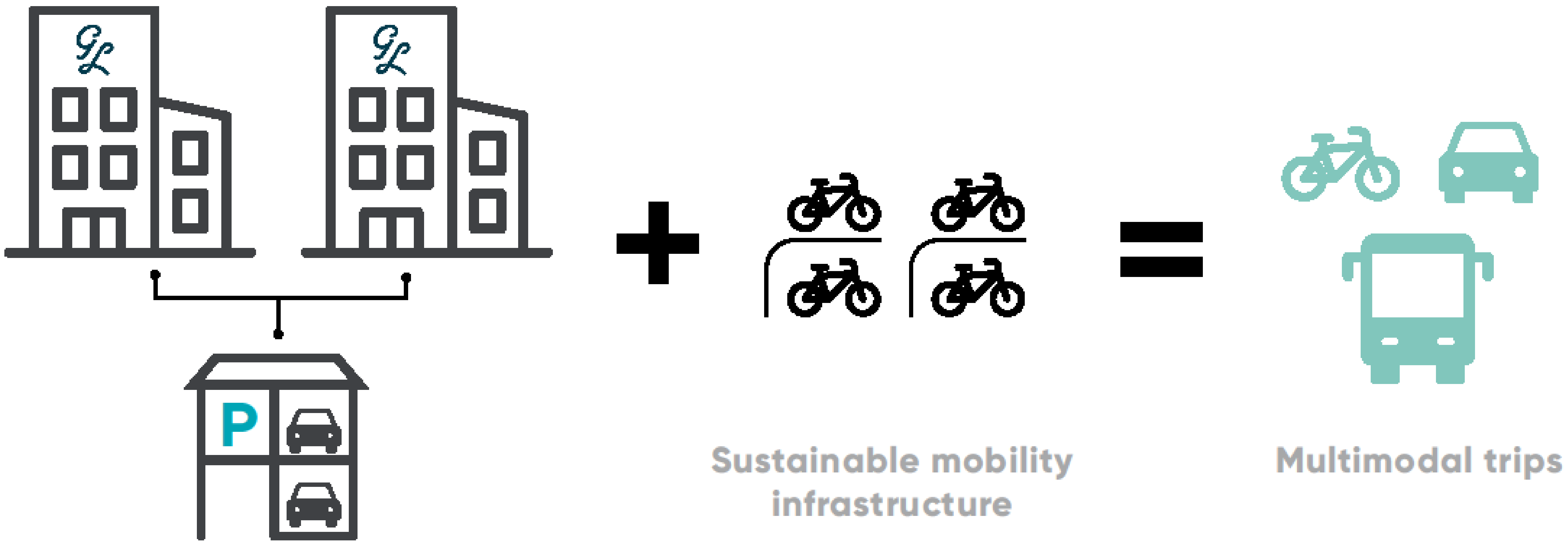
Conventional parking requirements for standard buildings adds increased cars and vehicular use, thus creating additional congestion.



245

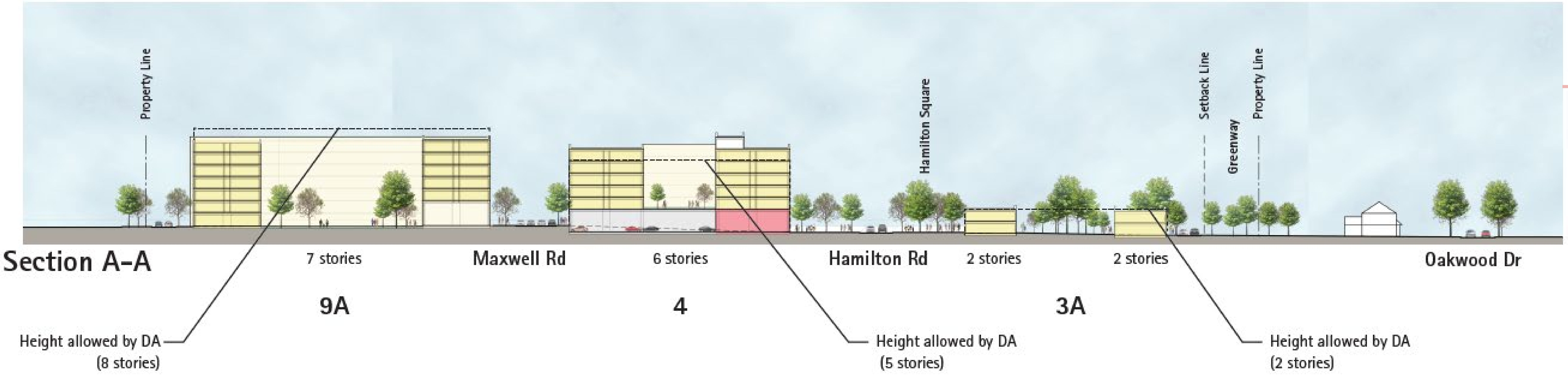
# Glen Lennox Density

Shared parking facilities spur lower car use and open up additional road space for multimodal infrastructure, leading to more opportunities for non-vehicular travel and fewer single occupant vehicles on the roads.



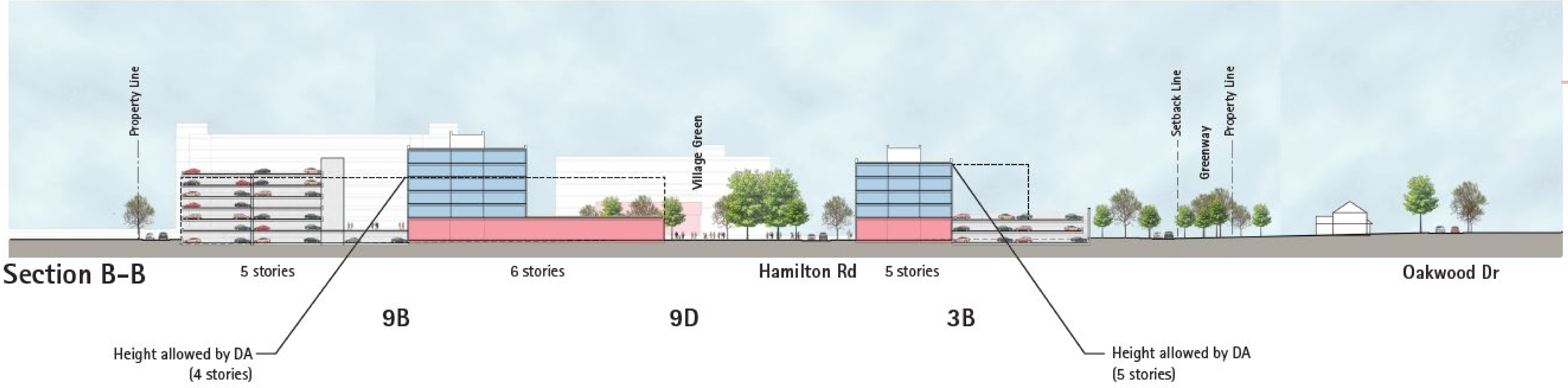
MODIFICATION REQUEST

# Section A

# MODIFICATION REQUEST

# Section B

248

# MODIFICATION REQUEST

# Section C


249

# Trip Generation

The 2014 Development Agreement for Glen Lennox stipulated thresholds for traffic improvements on Fordham Boulevard and Raleigh Road, as well as a threshold to revisit the committed improvements.

Fordham Boulevard improvements were completed with the delivery of Phase I and Raleigh Road improvements are to be completed with Phase II.

| Additional External Vehicle Trips Per Day | |
|---|---|
| Existing | 0 |
| Phase I | 384 |
| *Fordham Blvd Improvement Threshold* | *5,000* |
| Phase II | 6,431 |
| *Raleigh Rd Improvements Threshold* | *8,000* |
| Future Glen Lennox | 17,027 |
| *Revisit Traffic Improvements Threshold* | *17,557* |


# Height Limit – Modification Request

251

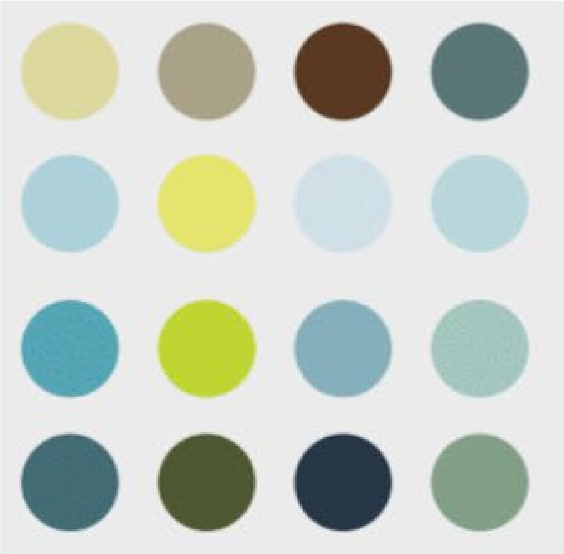
# THANK YOU

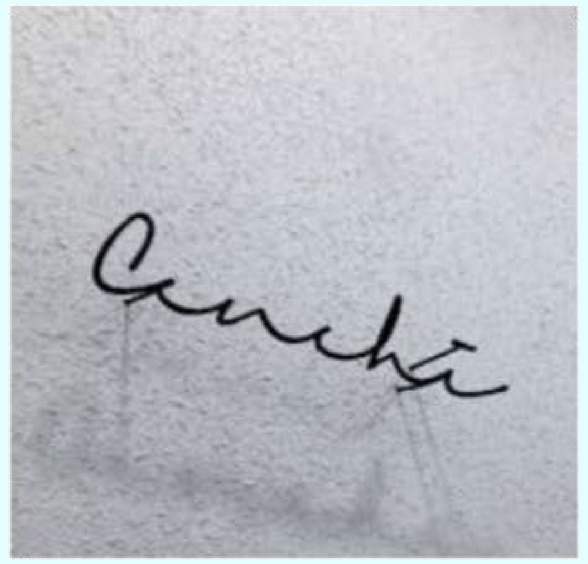
## Q&A

252

# Design DNA

Glen Lennox was born as a forward thinking community in the 1950s, helping to solve that era's housing crisis and bring quality lifestyle to many American families.



### A. PATTERN

Simple and often expressive patterns are hallmark for Mid-Century design. The patterns can be applied to bring uniqueness and separation to the different neighborhoods.

### B. COLORS

Glen Lennox brand provides a vibrant and timeless color palette that is a modern tribute to the mid-century. Wayfinding and environmental design use colors as an element to bring connection between the brand and built environment.


### C. MATERIAL

Materials are critical to bring integrity to the design and architecture cohesiveness to a place. Using materials that create a connection to the architecture will bring the experience from large to small scale and feel like a complete cycle.

### D. EXPRESSIVE ELEMENTS

Use mid century elements to bring expressive elements to the site. This will create vibrancy and engagement at a pedestrian level and create highly memorable places.


## Purposeful Experience

Taking cues and inspiration from Mid-Century design, we identified four visual/signage language facets.

MODIFICATION REQUEST

# DA with Master Plan Overlay

MODIFICATION REQUEST

# Revised Plan with Master Plan Overlay


MODIFICATION REQUEST

# Height Limits Changes

| | Block | DA | Proposed | Δ |
|---|---|---|---|---|
| | | STORIES | | |
| Phase II | 4 | 5 | 6 | +1 |
| | 9b | 4 | 6 | +2 |
| | 9c | 4 | 5 | +1 |
| | 9a | 8 | 7 | -1 |
| | 9d | 4 | 2 | -2 |
| | 9e | 2 | 2 | 0 |
| | 3a | 2 | 2 | 0 |
| | 3b | 5 | 5 | 0 |
| | 3c | 5 | 5 | 0 |

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 10., **File #:** [21-0768], **Version:** 1 **Meeting Date:** 10/13/2021

**Close the Legislative Hearing and Consider a Land Use Management Ordinance Text Amendment - Proposed Changes to Section 8.5, Community Design Commission - and Updates to the Advisory Board Membership Policy**.

See the Staff Report on the next page.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Corey Liles, Principal Planner

a. Introduction and revised recommendation
b. Recommendation of the Planning Commission
c. Comments from the public
d. Comments and questions from the Mayor and Town Council
e. Motion to adjourn the Legislative Hearing
f. Motion to adopt the Resolution of Consistency with the Comprehensive Plan
g. Motion to enact the ordinance to approve the changes to the Land Use Management Ordinance
h. Motion to adopt the Resolution amending the Advisory Board Membership Policy.

RECOMMENDATION: That the Council consider reducing the number of member seats on the Community Design Commission, and consider associated reductions to the thresholds for quorum and voting.

# CONSIDER A LAND USE MANAGEMENT ORDINANCE TEXT AMENDMENT - PROPOSED CHANGES TO SECTION 8.5, COMMUNITY DESIGN COMMISSION - AND UPDATES TO THE ADVISORY BOARD MEMBERSHIP POLICY

**STAFF REPORT**

TOWN OF CHAPEL HILL PLANNING DEPARTMENT
Colleen Willger, Director
Corey Liles, Principal Planner
Adam Nicholson, Senior Planner

| **AMENDMENT REQUEST** | **DATE** |
|---|---|
| Consider reducing the number of member seats on the Community Design Commission, given recent challenges with recruitment and retention. Consider associated reductions to the thresholds for quorum and voting, to maintain simple majorities. | October 13, 2021 |

**UPDATES SINCE LEGISLATIVE HEARING** (held on September 1, 2021[1])

- No changes have been made to the proposal for revising rules of the CDC
- The Planning Commission recommended approval of the text amendment on September 7, 2021

**TOWN MANAGER'S RECOMMENDATION**

I have reviewed and discussed key issues with Town staff. Based on the information in the record to date, I believe the Council could make the findings required to approve the proposal, and therefore should:

1) close the legislative hearing;
2) adopt Resolution A for Consistency with the Comprehensive Plan;
3) enact Ordinance A to amend Section 8.5 of the Land Use Management Ordinance; and
4) adopt Resolution B updating the Advisory Board Membership Policy

**ADDITIONAL INFO**

- The proposal is in response to the Community Design Commission (CDC) petitioning Council on February 23, 2021.
- The CDC currently has three vacant seats.
- The CDC has had at least one vacant seat out of nine total seats since July 2019.
- With six currently active CDC members, a meeting must be rescheduled or cancelled if there is more than one absence. No decision can be made on an official action if there is more than one 'Nay' vote.

**PROCESS**

| | |
|---|---|
| 1 | Receive CDC Petition |
| 2 | Initiate Text Amendment Process |
| 3 | Call the Legislative Hearing |
| 4 | Community Design Commission Review |
| 5 | Legislative Hearing |
| 6 | Planning Commission Review |
| 7 | **Consider Action** |

**DECISION POINTS**

Proposed amendments to the rules of the Community Design Commission include the following:

- Move the rules for membership, quorum, and voting from LUMO to the Council's Advisory Board Membership Policy, and update LUMO to further reference that Policy;
- Reduce the number of Commission member seats from 9 to 7;
- Reduce the number of members needed for quorum from 5 to 4;
- Reduce the number of concurring votes needed for formal action from 5 to 4.

To enact a Land Use Management Ordinance Text Amendment, Council must consider whether it achieves one or more of the following three purposes:

1. To correct a manifest error in the chapter
2. Because of changed or changing conditions in a particular area or in the jurisdiction generally
3. To achieve the purposes of the Comprehensive Plan.

[1] https://chapelhill.legistar.com/LegislationDetail.aspx?ID=5120300&GUID=6C7BF1EE-D3D9-418D-B083-050B64AEC7EA

| | |
|---|---|
| **ATTACHMENTS** | 1. Technical Report<br>2. Draft Staff Presentation<br>3. Resolution A, Consistency with the Comprehensive Plan<br>4. Ordinance A, Enacting the Land Use Management Ordinance Text Amendment<br>5. Resolution B, Adopting the Advisory Board Policy<br>6. Resolution C, Denying the Proposal<br>7. Community Design Commission Recommendation<br>8. Planning Commission Recommendation |

# TECHNICAL REPORT
# RULES OF THE COMMUNITY DESIGN COMMISSION, SECTION 8.5

This report provides various considerations for the proposed LUMO text amendment to revise rules of the Community Design Commission

## BACKGROUND AND NEXT STEPS

| | |
|---|---|
| February 23, 2021 | The Community Design Commission (CDC) petitions Council to consider a reduction of Commission member seats |
| February 25, 2021 | Council Committee on Boards and Commissions recommends full Council consideration of the petition |
| March 24, 2021 | Council formally initiates a text amendment process to consider revisions to membership, quorum, and voting rules of the CDC |
| June 23, 2021 | Council calls a legislative hearing to consider the LUMO text amendment |
| August 24, 2021 | Community Design Commission reviews and makes recommendation on proposed LUMO text amendment |
| September 1, 2021 | Council holds legislative hearing to consider LUMO text amendment |
| September 7, 2021 | Planning Commission reviews and makes recommendation |
| October 13, 2021 | Council considers actions on LUMO text amendment and related update to the Advisory Board Membership Policy |

## CURRENT CDC MEMBERSHIP RULES

9 Member Seats on the Community Design Commission

5 Members in attendance needed for Quorum

5 Concurring Votes needed to take any formal action. This includes approval or denial of a Blue Hill Certificate of Appropriateness. This does not include building elevation reviews and recommendations to Council, which may be approved with a simple majority of members present.

The CDC has had 9 member seats since 2014, when the number of seats was reduced from 10 to 9. Quorum has been set to equal a majority of seats.

Staff compared the sizes of other appearance commissions in the region and noted that Carrboro, Graham, and Chatham County all currently have 9-member commissions. A greater number of member seats was typical among larger communities such as Raleigh and Durham.

Council applied the 5-member concurring vote threshold through a LUMO text amendment on June 27, 2018. The text amendment required that the Planning Commission, Historic District Commission, and Community Design Commission all take formal actions through a majority vote of total member seats, rather than a majority vote of members present. The purpose of the change was to prevent instances of significant decisions being made by only a few people.

## CHALLENGES FOR THE COMMISSION AND STAFF

There are currently six active CDC members and three vacant seats. Since July 2019, at least one seat has been vacant out of the nine total. Challenges created by this situation include:

- **Time and effort spent on recruiting and interviewing candidates**.
  The Commission has held interviews outside of the typical spring cycle to try to fill vacant seats. This does not always result in new appointments.
- **Meetings must be rescheduled or cancelled if there is more than one absence**.
  Staff notes that in the past year, absences have resulted in one meeting (December 2020) needing to be rescheduled. In recent years there have been high levels of attendance, with most Commission members only being absent once per year (on average) or less. However, there is always the risk that attendance patterns could change over time.
- **No decision can be made when there is more than one 'Nay' vote.**
  This applies to formal actions only. The result of two 'Nay' votes is not denial of an application, but rather lack of decision and lack of clear path forward. While no formal application review in recent years has resulted in lack of decision, the risk remains.

## PROPOSED CHANGES

Council reviewed the following changes at the Legislative Hearing on September 1, 2021.

| Existing Rule | Proposed Change | Staff Evaluation |
|---|---|---|
| **Membership** | | |
| **9** seats | **7** seats | • Less time and effort addressing vacancies<br>• More efficient discussion at meetings<br>• May slightly reduce the range of member perspectives<br>• A seat for extraterritorial jurisdiction (ETJ) representation, required by Chapter 160D, is being addressed in a separate resolution. |
| **Quorum** | | |
| **5** attending | **4** attending | • Reduces risk of meetings being rescheduled/cancelled<br>• Maintains simple majority threshold, IF membership is also reduced<br>• Constitutes a majority of current active members |
| **Voting** | | |
| **5** concurring votes | **4** concurring votes | • Reduces risk of applications getting 'stuck' without formal approval OR denial<br>• Maintains simple majority threshold as established in 2018, IF membership is also reduced<br>• Constitutes a majority of current active members |

## ADVISORY BOARD MEMBERSHIP POLICY vs. LAND USE MANAGEMENT ORDINANCE

Rules for the Town's Development Review Commissions are found in two places – the LUMO and the Council's standing Advisory Board Membership Policy. The information is sometimes duplicative. Referencing the Membership Policy in LUMO is a common practice.

Staff recommends that rules for membership, quorum, and voting be contained in the Advisory Board Membership Policy, with appropriate references in LUMO to the Policy. The rules contained in LUMO would then primarily focus on powers and duties of the Commission. Advantages of this approach include:

- Removing the risk of inconsistencies by not duplicating information.
- A simplified procedure to make any future updates. If Council wished to pilot some changes in response to the CDC's petition, then a later update following the pilot could be made without requiring a Text Amendment process.

## LAND USE MANAGEMENT ORDINANCE FINDINGS OF FACT

Staff provides the following evaluation of the amendment under the three Findings of Fact identified in LUMO Section 4.4. At least one of the Findings must be made to amend the LUMO.

| **FINDING #1:** The proposed zoning amendment is necessary to correct a manifest error. | |
|---|---|
| **Arguments** | To date, no arguments in support or in opposition have been submitted or identified by staff. |
| **Staff Evaluation** | There appears to be no manifest error in the Ordinance. |

| **FINDING #2:** The proposed zoning amendment is necessary because of changed or changing conditions in a particular area or in the jurisdiction generally. | |
|---|---|
| **Arguments** | Challenges noted in this report represent changing conditions that may impact the ability of the Community Design Commission to successfully fulfill its charge and exercise its powers as stated in the Land Use Management Ordinance.<br><br>To date, no arguments in opposition have been submitted or identified. |
| **Staff Evaluation** | The Council could make the finding that the proposed zoning amendment is necessary because of changing conditions in the jurisdiction generally. |

| **FINDING #3:** The proposed zoning amendment is necessary to achieve the purposes of the comprehensive plan. | |
|---|---|
| **Arguments** | Staff finds that the proposed amendment relates to the following goal of Chapel Hill 2020, under the Theme of 'Good Places New Spaces':<br>• A development decision-making process that provides clarity and consistency with the goals of the Chapel Hill 2020 Comprehensive Plan.<br><br>To date, no arguments in opposition have been submitted or identified. |
| **Staff Evaluation** | The Council could make the finding that the proposed zoning amendment is necessary to achieve the purposes of the Comprehensive Plan. |

# Land Use Management Ordinance Text Amendment
# +
# Advisory Board Membership Policy Update

DRAFT

## **CDC Membership Rules**

October 13, 2021

# RECOMMENDATION

1. Close the Legislative Hearing
2. Adopt Resolution A -
   Consistency with the Comp Plan (R-#)
3. Enact Ordinance A –
   LUMO Text Amendment (O-#)
4. Adopt Resolution B -
   Adv Board Membership Policy Update (R-#)

DRAFT

# AMENDMENT PROCESS

**CDC Petition**
**2/23/21**

→

**Council Initiates Text Amendment**
**3/24/21**

→

**Council Hearing**
**9/1/21**

→

**Planning Comm. Review**
**9/7/21**

→

**Council Action**
**10/13/21**

# PROPOSED CHANGES

DRAFT

| | Existing Rule | Reduction |
|---|---|---|
| **9** | Member Seats | **7** |
| **5** | Quorum | **4** |
| **5** | Concurring Votes | **4** |

Move rules from LUMO to
Advisory Board Membership Policy

# BOARD RECOMMENDATIONS

DRAFT

- ✓ Community Design Commission - August 24, 2021

  Recommended **approval**

- ✓ Planning Commission - September 7, 2021

  Recommended **approval**

# RECOMMENDATION

1. Close the Legislative Hearing
2. Adopt Resolution A -
   Consistency with the Comp Plan (R-#)
3. Enact Ordinance A –
   LUMO Text Amendment (O-#)
4. Adopt Resolution B -
   Adv Board Membership Policy Update (R-#)

DRAFT

# CHALLENGES

DRAFT

| | | |
|---|---|---|
| **9** | Member Seats | ➢ 3 current vacancies – time spent on recruitment |
| **5** | Quorum | ➢ Risk of cancelled/ rescheduled meetings |
| **5** | Concurring Votes | ➢ Risk of ‘stuck’ applications |

**RESOLUTION A**
**RESOLUTION OF CONSISTENCY**

**A RESOLUTION FINDING THAT THE PROPOSED AMENDMENTS TO SECTION 8.5 OF THE CHAPEL HILL LAND USE MANAGEMENT ORDINANCE REVISING RULES OF THE COMMUNITY DESIGN COMMISSION ARE CONSISTENT WITH THE CHAPEL HILL 2020 COMPREHENSIVE PLAN (2021-10-13/R-15)**

WHEREAS, on March 24, 2021, the Town Council initiated a text amendment process to consider revisions to membership, quorum, and voting rules of the Community Design Commission, in response to a petition made by Commission members; and

WHEREAS, the Planning Commission reviewed the proposed text amendments to the Land Use Management Ordinance Section 8.5 on September 7, 2021 and recommended that the Council enact the text amendments; and

WHEREAS, the Council of the Town of Chapel Hill has considered the proposal to amend the Land Use Management Ordinance (LUMO) to revise membership rules of the Community Design Commission in response to the Commission's petition; and

WHEREAS, upon consideration the Council finds that the amendments, if enacted, are reasonable and in the public's interest and are warranted to achieve the purposes of the Comprehensive Plan, as explained by, but not limited to, the following goals of the Comprehensive Plan:

- A development decision-making process that provides clarity and consistency with the goals of the Chapel Hill 2020 Comprehensive Plan (Good Places New Spaces.3)

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby finds the proposed text amendment to be reasonable and consistent with the Town Comprehensive Plan.

This the 13th day of October, 2021.

**ORDINANCE A**
(Enacting the Land Use Management Ordinance Text Amendment)

**AN ORDINANCE AMENDING SECTION 8.5 OF THE CHAPEL HILL LAND USE MANAGEMENT ORDINANCE TO REVISE RULES FOR THE COMMUNITY DESIGN COMMISSION (2021-10-13/O-4)**

WHEREAS, on March 24, 2021, the Town Council initiated a text amendment process to consider revisions to membership, quorum, and voting rules of the Community Design Commission, in response to a petition made by Commission members; and

WHEREAS, the Planning Commission reviewed the proposed text amendments to the Land Use Management Ordinance Section 8.5 on September 7, 2021 and recommended that the Council enact the text amendments; and

WHEREAS, the Council of the Town of Chapel Hill has considered the proposal to amend the Land Use Management Ordinance (LUMO) to revise membership rules of the Community Design Commission in response to the Commission's petition; and

WHEREAS, an accompanying resolution would amend the Advisory Board Membership Policy of the Town of Chapel Hill, to provide consistency with the revisions detailed in this Ordinance; and

WHEREAS, upon consideration the Council finds that the amendments are reasonable and in the public's interest and are warranted to achieve the purposes of the Comprehensive Plan, as explained by, but not limited to, the following goals of the Comprehensive Plan:

- A development decision-making process that provides clarity and consistency with the goals of the Chapel Hill 2020 Comprehensive Plan (Develop Good Places New Spaces.3)

NOW, THEREFORE, BE IT ORDAINED by the Council of the Town of Chapel Hill that Section 8.5 – Community Design Commission of Appendix A – Land Use Management of the Code of Ordinances, Town of Chapel Hill, North Carolina is hereby amended as follows:

**SECTION 1**

**Section 8.5.1. Establishment of the Commission; Charge** is hereby revised to read as follows:

> "A Community Design Commission, consisting of ~~nine (9)~~ members appointed in accordance with the council's advisory board membership policy, is hereby established. The charge of the commission is to assist the council in guiding the town's vision on aesthetics, character and function to focus community growth through advice, advocacy, and implementation of the council's policies and review of proposed development in key areas of the community."

**SECTION 2**

**Section 8.5.8. Quorum and Voting** is hereby revised to read as follows:

> "A quorum of the commission **shall be defined in accordance with the council's advisory board membership policy**, ~~necessary to take any official action, shall consist of five (5) members.~~ **A concurring vote necessary to take**

**action or conduct business shall be defined in accordance with the council's advisory board membership policy.** ~~The concurring vote of five (5) members shall be necessary to take any official action to approve or deny an application or permit.~~

~~The concurring majority vote of the quorum shall be necessary to conduct other business, including making a recommendation on an application to be considered by the council.~~"

**SECTION 3**

This ordinance shall be effective upon enactment.

This the 13th day of October, 2021.

**RESOLUTION B**
(Adopting the Advisory Board Membership Policy Amendment)

**A RESOLUTION AMENDING THE ADVISORY BOARD MEMBERSHIP POLICY TO REVISE RULES FOR THE COMMUNITY DESIGN COMMISSION (2021-10-13/R-16)**

WHEREAS, on March 24, 2021, the Town Council initiated a text amendment process to consider revisions to membership, quorum, and voting rules of the Community Design Commission, in response to a petition made by Commission members; and

WHEREAS, the Planning Commission reviewed the proposed text amendments to the Land Use Management Ordinance Section 8.5 on September 7, 2021 and recommended that the Council enact the text amendments; and

WHEREAS, the Council of the Town of Chapel Hill has considered the proposal to amend the Land Use Management Ordinance (LUMO) to revise membership rules of the Community Design Commission in response to the Commission's petition; and

WHEREAS, an accompanying ordinance would amend the Land Use Management Ordinance to provide consistency with the revisions detailed in this Resolution.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Advisory Board Membership Policy of the Town of Chapel Hill, North Carolina is hereby amended as follows:

**SECTION 1**

The **Board Specific Policies** for the **Community Design Commission** are hereby revised to read as follows:

[Adoption of this Resolution removes the first 2 rows of the table below, with 7 rows to remain.]

| "Seat Category | Seat Requirements |
|---|---|
| ~~**Chapel Hill Resident**~~ | ~~Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field.~~ |
| ~~**Chapel Hill Resident**~~ | ~~Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field.~~ |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |

| “Seat Category | Seat Requirements |
|---|---|
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field. |
| **Chapel Hill Resident** | [Note that Council will also consider a separate resolution on the October 13, 2021 consent agenda, regarding the requirement under NC General Statute 160D to have an ETJ Resident on the Community Design Commission. If that resolution is adopted, this row will have been deleted and a new row for ETJ Resident will have been added.]<br><br>Must live within the municipal limits of the Town of Chapel Hill and have demonstrated special training or experience in a design field such as architecture, landscape design, horticulture, city planning, green design, place making or a closely related field.” |

**SECTION 2**

The **Board Specific Policies** for the **Community Design Commission** are hereby revised to include a new subsection on **Voting**, to read as follows:

> “**Voting**
>
> **The concurring vote of four (4) members shall be necessary to take any official action to approve or deny an application or permit.**
>
> **The concurring majority vote of the quorum shall be necessary to conduct other business, including making a recommendation on an application to be considered by the council.**”

**SECTION 3**

The section titled **Quorum** is hereby revised to read as follows:

> “For the Grievance Hearing Board ~~and Community Design Commission~~, quorum is 5 members. For the Board of Adjustment, ~~and~~ Historic District Commission, **and** Planning Commission the quorum is 6 members. **For the Community Design**

**<u>Commission, quorum is 4 members.</u>** For all other advisory boards, quorum is a majority of members excluding any vacant seats."

**<u>SECTION 4</u>**

This resolution shall be effective upon adoption.

This the 13th day of October, 2021.

**RESOLUTION C**
(Denying the Land Use Management Ordinance Text Amendment)

**A RESOLUTION DENYING A PROPOSAL TO AMEND SECTION 8.5 OF THE CHAPEL HILL LAND USE MANAGEMENT ORDINANCE TO REVISE RULES OF THE COMMUNITY DESIGN COMMISSION (2021-10-13/R-17)**

WHEREAS, on March 24, 2021, the Town Council initiated a text amendment process to consider revisions to membership, quorum, and voting rules of the Community Design Commission, in response to a petition made by Commission members; and

WHEREAS, the Council of the Town of Chapel Hill has considered the proposal to amend the Land Use Management Ordinance (LUMO) to revise membership rules of the Community Design Commission, and fails to find that the amendment:

a) corrects a manifest error in the chapter, or
b) is justified because of changed or changing conditions in the area of the rezoning site or the community in general, or
c) achieves the purposes of the Comprehensive Plan.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council hereby denies the proposal to amend the Land Use Management Ordinance to revise membership rules of the Community Design Commission.

This the 13th day of October, 2021.

# COMMUNITY DESIGN COMMISSION

*The charge of the Community Design Commission is to assist the Council in guiding the Town's vision on aesthetics, character, and function to focus community growth through advice, advocacy and implementation of the Council's policies and review of proposed development in key areas of the community.*

## RECOMMENDATION FOR CDC MEMBERSHIP REDUCTION REQUEST

August 24, 2021

**Recommendation:** **Approval** ☑ **Approval with Conditions** ☐ **Denial** ☐

**Motion:** John Weis moved and Ted Hoskins seconded a motion to recommend approval to Council of the proposed Land Use Management Ordinance and Advisory Board Membership Policy language to reduce the Community Design Commission seats from nine (9) to seven (7), with associated reductions to Quorum and Concurring Vote thresholds.

**Vote:** 5-0 (Note Commissioner Levitan was not present at this meeting)

**Yeas**: Ted Hoskins
Susan Lyons
Megan Patnaik
John Weis
Susana Dancy

**Nays**: NA

Prepared by: Adam Nicholson, Senior Planner

# PLANNING COMMISSION

*The charge of the Planning Commission is to assist the Council in achieving the Town's Comprehensive Plan for orderly growth and development by analyzing, evaluating, and recommending responsible town policies, ordinances, and planning standards that manage land use and involving the community in long-range planning.*

## RECOMMENDATION
## FOR A LAND USE MANAGEMENT ORDINANCE TEXT AMENDMENT – MEMBERSHIP RULES OF THE COMMUNITY DESIGN COMMISSION

September 7, 2021

**Recommendation:** **Approval ☑** **Approval with Conditions ☐** **Denial ☐**

**Motion:** John Rees moved and Elizabeth Losos seconded a motion to recommend that the Council adopt Resolution A (Resolution of Consistency with the Comprehensive Plan).

**Vote:** 8 – 0

**Yeas**: Michael Everhart (Chair), James Baxter (Vice-Chair), Neal Bench, Elizabeth Losos, Jon Mitchell, John Rees, Louie Rivers, Stephen Whitlow

**Nays**: none

**Motion:** John Rees moved and Elizabeth Losos seconded a motion to recommend that the Council enact Ordinance A (LUMO Text Amendment - Membership Rules of the Community Design Commission).

**Vote:** 8 – 0

**Yeas**: Michael Everhart (Chair), James Baxter (Vice-Chair), Neal Bench, Elizabeth Losos, Jon Mitchell, John Rees, Louie Rivers, Stephen Whitlow

**Nays**: none

Prepared by: Corey Liles, Principal Planner

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 11., **File #:** [21-0769], **Version:** 1 **Meeting Date:** 10/13/2021

**Receive Updated Risk Assessment for Police Station Property.**

**Staff:**
Maurice Jones, Town Manager
Mary Jane Nirdlinger, Deputy Town Manager
Laura Selmer, Economic Development Specialist
John Richardson, Community Resilience Officer

**Department:**
Manager's Office

**Overview:** The Town Council continues to consider the long-term land use and remediation options for the Police Station property, located at 828 Martin Luther King Jr Blvd. The latest option includes the Town entering into the North Carolina Brownfields Program and partnering with Belmont Sayre, a local developer, to create a mixed-use redevelopment of the property that could include a new Municipal Services Center, retail, and housing. As part of this process, the Town continues to work with environmental consulting services firm, Hart & Hickman, to complete an updated Human Health and Ecological Risk Assessment. This assessment will help the Town to better understand risk under the current land use scenario and possible future redevelopment scenarios. See the attached presentation, executive summary, and full report for findings and details.

**Recommendation(s):**

That the Council receive the attached presentation and report and continue to provide guidance, as needed.

**Fiscal Impact/Resources:** The cost of the updated risk assessment was $28,700. Additional fiscal impacts will be discussed as part of other items related to the potential future land uses and remediation options for the property.

**Where is this project in its process?**

Council Previews Updated Risk Assessment — Oct. 1, 2021 → **Council Receives Full Risk Assessment — Oct. 13, 2021** → Project Public Information Meeting — Oct. 25, 2021 → Council Reviews Draft MOU with Belmont Sayre — Oct. 27, 2021

**Attachments:**

- Consultant Presentation
- Risk Assessment Executive Summary
- Risk Assessment Report

**Item #:** 11., **File #:** [21-0769], **Version:** 1 **Meeting Date:** 10/13/2021

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Genna Olson, Principal Geologist, Hart & Hickman

RECOMMENDATION: That the Council receive the attached presentation and report and continue to provide guidance, as needed.

# Risk Assessment Results


Prepared by

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

October 1, 2021

# Topics of Discussion

- Introduction & Background
- Human Health Risk Assessment
- Ecological Risk Assessment
- Conclusions & Recommendations

# Introduction & Background


- Mixture of coal combustion products (CCPs) and construction debris buried across much of the property.
- Primary compounds of concern are metals.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

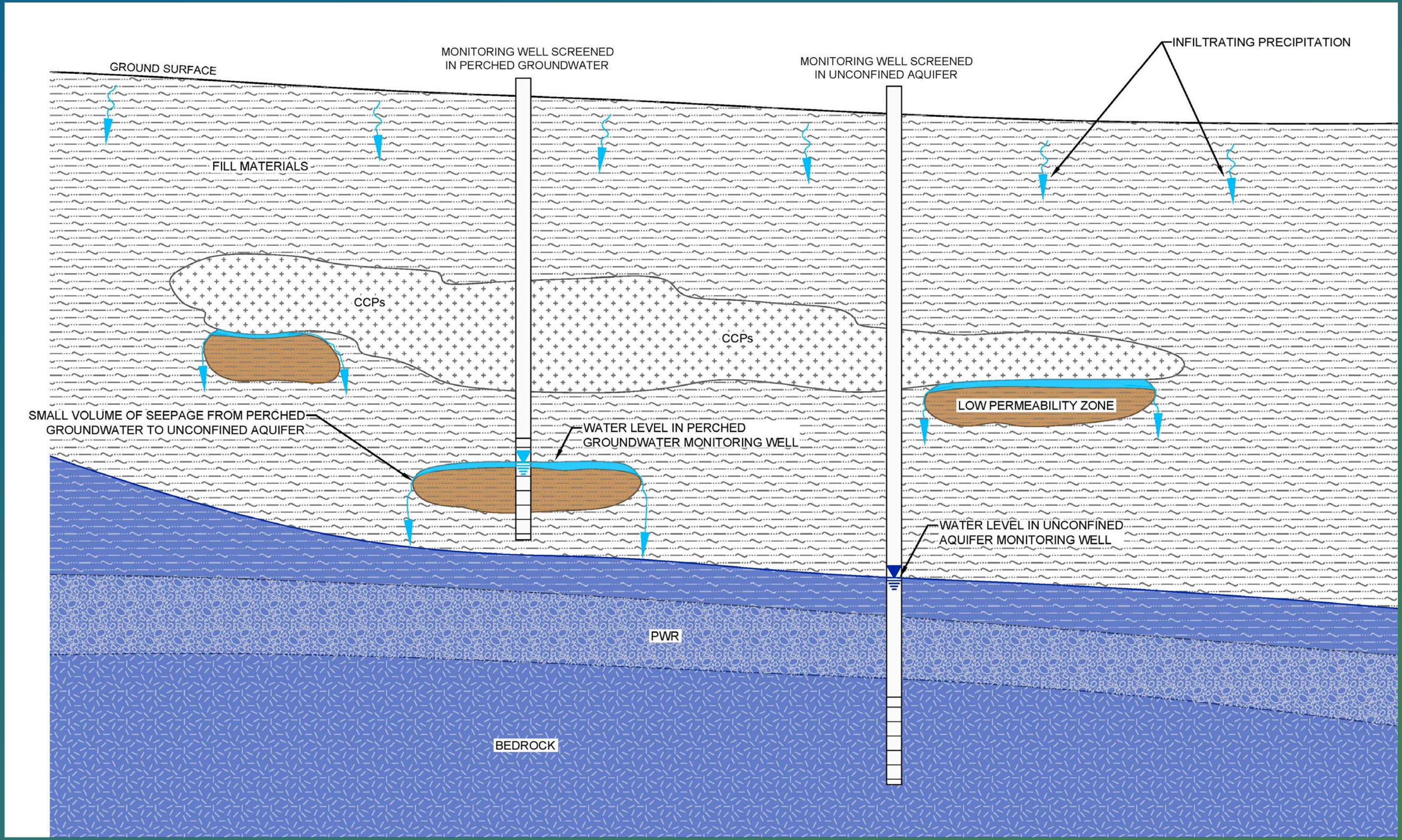
# Introduction & Background

2020 interim remedial measures:

- Excavation of coal combustion products (CCPs) along Bolin Creek Trail
- Stabilization of embankment and stormwater management controls


hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Introduction & Background




- Some elevated concentrations of metals in perched water within fill materials, but limited or no groundwater impact in wells screened in non-fill zones in the underlying aquifer.
- No significant impact to surface water in Bolin Creek.
- No groundwater users (such as water supply wells) in the area.

# Introduction & Background

- Prior risk assessment focused on area of greenway. Concluded that interim remedial measures effectively reduced risk such that greenway trail is safe for use.
- More comprehensive human-health and ecological risk assessment recently performed for the site as a whole.  Goal was to define the final measures recommended under the current land use scenario and possible future redevelopment scenarios.

synTerra

Science & Engineering Consultants
511 Keisler Dr # 102, Cary, NC 27518 | 919.858.9898

**HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT REPORT**

**828 MARTIN LUTHER KING, JR. BOULEVARD PROPERTY**
**CHAPEL HILL, NORTH CAROLINA**

**MAY 6, 2021**

**PREPARED FOR:**

**TOWN OF CHAPEL HILL**
**CHAPEL HILL, NORTH CAROLINA**

**PREPARED BY:**

**SYNTERRA CORPORATION**
**CARY, NORTH CAROLINA**

Kevin P. Kelt, G.I.T.
Project Geologist

David L. Duncklee, P.G.
Senior Hydrogeologist

Kenneth Rudo, Ph. D
Toxicologist

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Topics of Discussion

- Introduction & Background
- **Human Health Risk Assessment**
- Ecological Risk Assessment
- Conclusions & Recommendations

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human Health Risk Assessment

North Carolina Department of Environmental Quality
Risk Calculator
June 2021 Version

COVER PAGE | TABLE OF CONTENTS | SELECT SHEETS TO PRINT

LINKS

NCDEQ Risk Calculator User Guide | What's New | Risk Evaluation Equations and Calculations | Preliminary Soil Remediation Goals (PSRG) Table

Residential Vapor Intrusion Screening Levels (VISL) Table | Non-Residential VISL Table

DATA INPUT SHEETS

1. Exposure Pathways & Parameters

A. Complete Exposure Pathways | B. Exposure Factors and Target Risks | C. Contaminant Migration Parameters | D. Sample Statistics

2. Exposure Point Concentrations

A. Soil | B. Groundwater | C. Surface Water | D. Soil Gas | E. Air

DATA OUTPUT SHEETS

1. Summary Output for All Calculators

A. Risk for Individual Pathways | B. Sitewide Risk

2. Direct Contact Soil and Water Calculators

A. RESIDENT Soil | B. RESIDENT Groundwater Use | C. NON-RESIDENTIAL WORKER Soil | D. NON-RESIDENTIAL WORKER Groundwater Use | E. CONSTRUCTION WORKER Soil

F. RECREATOR/ TRESPASSER Soil | G. RECREATOR/ TRESPASSER Surface Water

3. Vapor Intrusion Calculators

A. RESIDENT Groundwater to Indoor Air | B. RESIDENT Soil Gas to Indoor Air | C. RESIDENT Indoor Air | D. NON-RESIDENTIAL WORKER Groundwater to Indoor Air | E. NON-RESIDENTIAL WORKER Soil Gas to Indoor Air | F. NON-RESIDENTIAL WORKER Indoor Air

4. Contaminant Migration Worksheets

A. Soil to Groundwater Forward Mode | B. Groundwater to Groundwater Forward Mode | C. Soil to Surface Water Forward Mode | D. Groundwater to Surface Water Forward Mode

E. Soil to Groundwater Backward Mode | F. Groundwater to Groundwater Backward Mode | G. Soil to Surface Water Backward Mode | H. Groundwater to Surface Water Backward Mode

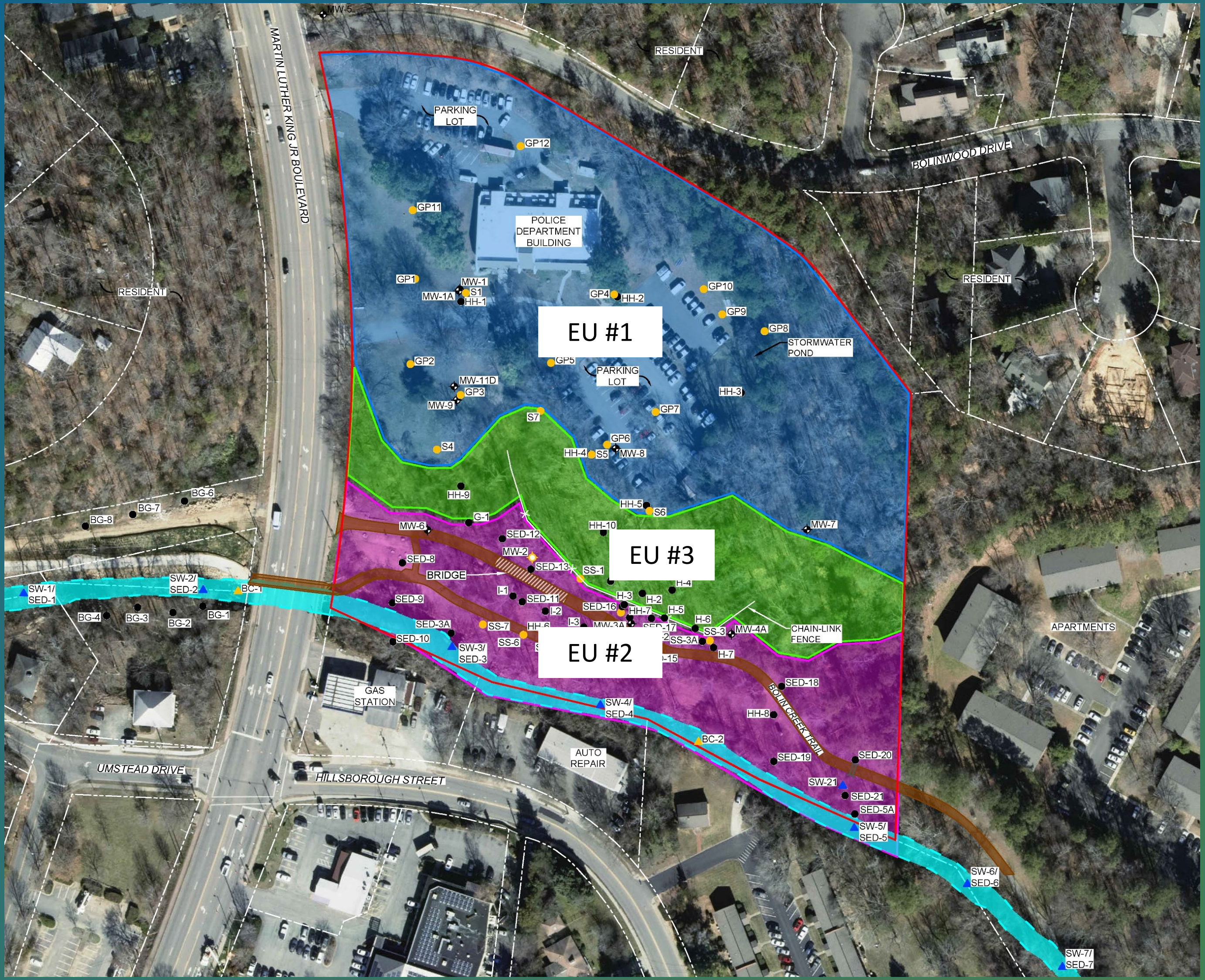
For NCDEQ Use Only

UNPROTECT ALL SHEETS | PROTECT ALL SHEETS

- Risk assessment calculations performed using the DEQ Risk Calculator.
- Recommendations to address exceedances of acceptable risk levels could include remediation, land-use restrictions (LURs), or other measures.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human Health Risk Assessment - Exposure Pathways Evaluation




- Exposure Unit (EU) = Areas of similar land-use and exposure characteristics
- Evaluated risk for both current and possible future site occupants.
- EU #1 – Upper Level
  - Residents
  - Non-residential workers
  - Construction workers
- EU #2 – Lower Level
  - Greenway user
  - Construction workers
- EU #3 - Embankment
  - Current exposure minimal, evaluated future risks for all possible users to identify whether additional measures needed.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human Health Risk Assessment - Exposure Pathways Evaluation

| Exposure Pathway | Evaluation |
| --- | --- |
| **SOIL**<br>Direct contact soil exposure pathway – dermal contact, ingestion, or outdoor inhalation of particulates from impacted soil or coal combustion products (CCPs) | Pathway evaluated for all three exposure units. |
| **SURFACE WATER**<br>Direct contact surface water exposure pathway – dermal contact or ingestion of impacted surface water | Pathway evaluated for surface water in Bolin Creek (Exposure Unit #2). |
| **STREAM SEDIMENT**<br>Direct contact sediment exposure pathway – dermal contact, ingestion, or outdoor inhalation of particulates from impacted stream sediment | Pathway evaluated for stream sediment in Bolin Creek (Exposure Unit #2). |
| **VAPOR INTRUSION**<br>Migration of volatile vapors into buildings | Pathway not complete because no volatile compounds present. |
| **GROUNDWATER**<br>Direct contact groundwater use pathway – ingestion, dermal contact, or inhalation associated with water supply well use | Pathway not complete because no water supply wells present and land-use restriction preventing future installation of water supply wells proposed. |

# Human Health Risk Assessment - Exposure Parameters

*Reasonable maximum exposure (RME) – the highest exposure reasonably likely to occur, generally assumed to be in the range of the 90th and 99.9th percentiles (US EPA, 2001).*

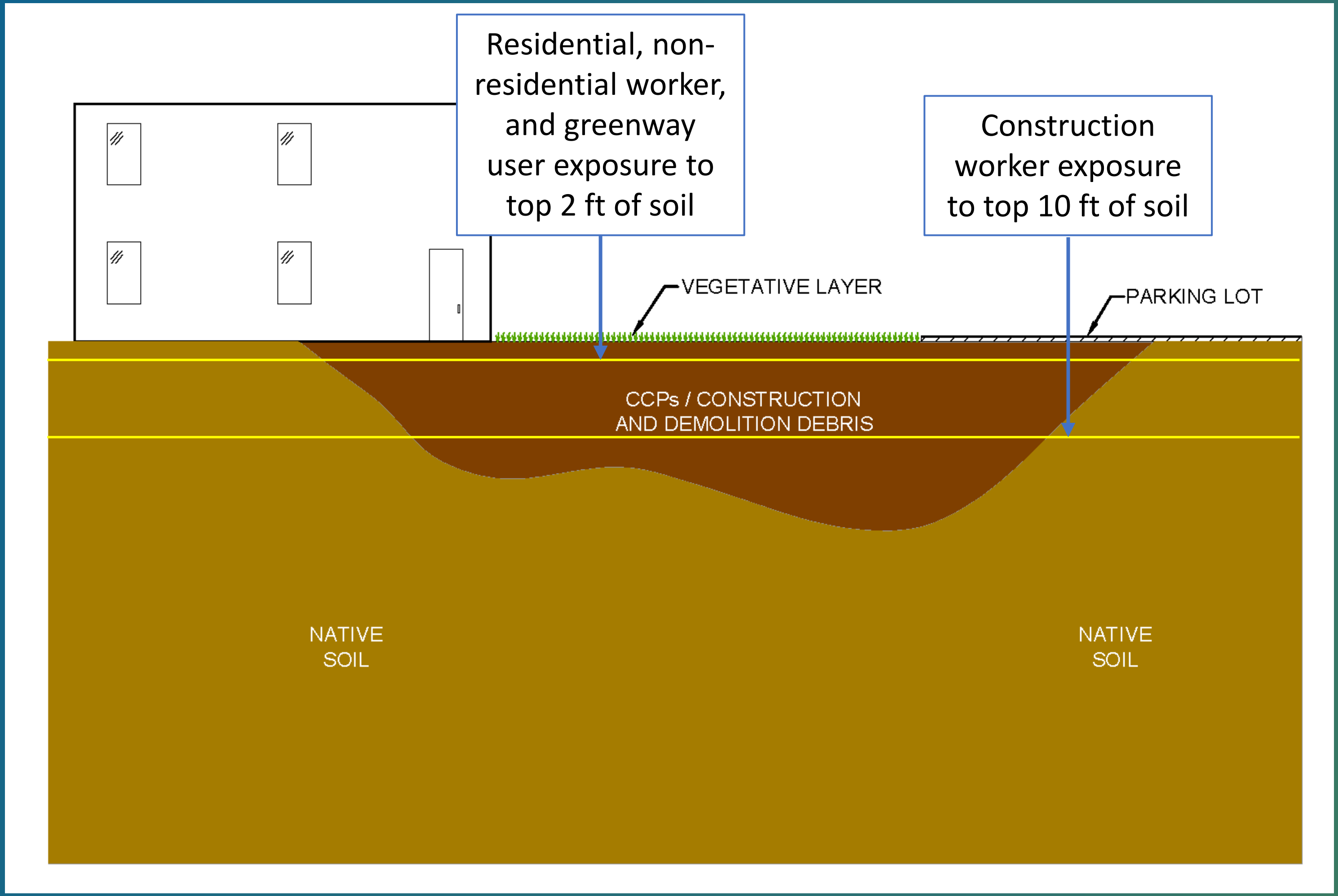
***90 to 99.9% of time people will be exposed at levels less than risk assessment assumes.***

- DEQ default exposure parameters used for resident, non-residential worker, and construction worker, which represent RME.
- For greenway user, site-specific values calculated which represent 98$^{th}$ percentile based on trail survey.

# Human Health Risk Assessment - Exposure Point Concentrations

- Metals are naturally occurring in North Carolina soils.
- Metals representative of naturally occurring conditions removed for the purpose of defining areas where remediation or other measures needed to address risks.

# Human-Health Risk Assessment – Exposure Point Concentrations




- Risk calculations used maximum concentrations in designated depth zone.
- If deeper samples exposed during grading and not covered by impervious surfaces post-redevelopment, recommend additional risk evaluation or cover with 2 ft of clean fill.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human Health Risk Assessment – Target Risk Levels

- Based on EPA and NCDEQ risk assessment guidance, exceedances of the following target risk levels will be considered “triggers” for additional action:
  - Non-cancer hazard index > 1
  - Cancer risk > 1 in 10,000 ($10^{-4}$)
- Per typical Brownfields redevelopment process, actions may be performed to minimize exposure even if target risk levels are not exceeded.

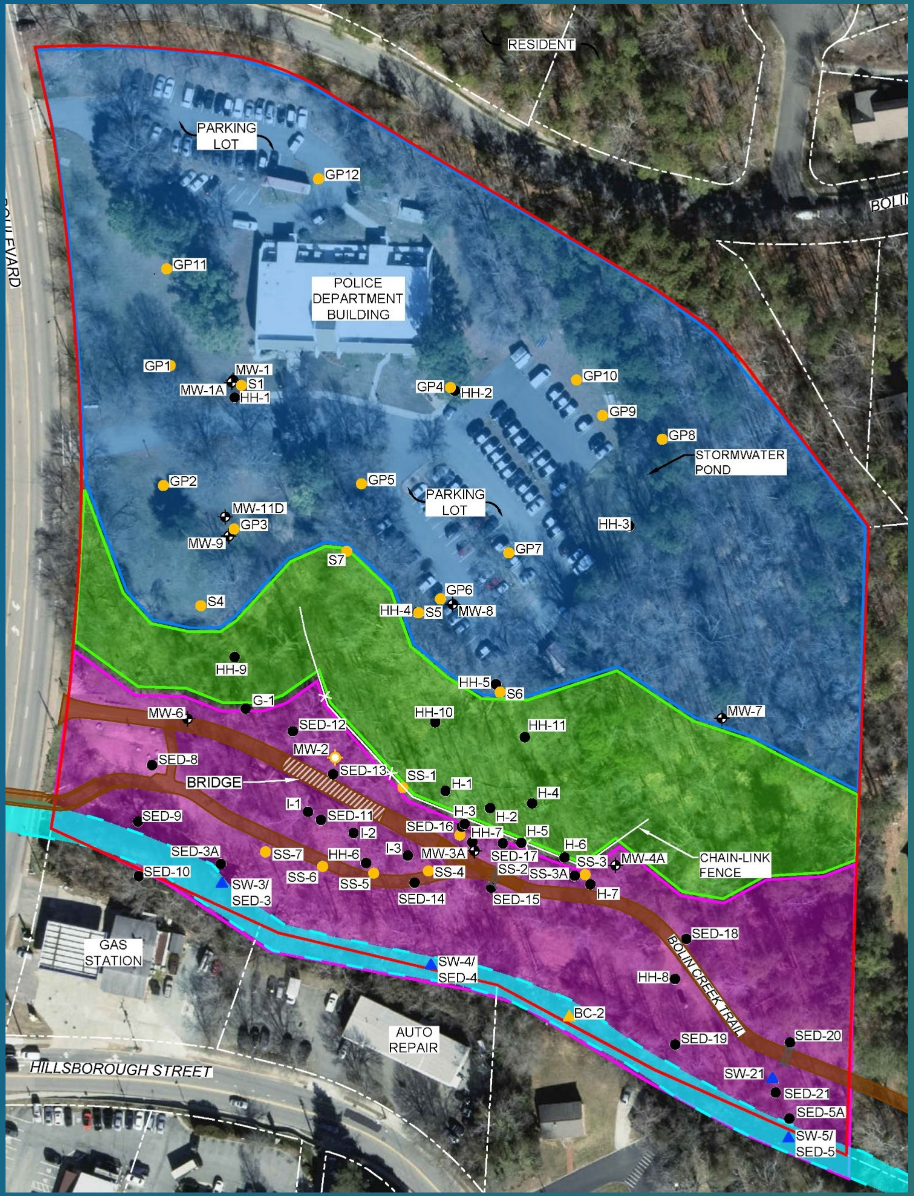
Non-cancer hazard index (HI) or hazard quotient (HQ) = The ratio of the amount of a contaminant a person is exposed to versus the amount that may cause non-cancer harmful effects.

Individual Excess Lifetime Cancer Risk (CR) = Increase over background in an individual’s probability of getting cancer over a lifetime due to exposure to a chemical.

hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

# Human-Health Risk Assessment – Non-Residential Worker




Exposure assumptions:

- Exposure for 25 yrs, 250 d/yr, and 8 hr/d.
- Dermal exposure of head, hands, and forearms.
- Ingestion of 100 mg/d of soil.

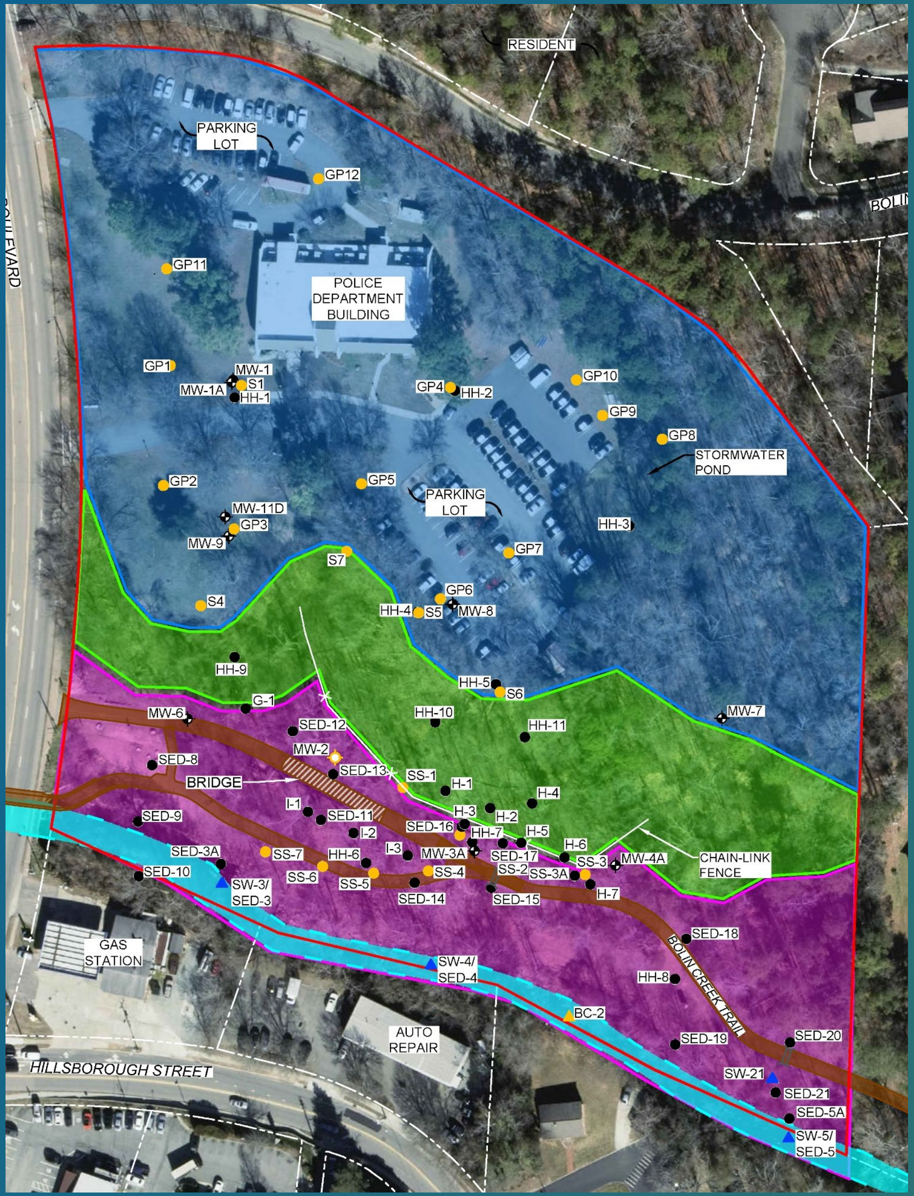
Risk assessment results:

- No exceedances of acceptable risk levels.

***Site considered safe for current or future non-residential workers.***

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human-Health Risk Assessment – Greenway User




Exposure assumptions:

- Adult exposure for 20 yrs, 364 d/yr, and 1 hr/d.
- Child exposure for 6 yrs, 52 d/yr and 0.5 hr/d.
- Dermal exposure of head, hands, forearms, lower legs, and feet.
- Ingestion of 200 mg/d of soil by a child and 100 mg/d of soil by an adult.

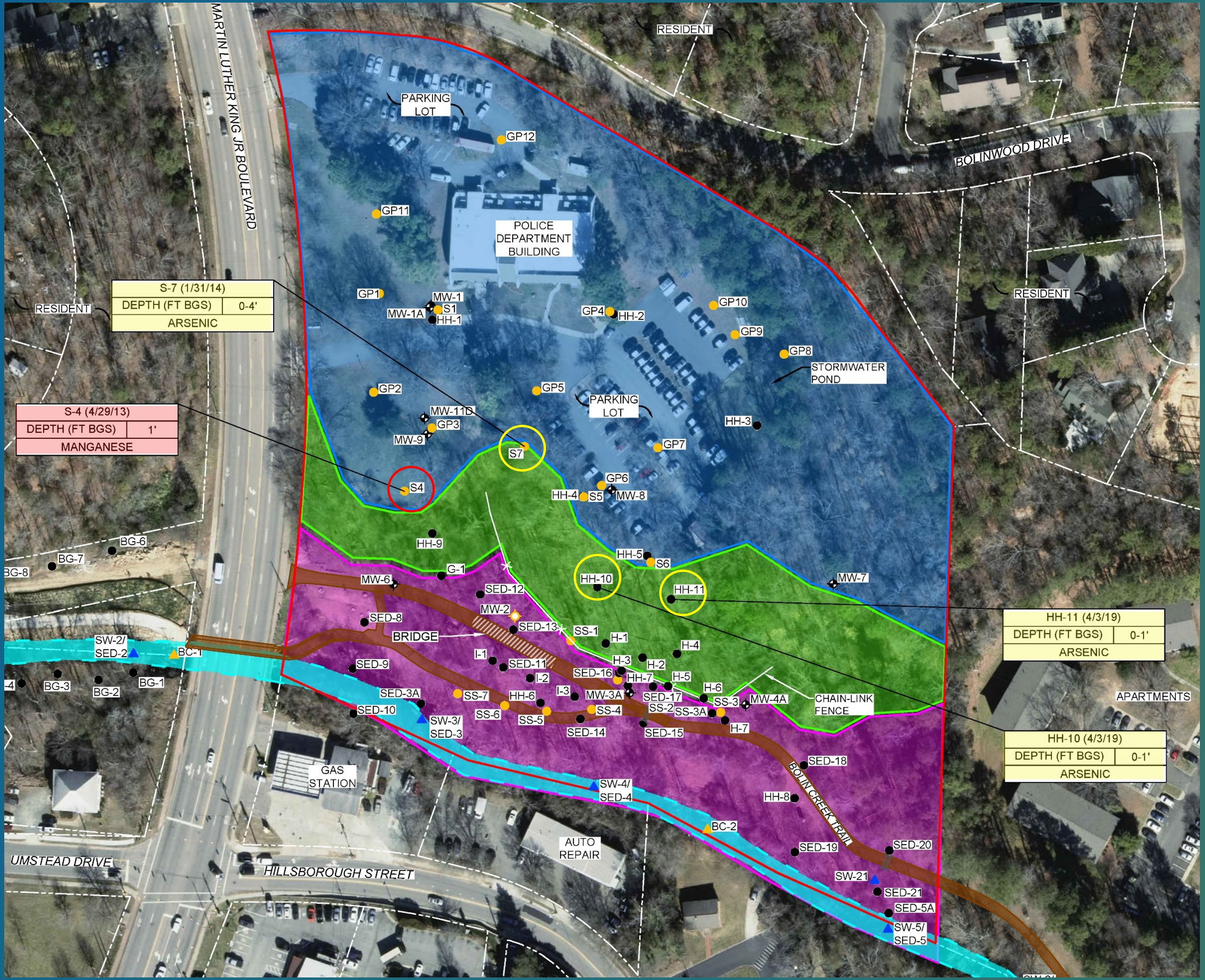
Risk assessment results:

- No exceedances of acceptable risk levels.

***Site considered safe for current or future greenway users.***

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human-Health Risk Assessment - Resident




Exposure assumptions:

- Exposure for 6 yrs as a child and 20 yrs as an adult, 350 d/yr, and 24 hr/d.
- Dermal exposure of head, hands, forearms, lower legs, and feet.
- Ingestion of 200 mg/d of soil by a child and 100 mg/d of soil by an adult.

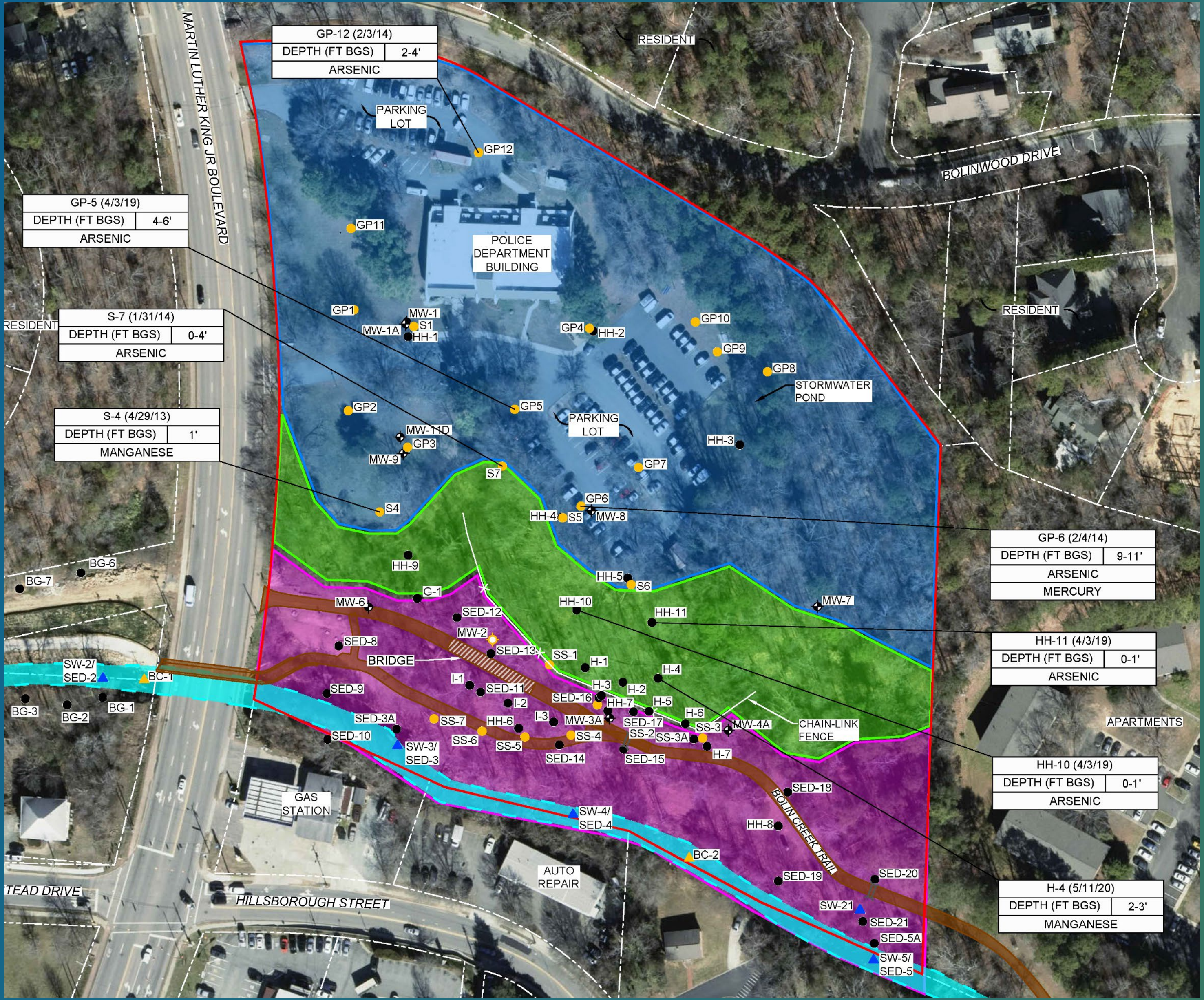
Risk assessment results:

- Samples in yellow indicate coal combustion products (CCPs) in embankment area. Recommend addressing in conjunction with permanent measures for embankment.
- For sample in red (S-4), recommend remediation or other measures to address impacts.

***No current residents, risk management recommendations apply if site is redeveloped for residential use.***

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Human-Health Risk Assessment – Construction Worker




Exposure assumptions:

- Exposure for 1 yr, 250 d/hr, and 8 hr/d.
- Dermal exposure of head, hands, and forearms.
- Ingestion of 330 mg/d of soil.
- Significantly increased outdoor inhalation of particulates.

Risk assessment results:

- Several samples with exceedances.
- Recommend Environmental Management Plan (EMP) requiring personal protective equipment (PPE) and other measures to eliminate construction worker exposures.

***Future construction worker risk can be addressed via EMP.***

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Topics of Discussion

- Introduction & Background
- Human Health Risk Assessment
- **Ecological Risk Assessment**
- Conclusions & Recommendations

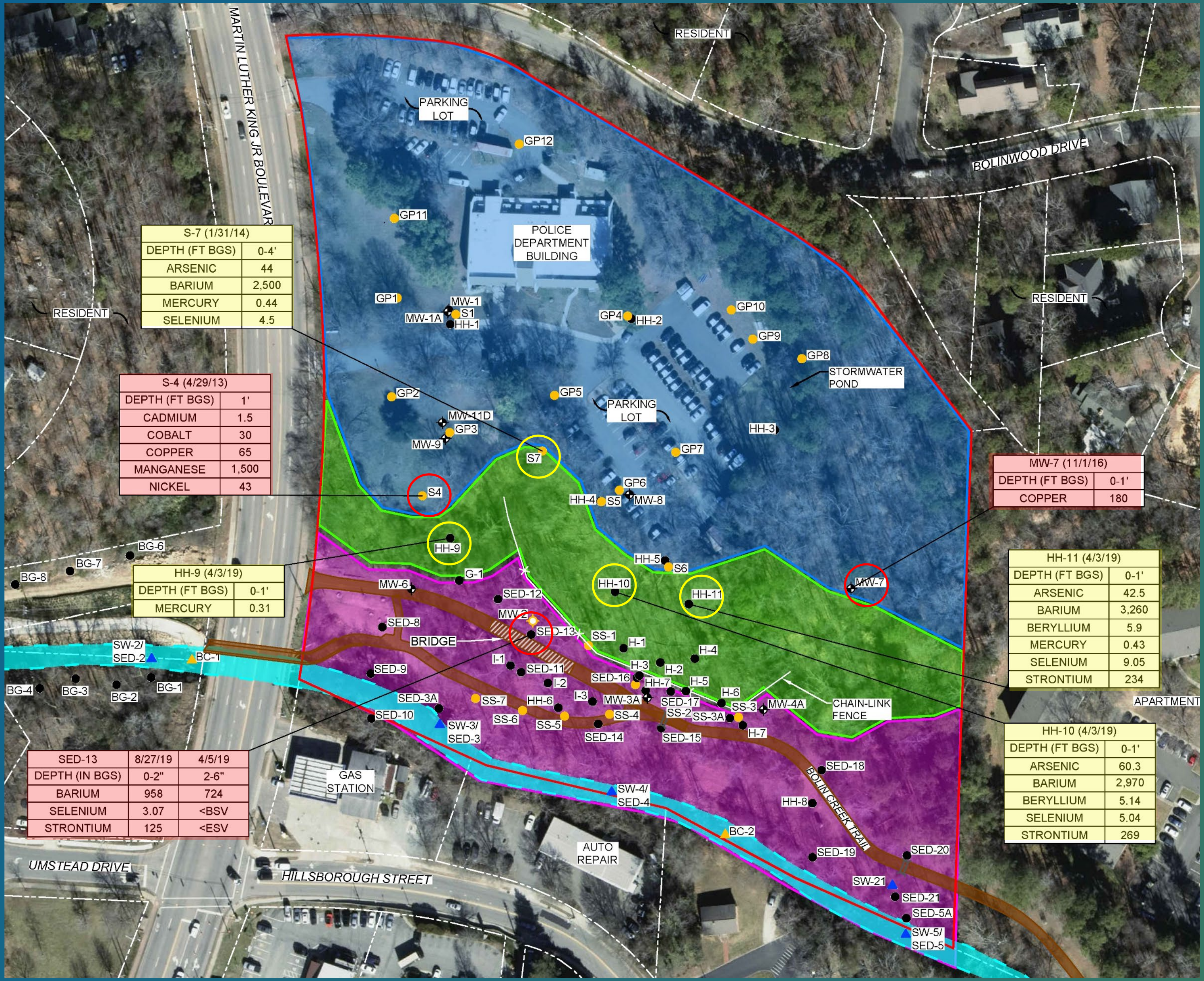
hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Ecological Risk Assessment Results

- Initial screening level comparison of concentrations to EPA Ecological Screening Values (ESVs).
- EPA ESVs are based on conservative endpoints and ecological effects data, and represent preliminary screening criteria to evaluate the potential for ecological risk (or lack thereof). Not considered remediation goals.
- Compared concentrations of stream sediment, surface water, and soil (0-2 ft) above background levels to EPA ESVs.

Image reference: KY Department of Fish & Wildlife Resources

# Ecological Risk Assessment Results




- No exceedances of EPA Ecological Screening Values (ESVs) in surface water or stream sediment in Bolin Creek, which is most ecologically sensitive area.
- Samples in yellow indicate exceedances of ESVs in embankment area. Recommend addressing in conjunction with permanent measures for embankment.
- Samples in red indicate exceedances of ESVs in upper or lower level soil. DEQ does not commonly require evaluation of ecological risks for soil. If required by DEQ or if the Town wishes to take voluntary actions, H&H recommends remediation or other measures to address or further evaluate potential ecological risks in the area of these samples.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Topics of Discussion

- Introduction and Background
- Human Health Risk Assessment
- Ecological Risk Assessment
- **Conclusions & Recommendations**

# Conclusions & Recommendations

- Human-health risk is safe for current site uses (non-residential workers and greenway users).
- Ecological risk is acceptable for Bolin Creek.
- For the area of the embankment, recommend implementation of permanent measures to prevent erosion and address exposed coal combustion products (CCPs), which exceed acceptable risk levels for a resident, construction worker, and ecological receptors.
- If the site is redeveloped for residential use, recommend remediation or other measures to address impacts in the upper level in the area of sample S-4.
- Outside of the embankment area, ecological risk screening indicated localized exceedances of Ecological Screening Values (ESVs) at three sample locations. DEQ does not commonly require evaluation of ecological risks for soil. If required by DEQ or if the Town wishes to take voluntary actions, recommend remediation or other measures to address or further evaluate risks in the area of these samples.
- Recommend Environmental Management Plan (EMP) manage risks to construction workers.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

# Conclusions & Recommendations

- Risk calculations based on 0-2 ft samples for residents, non-residential workers, and greenway users, and 0-10 ft samples for construction worker. If deeper samples exposed during grading and not covered by impervious surfaces post-redevelopment, recommend additional risk evaluation or cover with 2 ft of clean fill.
- Recommend land use restriction (LUR) preventing the future installation of water supply wells at the site.
- Final LURs will be detailed in a Brownfields Agreement (BFA). The BFA will be filed on the deed for the property, and requires annual certification that LURs are being complied with in perpetuity.

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

hart hickman

# Questions?

Smarter Environmental Solutions

**Executive Summary**
**Risk Assessment**
**828 Martin Luther King Jr. Boulevard**
**Chapel Hill, Orange County, North Carolina**

Hart & Hickman, PC (H&H) has completed human health and ecological risk assessment activities for the property located at 828 Martin Luther King (MLK) Jr. Boulevard in Chapel Hill, Orange County, North Carolina (site). This document provides an executive summary of the risk assessment background, methodology, and results. Refer to the Risk Assessment Report dated October 7, 2021 for details regarding the assessment.

Background Information

Previous assessment activities indicated that the site was initially used as a borrow pit from the late 1950s to early 1960s, and then was used as a fill site by a previous owner for construction debris and coal combustion products (CCPs) from the mid-1960s to the mid-1970s. In the early 1980s, the Town of Chapel Hill (Town) acquired the property and constructed a building that is currently used for police department operations. The site consists of an upper level where the borrow pit was located which is now occupied by the police department building and associated parking areas, and a lower level adjacent to Bolin Creek where the Bolin Creek Trail (hereinafter also referred to as the greenway) is located. The upper and lower levels are separated by a steep embankment. The site layout and area of CCPs are depicted on Figure 1.

Assessment activities were conducted to investigate potential environmental impacts associated with CCPs at the site from 2013 to 2020. The investigation activities included collection and laboratory analysis of CCPs, groundwater, soil, sediment, and surface water samples. The results of the assessment activities identified concentrations of certain metals in soil and CCP samples and in perched groundwater zones within the fill material. However, groundwater assessment activities identified limited to no impacts in the underlying unconfined aquifer downgradient of the fill area. Assessment activities also identified no significant impacts to stream sediment or surface water in Bolin Creek.

Preliminary risk assessment activities were performed to evaluate risks for greenway users in the trail area in 2019. Based on the results, interim remedial measures (IRMs) were implemented in

2020. IRMs included excavation and off-site disposal of soil and exposed CCPs along Bolin Creek Trail, stabilization and cover of exposed CCPs along the embankment between the upper and lower portions of the site, and temporary measures to address stormwater and erosion control in the area of the embankment. Additional risk assessment activities performed after IRMs concluded that the greenway trail is safe for users. Under present conditions, CCP fill material at the site is covered by at least 2 ft of soil cover, with the exception of localized areas in the upper level with 1 to 2 ft of soil cover and areas of exposed CCPs along the embankment.

The Town is considering redevelopment of the site and has entered the site into the North Carolina Department of Environmental Quality (DEQ) Brownfields Program. The Town requested that H&H perform the additional risk assessment activities documented in this report to define the final measures recommended for the site as a whole to address CCP impacts, both under the current land use scenario and possible future redevelopment scenarios.

Risk Assessment Methodology

The risk assessment activities were completed in general accordance with DEQ and United States Environmental Protection Agency (EPA) risk assessment guidance (DEQ, 2020, DEQ, 2021a, EPA, 2018a, EPA, 2018b). For the purpose of risk characterization, the site was divided into three exposure units (EUs) that represent areas of similar land use and potential receptors. EU #1 encompasses the upper level in the vicinity of the existing police department building and associated parking areas, EU #2 encompasses lower level in the area of Bolin Creek and the adjacent Bolin Creek Trail, and EU #3 encompasses the embankment between EU #1 and EU #2. The exposure units are depicted on Figure 2.

For the human-health risk assessment, an exposure pathway evaluation was performed to identify pathways by which residents, non-residential workers, construction workers, or greenway trail users could be exposed to impacted media within each EU. Risks were calculated for each complete exposure pathway assuming conservative reasonable maximum exposures. The DEQ Risk Calculator was used to calculate potential cancer risk (CR) and non-cancer hazard index (HI). Based on EPA and DEQ guidance (DEQ, 2021a, EPA, 2018b) remediation or other measures to address risks are recommended for calculated CR above one in 10,000 (1.0E-04) or HI of greater than 1.0.

The ecological risk assessment activities were limited to an initial screening comparison of detected concentrations to the Ecological Screening Values (ESVs) established by EPA Region 4. Per DEQ and EPA guidance (DENR, 2003, EPA, 2018a), EPA ESVs are based on conservative endpoints and ecological effects data, and represent preliminary screening criteria to evaluate the potential for ecological risk (or lack thereof). ESVs are not intended to represent remediation goals, and in some cases further data evaluation can be performed instead of proceeding directly to remediation for cases where ESVs are exceeded.

The primary compounds of concern for the site are metals associated with CCPs; however, naturally-occurring background levels of metals are also present, which are derived from the natural elemental composition of the source rock underlying the site. Background samples collected from the site contained concentrations of certain metals exceeding DEQ Preliminary Soil Remediation Goals (PSRGs) in soil and stream sediment, which are attributed to naturally-occurring metals in the parent bedrock. EPA and DEQ do not require remediation of concentrations below background levels (EPA, 2002, DEQ, 2021), since these concentrations represent naturally occurring conditions that are not associated with contamination sources. Note also that DEQ PSRGs are initial screening levels based upon conservative exposure assumptions. In accordance with EPA and DEQ guidance, risk management recommendations for the site are based on risk calculations with background metals excluded.

Human-Health Risk Assessment Results

The human-health risk assessment results indicated the following:

- Human-health risk was evaluated for possible future residents in the area of EU #1 (upper level) and EU #3 (embankment). The results of the risk evaluation indicated that acceptable risk levels were exceeded for a future resident in both units (with and without background concentrations included), with risks being driven by the following sample locations: the manganese concentration in soil sample S-4 in EU #1 (upper level), and the arsenic concentrations in samples S-7, HH-10, and HH-11 in EU #3 (embankment). The samples exceeding acceptable risk levels for a possible future resident are depicted on Figure 3.

- Human-health risk was evaluated for possible current or future non-residential workers in the area of EU #1 (upper level) and EU #3 (embankment). The results of the risk evaluation indicated acceptable risk levels for a non-residential worker in both units. Therefore, the site is considered safe for non-residential workers.
- Human-health risk was evaluated for possible future construction workers in the area of all three exposure units (upper level, lower level, and embankment). The results of the risk evaluation indicated that acceptable risk levels were exceeded for a construction worker in all three units, with multiple samples identified as risk drivers. If background concentrations are removed, acceptable risk levels were exceeded for a construction worker in EU #1 (upper level) and EU #3 (embankment). The samples exceeding acceptable risk levels for a possible future construction worker are depicted on Figure 4.
- Human-health risk was evaluated for possible current and future greenway users in the area of EU #2 (lower level) and EU #3 (embankment). The results of the risk evaluation indicated acceptable risk levels for greenway users in both units. Therefore, the site is considered safe for greenway users.

<u>Ecological Risk Assessment Results</u>

The results of the ecological risk screening indicated the following:

- The area of Bolin Creek (EU #2) is the area with the highest likelihood of potential ecological receptors. The results of the risk evaluation indicated no significant ecological risk for surface water and sediment in Bolin Creek.
- Exceedances of ESVs for multiple metals were identified in samples of exposed CCPs collected along the embankment in EU #3 (S-7, HH-9, HH-10, and HH-11).
- Localized exceedances of ESVs were also identified at two soil sample locations within EU #1 (S-4 and MW-7) and one individual soil sample location within EU #2 (SED-13).

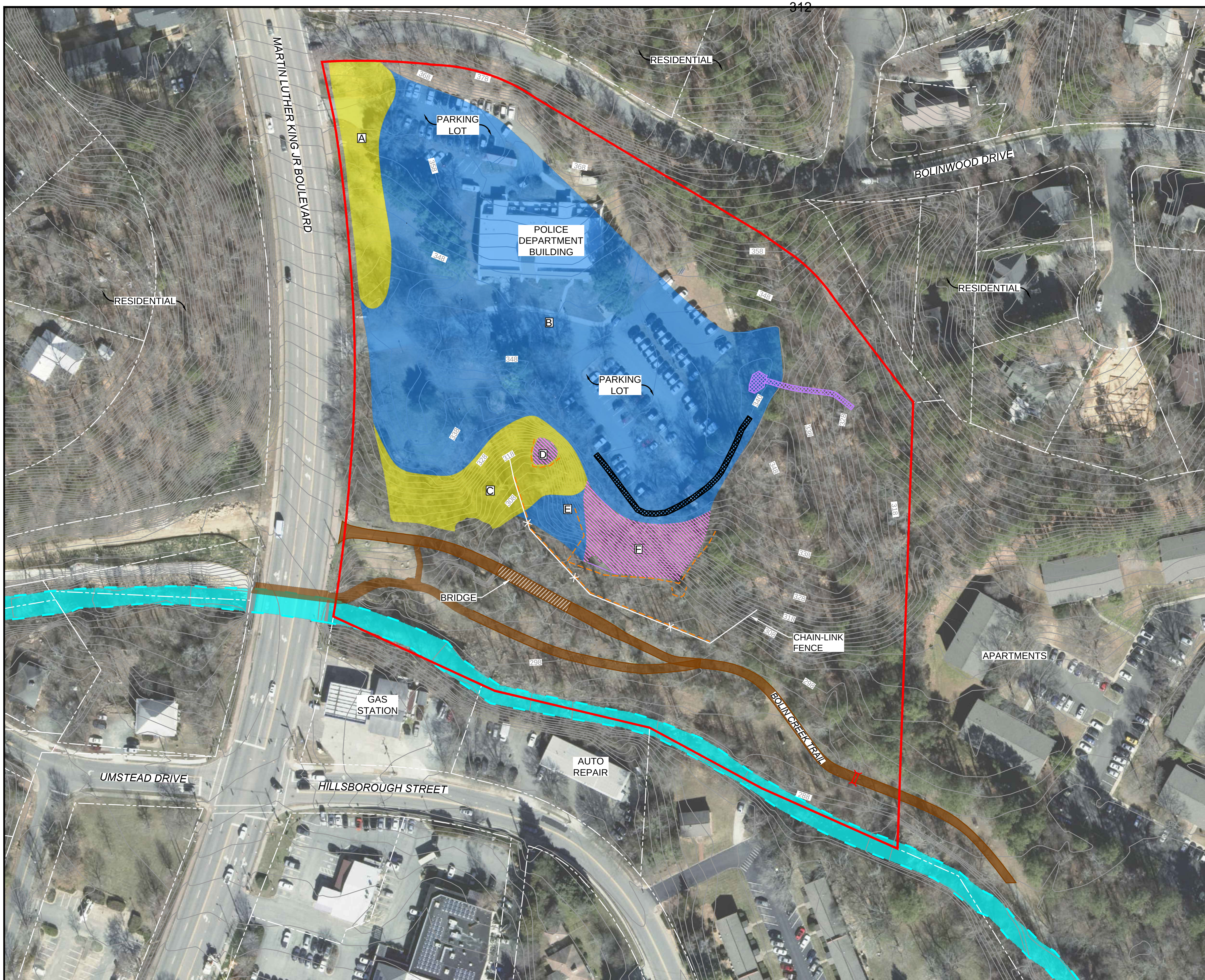
The samples exceeding ESVs for ecological receptors are depicted on Figure 5.

<u>Recommendations</u>

H&H's recommendations to address potential human-health and ecological risks identified as part of the risk assessment are detailed below. In addition to recommendations related to specific sample locations which are drivers for potential risks, in some cases land-use restrictions (LURs) are recommended to confirm the assumptions made during the risk assessment activities remain valid. LURs are expected to be specified in a future Brownfields Agreement with the DEQ Brownfields Program, which will be filed on the deed for the property and remain in perpetuity. The Brownfields Program requires annual certifications from the property owner that LURs are being complied with in perpetuity, which will confirm that potential risks addressed via LURs will be managed long-term.

- Exposed CCPs are present in the area of the embankment. The risk evaluation indicated exceedances of acceptable risk levels for a resident, construction worker, and/or ecological receptors based on metals concentrations in several samples of exposed CCPs collected in the embankment area (S-7, HH-9, HH-10, and HH-11). The potential for erosion to transport CCPs from the area of the embankment into the greenway area is considered an additional concern. The Town implemented temporary measures to minimize the potential for erosion as part of the IRMs implemented in 2020; however, H&H recommends implementation of permanent measures to address exposed CCPs and prevent erosion in the embankment area. These measures could effectively be performed in conjunction with site redevelopment activities.
- If the site is redeveloped for residential use, H&H recommends remediation or other actions (ex., excavation, impervious cover to prevent exposure, resampling to verify concentrations) to address impacts in the upper level in the area of sample S-4.
- Outside of the embankment area, the ecological risk screening indicated localized exceedances of ESVs at two soil sample locations within EU #1 (S-4 and MW-7) and one individual soil sample location within EU #2 (SED-13). DEQ does not commonly require evaluation of ecological risks for soil (DEQ, 2021c). As such, DEQ may not require additional actions with regard to the exceedances of ESVs in these samples. If required by DEQ or if the Town wishes to take voluntary actions, H&H recommends remediation or other measures to address or further evaluate potential ecological risks in the area of samples S-4, MW-7, and SED-13.

- To address construction worker risks, H&H recommends implementation of an anticipated LUR requiring preparation of an Environmental Management Plan (EMP), which will detail measures to prevent construction worker exposure, manage impacted soil, and minimize the potential for off-site migration during construction (i.e., redevelopment) activities.
- The risk assessment calculations were based on soil samples collected at depths of 0 to 2 feet below ground surface (ft bgs) for a resident, non-residential worker, and greenway user, and samples collected at depths of 0 to 10 ft bgs for a construction worker. If impacted soil or CCPs at deeper depths are exposed during site redevelopment, additional risk evaluation should be performed to confirm that potential exposure to these soils does not exceed acceptable risk levels. If the site is redeveloped, the Brownfields Program will also likely require confirmatory sampling and risk evaluation in areas of potentially impacted soil or CCPs that are not covered by impervious surfaces (buildings, pavement, etc.) or at least 2 ft of clean fill.
- H&H recommends a LUR preventing the future installation of water supply wells or other use or exposure of groundwater at the site.




LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 328 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE (HYDROSEEDED)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- SILT FENCE
- STORM DIVERSION CHANNEL
- STORM OUTFALL CHANNEL
- A CCP AREA DESIGNATION

N

APPROXIMATE
0 115 230
SCALE IN FEET

TITLE
SITE MAP

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 6-22-21 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 1 |


LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

N

APPROXIMATE

0 115 230

SCALE IN FEET

TITLE

SAMPLE LOCATION AND EXPOSURE UNIT MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 9-10-21 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 2 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 3, 9/21/2021 8:53:22 AM, shaynes


LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

SAMPLE ID & DATE

| HH-10 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 60.3 |

SAMPLE DEPTH

CONCENTRATION (mg/kg)

RISK DRIVERS

NOTES:

1. ONLY COMPOUNDS THAT DRIVE EXCEEDANCES OF ACCEPTABLE RISK LEVELS (CARCINOGENIC RISK > 1.0E-04 AND HAZARD INDEX > 1.0) ARE SHOWN.
2. FT BGS = FEET BELOW GROUND SURFACE

N

APPROXIMATE

0 115 230

SCALE IN FEET

TITLE

RESIDENTIAL HUMAN HEALTH RISK DRIVERS MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 9-10-21 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 3 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 4A, 9/30/2021 4:12:16 PM, shaynes


LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

SAMPLE ID & DATE

| HH-10 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 60.3 |

SAMPLE DEPTH

CONCENTRATION (mg/kg)

RISK DRIVERS

NOTES:

1. ONLY COMPOUNDS THAT DRIVE EXCEEDANCES OF ACCEPTABLE RISK LEVELS (CARCINOGENIC RISK > 1.0E-04 AND HAZARD INDEX > 1.0) ARE SHOWN.
2. FT BGS = FEET BELOW GROUND SURFACE

N

APPROXIMATE

0 115 230

SCALE IN FEET

TITLE

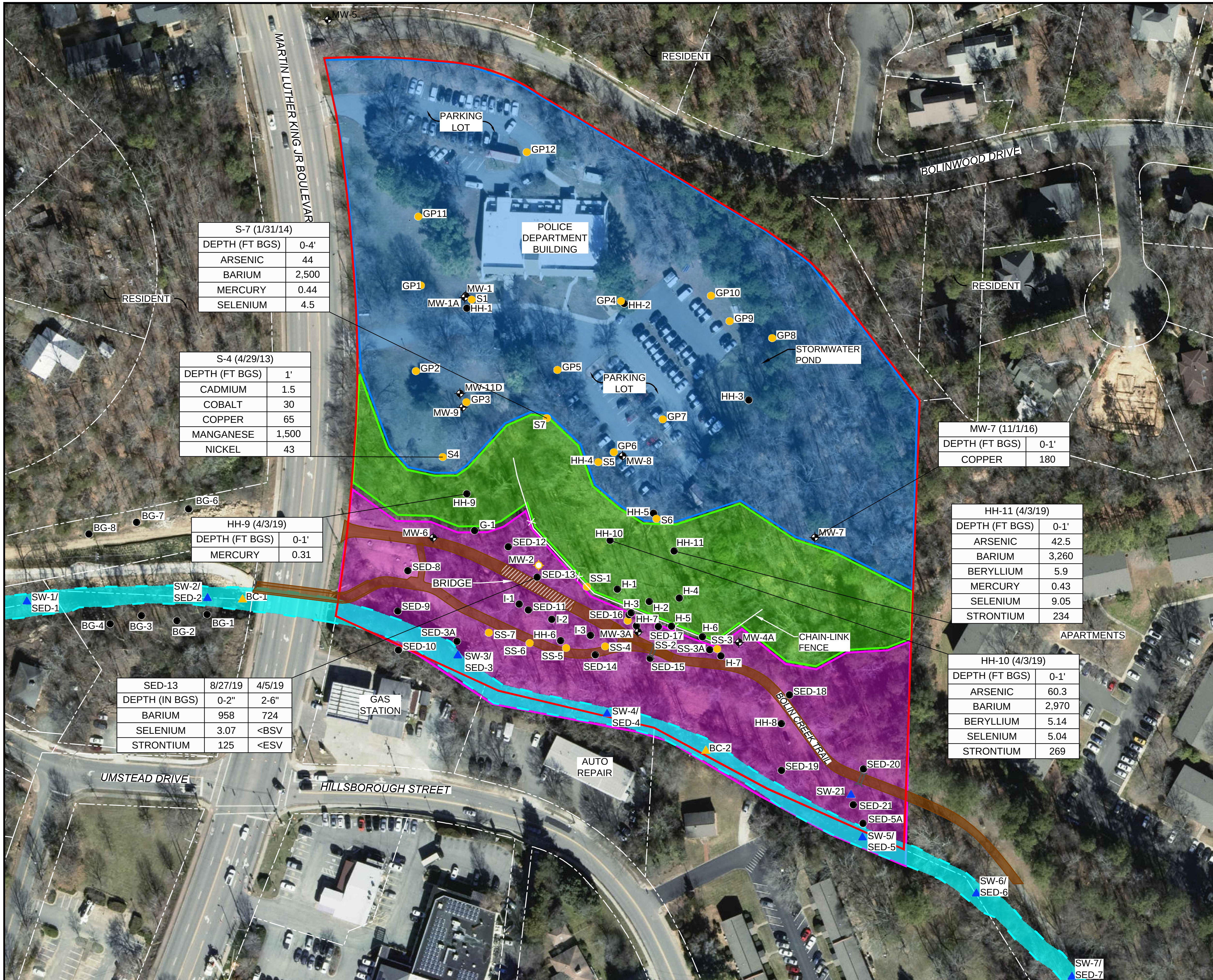
# CONSTRUCTION WORKER HUMAN HEALTH RISK DRIVERS MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| DATE: 9-10-21 | REVISION NO. 0 |
|---|---|
| JOB NO. TCH-009 | FIGURE NO. 4 |




| S-7 (1/31/14) | |
|---|---|
| DEPTH (FT BGS) | 0-4' |
| ARSENIC | 44 |
| BARIUM | 2,500 |
| MERCURY | 0.44 |
| SELENIUM | 4.5 |

| S-4 (4/29/13) | |
|---|---|
| DEPTH (FT BGS) | 1' |
| CADMIUM | 1.5 |
| COBALT | 30 |
| COPPER | 65 |
| MANGANESE | 1,500 |
| NICKEL | 43 |

| HH-9 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| MERCURY | 0.31 |

| SED-13 | 8/27/19 | 4/5/19 |
|---|---|---|
| DEPTH (IN BGS) | 0-2" | 2-6" |
| BARIUM | 958 | 724 |
| SELENIUM | 3.07 | <BSV |
| STRONTIUM | 125 | <ESV |

| MW-7 (11/1/16) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| COPPER | 180 |

| HH-11 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 42.5 |
| BARIUM | 3,260 |
| BERYLLIUM | 5.9 |
| MERCURY | 0.43 |
| SELENIUM | 9.05 |
| STRONTIUM | 234 |

| HH-10 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 60.3 |
| BARIUM | 2,970 |
| BERYLLIUM | 5.14 |
| SELENIUM | 5.04 |
| STRONTIUM | 269 |

LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

SAMPLE ID & DATE
SAMPLE DEPTH
CONCENTRATION (mg/kg)
CONSTITUENT

| S-4 (4/29/13) | |
|---|---|
| DEPTH (FT BGS) | 1' |
| CADMIUM | 1.5 |
| COBALT | 30 |
| COPPER | 65 |
| MANGANESE | 1,500 |
| NICKEL | 43 |

NOTES:

1. ONLY SAMPLES EXCEEDING ECOLOGICAL SCREENING VALUES (ESVs) AND BACKGROUND SCREENING VALUES (BSVs) ARE SHOWN.
2. FT BGS = FEET BELOW GROUND SURFACE
   IN BGS = INCHES BELOW GROUND SURFACE
   mg/kg = MILLIGRAMS PER KILOGRAM

N
APPROXIMATE
0 115 230
SCALE IN FEET

TITLE
# ECOLOGICAL RISK DRIVERS MAP

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| DATE: 9-10-21 | REVISION NO. 0 |
|---|---|
| JOB NO. TCH-009 | FIGURE NO. 5 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 5, 9/21/2021 9:00:43 AM, shaynes

# Risk Assessment Report

## 828 Martin Luther King Jr. Blvd. Property
## Chapel Hill, North Carolina
## IHSB Site No. NONCD0001486
## Brownfields Project No. 21061-17-060

**H&H Job No. TCH-009**
**October 7, 2021**

**C-1269 Engineering**
**#C-245 Geology**

hart hickman

SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street, Suite 100
Charlotte, NC 28203
704.586.0007 main

3921 Sunset Ridge Rd , Suite 301
Raleigh, NC 27607
919.847.4241 main

www.harthickman.com

**Risk Assessment Report**
**828 Martin Luther King Jr. Blvd. Property**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

## Table of Contents

## List of Tables



## List of Figures



## List of Appendices

**Risk Assessment Report**
**828 Martin Luther King Jr. Blvd. Property**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

## 1.0 Introduction

This Risk Assessment Report has been prepared by Hart & Hickman, P.C. (H&H) to document the results of human health and ecological risk assessment activities completed for the property located at 828 Martin Luther King (MLK) Jr. Boulevard in Chapel Hill, Orange County, North Carolina (site).

The site is comprised of one land parcel that is approximately 10.24 acres in size and contains a two-story approximately 35,000 sq ft building located in the north-central portion. The building and associated parking areas are currently used for police department operations by the Town of Chapel Hill (Town). South of the police department operations area, the topography slopes downward along an embankment to a lower area where Bolin Creek and the Bolin Creek Trail (hereinafter also referred to as the greenway) are located. Prior to purchase of the site by the Town, the site was used by the previous owner as a borrow pit and fill site for coal combustion products (CCPs) and construction debris. The primary compounds of concern (COCs) associated with the site are metals associated with CCPs. A site location map is included as Figure 1, and a site map is included as Figure 2.

The purpose of this recent risk assessment is to evaluate the potential risk to human health or ecological receptors associated with the CCPs at the site, and whether additional remedial actions or other measures are warranted to address these risks. As discussed in Section 2.0 below, interim remedial measures were implemented by the Town in 2020 which included removal of exposed CCPs along the Bolin Creek Trail. The risk assessment activities were completed in general accordance with North Carolina Department of Environmental Quality (DEQ) and United States Environmental Protection Agency (EPA) risk assessment guidance (DEQ, 2020, DEQ, 2021a, EPA, 2018a, EPA, 2018b).

This Risk Assessment Report is organized into sections to include the following:

- Site Background Information (Section 2.0)
- Environmental Setting (Section 3.0)
- Summary of Environmental Conditions (Section 4.0)
- Human Health Risk Assessment (Section 5.0)
- Ecological Risk Assessment (Section 6.0)
- Conclusions and Recommendations (Section 7.0)
- References (Section 8.0)

# 2.0 Site Background Information

## 2.1 Site Location and Surrounding Land Use

The site is located at 828 MLK Jr. Blvd. in Chapel Hill, Orange County, North Carolina. The location of the site is shown in Figure 1, and a general layout of the site including the building, pavement, drainage features, vegetation, and greenway features is illustrated in Figure 2. The approximate geographical coordinates of the site are: 35°55'36.69"N latitude and 79°03'10.47"W longitude. The site parcel is zoned R-2 Residential 2 (4 units/acre) by the Town of Chapel Hill.

Adjacent properties are zoned as R-2, with the exception of southern adjacent properties. Southwest and southeast adjacent properties are zoned as R-4 Medium Density Residential Conditional (10 units/acre) and the south adjacent properties are zoned as NC Neighborhood Commercial.

The surrounding properties are occupied by the following:

- North and Northeast – Bolinwood Drive with residential properties located beyond
- East – Stratford Hills Apartments complex followed by vacant land
- South – Bolin Creek followed by Lloyd Tire & Alignment and Mobil-branded gas station/Run-In-Jim's convenience store
- West – MLK Jr. Blvd. followed by vacant land with residential properties located beyond

## 2.2 Site Description

The site is comprised of one land parcel that is approximately 10.24 acres in size and contains a two-story approximately 35,000 sq ft building located in the north-central portion of the site that is currently used for police department operations. Asphalt parking lots are located in the northwestern and central portions of the site, and wooded areas are located in the southern and eastern portions of the site. Bolin Creek traverses the southern portion of the site, and a portion of the Bolin Creek Trail is located in the southern portion of the site just north of and parallel to Bolin Creek. The site topography consists of an elevated area where the police building and associated parking lots are located which slopes along an embankment to the south to a lower area along Bolin Creek where the Bolin Creek Trail is located. Chain-link fencing prevents access from the Bolin Creek Trail to the embankment along certain portions of the trail. Site topography is indicated in Figure 1.

### 2.3 Site History

#### 2.3.1 Site Ownership and Operational History

As indicated by Orange County Tax Records, the owner of the facility prior to the Town was Richard W. Sparrow, who initially operated the site as a borrow pit from the late 1950s to the early 1960s, and then as a fill site from the mid-1960s to the mid-1970s. The Town acquired the property in 1980 and constructed the site building in the early 1980s. The building has been used for police department operations by the Town since its construction. Additional municipal offices have also been located within the site building.

The Town is currently evaluating potential on and off-site locations for mixed-used redevelopment that may include the Municipal Services Center, residential housing, and retail. As part of the evaluation process, the Town applied for entry into the DEQ Brownfields Program, and received eligibility (Brownfields Project No. 23022-19-068) via a Letter of Eligibility dated October 1, 2019.

#### 2.3.2 Previous Environmental Investigations

Evidence of subsurface impacts associated with CCPs was first identified at the site during a *Phase I & Limited Phase II Environmental Site Assessment* completed by Falcon Engineering, Inc. in 2013. Investigation activities were then performed by Falcon and H&H under the direction of the DEQ Inactive Hazardous Sites Branch (IHSB) between 2013 and 2016, and culminated in a *Phase II Remedial Investigation (RI) Report* dated August 14, 2017. The investigation activities included collection and laboratory analysis of CCPs, groundwater, soil, stream sediment, and surface water samples. In addition, an evaluation was performed to identify where the CCPs were potentially exposed at the ground surface.

In 2019, the Town contracted Duncklee & Dunham (D&D) and Dr. Ken Rudo of Rudo Toxicological Consultants (Rudo) to complete a preliminary human health and ecological risk assessment for the site. The risk assessment focused on the area of Bolin Creek and the Bolin Creek Trail, and included an evaluation of interim remedial measures (IRMs) to better control the risk profile of the site. Prior to performing the risk assessment, D&D and Rudo identified certain data gaps and requested that additional assessment be completed to support the risk assessment activities. In response, H&H performed additional drainage pathway soil assessment, fill material evaluation, and groundwater assessment, which is documented in a *Results of Post-Data Gap Assessment Report* dated December 1, 2020.

The initial risk assessment results concluded that interim measures, including removal of surficial coal ash in selected locations in the lower part of the site, would be protective of greenway trail users. In 2020, IRMs were implemented. IRMs included excavation and off-site disposal of soil and exposed CCPs along Bolin Creek Trail, stabilization and cover of exposed CCPs along the embankment between the upper and lower portions of the site, and temporary measures to address stormwater and erosion control in the area of the embankment. Specifically, approximately 1,004 tons of soil/CCPs at the base of the embankment and along Bolin Creek were excavated and transported off-site for disposal. In addition, super silt fencing and hydroseed were placed along the embankment, and a new storm water diversion channel was installed. The interim measures are documented in an *Interim Remedial Measures Report* dated April 19, 2021.

Following completion of the 2020 IRMs, D&D (now part of SynTerra Corporation) completed a *Human Health and Ecological Risk Assessment Report* dated May 6, 2021, which focused on potential risks in the area of Bolin Creek and the greenway trail. With regard to human health risk, the report concluded that the greenway trail is safe for users. With regard to ecological risk, the report concluded that ecological risk was likely minimal, but recommended additional evaluation for certain constituents.

The Town requested that H&H perform additional risk assessment activities with the intent of defining the final measures recommended to address CCP impacts, both under the current land use scenario and possible future redevelopment scenarios. The results of the risk assessment performed by H&H are documented in this report. The risk assessment performed by H&H covered the site as a whole, including both the greenway trail area and the area of the current municipal operations.

As referenced in Section 2.3.1, the site has been accepted into the NC Brownfields Program, and mixed-used redevelopment that includes the Municipal Services Center, residential housing, and retail is being contemplated for the site. The Brownfields Program implements standard measures designed to address human-health risks for all projects, and did not request that the Town prepare this Risk Assessment Report. However, the Town voluntarily elected to contract H&H to complete the Risk Assessment in order to provide better explanation and transparency to the public regarding how risks will be addressed for the site. Should the Town Council decide to move forward with redevelopment of the site, future remediation, risk management, and/or redevelopment activities would be performed under the oversight of the Brownfields Program.

## 3.0 Environmental Setting

### 3.1 Site Topography

The site property is located in the Piedmont Physiographic Province of North Carolina. The Piedmont province is a plateau that divides North Carolina's mountain and coastal plain regions. It has variable topography, with elevations ranging from approximately 300 feet above mean sea level (msl) in the eastern portion to approximately 1,500 feet msl in the western portion. The Piedmont is separated from the Coastal Plain region by a fall line, or the point in which rivers transition from rocky, shallow streams to smooth-flowing streams.

Overall, the site slopes to the south from an elevation of approximately 375 ft msl near Bolinwood Drive to an elevation of approximately 300 ft above msl near Bolin Creek, which transverses the southern boundary of the site. The site topography is segmented into two gently graded areas referred to as the "upper level" and the "lower level" that are separated by a steep embankment which generally runs east-west. The upper level includes the northern and central portion of the site where the building and asphalt parking lots are located. The lower level of the site gently slopes to the southeast toward Bolin Creek and includes the Bolin Creek Trail.

### 3.2 Surface Water Hydrology

The land surface across the site generally slopes to the south toward Bolin Creek. Stormwater infrastructure in the upper level was upgraded in October through November 2020 to minimize the potential for runoff from the upper level to the lower level. Super silt fencing was installed along the flanks of the embankment and in other areas in the vicinity of the trail to minimize the potential for stormwater to carry CCPs to the area of the trail and greenway. Portions of the embankment were also hydroseeded with grass seed and a biodegradable growth medium to provide erosion resistance to the slopes. In addition, stormwater upgrades were implemented in the police parking lot and an existing stormwater outfall channel so that stormwater is diverted from the embankment where CCPs are present at or below land surface which minimizes the potential for future erosion of soil/CCPs along the embankment. Note that these are considered interim measures to address erosion along the embankment, and the Town is considering permanent measures to be implemented in conjunction with site redevelopment activities. Locations of site drainage features which discharge surface water to Bolin Creek are depicted in Figure 2.

Bolin Creek and its tributaries are classified by DEQ as Class WS-V, Nutrient Sensitive Waters (NSW) surface water bodies, and are part of the Cape Fear River basin. Class WS-V surface waters are protected as upstream water supplies draining to waters used as drinking water supplies. These waters are also protected for Class C uses, including secondary recreation, fishing, wildlife, fish consumption, aquatic life including propagation, survival, and maintenance of biological integrity, and agriculture. Secondary recreation includes wading, boating, and other uses involving human body contact with water where such activities take place in an infrequent, unorganized, or incidental manner. A NSW classification is a supplemental classification to identify waters needing additional nutrient management due to excessive microscopic or macroscopic vegetation growth.

Bolin Creek discharges into Little Creek, which feeds into Jordan Lake. Jordan Lake discharges to the Haw River, which joins with the Deep River to form the Cape Fear River.

**3.3 Geology**

The site is located in the Piedmont Geologic Province of North Carolina, which consists of metamorphic and igneous crystalline bedrock overlain by a region of fractured and folded metamorphic and igneous crystalline bedrock. According to the Geologic Map of North Carolina (1985), the bedrock in site area is described as metamorphosed granitic rock. More detailed references (Cunningham and Daniel, 2001) describe the underlying bedrock as meta-igneous and meta-volcanic felsic rocks. Meta-igneous felsic rocks are light colored, massive to foliated metamorphosed igneous rock bodies, commonly with local shearing and jointing. Meta-volcanic felsic rocks are primarily dense, fine-grained, light colored felsic tuffs and felsic crystal tuffs, commonly with local shearing and phyllitic zones.

Based on previous assessment activities, the native shallow soil generally consists of silty clay saprolite which is approximately 5 to 15 ft thick. In areas where fill material is not present, the saprolite is underlain by a partially weathered rock (PWR) zone that is approximately 5 ft thick, and the PWR is underlain by bedrock. Depth to bedrock at the site generally ranges from approximately 10 to 15 ft bgs in the northern portion of the site near Bolinwood Road and in the southern portion of the site near Bolin Creek. Depth to bedrock in the central portion of the site where fill material has been placed is approximately 45 ft to 50 ft bgs. In areas where fill has been placed, the shallow cover soil generally consists of clayey silt fill which, in some locations, appears to be mixed with CCP. See Section 4.2 for a discussion of the extent and thickness of buried fill material across the site.

**3.4 Hydrogeology**

The occurrence and movement of groundwater in the Piedmont is within two separate yet interconnected water-bearing zones. A shallow water-bearing zone occurs within the saprolite (and may include alluvium near streams), and a deeper zone occurs within the underlying bedrock. Groundwater in the shallow saprolite zone occurs in the interstitial pore spaces between the grains comprising the unconsolidated saprolitic soils. Groundwater in this zone is typically under water table or unconfined conditions. Groundwater movement is generally lateral from recharge areas to small streams which serve as localized discharge points.

The occurrence and movement of groundwater in the underlying water-bearing zone within the crystalline bedrock is controlled by secondary joints, fractures, and faults within the bedrock. On a regional scale, the direction of groundwater flow is typically from highlands to major streams and groundwater sinks. The saprolite has a higher porosity than the bedrock and serves as a reservoir which supplies water to a network of fractures in the bedrock.

Based on the results of groundwater monitoring completed at the site, the direction of groundwater flow in the uppermost unconfined aquifer is south-southeast across the site towards Bolin Creek. The depth to groundwater is approximately 7 to 10 ft bgs in the most upgradient portion of the site near Bolinwood Road, and 1 to 6 ft bgs in the most downgradient portion of the site near Bolin Creek. Groundwater is present at deeper depths in the central portion of the site where the natural ground surface elevation has been modified due to fill placement. Groundwater has been measured in the existing monitoring wells in the fill area at depths ranging from approximately 30 to 40 ft bgs. However, prior assessment activities also identified evidence of perched groundwater in the fill material, which is separated from the main underlying unconfined aquifer. As such, the groundwater depths measured in some monitoring wells (MW-1A, MW-1, MW-8, and MW-9) appear to reflect perched groundwater zones rather than the main underlying aquifer. Uncontrolled fill areas such as the site, in which layers with significantly different permeabilities are placed next to one another (i.e., debris with sand or a gravel zone immediately overlying a silt or clay layer) have a high potential for perched groundwater zones. Refer to the *Results of Post-Data Gap Assessment Report* prepared by H&H and dated December 1, 2020 for additional discussion of lines of evidence for perched groundwater conditions.

Historical tables and figures are included in Appendix A, including a summary of monitor well construction and historical groundwater elevation data, a geologic cross-section, and an unconfined aquifer potentiometric map.

## 4.0 Summary of Environmental Conditions

The primary COCs associated with the site are metals associated with CCPs. Naturally-occurring background levels of metals are also present at the site. An explanation of background concentrations, extent of CCPs, and brief summaries of the site-specific COCs in soil, groundwater, surface water, and sediment are presented in the sections below. Summaries of historical data for site soil, groundwater, surface water, and sediment are included in Appendix A.

### 4.1 Background Conditions

Metals, including the COCs for the site, are naturally occurring within North Carolina soils. These compounds are derived from the natural elemental composition of the source rock and compound concentrations are a reflection of the rock composition. Background samples collected from the site contained concentrations of certain metals exceeding DEQ Preliminary Soil Remediation Goals (PSRGs) in soil and stream sediment, which are attributed to naturally-occurring metals in the parent bedrock. EPA and DEQ do not require remediation of concentrations below naturally occurring background levels (EPA, 2002, DEQ, 2021). Therefore, evaluation of site-specific background levels is important in determining remedial goals. Note also that the DEQ PSRGs are initial screening levels based upon conservative exposure assumptions. DEQ allows that final remedial goals be based upon a risk evaluation using the DEQ risk calculator as discussed further in Section 5.0.

In order to determine whether metals detections at the site are related to fill materials or represent background levels, H&H calculated site-specific Background Screening Values (BSVs). Based on EPA guidance (EPA, 2015a, 2018a, 2018b), the BSVs for metals in soil consist of 95% upper tolerance limits (UTLs) with 95% coverage determined using EPA's ProUCL calculator (EPA, 2015a). Due to a more limited data set which introduces more uncertainty in output of the ProUCL calculator, the BSVs for stream sediment and surface water consist of the lower of the maximum detected background concentration or twice the mean of background concentrations. Appendix B contains details regarding the basis for the BSVs and documentation of the calculations. The BSVs are referenced in subsequent sections of this report when evaluating whether concentrations detected in individual samples represent background conditions or evidence of contamination.

### 4.2 Extent of CCPs

Based on prior assessment activities, fill materials placed at the site consist primarily of construction and demolition debris and fill soil intermixed with zones of CCPs. The thickness of the CCP zones primarily ranges from less than 1 ft to 3 ft, with some thicker zones up to 10 ft. Fill materials were identified to depths of approximately 40 ft, although the deepest that CCPs were observed was approximately 29 ft.

In the upper level of the site, CCPs are capped with clayey silt that ranges in thickness from less than 1 ft to approximately 10 ft thick, with most areas having greater than 2 ft of soil cover. CCP is exposed at the surface along the eastern and central portions of the embankment that separates the upper and lower levels of the site. CCPs in the western portion of the embankment are covered but with soil that is less than 2 ft thick. Erosion of CCPs along some portions of the embankment historically resulted in deposition of a layer of CCPs in the lower level of the site north and south of the Bolin Creek Trail. However, CCPs in the lower level were excavated as part of the 2020 IRMs, and no significant CCPs are currently present in the lower level.

### 4.3 Soil and CCP Concentrations

Over 70 samples of soil and/or CCPs have been collected at the site over the course of historical assessment activities. Concentrations of COCs for samples that were not removed during the 2020 IRMs were compared to the current DEQ residential health-based PSRGs, industrial/commercial health-based PSRGs, and protection of groundwater PSRGs. Concentrations of metals were also compared to site-specific BSVs prior to comparison to PSRGs. The results of this comparison indicated concentrations of arsenic, barium, cobalt, manganese, mercury, and selenium above current PSRGs and BSVs, with arsenic being the most commonly detected constituent. Note that PSRGs are not intended as remediation goals and are based on conservative risk assumptions. DEQ guidance recommends comparison of concentrations to PSRGs for initial screening purposes, but final remediation goals may be determined based on risk evaluation performed using the NC Risk Calculator, as discussed further in Section 5.0.

**4.4 Groundwater**

Multiple groundwater monitoring events have been performed at the site over the course of historical assessment activities. Concentrations of COCs in groundwater samples were compared to 15A NCAC 02L .0202 Groundwater Standards (2L Standards). As previously mentioned, prior assessment data indicate that there are perched water zones in the fill material, and groundwater samples collected from shallow wells in the fill are monitoring these perched zones. Perched groundwater is likely present in some zones of CCPs or just below zones of CCPs. Concentrations of metals above 2L Standards in groundwater samples from these wells (MW-1A, MW-1, MW-8, and MW-9) are associated with the presence of CCPs within or near perched groundwater. Some impacted perched groundwater may eventually migrate through underlying unsaturated zones to groundwater in the main underlying unconfined aquifer; however, this migration is slow and of low volume. As such, there is limited or no groundwater impact in monitoring wells which are screened in non-fill zones in the unconfined aquifer, including well MW-11D located directly below the fill and shallow downgradient monitoring wells MW-3A and MW-4A which are located downgradient of the fill area.

**4.5 Surface Water**

Surface water samples have been collected from Bolin Creek during four sampling events completed in 2013, 2014, 2016, and 2019 from three upstream locations, three locations adjacent to the site, and three downstream locations. A surface water sample was also collected from a drainage pathway at the site. No COCs were detected in surface water samples at concentrations above 15A NCAC 2B Section .0100 Surface Water Quality Standards (2B Standards). Based upon the surface water sample results, there is no evidence of surface water impact at the site which would warrant further assessment or remediation.

### 4.6 Stream Sediment

Stream sediment samples have been collected from Bolin Creek during two sampling events completed in 2016 and 2019 from two upstream locations, two locations adjacent to the site, and three downstream locations. Concentrations of COCs were compared to the current DEQ residential health-based PSRGs, industrial/commercial health-based PSRGs, and protection of groundwater PSRGs. Concentrations of metals were also compared to site-specific BSVs prior to comparison to PSRGs. Manganese and/or hexavalent chromium were detected in two samples at concentrations above PSRGs and site-specific BSVs. As previously mentioned, note that PSRGs are not intended as remediation goals and are based on conservative risk assumptions. DEQ guidance recommends comparison to PSRGs for initial screening purposes, but remediation goals are determined based on risk evaluation performed using the NC Risk Calculator, as discussed further in Section 5.0.

## 5.0 Human-Health Risk Assessment

H&H evaluated potential human-health risks associated with COCs detected in soil, groundwater, stream sediment, and surface water, and whether actions are warranted to address these risks. Actions could include remediation activities, implementation of land-use restrictions (LURs), or other measures to prevent exposures. Should the Town Council decide to move forward with redevelopment of the site, LURs are expected to be included in a Brownfields Agreement (BFA) with the DEQ Brownfields Program, which would be filed on the deed for the property and remain in perpetuity.

Risk assessment calculations were performed using the DEQ Risk Calculator (June 2021), which is an Excel-based calculator tool developed by DEQ that evaluates human-health risks using equations and inputs that have been approved by DEQ and are consistent with EPA risk assessment guidance. The methodology for the risk evaluation was in general accordance with the risk assessment procedures detailed in DEQ and EPA risk assessment guidance (DEQ, 2020, DEQ, 2021a, EPA, 2018b).

### 5.1 Exposure Pathways Evaluation

An exposure pathway refers the mechanism by which people could potentially be exposed to COCs. A complete exposure pathway means that there is potential for human exposure to COCs, while an incomplete exposure pathway means that exposure is not possible due to absence of COCs, absence of receptors, or inaccessibility (i.e., surface cover such as pavement, no water supply well usage, etc). An exposure pathways evaluation was performed to identify current and potential future complete pathways for receptor exposure to site COCs. Below is a list of exposure pathways and a discussion of whether each pathway is complete for the site. For convenience, these pathways are addressed using the same naming conventions and order used in the DEQ Risk Calculator.

Direct Contact Soil and Water Exposure Pathways

- Direct contact soil exposure pathway – This pathway covers health-based soil exposure via ingestion, dermal contact, or outdoor inhalation of volatiles and particulates. Receptor scenarios considered for this exposure pathway are detailed below.
  - Resident – Site use is currently non-residential; therefore, the direct contact soil exposure pathway is currently incomplete for the resident scenario. Under a future scenario, this exposure pathway could become complete in certain areas if the site is used for residential purposes.
  - Non-residential worker – The direct contact soil exposure pathway is currently complete for non-residential workers in the area of the police department building where impacted soil is not covered by pavement, building floor slabs, or non-impacted soil cover. Under a future land use scenario, this exposure pathway could become complete in additional areas if building floor slabs, pavement, or non-impacted soil cover are removed.
  - Construction worker – Per DEQ guidance (DEQ, 2021a), the Risk Calculator uses very conservative default inputs that represent worst-case situations and may result in overly restrictive risk values when evaluating the construction worker pathway. Therefore, the results of the construction worker evaluation performed using the Risk Calculator should not drive a cleanup level. Instead, the results are intended to be used to help guide safety concerns for imminent or potential future construction activities. An Environmental Management Plan (EMP) detailing methods to prevent construction worker exposure and manage impacted soil during construction activities is required by the Brownfields Program and will be specified in a LUR. Implementation of this EMP will result in the direct contact soil exposure pathway being incomplete for a construction worker. This pathway was evaluated as part of the risk assessment to help identify potential areas of concern to be addressed by the EMP, but does not drive proposed remediation goals.
  - Recreator – The southern portion of the site is used as a public green space and contains the Bolin Creek Trail for recreational use; therefore, this pathway is currently complete for greenway users under both the current and future land use

scenarios. For consistency, the recreator receptor is referred to as a greenway user throughout this report.

- Direct contact groundwater use exposure pathway – This pathway covers health-based groundwater exposure via ingestion, dermal contact, or inhalation associated with use of groundwater from a water supply well. For the subject site, assessment data do not indicate groundwater impacts extending beyond the site property boundary, no water supply wells are currently present at the site, and a LUR preventing the future installation of water supply wells is proposed as part of the BFA. Implementation of this LUR will result in the groundwater use exposure pathway being incomplete. Therefore, this pathway was not evaluated as part of the risk assessment. However, possible direct contact with surface water and sediment from groundwater seepage to surface water is considered an exposure pathway as discussed below.
- Direct contact surface water exposure pathway – This pathway covers health-based surface water exposure via ingestion or dermal contact during a recreational scenario. This pathway is considered complete for greenway users in the area of Bolin Creek under both the current and future land use scenarios.
- Direct contact sediment exposure pathway – This pathway covers health-based stream sediment exposure via ingestion, dermal contact, or outdoor inhalation of volatiles and particulates. This pathway is not specifically covered in the DEQ Risk Calculator. Per DEQ guidance (DEQ, 2021a), this pathway was evaluated by entering sediment concentrations under the direct contact soil exposure pathway for a greenway user in the area of Bolin Creek. However, note that this approach overestimates risk since sediment will usually be covered by water, which limits human exposure and eliminates inhalation risk.

Vapor Intrusion Exposure Pathway

- Vapor intrusion exposure pathway – The vapor intrusion pathway covers indoor inhalation risk due to intrusion of volatile organic compound vapors from subsurface soil and/or groundwater into buildings. COCs for the site are non-volatile metals associated with CCPs; therefore, this pathway is not considered complete.

Contaminant Migration Pathways

- The contaminant migration pathways evaluate leaching of compounds from soil to groundwater, and migration of impacted groundwater towards either a downgradient water supply well or a downgradient surface water body. The Risk Calculator contains tools for predictive modeling of these pathways; however, per DEQ guidance (DEQ, 2021a), groundwater monitoring data that confirm the plume is stable and unlikely to impact a downgradient receptor are more reliable to support risk management decisions. As discussed in Section 4.3, groundwater monitoring data for the site indicate limited or no groundwater impact in monitoring wells which are screened in non-fill zones in the unconfined aquifer. Groundwater impacts, if any, will not migrate beyond the site property boundary due to the hydraulic barrier formed by Bolin Creek. In addition, as discussed in Section 4.4, surface water monitoring data indicate no significant impacts to Bolin Creek. Based on monitoring data, contaminant migration pathways are not considered a concern for the site.

**5.2 Exposure Unit Designations**

For the purpose of risk characterization, the site was divided into exposure units (EUs) that represent areas of similar land use and potential receptors. Three EUs were defined for the site, and the EUs are depicted in Figure 3. A description of each EU and associated exposure pathways is provided below.

- EU #1 encompasses the upper level in the vicinity of the existing police department building and associated parking areas. EU #1 is currently non-residential. Future redevelopment may include residential use. Therefore, calculations were performed to evaluate the soil direct contact pathway for a resident, non-residential worker, and construction worker within EU #1. The direct contact groundwater use pathway will be managed via a LUR preventing the installation of water supply wells. No surface water or stream sediment are located within EU #1.
- EU #2 encompasses the area of Bolin Creek and the adjacent trail area, which is also referred to as the lower level of the site. EU #2 is currently used for recreational

purposes only. EU #2 is located within a flood zone; therefore, commercial or residential redevelopment is not viable. Calculations were performed to evaluate the soil, surface water, and stream sediment direct contact pathways for a greenway user, and the soil direct contact pathway for a construction worker within EU #2. The direct contact groundwater use pathway will be managed via a LUR preventing the installation of water supply wells.

- EU #3 encompasses the embankment between EU #1 and EU #2. The embankment is not currently in use and partially fenced off to prevent access from the adjacent EU #2 greenway area. Although occupancy and uses of EU #3 are inherently limited due to the steep slope, calculations were conservatively performed to evaluate the soil direct contact pathway for a resident, non-residential worker, construction worker, or greenway user within EU #3. The direct contact groundwater use pathway will be managed via a LUR preventing the installation of water supply wells. No surface water or stream sediment are located within EU #1.
- Note that the potential for erosion to transport impacts from the area of the embankment (EU #3) into the greenway area (EU #2) is an additional concern. The Town implemented temporary measures to minimize the potential for erosion as part of the IRMs implemented in 2020; however, H&H recommends implementation of permanent measures to prevent erosion in conjunction with site redevelopment activities.

**5.3 Exposure Point Concentrations**

Exposure point concentrations were defined for the soil, sediment, and surface water direct contact exposure pathways. Analytes considered in the risk assessment conservatively included all detected constituents designated by DEQ as COCs requiring analysis for the site (see DEQ letter dated February 11, 2016). The data sets used for the risk assessment included the following:

- The soil EPC data set included the full set of historical soil sampling data, with several exceptions. First, soil samples that were excavated during the 2020 IRMs were removed from the data set. Secondly, at locations that were sampled more than once, only the more recent samples were included in the data set. Lastly, based on EPA risk assessment guidance (EPA, 2018b), soil samples collected at depths 2 ft bgs or less were used for risk calculations for residents, non-residential workers, and greenway users, and samples collected at depths of 10 ft bgs or less were used for risk calculations for construction workers. Note that if impacted soil or CCPs at deeper depths are exposed during site redevelopment, additional risk evaluation should be performed to confirm surface soils do not exceed acceptable risk levels. If the site is redeveloped, the Brownfields Program will also likely require confirmatory sampling and risk evaluation in areas of potentially impacted soil or CCPs that are not covered by impervious surfaces (buildings, pavement, etc.) or at least 2 ft of clean fill.

- For surface water, more recent data is considered most representative of current conditions, but EPCs also need to account for possible variations in surface water concentrations over time. To account for potential variability over time, the surface water EPC data set included surface water samples collected within the past five years (2016 and 2019 sampling events).
- For stream sediment, two sampling events have been performed to date in 2016 and 2019. The locations sampled in 2016 were resampled in 2019, so the 2019 is considered most representative of current conditions and was used as the EPC data set.

Per DEQ guidance (DEQ, 2020), maximum concentrations for each constituent of concern detected in the referenced data sets were used as the EPCs. Following initial risk calculations, the EPC dataset was further refined to exclude metals detected at concentrations below site-specific BSVs. As previously discussed, the BSVs established for the site consisted of the 95% UTL with 95% coverage for background soil, and the lower of two times the mean or the maximum detected concentration for background surface water and sediment. EPC tables are included in Appendix C.

**5.4 Exposure Parameters**

The default exposure parameters incorporated in the DEQ Risk Calculator were used for the risk evaluation for a resident, non-residential worker, and construction worker. These exposure parameters are consistent with EPA default exposure parameters (EPA, 2021), where established, and are intended to represent a reasonable maximum exposure (RME) scenario. RME is defined by EPA as the highest exposure that is reasonably expected to occur at a site, generally assumed to be in the range of the $90^{th}$ and $99^{th}$ percentiles (EPA, 2001). To calculate risks specific for greenway users, H&H calculated site-specific exposure factors based on greenway user polling data collected by the Town. Specifically, for adult and child exposure frequency, soil exposure time, and water exposure time, H&H used values equal to or more conservative than the 98th percentile of responses reported during the greenway user survey. This approach is consistent with RME as defined by EPA, and represents "worst-case" exposures. Following is a brief summary of the most pertinent exposure parameters, but please refer to the NC Risk Calculator documentation in Appendix C for a full list of exposure parameters used in the calculations:

- Residential exposure for 6 years (yrs) as a child and 20 yrs as an adult (26 yrs total), 350 days per year (d/yr), and 24 hours per day (hr/d).
- Non-residential exposure for 25 yrs (adult only), 250 d/yr, and 8 hr/d.
- Construction worker exposure for 1 yr (adult only), 250 d/yr, and 8 hr/day.
- Greenway user exposure for 6 yrs as a child and 20 yrs as an adult (26 yrs total), 364 d/yr and 1 hr/d as an adult, and 52 d/yr and 0.5 hr/d as a child.
- Dermal contact with soil parameters assumes exposure of head, hands, forearms, lower legs, and feet for a resident and greenway user, and exposure of head, hands, and forearms for a non-residential worker and construction worker.
- Soil ingestion parameters assume ingestion of 200 milligrams per day (mg/d) of soil by a child (greenway user or resident), and 100 mg/d of soil by an adult (greenway user, resident, or non-residential worker). Increased ingestion of 330 mg/d of soil is assumed for a construction worker.
- Significantly increased outdoor inhalation of particulates is assumed for a construction worker, with assumed particulates at levels greater than the National Ambient Air Quality Standard established under 40 Code of Federal Regulations Part 50 for particle pollution.

### 5.5 Toxicity Factors

The conservative default toxicity factors incorporated in the DEQ Risk Calculator were used for the risk evaluation. Note that these toxicity factors account for possible development effects for pregnant women.

**5.6 Risk Assessment Results**

For the direct contact pathways, the DEQ Risk Calculator calculates values for potential cancer risk (CR) and potential non-cancer hazard quotient (HQ) or hazard index (HI) as described below:

- CR is defined as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen. For example, a CR of one in 10,000 (1.0E-04) indicates one person in 10,000 may have an increased risk of cancer due to exposure to a chemical.
- HQ is defined as the ratio of the amount of a contaminant a person is exposed to versus the amount that may cause non-cancer harmful effects, while HI is defined the sum of HQs for individual contaminants for a given scenario. For example, a HI of less than 1 indicates the exposure is unlikely to cause non-cancer harmful effects.

For each receptor scenario, CR and HQ values for complete exposure pathways are summed to determine the cumulative risk for each receptor. The cumulative CR and HI values for each receptor are then compared to the DEQ acceptable risk values. DEQ considers a cumulative CR of 1.0E-4 and HI of 1.0 or less to be acceptable (DEQ, 2021a). Similarly, EPA considers exceedances of a CR of 1E-04 and HI of 1 to be triggers requiring remediation or other actions to reduce exposures (EPA, 2018b).

Note that calculated cumulative CR and HI values do not include risks associated with lead. Currently, there is no EPA reference dose or cancer potency factor to quantify risks associated with exposures to lead. Exposure risks to lead are characterized based on predicted blood lead levels. The DEQ Risk Calculator flags a lead concentration when the concentration exceeds the DEQ health-based residential or industrial/commercial PSRGs for lead (400 mg/kg and 800 mg/kg, respectively). Lead has not been detected at concentrations above DEQ health-based

PSRGs in samples collected at the site; therefore, lead is not considered to be a compound posing a significant risk for the site.

Cumulative CR and HI values calculated for each exposure unit and receptor scenario are summarized in Table 1. Risk calculator documentation is included in Appendix C. A discussion of the results is presented below.

**5.6.1 Exposure Unit #1 – Upper Level**

EU #1 covers the upper level in the area of the existing police department building. In the area of EU #1, calculated CR and HI values do not exceed DEQ acceptable risk limits for a non-residential worker. Therefore, the area of EU #1 is considered safe for non-residential workers, and no further evaluation of this exposure unit/receptor is considered warranted.

For a future resident in EU #1, the calculated cumulative CR value is acceptable; however, the calculated HI value exceeds the DEQ acceptable risk level of 1, both with and without background concentrations included. As previously referenced, background concentrations are excluded when determining remedial goals for the site. With background levels excluded, the COC driving the risk level above 1 is limited to manganese within the S-4 sample. This sample was collected at a depth of 1 ft bgs in the wooded area southwest of the police department building during the initial site assessment activities in April 2013, as reported in the Phase I & Limited Phase II Environmental Site Assessment prepared by Falcon Engineering and dated July 18, 2013. If the site is redeveloped for residential use, H&H recommends remediation (ex., excavation, cover to prevent exposure) or other actions (ex., resampling to verify concentrations) to address impacts in the area of sample S-4. Samples driving exceedances of residential risk levels are identified on Figure 4A.

For a construction worker, the calculated cumulative CR value was acceptable; however, calculated HI value exceeds the DEQ acceptable risk level of 1, both with and without background concentrations included. The COCs driving the risk level greater than 1 include manganese, arsenic, and mercury. Samples driving exceedances of construction worker risk levels are identified on Figure 4B. As previously discussed, the Risk Calculator uses very conservative default inputs that represent worst-case situations and may result in overly restrictive risk values when evaluating the construction worker pathway. Construction worker risks will be managed via a LUR requiring preparation of an EMP, which will detail measures to prevent construction worker exposure, manage impacted soil during construction activities, and minimize the potential for off-site migration of impacted soil via surface water or windborne pathways.

### 5.6.2 Exposure Unit #2 – Lower Level

EU #2 covers the lower level in the area of the greenway trail and Bolin Creek. For a current and future greenway user, the calculated CR and HI values do not exceed DEQ acceptable risk limits. Therefore, the area of EU #2 is considered safe for greenway users, and no further evaluation of this exposure unit/receptor is considered warranted.

For a construction worker, the initial evaluation including background levels indicated the calculated cumulative CR value was acceptable, but the calculated HI value exceeds the DEQ acceptable risk level of 1. If background levels are excluded, the calculated CR and HI values do not exceed DEQ acceptable risk levels. Because risks associated with contamination do not exceed acceptable risk levels, no remediation or other measures are considered warranted to address construction worker risks in EU#2. However, the Brownfields Program will likely require an EMP for the site as a whole, including EU #2, which will detail measures to prevent construction worker exposure, manage impacted soil during construction activities, and minimize off-site migration pathways.

### 5.6.3 Exposure Unit #3 - Embankment

EU #3 covers the area of the embankment between the upper and lower level. As previously noted, EU #3 is not currently used and occupancy is limited by fencing and a steep slope; however, H&H conservatively evaluated the same receptors designated for the upper and lower levels for this exposure unit.

For a potential current or future greenway user, the calculated CR and HI values do not exceed DEQ acceptable risk limits. Therefore, the area of EU #3 is considered safe for greenway users, and no further evaluation of this exposure unit/receptor is considered warranted.

For a potential current or future non-residential worker, the calculated CR and HI values do not exceed DEQ acceptable risk limits. Therefore, the area of EU#3 is considered safe for non-residential workers, and no further evaluation of this exposure unit/receptor is considered warranted.

For a potential future resident, the calculated cumulative CR value was acceptable; however, calculated HI value exceeds the DEQ acceptable risk limit, both with and without background levels included. With background levels excluded, the COC driving the exceedance is arsenic in samples S-7, HH-10, and HH-11. CCPs are exposed in areas of the embankment and the samples driving the risk exceedance were CCP samples. H&H recommends remediation or other measures (several examples given above) to address exposed CCPs in the area of the embankment. Samples driving exceedances of residential risk levels are identified on Figure 4A.

For a construction worker, the calculated cumulative CR value was acceptable; however, the calculated HI value exceeds the DEQ acceptable risk level, both with and without background levels included. The COCs driving the exceedance include manganese and arsenic. Samples driving exceedances of construction worker risk levels are identified on Figure 4B. Construction worker risks will be managed via a LUR requiring preparation of an EMP, which will detail measures to prevent construction worker exposure, manage impacted soil during construction activities, and minimize potential off-site migration.

## 6.0 Ecological Risk Assessment

Due to the presence of potential ecological receptors in the area of Bolin Creek, H&H conducted initial screening activities related to ecological risk assessment. Based on DEQ guidance (DEQ, 2021b), the initial screening activities consisted of comparison of detected concentrations to the Ecological Screening Values (ESVs) established by EPA Region 4. The Guidelines for Performing Screening Level Ecological Risk Assessments within the Division of Waste Management (DENR, 2003) and EPA Region 4 Ecological Risk Assessment Supplemental Guidance (EPA, 2018a) were consulted during the initial screening; however, please note that H&H's evaluation did not constitute a full Screening Level Ecological Risk Assessment (SLERA).

Per DEQ and EPA guidance (DENR, 2003, EPA, 2018a), EPA ESVs are based on conservative endpoints and ecological effects data, and represent preliminary screening criteria to evaluate the potential for ecological risk (or lack thereof). ESVs are not intended to represent remediation goals. The purpose of the initial ESV screening activities performed by H&H was to evaluate whether additional actions are warranted to further evaluate or address ecological risks for the site. This section details the EPCs used for the screening, and the results of the ESV screening for surface water, sediment, and soil.

### 6.1 Exposure Units

The ecological risk assessment included evaluation of data with respect to the same exposure units established in the human health risk assessment. The EUs were further evaluated with respect to the potential for significant ecological receptors to be present, as detailed below.

- EU #1 encompasses the upper level in the vicinity of the existing police department building. Ecological receptors are less likely to be present in the area of EU #1 due to the buildings and pavement associated with the police department building. However, some ecological receptors could potentially be present in the wooded areas surrounding the facility; therefore, this unit was conservatively screened for ecological risk. No stream sediment or surface water are located within this unit, so the only complete exposure pathway for ecological receptors is surface soil exposure.

- EU #2 encompasses the area of Bolin Creek and the adjacent trail area. EU #2 is considered the unit with the highest likelihood of potential ecological receptors. Complete exposure pathways for ecological receptors include surface soil exposure, sediment exposure, and surface water exposure.
- EU #3 encompasses the embankment between EU #1 and EU #2. The potential for ecological receptors in this area is considered moderate. No stream sediment or surface water are located within this unit, so the only complete exposure pathway for ecological receptors is surface soil exposure.
- As previously discussed, note that the potential for erosion to transport impacts from the area of the embankment (EU #3) into the greenway area (EU #2) is an additional concern. The Town implemented temporary measures to minimize the potential for erosion as part of the interim remediation measures implemented in 2020; however, H&H recommends implementation of permanent measures to prevent erosion in conjunction with site redevelopment activities.

**6.2 Exposure Point Concentrations**

Analytes considered in the risk assessment conservatively included all detected constituents designated by DEQ as COCs requiring analysis for the site (see DEQ letter dated February 11, 2016). Similar to the human-health risk assessment, the data set used for the risk assessment included the following:

- The surface water EPC data set included surface water samples collected within the past five years (2016 and 2019 sampling events).
- The stream sediment EPC data set included the most recent samples collected in 2019.
- The soil EPC data set included the full set of historical soil sampling data with the exception of (1) soil samples that were excavated during the 2020 IRMs, (2) locations that were resampled, in which case only the latest data was included, and (3) samples collected at depths of more than 2 ft bgs. Samples collected from 0 to 2 ft bgs were used

based on prior guidance from DEQ personnel. This is consistent with or more conservative than EPA guidance, which recommends collection of samples for terrestrial ecological risk assessment at depths on the order of 25 to 30 cm, or 0.8 to 1 ft (EPA, 2015b).

Maximum concentrations for each constituent of concern detected in the referenced data sets were used as the EPCs. Concentrations were initially compared to ESVs directly without consideration of background concentrations. Where concentrations exceeded ESVs, concentrations were also compared to the established site-specific BSVs to evaluate exceedances potentially attributable to contamination rather than background conditions. As previously discussed, the BSVs established for the site consisted of the 95% UTL with 95% coverage for background soil, and the lower of two times the mean or the maximum detected concentration for background surface water and sediment.

### 6.3 Ecological Screening Evaluation

The results of the ecological risk evaluation for the soil, stream sediment, and surface water exposure pathways are detailed below. COCs identified at concentrations above BSVs and ESVs are shown on Figure 5.

#### 6.3.1 Soil Ecological Screening

The designated soil EPCs within the three exposure units were compared to the EPA Soil ESVs as summarized in Table 2. The results of the comparison for each exposure unit are discussed below.

Exposure Unit #1

Within EU #1 (upper level), soil concentrations were identified above the EPA ESVs in multiple samples. However, the majority of the detections are below the site-specific BSVs and therefore considered representative of background conditions. Concentrations above both EPA ESVs and BSVs were identified only in soil samples S-4 and MW-7.

Sample S-4 contained cadmium, cobalt, copper, manganese, and nickel at concentrations above ESVs and BSVs. As previously discussed, this sample was collected at a depth of 1 ft bgs in the wooded area southwest of the police department building during the initial site assessment activities in April 2013. This sample was also identified as a driver for residential risk exceedances during the human health risk assessment.

Sample MW-7 is a soil sample collected from the boring for well MW-7 at a depth of 0-1 ft bgs in 2016. This sample contained copper at a concentration above both the ESV and BSV. This sample was collected in the eastern portion of the site approximately 120 ft cross-gradient of the area of CCPs. The detected concentration is higher than copper concentrations collected from CCPs in the source area. Based on review of the data, the copper detected in sample MW-7 is likely not associated with the CCP disposal area and is considered an outlier. Additional sampling may be beneficial to confirm concentrations in the area of well MW-7.

It should be noted that DEQ does not commonly require evaluation of ecological risks for soil (DEQ, 2021b). As such, DEQ may not require additional actions with regard to the exceedances of ESVs in S-4 and MW-7. If required by DEQ or if the Town wishes to take voluntary actions, H&H recommends remediation or other measure to address or further evaluate potential ecological risks in the area of samples S-4 and MW-7.

<u>Exposure Unit #2</u>

Within EU #2 (lower level), soil concentrations were identified above the EPA ESVs in multiple samples. However, the majority of the detections are below the site-specific BSVs and therefore considered representative of background conditions. Concentrations above both EPA ESVs and BSVs were identified only in sample SED-13 which is a drainage pathway sample located near the bridge of the Bolin Creek Trail.

At the SED-13 location, samples were collected at both 0-2 and 2-6 inches bgs. Barium was detected at concentrations above the ESV and BSV in both sample depths. Selenium and strontium were also detected at concentrations above the ESVs and BSVs in the 0-2-inch bgs sample depth.

As previously referenced, DEQ does not commonly require evaluation of ecological risks for soil (DEQ, 2021b). As such, DEQ may not require additional actions with regard to the exceedances of ESVs in SED-13. If required by DEQ or if the Town wishes to take voluntary actions, H&H recommends remediation or other measure to address or further evaluate potential ecological risks in the area of sample SED-13.

Exposure Unit #3

Within EU #3 (embankment), concentrations were identified above both EPA ESVs and BSVs in each sample collected (S-7, H-9, H-10, and H-11). Constituents detected above ESVs and BSVs include arsenic, barium, beryllium, mercury, selenium, and strontium. CCPs are exposed in areas of the embankment and the samples indicating exceedances were CCP samples. H&H recommends remediation or other measures to address exposed CCPs in the area of the embankment.

### 6.3.2 Stream Sediment Ecological Screening

The designated stream sediment EPCs in the area of Bolin Creek (EU #2) were compared to the EPA Sediment ESVs, as summarized in Table 3. The results of the comparison indicated barium in samples SED-4 (Adjacent to the site) and SED-5 (Downstream near the southeast property boundary) and total chromium in samples SED-4 (Adjacent) and SED-7 (Downstream and off-site) at concentrations above the EPA ESVs. For these exceedances, concentrations were then compared to the established BSVs. The concentrations were found to be below the BSVs, and are therefore considered representative of background conditions. The fact that these constituents represent background conditions is further confirmed by the detection of both barium and chromium at concentrations above EPA ESVs in the upgradient background sediment samples collected at the site.

Note that Table 3 also lists EPA Region 4 Refinement Screening Values (RSVs) for sediment. The RSVs are based on less conservative ecological effects data, and are intended to be used as a second-tier screening where ESVs are exceeded. Although sediment concentrations appear indicative of background conditions and therefore do not warrant remediation, the concentrations (including those at background locations).do not exceed RSVs and therefore are not considered a significant ecological risk.

**6.3.3 Surface Water Ecological Screening**

The designated surface water EPCs in the area of Bolin Creek (EU #2) were compared to the EPA Region 4 Acute and Chronic Surface Water ESVs, as well as the NC 2B Standards. The ESVs and 2B Standards for some constituents vary based on hardness. Based on historical sampling, the average hardness in Bolin Creek was calculated as 54.5 milligrams per liter (mg/L). Based on this value, the published ESVs based on a hardness of 50 mg/L were used. NC 2B Standards were derived using the DEQ Hardness-Dependent Metal Calculator dated July 26, 2021, and the average site-specific hardness of 54.5 mg/L. For constituents with no established 2B Standard, concentrations were compared to the NC In-Stream Target Values for Surface Water (July 26, 2021).

Table 4 provides a summary of surface water EPCs in comparison the referenced ecological screening criteria. As shown, no concentrations were found to exceed EPA Region 4 Acute and Chronic Surface Water ESVs, NC 2B Standards, or NC In-Stream Target Values for Surface Water.

## 7.0 Conclusions and Recommendations

H&H has completed human-health and ecological risk assessment activities for the property located at 828 MLK Jr. Boulevard in Chapel Hill. The purpose of the risk assessment activities was to evaluate potential human health and ecological risks for CCPs at the site under the current land use scenario and possible future redevelopment scenarios. The risk assessment was performed in general accordance with DEQ and EPA risk assessment guidance (DEQ, 2020, DEQ, 2021a, EPA, 2018a, EPA 2018b), using conservative inputs intended to represent reasonable maximum exposure scenarios. A summary of the results is presented below.

<u>Human-Health Risk Assessment Results</u>

The human-health risk assessment results indicated the following:

- Human-health risk was evaluated for possible future residents in the area of EU #1 (upper level) and EU #3 (embankment). The results of the risk evaluation indicated that acceptable risk levels were exceeded for a future resident in both units (with and without background concentrations included) with risks being driven by metals in the following locations:
    - In the area of EU #1 (upper level), the driver for unacceptable risk levels for a resident is the manganese concentration in soil sample S-4.
    - In the area of EU #3 (embankment), the drivers for unacceptable risk levels for a resident are arsenic concentrations in samples S-7, HH-10, and HH-11.
- Human-health risk was evaluated for possible current or future non-residential workers in the area of EU #1 (upper level) and EU #3 (embankment). The results of the risk evaluation indicated acceptable risk levels for a non-residential worker in both units. Therefore, the site is considered safe for non-residential workers under both current and future use scenarios.
- Human-health risk was evaluated for possible future construction workers in the area of all three exposure units (upper level, lower level, and embankment). The results of the risk evaluation indicated acceptable risk levels were exceeded for a construction worker in all three units. If background concentrations are removed, acceptable risk levels were exceeded for a construction worker in EU #1 (upper level) and EU #3 (embankment).

- Human-health risk was evaluated for possible current and future greenway users in the area of EU #2 (lower level) and EU #3 (embankment). The results of the risk evaluation indicated acceptable risk levels for greenway users in both units. Therefore, the site is considered safe for greenway users.

Ecological Risk Assessment Results

The results of the ecological risk screening indicated the following:

- The area of Bolin Creek (EU #2) is the area with the highest likelihood of potential ecological receptors. The results of the risk evaluation indicated no significant ecological risk for surface water and sediment in Bolin Creek.
- Exceedances of ESVs for multiple metals were identified in samples of exposed CCP collected along the embankment in EU #3 (S-7, HH-9, HH-10, and HH-11).
- Localized exceedances of ESVs were also identified at two soil sample locations within EU #1 (S-4 and MW-7) and one individual soil sample location within EU #2 (SED-13).

Recommendations

H&H's recommendations to address potential human-health and ecological risks identified as part of this risk assessment are detailed below. In addition to recommendations related to specific sample locations which are drivers for potential risks, in some cases LURs are recommended to confirm the assumptions made during the risk assessment activities remain valid. LURs are expected to be covered under a future BFA, which would be prepared under the jurisdiction of the DEQ Brownfields Program and filed on the deed for the property. The Brownfields Program requires annual certifications from the property owner that LURs are being complied with in perpetuity, which will confirm that potential risks addressed via LURs will be managed long-term.

- Exposed CCPs are present in the area of the embankment. The risk evaluation indicated exceedances of acceptable risk levels for a resident, construction worker, and/or ecological receptors based on metals concentrations in several samples of exposed CCPs collected in the embankment area (S-7, HH-9, HH-10, and HH-11). The potential for erosion to transport CCPs from the area of the embankment into the greenway area is considered an additional concern. The Town implemented temporary measures to minimize the potential for erosion as part of the interim remediation measures implemented in 2020; however, H&H recommends implementation of permanent measures to address exposed CCPs and prevent erosion in the embankment area. These measures could effectively be performed in conjunction with site redevelopment activities.

- If the site is redeveloped for residential use, H&H recommends remediation or other actions (ex., excavation, impervious cover to prevent exposure, resampling to verify concentrations) to address impacts in the upper level in the area of sample S-4.
- Outside of the embankment area, the ecological risk screening indicated localized exceedances of ESVs at two soil sample locations within EU #1 (S-4 and MW-7) and one individual soil sample location within EU #2 (SED-13). DEQ does not commonly require evaluation of ecological risks for soil (DEQ, 2021b). As such, DEQ may not require additional actions with regard to the exceedances of ESVs in these samples. If required by DEQ or if the Town wishes to take voluntary actions, H&H recommends remediation or other measures to address or further evaluate potential ecological risks in the area of samples S-4, MW-7, and SED-13.
- To address construction worker risks, H&H recommends implementation of an anticipated LUR requiring preparation of an EMP, which will detail measures to prevent construction worker exposure, manage impacted soil and minimize the potential for off-site migration during construction (i.e., redevelopment) activities.
- The risk assessment calculations were based on soil samples collected at depths of 0 to 2 ft bgs for a resident, non-residential worker, and greenway user, and samples collected at depths of 0 to 10 ft bgs for a construction worker. If impacted soil or CCPs at deeper depths are exposed during site redevelopment, additional risk evaluation should be performed to confirm that potential exposure to these soils does not exceed acceptable risk levels. If the site is redeveloped, the Brownfields Program will also likely require confirmatory sampling and risk evaluation in areas of potentially impacted soil or CCPs that are not covered by impervious surfaces (buildings, pavement, etc.) or at least 2 ft of clean fill.
- H&H recommends a LUR preventing the future installation of water supply wells or other use or exposure of groundwater at the site.

## 8.0 References

Cunningham and Daniel, 2001. *Investigation of Ground-Water Availability and Quality in Orange County, North Carolina*. Cunningham, W.L. and C.C. Daniel, III, US Geological Survey. Raleigh, NC. Water-Resources Investigations Report 00-4286.

DENR, 2003. *Guidelines for Performing Screening Level Ecological Risk Assessments within the North Carolina Division of Waste Management.* North Carolina Department of Environment and Natural Resources (currently DEQ), Division of Waste Management. October 2003.

DEQ, 2016. *Chapel Hill Police Department Property Letter*. North Carolina Department of Environmental Quality. February 2016.

DEQ, 2020. *Technical Guidance for Risk-Based Environmental Remediation of Sites (Revised)*, North Carolina Department of Environmental Quality. April 2020.

DEQ, 2021a. *Guidelines for Assessment and Cleanup of Contaminated Sites*, North Carolina Department of Environmental Quality – Division of Waste Management Superfund Section Inactive Hazardous Sites Branch. July 2021.

Dragun and Chekiri, 2005. *Elements in North American Soils, Second Edition*. Dragun, James, and Khaled Chekiri. 2005.

Falcon, 2013. *Phase I & Limited Phase II Environmental Site Assessment.* Falcon Engineering, Inc. October 2013.

H&H, 2017. *Phase II Remedial Investigation (RI) Report*. Hart & Hickman, PC. August 2017.

H&H, 2020. *Results of Post-Data Gap Assessment*. Hart & Hickman, PC. December 2020.

H&H, 2021. *Interim Remedial Measures Report.* Hart & Hickman, PC. April 2021.

NCGS, 1985. *Geologic Map of North Carolina: North Carolina Geological Survey, General Geologic Map*. North Carolina Geological Survey. 1985.

Synterra, 2021. *Human Health and Ecological Risk Assessment Report.* Synterra Corporation. May 2021.

USEPA, 2001. *Risk Assessment Guidance for Superfund: Volume III Part A.* U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. December 2001.

USEPA, 2002. *Role of Background in the CERCLA Cleanup Program.* U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Office of Emergency and Remedial Response. April 2002.

USEPA, 2015a. *ProUCL Version 5.1 User Guide.* U.S. Environmental Protection Agency, Office of Research and Development. October 2015.

USEPA, 2015b. Determination of the Biologically Relevant Sampling Depth for Terrestrial and Aquatic Ecological Risk Assessments. U.S. Environmental Protection Agency, Ecological Risk Assessment Support Center, National Center for Environmental Assessment, Office of Research and Development. October 2015.

USEPA, 2018a. *Region 4 Ecological Risk Assessment Supplemental Guidance (Update).* U.S. Environmental Protection Agency, Scientific Support Section, Superfund Division, EPA Region 4. March 2018.

USEPA, 2018b. *Region 4 Human Health Risk Assessment Supplemental Guidance.* U.S. Environmental Protection Agency, Scientific Support Section, Superfund Division, EPA Region 4. March 2018.

USEPA, 2021. *Regional Screening Levels (RSLs) – User's Guide.* U.S. Environmental Protection Agency. May 2021.

**Table 1 (Page 1 of 1)**
**Summary of Human Health Risk Assessment Results**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| RISK ASSESSMENT RESULTS INCLUDING BACKGROUND CONCENTRATIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Exposure Pathway | Residential | | Non-Residential Worker | | Construction Worker | | Greenway User | |
| | Carcinogenic Risk | Hazard Index | Carcinogenic Risk | Hazard Index | Carcinogenic Risk | Hazard Index | Carcinogenic Risk | Hazard Index |
| Exposure Unit #1 - Upper Level | | | | | | | | |
| Soil Direct Contact | 2.4E-05 | **3.6E+00** | 4.8E-06 | 2.4E-01 | 7.0E-06 | **1.1E+01** | N/A | N/A |
| Exposure Unit #2 - Lower Level | | | | | | | | |
| Soil Direct Contact | N/A | N/A | N/A | N/A | 1.4E-06 | **3.6E+00** | 8.4E-06 | 4.1E-01 |
| Sediment Direct Contact | N/A | N/A | N/A | N/A | N/A | N/A | 1.8E-06 | 9.1E-02 |
| Surface Water Direct Contact | N/A | N/A | N/A | N/A | N/A | N/A | 3.2E-07 | 1.7E-02 |
| Cumulative Risk for Exposure Unit #2* | N/A | N/A | N/A | N/A | 1.4E-06 | **3.6E+00** | 8.7E-06 | 4.2E-01 |
| Exposure Unit #3 - Embankment | | | | | | | | |
| Soil Direct Contact | 9.4E-05 | **3.1E+00** | 2.0E-05 | 2.2E-01 | 4.4E-06 | **8.8E+00** | 3.4E-05 | 4.6E-01 |

| RISK ASSESSMENT RESULTS EXCLUDING BACKGROUND CONCENTRATIONS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Exposure Pathway | Residential | | Non-Residential | | Construction Worker | | Greenway User* | |
| | Carcinogenic Risk | Hazard Index | Carcinogenic Risk | Hazard Index | Carcinogenic Risk | Hazard Index | Carcinogenic Risk | Hazard Index |
| Exposure Unit #1 - Upper Level | | | | | | | | |
| Soil Direct Contact | 2.1E-05 | **1.3E+00** | 4.7E-06 | 9.1E-02 | 5.4E-06 | **1.1E+01** | N/A | N/A |
| Exposure Unit #2 - Lower Level | | | | | | | | |
| Soil Direct Contact | N/A | N/A | N/A | N/A | 8.1E-07 | 3.9E-01 | 8.0E-06 | 7.5E-02 |
| Sediment Direct Contact | N/A | N/A | N/A | N/A | N/A | N/A | 7.1E-13 | 2.1E-03 |
| Surface Water Direct Contact | N/A | N/A | N/A | N/A | N/A | N/A | 3.2E-07 | 1.7E-02 |
| Cumulative Risk for Exposure Unit #2 | N/A | N/A | N/A | N/A | 8.1E-07 | 3.9E-01 | 8.3E-06 | 9.1E-02 |
| Exposure Unit #3 - Embankment | | | | | | | | |
| Soil Direct Contact | 8.9E-05 | **2.1E+00** | 2.0E-05 | 1.5E-01 | 3.4E-06 | **8.5E+00** | 3.3E-05 | 3.1E-01 |

Notes:
N/A = Not applicable
**Bold Red** indicates an exceedance of NCDEQ acceptable risk levels (Carcinogenic Risk <1.0E-04 and Hazard Index <1.0).
* Cumulative risk calculated for EU #2 since more than one exposure pathway is complete. Cumulative risk indicates the higher of the sediment or soil risk, combined with the surface water risk. This is considered appropriate since a receptor could not be exposed to both soil and sediment at the same time and the same exposure pathways are covered by both risk calculations.

# Table 2 (Page 1 of 1)
## Soil Ecological Screening Table
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job No. TCH-009

| Sample ID | Sample Date | Material Sampled (Soil or CCP) | Sample Depth (ft or in bgs) | arsenic | barium | beryllium | cadmium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | lead | manganese | mercury | nickel | selenium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site-Specific BSV[1] | | | | 3.015 | 87.86 | 0.929 | 0.313 | 5.725 | 70.2 | 70.2 | 36.31 | 77.3 | 59.11 | 1,149 | 0.256 | 19.49 | 2.503 | 43.19 | 0.981* | 227 | 230 |
| EPA Region 4 Soil ESV[2] | | | | 18 | 330 | 2.5 | 0.36 | 0.34 | 26 | 23 | 13 | 28 | 11 | 220 | 0.013 | 38 | 0.52 | 96 | 0.05 | 7.8 | 46 |
| **Upper Level Samples (Exposure Unit #1)** | | | | | | | | | | | | | | | | | | | | | |
| S-4 | 04/29/13 | CCP | 1 ft | 14 | 24 | ND | **1.5** | NA | NA | 22 | **30** | **65** | **20** | **1,500** | 0.011 | **43** | ND | NA | ND | **21** | **120** |
| HH-1 | 11/03/16 | Soil | 0-1 ft | 5.9 | 120 | 1.00 | <0.29 | **0.45** | 20.55 | 21 | 7.9 | 25 | **27** | **350** | **0.052** | 8.8 | **0.69** | 31 | <0.58 | **48** | **50** |
| | 11/03/16[5] | Soil | 0-1 ft | 3.4 | 110 | 0.79 | <0.35 | **0.54** | 19.46 | 20 | 8.4 | 17 | **18** | **360 BH** | **0.067** | 12 | <0.71 | 30 | <0.71 | **41** | 35 |
| HH-2 | 11/03/16 | Soil | 0-1 ft | 4.9 | 140 | 0.93 | <0.29 | **0.43** | 13.57 | 14 | 12 | 21 | **30** | **260** | **0.085** | 5.9 | **1.0** | 25 | <0.58 | **48** | 43 |
| HH-3 | 11/03/16 | Soil | 0-1 ft | 9.9 | 200 | 1.30 | <0.33 | **0.46 J** | 17.54 | 18 | 7.8 | **31** | **24** | **350** | **0.076** | 8.9 | **2.4** | 36 | <0.65 | **53** | **100** |
| HH-4 | 11/03/16 | Soil | 0-1 ft | 2.4 | 72 | 1.00 | <0.28 | **0.50** | **44.5** | **45** | **16** | **37** | 2.3 | **630** | <0.023 | 33 | <0.56 | 42 | **0.60** | **73** | **70** |
| HH-5 | 11/03/16 | Soil | 0-1 ft | 2.4 | 73 | 0.75 | <0.30 | <0.14 | 23 | **23** | 8.4 | 19 | 9.3 | **410** | <0.025 | 14 | **1.2** | 23 | <0.60 | **39** | **51** |
| HH-6 | 10/27/16 | Soil | 0-1 ft | NA | NA | NA | NA | <0.33 | 20 | 20 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| HH-7 | 10/27/16 | Soil | 0-1 ft | NA | NA | NA | NA | <0.61 | 22 | 22 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| MW-7 | 11/01/16 | Soil | 0-1 ft | 2.6 | 67 | 0.87 | <0.30 | **0.89** | 9.11 | 10 | 3.9 | **180** | 7.6 | 100 | **0.030** | 2.9 | <0.59 | 6.7 | <0.59 | **61** | **46** |
| **Embankment Samples (Exposure Unit #3)** | | | | | | | | | | | | | | | | | | | | | |
| S-7 | 01/31/14 | CCP | 0-4 ft | **44** | **2,500** | NA | ND | **1.4** | **27.6** | **29** | NA | NA | **11** | NA | **0.44** | NA | **4.5** | NA | NA | NA | NA |
| HH-9 | 04/03/19 | CCP | 0-1 ft | 3.37 | 131 | 0.398 J | 0.178 J | <1.29 | 12.7 | 12.7 | 5.97 | 14.5 | NA | **260** | **0.31** | 3.59 | **0.722** | 33.2 | NA | NA | NA |
| HH-10 | 04/03/19 | CCP | 0-1 ft | **60.3** | **2,970** | **5.14** | 0.162 J | <1.60 | 13.8 | 13.8 | 9.84 | **51.3** | NA | 73.3 | **0.22** | 17.1 | **5.04** | **269** | NA | NA | NA |
| HH-11 | 04/03/19 | CCP | 0-1 ft | **42.5** | **3,260** | **5.9** | 0.220 J | **0.467 J** | 18.7 | 19.2 | **13.4** | **55.3** | NA | 113 | **0.43** | 23.5 | **9.05** | **234** | NA | NA | NA |
| **Lower Level Samples (Exposure Unit #2)** | | | | | | | | | | | | | | | | | | | | | |
| SS-7 | 02/18/16 | Soil | 2-12 in | 3.1 | 84 | 0.60 | ND | NA | NA | 14 | 6.9 | 15 | **13** | **500** | **0.038** | 5.9 | ND | 31 | ND | **37** | 37 |
| HH-8 | 10/27/16 | Soil | 0-1 ft | 3.6 | 100 | 1.00 | <0.30 | <0.35 | 19 | 19 | 12 | **29** | **18** | **570** | **0.036** | 9.0 | <0.60 | 28 | <0.60 | **52** | **54** |
| MW-6 | 11/02/16 | Soil | 0-1 ft | 2.9 | 38 | 0.61 | <0.26 | 0.21 J | 9.79 | 10 | 9.5 | 23 | **12** | **570** | **0.082** | 8.2 | **1.0** | 22 | **0.81** | **31** | **77** |
| SED-3A | 04/05/19 | Soil | 0-1 ft | 3.45 | 33.9 | 0.418 J | <0.582 | <1.16 | 17.4 | 17.4 | **16.5** | 6.97 | NA | **560** | <0.0054 | 5.82 | 0.237 J | 9.6 | NA | NA | NA |
| SED-5A | 04/04/19 | Soil | 0-1 ft | 1.25 | 13.5 | 0.156 J | <0.571 | **0.352 J** | 13.2 | 13.6 | 5.95 | **39.1** | NA | **243** | 0.0071 | 4.38 | <0.571 | 10.9 | NA | NA | NA |
| SED-8 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 2.41 | 49.1 | 0.313 J | 0.122 J | <1.25 | 12.0 | 12 | 7.01 | 14.3 | NA | **423** | **0.063** | 4.66 | **1.01** | 15.2 | NA | NA | NA |
| SED-9 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.16 | 33.8 | 0.199 J | <0.660 | **0.461 J** | 21.6 | 22.1 | 9.11 | 10.1 | NA | **431** | **0.013** | 6.68 | <0.660 | 16.7 | NA | NA | NA |
| SED-10 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.29 | 24.4 | 0.118 J | 0.221 J | **0.418 J** | 12.0 | 12.4 | 4.43 | 10.8 | NA | 195 | **0.037** | 4.03 | 0.273 J | 8.1 | NA | NA | NA |
| SED-12 | 08/27/19 | Drainage Pathway Soil | 0-2 in | 4.73 | 102 | 0.765 J | 0.214 J | <1.68 | **27.6** | **27.6** | 6.17 | 23.1 | NA | **341** | **0.042** | 7.69 | **0.961** | 25.4 | NA | NA | NA |
| | 04/05/19 | Drainage Pathway Soil | 2-6 in | 3.97 | 122 | 0.499 J | 0.204 J | <1.74 | 9.45 | 9.45 B | 6.04 | 19.7 | NA | **319** | **0.077** | 4.95 | **1.36** | 32.8 | NA | NA | NA |
| SED-13 | 08/27/19 | Drainage Pathway Soil | 0-2 in | 12.4 | **958** | 1.56 | 0.284 J | <2.03 | **29.4** | **29.4** | **13.9** | **38.9** | NA | **538** | **0.12** | 19.2 | **3.07** | **125** | NA | NA | NA |
| | 04/05/19 | Drainage Pathway Soil | 2-6 in | 14.5 | **724** | 1.1 | 0.171 J | <1.58 | 14.0 | 14 | 7.58 | 27.1 | NA | **563** | **0.075** | 8.73 | **1.69** | 70.5 | NA | NA | NA |
| SED-18 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 4.53 | 137 | 0.534 J | <0.689 | <1.38 | 18.7 | 18.7 | 11.1 | **28.2** | NA | **464** | **0.051** | 9.00 | **1.85** | 32.6 | NA | NA | NA |
| SED-19 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.55 | 20.0 | 0.161 J | <0.588 | **0.435 J** | 21.7 | 22.1 | 7.98 | 8.38 | NA | **266** | 0.0073 | 4.94 | 0.334 J | 15 | NA | NA | NA |
| SED-20 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 0.792 | 31.4 | 0.152 J | <0.687 | <1.37 | 5.76 | 5.76 B | 4.5 | 9.1 | NA | **360** | 0.012 | 2.19 | 0.263 J | 11.5 | NA | NA | NA |
| SED-21 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.12 | 25.9 | 0.149 J | <0.591 | <1.18 | 20.9 | 20.9 | 4.44 | 6.58 | NA | **221** | 0.011 | 2.70 | 0.286 J | 12.8 | NA | NA | NA |
| Excavation H-3 | 05/11/20 | Soil | 1-2 ft | 2.41 | 71.0 | <3.28 | <1.31 | **0.410 J** | **40.2** | **40.6** | **14.1** | **43.4** | NA | **251** | 0.0485 J | 12.5 | **1.46 J** | 58.1 | NA | NA | NA |
| Excavation H-5 | 05/11/20 | Soil | 1-2 ft | 1.10 J | 74.5 | <3.04 | <1.22 | **0.497 J** | 21.1 | 21.6 | 8.25 | 16.9 | NA | **558** | <0.0486 | 6.77 | <3.04 | 32.2 | NA | NA | NA |
| Excavation H-6 | 05/11/20 | Soil | 1-2 ft | 1.02 J | 96.0 | <2.97 | <1.19 | <1.19 | 14.9 | 14.9 | 7.57 | 10.7 | NA | **557** | 0.0222 J | 4.03 | <2.97 | 20.5 | NA | NA | NA |
| Excavation H-7 | 11/09/20 | Soil | 0-1 ft | 1.10 J | 73.7 | 0.767 J | <1.22 | <1.22 | 8.04 | 8.04 | 3.68 | 15.0 | NA | **233** | **0.022** | 4.63 | 0.479 J | 9.6 | NA | NA | NA |
| Excavation I-1 | 04/08/20 | Soil | 1-2 ft | 2.91 | 67.2 | <2.77 | <1.11 | **0.457 J** | **26.2** | **26.7** | **13.0** | 18.3 | NA | **594** | **0.042** | 8.25 | <2.77 | 26.3 | NA | NA | NA |
| Excavation I-2 | 04/08/20 | Soil | 1-2 ft | 3.65 | 74.1 | <2.85 | <1.14 | 0.313 J | 23.3 | **23.6** | 12.0 | 21.4 | NA | **544** | **0.022** | 8.70 | <2.85 | 17.2 | NA | NA | NA |
| Excavation I-3 | 04/08/20 | Soil | 1-2 ft | 2.18 | 61.5 | <2.88 | <1.15 | **0.387 J** | 13.1 | 13.5 | 9.23 | 19.5 | NA | **419** | **0.019** | 6.02 | <2.88 | 13.3 | NA | NA | NA |

**Notes:**
Concentrations reported in milligrams per kilogram (mg/kg).
1) Site-Specific Background Screening Value (BSV) represents 95% upper threshold level (UTL) with 95% coverage calculated using EPA ProUCL 5.1.
*Insufficient data to calculate 95% UTL; therefore, site-specific BSV indicates 2x mean concentration with non-detectable concentrations calculated as half the reporting limit
2) EPA Region 4 Soil Ecological Screening Value (ESV) (March 2018).
**Bold** denotes concentration above or equal to EPA Soil ESV.
**Bold**/Shaded denotes concentration above or equal to EPA Soil ESV and site-specific BSV.
NA = Not Analyzed
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
Table shows constituents detected in soil samples collected between 0 and 2 ft bgs, excluding background samples, samples that have been excavated, and samples collected from locations resampled at a later date. Refer to Appendix A for a summary of additional sampling data.

# Table 3 (Page 1 of 1)
## Stream Sediment Ecological Screening Table
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job No. TCH-009

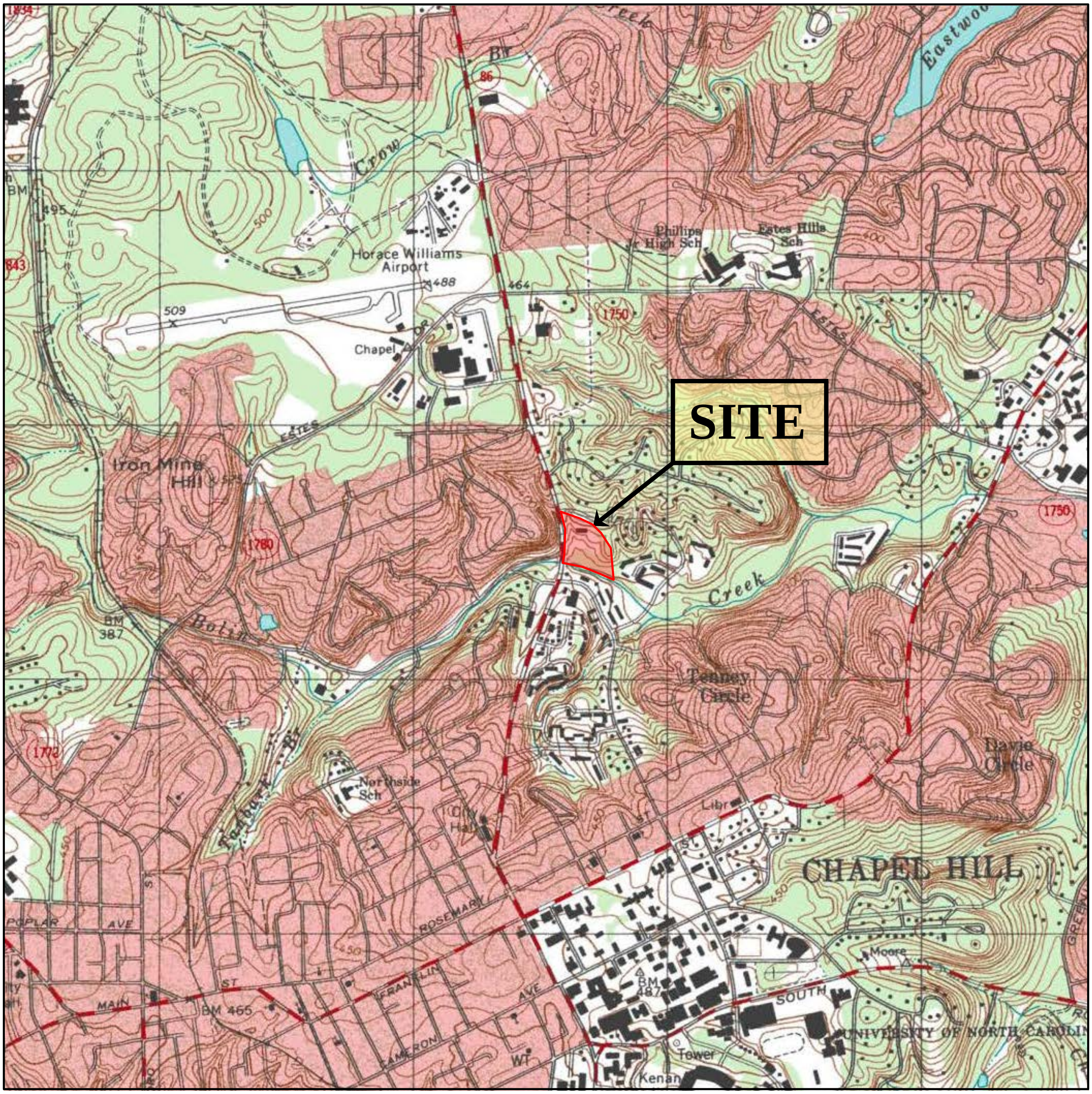
| Sediment Sampling Point ID | Sample Date | arsenic | barium | beryllium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | manganese | mercury | nickel | selenium | strontium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV[1]** | | 2.74 | 38.4 | 0.48 | 0.79 | 69.5 | 70 | 16.388 | 13.8 | 759 | 0.0078 | 9.92 | 0.409 | 16.9 |
| **EPA Region 4 Sediment ESV[2]** | | 9.8 | 20 | NS | NS | NS | 43.4 | 50 | 31.6 | 460 | 0.17* | 22.7 | 0.72* | NS |
| **EPA Region 4 Sediment RSV[3]** | | 33 | 60 | NS | NS | NS | 111 | NS | 149 | 1,100 | 0.17* | 48.6 | 1.2* | NS |
| **SED-3 (Adjacent)** | 04/05/19 | 1.36 | 16.4 | 0.111 J | 0.670 J | 13.5 | 14.2 | 5.18 | 20.2 | 225 | 0.0054 J | 4.81 | <0.607 | 9.2 |
| **SED-4 (Adjacent)** | 04/05/19 | 2.35 | **20.3** | 0.191 J | 0.456 J | 63.8 | **64.3** | 7.26 | 8.39 | 293 | 0.0080 | 10.5 | 0.344 J | 30.7 |
| **SED-5 (Downstream)** | 04/04/19 | 1.82 | **24.3** | 0.233 J | 0.595 J | 16.8 | 17.4 | 5.9 | 8.86 | 399 | <0.0035 | 4.86 | <0.617 | 6.2 |
| **SED-6 (Downstream)** | 04/04/19 | 1.96 | 17.3 | 0.247 J | 0.517 J | 24.9 | 25.4 | 6.57 | 9.25 | 308 | 0.0058 | 7.15 | <0.643 | 8.4 |
| **SED-7 (Downstream)** | 04/04/19 | 1.35 | 16.4 | 0.179 J | 0.995 J | 59.4 | **60.4** | 6.47 | 6.77 | 262 | 0.0025 J | 9.04 | <0.635 | 8.1 |

**Notes**
Concentrations reported in milligrams per kilogram (mg/kg).
1) Site-Specific Background Screening Value (BSV) indicates two times the mean detected background concentration or maximum detected background concentration, whichever is smaller
2) EPA Region 4 Sediment Ecological Screening Value (ESV) for freshwater (March 2018)
3) EPA Region 4 Sediment Refinement Screening Value (RSV) for freshwater (March 2018)
*Indicates the lower of the aquatic versus wildlife based ESVs and RSVs.
**Bold** denotes concentration above EPA Sediment ESV.
**Bold**/Shaded denotes concentration above EPA Sediment ESV and site-specific BSV.
Red denotes concentration above EPA Sediment RSV.
Red/Shaded denotes concentration above EPA Sediment RSV and site-specific BSV.
NS = Not Specified
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
Table shows constituents detected in the most recent set of surface water samples, excluding background samples. Refer to Appendix A for a summary of additional sampling data.

# Table 4 (page 1 of 1)
## Surface Water Ecological Screening Table
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job No. TCH-009

| Surface Water Sampling Point ID | Sample Date | arsenic | barium | total chromium(4,5,6) | cobalt | copper(4,5) | manganese | nickel(4,5) | selenium | strontium |
|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV(1)** | | 0.44 | 27 | 0.53 | 0.16 | 1.2 | 22.2 | 0.33 | 0.11 | 100 |
| **NC 2B Standard(2)** | | 10(t) | 1,000(t) | 11 | 1.6(7) | 5.33 | NS | 25(t) | 5(t) | 14,000(7) |
| **EPA Region 4 Surface Water ESV (Acute)(3)** | | 340 | 2,000 | 16 | 120 | 7.3 | 1,680 | 261 | 20 | 48,000 |
| **EPA Region 4 Surface Water ESV (Chronic)(3)** | | 150 | 220 | 11 | 19 | 5.16 | 93 | 29 | 5 | 5,300 |
| **SW-3 (Adjacent)** | 11/03/16 | <10 | 27 | <5.0 | <5.0 | <10 | 34 | <10 | <20 | 100 |
| | 11/03/16(8) | <10 | 27 | <5.0 | <5.0 | <10 | 33 | <10 | <20 | 110 |
| | 04/05/19 | 0.45 | 25.7 | 0.62 | 0.26 | 2.8 | 37.4 | 0.50 | 0.11 J | 88.8 |
| **SW-4 (Adjacent)** | 11/03/16 | <10 | 27 | <5.0 | <5.0 | <10 | 25 | <10 | <20 | 110 |
| | 04/05/19 | 0.42 | 23.6 | <0.50 | 0.14 | 1.0 | 24.6 | 0.26 J | 0.10 J | 89.1 |
| | 04/05/19(8) | 0.41 | 23.7 | <0.50 | 0.14 | 0.98 | 24.8 | 0.26 J | 0.088 J | 87.7 |
| **SW-5 (Downstream)** | 11/03/16 | <10 | 26 | <5.0 | <5.0 | <10 | 24 | <10 | <20 | 100 |
| | 04/04/19 | 0.40 | 16.9 | <0.50 | 0.14 | 0.88 | 19.5 | 0.21 J | 0.12 J | 81.8 |
| **SW-6 (Downstream)** | 04/04/19 | 0.40 | 16.9 | <0.50 | 0.14 | 0.84 | 18.7 | 0.21 J | 0.11 J | 81.3 |
| **SW-7 (Downstream)** | 04/04/19 | 0.42 | 18.4 | <0.50 | 0.16 | 1.1 | 23.1 | 0.23 J | 0.10 J | 86.7 |
| **SW-21 (Drainage Pathway)** | 04/05/19 | 0.40 | 32.1 | 0.73 | 0.36 | 3.2 | 29.5 | 0.62 | 0.11 J | 69.9 |
| | 04/05/19(9) | 0.15 | 18.3 | <0.50 | 0.094 J | 3.1 | 9.3 | 0.43 J | <0.50 | 43.5 |

**Notes:**
Concentrations reported in micrograms per liter (µg/L).
1) Site-Specific Background Screening Value (BSV) indicates two times the mean detected background concentration or maximum detected background concentration, whichever is smaller.
2) North Carolina Surface Water Quality Standard (NC 2B Standard) adopted per 15A NCAC 2B Section .0100. Unless otherwise noted, values are the lowest of the Freshwater, Water Supply, and Human Health values because Bolin Creek is a WS V classification surface water.
3) EPA Region 4 Surface Water Ecological Screening Value (ESV) for freshwater (March 2018).
4) 2B Standards derived using site-specific hardness data for surface water samples SW-1 through SW-7 and the DEQ Hardness-Dependent Metal Calculator dated July 26, 2021. Mean hardness for these samples was 54.5 mg/L. Value shown is the lower of the acute versus chronic values.
5) EPA ESVs based on estimated hardness of 50 mg/L, which is the value reported by EPA closest to the measured site-specific hardness
6) 2B Standard shown for total chromium indicates the lower of the hexavalent and trivalent chromium values.
7) No 2B Standard established, value shown is the NC In-Stream Target Values for Surface Water (July 26, 2021). Value shown is the lower of the acute versus chronic values.
8) Duplicate sample taken.
9) Sample was field filtered.
**Bold** denotes concentration above NC 2B Standard.
**Bold**/Shaded denotes concentration above NC 2B Standard and site-specific BSV.
Red denotes concentration above EPA Surface Water ESV (lower of acute or chronic).
Red/Shaded denotes concentration above EPA Surface Water RSV and site-specific BSV.
NS = Not Specified
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
(t) = Based upon measurement of total recoverable metal. See 15A NCAC 02B .0211 for more information.
Table shows constituents detected in surface water samples within the past five years, excluding background samples. Refer to Appendix A for a summary of additional sampling data.




N

APPROXIMATE

0 2000 4000

SCALE IN FEET

U.S.G.S. QUADRANGLE MAP

**CHAPEL HILL, NORTH CAROLINA, 2002**

QUADRANGLE
7.5 MINUTE SERIES (TOPOGRAPHIC)

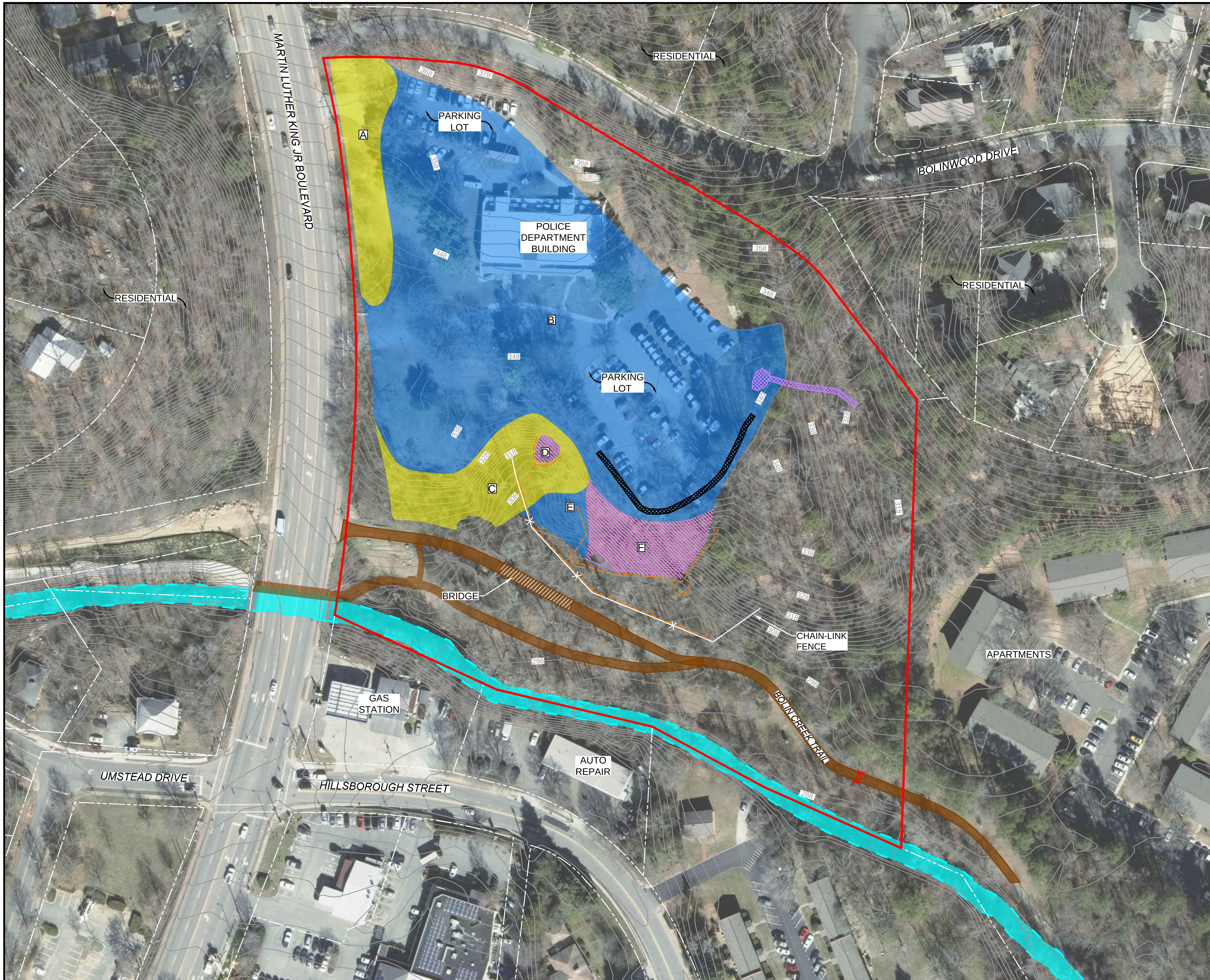
TITLE

**SITE LOCATION MAP**

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | | | |
|---|---|---|---|
| DATE: | 9-10-21 | REVISION NO: | 0 |
| JOB NO: | TCH-009 | FIGURE NO: | 1 |




LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 328 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- CCP UNDER > 2 FT COVER
- CCP UNDER < 2 FT COVER
- CCP EXPOSED AT GROUND SURFACE (HYDROSEEDED)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- SILT FENCE
- STORM DIVERSION CHANNEL
- STORM OUTFALL CHANNEL
- A CCP AREA DESIGNATION

N

APPROXIMATE
0 115 230
SCALE IN FEET

TITLE
SITE MAP

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 6-22-21 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 2 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\TCH.009 20210622-FIG2.dwg, FIG 2, 9/10/2021 1:16:15 PM, shaynes


LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

TITLE

SAMPLE LOCATION AND EXPOSURE UNIT MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 9-10-21 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 3 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 3, 9/21/2021 8:53:22 AM, shaynes


LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

SAMPLE ID & DATE

| HH-10 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 60.3 |

SAMPLE DEPTH

CONCENTRATION (mg/kg)

RISK DRIVERS

NOTES:

1. ONLY COMPOUNDS THAT DRIVE EXCEEDANCES OF ACCEPTABLE RISK LEVELS (CARCINOGENIC RISK > 1.0E-04 AND HAZARD INDEX > 1.0) ARE SHOWN.
2. FT BGS = FEET BELOW GROUND SURFACE

N

APPROXIMATE

0 115 230

SCALE IN FEET

TITLE

RESIDENTIAL HUMAN HEALTH RISK DRIVERS MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| DATE: 9-10-21 | REVISION NO. 0 |
|---|---|
| JOB NO. TCH-009 | FIGURE NO. 4A |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 4A, 9/30/2021 4:12:16 PM, shaynes


LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

SAMPLE ID & DATE

| HH-10 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 60.3 |

SAMPLE DEPTH
CONCENTRATION (mg/kg)
RISK DRIVERS

NOTES:

1. ONLY COMPOUNDS THAT DRIVE EXCEEDANCES OF ACCEPTABLE RISK LEVELS (CARCINOGENIC RISK > 1.0E-04 AND HAZARD INDEX > 1.0) ARE SHOWN.
2. FT BGS = FEET BELOW GROUND SURFACE

N
APPROXIMATE
0 115 230
SCALE IN FEET

TITLE
CONSTRUCTION WORKER HUMAN HEALTH RISK DRIVERS MAP

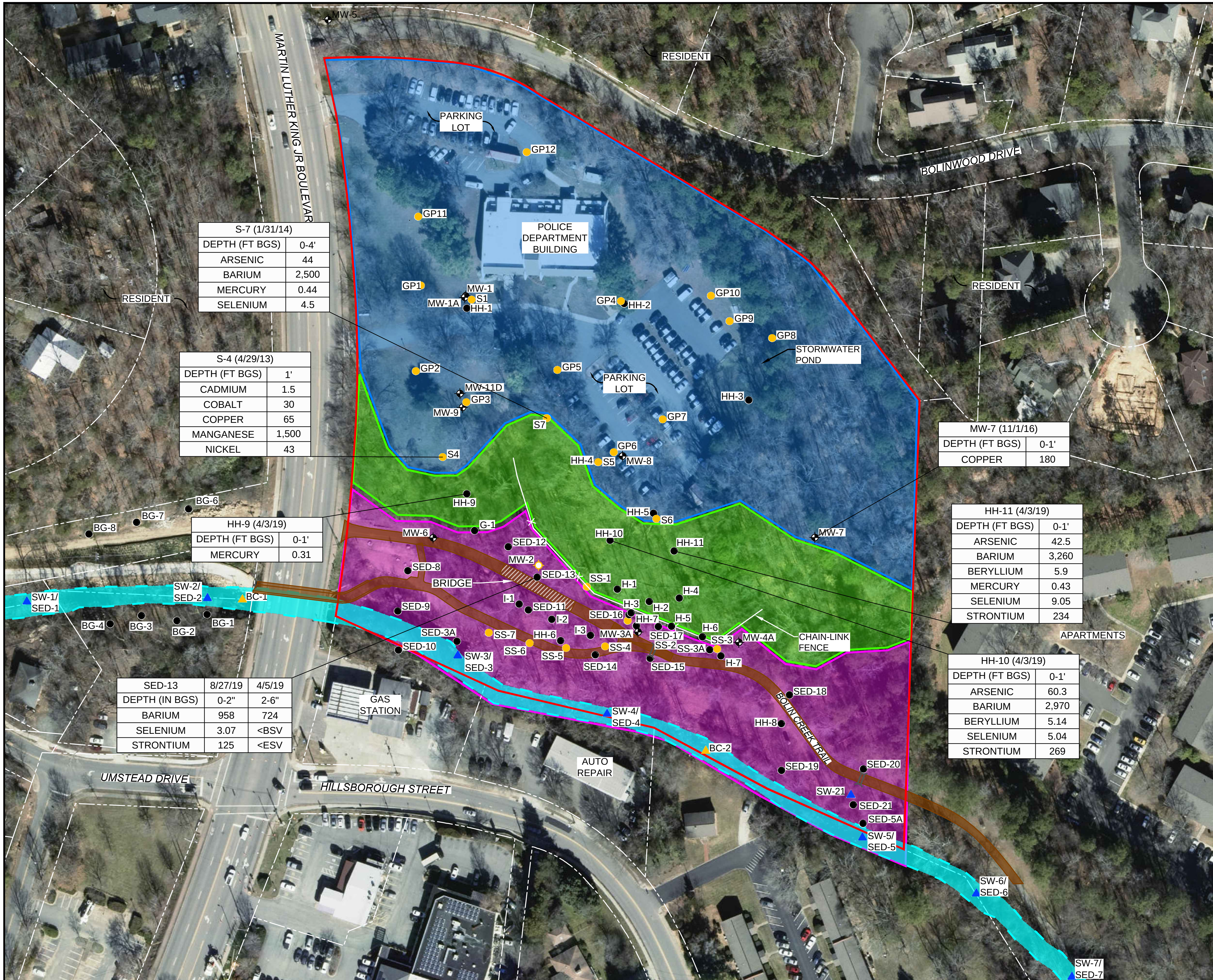
PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 9-10-21 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 4B |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 4B, 9/30/2021 4:16:41 PM, shaynes




| S-7 (1/31/14) | |
|---|---|
| DEPTH (FT BGS) | 0-4' |
| ARSENIC | 44 |
| BARIUM | 2,500 |
| MERCURY | 0.44 |
| SELENIUM | 4.5 |

| S-4 (4/29/13) | |
|---|---|
| DEPTH (FT BGS) | 1' |
| CADMIUM | 1.5 |
| COBALT | 30 |
| COPPER | 65 |
| MANGANESE | 1,500 |
| NICKEL | 43 |

| HH-9 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| MERCURY | 0.31 |

| SED-13 | 8/27/19 | 4/5/19 |
|---|---|---|
| DEPTH (IN BGS) | 0-2" | 2-6" |
| BARIUM | 958 | 724 |
| SELENIUM | 3.07 | <BSV |
| STRONTIUM | 125 | <ESV |

| MW-7 (11/1/16) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| COPPER | 180 |

| HH-11 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 42.5 |
| BARIUM | 3,260 |
| BERYLLIUM | 5.9 |
| MERCURY | 0.43 |
| SELENIUM | 9.05 |
| STRONTIUM | 234 |

| HH-10 (4/3/19) | |
|---|---|
| DEPTH (FT BGS) | 0-1' |
| ARSENIC | 60.3 |
| BARIUM | 2,970 |
| BERYLLIUM | 5.14 |
| SELENIUM | 5.04 |
| STRONTIUM | 269 |

LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- SOIL SAMPLE LOCATION (H&H)
- DRAINAGE PATHWAY, SURFACE WATER/SEDIMENT SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXPOSURE UNIT #1 - UPPER LEVEL
- EXPOSURE UNIT #2 - LOWER LEVEL
- EXPOSURE UNIT #3 - EMBANKMENT

SAMPLE ID & DATE
SAMPLE DEPTH
CONCENTRATION (mg/kg)
CONSTITUENT

| S-4 (4/29/13) | |
|---|---|
| DEPTH (FT BGS) | 1' |
| CADMIUM | 1.5 |
| COBALT | 30 |
| COPPER | 65 |
| MANGANESE | 1,500 |
| NICKEL | 43 |

NOTES:

1. ONLY SAMPLES EXCEEDING ECOLOGICAL SCREENING VALUES (ESVs) AND BACKGROUND SCREENING VALUES (BSVs) ARE SHOWN.
2. FT BGS = FEET BELOW GROUND SURFACE
IN BGS = INCHES BELOW GROUND SURFACE
mg/kg = MILLIGRAMS PER KILOGRAM

N
APPROXIMATE
0 115 230
SCALE IN FEET

TITLE
ECOLOGICAL RISK DRIVERS MAP

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| DATE: 9-10-21 | REVISION NO. 0 |
|---|---|
| JOB NO. TCH-009 | FIGURE NO. 5 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-009 - Police Station - Remedial Services\Risk Assessment\Figures\Figures_20210831.dwg, FIG 5, 9/21/2021 9:00:43 AM, shaynes

# Appendix A

## Historical Data Tables and Figures

**Table A-1 (page 1 of 2)**
**Summary of Post-IRM Soil Analytical Data**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Sample ID | Sample Date | Material Sampled (Soil or CCP) | Sample Depth (ft or in bgs) | aluminum | antimony | arsenic | barium | beryllium | boron | cadmium | calcium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | iron | lead | magnesium | manganese | mercury | molybdenum | nickel | potassium | selenium | silver | sodium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Site-Specific BSV(1) | | | | NA | ND | 3.015 | 87.86 | 0.929 | NA | 0.313 | NA | 5.725 | 70.2 | 70.2 | 36.31 | 77.3 | NA | 59.11 | NA | 1,149 | 0.256 | NA | 19.49 | NA | 2.503 | NA | NA | 43.19 | 0.981* | 227 | 230 |
| PSRG - Protection of Groundwater(2) | | | | 110,000 | 0.90 | 5.8 | 580 | 63 | 45 | 3.0 | NS | 3.8 | 360,000 | NS | 0.90 | 700 | 150 | 270 | NS | 65 | 1.0 | 7.1 | 130 | NS | 2.1 | 3.4 | NS | 1,500 | 0.28 | 350 | 1,200 |
| PSRG - Residential Health-based(2) | | | | 16,000 | 6.3 | 0.68 | 3,100 | 31 | 3,100 | 14 | NS | 0.31 | 23,000 | NS | 4.7 | 630 | 11,000 | 400 | NS | 380 | 2.3 | 78 | 310 | NS | 78 | 78 | NS | 9,400 | 0.16 | 78 | 4,700 |
| PSRG - Industrial/Commercial Health-based(2) | | | | 230,000 | 93 | 3.0 | 47,000 | 470 | 47,000 | 200 | NS | 6.5 | 350,000 | NS | 70 | 9,300 | 160,000 | 800 | NS | 5,600 | 9.7 | 1,200 | 4,700 | NS | 1,200 | 1,200 | NS | 140,000 | 2.3 | 1,200 | 70,000 |
| Upper Level Samples | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S-4 | 04/29/13 | CCP | 1 ft | 23,000 | ND | 14 | 24 | ND | NA | 1.5 | 9,900 | NA | NA | 22 | 30 | 65 | 59,000 | 20 | 9,000 | 1,500 | 0.011 | NA | 43 | 680 | ND | ND | 150 | NA | ND | 21 | 120 |
| S-5 | 01/31/14 | CCP | 0-4 ft | NA | NA | 37 | 2,800 | NA | NA | ND | NA | 1.3 | 19.7 | 21 | NA | NA | NA | 10 | NA | NA | 0.30 | NA | NA | NA | 3.2 | ND | NA | NA | NA | NA | NA |
| S-6 | 01/31/14 | CCP | 0-4 ft | NA | NA | 43 | 3,200 | NA | NA | ND | NA | 2.7 | 19.3 | 22 | NA | NA | NA | 12 | NA | NA | 0.42 | NA | NA | NA | 6.1 | ND | NA | NA | NA | NA | NA |
| GP-1 | 02/03/14 | CCP | 8-12 ft | NA | NA | 3.5 | 86 | NA | NA | ND | NA | ND | 8.8 | 8.8 | NA | NA | NA | 26 | NA | NA | 0.083 | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| GP-2 | 02/03/14 | CCP | 26-28 ft | NA | NA | 41 | 1,100 | NA | NA | ND | NA | ND | 19 | 19 | NA | NA | NA | 11 | NA | NA | 0.24 | NA | NA | NA | 4.0 | ND | NA | NA | NA | NA | NA |
| GP-3 | 02/03/14 | CCP | 10-12 ft | NA | NA | 48 | 1,200 | NA | NA | ND | NA | 0.53 | 22.47 | 23 | NA | NA | NA | 39 | NA | NA | 0.42 | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| GP-4 | 02/04/14 | CCP | 10-12 ft | NA | NA | 59 | 2,900 | NA | NA | ND | NA | ND | 20 | 20 | NA | NA | NA | 11 | NA | NA | 0.51 | NA | NA | NA | 5.8 | ND | NA | NA | NA | NA | NA |
| GP-5 | 02/04/14 | CCP | 4-6 ft | NA | NA | 72 | 2,800 | NA | NA | ND | NA | ND | 19 | 19 | NA | NA | NA | 9.5 | NA | NA | 0.33 | NA | NA | NA | 2.6 | ND | NA | NA | NA | NA | NA |
| | 04/03/19 | CCP | 4-6 ft | NA | NA | 95.9 | 2,350 | 5.46 | NA | <0.956 | NA | 0.836 J | 12.3 | 13.1 | 7.05 | 50.9 | NA | NA | NA | 34.7 | 1.2 | NA | 11.1 | NA | 12 | NA | NA | 325 | NA | NA | NA |
| | 04/03/19(3) | CCP | 4-6 ft | NA | NA | 95.9 | 2,630 | 6.99 | NA | <0.931 | NA | 0.712 J | 16.2 | 16.9 | 10.3 | 62.5 | NA | NA | NA | 53.4 | 0.39 | NA | 17.1 | NA | 13 | NA | NA | 308 | NA | NA | NA |
| GP-6 | 02/04/14 | CCP | 9-11 ft | NA | NA | 65 | 850 | NA | NA | ND | NA | ND | 19 | 19 | NA | NA | NA | 27 | NA | NA | 11 | NA | NA | NA | 4.1 | ND | NA | NA | NA | NA | NA |
| | 04/04/19 | CCP | 9-10 ft | NA | NA | 6.73 | 178 | 0.758 | NA | 0.118 J | NA | <1.11 | 10.0 | 10 | 5.18 | 11 | NA | NA | NA | 687 | 0.050 | NA | 6.24 | NA | 0.88 | NA | NA | 21.7 | NA | NA | NA |
| GP-7 | 02/04/14 | CCP | 10-12 ft | NA | NA | 55 | 1,700 | NA | NA | ND | NA | ND | 19 | 19 | NA | NA | NA | 11 | NA | NA | 0.26 | NA | NA | NA | 4.3 | ND | NA | NA | NA | NA | NA |
| GP-8 | 02/04/14 | CCP | 11-15 ft | NA | NA | 54 | 4,100 | NA | NA | ND | NA | ND | 20 | 20 | NA | NA | NA | 9.2 | NA | NA | 0.29 | NA | NA | NA | 4.5 | ND | NA | NA | NA | NA | NA |
| GP-11 | 02/04/14 | CCP | 4-6 ft | NA | NA | 16 | 450 | NA | NA | ND | NA | ND | 16 | 16 | NA | NA | NA | 23 | NA | NA | 0.35 | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| GP-12 | 02/04/14 | CCP | 2-4 ft | NA | NA | 52 | 2,000 | NA | NA | ND | NA | ND | 19 | 19 | NA | NA | NA | 14 | NA | NA | 0.28 | NA | NA | NA | 2.1 | ND | NA | NA | NA | NA | NA |
| HH-1 | 11/03/16 | Soil | 0-1 ft | NA | <0.29 | 5.9 | 120 | 1.00 | NA | <0.29 | NA | 0.45 | 20.55 | 21 | 7.9 | 25 | NA | 27 | NA | 350 | 0.052 | NA | 8.8 | NA | 0.69 | NA | NA | 31 | <0.58 | 48 | 50 |
| | 11/03/16(3) | Soil | 0-1 ft | NA | <0.35 | 3.4 | 110 | 0.79 | NA | <0.35 | NA | 0.54 | 19.46 | 20 | 8.4 | 17 | NA | 18 | NA | 360 BH | 0.067 | NA | 12 | NA | <0.71 | NA | NA | 30 | <0.71 | 41 | 35 |
| HH-2 | 11/03/16 | Soil | 0-1 ft | NA | <0.29 | 4.9 | 140 | 0.93 | NA | <0.29 | NA | 0.43 | 13.57 | 14 | 12 | 21 | NA | 30 | NA | 260 | 0.085 | NA | 5.9 | NA | 1.0 | NA | NA | 25 | <0.58 | 48 | 43 |
| HH-3 | 11/03/16 | Soil | 0-1 ft | NA | <0.33 | 9.9 | 200 | 1.30 | NA | <0.33 | NA | 0.46 J | 17.54 | 18 | 7.8 | 31 | NA | 24 | NA | 350 | 0.076 | NA | 8.9 | NA | 2.4 | NA | NA | 36 | <0.65 | 53 | 100 |
| HH-4 | 11/03/16 | Soil | 0-1 ft | NA | <0.28 | 2.4 | 72 | 1.00 | NA | <0.28 | NA | 0.50 | 44.5 | 45 | 16 | 37 | NA | 2.3 | NA | 630 | <0.023 | NA | 33 | NA | <0.56 | NA | NA | 42 | 0.60 | 73 | 70 |
| HH-5 | 11/03/16 | Soil | 0-1 ft | NA | <0.30 | 2.4 | 73 | 0.75 | NA | <0.30 | NA | <0.14 | 23 | 23 | 8.4 | 19 | NA | 9.3 | NA | 410 | <0.025 | NA | 14 | NA | 1.2 | NA | NA | 23 | <0.60 | 39 | 51 |
| MW-7 | 11/01/16 | Soil | 0-1 ft | NA | <0.30 | 2.6 | 67 | 0.87 | NA | <0.30 | NA | 0.89 | 9.11 | 10 | 3.9 | 180 | NA | 7.6 | NA | 100 | 0.030 | NA | 2.9 | NA | <0.59 | NA | NA | 6.7 | <0.59 | 61 | 46 |
| Embankment Samples | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| S-7 | 01/31/14 | CCP | 0-4 ft | NA | NA | 44 | 2,500 | NA | NA | ND | NA | 1.4 | 27.6 | 29 | NA | NA | NA | 11 | NA | NA | 0.44 | NA | NA | NA | 4.5 | ND | NA | NA | NA | NA | NA |
| HH-9 | 04/03/19 | CCP | 0-1 ft | NA | NA | 3.37 | 131 | 0.398 J | NA | 0.178 J | NA | <1.29 | 12.7 | 12.7 | 5.97 | 14.5 | NA | NA | NA | 260 | 0.31 | NA | 3.59 | NA | 0.722 | NA | NA | 33.2 | NA | NA | NA |
| HH-10 | 04/03/19 | CCP | 0-1 ft | NA | NA | 60.3 | 2,970 | 5.14 | NA | 0.162 J | NA | <1.60 | 13.8 | 13.8 | 9.84 | 51.3 | NA | NA | NA | 73.3 | 0.22 | NA | 17.1 | NA | 5.04 | NA | NA | 269 | NA | NA | NA |
| HH-11 | 04/03/19 | CCP | 0-1 ft | NA | NA | 42.5 | 3,260 | 5.9 | NA | 0.220 J | NA | 0.467 J | 18.7 | 19.2 | 13.4 | 55.3 | NA | NA | NA | 113 | 0.43 | NA | 23.5 | NA | 9.05 | NA | NA | 234 | NA | NA | NA |
| Lower Level Samples | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SS-7 | 02/18/16 | Soil | 2-12 in | NA | ND | 3.1 | 84 | 0.60 | ND | ND | NA | NA | NA | 14 | 6.9 | 15 | NA | 13 | NA | 500 | 0.038 | ND | 5.9 | NA | ND | ND | NA | 31 | ND | 37 | 37 |
| HH-8 | 10/27/16 | Soil | 0-1 ft | NA | <0.30 | 3.6 | 100 | 1.00 | NA | <0.30 | NA | <0.35 | 19 | 19 | 12 | 29 | NA | 18 | NA | 570 | 0.036 | NA | 9.0 | NA | <0.60 | NA | NA | 28 | <0.60 | 52 | 54 |
| MW-6 | 11/02/16 | Soil | 0-1 ft | NA | <0.26 | 2.9 | 38 | 0.61 | NA | <0.26 | NA | 0.21 J | 9.79 | 10 | 9.5 | 23 | NA | 12 | NA | 570 | 0.082 | NA | 8.2 | NA | 1.0 | NA | NA | 22 | 0.81 | 31 | 77 |
| SED-3A | 04/05/19 | Soil | 0-1 ft | NA | NA | 3.45 | 33.9 | 0.418 J | NA | <0.582 | NA | <1.16 | 17.4 | 17.4 | 16.5 | 6.97 | NA | NA | NA | 560 | <0.0054 | NA | 5.82 | NA | 0.237 J | NA | NA | 9.6 | NA | NA | NA |
| SED-5A | 04/04/19 | Soil | 0-1 ft | NA | NA | 1.25 | 13.5 | 0.156 J | NA | <0.571 | NA | 0.352 J | 13.2 | 13.6 | 5.95 | 39.1 | NA | NA | NA | 243 | 0.0071 | NA | 4.38 | NA | <0.571 | NA | NA | 10.9 | NA | NA | NA |
| SED-8 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 2.41 | 49.1 | 0.313 J | NA | 0.122 J | NA | <1.25 | 12.0 | 12 | 7.01 | 14.3 | NA | NA | NA | 423 | 0.063 | NA | 4.66 | NA | 1.01 | NA | NA | 15.2 | NA | NA | NA |
| SED-9 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 1.16 | 33.8 | 0.199 J | NA | <0.660 | NA | 0.461 J | 21.6 | 22.1 | 9.11 | 10.1 | NA | NA | NA | 431 | 0.013 | NA | 6.68 | NA | <0.660 | NA | NA | 16.7 | NA | NA | NA |
| SED-10 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 1.29 | 24.4 | 0.118 J | NA | 0.221 J | NA | 0.418 J | 12.0 | 12.4 | 4.43 | 10.8 | NA | NA | NA | 195 | 0.037 | NA | 4.03 | NA | 0.273 J | NA | NA | 8.1 | NA | NA | NA |
| SED-12 | 08/27/19 | Drainage Pathway Soil | 0-2 in | NA | NA | 4.73 | 102 | 0.765 J | NA | 0.214 J | NA | <1.68 | 27.6 | 27.6 | 6.17 | 23.1 | NA | NA | NA | 341 | 0.042 | NA | 7.69 | NA | 0.961 | NA | NA | 25.4 | NA | NA | NA |
| | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 3.97 | 122 | 0.499 J | NA | 0.204 J | NA | <1.74 | 9.45 | 9.45 B | 6.04 | 19.7 | NA | NA | NA | 319 | 0.077 | NA | 4.95 | NA | 1.36 | NA | NA | 32.8 | NA | NA | NA |
| SED-13 | 08/27/19 | Drainage Pathway Soil | 0-2 in | NA | NA | 12.4 | 958 | 1.56 | NA | 0.284 J | NA | <2.03 | 29.4 | 29.4 | 13.9 | 38.9 | NA | NA | NA | 538 | 0.12 | NA | 19.2 | NA | 3.07 | NA | NA | 125 | NA | NA | NA |
| | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 14.5 | 724 | 1.1 | NA | 0.171 J | NA | <1.58 | 14.0 | 14 | 7.58 | 27.1 | NA | NA | NA | 563 | 0.075 | NA | 8.73 | NA | 1.69 | NA | NA | 70.5 | NA | NA | NA |
| SED-18 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 4.53 | 137 | 0.534 J | NA | <0.689 | NA | <1.38 | 18.7 | 18.7 | 11.1 | 28.2 | NA | NA | NA | 464 | 0.051 | NA | 9 | NA | 1.85 | NA | NA | 32.6 | NA | NA | NA |
| SED-19 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 1.55 | 20.0 | 0.161 J | NA | <0.588 | NA | 0.435 J | 21.7 | 22.1 | 7.98 | 8.38 | NA | NA | NA | 266 | 0.0073 | NA | 4.94 | NA | 0.334 J | NA | NA | 15 | NA | NA | NA |
| SED-20 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 0.792 | 31.4 | 0.152 J | NA | <0.687 | NA | <1.37 | 5.76 | 5.76 B | 4.5 | 9.1 | NA | NA | NA | 360 | 0.012 | NA | 2.19 | NA | 0.263 J | NA | NA | 11.5 | NA | NA | NA |
| SED-21 | 04/05/19 | Drainage Pathway Soil | 2-6 in | NA | NA | 1.12 | 25.9 | 0.149 J | NA | <0.591 | NA | <1.18 | 20.9 | 20.9 | 4.44 | 6.58 | NA | NA | NA | 221 | 0.011 | NA | 2.7 | NA | 0.286 J | NA | NA | 12.8 | NA | NA | NA |
| Excavation G-1 | 04/16/20 | Soil | 2-3 ft | NA | NA | 3.68 | 58.8 | <3.08 | NA | <1.23 | NA | 0.478 J | 20.0 | 20.5 | 5.73 | 14.5 | NA | NA | NA | 193 | 0.052 | NA | 6.94 | NA | <3.08 | NA | NA | 6.2 | NA | NA | NA |
| Excavation H-1 | 05/11/20 | Soil | 1-2 ft | NA | NA | 1.16 | 37.2 | <2.76 | NA | <1.10 | NA | <1.10 | 20.1 | 20.1 | 10.7 | 15.3 | NA | NA | NA | 412 | <0.0442 | NA | 5.80 | NA | <2.76 | NA | NA | 29.3 | NA | NA | NA |
| Excavation H-2 | 05/11/20 | Soil | 1-2 ft | NA | NA | 1.93 | 100 | <3.25 | NA | <1.30 | NA | 0.578 J | 43.8 | 44.4 | 19.1 | 59.2 | NA | NA | NA | 265 | 0.0494 J | NA | 16.2 | NA | 1.58 J | NA | NA | 56.8 | NA | NA | NA |
| Excavation H-3 | 05/11/20 | Soil | 1-2 ft | NA | NA | 2.41 | 71.0 | <3.28 | NA | <1.31 | NA | 0.410 J | 40.2 | 40.6 | 14.1 | 43.4 | NA | NA | NA | 251 | 0.0485 J | NA | 12.5 | NA | 1.46 J | NA | NA | 58.1 | NA | NA | NA |
| Excavation H-4 | 05/11/20 | Soil | 2-3 ft | NA | NA | 2.03 | 67.1 | <3.04 | NA | <1.22 | NA | 0.388 J | 25.8 | 26.2 | 20.8 | 24.0 | NA | NA | NA | 1,480 | 0.0237 J | NA | 7.81 | NA | <3.04 | NA | NA | 38.1 | NA | NA | NA |
| Excavation H-5 | 05/11/20 | Soil | 1-2 ft | NA | NA | 1.10 J | 74.5 | <3.04 | NA | <1.22 | NA | 0.497 J | 21.1 | 21.6 | 8.25 | 16.9 | NA | NA | NA | 558 | <0.0486 | NA | 6.77 | NA | <3.04 | NA | NA | 32.2 | NA | NA | NA |
| Excavation H-6 | 05/11/20 | Soil | 1-2 ft | NA | NA | 1.02 J | 96.0 | <2.97 | NA | <1.19 | NA | <1.19 | 14.9 | 14.9 | 7.57 | 10.7 | NA | NA | NA | 557 | 0.0222 J | NA | 4.03 | NA | <2.97 | NA | NA | 20.5 | NA | NA | NA |
| Excavation H-7 | 11/09/20 | Soil | 0-1 ft | NA | NA | 1.10 J | 73.7 | 0.767 J | NA | <1.22 | NA | <1.22 | 8.04 | 8.04 | 3.68 | 15.0 | NA | NA | NA | 233 | 0.022 | NA | 4.63 | NA | 0.479 J | NA | NA | 9.6 | NA | NA | NA |
| Excavation I-1 | 04/08/20 | Soil | 1-2 ft | NA | NA | 2.91 | 67.2 | <2.77 | NA | <1.11 | NA | 0.457 J | 26.2 | 26.7 | 13.0 | 18.3 | NA | NA | NA | 594 | 0.042 | NA | 8.25 | NA | <2.77 | NA | NA | 26.3 | NA | NA | NA |
| Excavation I-2 | 04/08/20 | Soil | 1-2 ft | NA | NA | 3.65 | 74.1 | <2.85 | NA | <1.14 | NA | 0.313 J | 23.3 | 23.6 | 12.0 | 21.4 | NA | NA | NA | 544 | 0.022 | NA | 8.70 | NA | <2.85 | NA | NA | 17.2 | NA | NA | NA |
| Excavation I-3 | 04/08/20 | Soil | 1-2 ft | NA | NA | 2.18 | 61.5 | <2.88 | NA | <1.15 | NA | 0.387 J | 13.1 | 13.5 | 9.23 | 19.5 | NA | NA | NA | 419 | 0.019 | NA | 6.02 | NA | <2.88 | NA | NA | 13.3 | NA | NA | NA |

**Table A-1 (page 2 of 2)**
**Summary of Post-IRM Soil Analytical Data**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Sample ID | Sample Date | Material Sampled (Soil or CCP) | Sample Depth (ft or in bgs) | aluminum | antimony | arsenic | barium | beryllium | boron | cadmium | calcium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | iron | lead | magnesium | manganese | mercury | molybdenum | nickel | potassium | selenium | silver | sodium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV(1)** | | | | NA | ND | 3.015 | 87.86 | 0.929 | NA | 0.313 | NA | 5.725 | 70.2 | 70.2 | 36.31 | 77.3 | NA | 59.11 | NA | 1,149 | 0.256 | NA | 19.49 | NA | 2.503 | NA | NA | 43.19 | 0.981* | 227 | 230 |
| **PSRG - Protection of Groundwater(2)** | | | | 110,000 | 0.90 | 5.8 | 580 | 63 | 45 | 3.0 | NS | 3.8 | 360,000 | NS | 0.90 | 700 | 150 | 270 | NS | 65 | 1.0 | 7.1 | 130 | NS | 2.1 | 3.4 | NS | 1,500 | 0.28 | 350 | 1,200 |
| **PSRG - Residential Health-based(2)** | | | | 16,000 | 6.3 | 0.68 | 3,100 | 31 | 3,100 | 14 | NS | 0.31 | 23,000 | NS | 4.7 | 630 | 11,000 | 400 | NS | 380 | 2.3 | 78 | 310 | NS | 78 | 78 | NS | 9,400 | 0.16 | 78 | 4,700 |
| **PSRG - Industrial/Commercial Health-based(2)** | | | | 230,000 | 93 | 3.0 | 47,000 | 470 | 47,000 | 200 | NS | 6.5 | 350,000 | NS | 70 | 9,300 | 160,000 | 800 | NS | 5,600 | 9.7 | 1,200 | 4,700 | NS | 1,200 | 1,200 | NS | 140,000 | 2.3 | 1,200 | 70,000 |
| **Background Samples** | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **MW-5 (background)** | 11/02/16 | Soil | 0-1 ft | NA | <0.30 | 2.1 | 76 | 0.99 | NA | <0.30 | NA | 0.43 J | 17.57 | 18 | 27 | 49 | NA | 4.0 | NA | 710 | <0.023 | NA | 5.0 | NA | <0.59 | NA | NA | 25 | <0.59 | 190 | 47 |
| | 11/02/16 | Soil | 6-7 ft | NA | <0.27 | 1.4 | 61 | 0.60 | NA | <0.27 | NA | 0.81 | 38.19 | 39 | 19 | 18 | NA | 0.55 | NA | 940 | <0.020 | NA | 20 | NA | <0.53 | NA | NA | 29 | **2.3** | 67 | 75 |
| **BG-1 (background)** | 11/03/16 | Soil | 0-1 ft | NA | <0.28 | 1.9 | 36 | 0.39 | NA | <0.28 | NA | 0.87 | 17.13 | 18 | 6.3 | 16 | NA | 25 | NA | 310 | 0.033 | NA | 5.4 | NA | 1.6 | NA | NA | 15 | <0.57 | 34 | 43 |
| | 11/03/16 | Soil | 2-3 ft | NA | <0.29 | 2.3 | 45 | 0.48 | NA | <0.29 | NA | <0.12 | 19 | 19 | 7.3 | 18 | NA | 43 | NA | 440 | 0.280 | NA | 6.2 | NA | 1.6 | NA | NA | 15 | <0.57 | 35 | 49 |
| **BG-2 (background)** | 11/03/16 | Soil | 0-1 ft | NA | <0.28 | 1.9 | 45 | 0.50 | NA | <0.28 | NA | 0.84 | 16.16 | 17 | 7.4 | 18 | NA | 32 | NA | 410 | 0.045 | NA | 4.9 | NA | 1.1 | NA | NA | 14 | <0.56 | 35 | 44 |
| | 11/03/16 | Soil | 2-3 ft | NA | <0.27 | 1.9 | 52 | 0.53 | NA | <0.27 | NA | 0.70 | 23.3 | 24 | 7.5 | 20 | NA | 26 | NA | 450 | 0.038 | NA | 7.9 | NA | 1.7 | NA | NA | 19 | <0.55 | 37 | 45 |
| **BG-3 (background)** | 11/03/16 | Soil | 0-1 ft | NA | <0.30 | 1.7 | 44 | 0.43 | NA | <0.30 | NA | 0.21 J | 23.3 | 16 | 7.5 | 15 | NA | 25 | NA | 410 | 0.024 | NA | 5.1 | NA | 1.4 | NA | NA | 46 | <0.60 | 37 | 40 |
| | 11/03/16 | Soil | 2-3 ft | NA | <0.27 | 2.2 | 56 | 0.54 | NA | <0.27 | NA | 0.88 | 21.12 | 22 | 7.5 | 18 | NA | 29 | NA | 410 | 0.040 | NA | 5.2 | NA | 1.2 | NA | NA | 19 | <0.53 | 40 | 46 |
| **BG-4 (background)** | 11/03/16 | Soil | 0-1 ft | NA | <0.29 | 1.7 | 50 | 0.50 | NA | <0.29 | NA | <0.13 | 19 | 19 | 9.5 | 16 | NA | 22 | NA | 450 BH | 0.026 | NA | 6.0 | NA | <0.59 | NA | NA | 16 A | <0.59 | 53 | 50 |
| | 11/03/16 | Soil | 2-3 ft | NA | <0.33 | 2.0 | 53 | 0.52 | NA | 0.38 | NA | 0.50 J | 22.5 | 23 | 11 | 23 | NA | 21 | NA | 460 BH | 0.054 | NA | 8.5 | NA | <0.65 | NA | NA | 19 | <0.65 | 51 | 230 |
| **BG-6 (background)** | 04/03/19 | Soil | 0-1 ft | NA | NA | 2.05 O1 | 64.4 | 0.625 | NA | 0.177 J | NA | 5.34 | 39.4 | 44.7 | 14.4 | 26.4 | NA | NA | NA | 448 J6 | 0.022 | NA | 12.8 | NA | 0.562 J | NA | NA | 17 | NA | NA | NA |
| | 04/04/19 | Soil | 2-3 ft | NA | NA | 2.29 | 66.3 | 0.507 J | NA | 0.139 J | NA | <1.19 | 22.9 | 22.9 | 14.7 | 32.3 | NA | NA | NA | 467 | 0.032 | NA | 7.78 | NA | 0.828 | NA | NA | 16.8 | NA | NA | NA |
| **BG-7 (background)** | 04/03/19 | Soil | 0-1 ft | NA | NA | 1.97 | 52.7 | 0.410 J | NA | 0.136 J | NA | <1.16 | 70.2 | 70.2 | 18.9 | 36.4 | NA | NA | NA | 813 | 0.025 | NA | 12.8 | NA | 0.543 J | NA | NA | 22.6 | NA | NA | NA |
| | 04/04/19 | Soil | 2-3 ft | NA | NA | 3.08 | 77.9 | 0.430 J | NA | 0.108 J | NA | <1.16 | 27 | 27 | 16.3 | 32.5 | NA | NA | NA | 548 | 0.023 | NA | 6.2 | NA | 0.502 J | NA | NA | 24.3 | NA | NA | NA |
| **BG-8 (background)** | 04/03/19 | Soil | 0-1 ft | NA | NA | 1.8 | 52.4 | 0.370 J | NA | 0.0951 J | NA | <1.14 | 24.5 | 24.5 | 21.8 | 62.8 | NA | NA | NA | 759 | 0.0072 | NA | 9.04 | NA | 0.485 J | NA | NA | 24.4 | NA | NA | NA |
| | 04/04/19 | Soil | 2-3 ft | NA | NA | 1.66 | 47.6 | 0.293 J | NA | 0.0918 J | NA | <1.14 | 21.7 | 21.7 | 23.5 | 60.2 | NA | NA | NA | 732 | <0.0067 | NA | 7.86 | NA | 0.306 J | NA | NA | 25.1 | NA | NA | NA |

**Notes:**
Concentrations reported in milligrams per kilogram (mg/kg).
1) Site-Specific Background Screening Value (BSV) represents 95% upper threshold level (UTL) with 95% coverage calculated using EPA ProUCL 5.1.
*Insufficient data to calculate 95% UTL; therefore, site-specific BSV indicates 2x mean concentration with non-detect concentrations calculated as half the reporting limit.
2) North Carolina Department of Environmental Quality (DEQ) Preliminary Soil Remediation Goals (PSRGs) (June 2021)
3) Duplicate sample taken
**Bold** denotes concentration above or equal to Protection of Groundwater PSRG and site-specific BS\
Shading indicates concentration above or equal to Residential PSRG and site-specific BSV.
Underlining indicates concentration above or equal to Industrial/Commercial PSRG and site-specific BS\
ND = Not Detected; NA = Not Analyzed; NS = Not Specified; NC = Not Calculated
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
O1 = Analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.
BH = Method blank greater than one-half laboratory reporting limit, but sample concentration greater than 10x the method blank.
A = Continuing Calibration Verification standard recovery (82%) is less than the lower control limit (90%). Result has possible low bias.
Excavated sample locations are not shown in table.
**Analytical Methods**
Metals by EPA Method 6010C or 6020B
Hexavalent Chromium by EPA Method 7196 or 7199 (Phase II RI and April 2019 Data Gap Samples)
Mercury by EPA Method 7471B

## Table A-2 (page 1 of 1)
## Summary of Stream Sediment Analytical Data
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job No. TCH-009

| Sediment Sampling Point ID | Sample Date | antimony | arsenic | barium | beryllium | cadmium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | lead | manganese | mercury | nickel | selenium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV(1)** | | ND | 2.74 | 38.4 | 0.48 | ND | 0.79 | 69.5 | 70 | 16.388 | 13.8 | 7.1 | 759 | 0.0078 | 9.92 | 0.409 | 16.9 | ND | 37 | 34 |
| **PSRG - Protection of Groundwater(2)** | | 0.90 | 5.8 | 580 | 63 | 3.0 | 3.8 | 360,000 | NS | 0.90 | 700 | 270 | 65 | 1.0 | 130 | 2.1 | 1,500 | 0.28 | 350 | 1,200 |
| **PSRG - Residential(2)** | | 6.3 | 0.68 | 3,100 | 31 | 14 | 0.31 | 23,000 | NS | 4.7 | 630 | 400 | 380 | 2.3 | 310 | 78 | 9,400 | 0.16 | 78 | 4,700 |
| **PSRG - Industrial/Commercial(2)** | | 93 | 3.0 | 47,000 | 470 | 200 | 6.5 | 350,000 | NS | 70 | 9,300 | 800 | 5,600 | 9.7 | 4,700 | 1,200 | 140,000 | 2.3 | 1,200 | 70,000 |
| **SED-1 (Upstream)** | 10/27/16 | <0.32 | 1.2 | 12 | <0.32 | <0.32 | 0.24 J | 22.76 | 23 | 3.9 | 4.2 | 4.0 | 180 | <0.026 | 3.8 | <0.64 | 6.9 | <0.64 | 19 | 19 |
| | 04/05/19 | NA | 1.95 O1 | 38.4 J6 | 0.249 J | <0.636 | 0.428 J | 65.0 | 65.4 J3, J6 | 7.63 | 8.42 | NA | 449 J6 | 0.0078 | 7.1 | 0.409 J | 8.4 | NA | NA | NA |
| **SED-2 (Upstream)** | 10/27/16 | <0.33 | 2.1 | 20 | 0.48 | <0.33 | <0.40 | 36 | 36 | 7.8 | 8.0 | 7.1 | 330 | <0.025 | 7.2 | <0.65 | 11 | <0.65 | 37 | 34 |
| | 10/27/16(3) | <0.32 | 2.5 | 17 | 0.45 | <0.32 | <0.40 | 49 | 49 | 6.5 | 9.1 | 6.7 | 290 | <0.026 | 6.0 | <0.63 | 12 | <0.63 | 35 | 31 |
| | 04/05/19 | NA | 2.74 | 29.6 | 0.305 J | <0.619 | 0.796 J | 56.3 | 57.1 | **20.9** | 13.8 | NA | **811** | 0.0053 J | 9.16 | 0.306 J | 16.9 | NA | NA | NA |
| | 04/05/19(3) | NA | 2.02 | 17.4 | 0.222 J | <0.617 | 0.546 J | 69.5 | 70 | 7.29 | 6.79 | NA | 347 | 0.0051 | 9.92 | 0.237 J | 8.8 | NA | NA | NA |
| **SED-3 (Adjacent)** | 10/27/16 | <0.32 | 1.6 | 21 | 0.37 | <0.32 | <0.39 | 30 | 30 | 6.2 | 7.4 | 6.9 | 220 | <0.026 | 6.8 | <0.64 | 12 | <0.64 | 29 | 35 |
| | 04/05/19 | NA | 1.36 | 16.4 | 0.111 J | <0.607 | 0.670 J | 13.5 | 14.2 | 5.18 | 20.2 | NA | 225 | 0.0054 J | 4.81 | <0.607 | 9.2 | NA | NA | NA |
| **SED-4 (Adjacent)** | 10/27/16 | <0.33 | 1.2 | 8.4 | <0.33 | <0.33 | <0.38 | 34 | 34 | 3.5 | 5.2 | 3.5 | 130 | <0.027 | 5.0 | <0.65 | 6.4 | <0.65 | 16 | 20 |
| | 04/05/19 | NA | 2.35 | 20.3 | 0.191 J | <0.586 | 0.456 J | 63.8 | 64.3 | 7.26 | 8.39 | NA | 293 | 0.0080 | 10.5 | 0.344 J | 30.7 | NA | NA | NA |
| **SED-5 (Downstream)** | 10/27/16 | <0.31 | 1.4 | 44 | 0.41 | <0.31 | <0.37 | 51 | 51 | 9.5 | 8.6 | 22 | **860** | <0.025 | 5.3 | <0.62 | 13 | <0.62 | 35 | 32 |
| | 04/04/19 | NA | 1.82 | 24.3 | 0.233 J | <0.617 | 0.595 J | 16.8 | 17.4 | 5.9 | 8.86 | NA | 399 | <0.0035 | 4.86 | <0.617 | 6.2 | NA | NA | NA |
| **SED-6 (Downstream)** | 04/04/19 | NA | 1.96 | 17.3 | 0.247 J | <0.643 | 0.517 J | 24.9 | 25.4 | 6.57 | 9.25 | NA | 308 | 0.0058 | 7.15 | <0.643 | 8.4 | NA | NA | NA |
| **SED-7 (Downstream)** | 04/04/19 | NA | 1.35 | 16.4 | 0.179 J | <0.635 | 0.995 J | 59.4 | 60.4 | 6.47 | 6.77 | NA | 262 | 0.0025 J | 9.04 | <0.635 | 8.1 | NA | NA | NA |

**Notes**
Concentrations reported in milligrams per kilogram (mg/kg).
1) Site-Specific Background Screening Value (BSV) indicates two times the mean detected background concentration or maximum detected background concentration, whichever is smaller.
2) North Carolina Department of Environmental Quality (DEQ) Preliminary Soil Remediation Goals (PSRGs) (July 2021)
3) Duplicate sample taken.
**Bold** denotes concentration above or equal to Protection of Groundwater PSRG and site-specific BSVs.
Shading indicates concentration above or equal to Residential PSRG and site-specific BSVs.
Underlining indicates concentration above or equal to Industrial/Commercial PSRG and site-specific BSVs.
ND - Not Detected; NA - Not Analyzed; NS - Not Specified
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
O1 = Analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
J3 = The associated batch QC was outside the established quality control range for precision.
J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.
**Analytical Methods:**
Metals by EPA Method 6010C, 6020A, or 6020B
Mercury by EPA Method 7470A
Hexavalent Chromium by EPA Method 7199A

**Table A-3 (page 1 of 1)**
**Summary of Surface Water Analytical Data**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Surface Water Sampling Point ID | Sample Date | aluminum | antimony | arsenic | barium | beryllium | cadmium[3] | calcium | hexavalent chromium | trivalent chromium[3] | total chromium | cobalt | copper[3] | iron | lead[3] | magnesium | manganese | mercury | nickel[3] | potassium | selenium | strontium | silver[3] | sodium | thallium | vanadium | zinc[3] | Hardness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV** | | NA | ND | 0.44 | 27 | ND | ND | NA | ND | ND | 0.53 | 0.16 | 1.2 | ND | ND | NA | 22.2 | ND | 0.33 | NA | 0.11 | 100 | ND | NA | ND | ND | ND | 54,000 |
| **NC 2B Standard[2]** | | NS | NS | 10(t) | 1,000(t) | 6.5 | 0.27 | NS | 11 | 45.08 | NS | NS | 5.33 | NS | 1.29 | NS | NS | 0.012(t) | 25(t) | NS | 5(t) | NS | 0.06 | NS | NS | NS | 70.07 | NS |
| **BC-1 (Upstream)** | 2/5/2014 | NA | NA | ND | 24 | NA | ND | NA | ND | ND | ND | NA | NA | NA | ND | NA | NA | ND | NA | NA | ND | NA | ND | NA | NA | NA | NA | NA |
| **SW-1 (Upstream)** | 11/3/2016 | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 | <5.0 | NA | <10 | <0.2 | <10 | NA | <20 | 100 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/5/2019 | NA | NA | 0.44 | 23.1 | <0.10 | <0.080 | NA | NA | NA | 0.53 | 0.16 | 1.2 | NA | NA | NA | 22.2 | <0.20 | 0.29 J | NA | 0.096 J | 85.3 | NA | NA | NA | NA | NA | 54,000 |
| **SW-2 (Upstream)** | 11/3/2016 | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 | <5.0 | NA | 11 | <0.2 | <10 | NA | <20 | 100 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/5/2019 | NA | NA | 0.42 | 23.2 | <0.10 | <0.080 | NA | NA | NA | 0.45 J | 0.16 | 1.1 | NA | NA | NA | 21.2 | <0.20 | 0.33 J | NA | 0.11 J | 85.5 | NA | NA | NA | NA | NA | 53,600 |
| **BC-2 (Bolin Creek at Site)** | 6/20/2013 | 290 | ND | 0.90 | 27 | ND | ND | 16,000 | NA | ND | ND | 0.37 | 2.6 | 860 | 0.50 | 5,300 | 100 | ND | 1.2 | 2,300 | ND | NA | ND | 7,800 | ND | ND | 45 | NA |
| | 2/5/2014 | NA | NA | ND | 24 | NA | ND | NA | ND | ND | ND | NA | NA | NA | ND | NA | NA | ND | NA | NA | ND | NA | ND | NA | NA | NA | NA | NA |
| **SW-3 (Adjacent)** | 11/3/2016 | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 | <5.0 | NA | 34 | <0.2 | <10 | NA | <20 | 100 | NA | NA | <10 | <5.0 | <30 | NA |
| | 11/3/2016[4] | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 | <5.0 | NA | 33 | <0.2 | <10 | NA | <20 | 110 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/5/2019 | NA | NA | 0.45 | 25.7 | <0.10 | <0.080 | NA | NA | NA | 0.62 | 0.26 | 2.8 | NA | NA | NA | 37.4 | <0.20 | 0.50 | NA | 0.11 J | 88.8 | NA | NA | NA | NA | NA | 55,900 |
| **SW-4 (Adjacent)** | 11/3/2016 | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 | <5.0 | NA | 25 | <0.2 | <10 | NA | <20 | 110 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/5/2019 | NA | NA | 0.42 | 23.6 | <0.10 | <0.080 | NA | NA | NA | <0.50 | 0.14 | 1.0 | NA | NA | NA | 24.6 | <0.20 | 0.26 J | NA | 0.10 J | 89.1 | NA | NA | NA | NA | NA | 57,100 |
| | 4/5/2019[4] | NA | NA | 0.41 | 23.7 | <0.10 | <0.080 | NA | NA | NA | <0.50 | 0.14 | 0.98 | NA | NA | NA | 24.8 | <0.20 | 0.26 J | NA | 0.088 J | 87.7 | NA | NA | NA | NA | NA | 54,300 |
| **SW-5 (Downstream)** | 11/3/2016 | NA | <5.0 | <10 | 26 | <2.0 | <1.0 | NA | <0.74U | NA | <5.0 | <5.0 | <10 | <0.2 | <5.0 | NA | 24 | <0.2 | <10 | NA | <20 | 100 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/4/2019 | NA | NA | 0.40 | 16.9 | <0.10 | <0.080 | NA | NA | NA | <0.50 | 0.14 | 0.88 | NA | NA | NA | 19.5 | <0.20 | 0.21 J | NA | 0.12 J | 81.8 | NA | NA | NA | NA | NA | 53,400 |
| **SW-6 (Downstream)** | 4/4/2019 | NA | NA | 0.40 | 16.9 | <0.10 | <0.080 | NA | NA | NA | <0.50 | 0.14 | 0.84 | NA | NA | NA | 18.7 | <0.20 | 0.21 J | NA | 0.11 J | 81.3 | NA | NA | NA | NA | NA | 53,400 |
| **SW-7 (Downstream)** | 4/4/2019 | NA | NA | 0.42 | 18.4 | <0.10 | <0.080 | NA | NA | NA | <0.50 | 0.16 | 1.1 | NA | NA | NA | 23.1 | <0.20 | 0.23 J | NA | 0.10 J | 86.7 | NA | NA | NA | NA | NA | 54,400 |
| **SW-21 (Drainage Pathway)** | 4/5/2019 | NA | NA | 0.40 | 32.1 | <0.10 | <0.080 | NA | NA | NA | 0.73 | 0.36 | 3.2 | NA | NA | NA | 29.5 | <0.20 | 0.62 | NA | 0.11 J | 69.9 | NA | NA | NA | NA | NA | 31,400 |
| | 4/5/2019[5] | NA | NA | 0.15 | 18.3 | <0.10 | <0.080 | NA | NA | NA | <0.50 | 0.094 J | 3.1 | NA | NA | NA | 9.3 | <0.20 | 0.43 J | NA | <0.50 | 43.5 | NA | NA | NA | NA | NA | 22,200 |

**Notes:**
Concentrations reported in micrograms per liter (µg/L).
1) Site-Specific Background Screening Value (BSV) indicates two times the mean detected background concentration or maximum detected background concentration, whichever is smaller.
2) North Carolina Surface Water Quality Standard (NC 2B Standard) adopted per 15A NCAC 2B Section .0100. Unless otherwise noted, values are the lowest of the Freshwater, Water Supply, and Human Health values because Boli Creek is a WS V classification surface water. Value shown is the lower of the acute versus chronic, where applicable.
3) 2B Standards derived using site-specific hardness data for surface water samples SW-1 through SW-7 and the DEQ Hardness-Dependent Metal Calculator dated July 26, 2021. Mean hardness for these samples was 54.5 mg/L.
4) Duplicate sample taken.
5) Sample was field filtered.
**Bold** denotes concentration above NC 2B Standard and site-specific BSV.
ND = Not Detected; NA = Not Analyzed; NS = Not Specified
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration
(t) = Based upon measurement of total recoverable metal. See 15A NCAC 02B .0211 for more information.
**Analytical Methods:**
Metals by 6010C, 6020A, or 6020B
Mercury by 7470A
Hexavalent chromium by 7199A
Total hardness by Standard Method 2340B

**Table A-4 (page 1 of 1)**
**Summary of Well Construction and Groundwater Elevation Data**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

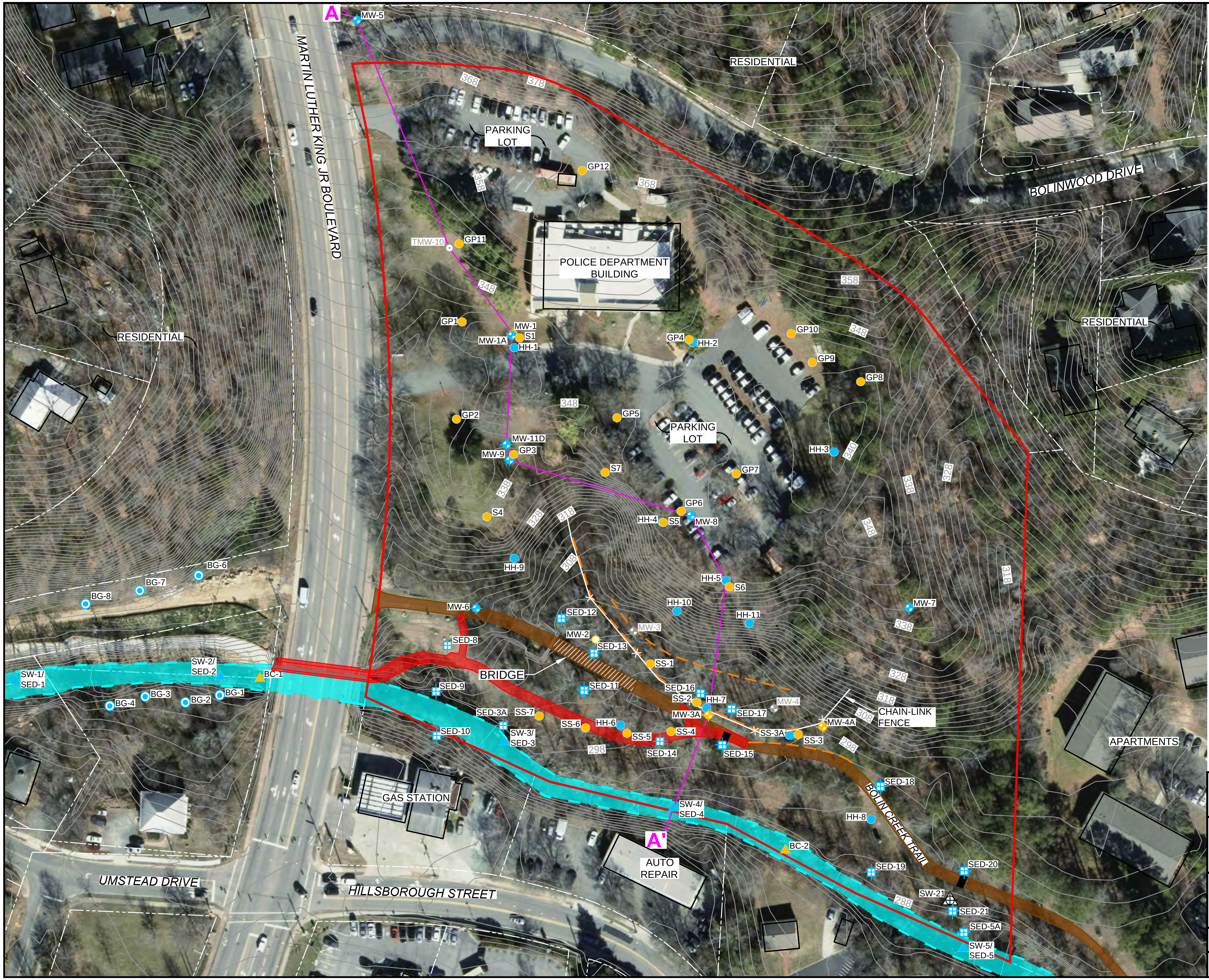
| Well ID | Permanent or Temporary | Date Installed | Date Abandoned | Drilling Method | Well Material | Screen Slot Size (in) | Total Depth (ft bls) | Screened Interval | TOC Elevation (ft) | November 9, 2016 | | April 3, 2019 | | Sepember 26, 2019 | | February 12, 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Depth to Water (ft bls) | Groundwater Elevation (ft) | Depth to Water (ft bls) | Groundwater Elevation (ft) | Depth to Water (ft bls) | Groundwater Elevation (ft) | Depth to Water (ft bls) | Groundwater Elevation (ft) |
| MW-1 | Permanent | 4/29/2013 | N/A | DPT | 2" PVC | 0.01 | 40 | 30-40 | 346.12 | 35.48 | 310.64 | 30.90 | 315.22 | 35.67 | 310.45 | 35.22 | 310.90 |
| MW-1A | Permanent | 9/24/2019 | N/A | Sonic | 2" PVC | 0.01 | 40 | 25-40 | 345.96 | -- | -- | -- | -- | 31.43 | 314.53 | 30.27 | 315.69 |
| MW-2 | Temporary | 6/20/2013 | 6/20/2013 | HA | Unknown | Unknown | 8 | Unknown | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-3 | Permanent | 1/27/2014 | 1/7/2015 | Auger | 2" PVC | 0.01 | 11 | 6-11 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-4 | Permanent | 1/27/2014 | 1/6/2015 | Auger | 2" PVC | 0.01 | 9.2 | 4.2-9.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| MW-3A | Permanent | 5/12/2015 | N/A | Air Rotary | 2" PVC | 0.01 | 16 | 1-16 | 298.10 | 5.91 | 292.19 | 2.79 | 295.31 | 7.14 | 290.96 | 1.34 | 296.76 |
| MW-4A | Permanent | 5/14/2015 | N/A | Air Rotary | 2" PVC | 0.01 | 19 | 4-19 | 298.00 | 6.72 | 291.28 | 3.20 | 294.80 | 7.83 | 290.17 | 2.22 | 295.78 |
| MW-5 | Permanent | 11/2/2016 | N/A | Air Rotary | 2" PVC | 0.01 | 27.5 | 17.5 - 27.5 | 369.33 | 9.27 | 360.06 | 7.03 | 362.30 | 10.24 | 359.09 | 9.67 | 359.66 |
| MW-6 | Permanent | 11/2/2016 | N/A | HSA | 2" PVC | 0.01 | 17.5 | 7.5 - 17.5 | 315.39 | 9.92 | 305.47 | 7.42 | 307.97 | 10.54 | 304.85 | 6.87 | 308.52 |
| MW-7 | Permanent | 11/2/2016 | N/A | Air Rotary | 2" PVC | 0.01 | 69.5 | 59.5 - 69.5 | 339.54 | 46.97 | 292.57 | 43.58 | 295.96 | 47.05 | 292.49 | 45.09 | 294.45 |
| MW-8 | Permanent | 9/24/2019 | N/A | Sonic | 2" PVC | 0.01 | 44.5 | 29.5-44.5 | 343.89 | -- | -- | -- | -- | 40.16 | 303.73 | 38.21 | 305.68 |
| MW-9 | Permanent | 9/24/2019 | N/A | Sonic | 2" PVC | 0.01 | 45.0 | 30-45 | 339.04 | -- | -- | -- | -- | 26.92 | 312.12 | 25.47 | 313.57 |
| TMW-10 | Temporary | 9/24/2019 | 9/24/2019 | Sonic | 2" PVC | 0.01 | 40.0 | 25-40 | 349.35 | -- | -- | -- | -- | 27.23* | 322.12* | -- | -- |
| MW-11D | Permanent | 2/11/2020 | N/A | HSA / Air Rotary | 2" PVC | 0.01 | 56.0 | 46-56 | 339.29 | -- | -- | -- | -- | -- | -- | 31.85 | 307.44 |

Notes:
MW-1, MW-3A, MW-4A, MW-5, MW-6, and MW-7 were surveyed by CE Group on December 8, 2016.
MW-1A, MW-8, MW-9, and TMW-10 were surveyed by H&H on September 26, 2019.
MW-11D was surveyed by H&H on March 3, 2020.
ft = feet; bls = below land surface; in = inches
DPT = Direct Push Technology; HA = Hand Auger; HSA = Hollow Stem Auger
TOC = Top of Casing; -- = Not Specified; N/A = Not Applicable
* = Depth to water gauged on September 24, 2019.

**Table A-5 (page 1 of 1)**
**Summary of Groundwater Analytical Data**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Monitoring Well ID | Sample Date | turbidity | alkalinity | aluminum | antimony* | arsenic | barium | beryllium | boron | cadmium | calcium | hexavalent chromium | trivalent chromium | Total chromium | cobalt* | copper | iron | lead | magnesium | manganese | mercury | molybdenum | nickel | potassium | selenium | silver | sodium | strontium | thallium* | vanadium* | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2L Standard or IMAC** | | NS | NS | NS | 1 | 10 | 700 | 4 | 700 | 2 | NS | NS | NS | 10 | 1 | 1,000 | 300 | 15 | NS | 50 | 1 | NS | 100 | NS | 20 | 20 | NS | NS | 0.2 | 0.3 | 1,000 |
| **MW-5 (Background)** | 11/9/2016 | 3.8 | NA | NA | <0.5 | <10 | 51 | <2.0 | NA | <1.0 | NA | NA | NA | <5.0 | 0.27 J | <10 | NA | <5.0 | NA | **580** | <0.2 | NA | <10 | NA | **23** | NA | NA | 190 | <2.5 | 0.39 J | <30 |
| | 4/3/2017 | 8.2 | NA | NA | NA | NA | NA | NA | NA | NA | NA | <4.8 | NA | <10.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| **MW-1** | 5/3/2013 | NA | NA | 5,600 | **5.4** | **85** | **1,100** | 1.6 | NA | 0.17 | 110,000 | NA | NA | **15** | **15** | 25 | **6,500** | 5.8 | 25,000 | **7,600** | ND | NA | 12 | 7,600 | 2.5 | ND | 34,000 | NA | **1.0** | **38** | 52 |
| | 2/18/2016 | NS | NA | NA | ND | **67** | **1,300** | **11.0** | ND | ND | NA | NA | NA | **100** | **78** | 170 | NA | **36** | NA | **9,600** | 0.26 | ND | 58 | NA | ND | ND | NA | 2,900 | ND | **260** | 330 |
| | 2/18/2016[4] | NS | NA | NA | ND | **52** | **1,100** | **8.8** | ND | ND | NA | NA | NA | **86** | **61** | 130 | NA | **29** | NA | **9,000** | 0.21 | ND | 46 | NA | ND | ND | NA | 2,700 | ND | **200** | 260 |
| | 11/10/2016 | 475.0 | NA | NA | <0.5 | **19** | 470 | **4.1** | NA | 0.15 J | NA | NA | NA | **31** | **32** | 57 | NA | 10 | NA | **8,600** | <0.2 | NA | 21 | NA | **23** | NA | NA | 2,200 | <2.5 | **92** | 99 |
| | 11/10/2016[4] | NA | NA | NA | <0.5 | <10 | 160 | 0.53 J | NA | <1.0 | NA | NA | NA | <5.0 | **6.0** | <10 | NA | <5.0 | NA | **8,000** | <0.2 | NA | 2.3 J | NA | <20 | NA | NA | 2,100 | <2.5 | **1.2 J** | <30 |
| | 4/3/2019 | 7.76 | NA | NA | NA | **22.9** | **1,730** | <0.10 | NA | <0.080 | NA | NA | NA | <0.50 | **1.8** | 0.33 J | NA | NA | NA | **3,090** | <0.20 | NA | 0.60 | NA | <0.50 | NA | NA | 4,710 | NA | NA | NA |
| **MW-1A** | 9/26/2019 | 6.63 | NA | NA | NA | **10** | **1,040** | <0.50 | NA | <0.40 | NA | NA | NA | <2.5 | **1.2** | <2.5 | NA | NA | NA | **2,420** | <0.20 | NA | 0.82 J | NA | <2.5 | NA | NA | 6,360 | NA | NA | NA |
| **MW-2** | 6/20/2013[1] | NA | NA | 16,000 | 0.61 | 8.3 | **1,100** | **5.5** | NA | 0.93 | 260,000 | NA | NA | 8.4 | **23** | **1,200** | **13,000** | **27** | 47,000 | **1,200** | 0.18 | NA | 70 | 42,000 | 18 | 0.27 | 52,000 | NA | **0.48** | **71** | **2,200** |
| **MW-3** | 2/5/2014 | NA | NA | NA | NA | ND | 160 | NA | NA | ND | NA | ND | NA | ND | NA | NA | NA | ND | NA | NA | NA | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| | 2/5/2014[2] | NA | NA | NA | NA | ND | 250 | NA | NA | ND | NA | ND | NA | **24** | NA | NA | NA | ND | NA | NA | NA | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| | 8/15/2014[3] | 1,500 | NA | NA | NA | **51** | **830** | NA | NA | ND | NA | 30 | NA | **78** | NA | NA | NA | **30** | NA | NA | ND | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| | 8/20/2014[4] | 13.0 | NA | NA | NA | ND | 220 | NA | NA | ND | NA | 23 | NA | ND | NA | NA | NA | ND | NA | NA | NA | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| **MW-3A** | 7/21/2015 | 5.7 | NA | NA | NA | ND | 67 | NA | 520 | ND | NA | ND | NA | ND | NA | NA | NA | ND | NA | NA | ND | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| | 2/17/2016 | 1.3 | NA | NA | ND | ND | 89 | ND | ND | ND | NA | NA | NA | ND | ND | ND | NA | ND | NA | ND | ND | ND | ND | NA | **23** | ND | NA | 2,400 | ND | ND | ND |
| | 2/17/2016[2] | 1.3 | NA | NA | ND | ND | 80 | ND | ND | ND | NA | NA | NA | ND | ND | ND | NA | ND | NA | 23 | ND | ND | ND | NA | **26** | ND | NA | 2,100 | ND | ND | ND |
| | 11/9/2016 | 1.2 | NA | NA | <0.5 | <10 | 53 | <2.0 | NA | <1.0 | NA | NA | NA | <5.0 | <0.11 | <10 | NA | <5.0 | NA | 14 | <0.2 | NA | <10 | NA | **50** | NA | NA | 2,400 | **5.4 J** | **0.94 J** | 12 J |
| | 11/9/2016[2] | 1.2 | NA | NA | <0.5 | <10 | 53 | <2.0 | NA | <1.0 | NA | NA | NA | <5.0 | <0.11 | <10 | NA | <5.0 | NA | 15 | <0.2 | NA | <10 | NA | **52** | NA | NA | 2,400 | **5.3 J** | **0.95 J** | <30 |
| | 4/4/2019 | 0.00 | NA | NA | NA | 0.15 | 68.2 | <0.10 | NA | <0.080 | NA | NA | NA | <0.50 | 0.21 | 0.55 | NA | NA | NA | 5.8 | <0.20 | NA | 0.50 J | NA | **34.2** | NA | NA | 2,950 | NA | NA | NA |
| **MW-4** | 2/5/2014 | NA | NA | NA | NA | **140** | **6,500** | NA | NA | 1.7 | NA | ND | NA | **930** | NA | NA | NA | **250** | NA | NA | **1.4** | NA | NA | NA | **99** | ND | NA | NA | NA | NA | NA |
| | 8/20/2014[4,5] | <10 | NA | NA | NA | ND | 75 | NA | NA | ND | NA | ND | NA | ND | NA | NA | NA | ND | NA | NA | NA | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| **MW-4A** | 7/21/2015 | 24.7 | NA | NA | NA | ND | 64 | NA | ND | ND | NA | ND | NA | ND | NA | NA | NA | ND | NA | NA | ND | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| | 7/21/2015[4] | 24.7 | NA | NA | NA | ND | 61 | NA | ND | ND | NA | ND | NA | ND | NA | NA | NA | ND | NA | NA | ND | NA | NA | NA | ND | ND | NA | NA | NA | NA | NA |
| | 2/18/2016 | 189.0 | NA | NA | ND | ND | 26 | ND | ND | ND | NA | NA | NA | ND | ND | ND | NA | 7.8 | NA | 49 | ND | ND | ND | NA | ND | ND | NA | 110 | ND | ND | 34 |
| | 2/18/2016[4] | 189.0 | NA | NA | ND | ND | 33 | ND | ND | ND | NA | NA | NA | ND | ND | ND | NA | 8.4 | NA | 41 | ND | ND | ND | NA | ND | ND | NA | 78 | ND | ND | 48 |
| | 11/9/2016 | 4.8 | NA | NA | <0.5 | <10 | 36 | <2.0 | NA | <1.0 | NA | NA | NA | 1.2 J | <0.11 | <10 | NA | <5.0 | NA | 140 | <0.2 | NA | <10 | NA | 7.2 J | NA | NA | 170 | <2.5 | <0.15 | 17 J |
| | 4/4/2019 | 9.43 | NA | NA | NA | <0.10 | 22.5 | 0.070 J | NA | <0.080 | NA | NA | NA | <0.50 | 0.063 J | 0.63 | NA | NA | NA | 6.0 | <0.20 | NA | 1.5 | NA | 0.82 | NA | NA | 73 | NA | NA | NA |
| **MW-6** | 11/9/2016 | 2.5 | NA | NA | <0.5 | <10 | 340 | <2.0 | NA | <1.0 | NA | NA | NA | **29** | <0.11 | 1.9 J | NA | <5.0 | NA | **2,500** | <0.2 | NA | 22 | NA | 20 | NA | NA | 690 | <2.5 | **1.2 J** | <30 |
| | 4/3/2017 | 7.6 | NA | NA | NA | NA | NA | NA | NA | NA | NA | <4.8 | NA | <10.0 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| | 4/4/2019 | 4.48 | NA | NA | NA | 0.14 | 283 | <0.10 | NA | <0.080 | NA | NA | NA | <0.50 | 0.33 | <0.50 | NA | NA | NA | **2,210** | <0.20 | NA | 0.20 J | NA | 0.12 J | NA | NA | 752 | NA | NA | NA |
| | 4/4/2019[2] | 4.48 | NA | NA | NA | 0.14 | 279 | <0.10 | NA | <0.080 | NA | NA | NA | <0.50 | 0.32 | 0.50 J | NA | NA | NA | **2,160** | <0.20 | NA | 0.19 J | NA | 0.11 J | NA | NA | 736 | NA | NA | NA |
| **MW-7** | 11/14/2016 | 8.9 | NA | NA | <0.5 | <10 | 10 | <2.0 | NA | <1.0 | NA | NA | NA | 1.3 J | 0.17 J | 1.6 J | NA | <5.0 | NA | 140 | <0.2 | NA | 1.6 J | NA | <20 | NA | NA | 42 | <2.5 | **1.1 J** | 26 J |
| | 4/3/2019 | 8.95 | NA | NA | NA | 0.13 | 4.5 | <0.10 | NA | <0.080 | NA | NA | NA | <0.50 | <0.050 | 0.72 | NA | NA | NA | 20.5 | <0.20 | NA | 0.43 J | NA | 0.10 J | NA | NA | 44.9 | NA | NA | NA |
| **MW-8** | 9/26/2019 | 7.95 | NA | NA | NA | 6.1 | 219 | <0.10 | NA | <0.080 | NA | NA | NA | 0.51 | **4.0** | 0.98 | NA | NA | NA | **4,880** | <0.20 | NA | 4.1 | NA | <0.50 | NA | NA | 750 | NA | NA | NA |
| **MW-9** | 9/26/2019 | 1.74 | NA | NA | NA | 0.75 | 394 | <0.20 | NA | <0.16 | NA | NA | NA | <1.0 | **1.5** | 2.1 | NA | NA | NA | **5,060** | <0.20 | NA | 0.41 J | NA | <1.0 | NA | NA | 2,160 | NA | NA | NA |
| | 2/12/2020 | 1.10 | 377,000 | NA | NA | 0.78J | 369 | <0.10 | NA | <0.10 | 118,000 | NA | NA | <1.0 | **2.3** | 1.0 | NA | NA | 26,100 | **5,430** | <0.20 | NA | <1.0 | 12,400 | <1.0 | NA | 24,900 | 2,380 | NA | NA | NA |
| | 2/12/2020[2] | 1.10 | 377,000 | NA | NA | 0.74J | 338 | <0.10 | NA | <0.10 | 113,000 | NA | NA | <1.0 | **2.5** | 1.1 | NA | NA | 25,600 | **5,170** | <0.20 | NA | <1.0 | 12,100 | <1.0 | NA | 24,100 | 2,310 | NA | NA | NA |
| **MW-11D** | 2/13/2020 | 8.59 | 413,000 | NA | NA | 1.5 | 24.1 | <0.10 | NA | <0.10 | 45,100 | NA | NA | 1.7 | <1.0 | 2.2 | NA | NA | 30,300 | 14.7 | <0.20 | NA | 5.5 | 145,000 | 0.74J | NA | 65,400 | 604 | NA | NA | NA |

**Notes:**
Concentrations reported in micrograms per liter (µg/L), except turbidity which is reported in Nephelometric Turbidity Units (NTUs).
2L Standard = North Carolina Department of Environmental Quality (DEQ) 15A NCAC 02L.0202 Groundwater Standards (April 2013).
IMAC = Interim Maximum Allowable Concentration
**Bold** denotes concentration above or equal to the 2L Standard or IMAC and background levels
ND = Not Detected; NA = Not Analyzed; NS = Not Specified
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
*Reported to the method detection limit instead of laboratory reporting limit.
1) Denotes sample labeled as "Well #1" in the lab report associated with the Limited Phase II ESA prepared by Falcon.
2) Denotes duplicate sample taken.
3) Denotes sample labeled as "Well 1" in the lab report associated with the October 3, 2014 letter prepared by Falcon.
4) Denotes filtered sample.
5) An unfiltered sample was also collected from MW-4 on August 20, 2014 and the results were reported in mg/kg-wet, presumably because of the high sediment load. These data are not included in this table.
**Analytical Methods:**
Metals by EPA Method 6010C, 6020A, or 6020B
Hexavalent Chromium by EPA Method 7196A / SM3500
Mercury by 7470A/245.1




LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- TEMPORARY MONITORING WELL LOCATION (FALCON ENGINEERING)
- SOIL BORING LOCATION (FALCON ENGINEERING)
- SURFACE WATER SAMPLE LOCATION (FALCON ENGINEERING)
- ABANDONED MONITORING WELL LOCATION
- ABANDONED TEMPORARY MONITORING WELL LOCATION (H&H)
- MONITORING WELL LOCATION (H&H)
- SOIL BORING LOCATION (H&H)
- BACKGROUND SOIL BORING LOCATION (H&H)
- SURFACE WATER SAMPLE LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- EXISTING SILT FENCE
- A CROSS-SECTION TRANSECT LINE

NOTE:

EXISTING MONITORING WELLS & OCTOBER/ NOVEMBER 2016 SAMPLING LOCATIONS SURVEYED BY CE GROUP ON DECEMBER 8, 9, & 20, 2016.

N

APPROXIMATE SCALE IN FEET: 0 100 200

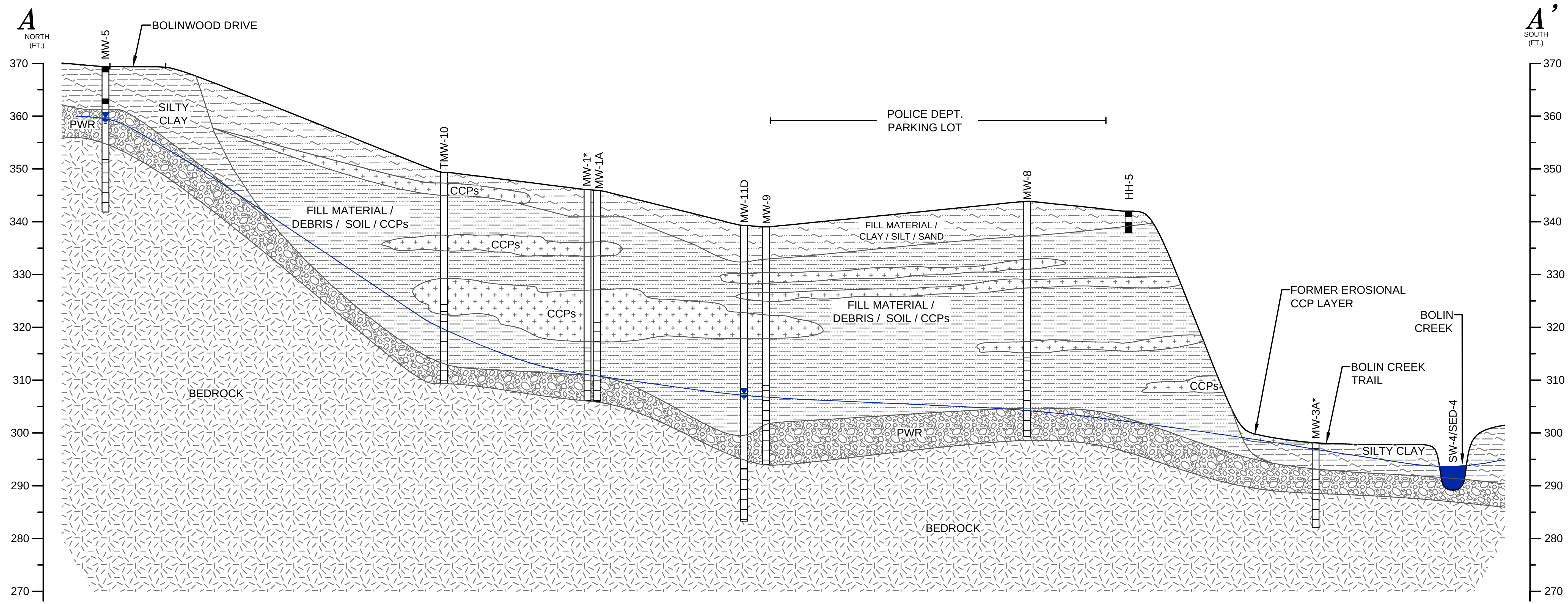
TITLE: CROSS-SECTION TRANSECT LOCATION MAP

PROJECT: TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 4-22-20 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 3 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-002 - Police Station\Ph II RI Work\Figures\Figures_3.26.20.dwg, FIG 3, 4/22/2020 3:00:11 PM, SVincent




LEGEND

HH-5 — SOIL BORING DEPICTING SAMPLE INTERVAL

MW-5 — MONITORING WELL DEPICTING SCREEN INTERVAL

320 — UNCONFINED AQUIFER (FEBRUARY 2020)

SILTY CLAY

FILL MATERIAL / CLAY / SILT / SAND

COAL COMBUSTION PRODUCTS (CCPs) - THICKER LAYERS

FILL MATERIAL, DEBRIS AND SOIL WITH INTERLAYERED AND INTERMIXED CCPs

PARTIALLY WEATHERED ROCK (PWR)

BEDROCK

NOTES:

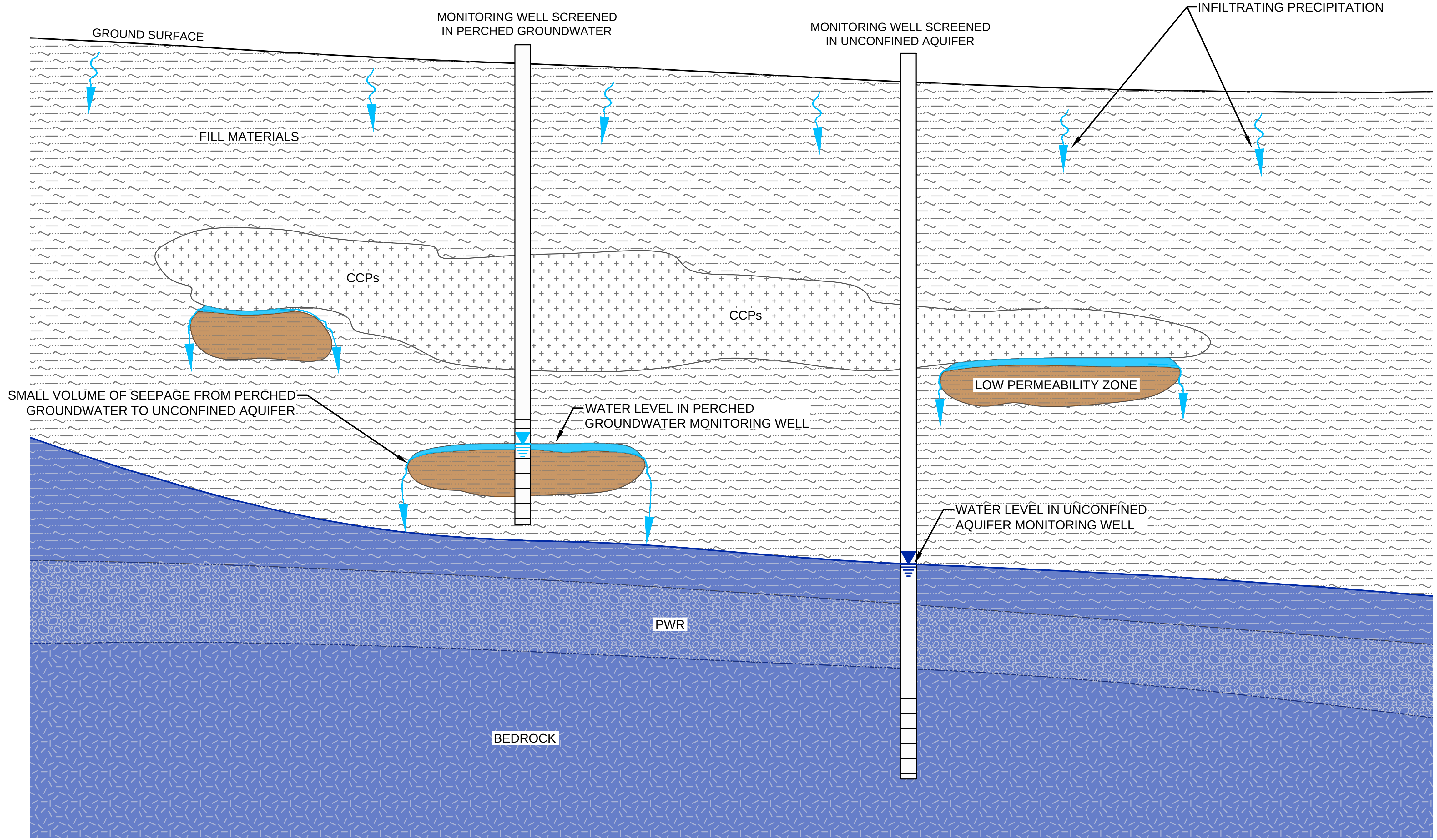
1. REFER TO FIGURE 3 OF THIS REPORT FOR CROSS-SECTION TRANSECT.
2. * INDICATES MONITORING WELL INSTALLED BY FALCON ENGINEERING, INC.
3. WITH THE EXCEPTION OF TMW-10 (GROUNDWATER ELEVATION MEASURED AND WELL ABANDONED ON SEPTEMBER 24, 2019), GROUNDWATER ELEVATIONS MEASURED ON FEBRUARY 12, 2020.
4. GROUNDWATER ELEVATIONS IN FILL (MW-1A, MW-9, AND TMW-10) APPEAR INDICATIVE OF PERCHED GROUNDWATER.
5. SOME CCP LAYERS CONCEPTUALLY INFERRED FOR ILLUSTRATION PURPOSES.

20
0
APPROXIMATE
80
SCALE IN FEET

VERTICAL EXAGGERATION = 4X

| TITLE | |
|---|---|
| CROSS-SECTION A-A' | |
| PROJECT: TOWN OF CHAPEL HILL<br>828 MARTIN LUTHER KING JR. BOULEVARD<br>CHAPEL HILL, NORTH CAROLINA | |
| hart hickman<br>SMARTER ENVIRONMENTAL SOLUTIONS | 2923 South Tryon Street-Suite 100<br>Charlotte, North Carolina 28203<br>704-586-0007(p) 704-586-0373(f)<br>License # C-1269 / #C-245 Geology |
| DATE: 6-2-20 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 4 |

S:\AAA-Master Projects\Town of Chapel Hill (TCH)\TCH-002 - Police Station\Ph II RI Work\Figures\Cross-Section_3.26.20.dwg, A-A', 6/2/2020 4:38:36 PM, SVincent




NOT TO SCALE

LEGEND

MONITORING WELL DEPICTING SCREEN INTERVAL

UNCONFINED AQUIFER WATER LEVEL

PERCHED GROUNDWATER LEVEL

FILL MATERIALS

COAL COMBUSTION PRODUCTS (CCPs)

LOW PERMEABILITY ZONES (EX: CLAY)

PERCHED GROUNDWATER

PARTIALLY WEATHERED ROCK (PWR)

BEDROCK

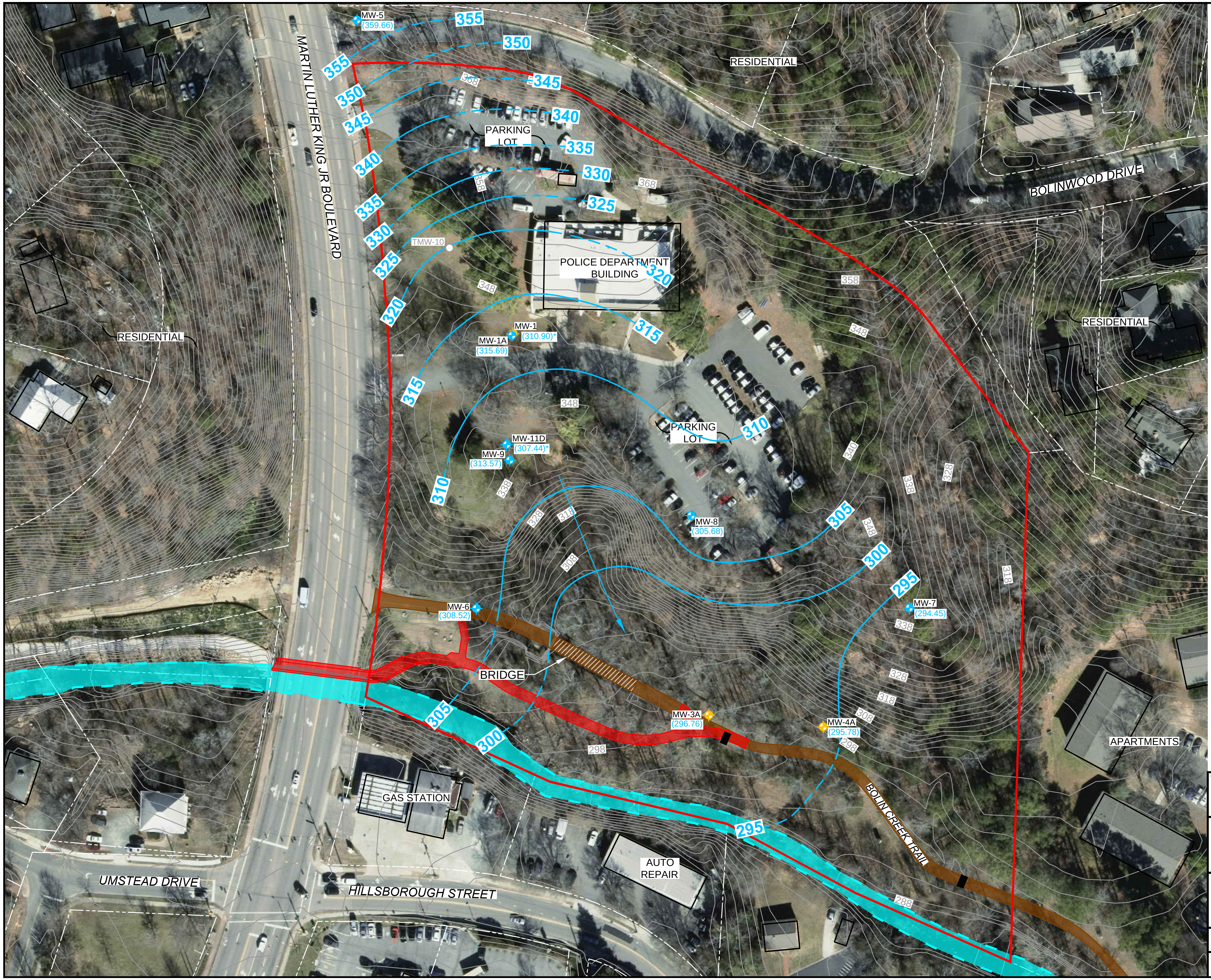
UNCONFINED AQUIFER

TITLE
CONCEPTUAL DIAGRAM OF RELATIONSHIP
BETWEEN PERCHED GROUNDWATER AND
UNCONFINED AQUIFER

PROJECT
TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS
2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 6-3-20 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 5 |




LEGEND

- SITE PROPERTY BOUNDARY
- BOLIN CREEK
- 101 TOPOGRAPHIC CONTOUR ELEVATION (FT MSL)
- MONITORING WELL LOCATION (FALCON ENGINEERING)
- MONITORING WELL LOCATION (H&H)
- ABANDONED TEMPORARY MONITORING WELL LOCATION (H&H)
- STORMWATER CULVERT
- BOLIN CREEK TRAIL
- 295 GROUNDWATER ELEVATION CONTOUR (FT MSL) (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- (315.69) GROUNDWATER ELEVATION (FT MSL)

NOTES:

1. GROUNDWATER ELEVATIONS MEASURED ON FEBRUARY 12, 2020.
2. SHALLOW WELLS IN FILL (MW-1, MW-1A, MW-8, AND MW-9) NOT USED IN CONTOURING DUE TO LIKELY PERCHED GROUNDWATER.

N

APPROXIMATE

0 100 200

SCALE IN FEET

TITLE

UNCONFINED AQUIFER POTENTIOMETRIC MAP

PROJECT

TOWN OF CHAPEL HILL
828 MARTIN LUTHER KING JR. BOULEVARD
CHAPEL HILL, NORTH CAROLINA

hart hickman
SMARTER ENVIRONMENTAL SOLUTIONS

2923 South Tryon Street-Suite 100
Charlotte, North Carolina 28203
704-586-0007(p) 704-586-0373(f)
License # C-1269 / #C-245 Geology

| | |
|---|---|
| DATE: 5-12-20 | REVISION NO. 0 |
| JOB NO. TCH-009 | FIGURE NO. 6 |

# Appendix B

## Summary of Background Screening Values Calculations

**Appendix B**
**Calculation of Background Screening Values (BSVs)**

In order to determine whether metals detections are related to source materials or represent naturally-occurring background levels, site-specific Background Screening Values (BSVs) were established for the site. This appendix documents the methodology used for the BSV calculations. The ProUCL software version 5.1 (ProUCL) published by the United States Environmental Protection Agency (EPA) was used to calculate statistics on the background metals sets, as described further below. A table summarizing the calculation results and the ProUCL output sheets are included in this appendix.

Soil BSVs

During historical assessment activities, a total of 16 background soil samples were collected at locations upgradient of the site and outside the area of fill material. Prior reports documented calculation of 95% upper confidence limits (UCLs) for soil, which represent the upper boundary of the mean of background concentrations. UCLs are appropriate for background metals evaluations when comparing mean concentrations in the source area to mean background concentrations. However, the risk assessment for the subject site is based on maximum source area concentrations rather mean concentrations. For maximum point source concentration comparisons, EPA guidance indicates that use of the 95% Upper Tolerance Limit (UTL) with 95% coverage is more appropriate (EPA, 2015). This UTL represents the value below which 95% of the population values are expected to fall with 95% confidence.

The calculated BSVs for soil represent the 95% UTLs for the background soil data set, which were calculated using the following steps:

- A 95% UTL was calculated for multiple potential data distributions, including normal, gamma, lognormal, and nonparametric.
- A Goodness of Fit (GoF) test was run on each dataset to determine which distribution fit the background dataset.
- A 95% UTL was selected based on which distribution best fit the dataset:
    - For datasets that potentially fit both the normal and gamma distributions, the 95% UTL for the distribution with the highest coefficient of correlation (R) was used.

- For datasets that only fit either the normal or gamma distribution, the 95% UTL for the distribution which the dataset fit (normal or gamma) was used.
- For datasets that did not fit normal or gamma distributions, but fit the lognormal distribution, the lognormal 95% UTL was used.
- For datasets which did not fit any distribution, the nonparametric 95% UTL was used.

Non-detects were incorporated into the calculations using the Kaplan-Meier (KM) method. For thallium, Pro-UCL was unable to calculate either a 95% UTL or a mean concentration because thallium was detected in only one of the background samples. As referenced below, EPA guidance also references use of two times the mean background concentration as an appropriate method of calculating BSVs. For thallium, a value of two times the mean concentration was calculated using half of the reporting limit as the concentration for non-detect values. Note that this value is less than the maximum concentration detected in site background samples and considered conservative.

<u>Sediment and Surface Water Background Screening Values</u>

During historical assessment activities, a total of four background sediment samples and five background surface water samples were collected at locations upstream of the site and outside the area of fill material. The number of samples is insufficient to calculate a 95% UTL. EPA guidance alternately recommends use of twice the site-specific background mean concentrations as BSVs (EPA, 2018a and 2018b). These values were calculated for the subject site. In some cases, two times the mean concentrations derived values that were higher than the maximum concentrations detected in the background samples. In order to provide for additional conservatism, the BSVs used for sediment and surface water represent the lower of the maximum background concentration or twice the site-specific background mean concentration.

For the purposes of calculating the site-specific background mean concentrations, duplicate sample results were averaged with their parent sample results prior to calculating the background mean concentrations. Additionally, for datasets with non-detect values, the ProUCL software was utilized to calculate the background mean concentrations following the KM method.

**Table B-1 (page 1 of 1)**
**Summary of Background Screening Values (BSVs) for Soil**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Sample ID | aluminum | antimony | arsenic | barium | beryllium | boron | cadmium | calcium | hexavalent chromium | trivalent chromium | total chromium |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site Background Data** | | | | | | | | | | | |
| MW-5 (0-1) | NA | <0.30 | 2.1 | 76 | 0.99 | NA | <0.30 | NA | 0.43 J | 17.57 | 18 |
| MW-5 (6-7) | NA | <0.27 | 1.4 | 61 | 0.60 | NA | <0.27 | NA | 0.81 | 38.19 | 39 |
| BG-1 (0-1) | NA | <0.28 | 1.9 | 36 | 0.39 | NA | <0.28 | NA | 0.87 | 17.13 | 18 |
| BG-1 (2-3) | NA | <0.29 | 2.3 | 45 | 0.48 | NA | <0.29 | NA | <0.12 | 19 | 19 |
| BG-2 (0-1) | NA | <0.28 | 1.9 | 45 | 0.50 | NA | <0.28 | NA | 0.84 | 16.16 | 17 |
| BG-2 (2-3) | NA | <0.27 | 1.9 | 52 | 0.53 | NA | <0.27 | NA | 0.70 | 23.3 | 24 |
| BG-3 (0-1) | NA | <0.30 | 1.7 | 44 | 0.43 | NA | <0.30 | NA | 0.21 J | 23.3 | 16 |
| BG-3 (2-3) | NA | <0.27 | 2.2 | 56 | 0.54 | NA | <0.27 | NA | 0.88 | 21.12 | 22 |
| BG-4 (0-1) | NA | <0.29 | 1.7 | 50 | 0.50 | NA | <0.29 | NA | <0.13 | 19 | 19 |
| BG-4 (2-3) | NA | <0.33 | 2.0 | 53 | 0.52 | NA | 0.38 | NA | 0.50 J | 22.5 | 23 |
| BG-6 (0-1) | NA | NA | 2.05 O1 | 64.4 | 0.625 | NA | 0.177 J | NA | 5.34 | 39.4 | 44.7 |
| BG-6 (2-3) | NA | NA | 2.29 | 66.3 | 0.507 J | NA | 0.139 J | NA | <1.19 | 22.9 | 22.9 |
| BG-7 (0-1) | NA | NA | 1.97 | 52.7 | 0.410 J | NA | 0.136 J | NA | <1.16 | 70.2 | 70.2 |
| BG-7 (2-3) | NA | NA | 3.08 | 77.9 | 0.430 J | NA | 0.108 J | NA | <1.16 | 27 | 27 |
| BG-8 (0-1) | NA | NA | 1.8 | 52.4 | 0.370 J | NA | 0.0951 J | NA | <1.14 | 24.5 | 24.5 |
| BG-8 (2-3) | NA | NA | 1.66 | 47.6 | 0.293 J | NA | 0.0918 J | NA | <1.14 | 21.7 | 21.7 |
| **Background Statistics** | | | | | | | | | | | |
| North Carolina Background Range(1) | 7000 - >100,000 | <1.0-8.8 | 1-18 | 50-1,000 | ND-1.0 | ND-100 | 1.0-10 | 100-280,000* | NS | NS | 7-300 |
| Site Specific Background Range | NA | ND | 1.4 - 3.08 | 36 - 77.9 | 0.293 - 0.99 | NA | <0.27 - 0.38 | NA | <0.12 - 5.34 | 16.16 - 70.2 | 16 - 70.2 |
| 2x Mean Background | NA | ND | 3.994 | 109.92 | 1.014 | NA | 0.28 | NA | 1.696 | 52.86 | 53.26 |
| Selected 95% UTL with 95% Coverage | NA | NC | 3.015 | 87.86 | 0.929 | NA | 0.313 | NA | 5.725 | 70.2 | 70.2 |
| **Recommended Site-Specific BSV(2,3)** | NA | ND | 3.015 | 87.86 | 0.929 | NA | 0.313 | NA | 5.725 | 70.2 | 70.2 |

| Sample ID | cobalt | copper | iron | lead | magnesium | manganese | mercury | molybdenum | nickel | potassium | selenium | silver | sodium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site Background Data** | | | | | | | | | | | | | | | | | |
| MW-5 (0-1) | 27 | 49 | NA | 4.0 | NA | 710 | <0.023 | NA | 5.0 | NA | <0.59 | NA | NA | 25 | <0.59 | 190 | 47 |
| MW-5 (6-7) | 19 | 18 | NA | 0.55 | NA | 940 | <0.020 | NA | 20 | NA | <0.53 | NA | NA | 29 | 2.3 | 67 | 75 |
| BG-1 (0-1) | 6.3 | 16 | NA | 25 | NA | 310 | 0.033 | NA | 5.4 | NA | 1.6 | NA | NA | 15 | <0.57 | 34 | 43 |
| BG-1 (2-3) | 7.3 | 18 | NA | 43 | NA | 440 | 0.280 | NA | 6.2 | NA | 1.6 | NA | NA | 15 | <0.57 | 35 | 49 |
| BG-2 (0-1) | 7.4 | 18 | NA | 32 | NA | 410 | 0.045 | NA | 4.9 | NA | 1.1 | NA | NA | 14 | <0.56 | 35 | 44 |
| BG-2 (2-3) | 7.5 | 20 | NA | 26 | NA | 450 | 0.038 | NA | 7.9 | NA | 1.7 | NA | NA | 19 | <0.55 | 37 | 45 |
| BG-3 (0-1) | 7.5 | 15 | NA | 25 | NA | 410 | 0.024 | NA | 5.1 | NA | 1.4 | NA | NA | 46 | <0.60 | 37 | 40 |
| BG-3 (2-3) | 7.5 | 18 | NA | 29 | NA | 410 | 0.040 | NA | 5.2 | NA | 1.2 | NA | NA | 19 | <0.53 | 40 | 46 |
| BG-4 (0-1) | 9.5 | 16 | NA | 22 | NA | 450 BH | 0.026 | NA | 6.0 | NA | <0.59 | NA | NA | 16 A | <0.59 | 53 | 50 |
| BG-4 (2-3) | 11 | 23 | NA | 21 | NA | 460 BH | 0.054 | NA | 8.5 | NA | <0.65 | NA | NA | 19 | <0.65 | 51 | 230 |
| BG-6 (0-1) | 14.4 | 26.4 | NA | NA | NA | 448 J6 | 0.022 | NA | 12.8 | NA | 0.562 J | NA | NA | 17 | NA | NA | NA |
| BG-6 (2-3) | 14.7 | 32.3 | NA | NA | NA | 467 | 0.032 | NA | 7.78 | NA | 0.828 | NA | NA | 16.8 | NA | NA | NA |
| BG-7 (0-1) | 18.9 | 36.4 | NA | NA | NA | 813 | 0.025 | NA | 12.8 | NA | 0.543 J | NA | NA | 22.6 | NA | NA | NA |
| BG-7 (2-3) | 16.3 | 32.5 | NA | NA | NA | 548 | 0.023 | NA | 6.2 | NA | 0.502 J | NA | NA | 24.3 | NA | NA | NA |
| BG-8 (0-1) | 21.8 | 62.8 | NA | NA | NA | 759 | 0.0072 | NA | 9.04 | NA | 0.485 J | NA | NA | 24.4 | NA | NA | NA |
| BG-8 (2-3) | 23.5 | 60.2 | NA | NA | NA | 732 | <0.0067 | NA | 7.86 | NA | 0.306 J | NA | NA | 25.1 | NA | NA | NA |
| **Background Statistics** | | | | | | | | | | | | | | | | | |
| North Carolina Background Range(1) | ND-50 | 2.0-20 | 100 - >100,000* | ND-50 | 50-50,000* | <2.0-7000* | 0.03-0.52 | <3-15* | ND | 50-37,000* | <0.1-0.8 | ND-5.0 | <500-50,000* | ND-300 | NS | 15-300 | 11-59 |
| Site Specific Background Range | 6.3 - 27 | 15 - 62.8 | NA | 0.55 - 43 | NA | 310 - 940 | <0.0067 - 0.28 | NA | 4.9 - 20 | NA | <0.53 - 1.7 | NA | NA | 14 - 46 | <0.53 - 2.3 | 34 - 190 | 40 - 230 |
| 2x Mean Background | 27.46 | 57.7 | NA | 45.52 | NA | 1094.6 | 0.0842 | NA | 16.336 | NA | 1.708 | NA | NA | 43.4 | NC | 115.8 | 133.8 |
| Selected 95% UTL with 95% Coverage | 36.31 | 77.3 | NA | 59.11 | NA | 1149 | 0.256 | NA | 19.49 | NA | 2.503 | NA | NA | 43.19 | NC | 227 | 230 |
| **Recommended Site-Specific BSV(2,3)** | 36.31 | 77.3 | NA | 59.11 | NA | 1149 | 0.256 | NA | 19.49 | NA | 2.503 | NA | NA | 43.19 | 0.981 | 227 | 230 |

1) North Carolina Soil Background Range taken from Elements in North American Soils, 2nd Edition by James Dragun and Khaled Chekiri
2) Recommended Site-Specific Background Screening Value (BSV) based on 95% UTL with 95% coverage for all constituents except thallium.
3) Thallium did not have enough detects to run ProUCL statistics. Site-specific BSV was calculated as 2x the mean using 1/2 of the reporting limits as the values for non-detects.
NA = Not Analyzed; ND = Not Detected; -- = Not Calculated; UTL = Upper Tolerance Limit
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration
O1 = Analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.
BH = Method blank greater than one-half laboratory reporting limit, but sample concentration greater than 10x the method blank.
A = Continuing Calibration Verification standard recovery (82%) is less than the lower control limit (90%). Result has possible low bias.

**Table B-2 (page 1 of 1)**
**Summary of Background Screening Values (BSVs) for Sediment**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Sediment Sampling Point ID | Sample Date | antimony | arsenic | barium | beryllium | cadmium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | lead | manganese | mercury | nickel | selenium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SED-1 (Upstream)** | 10/27/2016 | <0.32 | 1.2 | 12 | <0.32 | <0.32 | 0.24 J | 22.76 | 23 | 3.9 | 4.2 | 4.0 | 180 | <0.026 | 3.8 | <0.64 | 6.9 | <0.64 | 19 | 19 |
| | 4/5/2019 | NA | 1.95 O1 | 38.4 J6 | 0.249 J | <0.636 | 0.428 J | 65.0 | 65.4 J3, J6 | 7.63 | 8.42 | NA | 449 J6 | 0.0078 | 7.1 | 0.409 J | 8.4 | NA | NA | NA |
| **SED-2 (Upstream)** | 10/27/2016 | <0.33 | 2.1 | 20 | 0.48 | <0.33 | <0.40 | 36 | 36 | 7.8 | 8.0 | 7.1 | 330 | <0.025 | 7.2 | <0.65 | 11 | <0.65 | 37 | 34 |
| | 10/27/2016(1) | <0.32 | 2.5 | 17 | 0.45 | <0.32 | <0.40 | 49 | 49 | 6.5 | 9.1 | 6.7 | 290 | <0.026 | 6.0 | <0.63 | 12 | <0.63 | 35 | 31 |
| | 4/5/2019 | NA | 2.74 | 29.6 | 0.305 J | <0.619 | 0.796 J | 56.3 | 57.1 | 20.9 | 13.8 | NA | 811 | 0.0053 J | 9.16 | 0.306 J | 16.9 | NA | NA | NA |
| | 4/5/2019(1) | NA | 2.02 | 17.4 | 0.222 J | <0.617 | 0.546 J | 69.5 | 70 | 7.29 | 6.79 | NA | 347 | 0.0051 | 9.92 | 0.237 J | 8.8 | NA | NA | NA |
| **Background Statistics** | | | | | | | | | | | | | | | | | | | | |
| Site-Specific Background Range | | ND | 1.2-2.74 | 12-38.4 | <0.32-0.48 | <0.32-<0.636 | 0.24 J-0.796 J | 22.76-69.5 | 23-70 | 3.9-20.9 | 4.2-13.8 | 4.0-7.1 | 180-811 | <0.026 - 0.0078 | 3.8-9.92 | 0.237 J-<0.65 | 6.9-16.9 | <0.63-<0.65 | 19-37 | 19-34 |
| Site-Specific Mean(2) | | ND | 1.958 | 23.1 | 0.308 | ND | 0.395 | 48.28 | 48.61 | 8.194 | 7.866 | 5.45 | 379.5 | 0.0065 | 6.76 | 0.34 | 9.913 | ND | 27.5 | 25.75 |
| 2X Site-Specific Mean | | ND | 3.916 | 46.2 | 0.616 | ND | 0.79 | 96.56 | 97.22 | 16.388 | 15.732 | 10.9 | 759 | 0.013 | 13.52 | 0.68 | 19.826 | ND | 55 | 51.5 |
| **Recommended Site-Specific BSV(3)** | | ND | 2.74 | 38.4 | 0.48 | ND | 0.79 | 69.5 | 70 | 16.388 | 13.8 | 7.1 | 759 | 0.0078 | 9.92 | 0.409 | 16.9 | ND | 37 | 34 |

Notes:
1) Duplicate sample data, average of parent sample and duplicate used in calculations.
2) Site-specific mean for datasets with non-detects calculated using Kaplan-Meier Method via ProUCL version 5.1.
3) Recommended Site-Specific Background Screening Value (BSV) indicates 2x mean background concentration or maximum detected concentration, whichever is lower.
NA = Not Analyzed; ND = Not Detected
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
O1 = Analyte failed the method required serial dilution test and/or subsequent post-spike criteria. These failures indicate matrix interference.
J3 = The associated batch QC was outside the established quality control range for precision.
J6 = The sample matrix interfered with the ability to make any accurate determination; spike value is low.

**Table B-3 (page 1 of 1)**
**Summary of Background Screening Values (BSVs) for Surface Water**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job No. TCH-009**

| Surface Water Background Sample Location | Sample Date | aluminum | antimony | arsenic | barium | beryllium | cadmium | calcium | hexavalent chromium | trivalent chromium | total chromium | cobalt | copper | iron |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BC-1 (Upstream)** | 2/5/2014 | NA | NA | ND | 24 | NA | ND | NA | ND | ND | ND | NA | NA | NA |
| **SW-1 (Upstream)** | 11/3/2016 | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 |
| | 4/5/2019 | NA | NA | 0.44 | 23.1 | <0.10 | <0.080 | NA | NA | NA | 0.53 | 0.16 | 1.2 | NA |
| **SW-2 (Upstream)** | 11/3/2016 | NA | <5.0 | <10 | 27 | <2.0 | <1.0 | NA | <0.74 | NA | <5.0 | <5.0 | <10 | <0.2 |
| | 4/5/2019 | NA | NA | 0.42 | 23.2 | <0.10 | <0.080 | NA | NA | NA | 0.45 J | 0.16 | 1.1 | NA |
| **Background Statistics** | | | | | | | | | | | | | | |
| Site Specific Background Range | | NA | ND | <10 - 0.44 | 23.1 - 27 | ND | ND | NA | ND | ND | <5.0 - 0.53 | <5.0 - 0.16 | <10 - 1.2 | ND |
| Site Specific Mean[(1)] | | NA | ND | 0.43 | 24.86 | ND | ND | NA | ND | ND | 0.49 | 1.33[(3)] | 1.15 | ND |
| 2X Site Specific Mean | | NA | ND | 0.86 | 49.72 | ND | ND | NA | ND | ND | 0.98 | 2.66 | 2.3 | ND |
| **Recommended Site-Specific BSV[(2)]** | | NA | ND | 0.44 | 27 | ND | ND | NA | ND | ND | 0.53 | 0.16 | 1.2 | ND |

| Surface Water Background Sample Location | Sample Date | lead | magnesium | manganese | mercury | nickel | potassium | selenium | strontium | silver | sodium | thallium | vanadium | zinc | Hardness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BC-1 (Upstream)** | 2/5/2014 | ND | NA | NA | ND | NA | NA | ND | NA | ND | NA | NA | NA | NA | NA |
| **SW-1 (Upstream)** | 11/3/2016 | <5.0 | NA | <10 | <0.2 | <10 | NA | <20 | 100 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/5/2019 | NA | NA | 22.2 | <0.20 | 0.29 J | NA | 0.096 J | 85.3 | NA | NA | NA | NA | NA | 54,000 |
| **SW-2 (Upstream)** | 11/3/2016 | <5.0 | NA | 11 | <0.2 | <10 | NA | <20 | 100 | NA | NA | <10 | <5.0 | <30 | NA |
| | 4/5/2019 | NA | NA | 21.2 | <0.20 | 0.33 J | NA | 0.11 J | 85.5 | NA | NA | NA | NA | NA | 53,600 |
| **Background Statistics** | | | | | | | | | | | | | | | |
| Site Specific Background Range | | ND | NA | <10 - 22.2 | ND | <10 - 0.33 J | NA | <20 - 0.11 J | 85.3 - 100 | ND | NA | ND | ND | ND | 53,600 - 54,000 |
| Site Specific Mean[(1)] | | ND | NA | 16.1 | ND | 0.31 | NA | 0.103 | 92.7 | ND | NA | ND | ND | ND | 53,800 |
| 2X Site Specific Mean | | ND | NA | 32.2 | ND | 0.62 | NA | 0.206 | 185.4 | ND | NA | ND | ND | ND | 107,600 |
| **Recommended Site-Specific BSV[(2)]** | | ND | NA | 22.2 | ND | 0.33 | NA | 0.11 | 100 | ND | NA | ND | ND | ND | 54,000 |

Notes:
1) Site specific mean for datasets with non-detects calculated using Kaplan-Meier Method via ProUCL version 5.1
2) Recommended Site-Specific Background Screening Value (BSV) indicates 2x mean background concentration or maximum detected concentration, whichever is lower.
3) The Kaplan-Meier mean could not be calculated for Cobalt, as there was only one unique detection. Therefore, the site-specific mean was calculated using 1/2 of the reporting limits as the values for non-detects.
NA = Not Analyzed; ND = Not Detected; NC = Not Calculated
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration

| | |
|---|---|
| | **Background Statistics for Data Sets with Non-Detects** |
| **User Selected Options** | |
| Date/Time of Computation | ProUCL 5.18/17/2021 4:10:55 PM |
| From File | ProUCL Background Inputs.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Coverage | 95% |
| Different or Future K Observations | 1 |
| Number of Bootstrap Operations | 2000 |

**antimony**

| | | | |
|---|---|---|---|
| | **General Statistics** | | |
| Total Number of Observations | 10 | Number of Missing Observations | 6 |
| Number of Distinct Observations | 5 | | |
| Number of Detects | 0 | Number of Non-Detects | 10 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 5 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.27 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.33 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**

**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**

**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**

**The data set for variable antimony was not processed!**

**arsenic**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 16 | Number of Distinct Observations | 13 |
| Minimum | 1.4 | First Quartile | 1.775 |
| Second Largest | 2.3 | Median | 1.935 |
| Maximum | 3.08 | Third Quartile | 2.125 |
| Mean | 1.997 | SD | 0.376 |
| Coefficient of Variation | 0.188 | Skewness | 1.463 |
| Mean of logged Data | 0.676 | SD of logged Data | 0.176 |
| | **Critical Values for Background Threshold Values (BTVs)** | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | **Normal GOF Test** | | |
| Shapiro Wilk Test Statistic | 0.887 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.147 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Normal at 5% Significance Level | |
| | **Data appear Normal at 5% Significance Level** | | |

| | | | |
|---|---|---|---|
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 2.946 | 90% Percentile (z) | 2.479 |
| 95% UPL (t) | 2.676 | 95% Percentile (z) | 2.615 |
| 95% USL | 2.915 | 99% Percentile (z) | 2.871 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.399 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.736 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.124 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.215 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 33.27 | k star (bias corrected MLE) | 27.08 |
| Theta hat (MLE) | 0.06 | Theta star (bias corrected MLE) | 0.0737 |
| nu hat (MLE) | 1065 | nu star (bias corrected) | 866.4 |
| MLE Mean (bias corrected) | 1.997 | MLE Sd (bias corrected) | 0.384 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 2.69 | 90% Percentile | 2.502 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 2.693 | 95% Percentile | 2.667 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 3.015 | 99% Percentile | 2.996 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 3.027 | | |
| 95% WH USL | 2.977 | 95% HW USL | 2.988 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.948 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.125 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 3.069 | 90% Percentile (z) | 2.465 |
| 95% UPL (t) | 2.705 | 95% Percentile (z) | 2.628 |
| 95% USL | 3.026 | 99% Percentile (z) | 2.964 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 3.08 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 3.08 | 95% BCA Bootstrap UTL with 95% Coverage | 3.08 |
| 95% UPL | 3.08 | 90% Percentile | 2.295 |
| 90% Chebyshev UPL | 3.159 | 95% Percentile | 2.495 |
| 95% Chebyshev UPL | 3.686 | 99% Percentile | 2.963 |
| 95% USL | 3.08 | | |

| | | | |
|---|---|---|---|
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **barium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 15 |
| Minimum | 36 | First Quartile | 46.95 |
| Second Largest | 76 | Median | 52.55 |
| Maximum | 77.9 | Third Quartile | 61.85 |
| Mean | 54.96 | SD | 11.56 |
| Coefficient of Variation | 0.21 | Skewness | 0.653 |
| Mean of logged Data | 3.986 | SD of logged Data | 0.206 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.942 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.192 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 84.14 | 90% Percentile (z) | 69.77 |
| 95% UPL (t) | 75.85 | 95% Percentile (z) | 73.97 |
| 95% USL | 83.21 | 99% Percentile (z) | 81.85 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.321 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.736 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.17 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.215 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 25.01 | k star (bias corrected MLE) | 20.36 |
| Theta hat (MLE) | 2.197 | Theta star (bias corrected MLE) | 2.699 |
| nu hat (MLE) | 800.4 | nu star (bias corrected) | 651.7 |
| MLE Mean (bias corrected) | 54.96 | MLE Sd (bias corrected) | 12.18 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 77.19 | 90% Percentile | 71.03 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 77.42 | 95% Percentile | 76.4 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 87.86 | 99% Percentile | 87.18 |

| | | | |
|---|---|---|---|
| 95% HW Approx. Gamma UTL with 95% Coverage | 88.48 | | |
| 95% WH USL | 86.61 | 95% HW USL | 87.18 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.968 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.156 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 90.65 | 90% Percentile (z) | 70.16 |
| 95% UPL (t) | 78.19 | 95% Percentile (z) | 75.62 |
| 95% USL | 89.16 | 99% Percentile (z) | 87.03 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 77.9 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 77.9 | 95% BCA Bootstrap UTL with 95% Coverage | 77.9 |
| 95% UPL | 77.9 | 90% Percentile | 71.15 |
| 90% Chebyshev UPL | 90.71 | 95% Percentile | 76.48 |
| 95% Chebyshev UPL | 106.9 | 99% Percentile | 77.62 |
| 95% USL | 77.9 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **beryllium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 14 |
| Minimum | 0.293 | First Quartile | 0.425 |
| Second Largest | 0.625 | Median | 0.5 |
| Maximum | 0.99 | Third Quartile | 0.533 |
| Mean | 0.507 | SD | 0.154 |
| Coefficient of Variation | 0.305 | Skewness | 2.049 |
| Mean of logged Data | -0.715 | SD of logged Data | 0.268 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.813 | **Shapiro Wilk GOF Test** | |

| | | | |
|---|---|---|---|
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.228 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 0.897 | 90% Percentile (z) | 0.705 |
| 95% UPL (t) | 0.786 | 95% Percentile (z) | 0.761 |
| 95% USL | 0.885 | 99% Percentile (z) | 0.867 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.558 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.738 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.185 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.215 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 14.04 | k star (bias corrected MLE) | 11.45 |
| Theta hat (MLE) | 0.0361 | Theta star (bias corrected MLE) | 0.0443 |
| nu hat (MLE) | 449.4 | nu star (bias corrected) | 366.5 |
| MLE Mean (bias corrected) | 0.507 | MLE Sd (bias corrected) | 0.15 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 0.787 | 90% Percentile | 0.706 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 0.788 | 95% Percentile | 0.776 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 0.929 | 99% Percentile | 0.919 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 0.936 | | |
| 95% WH USL | 0.912 | 95% HW USL | 0.918 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.933 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.169 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 0.962 | 90% Percentile (z) | 0.69 |
| 95% UPL (t) | 0.794 | 95% Percentile (z) | 0.76 |
| 95% USL | 0.942 | 99% Percentile (z) | 0.913 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 0.99 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 0.99 | 95% BCA Bootstrap UTL with 95% Coverage | 0.99 |

| | | | |
|---|---|---|---|
| 95% UPL | 0.99 | 90% Percentile | 0.613 |
| 90% Chebyshev UPL | 0.985 | 95% Percentile | 0.716 |
| 95% Chebyshev UPL | 1.201 | 99% Percentile | 0.935 |
| 95% USL | 0.99 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| cadmium | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 11 | | |
| Number of Detects | 7 | Number of Non-Detects | 9 |
| Number of Distinct Detects | 7 | Number of Distinct Non-Detects | 4 |
| Minimum Detect | 0.0918 | Minimum Non-Detect | 0.27 |
| Maximum Detect | 0.38 | Maximum Non-Detect | 0.3 |
| Variance Detected | 0.0102 | Percent Non-Detects | 56.25% |
| Mean Detected | 0.161 | SD Detected | 0.101 |
| Mean of Detected Logged Data | -1.948 | SD of Detected Logged Data | 0.491 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| Shapiro Wilk Test Statistic | 0.712 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.803 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.3 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.304 | Detected Data appear Normal at 5% Significance Level | |
| **Detected Data appear Approximate Normal at 5% Significance Level** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.14 | KM SD | 0.0682 |
| 95% UTL95% Coverage | 0.313 | 95% KM UPL (t) | 0.264 |
| 90% KM Percentile (z) | 0.228 | 95% KM Percentile (z) | 0.253 |
| 99% KM Percentile (z) | 0.299 | 95% KM USL | 0.307 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.15 | SD | 0.0648 |
| 95% UTL95% Coverage | 0.314 | 95% UPL (t) | 0.267 |
| 90% Percentile (z) | 0.233 | 95% Percentile (z) | 0.257 |
| 99% Percentile (z) | 0.301 | 95% USL | 0.309 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| A-D Test Statistic | 0.646 | **Anderson-Darling GOF Test** | |
| 5% A-D Critical Value | 0.71 | Detected data appear Gamma Distributed at 5% Significance Level | |

| | | | | | |
|---|---|---|---|---|---|
| K-S Test Statistic | 0.267 | | **Kolmogorov-Smirnov GOF** | | |
| 5% K-S Critical Value | 0.313 | | Detected data appear Gamma Distributed at 5% Significance Level | | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | |
| | | | | | |
| **Gamma Statistics on Detected Data Only** | | | | | |
| k hat (MLE) | 4.282 | | k star (bias corrected MLE) | 2.542 | |
| Theta hat (MLE) | 0.0376 | | Theta star (bias corrected MLE) | 0.0633 | |
| nu hat (MLE) | 59.94 | | nu star (bias corrected) | 35.59 | |
| MLE Mean (bias corrected) | 0.161 | | | | |
| MLE Sd (bias corrected) | 0.101 | | 95% Percentile of Chisquare (2kstar) | 11.2 | |
| | | | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | | | |
| This is especially true when the sample size is small. | | | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | |
| Minimum | 0.0789 | | Mean | 0.143 | |
| Maximum | 0.38 | | Median | 0.131 | |
| SD | 0.0718 | | CV | 0.503 | |
| k hat (MLE) | 6.178 | | k star (bias corrected MLE) | 5.062 | |
| Theta hat (MLE) | 0.0231 | | Theta star (bias corrected MLE) | 0.0282 | |
| nu hat (MLE) | 197.7 | | nu star (bias corrected) | 162 | |
| MLE Mean (bias corrected) | 0.143 | | MLE Sd (bias corrected) | 0.0634 | |
| 95% Percentile of Chisquare (2kstar) | 18.48 | | 90% Percentile | 0.228 | |
| 95% Percentile | 0.26 | | 99% Percentile | 0.33 | |
| **The following statistics are computed using Gamma ROS Statistics on Imputed Data** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.335 | 0.339 | 95% Approx. Gamma UPL | 0.266 | 0.266 |
| 95% Gamma USL | 0.327 | 0.33 | | | |
| | | | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | | | |
| Mean (KM) | 0.14 | | SD (KM) | 0.0682 | |
| Variance (KM) | 0.00465 | | SE of Mean (KM) | 0.0207 | |
| k hat (KM) | 4.238 | | k star (KM) | 3.485 | |
| nu hat (KM) | 135.6 | | nu star (KM) | 111.5 | |
| theta hat (KM) | 0.0331 | | theta star (KM) | 0.0403 | |
| 80% gamma percentile (KM) | 0.197 | | 90% gamma percentile (KM) | 0.241 | |
| 95% gamma percentile (KM) | 0.283 | | 99% gamma percentile (KM) | 0.371 | |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.313 | 0.314 | 95% Approx. Gamma UPL | 0.252 | 0.25 |
| 95% KM Gamma Percentile | 0.239 | 0.237 | 95% Gamma USL | 0.306 | 0.307 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| Shapiro Wilk Test Statistic | 0.851 | | **Shapiro Wilk GOF Test** | | |
| 5% Shapiro Wilk Critical Value | 0.803 | | Detected Data appear Lognormal at 5% Significance Level | | |

| | | | |
|---|---|---|---|
| Lilliefors Test Statistic | 0.235 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.304 | Detected Data appear Lognormal at 5% Significance Level | |
| **Detected Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | |
| Mean in Original Scale | 0.143 | Mean in Log Scale | -2.02 |
| SD in Original Scale | 0.0693 | SD in Log Scale | 0.358 |
| 95% UTL95% Coverage | 0.327 | 95% BCA UTL95% Coverage | 0.38 |
| 95% Bootstrap (%) UTL95% Coverage | 0.38 | 95% UPL (t) | 0.253 |
| 90% Percentile (z) | 0.21 | 95% Percentile (z) | 0.239 |
| 99% Percentile (z) | 0.305 | 95% USL | 0.318 |
| | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | |
| KM Mean of Logged Data | -2.04 | 95% KM UTL (Lognormal)95% Coverage | 0.32 |
| KM SD of Logged Data | 0.357 | 95% KM UPL (Lognormal) | 0.248 |
| 95% KM Percentile Lognormal (z) | 0.234 | 95% KM USL (Lognormal) | 0.311 |
| | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | |
| Mean in Original Scale | 0.15 | Mean in Log Scale | -1.952 |
| SD in Original Scale | 0.0648 | SD in Log Scale | 0.312 |
| 95% UTL95% Coverage | 0.312 | 95% UPL (t) | 0.25 |
| 90% Percentile (z) | 0.212 | 95% Percentile (z) | 0.237 |
| 99% Percentile (z) | 0.293 | 95% USL | 0.304 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 16 | 95% UTL with95% Coverage | 0.38 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 0.38 |
| 95% USL | 0.38 | 95% KM Chebyshev UPL | 0.447 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **hexavalent chromium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 14 | | |
| Number of Detects | 9 | Number of Non-Detects | 7 |
| Number of Distinct Detects | 9 | Number of Distinct Non-Detects | 5 |
| Minimum Detect | 0.21 | Minimum Non-Detect | 0.12 |
| Maximum Detect | 5.34 | Maximum Non-Detect | 1.19 |
| Variance Detected | 2.493 | Percent Non-Detects | 43.75% |

| | | | |
|---|---|---|---|
| Mean Detected | 1.176 | SD Detected | 1.579 |
| Mean of Detected Logged Data | -0.27 | SD of Detected Logged Data | 0.867 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| Shapiro Wilk Test Statistic | 0.531 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.829 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.463 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.274 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.848 | KM SD | 1.195 |
| 95% UTL95% Coverage | 3.864 | 95% KM UPL (t) | 3.007 |
| 90% KM Percentile (z) | 2.379 | 95% KM Percentile (z) | 2.814 |
| 99% KM Percentile (z) | 3.628 | 95% KM USL | 3.768 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.85 | SD | 1.225 |
| 95% UTL95% Coverage | 3.941 | 95% UPL (t) | 3.063 |
| 90% Percentile (z) | 2.42 | 95% Percentile (z) | 2.865 |
| 99% Percentile (z) | 3.699 | 95% USL | 3.843 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| A-D Test Statistic | 1.129 | **Anderson-Darling GOF Test** | |
| 5% A-D Critical Value | 0.738 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.394 | **Kolmogorov-Smirnov GOF** | |
| 5% K-S Critical Value | 0.285 | Data Not Gamma Distributed at 5% Significance Level | |
| **Data Not Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 1.299 | k star (bias corrected MLE) | 0.94 |
| Theta hat (MLE) | 0.905 | Theta star (bias corrected MLE) | 1.25 |
| nu hat (MLE) | 23.38 | nu star (bias corrected) | 16.92 |
| MLE Mean (bias corrected) | 1.176 | | |
| MLE Sd (bias corrected) | 1.212 | 95% Percentile of Chisquare (2kstar) | 5.757 |
| | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | |
| This is especially true when the sample size is small. | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | |
| Minimum | 0.01 | Mean | 0.791 |
| Maximum | 5.34 | Median | 0.6 |
| SD | 1.263 | CV | 1.598 |
| k hat (MLE) | 0.541 | k star (bias corrected MLE) | 0.482 |

| | | | | | |
|---|---|---|---|---|---|
| Theta hat (MLE) | | 1.46 | Theta star (bias corrected MLE) | | 1.642 |
| nu hat (MLE) | | 17.33 | nu star (bias corrected) | | 15.41 |
| MLE Mean (bias corrected) | | 0.791 | MLE Sd (bias corrected) | | 1.139 |
| 95% Percentile of Chisquare (2kstar) | | 3.75 | 90% Percentile | | 2.155 |
| 95% Percentile | | 3.078 | 99% Percentile | | 5.354 |
| **The following statistics are computed using Gamma ROS Statistics on Imputed Data** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 5.5 | 6.852 | 95% Approx. Gamma UPL | 3.222 | 3.638 |
| 95% Gamma USL | 5.202 | 6.412 | | | |
| | | | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | | | |
| Mean (KM) | | 0.848 | SD (KM) | | 1.195 |
| Variance (KM) | | 1.429 | SE of Mean (KM) | | 0.322 |
| k hat (KM) | | 0.503 | k star (KM) | | 0.45 |
| nu hat (KM) | | 16.09 | nu star (KM) | | 14.4 |
| theta hat (KM) | | 1.686 | theta star (KM) | | 1.883 |
| 80% gamma percentile (KM) | | 1.383 | 90% gamma percentile (KM) | | 2.342 |
| 95% gamma percentile (KM) | | 3.379 | 99% gamma percentile (KM) | | 5.956 |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 3.926 | 4.122 | 95% Approx. Gamma UPL | 2.562 | 2.577 |
| 95% KM Gamma Percentile | 2.305 | 2.299 | 95% Gamma USL | 3.753 | 3.92 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| Shapiro Wilk Test Statistic | | 0.852 | **Shapiro Wilk GOF Test** | | |
| 5% Shapiro Wilk Critical Value | | 0.829 | Detected Data appear Lognormal at 5% Significance Level | | |
| Lilliefors Test Statistic | | 0.324 | **Lilliefors GOF Test** | | |
| 5% Lilliefors Critical Value | | 0.274 | Data Not Lognormal at 5% Significance Level | | |
| **Detected Data appear Approximate Lognormal at 5% Significance Level** | | | | | |
| | | | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | | | |
| Mean in Original Scale | | 0.836 | Mean in Log Scale | | -0.641 |
| SD in Original Scale | | 1.23 | SD in Log Scale | | 0.893 |
| 95% UTL95% Coverage | | 5.021 | 95% BCA UTL95% Coverage | | 5.34 |
| 95% Bootstrap (%) UTL95% Coverage | | 5.34 | 95% UPL (t) | | 2.647 |
| 90% Percentile (z) | | 1.655 | 95% Percentile (z) | | 2.29 |
| 99% Percentile (z) | | 4.208 | 95% USL | | 4.672 |
| | | | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | | | |
| KM Mean of Logged Data | | -0.678 | 95% KM UTL (Lognormal)95% Coverage | | 5.725 |
| KM SD of Logged Data | | 0.96 | 95% KM UPL (Lognormal) | | 2.877 |
| 95% KM Percentile Lognormal (z) | | 2.462 | 95% KM USL (Lognormal) | | 5.298 |
| | | | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | | | |
| Mean in Original Scale | | 0.85 | Mean in Log Scale | | -0.669 |
| SD in Original Scale | | 1.225 | SD in Log Scale | | 1.045 |
| 95% UTL95% Coverage | | 7.159 | 95% UPL (t) | | 3.384 |

| | | | |
|---|---|---|---|
| 90% Percentile (z) | 1.954 | 95% Percentile (z) | 2.857 |
| 99% Percentile (z) | 5.823 | 95% USL | 6.58 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 16 | 95% UTL with95% Coverage | 5.34 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 5.34 |
| 95% USL | 5.34 | 95% KM Chebyshev UPL | 6.218 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **trivalent chromium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 14 |
| Minimum | 16.16 | First Quartile | 19 |
| Second Largest | 39.36 | Median | 22.7 |
| Maximum | 70.2 | Third Quartile | 25.13 |
| Mean | 26.43 | SD | 13.43 |
| Coefficient of Variation | 0.508 | Skewness | 2.637 |
| Mean of logged Data | 3.194 | SD of logged Data | 0.377 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.668 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.307 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 60.32 | 90% Percentile (z) | 43.64 |
| 95% UPL (t) | 50.7 | 95% Percentile (z) | 48.52 |
| 95% USL | 59.24 | 99% Percentile (z) | 57.67 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 1.306 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.741 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.272 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.216 | Data Not Gamma Distributed at 5% Significance Level | |

| | | | |
|---|---|---|---|
| **Data Not Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 6.387 | k star (bias corrected MLE) | 5.231 |
| Theta hat (MLE) | 4.139 | Theta star (bias corrected MLE) | 5.053 |
| nu hat (MLE) | 204.4 | nu star (bias corrected) | 167.4 |
| MLE Mean (bias corrected) | 26.43 | MLE Sd (bias corrected) | 11.56 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 48.8 | 90% Percentile | 41.9 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 48.63 | 95% Percentile | 47.86 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 61.37 | 99% Percentile | 60.42 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 61.72 | | |
| 95% WH USL | 59.86 | 95% HW USL | 60.12 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.831 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.245 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Lognormal at 5% Significance Level | |
| **Data Not Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 63.2 | 90% Percentile (z) | 39.55 |
| 95% UPL (t) | 48.22 | 95% Percentile (z) | 45.36 |
| 95% USL | 61.3 | 99% Percentile (z) | 58.66 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data do not follow a Discernible Distribution (0.05)** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 70.2 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 70.2 | 95% BCA Bootstrap UTL with 95% Coverage | 70.2 |
| 95% UPL | 70.2 | 90% Percentile | 38.78 |
| 90% Chebyshev UPL | 67.95 | 95% Percentile | 47.07 |
| 95% Chebyshev UPL | 86.76 | 99% Percentile | 65.57 |
| 95% USL | 70.2 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **total chromium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 14 |

| | | | |
|---|---|---|---|
| Minimum | 16 | First Quartile | 18.75 |
| Second Largest | 44.7 | Median | 22.45 |
| Maximum | 70.2 | Third Quartile | 25.13 |
| Mean | 26.63 | SD | 13.98 |
| Coefficient of Variation | 0.525 | Skewness | 2.394 |
| Mean of logged Data | 3.194 | SD of logged Data | 0.397 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.689 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.31 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 61.92 | 90% Percentile (z) | 44.55 |
| 95% UPL (t) | 51.89 | 95% Percentile (z) | 49.63 |
| 95% USL | 60.79 | 99% Percentile (z) | 59.16 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 1.323 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.741 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.273 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.216 | Data Not Gamma Distributed at 5% Significance Level | |
| **Data Not Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 5.828 | k star (bias corrected MLE) | 4.777 |
| Theta hat (MLE) | 4.568 | Theta star (bias corrected MLE) | 5.573 |
| nu hat (MLE) | 186.5 | nu star (bias corrected) | 152.9 |
| MLE Mean (bias corrected) | 26.63 | MLE Sd (bias corrected) | 12.18 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 50.36 | 90% Percentile | 42.94 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 50.22 | 95% Percentile | 49.3 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 63.88 | 99% Percentile | 62.77 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 64.37 | | |
| 95% WH USL | 62.25 | 95% HW USL | 62.64 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.833 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.245 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Lognormal at 5% Significance Level | |
| **Data Not Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |

| | | | |
|---|---|---|---|
| 95% UTL with 95% Coverage | 66.4 | 90% Percentile (z) | 40.55 |
| 95% UPL (t) | 49.95 | 95% Percentile (z) | 46.84 |
| 95% USL | 64.31 | 99% Percentile (z) | 61.39 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data do not follow a Discernible Distribution (0.05)** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 70.2 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 70.2 | 95% BCA Bootstrap UTL with 95% Coverage | 70.2 |
| 95% UPL | 70.2 | 90% Percentile | 41.85 |
| 90% Chebyshev UPL | 69.87 | 95% Percentile | 51.08 |
| 95% Chebyshev UPL | 89.46 | 99% Percentile | 66.38 |
| 95% USL | 70.2 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **cobalt** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 14 |
| Minimum | 6.3 | First Quartile | 7.5 |
| Second Largest | 23.5 | Median | 12.7 |
| Maximum | 27 | Third Quartile | 18.93 |
| Mean | 13.73 | SD | 6.721 |
| Coefficient of Variation | 0.49 | Skewness | 0.591 |
| Mean of logged Data | 2.506 | SD of logged Data | 0.494 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.891 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.198 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 30.69 | 90% Percentile (z) | 22.34 |
| 95% UPL (t) | 25.87 | 95% Percentile (z) | 24.78 |
| 95% USL | 30.15 | 99% Percentile (z) | 29.36 |
| | | | |
| **Gamma GOF Test** | | | |

| | | | |
|---|---|---|---|
| A-D Test Statistic | 0.69 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | 0.742 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.218 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | 0.216 | Data Not Gamma Distributed at 5% Significance Level | |
| Detected data follow Appr. Gamma Distribution at 5% Significance Level | | | |
| | | | |
| Gamma Statistics | | | |
| k hat (MLE) | 4.558 | k star (bias corrected MLE) | 3.745 |
| Theta hat (MLE) | 3.011 | Theta star (bias corrected MLE) | 3.665 |
| nu hat (MLE) | 145.8 | nu star (bias corrected) | 119.8 |
| MLE Mean (bias corrected) | 13.73 | MLE Sd (bias corrected) | 7.092 |
| | | | |
| Background Statistics Assuming Gamma Distribution | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 27.93 | 90% Percentile | 23.23 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 28.34 | 95% Percentile | 27.08 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 36.31 | 99% Percentile | 35.32 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 37.53 | | |
| 95% WH USL | 35.29 | 95% HW USL | 36.4 |
| | | | |
| Lognormal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.9 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.215 | Lilliefors Lognormal GOF Test | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Lognormal at 5% Significance Level | |
| Data appear Approximate Lognormal at 5% Significance Level | | | |
| | | | |
| Background Statistics assuming Lognormal Distribution | | | |
| 95% UTL with 95% Coverage | 42.66 | 90% Percentile (z) | 23.08 |
| 95% UPL (t) | 29.93 | 95% Percentile (z) | 27.62 |
| 95% USL | 40.99 | 99% Percentile (z) | 38.69 |
| | | | |
| Nonparametric Distribution Free Background Statistics | | | |
| Data appear Normal at 5% Significance Level | | | |
| | | | |
| Nonparametric Upper Limits for Background Threshold Values | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 27 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 27 | 95% BCA Bootstrap UTL with 95% Coverage | 27 |
| 95% UPL | 27 | 90% Percentile | 22.65 |
| 90% Chebyshev UPL | 34.51 | 95% Percentile | 24.38 |
| 95% Chebyshev UPL | 43.92 | 99% Percentile | 26.48 |
| 95% USL | 27 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |

| copper | | | |
|---|---|---|---|
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 12 |
| Minimum | 15 | First Quartile | 18 |
| Second Largest | 60.2 | Median | 21.5 |
| Maximum | 62.8 | Third Quartile | 33.48 |
| Mean | 28.85 | SD | 15.78 |
| Coefficient of Variation | 0.547 | Skewness | 1.274 |
| Mean of logged Data | 3.244 | SD of logged Data | 0.482 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.801 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.213 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Normal at 5% Significance Level | |
| **Data appear Approximate Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 68.68 | 90% Percentile (z) | 49.07 |
| 95% UPL (t) | 57.36 | 95% Percentile (z) | 54.81 |
| 95% USL | 67.41 | 99% Percentile (z) | 65.56 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.943 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.742 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.212 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.216 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data follow Appr. Gamma Distribution at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 4.383 | k star (bias corrected MLE) | 3.603 |
| Theta hat (MLE) | 6.582 | Theta star (bias corrected MLE) | 8.007 |
| nu hat (MLE) | 140.3 | nu star (bias corrected) | 115.3 |
| MLE Mean (bias corrected) | 28.85 | MLE Sd (bias corrected) | 15.2 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 59.22 | 90% Percentile | 49.23 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 59.64 | 95% Percentile | 57.52 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 77.3 | 99% Percentile | 75.31 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 79.13 | | |
| 95% WH USL | 75.1 | 95% HW USL | 76.72 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.876 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.206 | **Lilliefors Lognormal GOF Test** | |

| | | | |
|---|---|---|---|
| 5% Lilliefors Critical Value | 0.213 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 86.59 | 90% Percentile (z) | 47.55 |
| 95% UPL (t) | 61.27 | 95% Percentile (z) | 56.66 |
| 95% USL | 83.28 | 99% Percentile (z) | 78.72 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Approximate Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 62.8 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 62.8 | 95% BCA Bootstrap UTL with 95% Coverage | 62.8 |
| 95% UPL | 62.8 | 90% Percentile | 54.6 |
| 90% Chebyshev UPL | 77.65 | 95% Percentile | 60.85 |
| 95% Chebyshev UPL | 99.75 | 99% Percentile | 62.41 |
| 95% USL | 62.8 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **lead** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 10 | Number of Distinct Observations | 9 |
| | | Number of Missing Observations | 6 |
| Minimum | 0.55 | First Quartile | 21.25 |
| Second Largest | 32 | Median | 25 |
| Maximum | 43 | Third Quartile | 28.25 |
| Mean | 22.76 | SD | 12.49 |
| Coefficient of Variation | 0.549 | Skewness | -0.582 |
| Mean of logged Data | 2.721 | SD of logged Data | 1.328 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.911 | d2max (for USL) | 2.176 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.912 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.842 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.244 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.262 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |

| | | | |
|---|---|---|---|
| 95% UTL with 95% Coverage | 59.11 | 90% Percentile (z) | 38.76 |
| 95% UPL (t) | 46.76 | 95% Percentile (z) | 43.29 |
| 95% USL | 49.93 | 99% Percentile (z) | 51.8 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 1.256 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.741 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.377 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.272 | Data Not Gamma Distributed at 5% Significance Level | |
| **Data Not Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 1.383 | k star (bias corrected MLE) | 1.034 |
| Theta hat (MLE) | 16.46 | Theta star (bias corrected MLE) | 22 |
| nu hat (MLE) | 27.65 | nu star (bias corrected) | 20.69 |
| MLE Mean (bias corrected) | 22.76 | MLE Sd (bias corrected) | 22.37 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 74.91 | 90% Percentile | 51.96 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 86.38 | 95% Percentile | 67.36 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 126.4 | 99% Percentile | 103 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 160.3 | | |
| 95% WH USL | 86.44 | 95% HW USL | 102.2 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.676 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.842 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.396 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.262 | Data Not Lognormal at 5% Significance Level | |
| **Data Not Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 726.1 | 90% Percentile (z) | 83.39 |
| 95% UPL (t) | 195.4 | 95% Percentile (z) | 135.1 |
| 95% USL | 273.6 | 99% Percentile (z) | 334 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 10 | 95% UTL with 95% Coverage | 43 |
| Approx, f used to compute achieved CC | 0.526 | Approximate Actual Confidence Coefficient achieved by UTL | 0.401 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 43 | 95% BCA Bootstrap UTL with 95% Coverage | 43 |
| 95% UPL | 43 | 90% Percentile | 33.1 |
| 90% Chebyshev UPL | 62.05 | 95% Percentile | 38.05 |
| 95% Chebyshev UPL | 79.84 | 99% Percentile | 42.01 |
| 95% USL | 43 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |

| | | | |
|---|---|---|---|
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **manganese** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 13 |
| Minimum | 310 | First Quartile | 432.5 |
| Second Largest | 813 | Median | 455 |
| Maximum | 940 | Third Quartile | 715.5 |
| Mean | 547.3 | SD | 182.1 |
| Coefficient of Variation | 0.333 | Skewness | 0.921 |
| Mean of logged Data | 6.257 | SD of logged Data | 0.313 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.854 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.295 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 1007 | 90% Percentile (z) | 780.7 |
| 95% UPL (t) | 876.4 | 95% Percentile (z) | 846.9 |
| 95% USL | 992.3 | 99% Percentile (z) | 971 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 1.03 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.739 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.281 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.215 | Data Not Gamma Distributed at 5% Significance Level | |
| **Data Not Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 10.67 | k star (bias corrected MLE) | 8.708 |
| Theta hat (MLE) | 51.31 | Theta star (bias corrected MLE) | 62.85 |
| nu hat (MLE) | 341.3 | nu star (bias corrected) | 278.7 |
| MLE Mean (bias corrected) | 547.3 | MLE Sd (bias corrected) | 185.5 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 899.2 | 90% Percentile | 794.4 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 903.3 | 95% Percentile | 883.7 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 1083 | 99% Percentile | 1068 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 1097 | | |
| 95% WH USL | 1061 | 95% HW USL | 1074 |

| | | | |
|---|---|---|---|
| | | | |
| Lognormal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.896 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.264 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Lognormal at 5% Significance Level | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 1149 | 90% Percentile (z) | 779 |
| 95% UPL (t) | 918 | 95% Percentile (z) | 872.6 |
| 95% USL | 1120 | 99% Percentile (z) | 1080 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 940 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 940 | 95% BCA Bootstrap UTL with 95% Coverage | 940 |
| 95% UPL | 940 | 90% Percentile | 786 |
| 90% Chebyshev UPL | 1110 | 95% Percentile | 844.8 |
| 95% Chebyshev UPL | 1366 | 99% Percentile | 921 |
| 95% USL | 940 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **mercury** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 15 | | |
| Number of Detects | 13 | Number of Non-Detects | 3 |
| Number of Distinct Detects | 13 | Number of Distinct Non-Detects | 3 |
| Minimum Detect | 0.0072 | Minimum Non-Detect | 0.0067 |
| Maximum Detect | 0.28 | Maximum Non-Detect | 0.023 |
| Variance Detected | 0.00492 | Percent Non-Detects | 18.75% |
| Mean Detected | 0.0499 | SD Detected | 0.0701 |
| Mean of Detected Logged Data | -3.402 | SD of Detected Logged Data | 0.807 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| Shapiro Wilk Test Statistic | 0.471 | **Shapiro Wilk GOF Test** | |

| | | | | |
|---|---|---|---|---|
| 5% Shapiro Wilk Critical Value | 0.866 | Data Not Normal at 5% Significance Level | | |
| Lilliefors Test Statistic | 0.4 | **Lilliefors GOF Test** | | |
| 5% Lilliefors Critical Value | 0.234 | Data Not Normal at 5% Significance Level | | |
| **Data Not Normal at 5% Significance Level** | | | | |
| | | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | | |
| KM Mean | 0.0421 | | KM SD | 0.0629 |
| 95% UTL95% Coverage | 0.201 | | 95% KM UPL (t) | 0.156 |
| 90% KM Percentile (z) | 0.123 | | 95% KM Percentile (z) | 0.146 |
| 99% KM Percentile (z) | 0.188 | | 95% KM USL | 0.196 |
| | | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | | |
| Mean | 0.0421 | | SD | 0.065 |
| 95% UTL95% Coverage | 0.206 | | 95% UPL (t) | 0.16 |
| 90% Percentile (z) | 0.125 | | 95% Percentile (z) | 0.149 |
| 99% Percentile (z) | 0.193 | | 95% USL | 0.201 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | | |
| | | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | | |
| A-D Test Statistic | 1.525 | **Anderson-Darling GOF Test** | | |
| 5% A-D Critical Value | 0.752 | Data Not Gamma Distributed at 5% Significance Level | | |
| K-S Test Statistic | 0.279 | **Kolmogorov-Smirnov GOF** | | |
| 5% K-S Critical Value | 0.241 | Data Not Gamma Distributed at 5% Significance Level | | |
| **Data Not Gamma Distributed at 5% Significance Level** | | | | |
| | | | | |
| **Gamma Statistics on Detected Data Only** | | | | |
| k hat (MLE) | 1.377 | | k star (bias corrected MLE) | 1.111 |
| Theta hat (MLE) | 0.0363 | | Theta star (bias corrected MLE) | 0.045 |
| nu hat (MLE) | 35.81 | | nu star (bias corrected) | 28.88 |
| MLE Mean (bias corrected) | 0.0499 | | | |
| MLE Sd (bias corrected) | 0.0474 | | 95% Percentile of Chisquare (2kstar) | 6.414 |
| | | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | | |
| This is especially true when the sample size is small. | | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | |
| Minimum | 0.0072 | | Mean | 0.0425 |
| Maximum | 0.28 | | Median | 0.0255 |
| SD | 0.0648 | | CV | 1.526 |
| k hat (MLE) | 1.207 | | k star (bias corrected MLE) | 1.023 |
| Theta hat (MLE) | 0.0352 | | Theta star (bias corrected MLE) | 0.0415 |
| nu hat (MLE) | 38.64 | | nu star (bias corrected) | 32.73 |
| MLE Mean (bias corrected) | 0.0425 | | MLE Sd (bias corrected) | 0.042 |
| 95% Percentile of Chisquare (2kstar) | 6.079 | | 90% Percentile | 0.0972 |
| 95% Percentile | 0.126 | | 99% Percentile | 0.193 |
| **The following statistics are computed using Gamma ROS Statistics on Imputed Data** | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | |
| WH | HW | | WH | HW |

| | | | | | |
|---|---|---|---|---|---|
| 95% Approx. Gamma UTL with 95% Coverage | 0.195 | 0.2 | 95% Approx. Gamma UPL | 0.128 | 0.126 |
| 95% Gamma USL | 0.187 | 0.19 | | | |
| | | | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | | | |
| Mean (KM) | 0.0421 | | SD (KM) | 0.0629 | |
| Variance (KM) | 0.00396 | | SE of Mean (KM) | 0.0164 | |
| k hat (KM) | 0.448 | | k star (KM) | 0.405 | |
| nu hat (KM) | 14.33 | | nu star (KM) | 12.97 | |
| theta hat (KM) | 0.094 | | theta star (KM) | 0.104 | |
| 80% gamma percentile (KM) | 0.068 | | 90% gamma percentile (KM) | 0.119 | |
| 95% gamma percentile (KM) | 0.174 | | 99% gamma percentile (KM) | 0.313 | |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.193 | 0.2 | 95% Approx. Gamma UPL | 0.126 | 0.125 |
| 95% KM Gamma Percentile | 0.113 | 0.112 | 95% Gamma USL | 0.185 | 0.19 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| Shapiro Wilk Test Statistic | 0.844 | | **Shapiro Wilk GOF Test** | | |
| 5% Shapiro Wilk Critical Value | 0.866 | | Data Not Lognormal at 5% Significance Level | | |
| Lilliefors Test Statistic | 0.227 | | **Lilliefors GOF Test** | | |
| 5% Lilliefors Critical Value | 0.234 | | Detected Data appear Lognormal at 5% Significance Level | | |
| **Detected Data appear Approximate Lognormal at 5% Significance Level** | | | | | |
| | | | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | | | |
| Mean in Original Scale | 0.0419 | | Mean in Log Scale | -3.691 | |
| SD in Original Scale | 0.065 | | SD in Log Scale | 0.958 | |
| 95% UTL95% Coverage | 0.28 | | 95% BCA UTL95% Coverage | 0.28 | |
| 95% Bootstrap (%) UTL95% Coverage | 0.28 | | 95% UPL (t) | 0.141 | |
| 90% Percentile (z) | 0.0852 | | 95% Percentile (z) | 0.121 | |
| 99% Percentile (z) | 0.232 | | 95% USL | 0.259 | |
| | | | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | | | |
| KM Mean of Logged Data | -3.68 | | 95% KM UTL (Lognormal)95% Coverage | 0.256 | |
| KM SD of Logged Data | 0.918 | | 95% KM UPL (Lognormal) | 0.133 | |
| 95% KM Percentile Lognormal (z) | 0.114 | | 95% KM USL (Lognormal) | 0.238 | |
| | | | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | | | |
| Mean in Original Scale | 0.0421 | | Mean in Log Scale | -3.687 | |
| SD in Original Scale | 0.065 | | SD in Log Scale | 0.979 | |
| 95% UTL95% Coverage | 0.296 | | 95% UPL (t) | 0.147 | |
| 90% Percentile (z) | 0.0878 | | 95% Percentile (z) | 0.125 | |
| 99% Percentile (z) | 0.244 | | 95% USL | 0.274 | |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | | | |
| | | | | | |
| **Nonparametric Distribution Free Background Statistics** | | | | | |
| **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | |
| | | | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | | | |

| | | | |
|---|---|---|---|
| Order of Statistic, r | 16 | 95% UTL with95% Coverage | 0.28 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 0.28 |
| 95% USL | 0.28 | 95% KM Chebyshev UPL | 0.325 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **nickel** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 14 |
| Minimum | 4.9 | First Quartile | 5.35 |
| Second Largest | 12.8 | Median | 6.99 |
| Maximum | 20 | Third Quartile | 8.635 |
| Mean | 8.168 | SD | 4.026 |
| Coefficient of Variation | 0.493 | Skewness | 1.97 |
| Mean of logged Data | 2.014 | SD of logged Data | 0.404 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.767 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.227 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 18.33 | 90% Percentile (z) | 13.33 |
| 95% UPL (t) | 15.44 | 95% Percentile (z) | 14.79 |
| 95% USL | 18 | 99% Percentile (z) | 17.53 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.845 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.741 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.192 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.216 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data follow Appr. Gamma Distribution at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 5.949 | k star (bias corrected MLE) | 4.876 |
| Theta hat (MLE) | 1.373 | Theta star (bias corrected MLE) | 1.675 |
| nu hat (MLE) | 190.4 | nu star (bias corrected) | 156 |
| MLE Mean (bias corrected) | 8.168 | MLE Sd (bias corrected) | 3.699 |
| | | | |

| | | | |
|---|---|---|---|
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 15.39 | 90% Percentile | 13.12 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 15.41 | 95% Percentile | 15.05 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 19.49 | 99% Percentile | 19.12 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 19.74 | | |
| 95% WH USL | 18.99 | 95% HW USL | 19.22 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.884 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.18 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 20.77 | 90% Percentile (z) | 12.57 |
| 95% UPL (t) | 15.55 | 95% Percentile (z) | 14.56 |
| 95% USL | 20.11 | 99% Percentile (z) | 19.18 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Approximate Gamma Distribution at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 20 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 20 | 95% BCA Bootstrap UTL with 95% Coverage | 20 |
| 95% UPL | 20 | 90% Percentile | 12.8 |
| 90% Chebyshev UPL | 20.62 | 95% Percentile | 14.6 |
| 95% Chebyshev UPL | 26.26 | 99% Percentile | 18.92 |
| 95% USL | 20 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **selenium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 16 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 14 | | |
| Number of Detects | 12 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 11 | Number of Distinct Non-Detects | 3 |
| Minimum Detect | 0.306 | Minimum Non-Detect | 0.53 |
| Maximum Detect | 1.7 | Maximum Non-Detect | 0.65 |
| Variance Detected | 0.258 | Percent Non-Detects | 25% |
| Mean Detected | 0.986 | SD Detected | 0.508 |
| Mean of Detected Logged Data | -0.157 | SD of Detected Logged Data | 0.582 |

| | | | |
|---|---|---|---|
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| Shapiro Wilk Test Statistic | 0.895 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.859 | Detected Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.214 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.243 | Detected Data appear Normal at 5% Significance Level | |
| **Detected Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.854 | KM SD | 0.481 |
| 95% UTL95% Coverage | 2.068 | 95% KM UPL (t) | 1.724 |
| 90% KM Percentile (z) | 1.471 | 95% KM Percentile (z) | 1.646 |
| 99% KM Percentile (z) | 1.973 | 95% KM USL | 2.03 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.813 | SD | 0.534 |
| 95% UTL95% Coverage | 2.16 | 95% UPL (t) | 1.778 |
| 90% Percentile (z) | 1.497 | 95% Percentile (z) | 1.691 |
| 99% Percentile (z) | 2.055 | 95% USL | 2.117 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| A-D Test Statistic | 0.53 | **Anderson-Darling GOF Test** | |
| 5% A-D Critical Value | 0.737 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.205 | **Kolmogorov-Smirnov GOF** | |
| 5% K-S Critical Value | 0.247 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 3.662 | k star (bias corrected MLE) | 2.802 |
| Theta hat (MLE) | 0.269 | Theta star (bias corrected MLE) | 0.352 |
| nu hat (MLE) | 87.88 | nu star (bias corrected) | 67.25 |
| MLE Mean (bias corrected) | 0.986 | | |
| MLE Sd (bias corrected) | 0.589 | 95% Percentile of Chisquare (2kstar) | 12 |
| | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | |
| This is especially true when the sample size is small. | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | |
| Minimum | 0.306 | Mean | 0.859 |
| Maximum | 1.7 | Median | 0.594 |
| SD | 0.493 | CV | 0.574 |
| k hat (MLE) | 3.391 | k star (bias corrected MLE) | 2.797 |
| Theta hat (MLE) | 0.253 | Theta star (bias corrected MLE) | 0.307 |
| nu hat (MLE) | 108.5 | nu star (bias corrected) | 89.5 |

| | | | |
|---|---|---|---|
| MLE Mean (bias corrected) | 0.859 | MLE Sd (bias corrected) | 0.514 |
| 95% Percentile of Chisquare (2kstar) | 11.98 | 90% Percentile | 1.548 |
| 95% Percentile | 1.84 | 99% Percentile | 2.476 |

**The following statistics are computed using Gamma ROS Statistics on Imputed Data**

**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**

| | WH | HW | | WH | HW |
|---|---|---|---|---|---|
| 95% Approx. Gamma UTL with 95% Coverage | 2.562 | 2.667 | 95% Approx. Gamma UPL | 1.909 | 1.943 |
| 95% Gamma USL | 2.482 | 2.577 | | | |

**Estimates of Gamma Parameters using KM Estimates**

| | | | |
|---|---|---|---|
| Mean (KM) | 0.854 | SD (KM) | 0.481 |
| Variance (KM) | 0.231 | SE of Mean (KM) | 0.127 |
| k hat (KM) | 3.156 | k star (KM) | 2.606 |
| nu hat (KM) | 101 | nu star (KM) | 83.39 |
| theta hat (KM) | 0.271 | theta star (KM) | 0.328 |
| 80% gamma percentile (KM) | 1.24 | 90% gamma percentile (KM) | 1.564 |
| 95% gamma percentile (KM) | 1.869 | 99% gamma percentile (KM) | 2.534 |

**The following statistics are computed using gamma distribution and KM estimates**

**Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods**

| | WH | HW | | WH | HW |
|---|---|---|---|---|---|
| 95% Approx. Gamma UTL with 95% Coverage | 2.503 | 2.604 | 95% Approx. Gamma UPL | 1.871 | 1.903 |
| 95% KM Gamma Percentile | 1.745 | 1.766 | 95% Gamma USL | 2.426 | 2.516 |

**Lognormal GOF Test on Detected Observations Only**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.906 | **Shapiro Wilk GOF Test** |
| 5% Shapiro Wilk Critical Value | 0.859 | Detected Data appear Lognormal at 5% Significance Level |
| Lilliefors Test Statistic | 0.181 | **Lilliefors GOF Test** |
| 5% Lilliefors Critical Value | 0.243 | Detected Data appear Lognormal at 5% Significance Level |

**Detected Data appear Lognormal at 5% Significance Level**

**Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects**

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.859 | Mean in Log Scale | -0.305 |
| SD in Original Scale | 0.492 | SD in Log Scale | 0.569 |
| 95% UTL95% Coverage | 3.101 | 95% BCA UTL95% Coverage | 1.7 |
| 95% Bootstrap (%) UTL95% Coverage | 1.7 | 95% UPL (t) | 2.062 |
| 90% Percentile (z) | 1.529 | 95% Percentile (z) | 1.88 |
| 99% Percentile (z) | 2.771 | 95% USL | 2.962 |

**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| KM Mean of Logged Data | -0.317 | 95% KM UTL (Lognormal)95% Coverage | 3.053 |
| KM SD of Logged Data | 0.568 | 95% KM UPL (Lognormal) | 2.032 |
| 95% KM Percentile Lognormal (z) | 1.853 | 95% KM USL (Lognormal) | 2.916 |

**Background DL/2 Statistics Assuming Lognormal Distribution**

| | | | |
|---|---|---|---|
| Mean in Original Scale | 0.813 | Mean in Log Scale | -0.424 |
| SD in Original Scale | 0.534 | SD in Log Scale | 0.691 |
| 95% UTL95% Coverage | 3.74 | 95% UPL (t) | 2.28 |
| 90% Percentile (z) | 1.586 | 95% Percentile (z) | 2.038 |
| 99% Percentile (z) | 3.263 | 95% USL | 3.538 |

| | | | |
|---|---|---|---|
| DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons. | | | |
| | | | |
| Nonparametric Distribution Free Background Statistics | | | |
| Data appear to follow a Discernible Distribution at 5% Significance Level | | | |
| | | | |
| Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects) | | | |
| Order of Statistic, r | 16 | 95% UTL with95% Coverage | 1.7 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 1.7 |
| 95% USL | 1.7 | 95% KM Chebyshev UPL | 3.016 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| strontium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 16 | Number of Distinct Observations | 13 |
| Minimum | 14 | First Quartile | 16.6 |
| Second Largest | 29 | Median | 19 |
| Maximum | 46 | Third Quartile | 24.55 |
| Mean | 21.7 | SD | 7.877 |
| Coefficient of Variation | 0.363 | Skewness | 2.078 |
| Mean of logged Data | 3.029 | SD of logged Data | 0.307 |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 2.524 | d2max (for USL) | 2.443 |
| | | | |
| Normal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.791 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.208 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Normal at 5% Significance Level | |
| Data appear Approximate Normal at 5% Significance Level | | | |
| | | | |
| Background Statistics Assuming Normal Distribution | | | |
| 95% UTL with 95% Coverage | 41.58 | 90% Percentile (z) | 31.79 |
| 95% UPL (t) | 35.93 | 95% Percentile (z) | 34.66 |
| 95% USL | 40.94 | 99% Percentile (z) | 40.02 |
| | | | |
| Gamma GOF Test | | | |
| A-D Test Statistic | 0.604 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | 0.739 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.186 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | 0.215 | Detected data appear Gamma Distributed at 5% Significance Level | |
| Detected data appear Gamma Distributed at 5% Significance Level | | | |
| | | | |

| | | | |
|---|---|---|---|
| **Gamma Statistics** | | | |
| k hat (MLE) | 10.41 | k star (bias corrected MLE) | 8.501 |
| Theta hat (MLE) | 2.084 | Theta star (bias corrected MLE) | 2.553 |
| nu hat (MLE) | 333.2 | nu star (bias corrected) | 272 |
| MLE Mean (bias corrected) | 21.7 | MLE Sd (bias corrected) | 7.443 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 35.79 | 90% Percentile | 31.62 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 35.82 | 95% Percentile | 35.21 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 43.19 | 99% Percentile | 42.64 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 43.54 | | |
| 95% WH USL | 42.31 | 95% HW USL | 42.61 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.91 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.887 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.17 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.213 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 44.88 | 90% Percentile (z) | 30.64 |
| 95% UPL (t) | 36 | 95% Percentile (z) | 34.25 |
| 95% USL | 43.78 | 99% Percentile (z) | 42.23 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Approximate Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 16 | 95% UTL with 95% Coverage | 46 |
| Approx, f used to compute achieved CC | 0.842 | Approximate Actual Confidence Coefficient achieved by UTL | 0.56 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 46 | 95% BCA Bootstrap UTL with 95% Coverage | 46 |
| 95% UPL | 46 | 90% Percentile | 27.05 |
| 90% Chebyshev UPL | 46.06 | 95% Percentile | 33.25 |
| 95% Chebyshev UPL | 57.09 | 99% Percentile | 43.45 |
| 95% USL | 46 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **thallium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 10 | Number of Missing Observations | 6 |
| Number of Distinct Observations | 8 | | |
| Number of Detects | 1 | Number of Non-Detects | 9 |

| | | | |
|---|---|---|---|
| Number of Distinct Detects | 1 | Number of Distinct Non-Detects | 7 |
| Minimum Detect | 2.3 | Minimum Non-Detect | 0.53 |
| Maximum Detect | 2.3 | Maximum Non-Detect | 0.65 |
| Variance Detected | N/A | Percent Non-Detects | 90% |
| Mean Detected | 2.3 | SD Detected | N/A |
| Mean of Detected Logged Data | 0.833 | SD of Detected Logged Data | N/A |

**Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!**

**It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).**

**The data set for variable thallium was not processed!**

**vanadium**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 10 | Number of Distinct Observations | 8 |
| | | Number of Missing Observations | 6 |
| Minimum | 34 | First Quartile | 35.5 |
| Second Largest | 67 | Median | 38.5 |
| Maximum | 190 | Third Quartile | 52.5 |
| Mean | 57.9 | SD | 47.63 |
| Coefficient of Variation | 0.823 | Skewness | 2.884 |
| Mean of logged Data | 3.89 | SD of logged Data | 0.527 |

**Critical Values for Background Threshold Values (BTVs)**

| | | | |
|---|---|---|---|
| Tolerance Factor K (For UTL) | 2.911 | d2max (for USL) | 2.176 |

**Normal GOF Test**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.548 | **Shapiro Wilk GOF Test** |
| 5% Shapiro Wilk Critical Value | 0.842 | Data Not Normal at 5% Significance Level |
| Lilliefors Test Statistic | 0.341 | **Lilliefors GOF Test** |
| 5% Lilliefors Critical Value | 0.262 | Data Not Normal at 5% Significance Level |

**Data Not Normal at 5% Significance Level**

**Background Statistics Assuming Normal Distribution**

| | | | |
|---|---|---|---|
| 95% UTL with 95% Coverage | 196.6 | 90% Percentile (z) | 118.9 |
| 95% UPL (t) | 149.5 | 95% Percentile (z) | 136.2 |
| 95% USL | 161.5 | 99% Percentile (z) | 168.7 |

**Gamma GOF Test**

| | | |
|---|---|---|
| A-D Test Statistic | 1.459 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.732 | Data Not Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.285 | **Kolmogorov-Smirnov Gamma GOF Test** |
| 5% K-S Critical Value | 0.268 | Data Not Gamma Distributed at 5% Significance Level |

**Data Not Gamma Distributed at 5% Significance Level**

**Gamma Statistics**

| | | | |
|---|---|---|---|
| k hat (MLE) | 3.123 | k star (bias corrected MLE) | 2.253 |
| Theta hat (MLE) | 18.54 | Theta star (bias corrected MLE) | 25.7 |

| | | | |
|---|---|---|---|
| nu hat (MLE) | 62.46 | nu star (bias corrected) | 45.06 |
| MLE Mean (bias corrected) | 57.9 | MLE Sd (bias corrected) | 38.58 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 139.3 | 90% Percentile | 109.5 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 138.1 | 95% Percentile | 132.3 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 209.5 | 99% Percentile | 182.5 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 212.7 | | |
| 95% WH USL | 155.5 | 95% HW USL | 155 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.71 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.842 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.249 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.262 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 227 | 90% Percentile (z) | 96.14 |
| 95% UPL (t) | 134.8 | 95% Percentile (z) | 116.4 |
| 95% USL | 154.1 | 99% Percentile (z) | 166.8 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 10 | 95% UTL with 95% Coverage | 190 |
| Approx, f used to compute achieved CC | 0.526 | Approximate Actual Confidence Coefficient achieved by UTL | 0.401 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 190 | 95% BCA Bootstrap UTL with 95% Coverage | 190 |
| 95% UPL | 190 | 90% Percentile | 79.3 |
| 90% Chebyshev UPL | 207.8 | 95% Percentile | 134.7 |
| 95% Chebyshev UPL | 275.7 | 99% Percentile | 178.9 |
| 95% USL | 190 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **zinc** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 10 | Number of Distinct Observations | 10 |
| | | Number of Missing Observations | 6 |
| Minimum | 40 | First Quartile | 44.25 |
| Second Largest | 75 | Median | 46.5 |
| Maximum | 230 | Third Quartile | 49.75 |
| Mean | 66.9 | SD | 58.12 |

| | | | |
|---|---|---|---|
| Coefficient of Variation | 0.869 | Skewness | 3.01 |
| Mean of logged Data | 4.028 | SD of logged Data | 0.524 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 2.911 | d2max (for USL) | 2.176 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.485 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.842 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.414 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.262 | Data Not Normal at 5% Significance Level | |
| **Data Not Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 236.1 | 90% Percentile (z) | 141.4 |
| 95% UPL (t) | 178.6 | 95% Percentile (z) | 162.5 |
| 95% USL | 193.4 | 99% Percentile (z) | 202.1 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 2.033 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.732 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.412 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.268 | Data Not Gamma Distributed at 5% Significance Level | |
| **Data Not Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 3.009 | k star (bias corrected MLE) | 2.173 |
| Theta hat (MLE) | 22.23 | Theta star (bias corrected MLE) | 30.79 |
| nu hat (MLE) | 60.18 | nu star (bias corrected) | 43.46 |
| MLE Mean (bias corrected) | 66.9 | MLE Sd (bias corrected) | 45.38 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 162.6 | 90% Percentile | 127.6 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 160.4 | 95% Percentile | 154.6 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 245.8 | 99% Percentile | 214.2 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 248.1 | | |
| 95% WH USL | 181.7 | 95% HW USL | 180.2 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.608 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.842 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.388 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.262 | Data Not Lognormal at 5% Significance Level | |
| **Data Not Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 258 | 90% Percentile (z) | 109.9 |
| 95% UPL (t) | 153.7 | 95% Percentile (z) | 132.9 |
| 95% USL | 175.6 | 99% Percentile (z) | 189.9 |
| | | | |

| Nonparametric Distribution Free Background Statistics | | | |
|---|---|---|---|
| Data do not follow a Discernible Distribution (0.05) | | | |
| | | | |
| Nonparametric Upper Limits for Background Threshold Values | | | |
| Order of Statistic, r | 10 | 95% UTL with 95% Coverage | 230 |
| Approx, f used to compute achieved CC | 0.526 | Approximate Actual Confidence Coefficient achieved by UTL | 0.401 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 230 | 95% BCA Bootstrap UTL with 95% Coverage | 230 |
| 95% UPL | 230 | 90% Percentile | 90.5 |
| 90% Chebyshev UPL | 249.8 | 95% Percentile | 160.3 |
| 95% Chebyshev UPL | 332.6 | 99% Percentile | 216.1 |
| 95% USL | 230 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |

| | |
|---|---|
| | Goodness-of-Fit Test Statistics for Data Sets with Non-Detects |
| **User Selected Options** | |
| Date/Time of Computation | ProUCL 5.18/17/2021 4:14:53 PM |
| From File | ProUCL Background Inputs.xls |
| Full Precision | OFF |
| Confidence Coefficient | 0.95 |

**antimony**

| | Num Obs | Num Miss | Num Valid | Detects | NDs | % NDs |
|---|---|---|---|---|---|---|
| Raw Statistics | 16 | 6 | 10 | 0 | 10 | 100.00% |

**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**

**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**

**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**

**The data set for variable antimony was not processed!**

**arsenic**

| | |
|---|---|
| **Raw Statistics** | |
| Number of Valid Observations | 16 |
| Number of Distinct Observations | 13 |
| Minimum | 1.4 |
| Maximum | 3.08 |
| Mean of Raw Data | 1.997 |
| Standard Deviation of Raw Data | 0.376 |
| Khat | 33.27 |
| Theta hat | 0.06 |
| Kstar | 27.08 |
| Theta star | 0.0737 |
| Mean of Log Transformed Data | 0.676 |
| Standard Deviation of Log Transformed Data | 0.176 |
| | |
| **Normal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.929 |
| Shapiro Wilk Test Statistic | 0.887 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 0.039 |
| Lilliefors Test Statistic | 0.147 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data appear Normal at (0.05) Significance Level** | |
| | |
| **Gamma GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.948 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A-D Test Statistic | 0.399 | | | | | | |
| A-D Critical (0.05) Value | 0.736 | | | | | | |
| K-S Test Statistic | 0.124 | | | | | | |
| K-S Critical(0.05) Value | 0.215 | | | | | | |
| **Data appear Gamma Distributed at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.963 | | | | | | |
| Shapiro Wilk Test Statistic | 0.948 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.368 | | | | | | |
| Lilliefors Test Statistic | 0.125 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data appear Lognormal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **barium** | | | | | | | |
| | | | | | | | |
| **Raw Statistics** | | | | | | | |
| Number of Valid Observations | 16 | | | | | | |
| Number of Distinct Observations | 15 | | | | | | |
| Minimum | 36 | | | | | | |
| Maximum | 77.9 | | | | | | |
| Mean of Raw Data | 54.96 | | | | | | |
| Standard Deviation of Raw Data | 11.56 | | | | | | |
| Khat | 25.01 | | | | | | |
| Theta hat | 2.197 | | | | | | |
| Kstar | 20.36 | | | | | | |
| Theta star | 2.699 | | | | | | |
| Mean of Log Transformed Data | 3.986 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.206 | | | | | | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.971 | | | | | | |
| Shapiro Wilk Test Statistic | 0.942 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.378 | | | | | | |
| Lilliefors Test Statistic | 0.192 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data appear Normal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.981 | | | | | | |
| A-D Test Statistic | 0.321 | | | | | | |
| A-D Critical (0.05) Value | 0.736 | | | | | | |
| K-S Test Statistic | 0.17 | | | | | | |
| K-S Critical(0.05) Value | 0.215 | | | | | | |
| **Data appear Gamma Distributed at (0.05) Significance Level** | | | | | | | |

| | |
|---|---|
| **Lognormal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.984 |
| Shapiro Wilk Test Statistic | 0.968 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 0.779 |
| Lilliefors Test Statistic | 0.156 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data appear Lognormal at (0.05) Significance Level** | |
| | |
| **beryllium** | |
| | |
| **Raw Statistics** | |
| Number of Valid Observations | 16 |
| Number of Distinct Observations | 14 |
| Minimum | 0.293 |
| Maximum | 0.99 |
| Mean of Raw Data | 0.507 |
| Standard Deviation of Raw Data | 0.154 |
| Khat | 14.04 |
| Theta hat | 0.0361 |
| Kstar | 11.45 |
| Theta star | 0.0443 |
| Mean of Log Transformed Data | -0.715 |
| Standard Deviation of Log Transformed Data | 0.268 |
| | |
| **Normal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.886 |
| Shapiro Wilk Test Statistic | 0.813 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 0.00264 |
| Lilliefors Test Statistic | 0.228 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data not Normal at (0.05) Significance Level** | |
| | |
| **Gamma GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.92 |
| A-D Test Statistic | 0.558 |
| A-D Critical (0.05) Value | 0.738 |
| K-S Test Statistic | 0.185 |
| K-S Critical(0.05) Value | 0.215 |
| **Data appear Gamma Distributed at (0.05) Significance Level** | |
| | |
| **Lognormal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.953 |
| Shapiro Wilk Test Statistic | 0.933 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | | |
| Approximate Shapiro Wilk P Value | 0.206 | | | | | | | |
| Lilliefors Test Statistic | 0.169 | | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | | |
| **Data appear Lognormal at (0.05) Significance Level** | | | | | | | | |
| | | | | | | | | |
| **cadmium** | | | | | | | | |
| | | | | | | | | |
| | Num Obs | Num Miss | Num Valid | Detects | NDs | % NDs | | |
| Raw Statistics | 16 | 0 | 16 | 7 | 9 | 56.25% | | |
| | | | | | | | | |
| | Number | Minimum | Maximum | Mean | Median | SD | | |
| Statistics (Non-Detects Only) | 9 | 0.27 | 0.3 | 0.283 | 0.28 | 0.0122 | | |
| Statistics (Non-Detects Only) | 7 | 0.0918 | 0.38 | 0.161 | 0.136 | 0.101 | | |
| Statistics (All: NDs treated as DL value) | 16 | 0.0918 | 0.38 | 0.23 | 0.27 | 0.09 | | |
| Statistics (All: NDs treated as DL/2 value) | 16 | 0.0918 | 0.38 | 0.15 | 0.14 | 0.0648 | | |
| Statistics (Normal ROS Imputed Data) | 16 | 0.0772 | 0.38 | 0.147 | 0.136 | 0.0725 | | |
| Statistics (Gamma ROS Imputed Data) | 16 | 0.0789 | 0.38 | 0.143 | 0.131 | 0.0718 | | |
| Statistics (Lognormal ROS Imputed Data) | 16 | 0.0918 | 0.38 | 0.143 | 0.131 | 0.0693 | | |
| | | | | | | | | |
| | K hat | K Star | Theta hat | Log Mean | Log Stdv | Log CV | | |
| Statistics (Non-Detects Only) | 4.282 | 2.542 | 0.0376 | -1.948 | 0.491 | -0.252 | | |
| Statistics (NDs = DL) | 5.628 | 4.614 | 0.0408 | -1.562 | 0.47 | -0.301 | | |
| Statistics (NDs = DL/2) | 9.164 | 7.487 | 0.0164 | -1.952 | 0.312 | -0.16 | | |
| Statistics (Gamma ROS Estimates) | 6.178 | 5.062 | 0.0231 | -2.03 | 0.392 | -0.193 | | |
| Statistics (Lognormal ROS Estimates) | -- | -- | -- | -2.02 | 0.358 | -0.177 | | |
| | | | | | | | | |
| **Normal GOF Test Results** | | | | | | | | |
| | | | | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Normal ROS | | | | |
| Correlation Coefficient R | 0.832 | 0.936 | 0.729 | 0.849 | | | | |
| | | | | | | | | |
| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) | | | | | |
| Shapiro-Wilk (Detects Only) | 0.712 | 0.803 | Data Not Normal | | | | | |
| Shapiro-Wilk (NDs = DL) | 0.866 | 0.887 | Data Not Normal | | | | | |
| Shapiro-Wilk (NDs = DL/2) | 0.566 | 0.887 | Data Not Normal | | | | | |
| Shapiro-Wilk (Normal ROS Estimates) | 0.742 | 0.887 | Data Not Normal | | | | | |
| Lilliefors (Detects Only) | 0.3 | 0.304 | Data Appear Normal | | | | | |
| Lilliefors (NDs = DL) | 0.297 | 0.213 | Data Not Normal | | | | | |
| Lilliefors (NDs = DL/2) | 0.376 | 0.213 | Data Not Normal | | | | | |
| Lilliefors (Normal ROS Estimates) | 0.215 | 0.213 | Data Not Normal | | | | | |
| | | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | | |
| | | | | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Gamma ROS | | | | |
| Correlation Coefficient R | 0.919 | 0.901 | 0.791 | 0.893 | | | | |
| | | | | | | | | |
| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) | | | | | |
| Anderson-Darling (Detects Only) | 0.646 | 0.71 | | | | | | |
| Kolmogorov-Smirnov (Detects Only) | 0.267 | 0.313 | Detected Data Appear Gamma Distributed | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Anderson-Darling (NDs = DL) | 1.302 | 0.741 | | | | | |
| Kolmogorov-Smirnov (NDs = DL) | 0.328 | 0.216 | Data Not Gamma Distributed | | | | |
| Anderson-Darling (NDs = DL/2) | 1.888 | 0.739 | | | | | |
| Kolmogorov-Smirnov (NDs = DL/2) | 0.332 | 0.215 | Data Not Gamma Distributed | | | | |
| Anderson-Darling (Gamma ROS Estimates) | 0.81 | 0.741 | | | | | |
| Kolmogorov-Smirnov (Gamma ROS Est.) | 0.165 | 0.216 | Detected Data appear Approximate Gamma Distr | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Log ROS | | | |
| Correlation Coefficient R | 0.918 | 0.916 | 0.846 | 0.905 | | | |
| | | | | | | | |
| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) | | | | |
| Shapiro-Wilk (Detects Only) | 0.851 | 0.803 | Data Appear Lognormal | | | | |
| Shapiro-Wilk (NDs = DL) | 0.827 | 0.887 | Data Not Lognormal | | | | |
| Shapiro-Wilk (NDs = DL/2) | 0.748 | 0.887 | Data Not Lognormal | | | | |
| Shapiro-Wilk (Lognormal ROS Estimates) | 0.832 | 0.887 | Data Not Lognormal | | | | |
| Lilliefors (Detects Only) | 0.235 | 0.304 | Data Appear Lognormal | | | | |
| Lilliefors (NDs = DL) | 0.33 | 0.213 | Data Not Lognormal | | | | |
| Lilliefors (NDs = DL/2) | 0.305 | 0.213 | Data Not Lognormal | | | | |
| Lilliefors (Lognormal ROS Estimates) | 0.162 | 0.213 | Data Appear Lognormal | | | | |
| | | | | | | | |
| **Note: Substitution methods such as DL or DL/2 are not recommended.** | | | | | | | |
| | | | | | | | |
| **hexavalent chromium** | | | | | | | |
| | | | | | | | |
| | Num Obs | Num Miss | Num Valid | Detects | NDs | % NDs | |
| Raw Statistics | 16 | 0 | 16 | 9 | 7 | 43.75% | |
| | | | | | | | |
| | Number | Minimum | Maximum | Mean | Median | SD | |
| Statistics (Non-Detects Only) | 7 | 0.12 | 1.19 | 0.863 | 1.14 | 0.504 | |
| Statistics (Non-Detects Only) | 9 | 0.21 | 5.34 | 1.176 | 0.81 | 1.579 | |
| Statistics (All: NDs treated as DL value) | 16 | 0.12 | 5.34 | 1.039 | 0.855 | 1.207 | |
| Statistics (All: NDs treated as DL/2 value) | 16 | 0.06 | 5.34 | 0.85 | 0.58 | 1.225 | |
| Statistics (Normal ROS Imputed Data) | 16 | -1.631 | 5.34 | 0.589 | 0.6 | 1.524 | |
| Statistics (Gamma ROS Imputed Data) | 16 | 0.01 | 5.34 | 0.791 | 0.6 | 1.263 | |
| Statistics (Lognormal ROS Imputed Data) | 16 | 0.13 | 5.34 | 0.836 | 0.6 | 1.23 | |
| | | | | | | | |
| | K hat | K Star | Theta hat | Log Mean | Log Stdv | Log CV | |
| Statistics (Non-Detects Only) | 1.299 | 0.94 | 0.905 | -0.27 | 0.867 | -3.21 | |
| Statistics (NDs = DL) | 1.38 | 1.163 | 0.753 | -0.366 | 0.941 | -2.571 | |
| Statistics (NDs = DL/2) | 1.124 | 0.955 | 0.756 | -0.669 | 1.045 | -1.561 | |
| Statistics (Gamma ROS Estimates) | 0.541 | 0.482 | 1.46 | -1.394 | 2.029 | -1.456 | |
| Statistics (Lognormal ROS Estimates) | -- | -- | -- | -0.641 | 0.893 | -1.394 | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Normal ROS | | | |
| Correlation Coefficient R | 0.705 | 0.73 | 0.659 | 0.853 | | | |
| | | | | | | | |

| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) |
|---|---|---|---|
| Shapiro-Wilk (Detects Only) | 0.531 | 0.829 | Data Not Normal |
| Shapiro-Wilk (NDs = DL) | 0.564 | 0.887 | Data Not Normal |
| Shapiro-Wilk (NDs = DL/2) | 0.467 | 0.887 | Data Not Normal |
| Shapiro-Wilk (Normal ROS Estimates) | 0.759 | 0.887 | Data Not Normal |
| Lilliefors (Detects Only) | 0.463 | 0.274 | Data Not Normal |
| Lilliefors (NDs = DL) | 0.388 | 0.213 | Data Not Normal |
| Lilliefors (NDs = DL/2) | 0.428 | 0.213 | Data Not Normal |
| Lilliefors (Normal ROS Estimates) | 0.308 | 0.213 | Data Not Normal |

**Gamma GOF Test Results**

| | No NDs | NDs = DL | NDs = DL/2 | Gamma ROS |
|---|---|---|---|---|
| Correlation Coefficient R | 0.864 | 0.856 | 0.822 | 0.884 |

| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) |
|---|---|---|---|
| Anderson-Darling (Detects Only) | 1.129 | 0.738 | |
| Kolmogorov-Smirnov (Detects Only) | 0.394 | 0.285 | Data Not Gamma Distributed |
| Anderson-Darling (NDs = DL) | 0.894 | 0.757 | |
| Kolmogorov-Smirnov (NDs = DL) | 0.265 | 0.219 | Data Not Gamma Distributed |
| Anderson-Darling (NDs = DL/2) | 1.404 | 0.761 | |
| Kolmogorov-Smirnov (NDs = DL/2) | 0.299 | 0.221 | Data Not Gamma Distributed |
| Anderson-Darling (Gamma ROS Estimates) | 1.083 | 0.793 | |
| Kolmogorov-Smirnov (Gamma ROS Est.) | 0.234 | 0.227 | Data Not Gamma Distributed |

**Lognormal GOF Test Results**

| | No NDs | NDs = DL | NDs = DL/2 | Log ROS |
|---|---|---|---|---|
| Correlation Coefficient R | 0.904 | 0.938 | 0.904 | 0.942 |

| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) |
|---|---|---|---|
| Shapiro-Wilk (Detects Only) | 0.852 | 0.829 | Data Appear Lognormal |
| Shapiro-Wilk (NDs = DL) | 0.893 | 0.887 | Data Appear Lognormal |
| Shapiro-Wilk (NDs = DL/2) | 0.839 | 0.887 | Data Not Lognormal |
| Shapiro-Wilk (Lognormal ROS Estimates) | 0.902 | 0.887 | Data Appear Lognormal |
| Lilliefors (Detects Only) | 0.324 | 0.274 | Data Not Lognormal |
| Lilliefors (NDs = DL) | 0.221 | 0.213 | Data Not Lognormal |
| Lilliefors (NDs = DL/2) | 0.246 | 0.213 | Data Not Lognormal |
| Lilliefors (Lognormal ROS Estimates) | 0.22 | 0.213 | Data Not Lognormal |

**Note: Substitution methods such as DL or DL/2 are not recommended.**

**trivalent chromium**

**Raw Statistics**

| | |
|---|---|
| Number of Valid Observations | 16 |
| Number of Distinct Observations | 14 |
| Minimum | 16.16 |
| Maximum | 70.2 |
| Mean of Raw Data | 26.43 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Standard Deviation of Raw Data | 13.43 | | | | | | |
| Khat | 6.387 | | | | | | |
| Theta hat | 4.139 | | | | | | |
| Kstar | 5.231 | | | | | | |
| Theta star | 5.053 | | | | | | |
| Mean of Log Transformed Data | 3.194 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.377 | | | | | | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.804 | | | | | | |
| Shapiro Wilk Test Statistic | 0.668 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 3.1044E-5 | | | | | | |
| Lilliefors Test Statistic | 0.307 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data not Normal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.883 | | | | | | |
| A-D Test Statistic | 1.306 | | | | | | |
| A-D Critical (0.05) Value | 0.741 | | | | | | |
| K-S Test Statistic | 0.272 | | | | | | |
| K-S Critical(0.05) Value | 0.216 | | | | | | |
| **Data not Gamma Distributed at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.905 | | | | | | |
| Shapiro Wilk Test Statistic | 0.831 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.00584 | | | | | | |
| Lilliefors Test Statistic | 0.245 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data not Lognormal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Non-parametric GOF Test Results** | | | | | | | |
| | | | | | | | |
| **Data do not follow a discernible distribution at (0.05) Level of Significanc** | | | | | | | |
| | | | | | | | |
| **total chromium** | | | | | | | |
| | | | | | | | |
| **Raw Statistics** | | | | | | | |
| Number of Valid Observations | 16 | | | | | | |
| Number of Distinct Observations | 14 | | | | | | |
| Minimum | 16 | | | | | | |
| Maximum | 70.2 | | | | | | |
| Mean of Raw Data | 26.63 | | | | | | |
| Standard Deviation of Raw Data | 13.98 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Khat | 5.828 | | | | | | |
| Theta hat | 4.568 | | | | | | |
| Kstar | 4.777 | | | | | | |
| Theta star | 5.573 | | | | | | |
| Mean of Log Transformed Data | 3.194 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.397 | | | | | | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.819 | | | | | | |
| Shapiro Wilk Test Statistic | 0.689 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 5.8616E-5 | | | | | | |
| Lilliefors Test Statistic | 0.31 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data not Normal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.901 | | | | | | |
| A-D Test Statistic | 1.323 | | | | | | |
| A-D Critical (0.05) Value | 0.741 | | | | | | |
| K-S Test Statistic | 0.273 | | | | | | |
| K-S Critical(0.05) Value | 0.216 | | | | | | |
| **Data not Gamma Distributed at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.909 | | | | | | |
| Shapiro Wilk Test Statistic | 0.833 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.00674 | | | | | | |
| Lilliefors Test Statistic | 0.245 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data not Lognormal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Non-parametric GOF Test Results** | | | | | | | |
| | | | | | | | |
| **Data do not follow a discernible distribution at (0.05) Level of Significanc** | | | | | | | |
| | | | | | | | |
| **cobalt** | | | | | | | |
| | | | | | | | |
| **Raw Statistics** | | | | | | | |
| Number of Valid Observations | 16 | | | | | | |
| Number of Distinct Observations | 14 | | | | | | |
| Minimum | 6.3 | | | | | | |
| Maximum | 27 | | | | | | |
| Mean of Raw Data | 13.73 | | | | | | |
| Standard Deviation of Raw Data | 6.721 | | | | | | |
| Khat | 4.558 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Theta hat | 3.011 | | | | | | |
| Kstar | 3.745 | | | | | | |
| Theta star | 3.665 | | | | | | |
| Mean of Log Transformed Data | 2.506 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.494 | | | | | | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.952 | | | | | | |
| Shapiro Wilk Test Statistic | 0.891 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.0725 | | | | | | |
| Lilliefors Test Statistic | 0.198 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data appear Normal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.974 | | | | | | |
| A-D Test Statistic | 0.69 | | | | | | |
| A-D Critical (0.05) Value | 0.742 | | | | | | |
| K-S Test Statistic | 0.218 | | | | | | |
| K-S Critical(0.05) Value | 0.216 | | | | | | |
| **Data appear Gamma Distributed at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.959 | | | | | | |
| Shapiro Wilk Test Statistic | 0.9 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.108 | | | | | | |
| Lilliefors Test Statistic | 0.215 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |
| **Data appear Approximate_Lognormal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **copper** | | | | | | | |
| | | | | | | | |
| **Raw Statistics** | | | | | | | |
| Number of Valid Observations | 16 | | | | | | |
| Number of Distinct Observations | 12 | | | | | | |
| Minimum | 15 | | | | | | |
| Maximum | 62.8 | | | | | | |
| Mean of Raw Data | 28.85 | | | | | | |
| Standard Deviation of Raw Data | 15.78 | | | | | | |
| Khat | 4.383 | | | | | | |
| Theta hat | 6.582 | | | | | | |
| Kstar | 3.603 | | | | | | |
| Theta star | 8.007 | | | | | | |
| Mean of Log Transformed Data | 3.244 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.482 | | | | | | |

| | |
|---|---|
| **Normal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.9 |
| Shapiro Wilk Test Statistic | 0.801 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 0.00266 |
| Lilliefors Test Statistic | 0.213 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data appear Approximate Normal at (0.05) Significance Level** | |
| | |
| **Gamma GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.957 |
| A-D Test Statistic | 0.943 |
| A-D Critical (0.05) Value | 0.742 |
| K-S Test Statistic | 0.212 |
| K-S Critical(0.05) Value | 0.216 |
| **Data follow Appr. Gamma Distribution at (0.05) Significance Level** | |
| | |
| **Lognormal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.945 |
| Shapiro Wilk Test Statistic | 0.876 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 0.0423 |
| Lilliefors Test Statistic | 0.206 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data appear Approximate_Lognormal at (0.05) Significance Level** | |
| | |
| **lead** | |
| | |
| **Raw Statistics** | |
| Number of Valid Observations | 10 |
| Number of Missing Observations | 6 |
| Number of Distinct Observations | 9 |
| Minimum | 0.55 |
| Maximum | 43 |
| Mean of Raw Data | 22.76 |
| Standard Deviation of Raw Data | 12.49 |
| Khat | 1.383 |
| Theta hat | 16.46 |
| Kstar | 1.034 |
| Theta star | 22 |
| Mean of Log Transformed Data | 2.721 |
| Standard Deviation of Log Transformed Data | 1.328 |
| | |
| **Normal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.95 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Shapiro Wilk Test Statistic | 0.912 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.842 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.242 | | | | | | |
| Lilliefors Test Statistic | 0.244 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.262 | | | | | | |
| **Data appear Normal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.86 | | | | | | |
| A-D Test Statistic | 1.256 | | | | | | |
| A-D Critical (0.05) Value | 0.741 | | | | | | |
| K-S Test Statistic | 0.377 | | | | | | |
| K-S Critical(0.05) Value | 0.272 | | | | | | |
| **Data not Gamma Distributed at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.809 | | | | | | |
| Shapiro Wilk Test Statistic | 0.676 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.842 | | | | | | |
| Approximate Shapiro Wilk P Value | 4.1142E-4 | | | | | | |
| Lilliefors Test Statistic | 0.396 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.262 | | | | | | |
| **Data not Lognormal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **manganese** | | | | | | | |
| | | | | | | | |
| **Raw Statistics** | | | | | | | |
| Number of Valid Observations | 16 | | | | | | |
| Number of Distinct Observations | 13 | | | | | | |
| Minimum | 310 | | | | | | |
| Maximum | 940 | | | | | | |
| Mean of Raw Data | 547.3 | | | | | | |
| Standard Deviation of Raw Data | 182.1 | | | | | | |
| Khat | 10.67 | | | | | | |
| Theta hat | 51.31 | | | | | | |
| Kstar | 8.708 | | | | | | |
| Theta star | 62.85 | | | | | | |
| Mean of Log Transformed Data | 6.257 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.313 | | | | | | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.925 | | | | | | |
| Shapiro Wilk Test Statistic | 0.854 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | |
| Approximate Shapiro Wilk P Value | 0.0161 | | | | | | |
| Lilliefors Test Statistic | 0.295 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Data not Normal at (0.05) Significance Level** | | | | | | |
| | | | | | | |
| **Gamma GOF Test Results** | | | | | | |
| | | | | | | |
| Correlation Coefficient R | 0.953 | | | | | |
| A-D Test Statistic | 1.03 | | | | | |
| A-D Critical (0.05) Value | 0.739 | | | | | |
| K-S Test Statistic | 0.281 | | | | | |
| K-S Critical(0.05) Value | 0.215 | | | | | |
| **Data not Gamma Distributed at (0.05) Significance Level** | | | | | | |
| | | | | | | |
| **Lognormal GOF Test Results** | | | | | | |
| | | | | | | |
| Correlation Coefficient R | 0.948 | | | | | |
| Shapiro Wilk Test Statistic | 0.896 | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | |
| Approximate Shapiro Wilk P Value | 0.075 | | | | | |
| Lilliefors Test Statistic | 0.264 | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | |
| **Data appear Approximate_Lognormal at (0.05) Significance Level** | | | | | | |
| | | | | | | |
| **mercury** | | | | | | |
| | | | | | | |
| | Num Obs | Num Miss | Num Valid | Detects | NDs | % NDs |
| Raw Statistics | 16 | 0 | 16 | 13 | 3 | 18.75% |
| | | | | | | |
| | Number | Minimum | Maximum | Mean | Median | SD |
| Statistics (Non-Detects Only) | 3 | 0.0067 | 0.023 | 0.0166 | 0.02 | 0.00868 |
| Statistics (Non-Detects Only) | 13 | 0.0072 | 0.28 | 0.0499 | 0.032 | 0.0701 |
| Statistics (All: NDs treated as DL value) | 16 | 0.0067 | 0.28 | 0.0437 | 0.0255 | 0.0642 |
| Statistics (All: NDs treated as DL/2 value) | 16 | 0.00335 | 0.28 | 0.0421 | 0.0255 | 0.065 |
| Statistics (Normal ROS Imputed Data) | 16 | -0.0704 | 0.28 | 0.0312 | 0.0255 | 0.0749 |
| Statistics (Gamma ROS Imputed Data) | 16 | 0.0072 | 0.28 | 0.0425 | 0.0255 | 0.0648 |
| Statistics (Lognormal ROS Imputed Data) | 16 | 0.00522 | 0.28 | 0.0419 | 0.0255 | 0.065 |
| | | | | | | |
| | K hat | K Star | Theta hat | Log Mean | Log Stdv | Log CV |
| Statistics (Non-Detects Only) | 1.377 | 1.111 | 0.0363 | -3.402 | 0.807 | -0.237 |
| Statistics (NDs = DL) | 1.314 | 1.11 | 0.0332 | -3.557 | 0.833 | -0.234 |
| Statistics (NDs = DL/2) | 1.098 | 0.934 | 0.0384 | -3.687 | 0.979 | -0.265 |
| Statistics (Gamma ROS Estimates) | 1.207 | 1.023 | 0.0352 | -3.628 | 0.87 | -0.24 |
| Statistics (Lognormal ROS Estimates) | -- | -- | -- | -3.691 | 0.958 | -0.26 |
| | | | | | | |
| **Normal GOF Test Results** | | | | | | |
| | | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Normal ROS | | |
| Correlation Coefficient R | 0.661 | 0.647 | 0.666 | 0.806 | | |
| | | | | | | |
| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) | | | |
| Shapiro-Wilk (Detects Only) | 0.471 | 0.866 | Data Not Normal | | | |
| Shapiro-Wilk (NDs = DL) | 0.451 | 0.887 | Data Not Normal | | | |

| | | | | | |
|---|---|---|---|---|---|
| Shapiro-Wilk (NDs = DL/2) | 0.475 | 0.887 | Data Not Normal | | |
| Shapiro-Wilk (Normal ROS Estimates) | 0.686 | 0.887 | Data Not Normal | | |
| Lilliefors (Detects Only) | 0.4 | 0.234 | Data Not Normal | | |
| Lilliefors (NDs = DL) | 0.374 | 0.213 | Data Not Normal | | |
| Lilliefors (NDs = DL/2) | 0.365 | 0.213 | Data Not Normal | | |
| Lilliefors (Normal ROS Estimates) | 0.318 | 0.213 | Data Not Normal | | |
| | | | | | |
| **Gamma GOF Test Results** | | | | | |
| | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Gamma ROS | |
| Correlation Coefficient R | 0.829 | 0.817 | 0.84 | 0.832 | |
| | | | | | |
| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) | | |
| Anderson-Darling (Detects Only) | 1.525 | 0.752 | | | |
| Kolmogorov-Smirnov (Detects Only) | 0.279 | 0.241 | Data Not Gamma Distributed | | |
| Anderson-Darling (NDs = DL) | 1.554 | 0.758 | | | |
| Kolmogorov-Smirnov (NDs = DL) | 0.247 | 0.22 | Data Not Gamma Distributed | | |
| Anderson-Darling (NDs = DL/2) | 1.06 | 0.762 | | | |
| Kolmogorov-Smirnov (NDs = DL/2) | 0.223 | 0.221 | Data Not Gamma Distributed | | |
| Anderson-Darling (Gamma ROS Estimates) | 1.267 | 0.76 | | | |
| Kolmogorov-Smirnov (Gamma ROS Est.) | 0.231 | 0.22 | Data Not Gamma Distributed | | |
| | | | | | |
| **Lognormal GOF Test Results** | | | | | |
| | | | | | |
| | No NDs | NDs = DL | NDs = DL/2 | Log ROS | |
| Correlation Coefficient R | 0.897 | 0.915 | 0.952 | 0.948 | |
| | | | | | |
| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) | | |
| Shapiro-Wilk (Detects Only) | 0.844 | 0.866 | Data Not Lognormal | | |
| Shapiro-Wilk (NDs = DL) | 0.864 | 0.887 | Data Not Lognormal | | |
| Shapiro-Wilk (NDs = DL/2) | 0.93 | 0.887 | Data Appear Lognormal | | |
| Shapiro-Wilk (Lognormal ROS Estimates) | 0.912 | 0.887 | Data Appear Lognormal | | |
| Lilliefors (Detects Only) | 0.227 | 0.234 | Data Appear Lognormal | | |
| Lilliefors (NDs = DL) | 0.21 | 0.213 | Data Appear Lognormal | | |
| Lilliefors (NDs = DL/2) | 0.197 | 0.213 | Data Appear Lognormal | | |
| Lilliefors (Lognormal ROS Estimates) | 0.198 | 0.213 | Data Appear Lognormal | | |
| | | | | | |
| **Note: Substitution methods such as DL or DL/2 are not recommended.** | | | | | |
| | | | | | |
| **nickel** | | | | | |
| | | | | | |
| **Raw Statistics** | | | | | |
| Number of Valid Observations | 16 | | | | |
| Number of Distinct Observations | 14 | | | | |
| Minimum | 4.9 | | | | |
| Maximum | 20 | | | | |
| Mean of Raw Data | 8.168 | | | | |
| Standard Deviation of Raw Data | 4.026 | | | | |
| Khat | 5.949 | | | | |
| Theta hat | 1.373 | | | | |

| | |
|---|---|
| Kstar | 4.876 |
| Theta star | 1.675 |
| Mean of Log Transformed Data | 2.014 |
| Standard Deviation of Log Transformed Data | 0.404 |
| | |
| **Normal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.87 |
| Shapiro Wilk Test Statistic | 0.767 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 6.9828E-4 |
| Lilliefors Test Statistic | 0.227 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data not Normal at (0.05) Significance Level** | |
| | |
| **Gamma GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.938 |
| A-D Test Statistic | 0.845 |
| A-D Critical (0.05) Value | 0.741 |
| K-S Test Statistic | 0.192 |
| K-S Critical(0.05) Value | 0.216 |
| **Data follow Appr. Gamma Distribution at (0.05) Significance Level** | |
| | |
| **Lognormal GOF Test Results** | |
| | |
| Correlation Coefficient R | 0.942 |
| Shapiro Wilk Test Statistic | 0.884 |
| Shapiro Wilk Critical (0.05) Value | 0.887 |
| Approximate Shapiro Wilk P Value | 0.0484 |
| Lilliefors Test Statistic | 0.18 |
| Lilliefors Critical (0.05) Value | 0.213 |
| **Data appear Approximate_Lognormal at (0.05) Significance Level** | |

**selenium**

| | | | | | | |
|---|---|---|---|---|---|---|
| | Num Obs | Num Miss | Num Valid | Detects | NDs | % NDs |
| Raw Statistics | 16 | 0 | 16 | 12 | 4 | 25.00% |
| | | | | | | |
| | Number | Minimum | Maximum | Mean | Median | SD |
| Statistics (Non-Detects Only) | 4 | 0.53 | 0.65 | 0.59 | 0.59 | 0.049 |
| Statistics (Non-Detects Only) | 12 | 0.306 | 1.7 | 0.986 | 0.964 | 0.508 |
| Statistics (All: NDs treated as DL value) | 16 | 0.306 | 1.7 | 0.887 | 0.62 | 0.47 |
| Statistics (All: NDs treated as DL/2 value) | 16 | 0.265 | 1.7 | 0.813 | 0.553 | 0.534 |
| Statistics (Normal ROS Imputed Data) | 16 | 0.306 | 1.7 | 0.859 | 0.617 | 0.495 |
| Statistics (Gamma ROS Imputed Data) | 16 | 0.306 | 1.7 | 0.859 | 0.594 | 0.493 |
| Statistics (Lognormal ROS Imputed Data) | 16 | 0.306 | 1.7 | 0.859 | 0.578 | 0.492 |
| | | | | | | |
| | K hat | K Star | Theta hat | Log Mean | Log Stdv | Log CV |
| Statistics (Non-Detects Only) | 3.662 | 2.802 | 0.269 | -0.157 | 0.582 | -3.698 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Statistics (NDs = DL) | 3.999 | 3.291 | 0.222 | -0.251 | 0.527 | -2.102 | | |
| Statistics (NDs = DL/2) | 2.462 | 2.042 | 0.33 | -0.424 | 0.691 | -1.629 | | |
| Statistics (Gamma ROS Estimates) | 3.391 | 2.797 | 0.253 | -0.307 | 0.574 | -1.874 | | |
| Statistics (Lognormal ROS Estimates) | -- | -- | -- | -0.305 | 0.569 | -1.868 | | |

**Normal GOF Test Results**

| | No NDs | NDs = DL | NDs = DL/2 | Normal ROS |
|---|---|---|---|---|
| Correlation Coefficient R | 0.958 | 0.931 | 0.933 | 0.939 |

| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) |
|---|---|---|---|
| Shapiro-Wilk (Detects Only) | 0.895 | 0.859 | Data Appear Normal |
| Shapiro-Wilk (NDs = DL) | 0.852 | 0.887 | Data Not Normal |
| Shapiro-Wilk (NDs = DL/2) | 0.848 | 0.887 | Data Not Normal |
| Shapiro-Wilk (Normal ROS Estimates) | 0.862 | 0.887 | Data Not Normal |
| Lilliefors (Detects Only) | 0.214 | 0.243 | Data Appear Normal |
| Lilliefors (NDs = DL) | 0.255 | 0.213 | Data Not Normal |
| Lilliefors (NDs = DL/2) | 0.243 | 0.213 | Data Not Normal |
| Lilliefors (Normal ROS Estimates) | 0.226 | 0.213 | Data Not Normal |

**Gamma GOF Test Results**

| | No NDs | NDs = DL | NDs = DL/2 | Gamma ROS |
|---|---|---|---|---|
| Correlation Coefficient R | 0.941 | 0.952 | 0.948 | 0.953 |

| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) |
|---|---|---|---|
| Anderson-Darling (Detects Only) | 0.53 | 0.737 | |
| Kolmogorov-Smirnov (Detects Only) | 0.205 | 0.247 | Detected Data Appear Gamma Distributed |
| Anderson-Darling (NDs = DL) | 0.833 | 0.742 | |
| Kolmogorov-Smirnov (NDs = DL) | 0.225 | 0.216 | Data Not Gamma Distributed |
| Anderson-Darling (NDs = DL/2) | 0.755 | 0.748 | |
| Kolmogorov-Smirnov (NDs = DL/2) | 0.19 | 0.217 | Detected Data appear Approximate Gamma Distr |
| Anderson-Darling (Gamma ROS Estimates) | 0.759 | 0.743 | |
| Kolmogorov-Smirnov (Gamma ROS Est.) | 0.206 | 0.216 | Detected Data appear Approximate Gamma Distr |

**Lognormal GOF Test Results**

| | No NDs | NDs = DL | NDs = DL/2 | Log ROS |
|---|---|---|---|---|
| Correlation Coefficient R | 0.961 | 0.959 | 0.955 | 0.959 |

| | Test value | Crit. (0.05) | Conclusion with Alpha(0.05) |
|---|---|---|---|
| Shapiro-Wilk (Detects Only) | 0.906 | 0.859 | Data Appear Lognormal |
| Shapiro-Wilk (NDs = DL) | 0.909 | 0.887 | Data Appear Lognormal |
| Shapiro-Wilk (NDs = DL/2) | 0.887 | 0.887 | Data Not Lognormal |
| Shapiro-Wilk (Lognormal ROS Estimates) | 0.901 | 0.887 | Data Appear Lognormal |
| Lilliefors (Detects Only) | 0.181 | 0.243 | Data Appear Lognormal |
| Lilliefors (NDs = DL) | 0.201 | 0.213 | Data Appear Lognormal |
| Lilliefors (NDs = DL/2) | 0.157 | 0.213 | Data Appear Lognormal |
| Lilliefors (Lognormal ROS Estimates) | 0.211 | 0.213 | Data Appear Lognormal |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Note: Substitution methods such as DL or DL/2 are not recommended.** | | | | | | | | |
| | | | | | | | | |
| **strontium** | | | | | | | | |
| | | | | | | | | |
| **Raw Statistics** | | | | | | | | |
| Number of Valid Observations | 16 | | | | | | | |
| Number of Distinct Observations | 13 | | | | | | | |
| Minimum | 14 | | | | | | | |
| Maximum | 46 | | | | | | | |
| Mean of Raw Data | 21.7 | | | | | | | |
| Standard Deviation of Raw Data | 7.877 | | | | | | | |
| Khat | 10.41 | | | | | | | |
| Theta hat | 2.084 | | | | | | | |
| Kstar | 8.501 | | | | | | | |
| Theta star | 2.553 | | | | | | | |
| Mean of Log Transformed Data | 3.029 | | | | | | | |
| Standard Deviation of Log Transformed Data | 0.307 | | | | | | | |
| | | | | | | | | |
| **Normal GOF Test Results** | | | | | | | | |
| | | | | | | | | |
| Correlation Coefficient R | 0.879 | | | | | | | |
| Shapiro Wilk Test Statistic | 0.791 | | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | | |
| Approximate Shapiro Wilk P Value | 0.00141 | | | | | | | |
| Lilliefors Test Statistic | 0.208 | | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | | |
| **Data appear Approximate Normal at (0.05) Significance Level** | | | | | | | | |
| | | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | | |
| | | | | | | | | |
| Correlation Coefficient R | 0.926 | | | | | | | |
| A-D Test Statistic | 0.604 | | | | | | | |
| A-D Critical (0.05) Value | 0.739 | | | | | | | |
| K-S Test Statistic | 0.186 | | | | | | | |
| K-S Critical(0.05) Value | 0.215 | | | | | | | |
| **Data appear Gamma Distributed at (0.05) Significance Level** | | | | | | | | |
| | | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | | |
| | | | | | | | | |
| Correlation Coefficient R | 0.951 | | | | | | | |
| Shapiro Wilk Test Statistic | 0.91 | | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.887 | | | | | | | |
| Approximate Shapiro Wilk P Value | 0.112 | | | | | | | |
| Lilliefors Test Statistic | 0.17 | | | | | | | |
| Lilliefors Critical (0.05) Value | 0.213 | | | | | | | |
| **Data appear Lognormal at (0.05) Significance Level** | | | | | | | | |
| | | | | | | | | |
| **thallium** | | | | | | | | |
| | | | | | | | | |
| | Num Obs | Num Miss | Num Valid | Detects | NDs | % NDs | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Raw Statistics | 16 | 6 | 10 | 1 | 9 | 90.00% | | |

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable thallium was not processed!

vanadium

**Raw Statistics**

| | |
|---|---|
| Number of Valid Observations | 10 |
| Number of Missing Observations | 6 |
| Number of Distinct Observations | 8 |
| Minimum | 34 |
| Maximum | 190 |
| Mean of Raw Data | 57.9 |
| Standard Deviation of Raw Data | 47.63 |
| Khat | 3.123 |
| Theta hat | 18.54 |
| Kstar | 2.253 |
| Theta star | 25.7 |
| Mean of Log Transformed Data | 3.89 |
| Standard Deviation of Log Transformed Data | 0.527 |

**Normal GOF Test Results**

| | |
|---|---|
| Correlation Coefficient R | 0.721 |
| Shapiro Wilk Test Statistic | 0.548 |
| Shapiro Wilk Critical (0.05) Value | 0.842 |
| Approximate Shapiro Wilk P Value | 1.7634E-5 |
| Lilliefors Test Statistic | 0.341 |
| Lilliefors Critical (0.05) Value | 0.262 |

Data not Normal at (0.05) Significance Level

**Gamma GOF Test Results**

| | |
|---|---|
| Correlation Coefficient R | 0.847 |
| A-D Test Statistic | 1.459 |
| A-D Critical (0.05) Value | 0.732 |
| K-S Test Statistic | 0.285 |
| K-S Critical(0.05) Value | 0.268 |

Data not Gamma Distributed at (0.05) Significance Level

**Lognormal GOF Test Results**

| | |
|---|---|
| Correlation Coefficient R | 0.832 |
| Shapiro Wilk Test Statistic | 0.71 |
| Shapiro Wilk Critical (0.05) Value | 0.842 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Approximate Shapiro Wilk P Value | 0.00103 | | | | | | |
| Lilliefors Test Statistic | 0.249 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.262 | | | | | | |
| **Data appear Approximate_Lognormal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **zinc** | | | | | | | |
| | | | | | | | |
| **Raw Statistics** | | | | | | | |
| Number of Valid Observations | 10 | | | | | | |
| Number of Missing Observations | 6 | | | | | | |
| Number of Distinct Observations | 10 | | | | | | |
| Minimum | 40 | | | | | | |
| Maximum | 230 | | | | | | |
| Mean of Raw Data | 66.9 | | | | | | |
| Standard Deviation of Raw Data | 58.12 | | | | | | |
| Khat | 3.009 | | | | | | |
| Theta hat | 22.23 | | | | | | |
| Kstar | 2.173 | | | | | | |
| Theta star | 30.79 | | | | | | |
| Mean of Log Transformed Data | 4.028 | | | | | | |
| Standard Deviation of Log Transformed Data | 0.524 | | | | | | |
| | | | | | | | |
| **Normal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.674 | | | | | | |
| Shapiro Wilk Test Statistic | 0.485 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.842 | | | | | | |
| Approximate Shapiro Wilk P Value | 4.0927E-6 | | | | | | |
| Lilliefors Test Statistic | 0.414 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.262 | | | | | | |
| **Data not Normal at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Gamma GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.809 | | | | | | |
| A-D Test Statistic | 2.033 | | | | | | |
| A-D Critical (0.05) Value | 0.732 | | | | | | |
| K-S Test Statistic | 0.412 | | | | | | |
| K-S Critical(0.05) Value | 0.268 | | | | | | |
| **Data not Gamma Distributed at (0.05) Significance Level** | | | | | | | |
| | | | | | | | |
| **Lognormal GOF Test Results** | | | | | | | |
| | | | | | | | |
| Correlation Coefficient R | 0.762 | | | | | | |
| Shapiro Wilk Test Statistic | 0.608 | | | | | | |
| Shapiro Wilk Critical (0.05) Value | 0.842 | | | | | | |
| Approximate Shapiro Wilk P Value | 7.2387E-5 | | | | | | |
| Lilliefors Test Statistic | 0.388 | | | | | | |
| Lilliefors Critical (0.05) Value | 0.262 | | | | | | |
| **Data not Lognormal at (0.05) Significance Level** | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Non-parametric GOF Test Results | | | | | | |
| | | | | | | |
| Data do not follow a discernible distribution at (0.05) Level of Significanc | | | | | | |

| | |
|---|---|
| | **Outlier Tests for Selected Variables excluding nondetects** |
| **User Selected Options** | |
| Date/Time of Computation | ProUCL 5.19/2/2021 1:32:32 PM |
| From File | ProUCL Background Inputs.xls |
| Full Precision | OFF |

**No Outlier Test for antimony**

**Dixon's Outlier Test for arsenic**

Total N = 16
Number NDs = 0
Number Detects = 16
10% critical value: 0.454
5% critical value: 0.507
1% critical value: 0.595
Note: NDs excluded from Outlier Test

**1. Data Value 3.08 is a Potential Outlier (Upper Tail)?**

Test Statistic: 0.572

For 10% significance level, 3.08 is an outlier.
For 5% significance level, 3.08 is an outlier.
For 1% significance level, 3.08 is not an outlier.

**2. Data Value 1.4 is a Potential Outlier (Lower Tail)?**

Test Statistic: 0.337

For 10% significance level, 1.4 is not an outlier.
For 5% significance level, 1.4 is not an outlier.
For 1% significance level, 1.4 is not an outlier.

**Dixon's Outlier Test for barium**

Total N = 16
Number NDs = 0
Number Detects = 16
10% critical value: 0.454
5% critical value: 0.507
1% critical value: 0.595
Note: NDs excluded from Outlier Test

**1. Data Value 77.9 is a Potential Outlier (Upper Tail)?**

Test Statistic: 0.353

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| For 10% significance level, 77.9 is not an outlier. | | | | | | | |
| For 5% significance level, 77.9 is not an outlier. | | | | | | | |
| For 1% significance level, 77.9 is not an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 36 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.297 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 36 is not an outlier. | | | | | | | |
| For 5% significance level, 36 is not an outlier. | | | | | | | |
| For 1% significance level, 36 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for beryllium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 16 | | | | | | | |
| 10% critical value: 0.454 | | | | | | | |
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.595 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 0.99 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.650 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.99 is an outlier. | | | | | | | |
| For 5% significance level, 0.99 is an outlier. | | | | | | | |
| For 1% significance level, 0.99 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 0.293 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.316 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.293 is not an outlier. | | | | | | | |
| For 5% significance level, 0.293 is not an outlier. | | | | | | | |
| For 1% significance level, 0.293 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for cadmium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 9 | | | | | | | |
| Number Detects = 7 | | | | | | | |
| 10% critical value: 0.434 | | | | | | | |
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.637 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1. Data Value 0.38 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.704 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.38 is an outlier. | | | | | | | |
| For 5% significance level, 0.38 is an outlier. | | | | | | | |
| For 1% significance level, 0.38 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 0.0918 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.011 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.0918 is not an outlier. | | | | | | | |
| For 5% significance level, 0.0918 is not an outlier. | | | | | | | |
| For 1% significance level, 0.0918 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for hexavalent chromium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 7 | | | | | | | |
| Number Detects = 9 | | | | | | | |
| 10% critical value: 0.441 | | | | | | | |
| 5% critical value: 0.512 | | | | | | | |
| 1% critical value: 0.635 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 5.34 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.908 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 5.34 is an outlier. | | | | | | | |
| For 5% significance level, 5.34 is an outlier. | | | | | | | |
| For 1% significance level, 5.34 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 0.21 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.328 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.21 is not an outlier. | | | | | | | |
| For 5% significance level, 0.21 is not an outlier. | | | | | | | |
| For 1% significance level, 0.21 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for trivalent chromium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 16 | | | | | | | |
| 10% critical value: 0.454 | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.595 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 70.2 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.608 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 70.2 is an outlier. | | | | | | | |
| For 5% significance level, 70.2 is an outlier. | | | | | | | |
| For 1% significance level, 70.2 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 16.16 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.064 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 16.16 is not an outlier. | | | | | | | |
| For 5% significance level, 16.16 is not an outlier. | | | | | | | |
| For 1% significance level, 16.16 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for total chromium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 16 | | | | | | | |
| 10% critical value: 0.454 | | | | | | | |
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.595 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 70.2 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.598 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 70.2 is an outlier. | | | | | | | |
| For 5% significance level, 70.2 is an outlier. | | | | | | | |
| For 1% significance level, 70.2 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 16 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.087 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 16 is not an outlier. | | | | | | | |
| For 5% significance level, 16 is not an outlier. | | | | | | | |
| For 1% significance level, 16 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for cobalt** | | | | | | | |
| | | | | | | | |

Total N = 16

Number NDs = 0

Number Detects = 16

10% critical value: 0.454

5% critical value: 0.507

1% critical value: 0.595

Note: NDs excluded from Outlier Test

**1. Data Value 27 is a Potential Outlier (Upper Tail)?**

Test Statistic: 0.265

For 10% significance level, 27 is not an outlier.

For 5% significance level, 27 is not an outlier.

For 1% significance level, 27 is not an outlier.

**2. Data Value 6.3 is a Potential Outlier (Lower Tail)?**

Test Statistic: 0.071

For 10% significance level, 6.3 is not an outlier.

For 5% significance level, 6.3 is not an outlier.

For 1% significance level, 6.3 is not an outlier.

**Dixon's Outlier Test for copper**

Total N = 16

Number NDs = 0

Number Detects = 16

10% critical value: 0.454

5% critical value: 0.507

1% critical value: 0.595

Note: NDs excluded from Outlier Test

**1. Data Value 62.8 is a Potential Outlier (Upper Tail)?**

Test Statistic: 0.295

For 10% significance level, 62.8 is not an outlier.

For 5% significance level, 62.8 is not an outlier.

For 1% significance level, 62.8 is not an outlier.

**2. Data Value 15 is a Potential Outlier (Lower Tail)?**

Test Statistic: 0.029

For 10% significance level, 15 is not an outlier.

For 5% significance level, 15 is not an outlier.

For 1% significance level, 15 is not an outlier.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for lead** | | | | | | | |
| | | | | | | | |
| Total N = 10 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 10 | | | | | | | |
| 10% critical value: 0.409 | | | | | | | |
| 5% critical value: 0.477 | | | | | | | |
| 1% critical value: 0.597 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 43 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.282 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 43 is not an outlier. | | | | | | | |
| For 5% significance level, 43 is not an outlier. | | | | | | | |
| For 1% significance level, 43 is not an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 0.55 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.110 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.55 is not an outlier. | | | | | | | |
| For 5% significance level, 0.55 is not an outlier. | | | | | | | |
| For 1% significance level, 0.55 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for manganese** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 16 | | | | | | | |
| 10% critical value: 0.454 | | | | | | | |
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.595 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 940 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.342 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 940 is not an outlier. | | | | | | | |
| For 5% significance level, 940 is not an outlier. | | | | | | | |
| For 1% significance level, 940 is not an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 310 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.223 | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| For 10% significance level, 310 is not an outlier. | | | | | | | |
| For 5% significance level, 310 is not an outlier. | | | | | | | |
| For 1% significance level, 310 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for mercury** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 3 | | | | | | | |
| Number Detects = 13 | | | | | | | |
| 10% critical value: 0.467 | | | | | | | |
| 5% critical value: 0.521 | | | | | | | |
| 1% critical value: 0.615 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 0.28 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.911 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.28 is an outlier. | | | | | | | |
| For 5% significance level, 0.28 is an outlier. | | | | | | | |
| For 1% significance level, 0.28 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 0.0072 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.338 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.0072 is not an outlier. | | | | | | | |
| For 5% significance level, 0.0072 is not an outlier. | | | | | | | |
| For 1% significance level, 0.0072 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for nickel** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 16 | | | | | | | |
| 10% critical value: 0.454 | | | | | | | |
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.595 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 20 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.483 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 20 is an outlier. | | | | | | | |
| For 5% significance level, 20 is not an outlier. | | | | | | | |
| For 1% significance level, 20 is not an outlier. | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| **2. Data Value 4.9 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.025 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 4.9 is not an outlier. | | | | | | | |
| For 5% significance level, 4.9 is not an outlier. | | | | | | | |
| For 1% significance level, 4.9 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for selenium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 4 | | | | | | | |
| Number Detects = 12 | | | | | | | |
| 10% critical value: 0.49 | | | | | | | |
| 5% critical value: 0.546 | | | | | | | |
| 1% critical value: 0.642 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 1.7 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.082 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 1.7 is not an outlier. | | | | | | | |
| For 5% significance level, 1.7 is not an outlier. | | | | | | | |
| For 1% significance level, 1.7 is not an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 0.306 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.151 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 0.306 is not an outlier. | | | | | | | |
| For 5% significance level, 0.306 is not an outlier. | | | | | | | |
| For 1% significance level, 0.306 is not an outlier. | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| **Dixon's Outlier Test for strontium** | | | | | | | |
| | | | | | | | |
| Total N = 16 | | | | | | | |
| Number NDs = 0 | | | | | | | |
| Number Detects = 16 | | | | | | | |
| 10% critical value: 0.454 | | | | | | | |
| 5% critical value: 0.507 | | | | | | | |
| 1% critical value: 0.595 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 46 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.674 | | | | | | | |

For 10% significance level, 46 is an outlier.
For 5% significance level, 46 is an outlier.
For 1% significance level, 46 is an outlier.

**2. Data Value 14 is a Potential Outlier (Lower Tail)?**

Test Statistic: 0.090

For 10% significance level, 14 is not an outlier.
For 5% significance level, 14 is not an outlier.
For 1% significance level, 14 is not an outlier.

**No Outlier Test for thallium**

**Dixon's Outlier Test for vanadium**

Total N = 10
Number NDs = 0
Number Detects = 10
10% critical value: 0.409
5% critical value: 0.477
1% critical value: 0.597
Note: NDs excluded from Outlier Test

**1. Data Value 190 is a Potential Outlier (Upper Tail)?**

Test Statistic: 0.794

For 10% significance level, 190 is an outlier.
For 5% significance level, 190 is an outlier.
For 1% significance level, 190 is an outlier.

**2. Data Value 34 is a Potential Outlier (Lower Tail)?**

Test Statistic: 0.030

For 10% significance level, 34 is not an outlier.
For 5% significance level, 34 is not an outlier.
For 1% significance level, 34 is not an outlier.

**Dixon's Outlier Test for zinc**

Total N = 10
Number NDs = 0
Number Detects = 10
10% critical value: 0.409
5% critical value: 0.477

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1% critical value: 0.597 | | | | | | | |
| Note: NDs excluded from Outlier Test | | | | | | | |
| | | | | | | | |
| **1. Data Value 230 is a Potential Outlier (Upper Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.829 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 230 is an outlier. | | | | | | | |
| For 5% significance level, 230 is an outlier. | | | | | | | |
| For 1% significance level, 230 is an outlier. | | | | | | | |
| | | | | | | | |
| **2. Data Value 40 is a Potential Outlier (Lower Tail)?** | | | | | | | |
| | | | | | | | |
| Test Statistic: 0.086 | | | | | | | |
| | | | | | | | |
| For 10% significance level, 40 is not an outlier. | | | | | | | |
| For 5% significance level, 40 is not an outlier. | | | | | | | |
| For 1% significance level, 40 is not an outlier. | | | | | | | |
| | | | | | | | |

| | |
|---|---|
| | **Background Statistics for Data Sets with Non-Detects** |
| **User Selected Options** | |
| Date/Time of Computation | ProUCL 5.18/20/2021 9:53:58 AM |
| From File | ProUCL Background Inputs_b.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Coverage | 95% |
| Different or Future K Observations | 1 |
| Number of Bootstrap Operations | 2000 |

**antimony**

| | | | |
|---|---|---|---|
| | **General Statistics** | | |
| Total Number of Observations | 2 | Number of Missing Observations | 2 |
| Number of Distinct Observations | 2 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 2 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.32 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.325 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable antimony was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

**arsenic**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 1.2 | First Quartile | 1.763 |
| Second Largest | 2.3 | Median | 2.125 |
| Maximum | 2.38 | Third Quartile | 2.32 |
| Mean | 1.958 | SD | 0.538 |
| Coefficient of Variation | 0.275 | Skewness | -1.363 |
| Mean of logged Data | 0.638 | SD of logged Data | 0.316 |
| | **Critical Values for Background Threshold Values (BTVs)** | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | **Normal GOF Test** | | |
| Shapiro Wilk Test Statistic | 0.87 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.244 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |

| | | | |
|---|---|---|---|
| Data appear Normal at 5% Significance Level | | | |
| | | | |
| Background Statistics Assuming Normal Distribution | | | |
| 95% UTL with 95% Coverage | 4.727 | 90% Percentile (z) | 2.648 |
| 95% UPL (t) | 3.374 | 95% Percentile (z) | 2.843 |
| 95% USL | 2.745 | 99% Percentile (z) | 3.21 |
| | | | |
| Gamma GOF Test | | | |
| A-D Test Statistic | 0.468 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | 0.657 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.279 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | 0.395 | Detected data appear Gamma Distributed at 5% Significance Level | |
| Detected data appear Gamma Distributed at 5% Significance Level | | | |
| | | | |
| Gamma Statistics | | | |
| k hat (MLE) | 14.82 | k star (bias corrected MLE) | 3.871 |
| Theta hat (MLE) | 0.132 | Theta star (bias corrected MLE) | 0.506 |
| nu hat (MLE) | 118.5 | nu star (bias corrected) | 30.96 |
| MLE Mean (bias corrected) | 1.958 | MLE Sd (bias corrected) | 0.995 |
| | | | |
| Background Statistics Assuming Gamma Distribution | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 3.878 | 90% Percentile | 3.291 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 3.973 | 95% Percentile | 3.828 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 6.703 | 99% Percentile | 4.976 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 7.191 | | |
| 95% WH USL | 2.892 | 95% HW USL | 2.917 |
| | | | |
| Lognormal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.83 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.288 | Lilliefors Lognormal GOF Test | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| Data appear Lognormal at 5% Significance Level | | | |
| | | | |
| Background Statistics assuming Lognormal Distribution | | | |
| 95% UTL with 95% Coverage | 9.598 | 90% Percentile (z) | 2.835 |
| 95% UPL (t) | 4.341 | 95% Percentile (z) | 3.18 |
| 95% USL | 3.002 | 99% Percentile (z) | 3.943 |
| | | | |
| Nonparametric Distribution Free Background Statistics | | | |
| Data appear Normal at 5% Significance Level | | | |
| | | | |
| Nonparametric Upper Limits for Background Threshold Values | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 2.38 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 2.38 | 90% Percentile | 2.356 |
| 90% Chebyshev UPL | 3.763 | 95% Percentile | 2.368 |
| 95% Chebyshev UPL | 4.581 | 99% Percentile | 2.378 |

| | | | |
|---|---|---|---|
| 95% USL | 2.38 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **barium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 12 | First Quartile | 16.88 |
| Second Largest | 23.5 | Median | 21 |
| Maximum | 38.4 | Third Quartile | 27.23 |
| Mean | 23.1 | SD | 11.23 |
| Coefficient of Variation | 0.486 | Skewness | 0.995 |
| Mean of logged Data | 3.052 | SD of logged Data | 0.485 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.952 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.236 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 80.89 | 90% Percentile (z) | 37.5 |
| 95% UPL (t) | 52.66 | 95% Percentile (z) | 41.58 |
| 95% USL | 39.53 | 99% Percentile (z) | 49.23 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.212 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.659 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.18 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.396 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 5.85 | k star (bias corrected MLE) | 1.629 |
| Theta hat (MLE) | 3.949 | Theta star (bias corrected MLE) | 14.18 |
| nu hat (MLE) | 46.8 | nu star (bias corrected) | 13.03 |
| MLE Mean (bias corrected) | 23.1 | MLE Sd (bias corrected) | 18.1 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 63.39 | 90% Percentile | 47.18 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 65.74 | 95% Percentile | 58.55 |

| | | | |
|---|---|---|---|
| 95% WH Approx. Gamma UTL with 95% Coverage | 134.8 | 99% Percentile | 84.07 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 151.3 | | |
| 95% WH USL | 41.31 | 95% HW USL | 41.66 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.998 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.164 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 256.5 | 90% Percentile (z) | 39.39 |
| 95% UPL (t) | 75.81 | 95% Percentile (z) | 46.98 |
| 95% USL | 43.01 | 99% Percentile (z) | 65.39 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 38.4 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 38.4 | 90% Percentile | 33.93 |
| 90% Chebyshev UPL | 60.78 | 95% Percentile | 36.17 |
| 95% Chebyshev UPL | 77.85 | 99% Percentile | 37.95 |
| 95% USL | 38.4 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **beryllium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 4 | | |
| Number of Detects | 3 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 3 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.249 | Minimum Non-Detect | 0.32 |
| Maximum Detect | 0.465 | Maximum Non-Detect | 0.32 |
| Variance Detected | 0.0146 | Percent Non-Detects | 25% |
| Mean Detected | 0.326 | SD Detected | 0.121 |
| Mean of Detected Logged Data | -1.163 | SD of Detected Logged Data | 0.345 |
| | | | |
| **Warning: Data set has only 3 Detected Values.** | | | |
| **This is not enough to compute meaningful or reliable statistics and estimates.** | | | |

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| Shapiro Wilk Test Statistic | 0.8 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.767 | Detected Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.364 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.425 | Detected Data appear Normal at 5% Significance Level | |
| **Detected Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.308 | KM SD | 0.0906 |
| 95% UTL95% Coverage | 0.775 | 95% KM UPL (t) | 0.547 |
| 90% KM Percentile (z) | 0.425 | 95% KM Percentile (z) | 0.457 |
| 99% KM Percentile (z) | 0.519 | 95% KM USL | 0.441 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.284 | SD | 0.129 |
| 95% UTL95% Coverage | 0.947 | 95% UPL (t) | 0.623 |
| 90% Percentile (z) | 0.449 | 95% Percentile (z) | 0.496 |
| 99% Percentile (z) | 0.584 | 95% USL | 0.473 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 12.11 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 0.0269 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 72.63 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | |
| This is especially true when the sample size is small. | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | |
| Minimum | 0.249 | Mean | 0.31 |
| Maximum | 0.465 | Median | 0.263 |
| SD | 0.103 | CV | 0.334 |
| k hat (MLE) | 14.23 | k star (bias corrected MLE) | 3.725 |
| Theta hat (MLE) | 0.0218 | Theta star (bias corrected MLE) | 0.0833 |
| nu hat (MLE) | 113.9 | nu star (bias corrected) | 29.8 |
| MLE Mean (bias corrected) | 0.31 | MLE Sd (bias corrected) | 0.161 |
| 95% Percentile of Chisquare (2kstar) | 14.72 | 90% Percentile | 0.526 |
| 95% Percentile | 0.613 | 99% Percentile | 0.8 |

| | | | | | |
|---|---|---|---|---|---|
| **The following statistics are computed using Gamma ROS Statistics on Imputed Data** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 1.083 | 1.135 | 95% Approx. Gamma UPL | 0.621 | 0.628 |
| 95% Gamma USL | 0.461 | 0.461 | | | |
| | | | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | | | |
| Mean (KM) | | 0.308 | SD (KM) | | 0.0906 |
| Variance (KM) | | 0.00821 | SE of Mean (KM) | | 0.0556 |
| k hat (KM) | | 11.59 | k star (KM) | | 3.064 |
| nu hat (KM) | | 92.7 | nu star (KM) | | 24.51 |
| theta hat (KM) | | 0.0266 | theta star (KM) | | 0.101 |
| 80% gamma percentile (KM) | | 0.439 | 90% gamma percentile (KM) | | 0.545 |
| 95% gamma percentile (KM) | | 0.643 | 99% gamma percentile (KM) | | 0.857 |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.947 | 0.983 | 95% Approx. Gamma UPL | 0.571 | 0.575 |
| 95% KM Gamma Percentile | 0.456 | 0.456 | 95% Gamma USL | 0.437 | 0.436 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| Shapiro Wilk Test Statistic | | 0.817 | **Shapiro Wilk GOF Test** | | |
| 5% Shapiro Wilk Critical Value | | 0.767 | Detected Data appear Lognormal at 5% Significance Level | | |
| Lilliefors Test Statistic | | 0.356 | **Lilliefors GOF Test** | | |
| 5% Lilliefors Critical Value | | 0.425 | Detected Data appear Lognormal at 5% Significance Level | | |
| **Detected Data appear Lognormal at 5% Significance Level** | | | | | |
| | | | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | | | |
| Mean in Original Scale | | 0.31 | Mean in Log Scale | | -1.206 |
| SD in Original Scale | | 0.103 | SD in Log Scale | | 0.295 |
| 95% UTL95% Coverage | | 1.364 | 95% BCA UTL95% Coverage | | N/A |
| 95% Bootstrap (%) UTL95% Coverage | | N/A | 95% UPL (t) | | 0.65 |
| 90% Percentile (z) | | 0.437 | 95% Percentile (z) | | 0.486 |
| 99% Percentile (z) | | 0.594 | 95% USL | | 0.461 |
| | | | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | | | |
| KM Mean of Logged Data | | -1.213 | 95% KM UTL (Lognormal)95% Coverage | | 1.129 |
| KM SD of Logged Data | | 0.259 | 95% KM UPL (Lognormal) | | 0.588 |
| 95% KM Percentile Lognormal (z) | | 0.456 | 95% KM USL (Lognormal) | | 0.434 |
| | | | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | | | |
| Mean in Original Scale | | 0.284 | Mean in Log Scale | | -1.331 |
| SD in Original Scale | | 0.129 | SD in Log Scale | | 0.438 |
| 95% UTL95% Coverage | | 2.511 | 95% UPL (t) | | 0.836 |
| 90% Percentile (z) | | 0.463 | 95% Percentile (z) | | 0.543 |
| 99% Percentile (z) | | 0.732 | 95% USL | | 0.501 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | | | |
| | | | | | |
| **Nonparametric Distribution Free Background Statistics** | | | | | |

| | | | |
|---|---|---|---|
| **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 0.465 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 0.465 |
| 95% USL | 0.465 | 95% KM Chebyshev UPL | 0.75 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **cadmium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 4 | | |
| Number of Detects | 0 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 4 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.32 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.636 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |
| | | | |
| **Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!** | | | |
| **Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!** | | | |
| **The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).** | | | |
| | | | |
| **The data set for variable cadmium was not processed!** | | | |
| | | | |
| | | | |
| **hexavalent chromium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 4 | | |
| Number of Detects | 3 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 3 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.24 | Minimum Non-Detect | 0.4 |
| Maximum Detect | 0.671 | Maximum Non-Detect | 0.4 |
| Variance Detected | 0.0467 | Percent Non-Detects | 25% |
| Mean Detected | 0.446 | SD Detected | 0.216 |
| Mean of Detected Logged Data | -0.892 | SD of Detected Logged Data | 0.515 |
| | | | |
| **Warning: Data set has only 3 Detected Values.** | | | |
| **This is not enough to compute meaningful or reliable statistics and estimates.** | | | |
| | | | |

| | | | |
|---|---|---|---|
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| Shapiro Wilk Test Statistic | 0.995 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.767 | Detected Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.2 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.425 | Detected Data appear Normal at 5% Significance Level | |
| **Detected Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.395 | KM SD | 0.177 |
| 95% UTL95% Coverage | 1.305 | 95% KM UPL (t) | 0.86 |
| 90% KM Percentile (z) | 0.622 | 95% KM Percentile (z) | 0.686 |
| 99% KM Percentile (z) | 0.807 | 95% KM USL | 0.654 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.385 | SD | 0.215 |
| 95% UTL95% Coverage | 1.492 | 95% UPL (t) | 0.951 |
| 90% Percentile (z) | 0.661 | 95% Percentile (z) | 0.739 |
| 99% Percentile (z) | 0.885 | 95% USL | 0.699 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 6.052 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 0.0738 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 36.31 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | |
| This is especially true when the sample size is small. | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | |
| Minimum | 0.22 | Mean | 0.39 |
| Maximum | 0.671 | Median | 0.334 |
| SD | 0.21 | CV | 0.538 |
| k hat (MLE) | 4.927 | k star (bias corrected MLE) | 1.398 |
| Theta hat (MLE) | 0.0791 | Theta star (bias corrected MLE) | 0.279 |
| nu hat (MLE) | 39.42 | nu star (bias corrected) | 11.19 |
| MLE Mean (bias corrected) | 0.39 | MLE Sd (bias corrected) | 0.33 |
| 95% Percentile of Chisquare (2kstar) | 7.459 | 90% Percentile | 0.826 |
| 95% Percentile | 1.04 | 99% Percentile | 1.523 |
| **The following statistics are computed using Gamma ROS Statistics on Imputed Data** | | | |

| Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods | | | | | |
|---|---|---|---|---|---|
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 2.552 | 2.894 | 95% Approx. Gamma UPL | 1.15 | 1.195 |
| 95% Gamma USL | 0.727 | 0.733 | | | |

| Estimates of Gamma Parameters using KM Estimates | | | |
|---|---|---|---|
| Mean (KM) | 0.395 | SD (KM) | 0.177 |
| Variance (KM) | 0.0313 | SE of Mean (KM) | 0.108 |
| k hat (KM) | 4.974 | k star (KM) | 1.41 |
| nu hat (KM) | 39.79 | nu star (KM) | 11.28 |
| theta hat (KM) | 0.0794 | theta star (KM) | 0.28 |
| 80% gamma percentile (KM) | 0.615 | 90% gamma percentile (KM) | 0.835 |
| 95% gamma percentile (KM) | 1.05 | 99% gamma percentile (KM) | 1.537 |

| The following statistics are computed using gamma distribution and KM estimates | | | | | |
|---|---|---|---|---|---|
| Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 2.009 | 2.205 | 95% Approx. Gamma UPL | 0.989 | 1.014 |
| 95% KM Gamma Percentile | 0.709 | 0.714 | 95% Gamma USL | 0.664 | 0.667 |

| Lognormal GOF Test on Detected Observations Only | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.995 | **Shapiro Wilk GOF Test** |
| 5% Shapiro Wilk Critical Value | 0.767 | Detected Data appear Lognormal at 5% Significance Level |
| Lilliefors Test Statistic | 0.2 | **Lilliefors GOF Test** |
| 5% Lilliefors Critical Value | 0.425 | Detected Data appear Lognormal at 5% Significance Level |
| **Detected Data appear Lognormal at 5% Significance Level** | | |

| Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects | | | |
|---|---|---|---|
| Mean in Original Scale | 0.393 | Mean in Log Scale | -1.031 |
| SD in Original Scale | 0.206 | SD in Log Scale | 0.505 |
| 95% UTL95% Coverage | 4.796 | 95% BCA UTL95% Coverage | N/A |
| 95% Bootstrap (%) UTL95% Coverage | N/A | 95% UPL (t) | 1.347 |
| 90% Percentile (z) | 0.681 | 95% Percentile (z) | 0.818 |
| 99% Percentile (z) | 1.155 | 95% USL | 0.746 |

| Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution | | | |
|---|---|---|---|
| KM Mean of Logged Data | -1.025 | 95% KM UTL (Lognormal)95% Coverage | 3.309 |
| KM SD of Logged Data | 0.432 | 95% KM UPL (Lognormal) | 1.118 |
| 95% KM Percentile Lognormal (z) | 0.73 | 95% KM USL (Lognormal) | 0.675 |

| Background DL/2 Statistics Assuming Lognormal Distribution | | | |
|---|---|---|---|
| Mean in Original Scale | 0.385 | Mean in Log Scale | -1.071 |
| SD in Original Scale | 0.215 | SD in Log Scale | 0.553 |
| 95% UTL95% Coverage | 5.895 | 95% UPL (t) | 1.469 |
| 90% Percentile (z) | 0.696 | 95% Percentile (z) | 0.851 |
| 99% Percentile (z) | 1.241 | 95% USL | 0.769 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | |

| Nonparametric Distribution Free Background Statistics |
|---|
| **Data appear to follow a Discernible Distribution at 5% Significance Level** |

| | | | |
|---|---|---|---|
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 0.671 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 0.671 |
| 95% USL | 0.671 | 95% KM Chebyshev UPL | 1.257 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **trivalent chromium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 22.76 | First Quartile | 37.57 |
| Second Largest | 62.88 | Median | 52.69 |
| Maximum | 64.97 | Third Quartile | 63.4 |
| Mean | 48.28 | SD | 19.8 |
| Coefficient of Variation | 0.41 | Skewness | -0.776 |
| Mean of logged Data | 3.797 | SD of logged Data | 0.488 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.894 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.27 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 150.1 | 90% Percentile (z) | 73.66 |
| 95% UPL (t) | 100.4 | 95% Percentile (z) | 80.85 |
| 95% USL | 77.24 | 99% Percentile (z) | 94.35 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.401 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.658 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.297 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.396 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 6.447 | k star (bias corrected MLE) | 1.778 |
| Theta hat (MLE) | 7.488 | Theta star (bias corrected MLE) | 27.15 |
| nu hat (MLE) | 51.58 | nu star (bias corrected) | 14.23 |

| | | | |
|---|---|---|---|
| MLE Mean (bias corrected) | 48.28 | MLE Sd (bias corrected) | 36.2 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 127.5 | 90% Percentile | 96.54 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 133.7 | 95% Percentile | 118.9 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 264.9 | 99% Percentile | 168.8 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 301.4 | | |
| 95% WH USL | 84.49 | 95% HW USL | 85.86 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.866 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.259 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 548.8 | 90% Percentile (z) | 83.33 |
| 95% UPL (t) | 161 | 95% Percentile (z) | 99.49 |
| 95% USL | 91.02 | 99% Percentile (z) | 138.7 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 64.97 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 64.97 | 90% Percentile | 64.34 |
| 90% Chebyshev UPL | 114.7 | 95% Percentile | 64.66 |
| 95% Chebyshev UPL | 144.8 | 99% Percentile | 64.91 |
| 95% USL | 64.97 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **total chromium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 23 | First Quartile | 37.63 |
| Second Largest | 63.55 | Median | 53.03 |
| Maximum | 65.4 | Third Quartile | 64.01 |
| Mean | 48.61 | SD | 19.99 |
| Coefficient of Variation | 0.411 | Skewness | -0.749 |
| Mean of logged Data | 3.804 | SD of logged Data | 0.487 |

| | | | |
|---|---|---|---|
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.891 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.273 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| Data appear Normal at 5% Significance Level | | | |
| | | | |
| Background Statistics Assuming Normal Distribution | | | |
| 95% UTL with 95% Coverage | 151.4 | 90% Percentile (z) | 74.23 |
| 95% UPL (t) | 101.2 | 95% Percentile (z) | 81.49 |
| 95% USL | 77.84 | 99% Percentile (z) | 95.11 |
| | | | |
| Gamma GOF Test | | | |
| A-D Test Statistic | 0.403 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | 0.658 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.3 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | 0.396 | Detected data appear Gamma Distributed at 5% Significance Level | |
| Detected data appear Gamma Distributed at 5% Significance Level | | | |
| | | | |
| Gamma Statistics | | | |
| k hat (MLE) | 6.448 | k star (bias corrected MLE) | 1.779 |
| Theta hat (MLE) | 7.539 | Theta star (bias corrected MLE) | 27.33 |
| nu hat (MLE) | 51.58 | nu star (bias corrected) | 14.23 |
| MLE Mean (bias corrected) | 48.61 | MLE Sd (bias corrected) | 36.45 |
| | | | |
| Background Statistics Assuming Gamma Distribution | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 128.4 | 90% Percentile | 97.21 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 134.6 | 95% Percentile | 119.7 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 266.7 | 99% Percentile | 170 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 303.3 | | |
| 95% WH USL | 85.08 | 95% HW USL | 86.44 |
| | | | |
| Lognormal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.866 | Shapiro Wilk Lognormal GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.262 | Lilliefors Lognormal GOF Test | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| Data appear Lognormal at 5% Significance Level | | | |
| | | | |
| Background Statistics assuming Lognormal Distribution | | | |
| 95% UTL with 95% Coverage | 550.8 | 90% Percentile (z) | 83.84 |
| 95% UPL (t) | 161.9 | 95% Percentile (z) | 100.1 |
| 95% USL | 91.57 | 99% Percentile (z) | 139.5 |
| | | | |
| Nonparametric Distribution Free Background Statistics | | | |
| Data appear Normal at 5% Significance Level | | | |

| | | | |
|---|---|---|---|
| Nonparametric Upper Limits for Background Threshold Values | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 65.4 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 65.4 | 90% Percentile | 64.85 |
| 90% Chebyshev UPL | 115.6 | 95% Percentile | 65.12 |
| 95% Chebyshev UPL | 146 | 99% Percentile | 65.34 |
| 95% USL | 65.4 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| cobalt | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 3.9 | First Quartile | 6.338 |
| Second Largest | 7.63 | Median | 7.39 |
| Maximum | 14.1 | Third Quartile | 9.246 |
| Mean | 8.194 | SD | 4.269 |
| Coefficient of Variation | 0.521 | Skewness | 1.072 |
| Mean of logged Data | 2.001 | SD of logged Data | 0.525 |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.919 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.303 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| Data appear Normal at 5% Significance Level | | | |
| | | | |
| Background Statistics Assuming Normal Distribution | | | |
| 95% UTL with 95% Coverage | 30.15 | 90% Percentile (z) | 13.66 |
| 95% UPL (t) | 19.43 | 95% Percentile (z) | 15.22 |
| 95% USL | 14.44 | 99% Percentile (z) | 18.12 |
| | | | |
| Gamma GOF Test | | | |
| A-D Test Statistic | 0.29 | Anderson-Darling Gamma GOF Test | |
| 5% A-D Critical Value | 0.659 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.254 | Kolmogorov-Smirnov Gamma GOF Test | |
| 5% K-S Critical Value | 0.396 | Detected data appear Gamma Distributed at 5% Significance Level | |
| Detected data appear Gamma Distributed at 5% Significance Level | | | |

| | | | |
|---|---|---|---|
| **Gamma Statistics** | | | |
| k hat (MLE) | 5.069 | k star (bias corrected MLE) | 1.434 |
| Theta hat (MLE) | 1.616 | Theta star (bias corrected MLE) | 5.714 |
| nu hat (MLE) | 40.55 | nu star (bias corrected) | 11.47 |
| MLE Mean (bias corrected) | 8.194 | MLE Sd (bias corrected) | 6.843 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 23.87 | 90% Percentile | 17.26 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 24.89 | 95% Percentile | 21.67 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 52.57 | 99% Percentile | 31.65 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 59.85 | | |
| 95% WH USL | 15.18 | 95% HW USL | 15.33 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.965 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.227 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 110.3 | 90% Percentile (z) | 14.51 |
| 95% UPL (t) | 29.47 | 95% Percentile (z) | 17.56 |
| 95% USL | 15.95 | 99% Percentile (z) | 25.11 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 14.1 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 14.1 | 90% Percentile | 12.16 |
| 90% Chebyshev UPL | 22.51 | 95% Percentile | 13.13 |
| 95% Chebyshev UPL | 29 | 99% Percentile | 13.9 |
| 95% USL | 14.1 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **copper** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 4.2 | First Quartile | 7.365 |
| Second Largest | 8.55 | Median | 8.485 |

| | | | |
|---|---|---|---|
| Maximum | 10.3 | Third Quartile | 8.986 |
| Mean | 7.866 | SD | 2.589 |
| Coefficient of Variation | 0.329 | Skewness | -1.323 |
| Mean of logged Data | 2.011 | SD of logged Data | 0.395 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.881 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.335 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 21.19 | 90% Percentile (z) | 11.18 |
| 95% UPL (t) | 14.68 | 95% Percentile (z) | 12.13 |
| 95% USL | 11.65 | 99% Percentile (z) | 13.89 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.517 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.657 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.376 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.395 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 9.824 | k star (bias corrected MLE) | 2.623 |
| Theta hat (MLE) | 0.801 | Theta star (bias corrected MLE) | 2.999 |
| nu hat (MLE) | 78.59 | nu star (bias corrected) | 20.98 |
| MLE Mean (bias corrected) | 7.866 | MLE Sd (bias corrected) | 4.857 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 17.78 | 90% Percentile | 14.38 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 18.42 | 95% Percentile | 17.17 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 33.5 | 99% Percentile | 23.27 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 36.97 | | |
| 95% WH USL | 12.56 | 95% HW USL | 12.72 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.82 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.369 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 56.85 | 90% Percentile (z) | 12.38 |
| 95% UPL (t) | 21.09 | 95% Percentile (z) | 14.29 |

| | | | |
|---|---|---|---|
| 95% USL | 13.3 | 99% Percentile (z) | 18.7 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 10.3 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 10.3 | 90% Percentile | 9.772 |
| 90% Chebyshev UPL | 16.55 | 95% Percentile | 10.03 |
| 95% Chebyshev UPL | 20.49 | 99% Percentile | 10.24 |
| 95% USL | 10.3 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **lead** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 2 | Number of Distinct Observations | 2 |
| | | Number of Missing Observations | 2 |
| Minimum | 4 | First Quartile | 4.725 |
| Second Largest | 4 | Median | 5.45 |
| Maximum | 6.9 | Third Quartile | 6.175 |
| Mean | 5.45 | SD | 2.051 |
| Coefficient of Variation | 0.376 | Skewness | N/A |
| | | | |
| **Warning: This data set only has 2 observations!** | | | |
| **Data set is too small to compute reliable and meaningful statistics and estimates!** | | | |
| **The data set for variable lead was not processed!** | | | |
| | | | |
| **It is suggested to collect at least 8 to 10 observations before using these statistical methods!** | | | |
| **If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.** | | | |
| | | | |
| | | | |
| **manganese** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 180 | First Quartile | 277.5 |
| Second Largest | 449 | Median | 379.5 |
| Maximum | 579 | Third Quartile | 481.5 |
| Mean | 379.5 | SD | 172.5 |
| Coefficient of Variation | 0.455 | Skewness | 0 |
| Mean of logged Data | 5.849 | SD of logged Data | 0.507 |

| | | | |
|---|---|---|---|
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.992 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.156 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 1267 | 90% Percentile (z) | 600.6 |
| 95% UPL (t) | 833.4 | 95% Percentile (z) | 663.2 |
| 95% USL | 631.8 | 99% Percentile (z) | 780.8 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.22 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.659 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.21 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.396 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 5.755 | k star (bias corrected MLE) | 1.605 |
| Theta hat (MLE) | 65.94 | Theta star (bias corrected MLE) | 236.4 |
| nu hat (MLE) | 46.04 | nu star (bias corrected) | 12.84 |
| MLE Mean (bias corrected) | 379.5 | MLE Sd (bias corrected) | 299.5 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 1049 | 90% Percentile | 777.9 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 1099 | 95% Percentile | 966.5 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 2240 | 99% Percentile | 1391 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 2554 | | |
| 95% WH USL | 682.1 | 95% HW USL | 691.8 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.969 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.194 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 4717 | 90% Percentile (z) | 664.9 |
| 95% UPL (t) | 1318 | 95% Percentile (z) | 799.4 |
| 95% USL | 728.8 | 99% Percentile (z) | 1130 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |

| | | | |
|---|---|---|---|
| Nonparametric Upper Limits for Background Threshold Values | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 579 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 579 | 90% Percentile | 540 |
| 90% Chebyshev UPL | 958.1 | 95% Percentile | 559.5 |
| 95% Chebyshev UPL | 1220 | 99% Percentile | 575.1 |
| 95% USL | 579 | | |

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

mercury

| | | | |
|---|---|---|---|
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 4 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 2 |
| Minimum Detect | 0.0052 | Minimum Non-Detect | 0.0255 |
| Maximum Detect | 0.0078 | Maximum Non-Detect | 0.026 |
| Variance Detected | 3.3800E-6 | Percent Non-Detects | 50% |
| Mean Detected | 0.0065 | SD Detected | 0.00184 |
| Mean of Detected Logged Data | -5.056 | SD of Detected Logged Data | 0.287 |

**Warning: Data set has only 2 Detected Values.**
**This is not enough to compute meaningful or reliable statistics and estimates.**

| | | | |
|---|---|---|---|
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |

**Normal GOF Test on Detects Only**
**Not Enough Data to Perform GOF Test**

| | | | |
|---|---|---|---|
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.0065 | KM SD | 0.0013 |
| 95% UTL95% Coverage | 0.0132 | 95% KM UPL (t) | 0.00992 |
| 90% KM Percentile (z) | 0.00817 | 95% KM Percentile (z) | 0.00864 |
| 99% KM Percentile (z) | 0.00952 | 95% KM USL | 0.0084 |

| | | | |
|---|---|---|---|
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.00969 | SD | 0.00383 |
| 95% UTL95% Coverage | 0.0294 | 95% UPL (t) | 0.0198 |
| 90% Percentile (z) | 0.0146 | 95% Percentile (z) | 0.016 |

| | | | | | |
|---|---|---|---|---|---|
| 99% Percentile (z) | | 0.0186 | 95% USL | | 0.0153 |
| DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons | | | | | |
| | | | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | | | |
| **Not Enough Data to Perform GOF Test** | | | | | |
| | | | | | |
| **Gamma Statistics on Detected Data Only** | | | | | |
| k hat (MLE) | | 24.66 | k star (bias corrected MLE) | | N/A |
| Theta hat (MLE) | | 2.6356E-4 | Theta star (bias corrected MLE) | | N/A |
| nu hat (MLE) | | 98.65 | nu star (bias corrected) | | N/A |
| MLE Mean (bias corrected) | | N/A | | | |
| MLE Sd (bias corrected) | | N/A | 95% Percentile of Chisquare (2kstar) | | N/A |
| | | | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | | | |
| Mean (KM) | | 0.0065 | SD (KM) | | 0.0013 |
| Variance (KM) | | 1.6900E-6 | SE of Mean (KM) | | 0.0013 |
| k hat (KM) | | 25 | k star (KM) | | 6.417 |
| nu hat (KM) | | 200 | nu star (KM) | | 51.33 |
| theta hat (KM) | | 2.6000E-4 | theta star (KM) | | 0.00101 |
| 80% gamma percentile (KM) | | 0.0085 | 90% gamma percentile (KM) | | 0.00993 |
| 95% gamma percentile (KM) | | 0.0112 | 99% gamma percentile (KM) | | 0.0139 |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.0157 | 0.0162 | 95% Approx. Gamma UPL | 0.0105 | 0.0106 |
| 95% KM Gamma Percentile | 0.00879 | 0.00882 | 95% Gamma USL | 0.0085 | 0.00852 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| **Not Enough Data to Perform GOF Test** | | | | | |
| | | | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | | | |
| Mean in Original Scale | | 0.00643 | Mean in Log Scale | | -5.056 |
| SD in Original Scale | | 0.00106 | SD in Log Scale | | 0.166 |
| 95% UTL95% Coverage | | 0.0149 | 95% BCA UTL95% Coverage | | N/A |
| 95% Bootstrap (%) UTL95% Coverage | | N/A | 95% UPL (t) | | 0.00984 |
| 90% Percentile (z) | | 0.00787 | 95% Percentile (z) | | 0.00836 |
| 99% Percentile (z) | | 0.00936 | 95% USL | | 0.00811 |
| | | | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | | | |
| KM Mean of Logged Data | | -5.056 | 95% KM UTL (Lognormal)95% Coverage | | 0.0181 |
| KM SD of Logged Data | | 0.203 | 95% KM UPL (Lognormal) | | 0.0109 |
| 95% KM Percentile Lognormal (z) | | 0.00889 | 95% KM USL (Lognormal) | | 0.00857 |
| | | | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | | | |
| Mean in Original Scale | | 0.00969 | Mean in Log Scale | | -4.704 |
| SD in Original Scale | | 0.00383 | SD in Log Scale | | 0.439 |
| 95% UTL95% Coverage | | 0.0866 | 95% UPL (t) | | 0.0287 |
| 90% Percentile (z) | | 0.0159 | 95% Percentile (z) | | 0.0186 |
| 99% Percentile (z) | | 0.0251 | 95% USL | | 0.0172 |

| | | | |
|---|---|---|---|
| DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons. | | | |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data do not follow a Discernible Distribution (0.05)** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 0.026 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 0.026 |
| 95% USL | 0.026 | 95% KM Chebyshev UPL | 0.0128 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **nickel** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 3.8 | First Quartile | 5.9 |
| Second Largest | 7.1 | Median | 6.85 |
| Maximum | 9.54 | Third Quartile | 7.71 |
| Mean | 6.76 | SD | 2.355 |
| Coefficient of Variation | 0.348 | Skewness | -0.225 |
| Mean of logged Data | 1.859 | SD of logged Data | 0.384 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.976 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.223 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 18.87 | 90% Percentile (z) | 9.777 |
| 95% UPL (t) | 12.96 | 95% Percentile (z) | 10.63 |
| 95% USL | 10.2 | 99% Percentile (z) | 12.24 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.289 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.657 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.263 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.395 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |

| | | | |
|---|---|---|---|
| **Gamma Statistics** | | | |
| k hat (MLE) | 9.852 | k star (bias corrected MLE) | 2.63 |
| Theta hat (MLE) | 0.686 | Theta star (bias corrected MLE) | 2.571 |
| nu hat (MLE) | 78.82 | nu star (bias corrected) | 21.04 |
| MLE Mean (bias corrected) | 6.76 | MLE Sd (bias corrected) | 4.169 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 15.26 | 90% Percentile | 12.35 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 15.73 | 95% Percentile | 14.74 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 28.74 | 99% Percentile | 19.97 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 31.44 | | |
| 95% WH USL | 10.78 | 95% HW USL | 10.88 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.939 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.279 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 46.32 | 90% Percentile (z) | 10.5 |
| 95% UPL (t) | 17.64 | 95% Percentile (z) | 12.08 |
| 95% USL | 11.26 | 99% Percentile (z) | 15.69 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 9.54 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 9.54 | 90% Percentile | 8.808 |
| 90% Chebyshev UPL | 14.66 | 95% Percentile | 9.174 |
| 95% Chebyshev UPL | 18.23 | 99% Percentile | 9.467 |
| 95% USL | 9.54 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **selenium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 0 |
| Number of Distinct Observations | 3 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |

| | | | |
|---|---|---|---|
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.272 | Minimum Non-Detect | 0.64 |
| Maximum Detect | 0.409 | Maximum Non-Detect | 0.64 |
| Variance Detected | 0.00945 | Percent Non-Detects | 50% |
| Mean Detected | 0.34 | SD Detected | 0.0972 |
| Mean of Detected Logged Data | -1.099 | SD of Detected Logged Data | 0.29 |
| | | | |
| **Warning: Data set has only 2 Detected Values.** | | | |
| **This is not enough to compute meaningful or reliable statistics and estimates.** | | | |
| | | | |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.34 | KM SD | 0.0688 |
| 95% UTL95% Coverage | 0.694 | 95% KM UPL (t) | 0.521 |
| 90% KM Percentile (z) | 0.428 | 95% KM Percentile (z) | 0.453 |
| 99% KM Percentile (z) | 0.5 | 95% KM USL | 0.441 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 0.33 | SD | 0.0573 |
| 95% UTL95% Coverage | 0.625 | 95% UPL (t) | 0.481 |
| 90% Percentile (z) | 0.404 | 95% Percentile (z) | 0.424 |
| 99% Percentile (z) | 0.464 | 95% USL | 0.414 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 24.16 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 0.0141 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 96.62 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | |
| Mean (KM) | 0.34 | SD (KM) | 0.0688 |
| Variance (KM) | 0.00473 | SE of Mean (KM) | 0.0688 |
| k hat (KM) | 24.49 | k star (KM) | 6.29 |
| nu hat (KM) | 195.9 | nu star (KM) | 50.32 |
| theta hat (KM) | 0.0139 | theta star (KM) | 0.0541 |
| 80% gamma percentile (KM) | 0.446 | 90% gamma percentile (KM) | 0.522 |
| 95% gamma percentile (KM) | 0.59 | 99% gamma percentile (KM) | 0.732 |
| | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | |

| Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods | | | | | |
|---|---|---|---|---|---|
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.827 | 0.853 | 95% Approx. Gamma UPL | 0.551 | 0.555 |
| 95% KM Gamma Percentile | 0.462 | 0.463 | 95% Gamma USL | 0.446 | 0.447 |

| Lognormal GOF Test on Detected Observations Only |
|---|
| Not Enough Data to Perform GOF Test |

| Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects | | | |
|---|---|---|---|
| Mean in Original Scale | 0.34 | Mean in Log Scale | -1.099 |
| SD in Original Scale | 0.0794 | SD in Log Scale | 0.237 |
| 95% UTL95% Coverage | 1.125 | 95% BCA UTL95% Coverage | N/A |
| 95% Bootstrap (%) UTL95% Coverage | N/A | 95% UPL (t) | 0.621 |
| 90% Percentile (z) | 0.451 | 95% Percentile (z) | 0.492 |
| 99% Percentile (z) | 0.578 | 95% USL | 0.471 |

| Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution | | | |
|---|---|---|---|
| KM Mean of Logged Data | -1.099 | 95% KM UTL (Lognormal)95% Coverage | 0.956 |
| KM SD of Logged Data | 0.205 | 95% KM UPL (Lognormal) | 0.571 |
| 95% KM Percentile Lognormal (z) | 0.467 | 95% KM USL (Lognormal) | 0.45 |

| Background DL/2 Statistics Assuming Lognormal Distribution | | | |
|---|---|---|---|
| Mean in Original Scale | 0.33 | Mean in Log Scale | -1.119 |
| SD in Original Scale | 0.0573 | SD in Log Scale | 0.169 |
| 95% UTL95% Coverage | 0.779 | 95% UPL (t) | 0.509 |
| 90% Percentile (z) | 0.405 | 95% Percentile (z) | 0.431 |
| 99% Percentile (z) | 0.484 | 95% USL | 0.418 |
| DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons. | | | |

| Nonparametric Distribution Free Background Statistics |
|---|
| Data do not follow a Discernible Distribution (0.05) |

| Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects) | | | |
|---|---|---|---|
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 0.64 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 0.64 |
| 95% USL | 0.64 | 95% KM Chebyshev UPL | 0.675 |

Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20.
Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers
and consists of observations collected from clean unimpacted locations.
The use of USL tends to provide a balance between false positives and false negatives provided the data
represents a background data set and when many onsite observations need to be compared with the BTV.

**strontium**

| General Statistics | | | |
|---|---|---|---|
| Total Number of Observations | 4 | Number of Distinct Observations | 4 |
| Minimum | 6.9 | First Quartile | 8.025 |
| Second Largest | 11.5 | Median | 9.95 |

| | | | |
|---|---|---|---|
| Maximum | 12.85 | Third Quartile | 11.84 |
| Mean | 9.913 | SD | 2.739 |
| Coefficient of Variation | 0.276 | Skewness | -0.0471 |
| Mean of logged Data | 2.264 | SD of logged Data | 0.285 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.944 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.219 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 24 | 90% Percentile (z) | 13.42 |
| 95% UPL (t) | 17.12 | 95% Percentile (z) | 14.42 |
| 95% USL | 13.92 | 99% Percentile (z) | 16.29 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.296 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.657 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.26 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.394 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 16.87 | k star (bias corrected MLE) | 4.384 |
| Theta hat (MLE) | 0.588 | Theta star (bias corrected MLE) | 2.261 |
| nu hat (MLE) | 134.9 | nu star (bias corrected) | 35.07 |
| MLE Mean (bias corrected) | 9.913 | MLE Sd (bias corrected) | 4.734 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 18.91 | 90% Percentile | 16.26 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 19.23 | 95% Percentile | 18.76 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 31.87 | 99% Percentile | 24.09 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 33.66 | | |
| 95% WH USL | 14.33 | 95% HW USL | 14.39 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.942 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.234 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 41.78 | 90% Percentile (z) | 13.87 |
| 95% UPL (t) | 20.39 | 95% Percentile (z) | 15.39 |

| | | | |
|---|---|---|---|
| 95% USL | 14.61 | 99% Percentile (z) | 18.69 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 12.85 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 12.85 | 90% Percentile | 12.45 |
| 90% Chebyshev UPL | 19.1 | 95% Percentile | 12.65 |
| 95% Chebyshev UPL | 23.26 | 99% Percentile | 12.81 |
| 95% USL | 12.85 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **thallium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 2 | Number of Missing Observations | 2 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.64 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.64 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |
| | | | |
| **Warning: This data set only has 2 observations!** | | | |
| **Data set is too small to compute reliable and meaningful statistics and estimates!** | | | |
| **The data set for variable thallium was not processed!** | | | |
| | | | |
| **It is suggested to collect at least 8 to 10 observations before using these statistical methods!** | | | |
| **If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.** | | | |
| | | | |
| | | | |
| **vanadium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 2 | Number of Distinct Observations | 2 |
| | | Number of Missing Observations | 2 |
| Minimum | 19 | First Quartile | 23.25 |
| Second Largest | 19 | Median | 27.5 |
| Maximum | 36 | Third Quartile | 31.75 |

| | | | |
|---|---|---|---|
| Mean | 27.5 | SD | 12.02 |
| Coefficient of Variation | 0.437 | Skewness | N/A |
| | | | |
| Warning: This data set only has 2 observations! | | | |
| Data set is too small to compute reliable and meaningful statistics and estimates! | | | |
| The data set for variable vanadium was not processed! | | | |
| | | | |
| It is suggested to collect at least 8 to 10 observations before using these statistical methods! | | | |
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |
| zinc | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 2 | Number of Distinct Observations | 2 |
| | | Number of Missing Observations | 2 |
| Minimum | 19 | First Quartile | 22.38 |
| Second Largest | 19 | Median | 25.75 |
| Maximum | 32.5 | Third Quartile | 29.13 |
| Mean | 25.75 | SD | 9.546 |
| Coefficient of Variation | 0.371 | Skewness | N/A |
| | | | |
| Warning: This data set only has 2 observations! | | | |
| Data set is too small to compute reliable and meaningful statistics and estimates! | | | |
| The data set for variable zinc was not processed! | | | |
| | | | |
| It is suggested to collect at least 8 to 10 observations before using these statistical methods! | | | |
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |

| | |
|---|---|
| | **Background Statistics for Data Sets with Non-Detects** |
| **User Selected Options** | |
| Date/Time of Computation | ProUCL 5.18/20/2021 9:47:02 AM |
| From File | ProUCL Background Inputs_a.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Coverage | 95% |
| Different or Future K Observations | 1 |
| Number of Bootstrap Operations | 2000 |

**aluminum**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |

**Warning: This data set only has 0 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable aluminum was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

**antimony**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 5 |
| Maximum Detect | N/A | Maximum Non-Detect | 5 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable antimony was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

| arsenic | | | |
|---|---|---|---|
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 3 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.42 | Minimum Non-Detect | 10 |
| Maximum Detect | 0.44 | Maximum Non-Detect | 10 |
| Variance Detected | 2.0000E-4 | Percent Non-Detects | 50% |
| Mean Detected | 0.43 | SD Detected | 0.0141 |
| Mean of Detected Logged Data | -0.844 | SD of Detected Logged Data | 0.0329 |
| | | | |
| Warning: Data set has only 2 Detected Values. | | | |
| This is not enough to compute meaningful or reliable statistics and estimates. | | | |
| | | | |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test on Detects Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Kaplan Meier (KM) Background Statistics Assuming Normal Distribution | | | |
| KM Mean | 0.43 | KM SD | 0.01 |
| 95% UTL95% Coverage | 0.481 | 95% KM UPL (t) | 0.456 |
| 90% KM Percentile (z) | 0.443 | 95% KM Percentile (z) | 0.446 |
| 99% KM Percentile (z) | 0.453 | 95% KM USL | 0.445 |
| | | | |
| DL/2 Substitution Background Statistics Assuming Normal Distribution | | | |
| Mean | 2.715 | SD | 2.639 |
| 95% UTL95% Coverage | 16.29 | 95% UPL (t) | 9.657 |
| 90% Percentile (z) | 6.096 | 95% Percentile (z) | 7.055 |
| 99% Percentile (z) | 8.853 | 95% USL | 6.574 |
| DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons | | | |
| | | | |
| Gamma GOF Tests on Detected Observations Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Gamma Statistics on Detected Data Only | | | |
| k hat (MLE) | 1849 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 2.3260E-4 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 7395 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| Estimates of Gamma Parameters using KM Estimates | | | |
| Mean (KM) | 0.43 | SD (KM) | 0.01 |
| Variance (KM) | 1.0000E-4 | SE of Mean (KM) | 0.01 |
| k hat (KM) | 1849 | k star (KM) | 462.4 |

| | | | | | |
|---|---|---|---|---|---|
| nu hat (KM) | | 14792 | nu star (KM) | | 3699 |
| theta hat (KM) | | 2.3256E-4 | theta star (KM) | | 9.2990E-4 |
| 80% gamma percentile (KM) | | 0.447 | 90% gamma percentile (KM) | | 0.456 |
| 95% gamma percentile (KM) | | 0.463 | 99% gamma percentile (KM) | | 0.478 |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.483 | 0.484 | 95% Approx. Gamma UPL | 0.457 | 0.457 |
| 95% KM Gamma Percentile | 0.447 | 0.447 | 95% Gamma USL | 0.445 | 0.445 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| **Not Enough Data to Perform GOF Test** | | | | | |
| | | | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | | | |
| Mean in Original Scale | | 0.43 | Mean in Log Scale | | -0.844 |
| SD in Original Scale | | 0.0115 | SD in Log Scale | | 0.0269 |
| 95% UTL95% Coverage | | 0.494 | 95% BCA UTL95% Coverage | | N/A |
| 95% Bootstrap (%) UTL95% Coverage | | N/A | 95% UPL (t) | | 0.461 |
| 90% Percentile (z) | | 0.445 | 95% Percentile (z) | | 0.449 |
| 99% Percentile (z) | | 0.458 | 95% USL | | 0.447 |
| | | | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | | | |
| KM Mean of Logged Data | | -0.844 | 95% KM UTL (Lognormal)95% Coverage | | 0.485 |
| KM SD of Logged Data | | 0.0233 | 95% KM UPL (Lognormal) | | 0.457 |
| 95% KM Percentile Lognormal (z) | | 0.447 | 95% KM USL (Lognormal) | | 0.445 |
| | | | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | | | |
| Mean in Original Scale | | 2.715 | Mean in Log Scale | | 0.383 |
| SD in Original Scale | | 2.639 | SD in Log Scale | | 1.417 |
| 95% UTL95% Coverage | | 2144 | 95% UPL (t) | | 60.96 |
| 90% Percentile (z) | | 9.009 | 95% Percentile (z) | | 15.07 |
| 99% Percentile (z) | | 39.59 | 95% USL | | 11.64 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | | | |
| | | | | | |
| **Nonparametric Distribution Free Background Statistics** | | | | | |
| **Data do not follow a Discernible Distribution (0.05)** | | | | | |
| | | | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | | | |
| Order of Statistic, r | | 4 | 95% UTL with95% Coverage | | 10 |
| Approx, f used to compute achieved CC | | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | | 0.185 |
| Approximate Sample Size needed to achieve specified CC | | 59 | 95% UPL | | 10 |
| 95% USL | | 10 | 95% KM Chebyshev UPL | | 0.479 |
| | | | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | | | |
| and consists of observations collected from clean unimpacted locations. | | | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | | | |
| | | | | | |

| barium | | | |
|---|---|---|---|
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 5 | Number of Distinct Observations | 4 |
| Minimum | 23.1 | First Quartile | 23.2 |
| Second Largest | 27 | Median | 24 |
| Maximum | 27 | Third Quartile | 27 |
| Mean | 24.86 | SD | 1.984 |
| Coefficient of Variation | 0.0798 | Skewness | 0.477 |
| Mean of logged Data | 3.211 | SD of logged Data | 0.0791 |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 4.203 | d2max (for USL) | 1.671 |
| | | | |
| **Normal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.782 | **Shapiro Wilk GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.762 | Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.268 | **Lilliefors GOF Test** | |
| 5% Lilliefors Critical Value | 0.343 | Data appear Normal at 5% Significance Level | |
| **Data appear Normal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics Assuming Normal Distribution** | | | |
| 95% UTL with 95% Coverage | 33.2 | 90% Percentile (z) | 27.4 |
| 95% UPL (t) | 29.49 | 95% Percentile (z) | 28.12 |
| 95% USL | 28.18 | 99% Percentile (z) | 29.48 |
| | | | |
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.647 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.678 | Detected data appear Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.286 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.357 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data appear Gamma Distributed at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 198.8 | k star (bias corrected MLE) | 79.64 |
| Theta hat (MLE) | 0.125 | Theta star (bias corrected MLE) | 0.312 |
| nu hat (MLE) | 1988 | nu star (bias corrected) | 796.4 |
| MLE Mean (bias corrected) | 24.86 | MLE Sd (bias corrected) | 2.786 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 29.71 | 90% Percentile | 28.49 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 29.74 | 95% Percentile | 29.61 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 34.05 | 99% Percentile | 31.8 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 34.17 | | |
| 95% WH USL | 28.26 | 95% HW USL | 28.27 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.787 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.762 | Data appear Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.26 | **Lilliefors Lognormal GOF Test** | |

| | | | |
|---|---|---|---|
| 5% Lilliefors Critical Value | 0.343 | Data appear Lognormal at 5% Significance Level | |
| Data appear Lognormal at 5% Significance Level | | | |
| | | | |
| Background Statistics assuming Lognormal Distribution | | | |
| 95% UTL with 95% Coverage | 34.57 | 90% Percentile (z) | 27.44 |
| 95% UPL (t) | 29.83 | 95% Percentile (z) | 28.24 |
| 95% USL | 28.3 | 99% Percentile (z) | 29.81 |
| | | | |
| Nonparametric Distribution Free Background Statistics | | | |
| Data appear Normal at 5% Significance Level | | | |
| | | | |
| Nonparametric Upper Limits for Background Threshold Values | | | |
| Order of Statistic, r | 5 | 95% UTL with 95% Coverage | 27 |
| Approx, f used to compute achieved CC | 0.263 | Approximate Actual Confidence Coefficient achieved by UTL | 0.226 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | 27 | 95% BCA Bootstrap UTL with 95% Coverage | 27 |
| 95% UPL | 27 | 90% Percentile | 27 |
| 90% Chebyshev UPL | 31.38 | 95% Percentile | 27 |
| 95% Chebyshev UPL | 34.34 | 99% Percentile | 27 |
| 95% USL | 27 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| beryllium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 2 | | |
| Number of Detects | 0 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 2 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.1 |
| Maximum Detect | N/A | Maximum Non-Detect | 2 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |
| | | | |
| Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs! | | | |
| Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit! | | | |
| The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV). | | | |
| | | | |
| The data set for variable beryllium was not processed! | | | |
| | | | |
| | | | |
| cadmium | | | |
| | | | |
| General Statistics | | | |

| | | | |
|---|---|---|---|
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 2 | | |
| Number of Detects | 0 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 2 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.08 |
| Maximum Detect | N/A | Maximum Non-Detect | 1 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!**

**Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!**

**The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).**

**The data set for variable cadmium was not processed!**

**calcium**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |

**Warning: This data set only has 0 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable calcium was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

**hexavalent chromium**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.74 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.74 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

| | | | |
|---|---|---|---|
| Data set is too small to compute reliable and meaningful statistics and estimates! | | | |
| The data set for variable hexavalent chromium was not processed! | | | |
| | | | |
| It is suggested to collect at least 8 to 10 observations before using these statistical methods! | | | |
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |
| trivalent chromium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |
| | | | |
| Warning: This data set only has 0 observations! | | | |
| Data set is too small to compute reliable and meaningful statistics and estimates! | | | |
| The data set for variable trivalent chromium was not processed! | | | |
| | | | |
| It is suggested to collect at least 8 to 10 observations before using these statistical methods! | | | |
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |
| total chromium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 3 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.45 | Minimum Non-Detect | 5 |
| Maximum Detect | 0.53 | Maximum Non-Detect | 5 |
| Variance Detected | 0.0032 | Percent Non-Detects | 50% |
| Mean Detected | 0.49 | SD Detected | 0.0566 |
| Mean of Detected Logged Data | -0.717 | SD of Detected Logged Data | 0.116 |
| | | | |
| Warning: Data set has only 2 Detected Values. | | | |
| This is not enough to compute meaningful or reliable statistics and estimates. | | | |
| | | | |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test on Detects Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Kaplan Meier (KM) Background Statistics Assuming Normal Distribution | | | |

| | | | |
|---|---|---|---|
| KM Mean | 0.49 | KM SD | 0.04 |
| 95% UTL95% Coverage | 0.696 | 95% KM UPL (t) | 0.595 |
| 90% KM Percentile (z) | 0.541 | 95% KM Percentile (z) | 0.556 |
| 99% KM Percentile (z) | 0.583 | 95% KM USL | 0.548 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 1.495 | SD | 1.161 |
| 95% UTL95% Coverage | 7.467 | 95% UPL (t) | 4.55 |
| 90% Percentile (z) | 2.983 | 95% Percentile (z) | 3.405 |
| 99% Percentile (z) | 4.196 | 95% USL | 3.193 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 149.7 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 0.00327 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 598.9 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | |
| Mean (KM) | 0.49 | SD (KM) | 0.04 |
| Variance (KM) | 0.0016 | SE of Mean (KM) | 0.04 |
| k hat (KM) | 150.1 | k star (KM) | 37.68 |
| nu hat (KM) | 1201 | nu star (KM) | 301.5 |
| theta hat (KM) | 0.00327 | theta star (KM) | 0.013 |
| 80% gamma percentile (KM) | 0.556 | 90% gamma percentile (KM) | 0.595 |
| 95% gamma percentile (KM) | 0.628 | 99% gamma percentile (KM) | 0.695 |
| | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | |

| | | | | | |
|---|---|---|---|---|---|
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.725 | 0.729 | 95% Approx. Gamma UPL | 0.602 | 0.603 |
| 95% KM Gamma Percentile | 0.558 | 0.558 | 95% Gamma USL | 0.55 | 0.55 |

| | | | |
|---|---|---|---|
| **Lognormal GOF Test on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | |
| Mean in Original Scale | 0.49 | Mean in Log Scale | -0.717 |
| SD in Original Scale | 0.0462 | SD in Log Scale | 0.0945 |
| 95% UTL95% Coverage | 0.794 | 95% BCA UTL95% Coverage | N/A |
| 95% Bootstrap (%) UTL95% Coverage | N/A | 95% UPL (t) | 0.626 |
| 90% Percentile (z) | 0.551 | 95% Percentile (z) | 0.57 |
| 99% Percentile (z) | 0.608 | 95% USL | 0.561 |
| | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | |
| KM Mean of Logged Data | -0.717 | 95% KM UTL (Lognormal)95% Coverage | 0.744 |

| | | | |
|---|---|---|---|
| KM SD of Logged Data | 0.0818 | 95% KM UPL (Lognormal) | 0.606 |
| 95% KM Percentile Lognormal (z) | 0.559 | 95% KM USL (Lognormal) | 0.55 |
| | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | |
| Mean in Original Scale | 1.495 | Mean in Log Scale | 0.0998 |
| SD in Original Scale | 1.161 | SD in Log Scale | 0.945 |
| 95% UTL95% Coverage | 142.8 | 95% UPL (t) | 13.29 |
| 90% Percentile (z) | 3.71 | 95% Percentile (z) | 5.23 |
| 99% Percentile (z) | 9.96 | 95% USL | 4.402 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data do not follow a Discernible Distribution (0.05)** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 5 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 5 |
| 95% USL | 5 | 95% KM Chebyshev UPL | 0.685 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **cobalt** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 2 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 1 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.16 | Minimum Non-Detect | 5 |
| Maximum Detect | 0.16 | Maximum Non-Detect | 5 |
| Variance Detected | 0 | Percent Non-Detects | 50% |
| Mean Detected | 0.16 | SD Detected | 0 |
| Mean of Detected Logged Data | -1.833 | SD of Detected Logged Data | 0 |
| | | | |
| **Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!** | | | |
| **It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).** | | | |
| | | | |
| **The data set for variable cobalt was not processed!** | | | |
| | | | |
| | | | |
| **copper** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 3 | | |

| | | | |
|---|---|---|---|
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 1.1 | Minimum Non-Detect | 10 |
| Maximum Detect | 1.2 | Maximum Non-Detect | 10 |
| Variance Detected | 0.005 | Percent Non-Detects | 50% |
| Mean Detected | 1.15 | SD Detected | 0.0707 |
| Mean of Detected Logged Data | 0.139 | SD of Detected Logged Data | 0.0615 |
| | | | |
| **Warning: Data set has only 2 Detected Values.** | | | |
| **This is not enough to compute meaningful or reliable statistics and estimates.** | | | |
| | | | |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 1.15 | KM SD | 0.05 |
| 95% UTL95% Coverage | 1.407 | 95% KM UPL (t) | 1.282 |
| 90% KM Percentile (z) | 1.214 | 95% KM Percentile (z) | 1.232 |
| 99% KM Percentile (z) | 1.266 | 95% KM USL | 1.223 |
| | | | |
| **DL/2 Substitution Background Statistics Assuming Normal Distribution** | | | |
| Mean | 3.075 | SD | 2.223 |
| 95% UTL95% Coverage | 14.51 | 95% UPL (t) | 8.924 |
| 90% Percentile (z) | 5.924 | 95% Percentile (z) | 6.732 |
| 99% Percentile (z) | 8.247 | 95% USL | 6.326 |
| **DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons** | | | |
| | | | |
| **Gamma GOF Tests on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Gamma Statistics on Detected Data Only** | | | |
| k hat (MLE) | 528.7 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 0.00218 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 2115 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | |
| Mean (KM) | 1.15 | SD (KM) | 0.05 |
| Variance (KM) | 0.0025 | SE of Mean (KM) | 0.05 |
| k hat (KM) | 529 | k star (KM) | 132.4 |
| nu hat (KM) | 4232 | nu star (KM) | 1059 |
| theta hat (KM) | 0.00217 | theta star (KM) | 0.00868 |
| 80% gamma percentile (KM) | 1.233 | 90% gamma percentile (KM) | 1.28 |
| 95% gamma percentile (KM) | 1.319 | 99% gamma percentile (KM) | 1.395 |
| | | | |

| | | | | | |
|---|---|---|---|---|---|
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 1.426 | 1.429 | 95% Approx. Gamma UPL | 1.286 | 1.286 |
| 95% KM Gamma Percentile | 1.233 | 1.234 | 95% Gamma USL | 1.224 | 1.224 |

| | | | |
|---|---|---|---|
| **Lognormal GOF Test on Detected Observations Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | |
| Mean in Original Scale | 1.15 | Mean in Log Scale | 0.139 |
| SD in Original Scale | 0.0577 | SD in Log Scale | 0.0502 |
| 95% UTL95% Coverage | 1.488 | 95% BCA UTL95% Coverage | N/A |
| 95% Bootstrap (%) UTL95% Coverage | N/A | 95% UPL (t) | 1.311 |
| 90% Percentile (z) | 1.225 | 95% Percentile (z) | 1.248 |
| 99% Percentile (z) | 1.291 | 95% USL | 1.237 |
| | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | |
| KM Mean of Logged Data | 0.139 | 95% KM UTL (Lognormal)95% Coverage | 1.437 |
| KM SD of Logged Data | 0.0435 | 95% KM UPL (Lognormal) | 1.288 |
| 95% KM Percentile Lognormal (z) | 1.234 | 95% KM USL (Lognormal) | 1.224 |
| | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | |
| Mean in Original Scale | 3.075 | Mean in Log Scale | 0.874 |
| SD in Original Scale | 2.223 | SD in Log Scale | 0.85 |
| 95% UTL95% Coverage | 189.7 | 95% UPL (t) | 22.42 |
| 90% Percentile (z) | 7.122 | 95% Percentile (z) | 9.698 |
| 99% Percentile (z) | 17.31 | 95% USL | 8.306 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data do not follow a Discernible Distribution (0.05)** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 10 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 10 |
| 95% USL | 10 | 95% KM Chebyshev UPL | 1.394 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **iron** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |

| | | | |
|---|---|---|---|
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.2 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.2 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable iron was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

lead

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 5 |
| Maximum Detect | N/A | Maximum Non-Detect | 5 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable lead was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

magnesium

General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |

**Warning: This data set only has 0 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

| | | | |
|---|---|---|---|
| The data set for variable magnesium was not processed! | | | |
| | | | |
| It is suggested to collect at least 8 to 10 observations before using these statistical methods! | | | |
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |
| manganese | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 4 | | |
| Number of Detects | 3 | Number of Non-Detects | 1 |
| Number of Distinct Detects | 3 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 11 | Minimum Non-Detect | 10 |
| Maximum Detect | 22.2 | Maximum Non-Detect | 10 |
| Variance Detected | 38.41 | Percent Non-Detects | 25% |
| Mean Detected | 18.13 | SD Detected | 6.198 |
| Mean of Detected Logged Data | 2.851 | SD of Detected Logged Data | 0.393 |
| | | | |
| Warning: Data set has only 3 Detected Values. | | | |
| This is not enough to compute meaningful or reliable statistics and estimates. | | | |
| | | | |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test on Detects Only | | | |
| Shapiro Wilk Test Statistic | 0.816 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.767 | Detected Data appear Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.356 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.425 | Detected Data appear Normal at 5% Significance Level | |
| Detected Data appear Normal at 5% Significance Level | | | |
| | | | |
| Kaplan Meier (KM) Background Statistics Assuming Normal Distribution | | | |
| KM Mean | 16.1 | KM SD | 5.622 |
| 95% UTL95% Coverage | 45.02 | 95% KM UPL (t) | 30.89 |
| 90% KM Percentile (z) | 23.31 | 95% KM Percentile (z) | 25.35 |
| 99% KM Percentile (z) | 29.18 | 95% KM USL | 24.32 |
| | | | |
| DL/2 Substitution Background Statistics Assuming Normal Distribution | | | |
| Mean | 14.85 | SD | 8.29 |
| 95% UTL95% Coverage | 57.5 | 95% UPL (t) | 36.66 |
| 90% Percentile (z) | 25.47 | 95% Percentile (z) | 28.49 |
| 99% Percentile (z) | 34.14 | 95% USL | 26.97 |
| DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons | | | |
| | | | |
| Gamma GOF Tests on Detected Observations Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Gamma Statistics on Detected Data Only | | | |

| | | | | | |
|---|---|---|---|---|---|
| k hat (MLE) | | 10.78 | k star (bias corrected MLE) | | N/A |
| Theta hat (MLE) | | 1.682 | Theta star (bias corrected MLE) | | N/A |
| nu hat (MLE) | | 64.69 | nu star (bias corrected) | | N/A |
| MLE Mean (bias corrected) | | N/A | | | |
| MLE Sd (bias corrected) | | N/A | 95% Percentile of Chisquare (2kstar) | | N/A |
| | | | | | |
| **Gamma ROS Statistics using Imputed Non-Detects** | | | | | |
| GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | |
| GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20) | | | | | |
| For such situations, GROS method may yield incorrect values of UCLs and BTVs | | | | | |
| This is especially true when the sample size is small. | | | | | |
| For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | |
| Minimum | | 4.816 | Mean | | 14.8 |
| Maximum | | 22.2 | Median | | 16.1 |
| SD | | 8.363 | CV | | 0.565 |
| k hat (MLE) | | 3.208 | k star (bias corrected MLE) | | 0.969 |
| Theta hat (MLE) | | 4.615 | Theta star (bias corrected MLE) | | 15.28 |
| nu hat (MLE) | | 25.66 | nu star (bias corrected) | | 7.748 |
| MLE Mean (bias corrected) | | 14.8 | MLE Sd (bias corrected) | | 15.04 |
| 95% Percentile of Chisquare (2kstar) | | 5.869 | 90% Percentile | | 34.36 |
| 95% Percentile | | 44.85 | 99% Percentile | | 69.28 |
| **The following statistics are computed using Gamma ROS Statistics on Imputed Data** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 131.9 | 162.7 | 95% Approx. Gamma UPL | 53.28 | 57.8 |
| 95% Gamma USL | 31.12 | 32.01 | | | |
| | | | | | |
| **Estimates of Gamma Parameters using KM Estimates** | | | | | |
| Mean (KM) | | 16.1 | SD (KM) | | 5.622 |
| Variance (KM) | | 31.61 | SE of Mean (KM) | | 3.443 |
| k hat (KM) | | 8.2 | k star (KM) | | 2.217 |
| nu hat (KM) | | 65.6 | nu star (KM) | | 17.73 |
| theta hat (KM) | | 1.963 | theta star (KM) | | 7.263 |
| 80% gamma percentile (KM) | | 23.81 | 90% gamma percentile (KM) | | 30.57 |
| 95% gamma percentile (KM) | | 36.98 | 99% gamma percentile (KM) | | 51.11 |
| | | | | | |
| **The following statistics are computed using gamma distribution and KM estimates** | | | | | |
| **Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods** | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 65.9 | 71.26 | 95% Approx. Gamma UPL | 35.35 | 36.2 |
| 95% KM Gamma Percentile | 26.59 | 26.8 | 95% Gamma USL | 25.15 | 25.28 |
| | | | | | |
| **Lognormal GOF Test on Detected Observations Only** | | | | | |
| Shapiro Wilk Test Statistic | | 0.799 | **Shapiro Wilk GOF Test** | | |
| 5% Shapiro Wilk Critical Value | | 0.767 | Detected Data appear Lognormal at 5% Significance Level | | |
| Lilliefors Test Statistic | | 0.364 | **Lilliefors GOF Test** | | |
| 5% Lilliefors Critical Value | | 0.425 | Detected Data appear Lognormal at 5% Significance Level | | |
| **Detected Data appear Lognormal at 5% Significance Level** | | | | | |
| | | | | | |
| **Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects** | | | | | |

| | | | |
|---|---|---|---|
| Mean in Original Scale | 15.22 | Mean in Log Scale | 2.606 |
| SD in Original Scale | 7.712 | SD in Log Scale | 0.586 |
| 95% UTL95% Coverage | 275.3 | 95% BCA UTL95% Coverage | N/A |
| 95% Bootstrap (%) UTL95% Coverage | N/A | 95% UPL (t) | 63.21 |
| 90% Percentile (z) | 28.68 | 95% Percentile (z) | 35.48 |
| 99% Percentile (z) | 52.88 | 95% USL | 31.88 |
| | | | |
| **Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution** | | | |
| KM Mean of Logged Data | 2.714 | 95% KM UTL (Lognormal)95% Coverage | 98.78 |
| KM SD of Logged Data | 0.365 | 95% KM UPL (Lognormal) | 39.44 |
| 95% KM Percentile Lognormal (z) | 27.51 | 95% KM USL (Lognormal) | 25.74 |
| | | | |
| **Background DL/2 Statistics Assuming Lognormal Distribution** | | | |
| Mean in Original Scale | 14.85 | Mean in Log Scale | 2.54 |
| SD in Original Scale | 8.29 | SD in Log Scale | 0.699 |
| 95% UTL95% Coverage | 461.2 | 95% UPL (t) | 79.71 |
| 90% Percentile (z) | 31.05 | 95% Percentile (z) | 40.02 |
| 99% Percentile (z) | 64.42 | 95% USL | 35.23 |
| **DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.** | | | |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)** | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 22.2 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 22.2 |
| 95% USL | 22.2 | 95% KM Chebyshev UPL | 43.5 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| mercury | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 4 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 0.2 |
| Maximum Detect | N/A | Maximum Non-Detect | 0.2 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |
| | | | |
| **Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!** | | | |
| **Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!** | | | |

| | | | |
|---|---|---|---|
| The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV). | | | |
| | | | |
| The data set for variable mercury was not processed! | | | |
| | | | |
| | | | |
| nickel | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 3 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.29 | Minimum Non-Detect | 10 |
| Maximum Detect | 0.33 | Maximum Non-Detect | 10 |
| Variance Detected | 8.0000E-4 | Percent Non-Detects | 50% |
| Mean Detected | 0.31 | SD Detected | 0.0283 |
| Mean of Detected Logged Data | -1.173 | SD of Detected Logged Data | 0.0914 |
| | | | |
| Warning: Data set has only 2 Detected Values. | | | |
| This is not enough to compute meaningful or reliable statistics and estimates. | | | |
| | | | |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test on Detects Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Kaplan Meier (KM) Background Statistics Assuming Normal Distribution | | | |
| KM Mean | 0.31 | KM SD | 0.02 |
| 95% UTL95% Coverage | 0.413 | 95% KM UPL (t) | 0.363 |
| 90% KM Percentile (z) | 0.336 | 95% KM Percentile (z) | 0.343 |
| 99% KM Percentile (z) | 0.357 | 95% KM USL | 0.339 |
| | | | |
| DL/2 Substitution Background Statistics Assuming Normal Distribution | | | |
| Mean | 2.655 | SD | 2.708 |
| 95% UTL95% Coverage | 16.58 | 95% UPL (t) | 9.78 |
| 90% Percentile (z) | 6.125 | 95% Percentile (z) | 7.109 |
| 99% Percentile (z) | 8.954 | 95% USL | 6.615 |
| DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons | | | |
| | | | |
| Gamma GOF Tests on Detected Observations Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Gamma Statistics on Detected Data Only | | | |
| k hat (MLE) | 239.9 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 0.00129 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 959.7 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |

| | | | | | |
|---|---|---|---|---|---|
| Estimates of Gamma Parameters using KM Estimates | | | | | |
| Mean (KM) | | 0.31 | SD (KM) | | 0.02 |
| Variance (KM) | | 4.0000E-4 | SE of Mean (KM) | | 0.02 |
| k hat (KM) | | 240.3 | k star (KM) | | 60.23 |
| nu hat (KM) | | 1922 | nu star (KM) | | 481.8 |
| theta hat (KM) | | 0.00129 | theta star (KM) | | 0.00515 |
| 80% gamma percentile (KM) | | 0.343 | 90% gamma percentile (KM) | | 0.362 |
| 95% gamma percentile (KM) | | 0.378 | 99% gamma percentile (KM) | | 0.41 |
| | | | | | |
| The following statistics are computed using gamma distribution and KM estimates | | | | | |
| Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.424 | 0.426 | 95% Approx. Gamma UPL | 0.365 | 0.366 |
| 95% KM Gamma Percentile | 0.344 | 0.344 | 95% Gamma USL | 0.34 | 0.34 |
| | | | | | |
| Lognormal GOF Test on Detected Observations Only | | | | | |
| Not Enough Data to Perform GOF Test | | | | | |
| | | | | | |
| Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects | | | | | |
| Mean in Original Scale | | 0.31 | Mean in Log Scale | | -1.173 |
| SD in Original Scale | | 0.0231 | SD in Log Scale | | 0.0746 |
| 95% UTL95% Coverage | | 0.454 | 95% BCA UTL95% Coverage | | N/A |
| 95% Bootstrap (%) UTL95% Coverage | | N/A | 95% UPL (t) | | 0.376 |
| 90% Percentile (z) | | 0.34 | 95% Percentile (z) | | 0.35 |
| 99% Percentile (z) | | 0.368 | 95% USL | | 0.345 |
| | | | | | |
| Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution | | | | | |
| KM Mean of Logged Data | | -1.173 | 95% KM UTL (Lognormal)95% Coverage | | 0.431 |
| KM SD of Logged Data | | 0.0646 | 95% KM UPL (Lognormal) | | 0.367 |
| 95% KM Percentile Lognormal (z) | | 0.344 | 95% KM USL (Lognormal) | | 0.34 |
| | | | | | |
| Background DL/2 Statistics Assuming Lognormal Distribution | | | | | |
| Mean in Original Scale | | 2.655 | Mean in Log Scale | | 0.218 |
| SD in Original Scale | | 2.708 | SD in Log Scale | | 1.607 |
| 95% UTL95% Coverage | | 4851 | 95% UPL (t) | | 85.42 |
| 90% Percentile (z) | | 9.758 | 95% Percentile (z) | | 17.5 |
| 99% Percentile (z) | | 52.33 | 95% USL | | 13.05 |
| DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons. | | | | | |
| | | | | | |
| Nonparametric Distribution Free Background Statistics | | | | | |
| Data do not follow a Discernible Distribution (0.05) | | | | | |
| | | | | | |
| Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects) | | | | | |
| Order of Statistic, r | | 4 | 95% UTL with95% Coverage | | 10 |
| Approx, f used to compute achieved CC | | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | | 0.185 |
| Approximate Sample Size needed to achieve specified CC | | 59 | 95% UPL | | 10 |
| 95% USL | | 10 | 95% KM Chebyshev UPL | | 0.407 |
| | | | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | | | |

| | | | |
|---|---|---|---|
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| **potassium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |
| | | | |
| **Warning: This data set only has 0 observations!** | | | |
| **Data set is too small to compute reliable and meaningful statistics and estimates!** | | | |
| **The data set for variable potassium was not processed!** | | | |
| | | | |
| **It is suggested to collect at least 8 to 10 observations before using these statistical methods!** | | | |
| **If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.** | | | |
| | | | |
| | | | |
| **selenium** | | | |
| | | | |
| **General Statistics** | | | |
| Total Number of Observations | 4 | Number of Missing Observations | 1 |
| Number of Distinct Observations | 3 | | |
| Number of Detects | 2 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 2 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | 0.096 | Minimum Non-Detect | 20 |
| Maximum Detect | 0.11 | Maximum Non-Detect | 20 |
| Variance Detected | 9.8000E-5 | Percent Non-Detects | 50% |
| Mean Detected | 0.103 | SD Detected | 0.0099 |
| Mean of Detected Logged Data | -2.275 | SD of Detected Logged Data | 0.0963 |
| | | | |
| **Warning: Data set has only 2 Detected Values.** | | | |
| **This is not enough to compute meaningful or reliable statistics and estimates.** | | | |
| | | | |
| | | | |
| **Critical Values for Background Threshold Values (BTVs)** | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| **Normal GOF Test on Detects Only** | | | |
| **Not Enough Data to Perform GOF Test** | | | |
| | | | |
| **Kaplan Meier (KM) Background Statistics Assuming Normal Distribution** | | | |
| KM Mean | 0.103 | KM SD | 0.007 |
| 95% UTL95% Coverage | 0.139 | 95% KM UPL (t) | 0.121 |

| | | | |
|---|---|---|---|
| 90% KM Percentile (z) | 0.112 | 95% KM Percentile (z) | 0.115 |
| 99% KM Percentile (z) | 0.119 | 95% KM USL | 0.113 |
| | | | |
| DL/2 Substitution Background Statistics Assuming Normal Distribution | | | |
| Mean | 5.052 | SD | 5.714 |
| 95% UTL95% Coverage | 34.44 | 95% UPL (t) | 20.09 |
| 90% Percentile (z) | 12.37 | 95% Percentile (z) | 14.45 |
| 99% Percentile (z) | 18.34 | 95% USL | 13.41 |
| DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons | | | |
| | | | |
| Gamma GOF Tests on Detected Observations Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Gamma Statistics on Detected Data Only | | | |
| k hat (MLE) | 216.2 | k star (bias corrected MLE) | N/A |
| Theta hat (MLE) | 4.7646E-4 | Theta star (bias corrected MLE) | N/A |
| nu hat (MLE) | 864.7 | nu star (bias corrected) | N/A |
| MLE Mean (bias corrected) | N/A | | |
| MLE Sd (bias corrected) | N/A | 95% Percentile of Chisquare (2kstar) | N/A |
| | | | |
| Estimates of Gamma Parameters using KM Estimates | | | |
| Mean (KM) | 0.103 | SD (KM) | 0.007 |
| Variance (KM) | 4.9000E-5 | SE of Mean (KM) | 0.007 |
| k hat (KM) | 216.5 | k star (KM) | 54.29 |
| nu hat (KM) | 1732 | nu star (KM) | 434.4 |
| theta hat (KM) | 4.7573E-4 | theta star (KM) | 0.0019 |
| 80% gamma percentile (KM) | 0.115 | 90% gamma percentile (KM) | 0.121 |
| 95% gamma percentile (KM) | 0.127 | 99% gamma percentile (KM) | 0.138 |

| | | | | | |
|---|---|---|---|---|---|
| The following statistics are computed using gamma distribution and KM estimates | | | | | |
| Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods | | | | | |
| | WH | HW | | WH | HW |
| 95% Approx. Gamma UTL with 95% Coverage | 0.143 | 0.144 | 95% Approx. Gamma UPL | 0.122 | 0.123 |
| 95% KM Gamma Percentile | 0.115 | 0.115 | 95% Gamma USL | 0.113 | 0.113 |

| | | | |
|---|---|---|---|
| Lognormal GOF Test on Detected Observations Only | | | |
| Not Enough Data to Perform GOF Test | | | |
| | | | |
| Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects | | | |
| Mean in Original Scale | 0.103 | Mean in Log Scale | -2.275 |
| SD in Original Scale | 0.00808 | SD in Log Scale | 0.0786 |
| 95% UTL95% Coverage | 0.154 | 95% BCA UTL95% Coverage | N/A |
| 95% Bootstrap (%) UTL95% Coverage | N/A | 95% UPL (t) | 0.126 |
| 90% Percentile (z) | 0.114 | 95% Percentile (z) | 0.117 |
| 99% Percentile (z) | 0.123 | 95% USL | 0.115 |
| | | | |
| Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution | | | |
| KM Mean of Logged Data | -2.275 | 95% KM UTL (Lognormal)95% Coverage | 0.146 |
| KM SD of Logged Data | 0.0681 | 95% KM UPL (Lognormal) | 0.123 |
| 95% KM Percentile Lognormal (z) | 0.115 | 95% KM USL (Lognormal) | 0.114 |

| | | | |
|---|---|---|---|
| | | | |
| Background DL/2 Statistics Assuming Lognormal Distribution | | | |
| Mean in Original Scale | 5.052 | Mean in Log Scale | 0.0136 |
| SD in Original Scale | 5.714 | SD in Log Scale | 2.644 |
| 95% UTL95% Coverage | 816321 | 95% UPL (t) | 1064 |
| 90% Percentile (z) | 30.01 | 95% Percentile (z) | 78.42 |
| 99% Percentile (z) | 475.2 | 95% USL | 48.42 |
| DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons. | | | |
| | | | |
| Nonparametric Distribution Free Background Statistics | | | |
| Data do not follow a Discernible Distribution (0.05) | | | |
| | | | |
| Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects) | | | |
| Order of Statistic, r | 4 | 95% UTL with95% Coverage | 20 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| Approximate Sample Size needed to achieve specified CC | 59 | 95% UPL | 20 |
| 95% USL | 20 | 95% KM Chebyshev UPL | 0.137 |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| strontium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 4 | Number of Distinct Observations | 3 |
| | | Number of Missing Observations | 1 |
| Minimum | 85.3 | First Quartile | 85.45 |
| Second Largest | 100 | Median | 92.75 |
| Maximum | 100 | Third Quartile | 100 |
| Mean | 92.7 | SD | 8.43 |
| Coefficient of Variation | 0.0909 | Skewness | -4.875E-4 |
| Mean of logged Data | 4.526 | SD of logged Data | 0.0911 |
| | | | |
| Critical Values for Background Threshold Values (BTVs) | | | |
| Tolerance Factor K (For UTL) | 5.144 | d2max (for USL) | 1.462 |
| | | | |
| Normal GOF Test | | | |
| Shapiro Wilk Test Statistic | 0.737 | Shapiro Wilk GOF Test | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data Not Normal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.307 | Lilliefors GOF Test | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Normal at 5% Significance Level | |
| Data appear Approximate Normal at 5% Significance Level | | | |
| | | | |
| Background Statistics Assuming Normal Distribution | | | |
| 95% UTL with 95% Coverage | 136.1 | 90% Percentile (z) | 103.5 |
| 95% UPL (t) | 114.9 | 95% Percentile (z) | 106.6 |
| 95% USL | 105 | 99% Percentile (z) | 112.3 |

| | | | |
|---|---|---|---|
| **Gamma GOF Test** | | | |
| A-D Test Statistic | 0.706 | **Anderson-Darling Gamma GOF Test** | |
| 5% A-D Critical Value | 0.657 | Data Not Gamma Distributed at 5% Significance Level | |
| K-S Test Statistic | 0.341 | **Kolmogorov-Smirnov Gamma GOF Test** | |
| 5% K-S Critical Value | 0.394 | Detected data appear Gamma Distributed at 5% Significance Level | |
| **Detected data follow Appr. Gamma Distribution at 5% Significance Level** | | | |
| | | | |
| **Gamma Statistics** | | | |
| k hat (MLE) | 160.9 | k star (bias corrected MLE) | 40.39 |
| Theta hat (MLE) | 0.576 | Theta star (bias corrected MLE) | 2.295 |
| nu hat (MLE) | 1287 | nu star (bias corrected) | 323.1 |
| MLE Mean (bias corrected) | 92.7 | MLE Sd (bias corrected) | 14.59 |
| | | | |
| **Background Statistics Assuming Gamma Distribution** | | | |
| 95% Wilson Hilferty (WH) Approx. Gamma UPL | 116.5 | 90% Percentile | 111.8 |
| 95% Hawkins Wixley (HW) Approx. Gamma UPL | 116.7 | 95% Percentile | 117.9 |
| 95% WH Approx. Gamma UTL with 95% Coverage | 143 | 99% Percentile | 130 |
| 95% HW Approx. Gamma UTL with 95% Coverage | 144.1 | | |
| 95% WH USL | 105.4 | 95% HW USL | 105.4 |
| | | | |
| **Lognormal GOF Test** | | | |
| Shapiro Wilk Test Statistic | 0.737 | **Shapiro Wilk Lognormal GOF Test** | |
| 5% Shapiro Wilk Critical Value | 0.748 | Data Not Lognormal at 5% Significance Level | |
| Lilliefors Test Statistic | 0.307 | **Lilliefors Lognormal GOF Test** | |
| 5% Lilliefors Critical Value | 0.375 | Data appear Lognormal at 5% Significance Level | |
| **Data appear Approximate Lognormal at 5% Significance Level** | | | |
| | | | |
| **Background Statistics assuming Lognormal Distribution** | | | |
| 95% UTL with 95% Coverage | 147.7 | 90% Percentile (z) | 103.9 |
| 95% UPL (t) | 117.5 | 95% Percentile (z) | 107.4 |
| 95% USL | 105.6 | 99% Percentile (z) | 114.2 |
| | | | |
| **Nonparametric Distribution Free Background Statistics** | | | |
| **Data appear Approximate Normal at 5% Significance Level** | | | |
| | | | |
| **Nonparametric Upper Limits for Background Threshold Values** | | | |
| Order of Statistic, r | 4 | 95% UTL with 95% Coverage | 100 |
| Approx, f used to compute achieved CC | 0.211 | Approximate Actual Confidence Coefficient achieved by UTL | 0.185 |
| | | Approximate Sample Size needed to achieve specified CC | 59 |
| 95% Percentile Bootstrap UTL with 95% Coverage | N/A | 95% BCA Bootstrap UTL with 95% Coverage | N/A |
| 95% UPL | 100 | 90% Percentile | 100 |
| 90% Chebyshev UPL | 121 | 95% Percentile | 100 |
| 95% Chebyshev UPL | 133.8 | 99% Percentile | 100 |
| 95% USL | 100 | | |
| | | | |
| Note: The use of USL tends to yield a conservative estimate of BTV, especially when the sample size starts exceeding 20. | | | |
| Therefore, one may use USL to estimate a BTV only when the data set represents a background data set free of outliers | | | |
| and consists of observations collected from clean unimpacted locations. | | | |
| The use of USL tends to provide a balance between false positives and false negatives provided the data | | | |

| | | | |
|---|---|---|---|
| represents a background data set and when many onsite observations need to be compared with the BTV. | | | |
| | | | |
| silver | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |
| | | | |
| **Warning: This data set only has 0 observations!** | | | |
| **Data set is too small to compute reliable and meaningful statistics and estimates!** | | | |
| **The data set for variable silver was not processed!** | | | |
| | | | |
| **It is suggested to collect at least 8 to 10 observations before using these statistical methods!** | | | |
| **If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.** | | | |
| | | | |
| | | | |
| sodium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 0 | Number of Distinct Observations | 0 |
| | | Number of Missing Observations | 5 |
| Minimum | N/A | First Quartile | N/A |
| Second Largest | N/A | Median | N/A |
| Maximum | N/A | Third Quartile | N/A |
| Mean | N/A | SD | N/A |
| Coefficient of Variation | N/A | Skewness | N/A |
| | | | |
| **Warning: This data set only has 0 observations!** | | | |
| **Data set is too small to compute reliable and meaningful statistics and estimates!** | | | |
| **The data set for variable sodium was not processed!** | | | |
| | | | |
| **It is suggested to collect at least 8 to 10 observations before using these statistical methods!** | | | |
| **If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.** | | | |
| | | | |
| | | | |
| thallium | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 10 |
| Maximum Detect | N/A | Maximum Non-Detect | 10 |
| Variance Detected | N/A | Percent Non-Detects | 100% |

| | | | |
|---|---|---|---|
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable thallium was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

vanadium

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 5 |
| Maximum Detect | N/A | Maximum Non-Detect | 5 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable vanadium was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

**If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.**

zinc

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 2 | Number of Missing Observations | 3 |
| Number of Distinct Observations | 1 | | |
| Number of Detects | 0 | Number of Non-Detects | 2 |
| Number of Distinct Detects | 0 | Number of Distinct Non-Detects | 1 |
| Minimum Detect | N/A | Minimum Non-Detect | 30 |
| Maximum Detect | N/A | Maximum Non-Detect | 30 |
| Variance Detected | N/A | Percent Non-Detects | 100% |
| Mean Detected | N/A | SD Detected | N/A |
| Mean of Detected Logged Data | N/A | SD of Detected Logged Data | N/A |

**Warning: This data set only has 2 observations!**

**Data set is too small to compute reliable and meaningful statistics and estimates!**

**The data set for variable zinc was not processed!**

**It is suggested to collect at least 8 to 10 observations before using these statistical methods!**

| | | | |
|---|---|---|---|
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |
| Hardness | | | |
| | | | |
| General Statistics | | | |
| Total Number of Observations | 2 | Number of Distinct Observations | 2 |
| | | Number of Missing Observations | 3 |
| Minimum | 53600 | First Quartile | 53700 |
| Second Largest | 53600 | Median | 53800 |
| Maximum | 54000 | Third Quartile | 53900 |
| Mean | 53800 | SD | 282.8 |
| Coefficient of Variation | 0.00526 | Skewness | N/A |
| | | | |
| Warning: This data set only has 2 observations! | | | |
| Data set is too small to compute reliable and meaningful statistics and estimates! | | | |
| The data set for variable Hardness was not processed! | | | |
| | | | |
| It is suggested to collect at least 8 to 10 observations before using these statistical methods! | | | |
| If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results. | | | |
| | | | |
| | | | |

# Appendix C - DEQ Risk Calculator Documentation

**Appendix C-1**
Exposure Point Concentration Tables

**Appendix C-2**
Exposure Unit #1 – Resident and Non-Residential Worker
(0-2 ft bgs soil samples, background concentrations included)

**Appendix C-3**
Exposure Unit #1 – Construction Worker
(0-10 ft bgs soil samples, background concentrations included)

**Appendix C-4**
Exposure Unit #2 Trail – Greenway User and Construction Worker
(soil samples, background concentrations included)

**Appendix C-5**
Exposure Unit #2 Creek – Greenway User
(sediment and surface water samples, background concentrations included)

**Appendix C-6**
Exposure Unit #3 – Resident, Non-Residential Worker, and Greenway User
(0-2 ft bgs soil samples, background concentrations included)

**Appendix C-7**
Exposure Unit #3 - Construction Worker
(0-10 ft bgs soil samples, background concentrations included)

**Appendix C-8**
Exposure Unit #1 – Resident and Non-Residential Worker
(0-2 ft bgs soil samples, background concentrations excluded)

**Appendix C-9**
Exposure Unit #1 – Construction Worker
(0-10 ft bgs soil samples, background concentrations excluded)

**Appendix C-10**
Exposure Unit #2 Trail – Greenway User and Construction Worker
(soil samples, background concentrations excluded)

**Appendix C-11**
Exposure Unit #2 Creek – Greenway User
(sediment and surface water samples, background concentrations excluded)

**Appendix C-12**
Exposure Unit #3 – Resident, Non-Residential Worker, and Greenway User
(0-2 ft bgs soil samples, background concentrations excluded)

**Appendix C-13**
Exposure Unit #3 - Construction Worker
(0-10 ft bgs soil samples, background concentrations excluded)

**Appendix C-1 Exposure Point Concentration Tables**
**Exposure Unit #1**
**Direct Contact to Soil Pathway**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job. No. TCH-009**

| Sample ID | Sample Date | Material Sampled (Soil or CCP) | Sample Depth | arsenic | barium | beryllium | cadmium | hexavalent chromium | trivalent chromium | cobalt | copper | lead | manganese | mercury | nickel | selenium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV** | | | | 3.015 | 87.86 | 0.929 | 0.313 | 5.725 | 70.2 | 36.31 | 77.3 | 59.11 | 1,149 | 0.256 | 19.49 | 2.503 | 43.19 | 0.981 | 227 | 230 |
| S-4 | 04/29/13 | CCP | 1 ft | 14 | 24 | ND | 1.5 | NA | NA | 30 | 65 | 20 | 1,500 | 0.011 | 43 | ND | NA | ND | 21 | 120 |
| S-5* | 01/31/14 | CCP | 0-4 ft | 37 | 2,800 | NA | ND | 1.3 | 19.7 | NA | NA | 10 | NA | 0.30 | NA | 3.2 | NA | NA | NA | NA |
| S-6* | 01/31/14 | CCP | 0-4 ft | 43 | 3,200 | NA | ND | 2.7 | 19.3 | NA | NA | 12 | NA | 0.42 | NA | 6.1 | NA | NA | NA | NA |
| GP-1 | 02/03/14 | CCP | 8-12 ft | 3.5 | 86 | NA | ND | ND | 8.8 | NA | NA | 26 | NA | 0.083 | NA | ND | NA | NA | NA | NA |
| GP-2 | 02/03/14 | CCP | 26-28 ft | 41 | 1,100 | NA | ND | ND | 19 | NA | NA | 11 | NA | 0.24 | NA | 4.0 | NA | NA | NA | NA |
| GP-3 | 02/03/14 | CCP | 10-12 ft | 48 | 1,200 | NA | ND | 0.53 | 22.47 | NA | NA | 39 | NA | 0.42 | NA | ND | NA | NA | NA | NA |
| GP-4 | 02/04/14 | CCP | 10-12 ft | 59 | 2,900 | NA | ND | ND | 20 | NA | NA | 11 | NA | 0.51 | NA | 5.8 | NA | NA | NA | NA |
| GP-5 | 02/04/14 | CCP | 4-6 ft | 72 | 2,800 | NA | ND | ND | 19 | NA | NA | 9.5 | NA | 0.33 | NA | 2.6 | NA | NA | NA | NA |
| | 04/03/19 | CCP | 4-6 ft | 95.9 | 2,350 | 5.46 | <0.956 | 0.836 J | 12.3 | 7.05 | 50.9 | NA | 34.7 | 1.2 | 11.1 | 12 | 325 | NA | NA | NA |
| | 04/03/19[1] | CCP | 4-6 ft | 95.9 | 2,630 | 6.99 | <0.931 | 0.712 J | 16.2 | 10.3 | 62.5 | NA | 53.4 | 0.39 | 17.1 | 13 | 308 | NA | NA | NA |
| GP-6 | 02/04/14 | CCP | 9-11 ft | 65 | 850 | NA | ND | ND | 19 | NA | NA | 27 | NA | 11 | NA | 4.1 | NA | NA | NA | NA |
| | 04/04/19 | CCP | 9-10 ft | 6.73 | 178 | 0.758 | 0.118 J | <1.11 | 10.0 | 5.18 | 11 | NA | 687 | 0.05 | 6.24 | 0.88 | 21.7 | NA | NA | NA |
| GP-7 | 02/04/14 | CCP | 10-12 ft | 55 | 1,700 | NA | ND | ND | 19 | NA | NA | 11 | NA | 0.26 | NA | 4.3 | NA | NA | NA | NA |
| GP-8 | 02/04/14 | CCP | 11-15 ft | 54 | 4,100 | NA | ND | ND | 20 | NA | NA | 9.2 | NA | 0.29 | NA | 4.5 | NA | NA | NA | NA |
| GP-11 | 02/04/14 | CCP | 4-6 ft | 16 | 450 | NA | ND | ND | 16 | NA | NA | 23 | NA | 0.35 | NA | ND | NA | NA | NA | NA |
| GP-12 | 02/04/14 | CCP | 2-4 ft | 52 | 2,000 | NA | ND | ND | 19 | NA | NA | 14 | NA | 0.28 | NA | 2.1 | NA | NA | NA | NA |
| HH-1 | 11/03/16 | Soil | 0-1 ft | 5.9 | 120 | 1.00 | <0.29 | 0.45 | 20.55 | 7.9 | 25 | 27 | 350 | 0.052 | 8.8 | 0.69 | 31 | <0.58 | 48 | 50 |
| | 11/03/16[1] | Soil | 0-1 ft | 3.4 | 110 | 0.79 | <0.35 | 0.54 | 19.46 | 8.4 | 17 | 18 | 360 BH | 0.067 | 12 | <0.71 | 30 | <0.71 | 41 | 35 |
| HH-2 | 11/03/16 | Soil | 0-1 ft | 4.9 | 140 | 0.93 | <0.29 | 0.43 | 13.57 | 12 | 21 | 30 | 260 | 0.085 | 5.9 | 1.0 | 25 | <0.58 | 48 | 43 |
| HH-3 | 11/03/16 | Soil | 0-1 ft | 9.9 | 200 | 1.30 | <0.33 | 0.46 J | 17.54 | 7.8 | 31 | 24 | 350 | 0.076 | 8.9 | 2.4 | 36 | <0.65 | 53 | 100 |
| HH-4 | 11/03/16 | Soil | 0-1 ft | 2.4 | 72 | 1.00 | <0.28 | 0.50 | 44.5 | 16 | 37 | 2.3 | 630 | <0.023 | 33 | <0.56 | 42 | 0.60 | 73 | 70 |
| HH-5 | 11/03/16 | Soil | 0-1 ft | 2.4 | 73 | 0.75 | <0.30 | <0.14 | 23 | 8.4 | 19 | 9.3 | 410 | <0.025 | 14 | 1.2 | 23 | <0.60 | 39 | 51 |
| MW-7 | 11/01/16 | Soil | 0-1 ft | 2.6 | 67 | 0.87 | <0.30 | 0.89 | 9.11 | 3.9 | 180 | 7.6 | 100 | 0.030 | 2.9 | <0.59 | 6.7 | <0.59 | 61 | 46 |
| **Maximum Concentrations - All Samples** | | | | 95.9 | 4,100 | 6.99 | 1.5 | 2.7 | 44.5 | 30 | 180 | 39 | 1,500 | 11 | 43 | 13 | 325 | 0.60 | 73 | 120 |
| **Maximum Concentrations - Shallow (0-2') Interval** | | | | 14 | 200 | 1.30 | 1.5 | 0.89 | 44.5 | 30 | 180 | 30 | 1,500 | 0.085 | 43 | 2.4 | 42 | 0.60 | 73 | 120 |
| **Maximum Concentrations - Construction Worker (0-10') Interval** | | | | 95.9 | 3,200 | 6.99 | 1.5 | 2.7 | 44.5 | 30 | 180 | 30 | 1,500 | 11 | 43 | 13 | 325 | 0.60 | 73 | 120 |

Notes:
Red indicates concentration is below recommended site-specific background screening value (BSV).
Orange shading indicates maximum concentration in all samples.
Blue shading indicated maximum concentrations in samples that include the shallow (0-2 ft) interval.
Purple shading indicates maximum concentrations in samples that include the 0-10 ft interval.
Grey shading indicates concentration is maximum concentration in all use scenarios.
[1] Duplicate sample taken.
CCP = Coal Combustion Product; ND = Not Detected; NA = Not Analyzed.
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
BH = Method blank greater than one-half laboratory reporting limit, but sample concentration greater than 10x the method blank.
*Location resampled at 0-1 ft interval (HH-2 and HH-5); 0-1 ft sample considered more representative of shallow interval.

**Appendix C-1 Exposure Point Concentration Tables**
**Exposure Unit #2**
**Direct Contact to Soil Pathway**
**828 Martin Luther King, Jr. Blvd.**
**Chapel Hill, North Carolina**
**H&H Job. No. TCH-009**

| Sample ID | Sample Date | Material Sampled (Soil or CCP) | Sample Depth | arsenic | barium | beryllium | cadmium | hexavalent chromium | trivalent chromium | cobalt | copper | lead | manganese | mercury | nickel | selenium | strontium | thallium | vanadium | zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Site-Specific BSV** | | | | 3.015 | 87.86 | 0.929 | 0.313 | 5.725 | 70.2 | 36.31 | 77.3 | 59.11 | 1,149 | 0.256 | 19.49 | 2.503 | 43.19 | 0.981 | 227 | 230 |
| SS-7 | 02/18/16 | Soil | 2-12 in | 3.1 | 84 | 0.60 | ND | NA | NA | 6.9 | 15 | 13 | 500 | 0.038 | 5.9 | ND | 31 | ND | 37 | 37 |
| HH-8 | 10/27/16 | Soil | 0-1 ft | 3.6 | 100 | 1.00 | <0.30 | <0.35 | 19 | 12 | 29 | 18 | 570 | 0.036 | 9.0 | <0.60 | 28 | <0.60 | 52 | 54 |
| MW-6 | 11/02/16 | Soil | 0-1 ft | 2.9 | 38 | 0.61 | <0.26 | 0.21 J | 9.79 | 9.5 | 23 | 12 | 570 | 0.082 | 8.2 | 1.0 | 22 | 0.81 | 31 | 77 |
| SED-3A | 04/05/19 | Soil | 0-1 ft | 3.45 | 33.9 | 0.418 J | <0.582 | <1.16 | 17.4 | 16.5 | 6.97 | NA | 560 | <0.0054 | 5.82 | 0.237 J | 9.6 | NA | NA | NA |
| SED-5A | 04/04/19 | Soil | 0-1 ft | 1.25 | 13.5 | 0.156 J | <0.571 | 0.352 J | 13.2 | 5.95 | 39.1 | NA | 243 | 0.0071 | 4.38 | <0.571 | 10.9 | NA | NA | NA |
| SED-8 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 2.41 | 49.1 | 0.313 J | 0.122 J | <1.25 | 12.0 | 7.01 | 14.3 | NA | 423 | 0.063 | 4.66 | 1.01 | 15.2 | NA | NA | NA |
| SED-9 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.16 | 33.8 | 0.199 J | <0.660 | 0.461 J | 21.6 | 9.11 | 10.1 | NA | 431 | 0.013 | 6.68 | <0.660 | 16.7 | NA | NA | NA |
| SED-10 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.29 | 24.4 | 0.118 J | 0.221 J | 0.418 J | 12.0 | 4.43 | 10.8 | NA | 195 | 0.037 | 4.03 | 0.273 J | 8.1 | NA | NA | NA |
| SED-12 | 08/27/19 | Drainage Pathway Soil | 0-2 in | 4.73 | 102 | 0.765 J | 0.214 J | <1.68 | 27.6 | 6.17 | 23.1 | NA | 341 | 0.042 | 7.69 | 0.961 | 25.4 | NA | NA | NA |
| | 04/05/19 | Drainage Pathway Soil | 2-6 in | 3.97 | 122 | 0.499 J | 0.204 J | <1.74 | 9.45 | 6.04 | 19.7 | NA | 319 | 0.077 | 4.95 | 1.36 | 32.8 | NA | NA | NA |
| SED-13 | 08/27/19 | Drainage Pathway Soil | 0-2 in | 12.4 | 958 | 1.56 | 0.284 J | <2.03 | 29.4 | 13.9 | 38.9 | NA | 538 | 0.12 | 19.2 | 3.07 | 125 | NA | NA | NA |
| | 04/05/19 | Drainage Pathway Soil | 2-6 in | 14.5 | 724 | 1.1 | 0.171 J | <1.58 | 14.0 | 7.58 | 27.1 | NA | 563 | 0.075 | 8.73 | 1.69 | 70.5 | NA | NA | NA |
| SED-18 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 4.53 | 137 | 0.534 J | <0.689 | <1.38 | 18.7 | 11.1 | 28.2 | NA | 464 | 0.051 | 9 | 1.85 | 32.6 | NA | NA | NA |
| SED-19 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.55 | 20 | 0.161 J | <0.588 | 0.435 J | 21.7 | 7.98 | 8.38 | NA | 266 | 0.0073 | 4.94 | 0.334 J | 15 | NA | NA | NA |
| SED-20 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 0.792 | 31.4 | 0.152 J | <0.687 | <1.37 | 5.76 | 4.5 | 9.1 | NA | 360 | 0.012 | 2.19 | 0.263 J | 11.5 | NA | NA | NA |
| SED-21 | 04/05/19 | Drainage Pathway Soil | 2-6 in | 1.12 | 25.9 | 0.149 J | <0.591 | <1.18 | 20.9 | 4.44 | 6.58 | NA | 221 | 0.011 | 2.7 | 0.286 J | 12.8 | NA | NA | NA |
| Excavation G-1 | 04/16/20 | Soil | 2-3 ft | 3.68 | 58.8 | <3.08 | <1.23 | 0.478 J | 20.0 | 5.73 | 14.5 | NA | 193 | 0.052 | 6.94 | <3.08 | 6.2 | NA | NA | NA |
| Excavation H-3 | 05/11/20 | Soil | 1-2 ft | 2.41 | 71.0 | <3.28 | <1.31 | 0.410 J | 40.2 | 14.1 | 43.4 | NA | 251 | 0.0485 J | 12.5 | 1.46 J | 58.1 | NA | NA | NA |
| Excavation H-5 | 05/11/20 | Soil | 1-2 ft | 1.10 J | 74.5 | <3.04 | <1.22 | 0.497 J | 21.1 | 8.25 | 16.9 | NA | 558 | <0.0486 | 6.77 | <3.04 | 32.2 | NA | NA | NA |
| Excavation H-6 | 05/11/20 | Soil | 1-2 ft | 1.02 J | 96.0 | <2.97 | <1.19 | <1.19 | 14.9 | 7.57 | 10.7 | NA | 557 | 0.0222 J | 4.03 | <2.97 | 20.5 | NA | NA | NA |
| Excavation H-7 | 11/09/20 | Soil | 0-1 ft | 1.10 J | 73.7 | 0.767 J | <1.22 | <1.22 | 8.04 | 3.68 | 15.0 | NA | 233 | 0.022 | 4.63 | 0.479 J | 9.6 | NA | NA | NA |
| Excavation I-1 | 04/08/20 | Soil | 1-2 ft | 2.91 | 67.2 | <2.77 | <1.11 | 0.457 J | 26.2 | 13.0 | 18.3 | NA | 594 | 0.042 | 8.25 | <2.77 | 26.3 | NA | NA | NA |
| Excavation I-2 | 04/08/20 | Soil | 1-2 ft | 3.65 | 74.1 | <2.85 | <1.14 | 0.313 J | 23.3 | 12.0 | 21.4 | NA | 544 | 0.022 | 8.70 | <2.85 | 17.2 | NA | NA | NA |
| Excavation I-3 | 04/08/20 | Soil | 1-2 ft | 2.18 | 61.5 | <2.88 | <1.15 | 0.387 J | 13.1 | 9.23 | 19.5 | NA | 419 | 0.019 | 6.02 | <2.88 | 13.3 | NA | NA | NA |
| **Maximum Concentrations*** | | | | 14.5 | 958 | 1.56 | 0.284 | 0.497 | 40.2 | 16.5 | 43.4 | 18 | 594 | 0.12 | 19.2 | 3.07 | 125 | 0.81 | 52 | 77 |

Notes:
Red indicates concentration is below recommended site-specific background screening value (BSV).
Orange shading indicates maximum exposure unit concentration.
CCP = Coal Combustion Product; ND = Not Detected; NA = Not Analyzed.
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.
Site-Specific Background Screening Value (BSV) represents 95% upper threshold level (UTL) with 95% coverage calculated using EPA ProUCL 5.1.
*Maximum concentration for samples collected in shallow (0-2 ft) soil interval are the same as maximum concentrations.

# Appendix C-1 Exposure Point Concentration Tables
## Exposure Unit #2
## Direct Contact to Sediment Pathway
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job. No. TCH-009

| Sediment Sampling Point ID | Sample Date | arsenic | barium | beryllium | hexavalent chromium | trivalent chromium | cobalt | copper | manganese | mercury | nickel | selenium | strontium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Recommended Site-Specific BSV** | | 2.74 | 38.4 | 0.48 | 0.79 | 69.5 | 16.388 | 13.8 | 759 | 0.0078 | 9.92 | 0.409 | 16.9 |
| **SED-3 (Adjacent)** | 04/05/19 | 1.36 | 16.4 | 0.111 J | 0.670 J | 13.5 | 5.18 | 20.2 | 225 | 0.0054 J | 4.81 | <0.607 | 9.2 |
| **SED-4 (Adjacent)** | 04/05/19 | 2.35 | 20.3 | 0.191 J | 0.456 J | 63.8 | 7.26 | 8.39 | 293 | 0.0080 | 10.5 | 0.344 J | 30.7 |
| **SED-5 (Downstream)** | 04/04/19 | 1.82 | 24.3 | 0.233 J | 0.595 J | 16.8 | 5.9 | 8.86 | 399 | <0.0035 | 4.86 | <0.617 | 6.2 |
| **Maximum Concentrations** | | 2.35 | 24.3 | 0.233 | 0.670 | 63.8 | 7.26 | 20.2 | 399 | 0.0080 | 10.5 | 0.344 | 30.7 |

Notes:

Red indicates concentration is below recommended site-specific background screening value (BSV).

Orange shading indicates maximum exposure unit concentration.

J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.

# Appendix C-1 Exposure Point Concentration Tables
## Exposure Unit #2
## Direct Contact to Surface Water Pathway
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job. No. TCH-009

| Surface Water Sampling Point ID | Sample Date | arsenic | barium | total chromium | cobalt | copper[2] | manganese | nickel[2] | selenium | strontium |
|---|---|---|---|---|---|---|---|---|---|---|
| Recommended Site-Specific BSV | | 0.44 | 27 | 0.53 | 0.16 | 1.2 | 22.2 | 0.33 | 0.11 | 100 |
| SW-3 (Adjacent) | 11/03/16 | <10 | 27 | <5.0 | <5.0 | <10 | 34 | <10 | <20 | 100 |
| | 11/03/16[1] | <10 | 27 | <5.0 | <5.0 | <10 | 33 | <10 | <20 | 110 |
| | 04/05/19 | 0.45 | 25.7 | 0.62 | 0.26 | 2.8 | 37.4 | 0.50 | 0.11 J | 88.8 |
| SW-4 (Adjacent) | 11/03/16 | <10 | 27 | <5.0 | <5.0 | <10 | 25 | <10 | <20 | 110 |
| | 04/05/19 | 0.42 | 23.6 | <0.50 | 0.14 | 1.0 | 24.6 | 0.26 J | 0.10 J | 89.1 |
| | 04/05/19[1] | 0.41 | 23.7 | <0.50 | 0.14 | 0.98 | 24.8 | 0.26 J | 0.088 J | 87.7 |
| SW-5 (Downstream) | 11/03/16 | <10 | 26 | <5.0 | <5.0 | <10 | 24 | <10 | <20 | 100 |
| | 04/04/19 | 0.40 | 16.9 | <0.50 | 0.14 | 0.88 | 19.5 | 0.21 J | 0.12 J | 81.8 |
| SW-21 (Drainage Pathway) | 04/05/19 | 0.40 | 32.1 | 0.73 | 0.36 | 3.2 | 29.5 | 0.62 | 0.11 J | 69.9 |
| | 04/05/19[2] | 0.15 | 18.3 | <0.50 | 0.094 J | 3.1 | 9.3 | 0.43 J | <0.50 | 43.5 |
| Maximum Concentrations | | 0.45 | 32.1 | 0.73 | 0.36 | 3.2 | 37.4 | 0.62 | 0.12 | 110 |

Notes:

Red indicates concentration is below recommended site-specific background screening value (BSV).

Orange shading indicates maximum exposure unit concentration.

[1] Duplicate sample taken.

[2] Sample was field filtered.

J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.

# Appendix C-1 Exposure Point Concentration Tables
## Exposure Unit #3
## Direct Contact to Soil Pathway
## 828 Martin Luther King, Jr. Blvd.
## Chapel Hill, North Carolina
## H&H Job. No. TCH-009

| Sample ID | Sample Date | Material Sampled (Soil or CCP) | Sample Depth | arsenic | barium | beryllium | cadmium | hexavalent chromium | trivalent chromium | cobalt | copper | manganese | mercury | nickel | selenium | strontium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Recommended Site-Specific BSV | | | | 3.015 | 87.86 | 0.929 | 0.313 | 5.725 | 70.2 | 36.31 | 77.3 | 1,149 | 0.256 | 19.49 | 2.503 | 43.19 |
| HH-9 | 04/03/19 | CCP | 0-1 ft | 3.37 | 131 | 0.398 J | 0.178 J | <1.29 | 12.7 | 5.97 | 14.5 | 260 | 0.31 | 3.59 | 0.722 | 33.2 |
| HH-10 | 04/03/19 | CCP | 0-1 ft | 60.3 | 2,970 | 5.14 | 0.162 J | <1.60 | 13.8 | 9.84 | 51.3 | 73.3 | 0.22 | 17.1 | 5.04 | 269 |
| HH-11 | 04/03/19 | CCP | 0-1 ft | 42.5 | 3,260 | 5.9 | 0.220 J | 0.467 J | 18.7 | 13.4 | 55.3 | 113 | 0.43 | 23.5 | 9.05 | 234 |
| S-7 | 01/31/14 | CCP | 0-4 ft | 44 | 2,500 | NA | ND | 1.4 | 27.6 | NA | NA | 11 | NA | 0.44 | NA | 4.5 |
| Excavation H-1 | 05/11/20 | Soil | 1-2 ft | 1.16 | 37.2 | <2.76 | <1.10 | <1.10 | 20.1 | 10.7 | 15.3 | 412 | <0.0442 | 5.80 | <2.76 | 29.3 |
| Excavation H-2 | 05/11/20 | Soil | 1-2 ft | 1.93 | 100 | <3.25 | <1.30 | 0.578 J | 43.8 | 19.1 | 59.2 | 265 | 0.0494 J | 16.2 | 1.58 J | 56.8 |
| Excavation H-4 | 05/11/20 | Soil | 2-3 ft | 2.03 | 67.1 | <3.04 | <1.22 | 0.388 J | 25.8 | 20.8 | 24.0 | 1,480 | 0.0237 J | 7.81 | <3.04 | 38.1 |
| **Maximum Concentrations** | | | | 60.3 | 3,260 | 5.9 | 0.220 | 1.4 | 43.8 | 20.8 | 59.2 | 1,480 | 0.43 | 23.5 | 9.05 | 269 |
| **Maximum Concentrations - Shallow Interval Only** | | | | 60.3 | 3,260 | 5.9 | 0.220 | 1.4 | 43.8 | 19.1 | 59.2 | 412 | 0.43 | 23.5 | 9.05 | 269 |

Notes:
Red indicates concentration is below recommended site-specific background screening value (BSV).
Orange shading indicates maximum exposure unit concentration.
CCP = Coal Combustion Product.
J = Detected above method detection limit but below laboratory reporting limit; therefore, result is an estimated concentration.

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #1 Resident & Non-Residential Worker |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| Version Date: June 2021 | | |
| Basis: May 2021 EPA RSL Table | | |
| Site ID: BPN 21061-17-060 | | |
| Exposure Unit ID: EU #1 Resident & Non-Residential Worker | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☑ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☑ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☐ |
| Output Form 2F | Recreator/Trespasser Soil | ☐ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021**<br>**Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU #1 Resident & Non-Residential Worker** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☑ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☑ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☐ |
| Recreator/Trespasser | Soil | ☐ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Resident & Non-Residential Worker**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Resident & Non-Residential Worker**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 195 | |
| Exposure Time (ET) (hr) | 2 | NA | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 195 | |
| Exposure Time (ET) (hr) | 2 | 2 | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

| Exposure Point Concentrations | Input Form 2A |
|---|---|
| Version Date: June 2021 | |
| Basis: May 2021 EPA RSL Table | |
| Site ID: BPN 21061-17-060 | |
| Exposure Unit ID: EU #1 Resident & Non-Residential Worker | |

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from shallow samples (0-2 ft) collected within the exposure unit.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | S-4 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 200 | HH-3 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 1.3 | HH-3 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 1.5 | S-4 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 44.5 | HH-4 | 16065-83-1 | Chromium(III), Insoluble Salts | | | mg/kg | | | | | | | | | | |
| 0.89 | MW-7 | 18540-29-9 | Chromium(VI) | | | mg/kg | | | | | | | | | | |
| 30 | S-4 | 7440-48-4 | Cobalt | | | mg/kg | | | | | | | | | | |
| 180 | MW-7 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 30 | HH-2 | 7439-92-1 | ~Lead and Compounds | | | mg/kg | | | | | | | | | | |
| 1500 | S-4 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 0.085 | HH-2 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 43 | S-4 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 2.4 | HH-3 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 42 | HH-4 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |
| 0.6 | HH-4 | 7440-28-0 | Thallium (Soluble Salts) | | | mg/kg | | | | | | | | | | |
| 73 | HH-4 | 7440-62-2 | Vanadium and Compounds | | | mg/kg | | | | | | | | | | |
| 120 | S-4 | 7440-66-6 | Zinc and Compounds | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date: June 2021** | | | | |
| **Basis: May 2021 EPA RSL Table** | | | | |
| **Site ID: BPN 21061-17-060** | | | | |
| **Exposure Unit ID: EU #1 Resident & Non-Residential Worker** | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | 2.4E-05 | 3.6E+00 | YES |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | 4.8E-06 | 2.4E-01 | NO |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | NC | NC | NC |
| Recreator/Trespasser | Soil | NC | NC | NC |
| | Surface Water* | NC | NC | NC |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

3. NM = Not Modeled

4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Resident Soil** | **Output Form 2A**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Resident & Non-Residential Worker**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk* | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient* | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14 | 14 | 14 | **1.8E-05** | **2.5E-06** | 3.6E-10 | 2.1E-05 | **3.6E-01** | 4.2E-02 | 1.5E-05 | **4.0E-01** |
| 7440-39-3 | Barium | 200 | 200 | 200 | | | | | 1.3E-02 | | 6.5E-06 | 1.3E-02 |
| 7440-41-7 | Beryllium and compounds | 1.3 | 1.3 | 1.3 | | | 1.9E-11 | 1.9E-11 | 8.3E-03 | | 1.1E-06 | 8.3E-03 |
| 7440-43-9 | Cadmium (Diet) | 1.5 | 1.5 | 1.5 | | | 1.6E-11 | 1.6E-11 | 1.9E-02 | 1.8E-03 | 2.4E-06 | 2.1E-02 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 44.5 | 44.5 | 44.5 | | | | | 3.8E-04 | | | 3.8E-04 |
| 18540-29-9 | Chromium(VI) | 0.89 | 0.89 | 0.89 | **2.9E-06** | | 1.2E-09 | 2.9E-06 | 3.8E-03 | | 1.4E-07 | 3.8E-03 |
| 7440-48-4 | Cobalt | 30 | 30 | 30 | | | 1.6E-09 | 1.6E-09 | **1.3E+00** | | 8.1E-05 | **1.3E+00** |
| 7440-50-8 | Copper | 180 | 180 | 180 | | | | | 5.8E-02 | | | 5.8E-02 |
| 7439-92-1 | ~Lead and Compounds | 30 | 30 | 30 | | | | | **<SL**** | **<SL**** | **<SL**** | |
| 7439-96-5 | Manganese (Non-diet) | 1500 | 1500 | 1500 | | | | | **8.0E-01** | | 4.8E-04 | **8.0E-01** |
| 7439-97-6 | ~Mercury (elemental) | 0.085 | 0.085 | 0.085 | | | | | | | 7.3E-03 | 7.3E-03 |
| 7440-02-0 | Nickel Soluble Salts | 43 | 43 | 43 | | | 6.7E-11 | 6.7E-11 | 2.7E-02 | | 7.7E-06 | 2.7E-02 |
| 7782-49-2 | Selenium | 2.4 | 2.4 | 2.4 | | | | | 6.1E-03 | | 1.9E-09 | 6.1E-03 |
| 7440-24-6 | Strontium, Stable | 42 | 42 | 42 | | | | | 8.9E-04 | | | 8.9E-04 |
| 7440-28-0 | Thallium (Soluble Salts) | 0.6 | 0.6 | 0.6 | | | | | **7.7E-01** | | | **7.7E-01** |
| 7440-62-2 | Vanadium and Compounds | 73 | 73 | 73 | | | | | 1.9E-01 | | 1.2E-05 | 1.9E-01 |
| 7440-66-6 | Zinc and Compounds | 120 | 120 | 120 | | | | | 5.1E-03 | | | 5.1E-03 |
| | | | | | | Cumulative: | | 2.4E-05 | | | | **3.6E+00** |

**DEQ Risk Calculator - Direct Contact - Non-Residential Worker Soil** — **Output Form 2C**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Resident & Non-Residential Worker**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14 | 14 | 14 | **3.9E-06** | 8.2E-07 | 8.3E-11 | **4.7E-06** | 2.4E-02 | 5.1E-03 | 3.6E-06 | 2.9E-02 |
| 7440-39-3 | Barium | 200 | 200 | 200 | | | | | 8.6E-04 | | 1.5E-06 | 8.6E-04 |
| 7440-41-7 | Beryllium and compounds | 1.3 | 1.3 | 1.3 | | | 4.3E-12 | 4.3E-12 | 5.6E-04 | | 2.5E-07 | 5.6E-04 |
| 7440-43-9 | Cadmium (Diet) | 1.5 | 1.5 | 1.5 | | | 3.7E-12 | 3.7E-12 | 1.3E-03 | 2.2E-04 | 5.8E-07 | 1.5E-03 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 44.5 | 44.5 | 44.5 | | | | | 2.5E-05 | | | 2.5E-05 |
| 18540-29-9 | Chromium(VI) | 0.89 | 0.89 | 0.89 | 1.4E-07 | | 1.0E-10 | 1.4E-07 | 2.5E-04 | | 3.4E-08 | 2.5E-04 |
| 7440-48-4 | Cobalt | 30 | 30 | 30 | | | 3.7E-10 | 3.7E-10 | 8.6E-02 | | 1.9E-05 | 8.6E-02 |
| 7440-50-8 | Copper | 180 | 180 | 180 | | | | | 3.9E-03 | | | 3.9E-03 |
| 7439-92-1 | ~Lead and Compounds | 30 | 30 | 30 | | | | | **<SL**** | **<SL**** | **<SL**** | |
| 7439-96-5 | Manganese (Non-diet) | 1500 | 1500 | 1500 | | | | | 5.4E-02 | | 1.2E-04 | 5.4E-02 |
| 7439-97-6 | ~Mercury (elemental) | 0.085 | 0.085 | 0.085 | | | | | | | 1.7E-03 | 1.7E-03 |
| 7440-02-0 | Nickel Soluble Salts | 43 | 43 | 43 | | | 1.5E-11 | 1.5E-11 | 1.8E-03 | | 1.8E-06 | 1.8E-03 |
| 7782-49-2 | Selenium | 2.4 | 2.4 | 2.4 | | | | | 4.1E-04 | | 4.6E-10 | 4.1E-04 |
| 7440-24-6 | Strontium, Stable | 42 | 42 | 42 | | | | | 6.0E-05 | | | 6.0E-05 |
| 7440-28-0 | Thallium (Soluble Salts) | 0.6 | 0.6 | 0.6 | | | | | 5.1E-02 | | | 5.1E-02 |
| 7440-62-2 | Vanadium and Compounds | 73 | 73 | 73 | | | | | 1.3E-02 | | 2.8E-06 | 1.3E-02 |
| 7440-66-6 | Zinc and Compounds | 120 | 120 | 120 | | | | | 3.4E-04 | | | 3.4E-04 |
| | | | | | | Cumulative: | | 4.8E-06 | | | | 2.4E-01 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #1 Construction Worker |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #1 Construction Worker | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☑ |
| Output Form 2F | Recreator/Trespasser Soil | ☐ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021** | | |
| **Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU #1 Construction Worker** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☑ |
| Recreator/Trespasser | Soil | ☐ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Construction Worker**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Construction Worker**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 195 | |
| Exposure Time (ET) (hr) | 2 | NA | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 195 | |
| Exposure Time (ET) (hr) | 2 | 2 | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 Construction Worker**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from samples collected between 0 to 10 ft within the exposure unit.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95.9 | GP-5 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 3200 | S-6 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 6.99 | GP-5 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 1.5 | S-4 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 44.5 | HH-4 | 16065-83-1 | Chromium(III), Insoluble Salts | | | mg/kg | | | | | | | | | | |
| 2.7 | S-6 | 18540-29-9 | Chromium(VI) | | | mg/kg | | | | | | | | | | |
| 30 | S-4 | 7440-48-4 | Cobalt | | | mg/kg | | | | | | | | | | |
| 180 | MW-7 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 30 | HH-2 | 7439-92-1 | ~Lead and Compounds | | | mg/kg | | | | | | | | | | |
| 1500 | S-4 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 11 | GP-6 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 43 | S-4 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 13 | GP-5 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 325 | GP-5 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |
| 0.6 | HH-4 | 7440-28-0 | Thallium (Soluble Salts) | | | mg/kg | | | | | | | | | | |
| 73 | HH-4 | 7440-62-2 | Vanadium and Compounds | | | mg/kg | | | | | | | | | | |
| 120 | S-4 | 7440-66-6 | Zinc and Compounds | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date:** June 2021 | | | | |
| **Basis:** May 2021 EPA RSL Table | | | | |
| **Site ID:** BPN 21061-17-060 | | | | |
| **Exposure Unit ID:** EU #1 Construction Worker | | | | |
| | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | 7.0E-06 | 1.1E+01 | YES |
| Recreator/Trespasser | Soil | NC | NC | NC |
| | Surface Water* | NC | NC | NC |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

| DEQ Risk Calculator - Direct Contact - Construction Worker Soil | Output Form 2E |
|---|---|
| **Version Date: June 2021** | |
| **Basis: May 2021 EPA RSL Table** | |
| **Site ID: BPN 21061-17-060** | |
| **Exposure Unit ID: EU #1 Construction Worker** | |

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 95.9 | 95.9 | 95.9 | **3.5E-06** | 5.6E-07 | **1.3E-06** | **5.3E-06** | **5.7E-01** | 9.1E-02 | **1.4E+00** | **2.1E+00** |
| 7440-39-3 | Barium | 3200 | 3200 | 3200 | | | | | 4.7E-02 | | 1.4E-01 | 1.9E-01 |
| 7440-41-7 | Beryllium and compounds | 6.99 | 6.99 | 6.99 | | | 5.2E-08 | 5.2E-08 | 4.1E-03 | | 7.9E-02 | 8.3E-02 |
| 7440-43-9 | Cadmium (Diet) | 1.5 | 1.5 | 1.5 | | | 8.3E-09 | 8.3E-09 | 8.8E-03 | 1.1E-03 | 3.4E-02 | 4.4E-02 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 44.5 | 44.5 | 44.5 | | | | | 8.7E-05 | | 2.0E-03 | 2.1E-03 |
| 18540-29-9 | Chromium(VI) | 2.7 | 2.7 | 2.7 | 5.4E-08 | | 7.0E-07 | 7.5E-07 | 1.6E-03 | | 2.0E-03 | 3.6E-03 |
| 7440-48-4 | Cobalt | 30 | 30 | 30 | | | 8.3E-07 | 8.3E-07 | 2.9E-02 | | **3.4E-01** | **3.7E-01** |
| 7440-50-8 | Copper | 180 | 180 | 180 | | | | | 5.3E-02 | | | 5.3E-02 |
| 7439-92-1 | ~Lead and Compounds | 30 | 30 | 30 | | | | | **<SL**** | **<SL**** | **<SL**** | |
| 7439-96-5 | Manganese (Non-diet) | 1500 | 1500 | 1500 | | | | | 1.8E-01 | | **6.7E+00** | **6.9E+00** |
| 7439-97-6 | ~Mercury (elemental) | 11 | 11 | 11 | | | | | | | **1.1E+00** | **1.1E+00** |
| 7440-02-0 | Nickel Soluble Salts | 43 | 43 | 43 | | | 3.4E-08 | 3.4E-08 | 6.3E-03 | | 4.8E-02 | 5.5E-02 |
| 7782-49-2 | Selenium | 13 | 13 | 13 | | | | | 7.7E-03 | | 1.5E-04 | 7.8E-03 |
| 7440-24-6 | Strontium, Stable | 325 | 325 | 325 | | | | | 4.8E-04 | | | 4.8E-04 |
| 7440-28-0 | Thallium (Soluble Salts) | 0.6 | 0.6 | 0.6 | | | | | 4.4E-02 | | | 4.4E-02 |
| 7440-62-2 | Vanadium and Compounds | 73 | 73 | 73 | | | | | 2.2E-02 | | 1.6E-01 | 1.9E-01 |
| 7440-66-6 | Zinc and Compounds | 120 | 120 | 120 | | | | | 1.2E-03 | | | 1.2E-03 |
| | | | | | | Cumulative: | | 7.0E-06 | | | | **1.1E+01** |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #2 Lower Level Trail - Greenway User and Construction Worker |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #2 Lower Level Trail - Greenway User and Construction Worker | | |
| **Form No.** | **Description** | **Check box if included** |
| **DATA INPUT SHEETS** | | |
| **Input Section 1 - Exposure Pathways & Parameters** | | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| **Input Section 2 - Exposure Point Concentrations** | | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| **DATA OUTPUT SHEETS** | | |
| **Output Section 1 - Summary Output for All Calculators** | | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☑ |
| Output Form 2F | Recreator/Trespasser Soil | ☑ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| **Output Section 3 - Vapor Intrusion Calculators** | | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| **Output Section 4 - Contaminant Migration Worksheets** | | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021** | | |
| **Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Wor** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☑ |
| Recreator/Trespasser | Soil | ☑ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Worker**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Worker**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | 98th percentile based on trail use polling data |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | 98th percentile based on trail use polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 0.5 | 98th percentile based on trail use polling data |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | 98th percentile based on trail use polling data |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | 98th percentile based on trail use polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 1 | 98th percentile based on trail use polling data |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Worker**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from all samples collected within the exposure unit. Note that all maximum concentrations were within the 0-2 ft bgs interval; therefore, both the construction worker and greenway user receptor were evaluated.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.5 | SED-13 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 958 | SED-13 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 1.56 | SED-13 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 0.284 | SED-13 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 40.2 | Excavation H-3 | 16065-83-1 | Chromium(III), Insoluble Salts | | | mg/kg | | | | | | | | | | |
| 0.497 | Excavation H-5 | 18540-29-9 | Chromium(VI) | | | mg/kg | | | | | | | | | | |
| 16.5 | SED-3A | 7440-48-4 | Cobalt | | | mg/kg | | | | | | | | | | |
| 43.4 | Excavation H-3 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 18 | HH-8 | 7439-92-1 | ~Lead and Compounds | | | mg/kg | | | | | | | | | | |
| 594 | Excavation I-1 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 0.12 | SED-13 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 19.2 | SED-13 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 3.07 | SED-13 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 125 | SED-13 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |
| 0.81 | MW-6 | 7440-28-0 | Thallium (Soluble Salts) | | | mg/kg | | | | | | | | | | |
| 52 | HH-8 | 7440-62-2 | Vanadium and Compounds | | | mg/kg | | | | | | | | | | |
| 77 | MW-6 | 7440-66-6 | Zinc and Compounds | | | mg/kg | | | | | | | | | | |

**Risk for Individual Pathways** | **Output Form 1A**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Worker**

**DIRECT CONTACT SOIL AND WATER CALCULATORS**

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | 1.4E-06 | 3.6E+00 | YES |
| Recreator/Trespasser | Soil | 8.4E-06 | 4.1E-01 | NO |
| | Surface Water* | NC | NC | NC |

**VAPOR INTRUSION CALCULATORS**

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |

**CONTAMINANT MIGRATION CALCULATORS**

| Pathway | Source | Target Receptor Concentrations Exceeded? | |
|---|---|---|---|
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

3. NM = Not Modeled

4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Construction Worker Soil** **Output Form 2E**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Worker**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14.5 | 14.5 | 14.5 | 5.3E-07 | 8.4E-08 | 1.9E-07 | 8.0E-07 | 8.5E-02 | 1.4E-02 | **2.2E-01** | **3.2E-01** |
| 7440-39-3 | Barium | 958 | 958 | 958 | | | | | 1.4E-02 | | 4.3E-02 | 5.7E-02 |
| 7440-41-7 | Beryllium and compounds | 1.56 | 1.56 | 1.56 | | | 1.2E-08 | 1.2E-08 | 9.2E-04 | | 1.8E-02 | 1.8E-02 |
| 7440-43-9 | Cadmium (Diet) | 0.284 | 0.284 | 0.284 | | | 1.6E-09 | 1.6E-09 | 1.7E-03 | 2.1E-04 | 6.4E-03 | 8.3E-03 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 40.2 | 40.2 | 40.2 | | | | | 7.9E-05 | | 1.8E-03 | 1.9E-03 |
| 18540-29-9 | Chromium(VI) | 0.497 | 0.497 | 0.497 | 1.0E-08 | | 1.3E-07 | 1.4E-07 | 2.9E-04 | | 3.7E-04 | 6.6E-04 |
| 7440-48-4 | Cobalt | 16.5 | 16.5 | 16.5 | | | 4.6E-07 | 4.6E-07 | 1.6E-02 | | 1.9E-01 | **2.0E-01** |
| 7440-50-8 | Copper | 43.4 | 43.4 | 43.4 | | | | | 1.3E-02 | | | 1.3E-02 |
| 7439-92-1 | ~Lead and Compounds | 18 | 18 | 18 | | | | | **<SL**** | **<SL**** | **<SL**** | |
| 7439-96-5 | Manganese (Non-diet) | 594 | 594 | 594 | | | | | 7.3E-02 | | **2.7E+00** | **2.7E+00** |
| 7439-97-6 | ~Mercury (elemental) | 0.12 | 0.12 | 0.12 | | | | | | | 1.2E-02 | 1.2E-02 |
| 7440-02-0 | Nickel Soluble Salts | 19.2 | 19.2 | 19.2 | | | 1.5E-08 | 1.5E-08 | 2.8E-03 | | 2.2E-02 | 2.4E-02 |
| 7782-49-2 | Selenium | 3.07 | 3.07 | 3.07 | | | | | 1.8E-03 | | 3.4E-05 | 1.8E-03 |
| 7440-24-6 | Strontium, Stable | 125 | 125 | 125 | | | | | 1.8E-04 | | | 1.8E-04 |
| 7440-28-0 | Thallium (Soluble Salts) | 0.81 | 0.81 | 0.81 | | | | | 6.0E-02 | | | 6.0E-02 |
| 7440-62-2 | Vanadium and Compounds | 52 | 52 | 52 | | | | | 1.5E-02 | | 1.2E-01 | 1.3E-01 |
| 7440-66-6 | Zinc and Compounds | 77 | 77 | 77 | | | | | 7.6E-04 | | | 7.6E-04 |
| | | | | | | Cumulative: | | 1.4E-06 | | | | **3.6E+00** |

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Soil** **Output Form 2F**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Trail - Greenway User and Construction Worker**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

Receptor Type: Greenway user

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14.5 | 14.5 | 14.5 | **6.8E-06** | **1.2E-06** | 1.6E-11 | **8.0E-06** | 5.5E-02 | 7.6E-03 | 6.8E-07 | 6.3E-02 |
| 7440-39-3 | Barium | 958 | 958 | 958 | | | | | 9.1E-03 | | 1.3E-06 | 9.1E-03 |
| 7440-41-7 | Beryllium and compounds | 1.56 | 1.56 | 1.56 | | | 9.7E-13 | 9.7E-13 | 1.5E-03 | | 5.5E-08 | 1.5E-03 |
| 7440-43-9 | Cadmium (Diet) | 0.284 | 0.284 | 0.284 | | | 1.3E-13 | 1.3E-13 | 5.4E-04 | 6.0E-05 | 2.0E-08 | 6.0E-04 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 40.2 | 40.2 | 40.2 | | | | | 5.1E-05 | | | 5.1E-05 |
| 18540-29-9 | Chromium(VI) | 0.497 | 0.497 | 0.497 | 3.9E-07 | | 3.0E-11 | 3.9E-07 | 3.1E-04 | | 3.5E-09 | 3.1E-04 |
| 7440-48-4 | Cobalt | 16.5 | 16.5 | 16.5 | | | 3.9E-11 | 3.9E-11 | 1.0E-01 | | 1.9E-06 | 1.0E-01 |
| 7440-50-8 | Copper | 43.4 | 43.4 | 43.4 | | | | | 2.1E-03 | | | 2.1E-03 |
| 7439-92-1 | ~Lead and Compounds | 18 | 18 | 18 | | | | | **<SL**** | **<SL**** | **<SL**** | |
| 7439-96-5 | Manganese (Non-diet) | 594 | 594 | 594 | | | | | 4.7E-02 | | 8.3E-06 | 4.7E-02 |
| 7439-97-6 | ~Mercury (elemental) | 0.12 | 0.12 | 0.12 | | | | | | | 4.5E-04 | 4.5E-04 |
| 7440-02-0 | Nickel Soluble Salts | 19.2 | 19.2 | 19.2 | | | 1.3E-12 | 1.3E-12 | 1.8E-03 | | 1.5E-07 | 1.8E-03 |
| 7782-49-2 | Selenium | 3.07 | 3.07 | 3.07 | | | | | 1.2E-03 | | 1.1E-10 | 1.2E-03 |
| 7440-24-6 | Strontium, Stable | 125 | 125 | 125 | | | | | 4.0E-04 | | | 4.0E-04 |
| 7440-28-0 | Thallium (Soluble Salts) | 0.81 | 0.81 | 0.81 | | | | | 1.5E-01 | | | 1.5E-01 |
| 7440-62-2 | Vanadium and Compounds | 52 | 52 | 52 | | | | | 2.0E-02 | | 3.6E-07 | 2.0E-02 |
| 7440-66-6 | Zinc and Compounds | 77 | 77 | 77 | | | | | 4.9E-04 | | | 4.9E-04 |
| | | | | | | Cumulative: | | 8.4E-06 | | | | 4.1E-01 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #2 Lower Level Creek - Greenway User |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #2 Lower Level Creek - Greenway User | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☑ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☐ |
| Output Form 2F | Recreator/Trespasser Soil | ☑ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☑ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021**<br>**Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU #2 Lower Level Creek - Greenway User** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☐ |
| Recreator/Trespasser | Soil | ☑ |
| | Surface Water | ☑ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Creek - Greenway User**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Creek - Greenway User**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | 98th percentile based on trail polling data |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | 98th percentile based on trail polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 0.5 | 98th percentile based on trail polling data |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | 98th percentile based on trail polling data |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | 98th percentile based on trail polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 1 | 98th percentile based on trail polling data |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #2 Lower Level Creek - Greenway User**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from sediment samples collected at the site during the most recent sampling event.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.35 | SED-4 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 24.3 | SED-5 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 0.233 | SED-5 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 63.8 | SED-4 | 16065-83-1 | Chromium(III), Insoluble Salts | | | mg/kg | | | | | | | | | | |
| 0.67 | SED-3 | 18540-29-9 | Chromium(VI) | | | mg/kg | | | | | | | | | | |
| 7.26 | SED-4 | 7440-48-4 | Cobalt | | | mg/kg | | | | | | | | | | |
| 20.2 | SED-3 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 399 | SED-5 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 0.008 | SED-4 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 10.5 | SED-4 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 0.344 | SED-4 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 30.7 | SED-4 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

**Exposure Point Concentrations** **Input Form 2C**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #2 Lower Level Creek - Greenway User**

**Surface Water Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations detected in surface water samples over the last 5 years of sampling.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (ug/L) | Notes: | CAS Number | Chemical | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.45 | SW-3 | 7440-38-2 | Arsenic, Inorganic | | | ug/L | | | | | | | | | | |
| 32.1 | SW-21 | 7440-39-3 | Barium | | | ug/L | | | | | | | | | | |
| 0.73 | SW-21 | 16065-83-1 | Chromium(III), Insoluble Salts | | | ug/L | | | | | | | | | | |
| 0.36 | SW-21 | 7440-48-4 | Cobalt | | | ug/L | | | | | | | | | | |
| 3.2 | SW-21 | 7440-50-8 | Copper | | | ug/L | | | | | | | | | | |
| 37.4 | SW-3 | 7439-96-5 | Manganese (Non-diet) | | | ug/L | | | | | | | | | | |
| 0.62 | SW-21 | 7440-02-0 | Nickel Soluble Salts | | | ug/L | | | | | | | | | | |
| 0.12 | SW-5 | 7782-49-2 | Selenium | | | ug/L | | | | | | | | | | |
| 110 | SW-3 and SW-4 | 7440-24-6 | Strontium, Stable | | | ug/L | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| Version Date: June 2021 | | | | |
| Basis: May 2021 EPA RSL Table | | | | |
| Site ID: BPN 21061-17-060 | | | | |
| Exposure Unit ID: EU #2 Lower Level Creek - Greenway User | | | | |
| | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | NC | NC | NC |
| Recreator/Trespasser | Soil | 1.8E-06 | 9.1E-02 | NO |
| | Surface Water* | 3.2E-07 | 1.7E-02 | NO |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Soil** **Output Form 2F**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Creek - Greenway User**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

Receptor Type: Greenway user

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 2.35 | 2.35 | 2.35 | **1.1E-06** | 2.0E-07 | 2.6E-12 | **1.3E-06** | 8.9E-03 | 1.2E-03 | 1.1E-07 | 1.0E-02 |
| 7440-39-3 | Barium | 24.3 | 24.3 | 24.3 | | | | | 2.3E-04 | | 3.4E-08 | 2.3E-04 |
| 7440-41-7 | Beryllium and compounds | 0.233 | 0.233 | 0.233 | | | 1.5E-13 | 1.5E-13 | 2.2E-04 | | 8.2E-09 | 2.2E-04 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 63.8 | 63.8 | 63.8 | | | | | 8.1E-05 | | | 8.1E-05 |
| 18540-29-9 | Chromium(VI) | 0.67 | 0.67 | 0.67 | 5.3E-07 | | 4.1E-11 | 5.3E-07 | 4.2E-04 | | 4.7E-09 | 4.2E-04 |
| 7440-48-4 | Cobalt | 7.26 | 7.26 | 7.26 | | | 1.7E-11 | 1.7E-11 | 4.6E-02 | | 8.5E-07 | 4.6E-02 |
| 7440-50-8 | Copper | 20.2 | 20.2 | 20.2 | | | | | 9.6E-04 | | | 9.6E-04 |
| 7439-96-5 | Manganese (Non-diet) | 399 | 399 | 399 | | | | | 3.2E-02 | | 5.6E-06 | 3.2E-02 |
| 7439-97-6 | ~Mercury (elemental) | 0.008 | 0.008 | 0.008 | | | | | | | 3.0E-05 | 3.0E-05 |
| 7440-02-0 | Nickel Soluble Salts | 10.5 | 10.5 | 10.5 | | | 7.1E-13 | 7.1E-13 | 1.0E-03 | | 8.2E-08 | 1.0E-03 |
| 7782-49-2 | Selenium | 0.344 | 0.344 | 0.344 | | | | | 1.3E-04 | | 1.2E-11 | 1.3E-04 |
| 7440-24-6 | Strontium, Stable | 30.7 | 30.7 | 30.7 | | | | | 9.7E-05 | | | 9.7E-05 |
| | | | | | | Cumulative: | | 1.8E-06 | | | | 9.1E-02 |

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Surface Water** **Output Form 2G**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #2 Lower Level Creek - Greenway User**

Receptor Type: Greenway user

| CAS # | Chemical Name: | Ingestion Concentration (ug/L) | Dermal Concentration (ug/L) | Ingestion Carcinogenic Risk | Dermal Contact Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Contact Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 0.45 | 0.45 | 2.7E-07 | 4.5E-08 | 3.2E-07 | 1.8E-03 | 3.7E-04 | 2.2E-03 |
| 7440-39-3 | Barium | 32.1 | 32.1 | | | | 2.0E-04 | 5.6E-04 | 7.6E-04 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 0.73 | 0.73 | | | | 6.0E-07 | 9.2E-06 | 9.8E-06 |
| 7440-48-4 | Cobalt | 0.36 | 0.36 | | | | 1.5E-03 | 1.2E-04 | 1.6E-03 |
| 7440-50-8 | Copper | 3.2 | 3.2 | | | | 9.8E-05 | 2.0E-05 | 1.2E-04 |
| 7439-96-5 | Manganese (Non-diet) | 37.4 | 37.4 | | | | 1.9E-03 | 9.5E-03 | 1.1E-02 |
| 7440-02-0 | Nickel Soluble Salts | 0.62 | 0.62 | | | | 3.8E-05 | 3.8E-05 | 7.6E-05 |
| 7782-49-2 | Selenium | 0.12 | 0.12 | | | | 2.9E-05 | 5.9E-06 | 3.5E-05 |
| 7440-24-6 | Strontium, Stable | 110 | 110 | | | | 2.3E-04 | 4.5E-05 | 2.7E-04 |
| | | | | | Cumulative: | 3.2E-07 | | | 1.7E-02 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site  Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #3 Embankment - Resident, Non-Residential Worker, and Greenway |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User | | |
| **Form No.** | **Description** | **Check box if included** |
| **DATA INPUT SHEETS** | | |
| **Input Section 1 - Exposure Pathways & Parameters** | | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| **Input Section 2 - Exposure Point Concentrations** | | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| **DATA OUTPUT SHEETS** | | |
| **Output Section 1 - Summary Output for All Calculators** | | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | | |
| Output Form 2A | Resident Soil | ☑ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☑ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☐ |
| Output Form 2F | Recreator/Trespasser Soil | ☑ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| **Output Section 3 - Vapor Intrusion Calculators** | | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| **Output Section 4 - Contaminant Migration Worksheets** | | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #3 Embankment - Resident, Non-Residential Worker, and Gr | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☑ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☑ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☐ |
| Recreator/Trespasser | Soil | ☑ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** | **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm$^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm$^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | Based on 98% percentile of trail users |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | Based on 98% percentile of trail users |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | Based on 98% percentile of trail users |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | Based on 98% percentile of trail users |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from samples collected from shallow (0-2 ft) soil within the exposure unit.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60.3 | HH-10 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 3260 | HH-11 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 5.9 | HH-11 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 0.22 | HH-11 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 43.8 | Excavation H-2 | 16065-83-1 | Chromium(III), Insoluble Salts | | | mg/kg | | | | | | | | | | |
| 1.4 | S-7 | 18540-29-9 | Chromium(VI) | | | mg/kg | | | | | | | | | | |
| 19.1 | Excavation H-2 | 7440-48-4 | Cobalt | | | mg/kg | | | | | | | | | | |
| 59.2 | Excavation H-2 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 412 | Excavation H-1 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 0.43 | HH-11 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 23.5 | HH-11 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 9.05 | HH-11 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 269 | HH-10 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

**Risk for Individual Pathways** **Output Form 1A**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User**

## DIRECT CONTACT SOIL AND WATER CALCULATORS

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Soil | 9.4E-05 | 3.1E+00 | YES |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | 2.0E-05 | 2.2E-01 | NO |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | NC | NC | NC |
| Recreator/Trespasser | Soil | 3.4E-05 | 4.6E-01 | NO |
| | Surface Water* | NC | NC | NC |

## VAPOR INTRUSION CALCULATORS

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |

## CONTAMINANT MIGRATION CALCULATORS

| Pathway | Source | Target Receptor Concentrations Exceeded? | |
|---|---|---|---|
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

3. NM = Not Modeled

4. NC = Pathway not calculated

| DEQ Risk Calculator - Direct Contact - Resident Soil | Output Form 2A |
|---|---|
| Version Date: June 2021 | |
| Basis: May 2021 EPA RSL Table | |
| Site ID: BPN 21061-17-060 | |
| Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User | |

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk* | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient* | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **7.8E-05** | **1.1E-05** | 1.6E-09 | 8.9E-05 | **1.5E+00** | 1.8E-01 | 6.5E-05 | **1.7E+00** |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | **2.1E-01** | | 1.1E-04 | **2.1E-01** |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 8.5E-11 | 8.5E-11 | 3.8E-02 | | 4.8E-06 | 3.8E-02 |
| 7440-43-9 | Cadmium (Diet) | 0.22 | 0.22 | 0.22 | | | 2.4E-12 | 2.4E-12 | 2.8E-03 | 2.7E-04 | 3.6E-07 | 3.1E-03 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 43.8 | 43.8 | 43.8 | | | | | 3.7E-04 | | | 3.7E-04 |
| 18540-29-9 | Chromium(VI) | 1.4 | 1.4 | 1.4 | **4.6E-06** | | 2.0E-09 | 4.6E-06 | 6.0E-03 | | 2.3E-07 | 6.0E-03 |
| 7440-48-4 | Cobalt | 19.1 | 19.1 | 19.1 | | | 1.0E-09 | 1.0E-09 | **8.1E-01** | | 5.1E-05 | **8.1E-01** |
| 7440-50-8 | Copper | 59.2 | 59.2 | 59.2 | | | | | 1.9E-02 | | | 1.9E-02 |
| 7439-96-5 | Manganese (Non-diet) | 412 | 412 | 412 | | | | | **2.2E-01** | | 1.3E-04 | **2.2E-01** |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 3.7E-02 | 3.7E-02 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 3.7E-11 | 3.7E-11 | 1.5E-02 | | 4.2E-06 | 1.5E-02 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 2.3E-02 | | 7.3E-09 | 2.3E-02 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 5.7E-03 | | | 5.7E-03 |
| | | | | | | Cumulative: | | 9.4E-05 | | | | **3.1E+00** |

| **DEQ Risk Calculator - Direct Contact - Non-Residential Worker Soil** | **Output Form 2C** |
|---|---|
| **Version Date: June 2021** | |
| **Basis: May 2021 EPA RSL Table** | |
| **Site ID: BPN 21061-17-060** | |
| **Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User** | |

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **1.7E-05** | **3.5E-06** | 3.6E-10 | **2.0E-05** | 1.0E-01 | 2.2E-02 | 1.5E-05 | 1.3E-01 |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | 1.4E-02 | | 2.5E-05 | 1.4E-02 |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 1.9E-11 | 1.9E-11 | 2.5E-03 | | 1.1E-06 | 2.5E-03 |
| 7440-43-9 | Cadmium (Diet) | 0.22 | 0.22 | 0.22 | | | 5.4E-13 | 5.4E-13 | 1.9E-04 | 3.2E-05 | 8.5E-08 | 2.2E-04 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 43.8 | 43.8 | 43.8 | | | | | 2.5E-05 | | | 2.5E-05 |
| 18540-29-9 | Chromium(VI) | 1.4 | 1.4 | 1.4 | 2.1E-07 | | 1.6E-10 | 2.1E-07 | 4.0E-04 | | 5.4E-08 | 4.0E-04 |
| 7440-48-4 | Cobalt | 19.1 | 19.1 | 19.1 | | | 2.4E-10 | 2.4E-10 | 5.5E-02 | | 1.2E-05 | 5.5E-02 |
| 7440-50-8 | Copper | 59.2 | 59.2 | 59.2 | | | | | 1.3E-03 | | | 1.3E-03 |
| 7439-96-5 | Manganese (Non-diet) | 412 | 412 | 412 | | | | | 1.5E-02 | | 3.2E-05 | 1.5E-02 |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 8.9E-03 | 8.9E-03 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 8.4E-12 | 8.4E-12 | 1.0E-03 | | 1.0E-06 | 1.0E-03 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 1.5E-03 | | 1.7E-09 | 1.5E-03 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 3.8E-04 | | | 3.8E-04 |
| | | | | | | Cumulative: | | 2.0E-05 | | | | 2.2E-01 |

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Soil** **Output Form 2F**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #3 Embankment - Resident, Non-Residential Worker, and Greenway User**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

Receptor Type: Greenway User

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **2.8E-05** | **5.1E-06** | 6.7E-11 | **3.3E-05** | **2.3E-01** | 3.2E-02 | 2.8E-06 | **2.6E-01** |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | 3.1E-02 | | 4.6E-06 | 3.1E-02 |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 3.7E-12 | 3.7E-12 | 5.6E-03 | | 2.1E-07 | 5.6E-03 |
| 7440-43-9 | Cadmium (Diet) | 0.22 | 0.22 | 0.22 | | | 1.0E-13 | 1.0E-13 | 4.2E-04 | 4.6E-05 | 1.5E-08 | 4.6E-04 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 43.8 | 43.8 | 43.8 | | | | | 5.5E-05 | | | 5.5E-05 |
| 18540-29-9 | Chromium(VI) | 1.4 | 1.4 | 1.4 | **1.1E-06** | | 8.5E-11 | **1.1E-06** | 8.9E-04 | | 9.8E-09 | 8.9E-04 |
| 7440-48-4 | Cobalt | 19.1 | 19.1 | 19.1 | | | 4.5E-11 | 4.5E-11 | 1.2E-01 | | 2.2E-06 | 1.2E-01 |
| 7440-50-8 | Copper | 59.2 | 59.2 | 59.2 | | | | | 2.8E-03 | | | 2.8E-03 |
| 7439-96-5 | Manganese (Non-diet) | 412 | 412 | 412 | | | | | 3.3E-02 | | 5.8E-06 | 3.3E-02 |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 1.6E-03 | 1.6E-03 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 1.6E-12 | 1.6E-12 | 2.2E-03 | | 1.8E-07 | 2.2E-03 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 3.4E-03 | | 3.2E-10 | 3.4E-03 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 8.5E-04 | | | 8.5E-04 |
| | | | | | | Cumulative: | | 3.4E-05 | | | | 4.6E-01 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #3 Embankment - Construction Worker |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #3 Embankment - Construction Worker | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☑ |
| Output Form 2F | Recreator/Trespasser Soil | ☐ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date:** June 2021<br>**Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #3 Embankment - Construction Worker | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☑ |
| Recreator/Trespasser | Soil | ☐ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #3 Embankment - Construction Worker**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** | **Input Form 1B**

**Version Date:** June 2021
**Basis:** May 2021 EPA RSL Table
**Site ID:** BPN 21061-17-060

**Exposure Unit ID:** EU #3 Embankment - Construction Worker

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | Based on 98% percentile of trail users |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | Based on 98% percentile of trail users |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | Based on 98% percentile of trail users |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | Based on 98% percentile of trail users |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #3 Embankment - Construction Worker**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from all samples collected within the exposure unit.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60.3 | HH-10 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 3260 | HH-11 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 5.9 | HH-11 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 0.22 | HH-11 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 43.8 | Excavation H-2 | 16065-83-1 | Chromium(III), Insoluble Salts | | | mg/kg | | | | | | | | | | |
| 1.4 | S-7 | 18540-29-9 | Chromium(VI) | | | mg/kg | | | | | | | | | | |
| 20.8 | Excavation H-4 | 7440-48-4 | Cobalt | | | mg/kg | | | | | | | | | | |
| 59.2 | Excavation H-2 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 1480 | Excavation H-4 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 0.43 | HH-11 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 23.5 | HH-11 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 9.05 | HH-11 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 269 | HH-10 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| Version Date: June 2021 | | | | |
| Basis: May 2021 EPA RSL Table | | | | |
| Site ID: BPN 21061-17-060 | | | | |
| Exposure Unit ID: EU #3 Embankment - Construction Worker | | | | |

**DIRECT CONTACT SOIL AND WATER CALCULATORS**

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | 4.4E-06 | 8.8E+00 | YES |
| Recreator/Trespasser | Soil | NC | NC | NC |
| | Surface Water* | NC | NC | NC |

**VAPOR INTRUSION CALCULATORS**

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |

**CONTAMINANT MIGRATION CALCULATORS**

| Pathway | Source | Target Receptor Concentrations Exceeded? | |
|---|---|---|---|
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Construction Worker Soil** **Output Form 2E**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #3 Embankment - Construction Worker**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **2.2E-06** | 3.5E-07 | 8.0E-07 | **3.3E-06** | **3.6E-01** | 5.7E-02 | **9.0E-01** | **1.3E+00** |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | 4.8E-02 | | 1.5E-01 | 1.9E-01 |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 4.4E-08 | 4.4E-08 | 3.5E-03 | | 6.6E-02 | 7.0E-02 |
| 7440-43-9 | Cadmium (Diet) | 0.22 | 0.22 | 0.22 | | | 1.2E-09 | 1.2E-09 | 1.3E-03 | 1.7E-04 | 4.9E-03 | 6.4E-03 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 43.8 | 43.8 | 43.8 | | | | | 8.6E-05 | | 2.0E-03 | 2.1E-03 |
| 18540-29-9 | Chromium(VI) | 1.4 | 1.4 | 1.4 | 2.8E-08 | | 3.6E-07 | 3.9E-07 | 8.3E-04 | | 1.0E-03 | 1.9E-03 |
| 7440-48-4 | Cobalt | 20.8 | 20.8 | 20.8 | | | 5.8E-07 | 5.8E-07 | 2.0E-02 | | **2.3E-01** | **2.5E-01** |
| 7440-50-8 | Copper | 59.2 | 59.2 | 59.2 | | | | | 1.7E-02 | | | 1.7E-02 |
| 7439-96-5 | Manganese (Non-diet) | 1480 | 1480 | 1480 | | | | | 1.8E-01 | | **6.6E+00** | **6.8E+00** |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 4.4E-02 | 4.4E-02 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 1.9E-08 | 1.9E-08 | 3.5E-03 | | 2.6E-02 | 3.0E-02 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 5.3E-03 | | 1.0E-04 | 5.4E-03 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 4.0E-04 | | | 4.0E-04 |
| | | | | | | Cumulative: | | 4.4E-06 | | | | **8.8E+00** |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU#1 - Resident & Non-Residential Worker excluding Background |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date: June 2021** | | |
| **Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Background** | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☑ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☑ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☐ |
| Output Form 2F | Recreator/Trespasser Soil | ☐ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021** | | |
| **Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Backgrour** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☑ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☑ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☐ |
| Recreator/Trespasser | Soil | ☐ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Background**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm$^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm$^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Background**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 195 | |
| Exposure Time (ET) (hr) | 2 | NA | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 195 | |
| Exposure Time (ET) (hr) | 2 | 2 | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Background**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from shallow samples (0-2 ft) collected within the exposure unit with background concentrations removed.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | S-4 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 200 | HH-3 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 1.3 | HH-3 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 1.5 | S-4 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 180 | MW-7 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 1500 | S-4 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 43 | S-4 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date:** June 2021 | | | | |
| **Basis:** May 2021 EPA RSL Table | | | | |
| **Site ID:** BPN 21061-17-060 | | | | |
| **Exposure Unit ID:** EU#1 - Resident & Non-Residential Worker excluding Background | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | 2.1E-05 | 1.3E+00 | YES |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | 4.7E-06 | 9.1E-02 | NO |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | NC | NC | NC |
| Recreator/Trespasser | Soil | NC | NC | NC |
| | Surface Water* | NC | NC | NC |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Resident Soil** **Output Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk* | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient* | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14 | 14 | 14 | **1.8E-05** | **2.5E-06** | 3.6E-10 | 2.1E-05 | **3.6E-01** | 4.2E-02 | 1.5E-05 | **4.0E-01** |
| 7440-39-3 | Barium | 200 | 200 | 200 | | | | | 1.3E-02 | | 6.5E-06 | 1.3E-02 |
| 7440-41-7 | Beryllium and compounds | 1.3 | 1.3 | 1.3 | | | 1.9E-11 | 1.9E-11 | 8.3E-03 | | 1.1E-06 | 8.3E-03 |
| 7440-43-9 | Cadmium (Diet) | 1.5 | 1.5 | 1.5 | | | 1.6E-11 | 1.6E-11 | 1.9E-02 | 1.8E-03 | 2.4E-06 | 2.1E-02 |
| 7440-50-8 | Copper | 180 | 180 | 180 | | | | | 5.8E-02 | | | 5.8E-02 |
| 7439-96-5 | Manganese (Non-diet) | 1500 | 1500 | 1500 | | | | | **8.0E-01** | | 4.8E-04 | **8.0E-01** |
| 7440-02-0 | Nickel Soluble Salts | 43 | 43 | 43 | | | 6.7E-11 | 6.7E-11 | 2.7E-02 | | 7.7E-06 | 2.7E-02 |
| | | | | | | Cumulative: | | 2.1E-05 | | | | **1.3E+00** |

| DEQ Risk Calculator - Direct Contact - Non-Residential Worker Soil | Output Form 2C |
|---|---|
| Version Date: June 2021 | |
| Basis: May 2021 EPA RSL Table | |
| Site ID: BPN 21061-17-060 | |
| Exposure Unit ID: EU#1 - Resident & Non-Residential Worker excluding Background | |

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14 | 14 | 14 | **3.9E-06** | 8.2E-07 | 8.3E-11 | **4.7E-06** | 2.4E-02 | 5.1E-03 | 3.6E-06 | 2.9E-02 |
| 7440-39-3 | Barium | 200 | 200 | 200 | | | | | 8.6E-04 | | 1.5E-06 | 8.6E-04 |
| 7440-41-7 | Beryllium and compounds | 1.3 | 1.3 | 1.3 | | | 4.3E-12 | 4.3E-12 | 5.6E-04 | | 2.5E-07 | 5.6E-04 |
| 7440-43-9 | Cadmium (Diet) | 1.5 | 1.5 | 1.5 | | | 3.7E-12 | 3.7E-12 | 1.3E-03 | 2.2E-04 | 5.8E-07 | 1.5E-03 |
| 7440-50-8 | Copper | 180 | 180 | 180 | | | | | 3.9E-03 | | | 3.9E-03 |
| 7439-96-5 | Manganese (Non-diet) | 1500 | 1500 | 1500 | | | | | 5.4E-02 | | 1.2E-04 | 5.4E-02 |
| 7440-02-0 | Nickel Soluble Salts | 43 | 43 | 43 | | | 1.5E-11 | 1.5E-11 | 1.8E-03 | | 1.8E-06 | 1.8E-03 |
| | | | | | | Cumulative: | | 4.7E-06 | | | | 9.1E-02 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU #1 - Construction Worker excluding Background |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU #1 - Construction Worker excluding Background | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☑ |
| Output Form 2F | Recreator/Trespasser Soil | ☐ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

**Complete Exposure Pathways** **Input Form 1A**

**Version Date:** **June 2021**
**Basis:** **May 2021 EPA RSL Table**
**Site ID:** **BPN 21061-17-060**

**Exposure Unit ID:** **EU #1 - Construction Worker excluding Background**

*Note: Risk output will only be calculated for complete exposure pathways.*

| Receptor | Pathway | Check box if pathway complete |
|---|---|---|
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☑ |
| Recreator/Trespasser | Soil | ☐ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 - Construction Worker excluding Background**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU #1 - Construction Worker excluding Background**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 195 | |
| Exposure Time (ET) (hr) | 2 | NA | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 195 | |
| Exposure Time (ET) (hr) | 2 | 2 | 2 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 2 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #1 - Construction Worker excluding Background**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from samples collected between 0 to 10 ft within the exposure unit, excluding background levels.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 95.9 | GP-5 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 3200 | S-6 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 6.99 | GP-5 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 1.5 | S-4 | 7440-43-9 | Cadmium (Diet) | | | mg/kg | | | | | | | | | | |
| 180 | MW-7 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 1500 | S-4 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 11 | GP-6 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 43 | S-4 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 13 | GP-5 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 325 | GP-5 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date:** June 2021 | | | | |
| **Basis:** May 2021 EPA RSL Table | | | | |
| **Site ID:** BPN 21061-17-060 | | | | |
| **Exposure Unit ID:** EU #1 - Construction Worker excluding Background | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | 5.4E-06 | 1.1E+01 | YES |
| Recreator/Trespasser | Soil | NC | NC | NC |
| | Surface Water* | NC | NC | NC |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Construction Worker Soil** **Output Form 2E**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU #1 - Construction Worker excluding Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 95.9 | 95.9 | 95.9 | **3.5E-06** | 5.6E-07 | **1.3E-06** | **5.3E-06** | **5.7E-01** | 9.1E-02 | **1.4E+00** | **2.1E+00** |
| 7440-39-3 | Barium | 3200 | 3200 | 3200 | | | | | 4.7E-02 | | 1.4E-01 | 1.9E-01 |
| 7440-41-7 | Beryllium and compounds | 6.99 | 6.99 | 6.99 | | | 5.2E-08 | 5.2E-08 | 4.1E-03 | | 7.9E-02 | 8.3E-02 |
| 7440-43-9 | Cadmium (Diet) | 1.5 | 1.5 | 1.5 | | | 8.3E-09 | 8.3E-09 | 8.8E-03 | 1.1E-03 | 3.4E-02 | 4.4E-02 |
| 7440-50-8 | Copper | 180 | 180 | 180 | | | | | 5.3E-02 | | | 5.3E-02 |
| 7439-96-5 | Manganese (Non-diet) | 1500 | 1500 | 1500 | | | | | 1.8E-01 | | **6.7E+00** | **6.9E+00** |
| 7439-97-6 | ~Mercury (elemental) | 11 | 11 | 11 | | | | | | | **1.1E+00** | **1.1E+00** |
| 7440-02-0 | Nickel Soluble Salts | 43 | 43 | 43 | | | 3.4E-08 | 3.4E-08 | 6.3E-03 | | 4.8E-02 | 5.5E-02 |
| 7782-49-2 | Selenium | 13 | 13 | 13 | | | | | 7.7E-03 | | 1.5E-04 | 7.8E-03 |
| 7440-24-6 | Strontium, Stable | 325 | 325 | 325 | | | | | 4.8E-04 | | | 4.8E-04 |
| | | | | | | Cumulative: | | 5.4E-06 | | | | **1.1E+01** |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU#2 Trail - Greenway User & Construction Worker excluding Backgro |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC<br>3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| Version Date: June 2021 | | |
| Basis: May 2021 EPA RSL Table | | |
| Site ID: BPN 21061-17-060 | | |
| Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☑ |
| Output Form 2F | Recreator/Trespasser Soil | ☑ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021** | | |
| **Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding E** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☑ |
| Recreator/Trespasser | Soil | ☑ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm$^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm$^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm$^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/cm$^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | Based on 98th pecrentile of trail user polling data |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | Based on 98th pecrentile of trail user polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 0.5 | Based on 98th pecrentile of trail user polling data |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | Based on 98th pecrentile of trail user polling data |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | Based on 98th pecrentile of trail user polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 1 | Based on 98th pecrentile of trail user polling data |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from all soil samples collected within the exposure unit, exlcuding background concentrations

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.5 | SED-13 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 958 | SED-13 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 1.56 | SED-13 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 3.07 | SED-13 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 125 | SED-13 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date: June 2021** | | | | |
| **Basis: May 2021 EPA RSL Table** | | | | |
| **Site ID: BPN 21061-17-060** | | | | |
| **Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background** | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | 8.1E-07 | 3.9E-01 | NO |
| Recreator/Trespasser | Soil | 8.0E-06 | 7.5E-02 | NO |
| | Surface Water* | NC | NC | NC |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

| **DEQ Risk Calculator - Direct Contact - Construction Worker Soil** | **Output Form 2E** |
|---|---|
| **Version Date: June 2021** | |
| **Basis: May 2021 EPA RSL Table** | |
| **Site ID: BPN 21061-17-060** | |
| **Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background** | |

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14.5 | 14.5 | 14.5 | 5.3E-07 | 8.4E-08 | 1.9E-07 | 8.0E-07 | 8.5E-02 | 1.4E-02 | **2.2E-01** | **3.2E-01** |
| 7440-39-3 | Barium | 958 | 958 | 958 | | | | | 1.4E-02 | | 4.3E-02 | 5.7E-02 |
| 7440-41-7 | Beryllium and compounds | 1.56 | 1.56 | 1.56 | | | 1.2E-08 | 1.2E-08 | 9.2E-04 | | 1.8E-02 | 1.8E-02 |
| 7782-49-2 | Selenium | 3.07 | 3.07 | 3.07 | | | | | 1.8E-03 | | 3.4E-05 | 1.8E-03 |
| 7440-24-6 | Strontium, Stable | 125 | 125 | 125 | | | | | 1.8E-04 | | | 1.8E-04 |
| | | | | | | Cumulative: | | 8.1E-07 | | | | 3.9E-01 |

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Soil** **Output Form 2F**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#2 Trail - Greenway User & Construction Worker excluding Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

Receptor Type: Greenway user

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 14.5 | 14.5 | 14.5 | **6.8E-06** | **1.2E-06** | 1.6E-11 | **8.0E-06** | 5.5E-02 | 7.6E-03 | 6.8E-07 | 6.3E-02 |
| 7440-39-3 | Barium | 958 | 958 | 958 | | | | | 9.1E-03 | | 1.3E-06 | 9.1E-03 |
| 7440-41-7 | Beryllium and compounds | 1.56 | 1.56 | 1.56 | | | 9.7E-13 | 9.7E-13 | 1.5E-03 | | 5.5E-08 | 1.5E-03 |
| 7782-49-2 | Selenium | 3.07 | 3.07 | 3.07 | | | | | 1.2E-03 | | 1.1E-10 | 1.2E-03 |
| 7440-24-6 | Strontium, Stable | 125 | 125 | 125 | | | | | 4.0E-04 | | | 4.0E-04 |
| | | | | | | Cumulative: | | 8.0E-06 | | | | 7.5E-02 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU#2 Creek - Greenway User exlcuding Background |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU#2 Creek - Greenway User exlcuding Background | | |
| **Form No.** | **Description** | **Check box if included** |
| **DATA INPUT SHEETS** | | |
| **Input Section 1 - Exposure Pathways & Parameters** | | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| **Input Section 2 - Exposure Point Concentrations** | | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☑ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| **DATA OUTPUT SHEETS** | | |
| **Output Section 1 - Summary Output for All Calculators** | | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☐ |
| Output Form 2F | Recreator/Trespasser Soil | ☑ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☑ |
| **Output Section 3 - Vapor Intrusion Calculators** | | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| **Output Section 4 - Contaminant Migration Worksheets** | | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021** | | |
| **Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☐ |
| Recreator/Trespasser | Soil | ☑ |
| | Surface Water | ☑ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** — **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | Based on 98th percentile tail use polling data |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | Based on 98th percentile tail use polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 0.5 | Based on 98th percentile tail use polling data |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | Based on 98th percentile tail use polling data |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | Based on 98th percentile tail use polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 1 | Based on 98th percentile tail use polling data |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from sediment samples collected at the site during the most recent sampling event, excluding background levels.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.2 | SED-3 | 7440-50-8 | Copper | | | mg/kg | | | | | | | | | | |
| 0.008 | SED-4 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 10.5 | SED-4 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 30.7 | SED-4 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date: June 2021** | | | | |
| **Basis: May 2021 EPA RSL Table** | | | | |
| **Site ID: BPN 21061-17-060** | | | | |
| **Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background** | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | NC | NC | NC |
| Recreator/Trespasser | Soil | 7.1E-13 | 2.1E-03 | NO |
| | Surface Water* | 3.2E-07 | 1.7E-02 | NO |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.
3. NM = Not Modeled
4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Soil** | **Output Form 2F**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*

*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

Receptor Type: Greenway user

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-50-8 | Copper | 20.2 | 20.2 | 20.2 | | | | | 9.6E-04 | | | 9.6E-04 |
| 7439-97-6 | ~Mercury (elemental) | 0.008 | 0.008 | 0.008 | | | | | | | 3.0E-05 | 3.0E-05 |
| 7440-02-0 | Nickel Soluble Salts | 10.5 | 10.5 | 10.5 | | | 7.1E-13 | 7.1E-13 | 1.0E-03 | | 8.2E-08 | 1.0E-03 |
| 7440-24-6 | Strontium, Stable | 30.7 | 30.7 | 30.7 | | | | | 9.7E-05 | | | 9.7E-05 |
| | | | | | | Cumulative: | | 7.1E-13 | | | | 2.1E-03 |

| DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Surface Water | Output Form 2G |
|---|---|
| Version Date: June 2021 | |
| Basis: May 2021 EPA RSL Table | |
| Site ID: BPN 21061-17-060 | |
| Exposure Unit ID: EU#2 Creek - Greenway User exlcuding Background | |

Receptor Type: Greenway user

| CAS # | Chemical Name: | Ingestion Concentration (ug/L) | Dermal Concentration (ug/L) | Ingestion Carcinogenic Risk | Dermal Contact Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Contact Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 0.45 | 0.45 | 2.7E-07 | 4.5E-08 | 3.2E-07 | 1.8E-03 | 3.7E-04 | 2.2E-03 |
| 7440-39-3 | Barium | 32.1 | 32.1 | | | | 2.0E-04 | 5.6E-04 | 7.6E-04 |
| 16065-83-1 | Chromium(III), Insoluble Salts | 0.73 | 0.73 | | | | 6.0E-07 | 9.2E-06 | 9.8E-06 |
| 7440-48-4 | Cobalt | 0.36 | 0.36 | | | | 1.5E-03 | 1.2E-04 | 1.6E-03 |
| 7440-50-8 | Copper | 3.2 | 3.2 | | | | 9.8E-05 | 2.0E-05 | 1.2E-04 |
| 7439-96-5 | Manganese (Non-diet) | 37.4 | 37.4 | | | | 1.9E-03 | 9.5E-03 | 1.1E-02 |
| 7440-02-0 | Nickel Soluble Salts | 0.62 | 0.62 | | | | 3.8E-05 | 3.8E-05 | 7.6E-05 |
| 7782-49-2 | Selenium | 0.12 | 0.12 | | | | 2.9E-05 | 5.9E-06 | 3.5E-05 |
| 7440-24-6 | Strontium, Stable | 110 | 110 | | | | 2.3E-04 | 4.5E-05 | 2.7E-04 |
| | | | | | Cumulative: | 3.2E-07 | | | 1.7E-02 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU#3 - Resident, Non-Residential Worker, & Greenway User excludign |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☑ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☑ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☐ |
| Output Form 2F | Recreator/Trespasser Soil | ☑ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU#3 - Resident, Non-Residential Worker, & Greenway User exc | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☑ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☑ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☐ |
| Recreator/Trespasser | Soil | ☑ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | Based on 98% percentile of trail users |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | Based on 98% percentile of trail users |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 0.5 | Based on 98% percentile of trail users |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | Based on 98% percentile of trail users |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | Based on 98% percentile of trail users |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 1 | Based on 98% percentile of trail users |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from samples collected from shallow (0-2 ft) soil within the exposure unit, excluding background levels.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60.3 | HH-10 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 3260 | HH-11 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 5.9 | HH-11 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 0.43 | HH-11 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 23.5 | HH-11 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 9.05 | HH-11 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 269 | HH-10 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date: June 2021** | | | | |
| **Basis: May 2021 EPA RSL Table** | | | | |
| **Site ID: BPN 21061-17-060** | | | | |
| **Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background** | | | | |
| **DIRECT CONTACT SOIL AND WATER CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Soil | 8.9E-05 | 2.1E+00 | YES |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | 2.0E-05 | 1.5E-01 | NO |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | NC | NC | NC |
| Recreator/Trespasser | Soil | 3.3E-05 | 3.1E-01 | NO |
| | Surface Water* | NC | NC | NC |
| **VAPOR INTRUSION CALCULATORS** | | | | |
| **Receptor** | **Pathway** | **Carcinogenic Risk** | **Hazard Index** | **Risk exceeded?** |
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| **CONTAMINANT MIGRATION CALCULATORS** | | | | |
| **Pathway** | **Source** | **Target Receptor Concentrations Exceeded?** | | |
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

3. NM = Not Modeled

4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Resident Soil** **Output Form 2A**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk* | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient* | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **7.8E-05** | **1.1E-05** | 1.6E-09 | 8.9E-05 | **1.5E+00** | 1.8E-01 | 6.5E-05 | **1.7E+00** |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | **2.1E-01** | | 1.1E-04 | **2.1E-01** |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 8.5E-11 | 8.5E-11 | 3.8E-02 | | 4.8E-06 | 3.8E-02 |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 3.7E-02 | 3.7E-02 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 3.7E-11 | 3.7E-11 | 1.5E-02 | | 4.2E-06 | 1.5E-02 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 2.3E-02 | | 7.3E-09 | 2.3E-02 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 5.7E-03 | | | 5.7E-03 |
| | | | | | | Cumulative: | | 8.9E-05 | | | | **2.1E+00** |

**DEQ Risk Calculator - Direct Contact - Non-Residential Worker Soil** **Output Form 2C**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **1.7E-05** | **3.5E-06** | 3.6E-10 | **2.0E-05** | 1.0E-01 | 2.2E-02 | 1.5E-05 | 1.3E-01 |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | 1.4E-02 | | 2.5E-05 | 1.4E-02 |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 1.9E-11 | 1.9E-11 | 2.5E-03 | | 1.1E-06 | 2.5E-03 |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 8.9E-03 | 8.9E-03 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 8.4E-12 | 8.4E-12 | 1.0E-03 | | 1.0E-06 | 1.0E-03 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 1.5E-03 | | 1.7E-09 | 1.5E-03 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 3.8E-04 | | | 3.8E-04 |
| | | | | | | Cumulative: | | 2.0E-05 | | | | 1.5E-01 |

**DEQ Risk Calculator - Direct Contact - Recreator/Trespasser Soil** **Output Form 2F**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#3 - Resident, Non-Residential Worker, & Greenway User excludign Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 400 mg/kg for residential soil.*

Receptor Type: Greenway User

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **2.8E-05** | **5.1E-06** | 6.7E-11 | **3.3E-05** | **2.3E-01** | 3.2E-02 | 2.8E-06 | **2.6E-01** |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | 3.1E-02 | | 4.6E-06 | 3.1E-02 |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 3.7E-12 | 3.7E-12 | 5.6E-03 | | 2.1E-07 | 5.6E-03 |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 1.6E-03 | 1.6E-03 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 1.6E-12 | 1.6E-12 | 2.2E-03 | | 1.8E-07 | 2.2E-03 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 3.4E-03 | | 3.2E-10 | 3.4E-03 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 8.5E-04 | | | 8.5E-04 |
| | | | | | | Cumulative: | | 3.3E-05 | | | | 3.1E-01 |

# North Carolina Department of Environmental Quality
# Risk Calculator

| | |
|---|---|
| **Version Date:** | June 2021 |
| **Basis:** | May 2021 EPA RSL Table |
| **Site Name:** | 828 MLK Jr. Blvd Property |
| **Site Address:** | 828 MLK Jr Blvd, Chapel Hill, Orange County, North Carolina |
| **DEQ Section:** | Brownfields Program |
| **Site ID:** | BPN 21061-17-060 |
| **Exposure Unit ID:** | EU#3 - Construction Worker excluding Background |
| **Submittal Date:** | |
| **Prepared By:** | Hart & Hickman, PC |
| | 3921 Sunset Ridge Rd, Suite 301, Raleigh, North Carolina |
| **Reviewed By:** | |

| Table of Contents | | TOC |
|---|---|---|
| **Version Date:** June 2021 | | |
| **Basis:** May 2021 EPA RSL Table | | |
| **Site ID:** BPN 21061-17-060 | | |
| **Exposure Unit ID:** EU#3 - Construction Worker excluding Background | | |
| **Form No.** | **Description** | **Check box if included** |
| | **DATA INPUT SHEETS** | |
| | **Input Section 1 - Exposure Pathways & Parameters** | |
| Input Form 1A | Complete Exposure Pathways | ☑ |
| Input Form 1B | Exposure Factors and Target Risks | ☑ |
| Input Form 1C | Contaminant Migration Parameters | ☐ |
| Input Form 1D | Sample Statistics | ☐ |
| | **Input Section 2 - Exposure Point Concentrations** | |
| Input Form 2A | Soil Exposure Point Concentration Table | ☑ |
| Input Form 2B | Groundwater Exposure Point Concentration Table | ☐ |
| Input Form 2C | Surface Water Exposure Point Concentration Table | ☐ |
| Input Form 2D | Soil Gas Exposure Point Concentration Table | ☐ |
| Input Form 2E | Indoor Air Exposure Point Concentration Table | ☐ |
| | **DATA OUTPUT SHEETS** | |
| | **Output Section 1 - Summary Output for All Calculators** | |
| Output Form 1A | Risk for Individual Pathways | ☑ |
| Output Form 1B | Sitewide Risk | ☐ |
| | **Output Section 2 - Direct Contact Soil and Groundwater Calculators** | |
| Output Form 2A | Resident Soil | ☐ |
| Output Form 2B | Resident Groundwater Use | ☐ |
| Output Form 2C | Non-Residential Worker Soil | ☐ |
| Output Form 2D | Non-Residential Worker Groundwater Use | ☐ |
| Output Form 2E | Construction Worker Soil | ☑ |
| Output Form 2F | Recreator/Trespasser Soil | ☐ |
| Output Form 2G | Recreator/Trespasser Surface Water | ☐ |
| | **Output Section 3 - Vapor Intrusion Calculators** | |
| Output Form 3A | Resident Groundwater to Indoor Air | ☐ |
| Output Form 3B | Resident Soil Gas to Indoor Air | ☐ |
| Output Form 3C | Resident Indoor Air | ☐ |
| Output Form 3D | Non-Residential Worker Groundwater to Indoor Air | ☐ |
| Output Form 3E | Non-Residential Worker Soil Gas to Indoor Air | ☐ |
| Output Form 3F | Non-Residential Worker Indoor Air | ☐ |
| | **Output Section 4 - Contaminant Migration Worksheets** | |
| Output Form 4A | Soil to Groundwater - Forward Mode | ☐ |
| Output Form 4B | Groundwater to Groundwater - Forward Mode | ☐ |
| Output Form 4C | Soil to Surface Water - Forward Mode | ☐ |
| Output Form 4D | Groundwater to Surface Water - Forward Mode | ☐ |
| Output Form 4E | Soil to Groundwater - Backward Mode | ☐ |
| Output Form 4F | Groundwater to Groundwater - Backward Mode | ☐ |
| Output Form 4G | Soil to Surface Water - Backward Mode | ☐ |
| Output Form 4H | Groundwater to Surface Water - Backward Mode | ☐ |

| Complete Exposure Pathways | | Input Form 1A |
|---|---|---|
| **Version Date: June 2021**<br>**Basis: May 2021 EPA RSL Table** | | |
| **Site ID: BPN 21061-17-060** | | |
| **Exposure Unit ID: EU#3 - Construction Worker excluding Background** | | |
| *Note: Risk output will only be calculated for complete exposure pathways.* | | |
| **Receptor** | **Pathway** | **Check box if pathway complete** |
| **DIRECT CONTACT SOIL AND WATER PATHWAYS** | | |
| Resident | Soil | ☐ |
| | Groundwater Use | ☐ |
| Non-Residential Worker | Soil | ☐ |
| | Groundwater Use | ☐ |
| Construction Worker | Soil | ☑ |
| Recreator/Trespasser | Soil | ☐ |
| | Surface Water | ☐ |
| **VAPOR INTRUSION PATHWAYS** | | |
| Resident | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| Non-Residential Worker | Groundwater to Indoor Air | ☐ |
| | Soil Gas to Indoor Air | ☐ |
| | Indoor Air | ☐ |
| **CONTAMINANT MIGRATION PATHWAYS** | | |
| Groundwater | Source Soil | ☐ |
| | Source Groundwater | ☐ |
| Surface Water | Source Soil | ☐ |
| | Source Groundwater | ☐ |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#3 - Construction Worker excluding Background**

| Exposure Parameter | Default Value | Site Specific Value | Justification |
|---|---|---|---|
| General | | | |
| Target Cancer Risk (individual) | 1.0E-06 | 1.0E-06 | |
| Target Cancer Risk (cumulative) | 1.0E-04 | 1.0E-04 | |
| Target Hazard Index (individual) | 2.0E-01 | 2.0E-01 | |
| Target Hazard Index (cumulative) | 1.0E+00 | 1.0E+00 | |
| Residential Child | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 15 | 15 | |
| Exposure Duration (ED) (yr) | 6 | 6 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) (cm2) | 2373 | 2373 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.2 | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) (cm2) | 6365 | 6365 | |
| Water Ingestion Rate (IRW) (L/d) | 0.78 | 0.78 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.54 | 0.54 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Residential Adult | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 20 | 20 | |
| Exposure Frequency (EF) (d/yr) | 350 | 350 | |
| Exposure Time (ET) (hr) | 24 | 24 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.07 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 2.5 | 2.5 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.71 | 0.71 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Non-Residential Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Exposure Duration (ED) (yr) | 25 | 25 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.12 | 0.12 | |
| Soil Ingestion Rate (IR) (mg/day) | 100 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/d) | 0.83 | 0.83 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 0.67 | 0.67 | |
| Water Event Frequency (EV) (events/day) | 1 | 1 | |
| Construction Worker | | | |
| Lifetime (LT) (years) | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 80 | |
| Working Weeks (EW) (wk/yr) | 50 | 50 | |
| Exposure Duration (ED) (yr) | 1 | 1 | |
| Exposure Frequency (EF) (d/yr) | 250 | 250 | |
| Exposure Time (ET) (hr) | 8 | 8 | |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 3527 | 3527 | |
| Soil Adherence Factor (AF) (mg/$cm^2$) | 0.3 | 0.3 | |
| Soil Ingestion Rate (IR) (mg/day) | 330 | 330 | |

**Exposure Factors and Target Risks** **Input Form 1B**

**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#3 - Construction Worker excluding Background**

| Exposure Parameter | Default Value | | Site Specific Value | Justification |
|---|---|---|---|---|
| User Defined Child | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | NA | 70 | |
| Averaging Time (AT) (days/yr) | 365 | NA | 365 | |
| Body Weight (BW) (kg) | 15 | NA | 15 | |
| Exposure Duration 0-2 (ED) (yr) | 2 | NA | 2 | |
| Exposure Duration 2-6 (ED) (yr) | 4 | NA | 4 | |
| Exposure Frequency (EF) (d/yr) | 195 | NA | 52 | Based on 98th percentile of trail use polling data |
| Exposure Time (ET) (hr) | 2 | NA | 0.5 | Based on 98th percentile of trail use polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 2373 | NA | 2373 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.2 | NA | 0.2 | |
| Soil Ingestion Rate (IRS) (mg/day) | 200 | NA | 200 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 6365 | NA | 6365 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.124 | NA | 0.124 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | NA | 0.5 | Based on 98th percentile of trail use polling data |
| Water Event Frequency (EV) (events/day) | 1 | NA | 1 | |
| User Defined Adult | | | | |
| | Recreator | Trespasser | | |
| Lifetime (LT) (years) | 70 | 70 | 70 | |
| Body Weight (BW) (kg) | 80 | 45 | 80 | |
| Exposure Duration 6-16 (ED) (yr) | 10 | 10 | 10 | |
| Exposure Duration 16-26 (ED) (yr) | 10 | 0 | 10 | |
| Exposure Frequency (EF) (d/yr) | 195 | 90 | 364 | Based on 98th percentile of trail use polling data |
| Exposure Time (ET) (hr) | 2 | 2 | 1 | Based on 98th percentile of trail use polling data |
| Skin Surface Area - Soil Exposure ($SA_s$) ($cm^2$) | 6032 | 6032 | 6032 | |
| Soil Adherence Factor (AF) ($mg/cm^2$) | 0.07 | 0.2 | 0.07 | |
| Soil Ingestion Rate (IRS) (mg/day) | 100 | 200 | 100 | |
| Skin Surface Area - Water Exposure ($SA_w$) ($cm^2$) | 19652 | 19652 | 19652 | |
| Water Ingestion Rate (IRW) (L/hr) | 0.0985 | 0.071 | 0.0985 | |
| Water Exposure Time ($ET_{event}$) (hr/event) | 2 | 2 | 1 | Based on 98th percentile of trail use polling data |
| Water Event Frequency (EV) (events/day) | 1 | 1 | 1 | |

**Exposure Point Concentrations** **Input Form 2A**

**Version Date: June 2021**

**Basis: May 2021 EPA RSL Table**

**Site ID: BPN 21061-17-060**

**Exposure Unit ID: EU#3 - Construction Worker excluding Background**

**Soil Exposure Point Concentration Table**

Description of Exposure Point Concentration Selection:

Maximum detected constituent concentrations from all samples collected within the exposure unit, excluding background levels.

**NOTE: If the chemical list is changed from a prior calculator run, remember to select "See All Chemicals" on the data output sheet or newly added chemicals will not be included in risk calculations**

| Exposure Point Concentration (mg/kg) | Notes: | CAS Number | Chemical<br>**For the chemicals highlighted in blue, data entry notes are provided in the PSRG Table link on the Main Menu** | Minimum Concentration (Qualifier) | Maximum Concentration (Qualifier) | Units | Location of Maximum Concentration | Detection Frequency | Range of Detection Limits | Concentration Used for Screening | Background Value | Screening Toxicity Value (Screening Level) (n/c) | Potential ARAR/TBC Value | Potential ARAR/TBC Source | COPC Flag (Y/N) | Rationale for Selection or Deletion |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 60.3 | HH-10 | 7440-38-2 | Arsenic, Inorganic | | | mg/kg | | | | | | | | | | |
| 3260 | HH-11 | 7440-39-3 | Barium | | | mg/kg | | | | | | | | | | |
| 5.9 | HH-11 | 7440-41-7 | Beryllium and compounds | | | mg/kg | | | | | | | | | | |
| 1480 | Excavation H-4 | 7439-96-5 | Manganese (Non-diet) | | | mg/kg | | | | | | | | | | |
| 0.43 | HH-11 | 7439-97-6 | ~Mercury (elemental) | | | mg/kg | | | | | | | | | | |
| 23.5 | HH-11 | 7440-02-0 | Nickel Soluble Salts | | | mg/kg | | | | | | | | | | |
| 9.05 | HH-11 | 7782-49-2 | Selenium | | | mg/kg | | | | | | | | | | |
| 269 | HH-10 | 7440-24-6 | Strontium, Stable | | | mg/kg | | | | | | | | | | |

| Risk for Individual Pathways | | | | Output Form 1A |
|---|---|---|---|---|
| **Version Date: June 2021** | | | | |
| **Basis: May 2021 EPA RSL Table** | | | | |
| **Site ID: BPN 21061-17-060** | | | | |
| **Exposure Unit ID: EU#3 - Construction Worker excluding Background** | | | | |

**DIRECT CONTACT SOIL AND WATER CALCULATORS**

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Non-Residential Worker | Soil | NC | NC | NC |
| | Groundwater Use* | NC | NC | NC |
| Construction Worker | Soil | 3.4E-06 | 8.5E+00 | YES |
| Recreator/Trespasser | Soil | NC | NC | NC |
| | Surface Water* | NC | NC | NC |

**VAPOR INTRUSION CALCULATORS**

| Receptor | Pathway | Carcinogenic Risk | Hazard Index | Risk exceeded? |
|---|---|---|---|---|
| Resident | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |
| Non-Residential Worker | Groundwater to Indoor Air | NC | NC | NC |
| | Soil Gas to Indoor Air | NC | NC | NC |
| | Indoor Air | NC | NC | NC |

**CONTAMINANT MIGRATION CALCULATORS**

| Pathway | Source | Target Receptor Concentrations Exceeded? | |
|---|---|---|---|
| Groundwater | Source Soil | Exceedence of 2L at Receptor? | NC |
| | Source Groundwater | Exceedence of 2L at Receptor? | NC |
| Surface Water | Source Soil | Exceedence of 2B at Receptor? | NC |
| | Source Groundwater | Exceedence of 2B at Receptor? | NC |

Notes:

1. If lead concentrations were entered in the exposure point concentration tables, see the individual calculator sheets for lead concentrations in comparison to screening levels. Note that lead is not included in cumulative risk calculations.

2. * = If concentrations in groundwater exceed the NC 2L Standards or IMAC, or concentrations in surface water exceed the NC 2B Standards, appropriate remediation and/or institutional control measures will be necessary to be eligible for a risk-based closure.

3. NM = Not Modeled

4. NC = Pathway not calculated

**DEQ Risk Calculator - Direct Contact - Construction Worker Soil** **Output Form 2E**
**Version Date: June 2021**
**Basis: May 2021 EPA RSL Table**
**Site ID: BPN 21061-17-060**
**Exposure Unit ID: EU#3 - Construction Worker excluding Background**

** - Note that inhalation on this calculator refers to outdoor inhalation of volatiles and particulates, not indoor inhalation associated with vapor intrusion.*
*** - Note that the EPA has no consensus on reference dose or cancer slope factor values for lead, therefore it is not possible to calculate cancer risk or hazard quotient. Lead concentrations are compared to the EPA screening level of 800 mg/kg for commercial/industrial soil.*

| CAS # | Chemical Name: | Ingestion Concentration (mg/kg) | Dermal Concentration (mg/kg) | Inhalation Concentration (mg/kg)* | Ingestion Carcinogenic Risk | Dermal Carcinogenic Risk | Inhalation Carcinogenic Risk | Calculated Carcinogenic Risk | Ingestion Hazard Quotient | Dermal Hazard Quotient | Inhalation Hazard Quotient | Calculated Non-Carcinogenic Hazard Quotient |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic, Inorganic | 60.3 | 60.3 | 60.3 | **2.2E-06** | 3.5E-07 | 8.0E-07 | **3.3E-06** | **3.6E-01** | 5.7E-02 | **9.0E-01** | **1.3E+00** |
| 7440-39-3 | Barium | 3260 | 3260 | 3260 | | | | | 4.8E-02 | | 1.5E-01 | 1.9E-01 |
| 7440-41-7 | Beryllium and compounds | 5.9 | 5.9 | 5.9 | | | 4.4E-08 | 4.4E-08 | 3.5E-03 | | 6.6E-02 | 7.0E-02 |
| 7439-96-5 | Manganese (Non-diet) | 1480 | 1480 | 1480 | | | | | 1.8E-01 | | **6.6E+00** | **6.8E+00** |
| 7439-97-6 | ~Mercury (elemental) | 0.43 | 0.43 | 0.43 | | | | | | | 4.4E-02 | 4.4E-02 |
| 7440-02-0 | Nickel Soluble Salts | 23.5 | 23.5 | 23.5 | | | 1.9E-08 | 1.9E-08 | 3.5E-03 | | 2.6E-02 | 3.0E-02 |
| 7782-49-2 | Selenium | 9.05 | 9.05 | 9.05 | | | | | 5.3E-03 | | 1.0E-04 | 5.4E-03 |
| 7440-24-6 | Strontium, Stable | 269 | 269 | 269 | | | | | 4.0E-04 | | | 4.0E-04 |
| | | | | | | Cumulative: | | 3.4E-06 | | | | **8.5E+00** |

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 12., **File #:** [21-0770], **Version:** 1 **Meeting Date:** 10/13/2021

**Receive the Fiscal Year (FY) 2021 Affordable Housing Annual Report.**

| **Staff:** | **Department:** |
|---|---|
| Sarah Osmer Viñas, Interim Director | Housing and Community |
| Faith Brodie, Director | Public Housing |
| Nate Broman-Fulks, Affordable Housing Manager | Housing and Community |
| Stacey Todd, Public Housing Management Analyst | Public Housing |

**Overview:** This annual report on affordable housing activities for Fiscal Year 2021 tracks:

- Community indicators related to the housing market and affordable housing,
- The Town's progress toward affordable housing targets,
- The status of projects funded with Town resources,
- General housing conditions in Chapel Hill, and
- Public Housing highlights

☆ **Recommendation(s):**

That the Council receive this Fiscal Year 2021 Annual Report.

**Report Highlights:**

**Community Indicators**

- The median household income in Chapel Hill rose to $90,400, which is an increase of $6,000 (or 7%) from 2019 to 2020 HUD Data.
- The median home value rose to $410,105, which is an increase of $26,000 (or 6%) from August 2019 to August 2020.
- The percentage of cost-burdened renters has continued to rise with 58% of renters currently spending more than 30% of their income on housing expenses.

**Affordable Housing Results**

- Housing and Community continues to focus on COVID-19 response efforts
- Town affordable housing partnership with DHIC wins state's highest honor in affordable housing, the 2020 Housing North Carolina Award
- The Town provided emergency housing assistance payments to 535 households. This assistance is reflected in the total units preserved.
- Council approved 198 affordable homes
- The Town awarded $1.8 million to community partners for affordable housing projects
- The Town awarded funding to 130 new development units
- The 2200 Homestead Road affordable housing development project received rezoning approval
- Selected development partners and completed Concept Planning process for Jay Street

affordable housing development project

**Public Housing Operations**

Highlights of the fourth quarter, including a recap from the first three quarters, include:

- Continued COVID-related efforts, such as responding to Emergency Work Orders only and managing a record of needed routine repairs and managing a "new normal" for Public Housing tenants by continuing socially distanced weekly food distributions, screening all maintenance services calls before entering apartments and conducting household annual income updates via mail and telephone instead of in person
- Tracking financial metrics such as liquidity ratio, adequacy of reserves and our timeliness in paying vendors to ensure scheduled property restorations, such as appliance replacements, are not delayed,
- Information on the 2021 Habitability Inspections conducted by HUD in July
- Continued implementation of the Public Housing Master Plan including progress with the redevelopment of Trinity Court
- Efforts to increase tenant engagement and programming.

**Attachments:**

- Draft Staff Presentation
- Affordable Housing Annual Report - Fiscal Year 2021
- Public Housing Annual Report - Fiscal Year 2021

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Sarah Osmer Viñas, Interim Housing and Community Director
Faith Brodie, Public Housing Director
Nate Broman-Fulks, Affordable Housing Manager
Stacey Todd, Public Housing Management Analyst

RECOMMENDATION: That the Council receive the Fiscal Year 2021 Affordable Housing Annual Report.

# AFFORDABLE HOUSING ANNUAL REPORT

## FISCAL YEAR 2021

DRAFT

Council Meeting Presentation
October 13, 2021

# Agenda

1. 2021 Annual Results

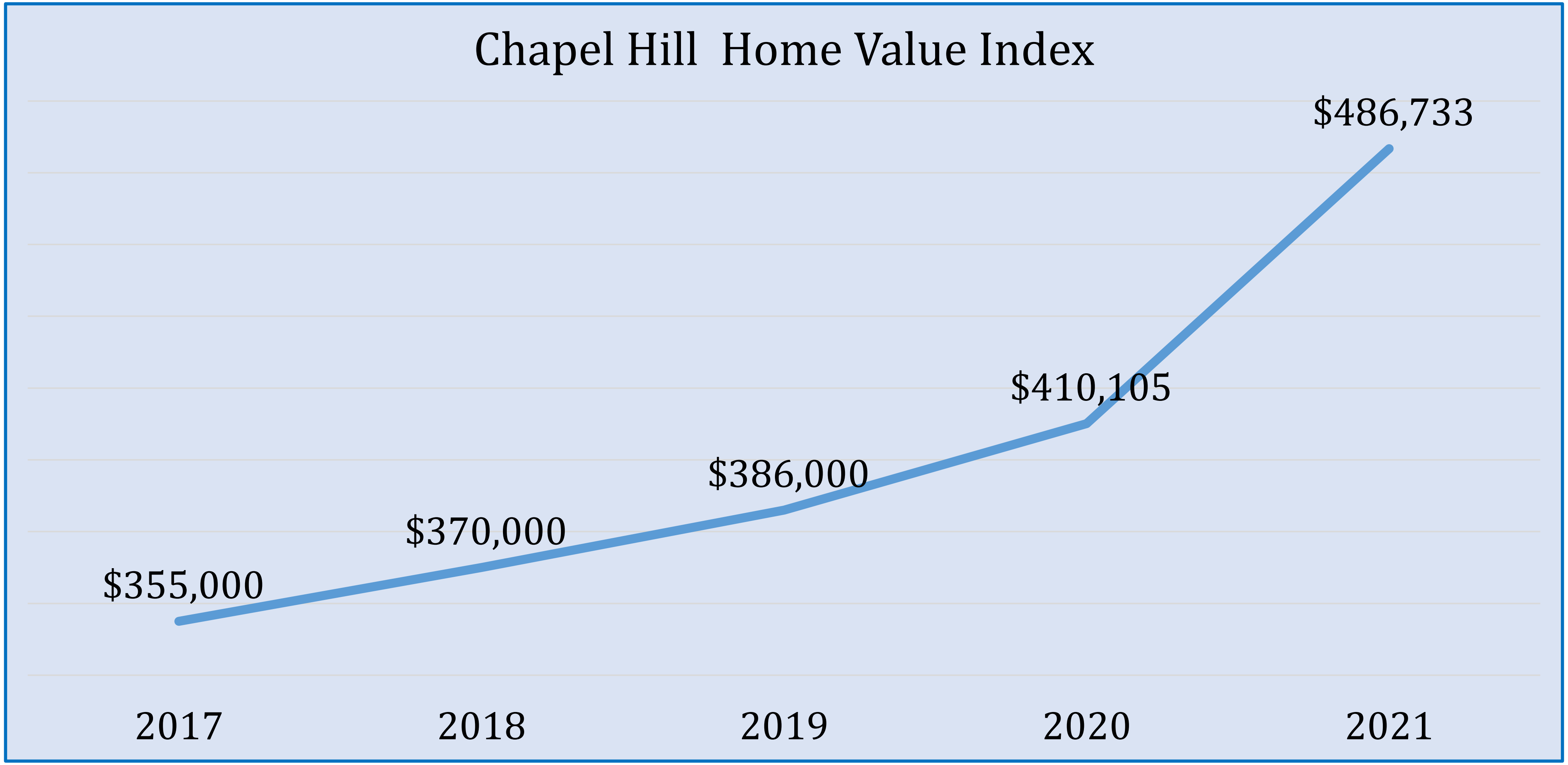
2. Project Highlights

3. Next Steps

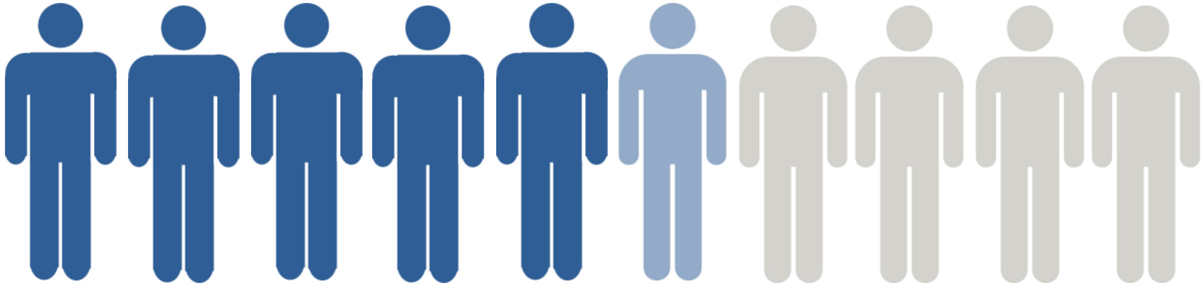
# Summary of Progress in FY21

- Town and DHIC Awarded the 2020 Housing North Carolina Award
- 535 households provided emergency Housing Assistance
- 198 affordable homes approved by Council
- **<u>$1.8</u>** million awarded to community partners for affordable housing projects
- 130 new development units awarded funding from the Town
- Selected development partners for Jay St and Trinity Court

# Substantial Increase in Home Values



# Cost-Burdened Renters in Chapel Hill



57% of Renters

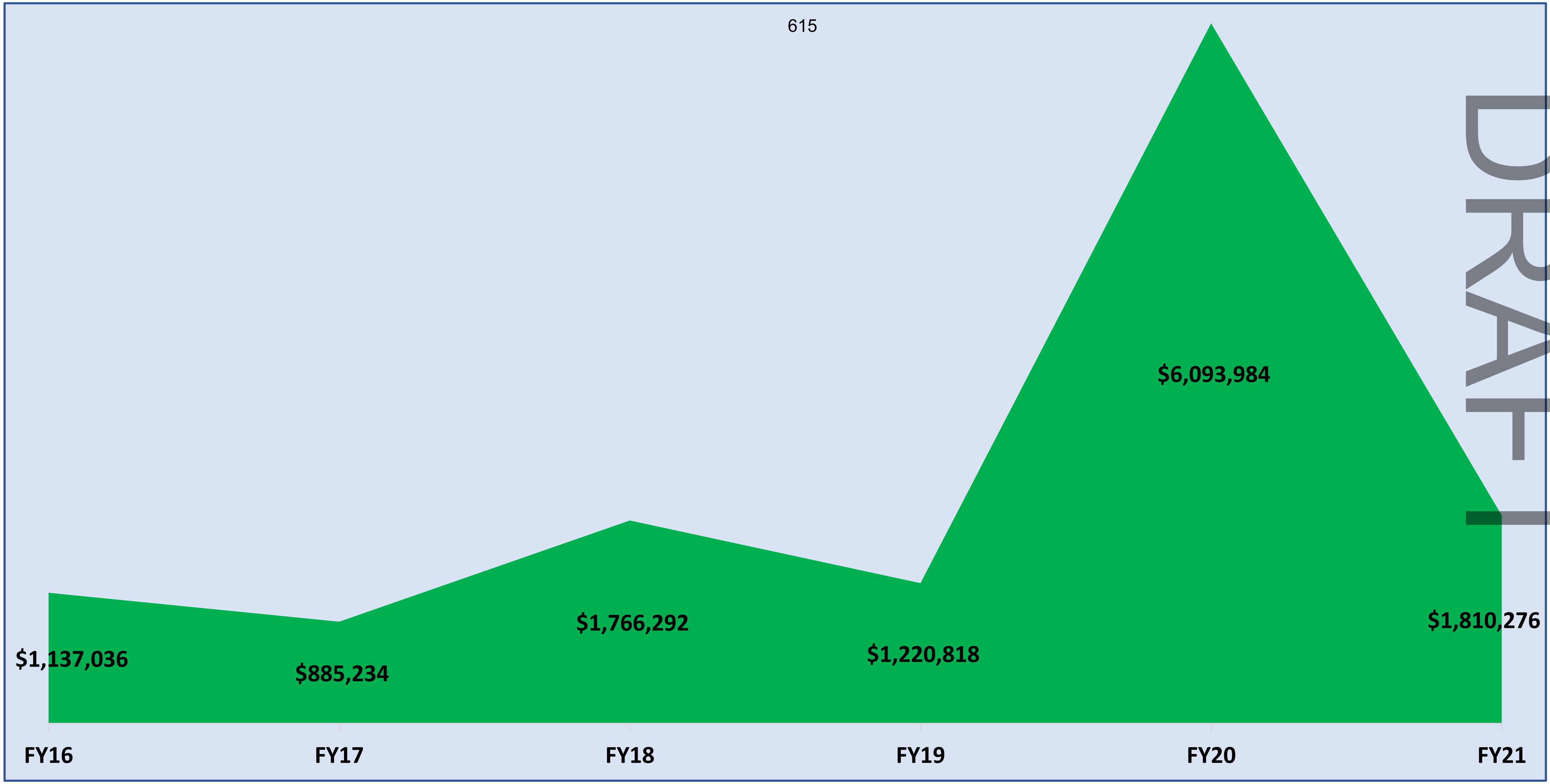
# Rental Units Affordable for 60% AMI

16%

# The Town has increased its support for affordable housing:

## Affordable Housing Funding Awarded to Projects

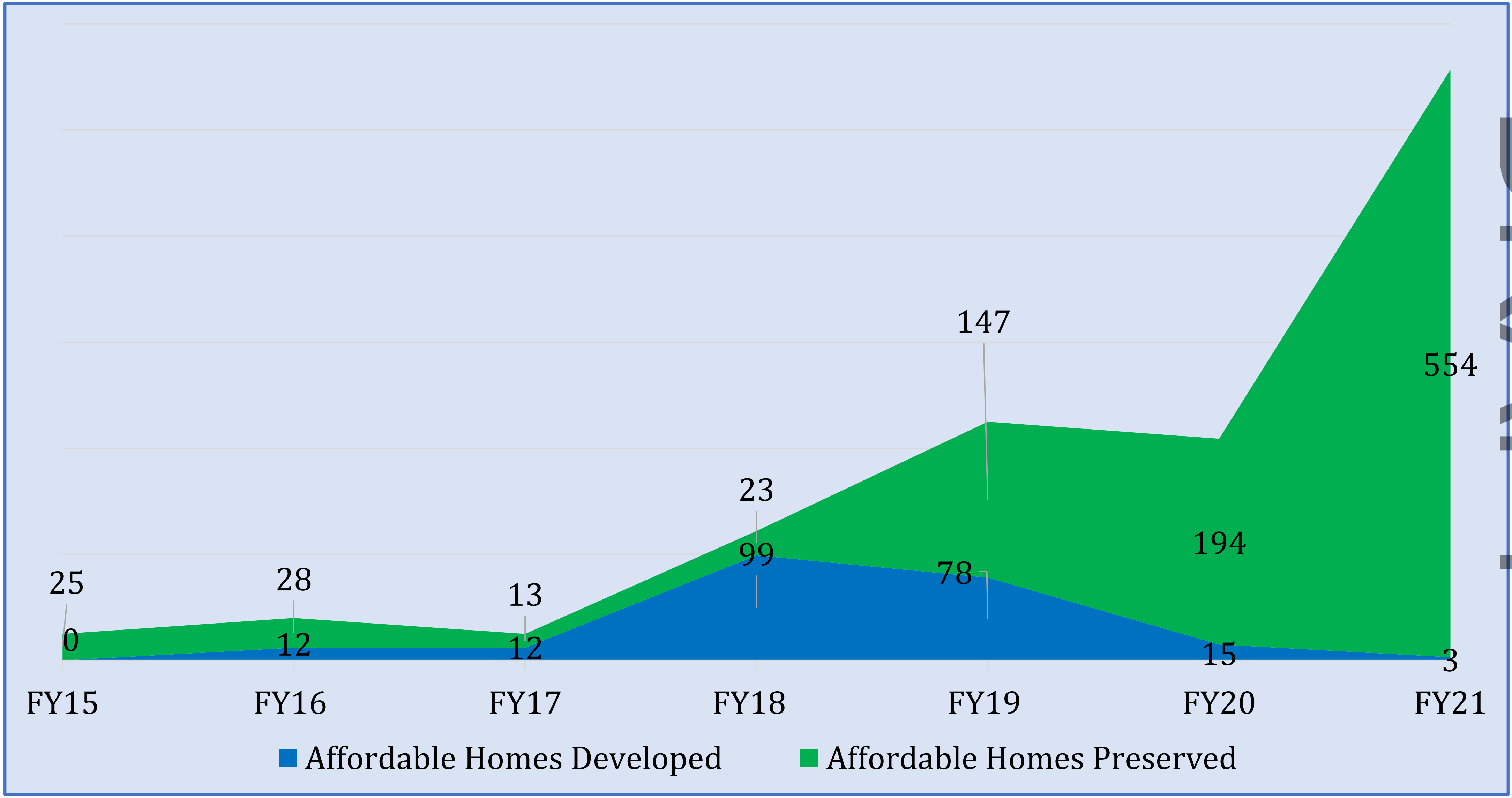




# Increased support has increased our impact:



## Increase in Units Developed and Preserved



# Five Year Targets – 2023

**400**

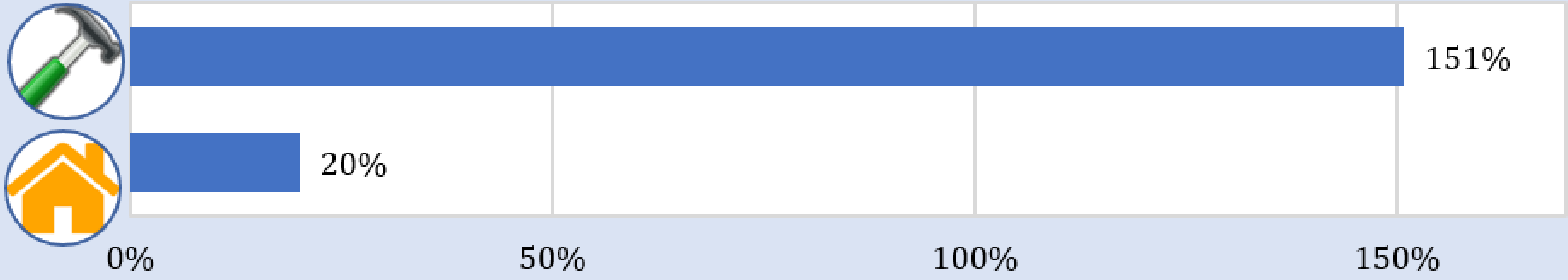
Development

**300**

Preservation

# FY21 Key Results

**Progress Towards FY21 Projection**



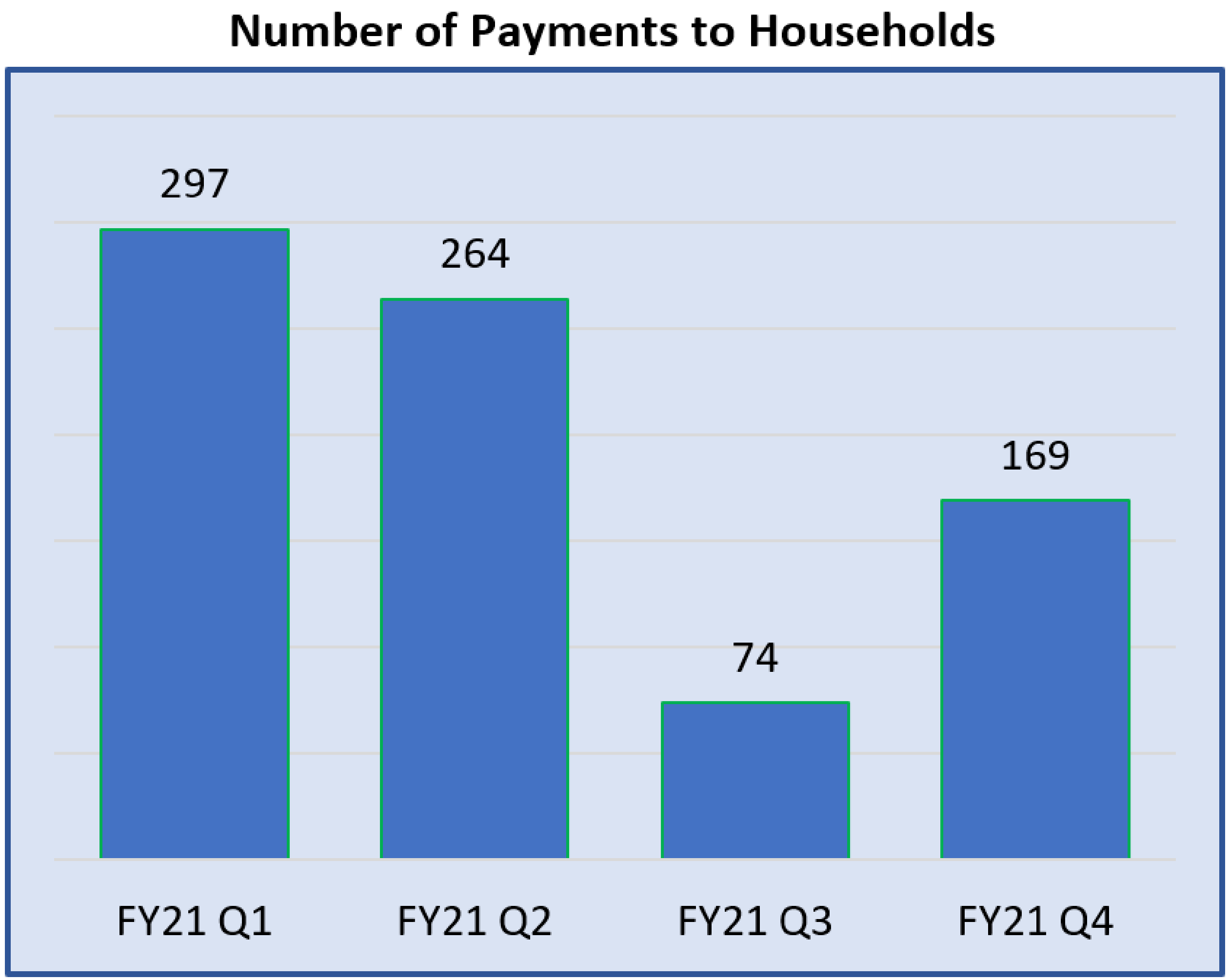

**Projection**

Preserve **400** Units

Develop **15** Units

# Emergency Housing Assistance Program

- 535 unique households assisted
- Serving very low-income households
- $ 1.3 million in Town investment




DRAFT

# Awarded Excellence in Affordable Housing

- Town and DHIC awarded the 2020 Housing North Carolina Award for excellence in affordable housing for Greenfield
- North Carolina's top honor for excellence in affordable housing

NORTH CAROLINA HOUSING FINANCE AGENCY


# Affordable Homes Approved

- 200 affordable homes received development approvals
  - ~75 through the Town's Inclusionary Housing program

- 130 affordable homes receive funding support from the Town

# Development on Town-Owned Land

- Homestead Gardens - 2200 Homestead
  - Received rezoning approval to develop ~120 affordable homes
  - Planning to break ground in spring/summer 2022
- Jay Street
  - Concept Plan process completed
  - Conducting community engagement to refine draft site plan before submit conditional zoning application

# FY21 Projection

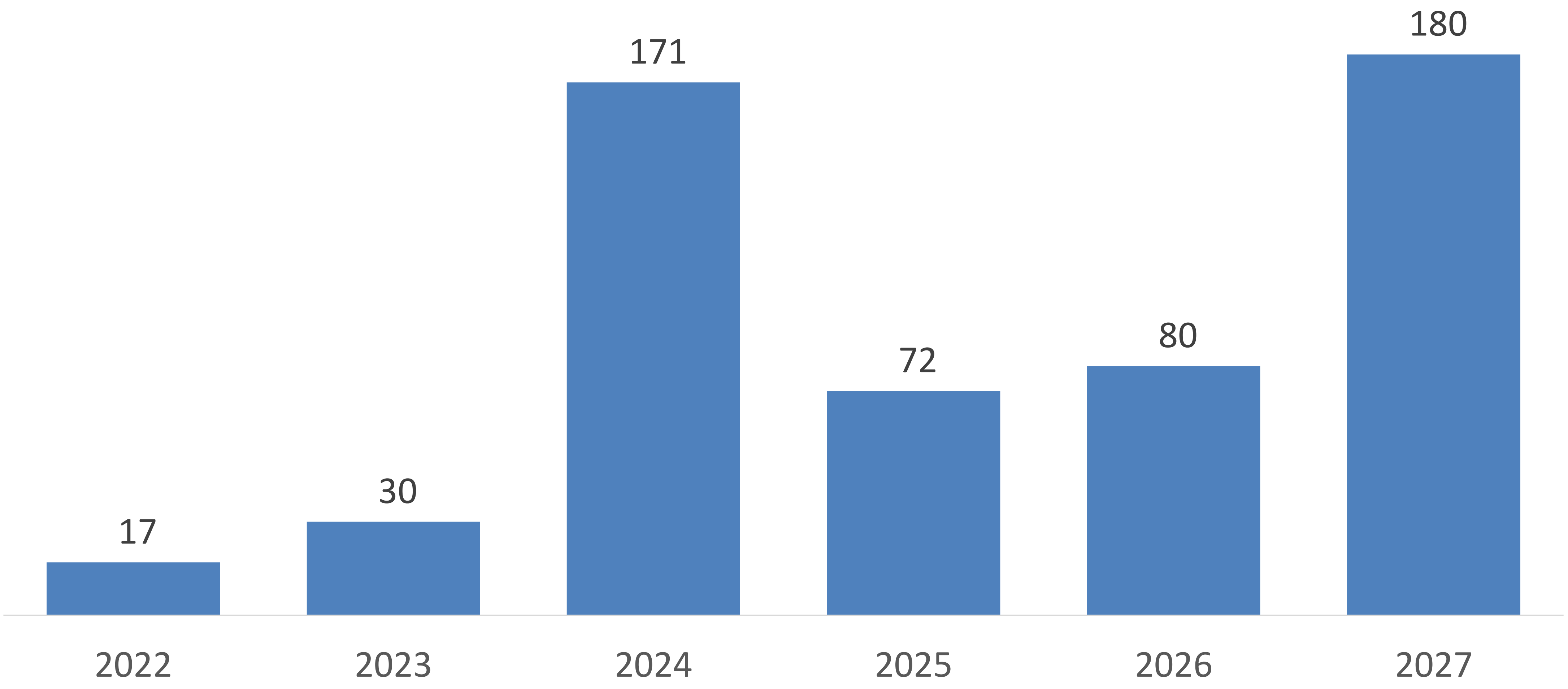
**15**

Development

**350**

Preservation

# Affordable Housing Development Pipeline



# On the Horizon

1. Break ground at Homestead Gardens, Weavers Grove, and Perry Place
2. Submit Trinity Court Concept Plan and Jay St Application
3. Review AHDR Funding Plan in October and allocate the remaining $5 million in bond funding
4. Continue providing Emergency Housing Assistance and adjusting programs based on impact from Covid-19
5. Community Development Block Grant Initial Public Forum in November

# Public Housing

## FY 2021 Annual Report

# Metrics

To track our progress and success, Public Housing will mirror HUD's metrics in the Public Housing Assessment System (PHAS) score. These metrics are:

- Physical Condition
- Financial Condition
- Management Operations
- Capital Fund
- Community Engagement

# Operations during COVID-19

- No graded PHAS inspection this fiscal year
- Habitability Inspection in Q4
- Emergency Work Orders only
- Continued pre-screening process for tenants
- Continued Annual Recertifications via mail
- Continued weekly food distribution

# Physical Condition

HUD evaluates site, building exterior, interior, and general condition of neighborhood

- Habitability Inspection
- Completion of Oakwood units!
- Plumbing repairs

128 Emergency Work Orders

92% closed within 24 hours

# Financial Condition

## Operating Fund

**HUD evaluates whether the Housing Agency has sufficient financial resources and is managing those resources effectively**

| | Liquidity | Adequacy of Reserves | Adjusted Operated Income | Money owed to vendors |
|---|---|---|---|---|
| 2021 | **19.09%** | **22.75%** | **$488,991** | **0.51** |
| 2020 | **12.83%** | **26.63%** | **$474,541** | **1.26** |

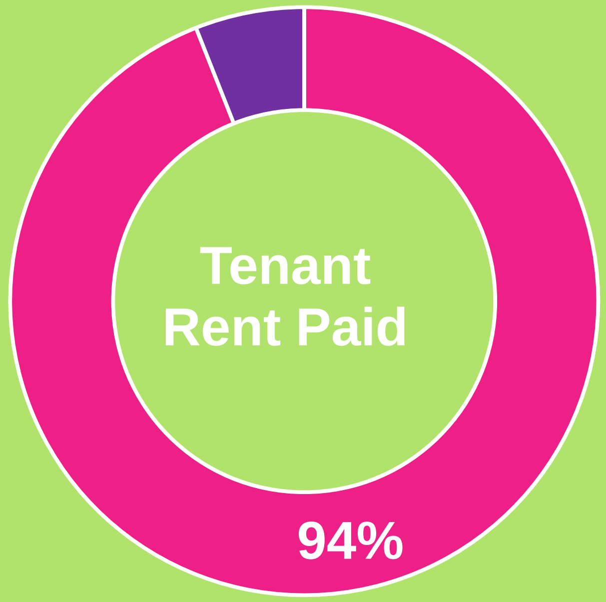
**No debt service either year

Data represents values from Annual Financial Data Schedule collected at FY end (6/30/21)

Improvements were made in Liquidity from 6/30/20 to 6/30/21

# Management Operations

HUD is assessing the effectiveness of the Housing Agency's Management in terms of Occupancy, Tenant Account Receivables, and Accounts Payable



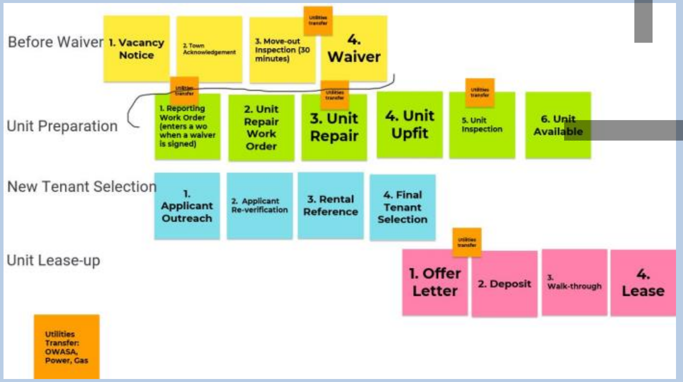

**98% Occupancy;**
**5 vacant units:**

2 vacant units due to Fire damage

3 vacant units currently in Leasing

- Community Housing Partners community engagement for Trinity Re-Imagined

- 67% of tenants = COVID vaccine




- Unit Turnaround Process Improvement team created

# Capital Fund

HUD evaluates the time it takes to use the funds designated for Building Improvements. All Grant Funds must be spent within 4 years of receipt.

4th Quarter balance does not reflect FY22 grant.

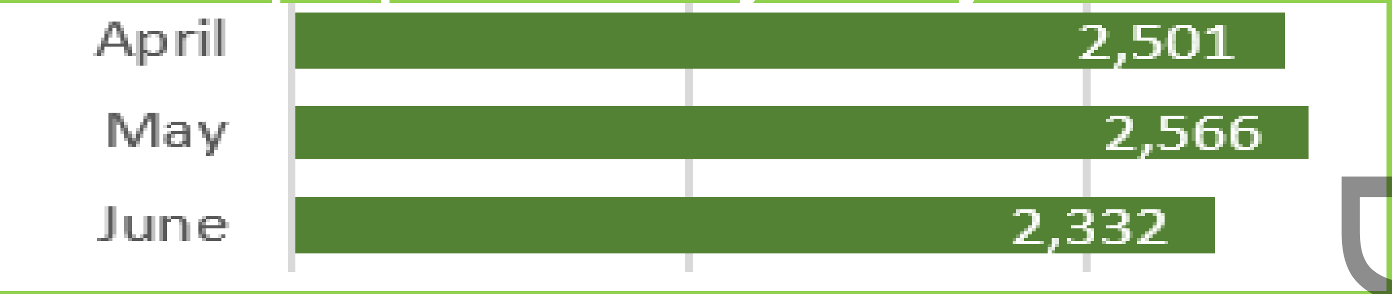
| Quarter | Current Encumbrances | Available Balance |
|---|---|---|
| 4 | $270,457.89 | $2,058,460.59 |
| 3 | $260,031.55 | $2,137,648.83 |
| 2 | $333,313.41 | $2,182,249.84 |
| 1 | $304,688.85 | $2,363,794.71 |

## Grant Funds used for:

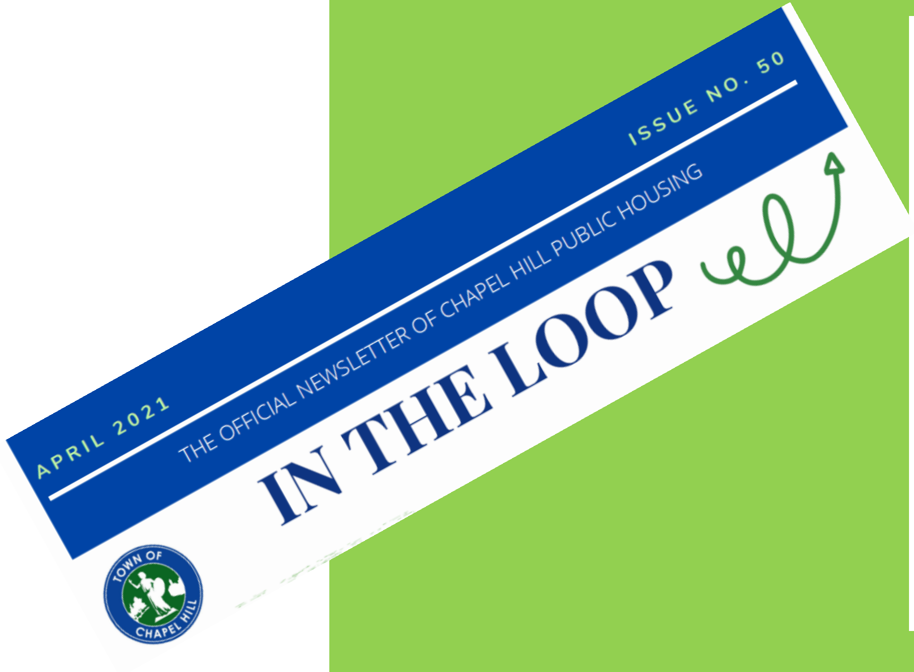
1. Development
2. Financing
3. Modernization
4. Management Improvement

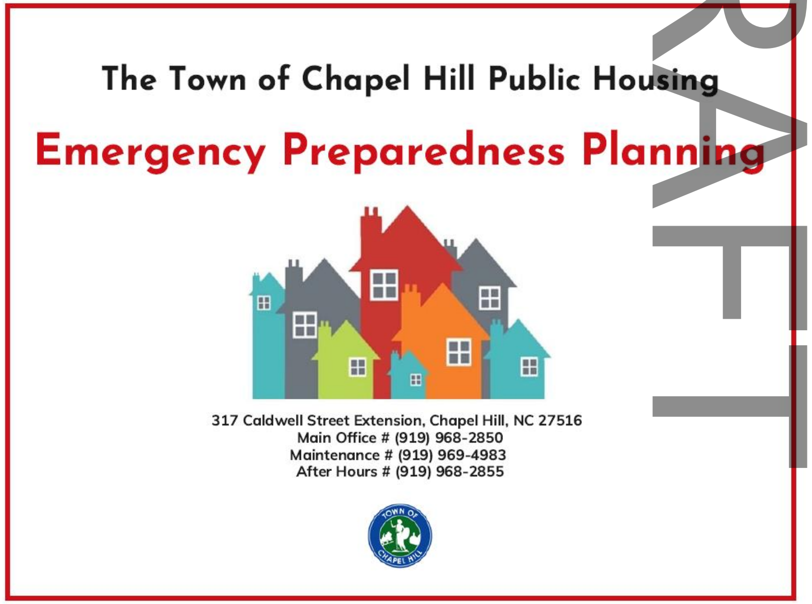
# Community Engagement

## Number of people served by weekly Food Distribution




National Night Out event held in THREE neighborhoods





The Town of Chapel Hill Public Housing
Emergency Preparedness Planning
317 Caldwell Street Extension, Chapel Hill, NC 27516
Main Office # (919) 968-2850
Maintenance # (919) 969-4983
After Hours # (919) 968-2855

Resident Council Members increases

# What's Ahead for Public Housing?

- Implementation of the Public Housing Master Plan
- Filling staff vacancies: Maintenance Programs Supervisor, Administration Assistant, two Maintenance Mechanics, and Housing Officer II
- Grow and develop our Resident Council
- Move forward with Trinity Re-Imagined

# THANK YOU

from Public Housing

# AFFORDABLE HOUSING ANNUAL REPORT

## FISCAL YEAR 2021
### JULY 1, 2020 - JUNE 30, 2021

## FY21 Key Results

**535** households provided Emergency Housing Assistance

**$6.3 million** Town Budget for affordable housing strategies

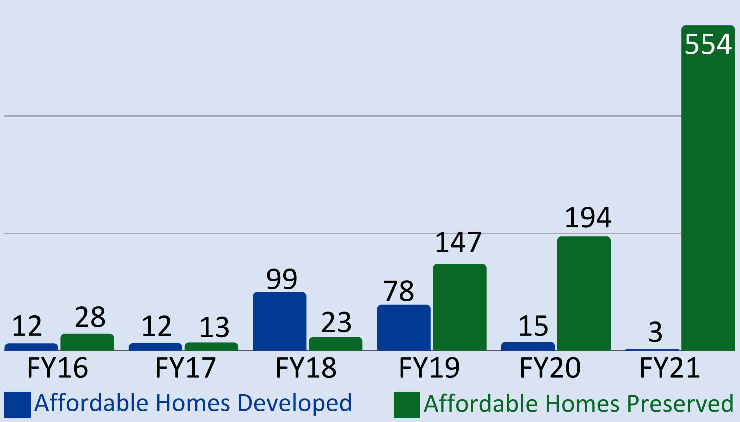
**198** affordable housing units approved by Council

Approval of the 2200 Homestead Road Affordable Housing Development Project

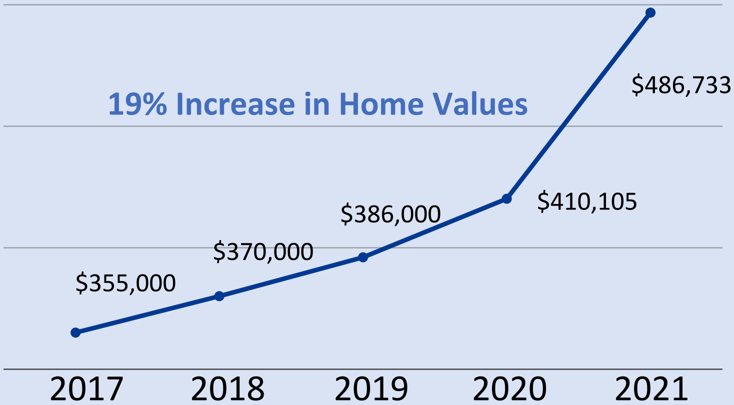
Making significant progress on development projects including Jay Street and Trinity Court

Awarded the 2020 Housing North Carolina Award for the Greenfield Project


### Affordable Homes Developed and Preserved




### Chapel Hill Home Value Index



# Community Indicators

**$6,226,205**
Town Budget for Affordable Housing Strategies

**$90,900**

Median Household Income

**$410,105**
Median Home Value

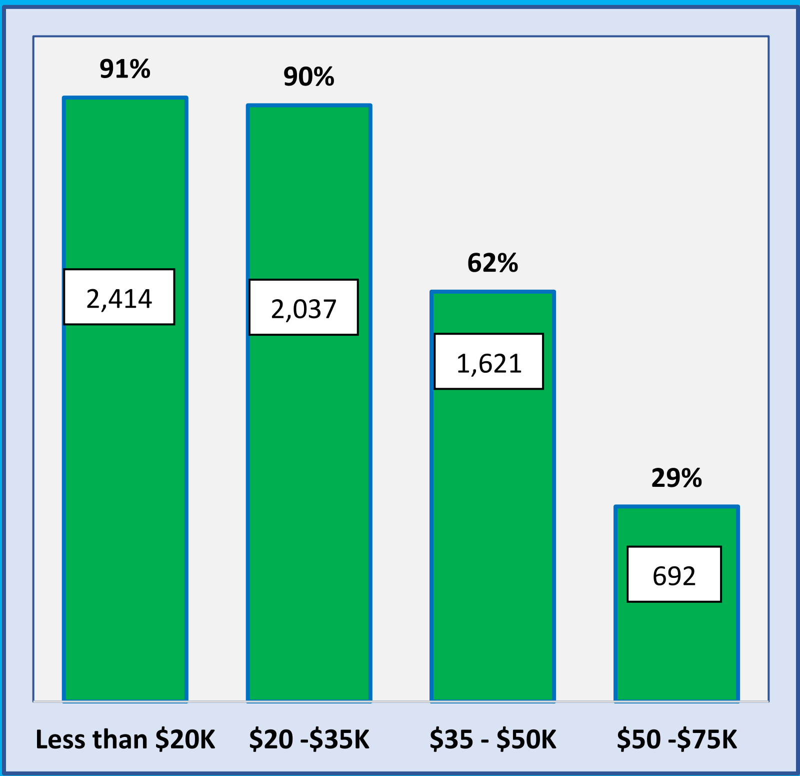
**58%**
of Renters spend more than 30% of income on Housing

**22.5%**
of Homeowners spend more than 30% of income on Housing

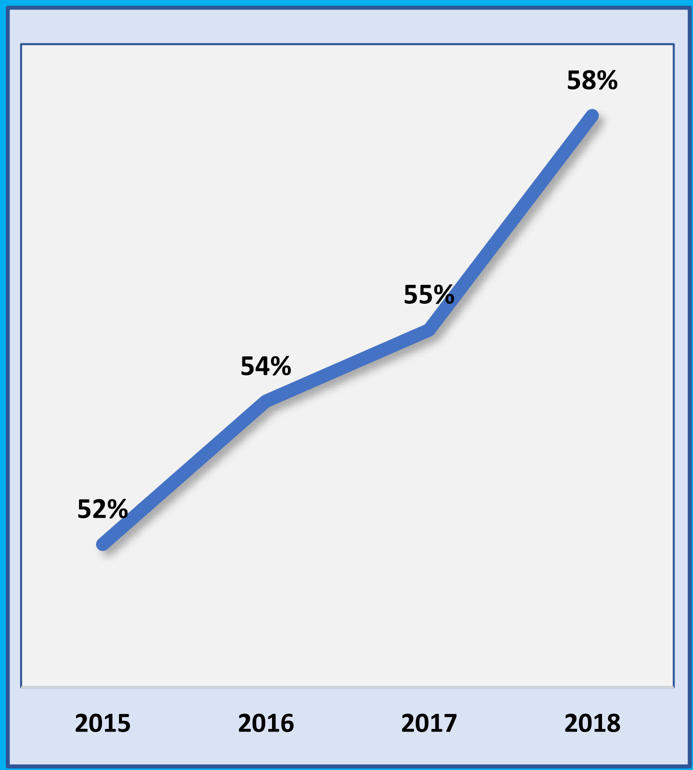
**40%**
of Housing Units (7,459) affordable to households with income at 80% AMI

**21,708**
Total housing units in town

**Number and Percent of Households that are Cost-Burdened by Income Level**




**Percentage of Renters Cost-Burdened by Year**



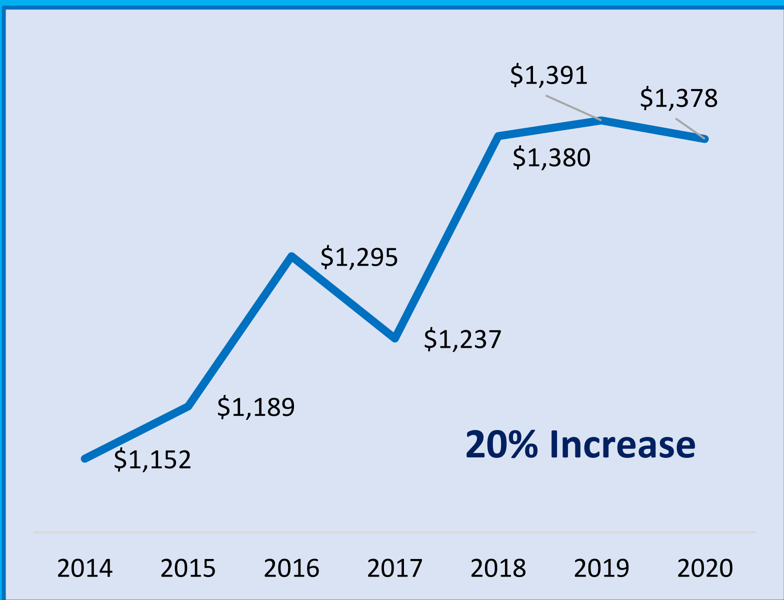

## To learn more:

[HTTP://WWW.CHAPELHILLAFFORDABLEHOUSING.ORG](http://www.chapelhillaffordablehousing.org)

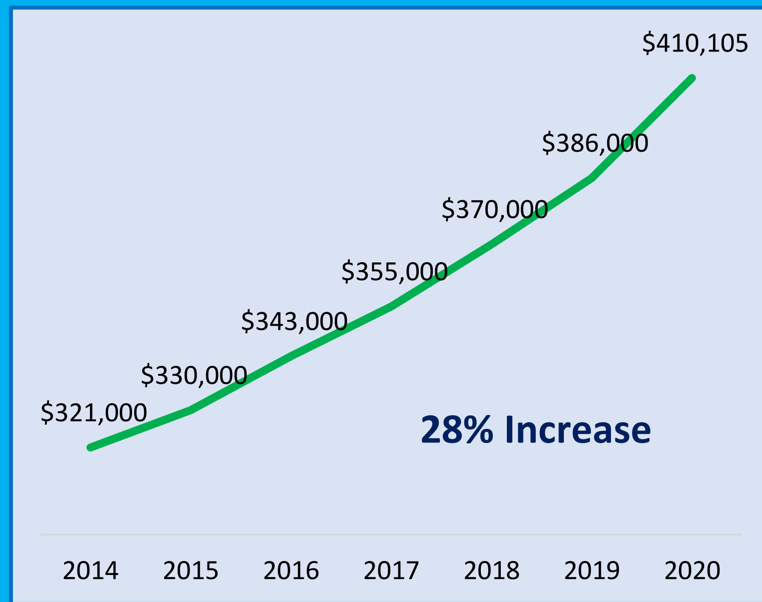
## Housing costs have been rising in Chapel Hill since 2014:



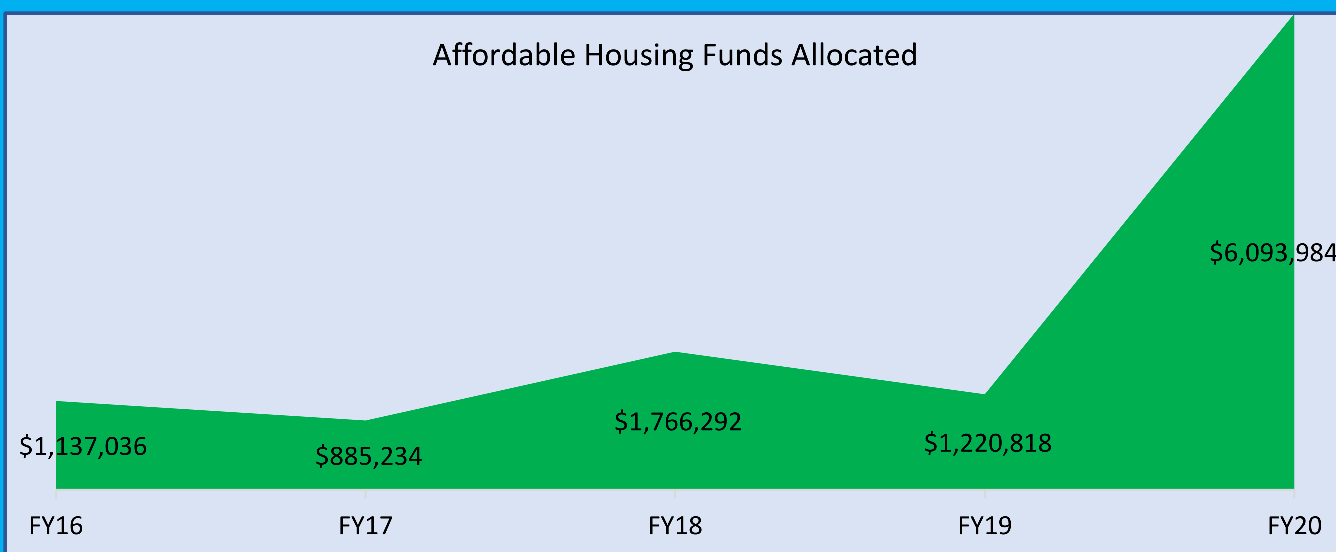
### Rise in Rental Rates



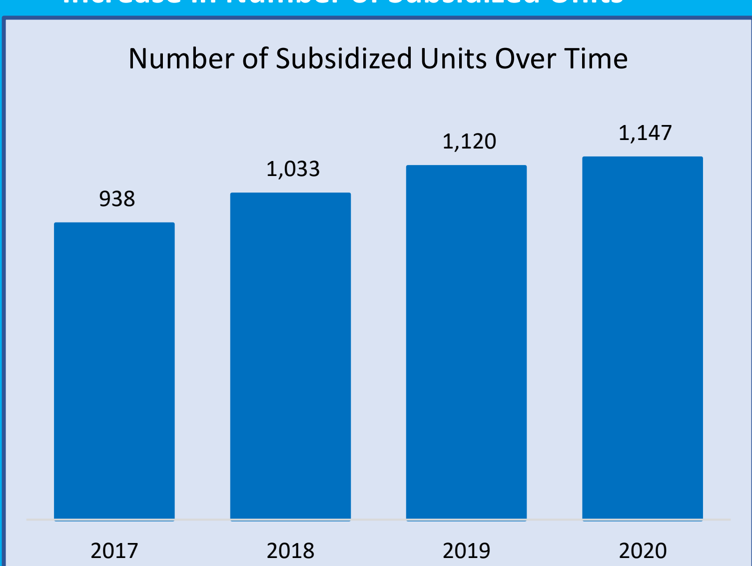

### Rise in Home Values



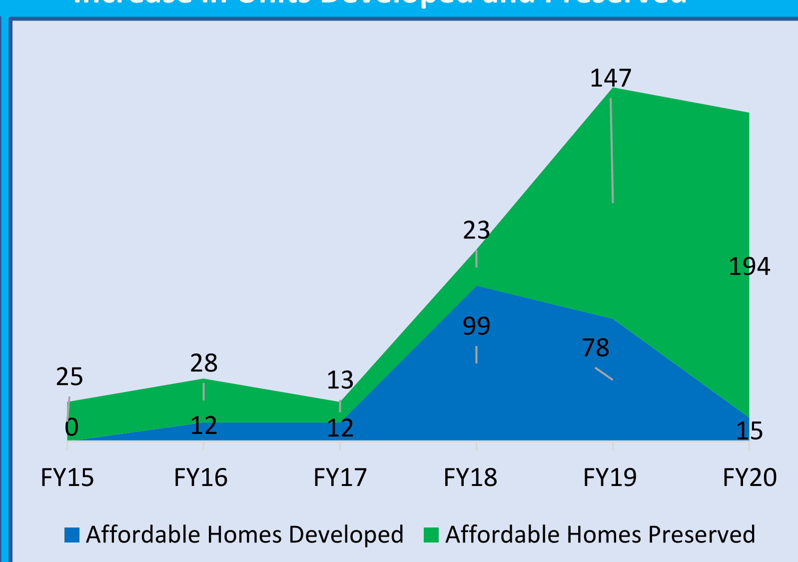

## The Town has increased its support for affordable housing to address housing needs:




### Increase in Number of Subsidized Units

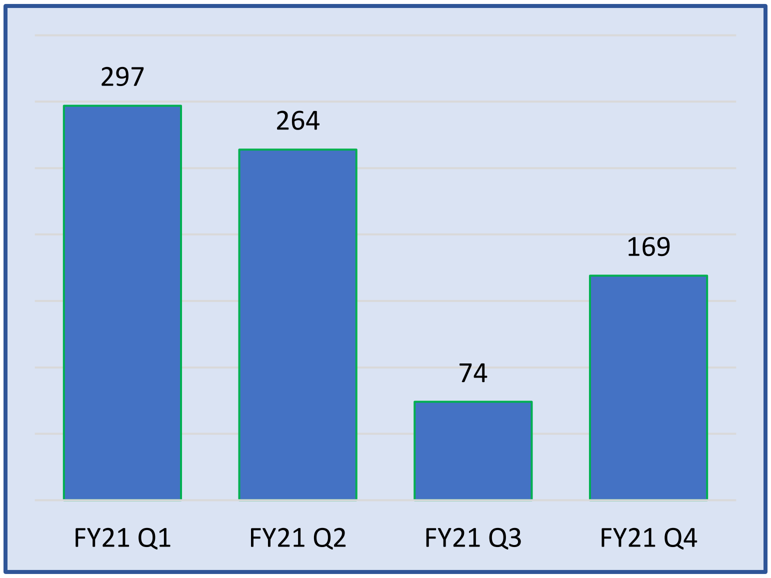



### Increase in Units Developed and Preserved

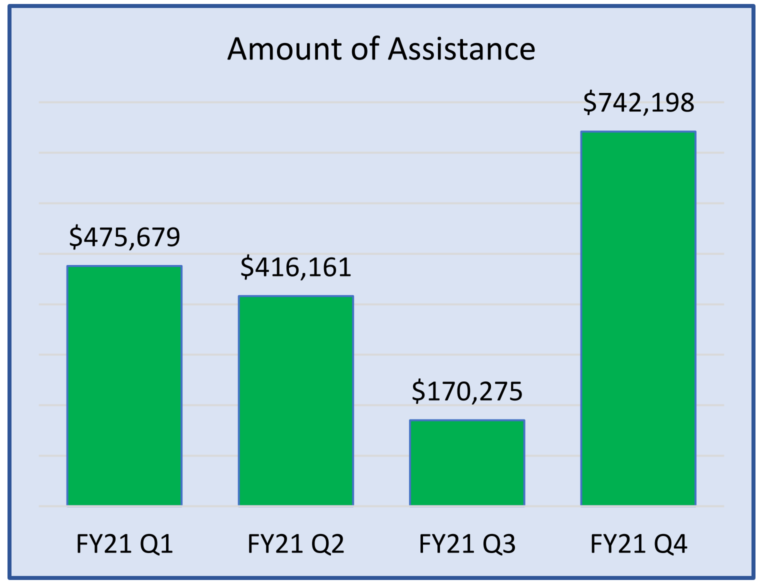


## Emergency Housing Assistance

**Number of Rental Payments Made**

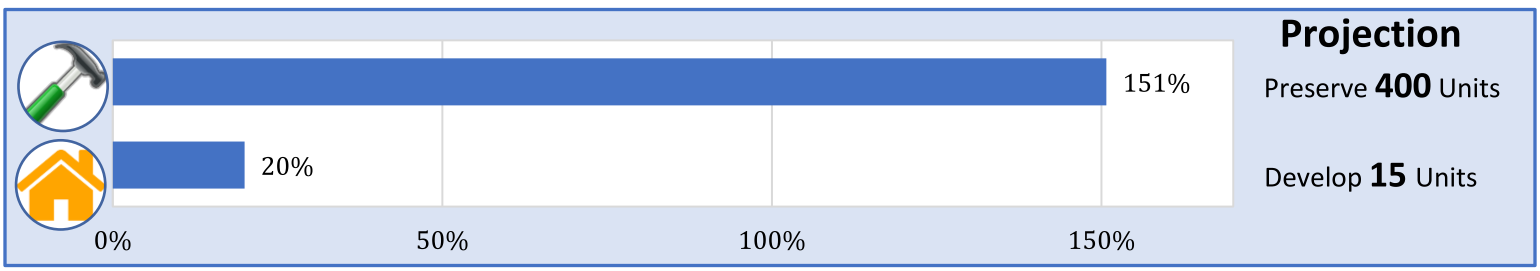



**Amount of Assistance Provided**

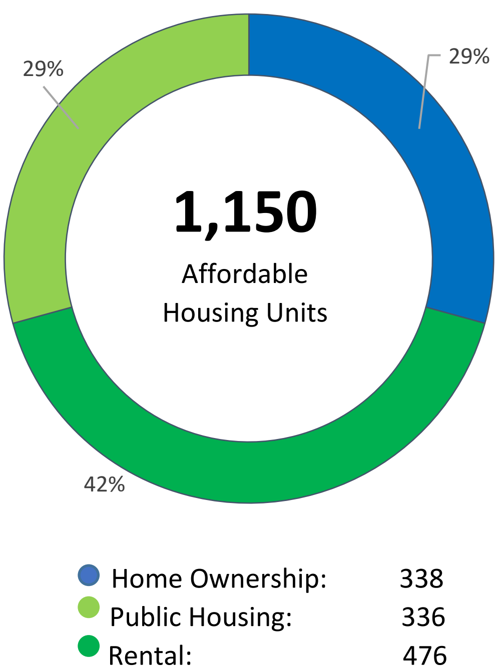



## FY21 Town Performance-to-Date

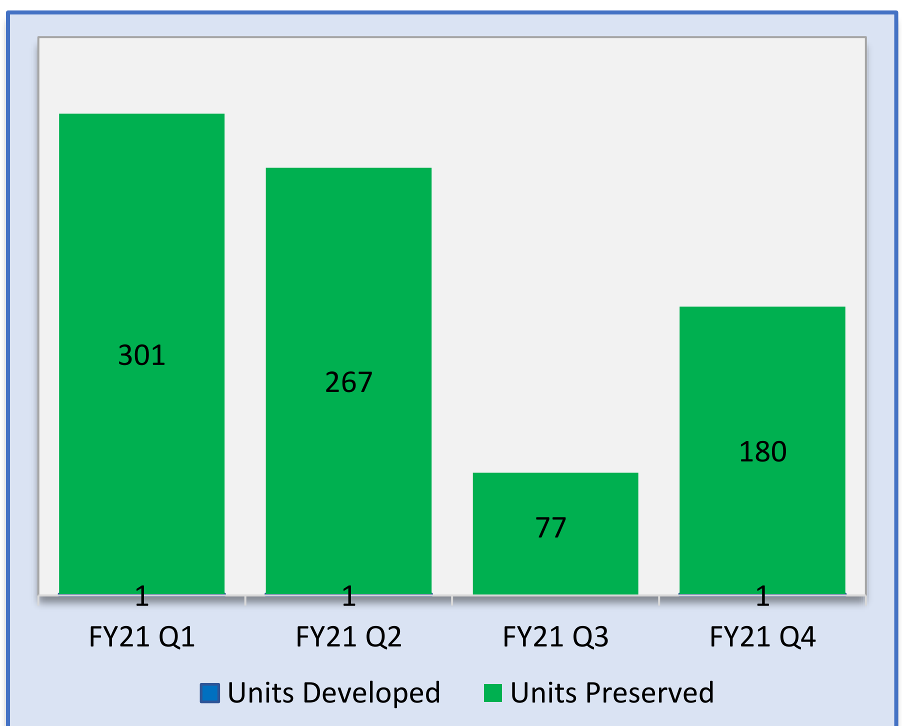
**Progress Towards FY21 Projection**




**Number of Subsidized Units in Town**




**Units Developed and Preserved by Quarter**



# Affordable Housing Projects Underway Supported by the Town

| Project Type | Provider | Project Name | Number of Units | Projected Completion | Status |
|---|---|---|---|---|---|
| 🏠 | Community Home Trust | Culbreth Park Acquisition | 1 | FY21 Q1 | ✓ |
| 🏠 | Community Home Trust | Graham Street Acquisition | 1 | FY21 Q2 | ✓ |
| 🔨 | Town of Chapel Hill Public Housing | Church Street Renovation | 1 | FY21 Q2 | ✓ |
| 🔨 | Town of Chapel Hill Transitional Housing | Sykes Street Renovation | 1 | FY21 Q4 | ✓ |
| 🔨 | Orange County | Emergency Housing Assistance | 400 | FY21 Q4 | ✓ |
| 🔨 | Self-Help | Northside Neighborhood Initiative Housing Rehabilitation | 7 | FY21 Q4 | ✓ |
| 🏠 | Habitat for Humanity | Sunset Drive Home Construction | 1 | FY21 Q4 | ✓ |
| 🔨 | Community Home Trust | Homebuyer Subsidy | 1 | FY21 Q4 | ✓ |
| 🏠 | Self-Help | Grisham Cottages | 2 | FY22 Q2 | 🟡 |
| 🔨 | Town of Chapel Hill Public Housing | Oak Avenue Furnace Replacement and Fire Repair | 3 | FY22 Q2 | 🟡 |
| 🔨 | Orange County Preservation Coalition | Homeowner Rehab | 3 | FY22 Q2 | 🟡 |
| 🔨 | Town of Chapel Hill Transitional Housing | Ashley Forest Renovation | 1 | FY22 Q2 | 🟡 |
| 🏠 | Town of Chapel Hill | Employee and Transitional Housing Program Master Leasing | 5 | FY22 Q2 | 🟡 |
| 🏠 | Pee Wee Homes | Mitchell Lane Tiny-plex | 2 | FY22 Q3 | 🟡 |
| 🏠 | CASA | Merritt Mill Road Multi-Family Development | 24 | FY23 Q4 | 🟡 |
| 🔨 | Town of Chapel Hill | Transitional Housing at Umstead Road | 1 | FY22 Q4 | 🟢 |
| 🏠 | Town of Chapel Hill | 2200 Homestead Road | 120 | FY24 Q2 | 🟢 |
| 🏠 | EmPOWERment, Inc. | PEACH Apartments | 10 | FY24 Q2 | 🟢 |
| 🏠 | Town of Chapel Hill | Jay Street | 48 | FY25 Q2 | 🟢 |
| 🏠 | Town of Chapel Hill | Trinity Court | 54 | FY25 Q2 | 🟢 |
| 🏠 | Habitat for Humanity | Weavers Grove | 100 | FY28 Q2 | 🟢 |

**Legend**:

✓: The project has been completed

🟢 : The project is on track to meet its project scope and schedule

🟡 : The project has been delayed in meeting its previous quarter project scope and schedule

🔴 : The project has stalled and may not be completed

🏠 : Development Project

🔨 : Preservation Project

## Affordable Housing Work Plan Highlights

| Project | Progress Update |
|---|---|
| **DEVELOPMENT** | |
| **2200 Homestead** | • Draft development contract between the Town and Homestead Collaborative scheduled for Council review October 13.<br>• Development team plans to break ground in spring/summer of 2022.<br>• Hosted Rep. David Price for a site visit in August as part of a Community Project Funding request in the FY22 federal budget. |
| **Jay Street** | • Development team received feedback on a preliminary concept plan from the Community Design Commission, Housing Advisory Board, and Town Council in the spring.<br>• Development team is working with the Jackson Center and Town staff for Phase 2 of its community engagement activities, with focus on gathering input to inform final site plan.<br>• Development team is anticipating a conditional zoning application submission in late fall. |
| **Trinity Court** | • In June, the Town executed a memorandum of understanding (MOU) with the recommended development partner, Community Housing Partners (CHP).<br>• Staff are working with CHP to conduct project due diligence and assemble a concept plan application for submission by October 2021. Advisory Boards and Town Council will review the concept in October and November.<br>• CHP and its partners are finalizing a community engagement plan. |
| **Bennett Road** | • Staff are finalizing a proposed visioning process designed to engage the Council and community, assess development options, and create a concept plan for the site. |
| **PRESERVATION** | |
| **Implement Manufactured Home Communities Strategy** | • Staff updated the draft County-wide Manufactured Home Action Plan (MHAP) and shared the latest version with the elected representatives of the Local Government Affordable Housing Collaborative.<br>• Each jurisdiction has shared the draft County-wide MHAP with their housing advisory boards, the OCAHC, and Preservation Coalition in September for review and input.<br>• Staff continuing to explore options for applying the Resident Owned Community model to MH communities in Orange County. |
| **Affordable Housing Preservation Strategy** | • The Town continues to support the County-wide Emergency Housing Assistance (EHA) program.<br>• The EHA partnership was selected by ChangeLabSolutions[1] to participate in their Housing Solutions Collaborative peer learning cohort to evaluate EHA program success and sustainability. Staff from each jurisdiction and Empowerment are serving on that team.<br>• Staff is conducting additional research on implementation options for the Preservation Strategy based on Council's feedback. |
| **POLICY** | |
| **Implement Employee Housing Program** | • Staff have completed an evaluation of program.<br>• Staff plan to provide Housing Advisory Board and Council with update on findings in October. |
| **FUNDING** | |
| **Implement Investment Plan for Affordable Housing – Affordable Housing Bond** | • Staff planning for next Bond RFP process in winter for remaining $5 million.<br>• Staff exploring eligible uses of American Rescue Plan Act funds and how other communities are using ARPA to support affordable housing efforts. |
| **Manage Funding Programs**<br>▪ **Affordable Housing Fund (AHF)**<br>▪ **Development Reserve (AHDR)**<br>▪ **CDBG** | • Staff released RFP for the Affordable Housing Development Reserve on August 30, with applications due Oct. 1st. The town received 5 applications requesting a total of $751,000 in funding.Town Council is scheduled to review in October 27th.<br>• CDBG Annual Action Plan submitted to HUD in May and Comprehensive Annual Performance and Evaluation Report (CAPER) submitted in early October |
| **MANAGING TOWN-OWNED HOUSING** | |
| **Transitional Housing Program** | • Renovations of Ashley Forest units underway.<br>• Households moving into the Union units within the next month |

[1] https://www.changelabsolutions.org/

## Notes & Citations

- The percentage of renters and homeowners that pay more than 30% of their income on Housing, the number and percentage of cost-burdened housing, and total occupied housing units in town data source is U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates
- HUD defines cost-burdened families as those who pay more than 30% of their income for all housing-related expenses and may have difficulty affording necessities such as food, clothing, transportation, and medical care.
- The median household income data source is the HUD 2020 Median Family Income Estimates based on American Community Survey data for the Durham-Chapel Hill Metropolitan Statistical Area.
- The median home value data source is Zillow.com and average rent rate is RentJungle.com
- The total budget this fiscal year for affordable housing strategies captures all Town expenditures for affordable housing. This includes the Affordable Housing Fund, CDBG Funds, the affordable housing bond, and operating funds, among others.
- The percentage of housing units that are affordable to households with income under 80% AMI includes naturally occurring affordable housing and units subsidized by the Town. The data source for this metric and corresponding chart is the commercial real-estate research firm Co-Star and the County-wide data inventory created through the Orange County Affordable Housing Coalition.
- The percent-of-budget allocated metric displays the percentage of the Town budget for affordable housing projects allocated as of the date of the quarterly report.
- The data source for the number of units subsidized by the Town is the County-wide Data Inventory created through the Orange County Affordable Housing Coalition.
- The data source for subsidized housing unit development projections is the County-wide data inventory created through the Orange County Affordable Housing Coalition.
- The number of subsidized units listed in this report has decreased by 35 units from the FY20 Q4 Report as an error in the jurisdictional classification of some units was discovered and corrected.

# PUBLIC HOUSING ANNUAL REPORT
# Including FY21 Q4: April- June

Our quarterly reports are designed to provide an overview of the Town's Public Housing Department. Consistent with the United States Housing & Urban Development (HUD)'s rating, we also include information as it pertains to the Public Housing Assessment System **(PHAS).**

PHAS was created by **HUD** to evaluate the overall condition of each housing agency to obtain results that are objective, uniform, and verifiable.

Chapel Hill's listed PHAS score is based on the Oct. 2019 Real Estate Assessment Center (**REAC**) inspection. Due to the COVID conditions, there has not been a graded assessment since that time. HUD conducted a 2021 **Habitability Inspection** on July 27 and 29, but that did not affect the existing PHAS score.

Our October 2019 scores: ……………………… -Management: 5 (out of 25)
-Capital Fund: 5 (out of 10)
-Physical Condition: 19 (out of 40)

Total Score: ………………………………………………… 54 out of 100
Status: ……………………………………………………….. **Troubled Status**

Graded as a Troubled Status resulted in a requirement for us to design and fulfill a **Recovery Agreement** with HUD. Our Recovery Agreement contained the following corrective actions:

-All Elected Officials and Senior Leadership Staff participating in HUD's "Lead the Way" training;
-Increasing the quantity and quality of external contractors;
-Improving the expenditure of our capital funds;
-Evaluating maintenance staffing and performance; and
-Evaluating previous REAC reports for strategies to improve Capital Fund and maintenance costs.

These are our evaluation tools referred to as **PHAS Indicators**. Public Housing leadership added a fifth indicator, Community Engagement, to identify opportunities for further connections with tenants. The five indicators are listed below, as well as their evaluation measures and steps taken to positively influence those measures.

| INDICATOR | HUD EVALUTION MEASURES | ACTIONS TAKEN TO IMPROVE SCORE |
|---|---|---|
| **Physical Condition** | ▪ Physical inspections | ▪ Building improvements<br>▪ Repairs |
| **Financial Condition** | ▪ Management of funds | ▪ Monitor and process all invoices to ensure they are paid within 30 days |

| | | |
|---|---|---|
| **Management** | ▪ Tenant Accounts Receivable<br>▪ Occupancy Rate<br>▪ Accounts Payable | ▪ Account for reductions in rent due to loss of income during pandemic<br>▪ Offer timely rent payment incentives<br>▪ Maintain all payable accounts within current status; paid within 90 days |
| **Capital Fund** | ▪ Obligation of HUD funds<br>▪ Occupancy Rate | ▪Obligate funds to specific projects – Create timeline to show exactly which properties will be improved<br>▪ Decrease time units are vacant |
| | | |
| **Community Engagement*** | ▪ Created indicators to develop and analyze community engagement efforts. | ▪ Continue Monthly newsletter<br>▪ Coordinate weekly Food Bank<br>▪ Facilitate Resident's Council<br>▪ Survey residents reference programming interest |

*added by Public Housing leadership to maintain and improve connections with tenants.

## OUR "NEW NORMAL" DEALING WITH COVID PANDEMIC

- Continued pre-screening process (employees, tenants, and applicants)
- Distributed face guards to Public Housing staff
- Continued abbreviated monthly safety inspections
- Responded to Emergency Work Orders only (maintained record of Routine Work Order Request)
- Staggered staffing at Administrative Office

## PHYSICAL CONDITION

QUARTER 1: JULY to SEPTEMBER 2020

- Responded to 184 Emergency Work Orders; 167 (90%) closed within 24 hours.
- Responded to Pest Control as needed; halted regular inspections for safety of residents and staff.
- New contract with landscape company for Public Housing properties
- Repair contracts completed or in progress:
  - Rebuilding of fire damaged units at Oakwood (E1 and E2)

QUARTER 2: OCTOBER to DECEMBER 2020

- Responded to 179 Emergency Work Orders; 173 (98%) closed within 24 hours.
- Responded to monthly Pest Control and air conditioner filter changes.
- Continued residential entry level inspections.
- Repair contracts completed or in progress:
  - Repair of brick wall at Sykes St. playground
  - Reroofing of Craig/ Gomains and Lindsay St. (19 buildings)
  - Continued rebuilding of fire damaged units at Oakwood (E1 and E2)

QUARTER 3: JANUARY to MARCH 2021

- Responded to 152 Emergency Work Orders; 148 (96%) closed within 24 hours.
- Responded to monthly Pest Control and air filter changes.
- Repair contracts completed or in progress: Oakwood burn units, sidewalk repairs

- Continued rebuilding of fire damaged units at Oakwood (E1 and E2)
- New sidewalk at Oakwood (D unit)
- 4 abandoned units reclaimed and repaired for leasing.
- Replaced flooring and completed asbestos remediation in 509C at Craig/Gomains
- Resurfaced bathtubs at Airport Gardens (21 bathtubs)

QUARTER 4: APRIL TO JUNE 2021

- Resolved 128 Emergency Work Orders, closing 92% within 24 hours.
- Maintained ledger of needed routine repairs.
- Completed safety inspections for all AMP II neighborhoods in preparation for the HUD Habitability Inspections; including smoke alarm checks, light bulb replacements, air filter changes and minor repairs.
- 30 Unit Turnovers completed
- Repair contracts completed or in progress: fencing around playground at S. Estes, renovation of units with fire damage at Oakwood.

## FINANCIAL CONDITION/ OPERATING FUND

- Liquidity Rate and Money Owed to Vendors have improved;
- However, Adequacy of Reserves rate decreased

| | |
|---|---|
| Quarter 1 | 10% |
| Quarter 2 | 52% |
| Quarter 3 | 26% |
| Quarter 4 | 117% |

## MANAGEMENT

QUARTER 1: JULY to SEPTEMBER 2020

- Tenant Account Receivable: 94% of accounts receivable paid
- Occupancy Rates: 6 vacant units at the end of the quarter, all being prepared to lease.

QUARTER 2: OCTOBER to DECEMBER 2020

- Tenant Account Receivable: 98% of accounts receivable paid
- Occupancy Rates: 7 vacant units at the end of the quarter
  - 2 units under repair due to fire damage, 5 being prepared to lease

**QUARTER 3: JANUARY to MARCH 2021**

- **Tenant Account Receivable: 99% of accounts receivable paid**
- **Occupancy Rates: 8 vacant units at the end of the quarter**
  - **2 units under repair due to fire damage, 6 being prepared to lease.**

**QUARTER 4: APRIL TO JUNE 2021**

- **Tenant Account Receivable:** 94% of accounts receivable paid

- **Occupancy Rates:** 5 vacant units at the end of the quarter
  - 2 units being completed from fire damage, 3 being prepared to lease
- Transfer of 3 households to appropriate bedroom-sized unit based on deconcentration plan's findings
- Unit Turnaround Process Improvement team created; held 4 meetings and collected data on last 15 unit turnarounds to analyze.

## CAPITAL FUND

- Funds used for development, preservation, financing, modernization, and management improvements.
- 100% allocation of funds to identified projects.
- Summary of Capital Fund Grant balances per quarter*.
  - *4th Quarter balance does not reflect acceptance of FY22 grant. We report those funds in FY22Q1:

| Quarter | Current Encumbrances | Available Balance |
|---|---|---|
| 4 | $270,457.89 | $2,058,460.59 |
| 3 | $260,031.55 | $2,137,648.83 |
| 2 | $333,313.41 | $2,182,249.84 |
| 1 | $304,688.85 | $2,363,794.71 |

- Quarter 3 Projects: Virtual Staff Retreat, Ballentine Associates-Affordable Housing Development analysis, Re-glazing bathtubs, asbestos testing, and abatement, reroofing at Craig Gomains.
- **Quarter 4 Projects: Asphalt and pavement evaluation in collaboration with Public Works. Replaced fencing around playground area in South Estes neighborhood.**

## COMMUNITY ENGAGEMENT

QUARTER 1: JULY to SEPTEMBER 2020

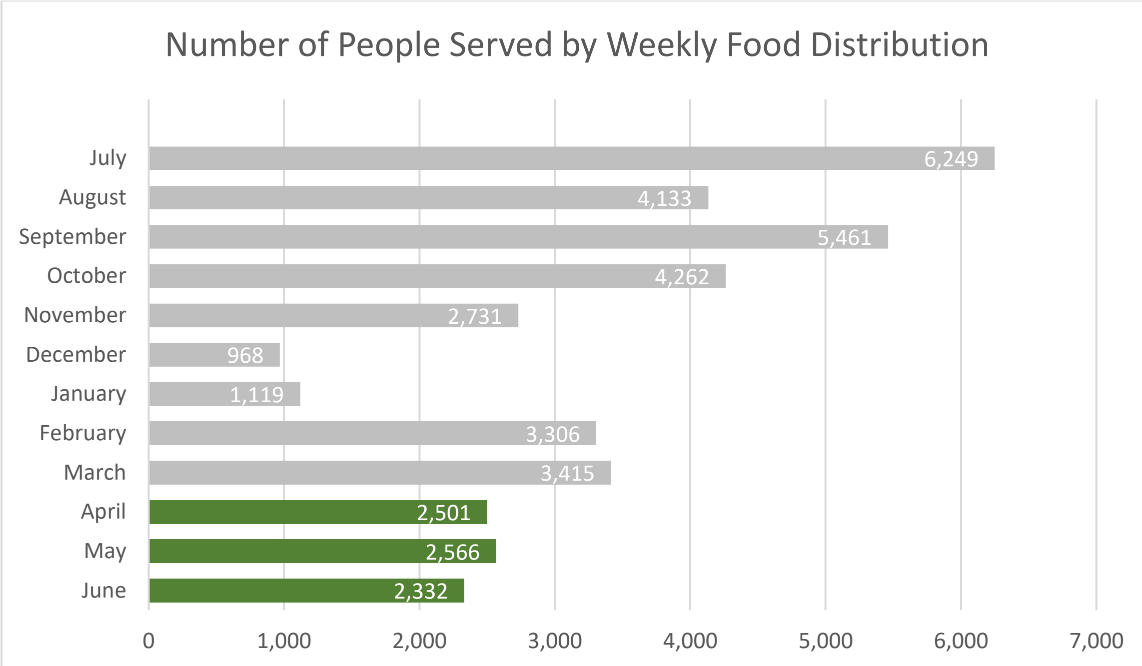
- Mailed monthly newsletter to tenants.
- Continued operation of weekly food distribution.

QUARTER 2: OCTOBER to DECEMBER 2020

- Mailed monthly newsletter to tenants.
- Mailed 2021 Calendars to tenants including information on community resources.
- Mailed invitations to the new Resident Council to residents
- Partnered with Piedmont Health Services to administer COVID tests and flu shots.
- Distributed over 2,500 masks to tenants.
- Continued operation of weekly food distribution.

QUARTER 3: JANUARY to MARCH 2021

- Mailed monthly newsletter to tenants.
- Held monthly Resident Council Meetings in January, February, and March
- Continued re-certification of Tenant's employment and family size.
- Continued operation of weekly food distribution.




Quarter 4: Community Engagement

- 296 Newsletters mailed each month
- 25 Newsletters sent electronically to community partners
- Resident Council convened each month
- Over 7,000 people served at weekly Food Bank Distribution
- 204 income and family size recertifications completed
- Wellness Committee information shared with tenants
- Office Assistant met regularly with Everbridge, a public communication platform created to allow for communication with tenants via automated calls and alerts.
- COVID Vaccination & Testing information sponsored by Piedmont Health shared with all tenants
- National Night Out event held in 3 Public Housing neighborhoods, staff, police and fire department present
- Distribution of Emergency Preparedness bags to ¼ of Public Housing households (other ¾ distributed in FY22 Q1)
- Two community engagement meetings held with Community Housing Partners for Trinity Re-Imagined project; a third is scheduled for December 2021.

## ** NOTES AND DEFINITIONS

HUD- U.S. Department of Housing and Urban Development

PHAS- Public Housing Assessment System- An assessment tool used by HUD to measure Public Housing Agencies uniformly and consistently.

PHAS Indicators - Four areas of Public Housing Agency operations that are inspected and rated; they are physical condition, financial condition, management, and capital fund.

Habitability Inspection: HUD conducted inspections; does not result in "grade" but does allow PHA to make corrections to any identified needs.

Liquidity- The ratio between cash and current liabilities.

- The higher the ratio, the better the score.

Adequacy of Reserves-the ratio between unrestricted resources and average monthly operating expenses

- The higher the ratio, the better the score.

Unrestricted Resources- Access to anything that can be turned into cash (unrestricted cash, tenant's security deposits, unrestricted investments)

Monthly Operating Expenses- dwelling rent expense, operating expense, and extraordinary maintenance (divided by 12 for a monthly average)

Adjusted Operated Income-the ratio between operating income and annual debt service.

Accounts Payable-the ratio between total vendor accounts payable and monthly operating expense.

- The lower the ratio, the higher the score
- Accounts payable-(both > and < than 90 days)/Monthly operating expenses

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr.
Boulevard
Chapel Hill, NC 27514

Item Overview

**Item #:** 13., **File #:** [21-0771], **Version:** 2 **Meeting Date:** 10/13/2021

**Authorize the Town Manager to Execute a Site Development Agreement with Self-Help Ventures Fund for the 2200 Homestead Road Mixed-Income Affordable Housing Development.**

**Staff:**
Sarah Osmer Viñas, Interim Director
Nate Broman-Fulks, Affordable Housing Manager
Emily Holt, Affordable Housing Development Officer

**Department:**
Housing and Community

**Overview:** This agreement authorizes the Town to temporarily convey land to Self-Help Ventures Fund while they perform and manage site development. The agreement describes the roles and responsibilities of Self-Help and the Town during site development.

☆ **Recommendation(s):**

That the Council authorize the Town Manager to execute a site development agreement with Self-Help Ventures Fund to prepare the land and infrastructure for the development of mixed income affordable housing at 2200 Homestead Road.

**Background**: The Town and its outside legal counsel at Sanford Holshouser Law Group have worked with Self-Help Ventures Fund to draft a site development agreement that confirms the roles and responsibilities of Self-Help and the Town in carrying out the site development scope for the 2200 Homestead Road project. This agreement is for the land and infrastructure preparation. Separate agreements with the housing developers - CASA, Community Home Trust, and Habitat for Humanity of Orange County - to develop the housing portions of the project will come to Council for approval in the winter/spring 2022.

The Town Council consistently reviewed and authorized the steps leading to consideration of this agreement.

- In September 2017 <http://chapelhill.granicus.com/MinutesViewer.php?view_id=21&clip_id=3233&doc_id=2307f58a-9404-11e7-8661-00505691bffa>, the Town Council designated a 14-acre parcel of Town-owned land at 2200 Homestead Road for mixed-income affordable housing and authorized the Town Manager to continue to pursue development on this site and to engage potential partners.
- In June 2018 <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=3531765&GUID=2AAB0753-D883-4117-BBFE-, the Town Council reviewed a concept plan for the development of 2200 Homestead Road.
- In November 2018 <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=3760315&GUID=212CC318-56AD-416C-A079-, the Town Council authorized the Town Manager to issue a Request for Qualifications to identify potential development partners and to begin negotiations with potential developers.
- In February 2020, the Town executed a Memorandum of Understanding with Self-Help Ventures Fund laying out the terms of negotiation for the drafting of a development agreement.
- In June 2020 <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=4563690&GUID=ADE08ABC-2155-4427-A7A8-

, Council approved $3.3M in Affordable Housing Bond funds to pay for site construction costs.
- In November 2020 <https://chapelhill.legistar.com/LegislationDetail.aspx?ID=4682752&GUID=67E829EC-E6E4-4117-849B-09126332CFA0>, Council approved $173,395 in Affordable Housing Development Reserve funding for predevelopment and site construction costs.
- On May 19, 2021 <https://chapelhill.legistar.com/LegislationDetail.aspx?GUID=3FF66E07-2362-4A7A-A8E7-F0E3EC81F28B&ID=4955855&Options=&Search=>, Council approved a conditional zoning application for the parcel, thereby approving the development of 117 mixed-income affordable housing units on the site.

**Key components of the agreement**:
- *The temporary conveyance of the 2200 Homestead Road parcel to Self-Help:* Once site development is complete, Self-Help will reconvey the land back to the Town and the Town will draft separate land conveyance and development agreements with each of the three housing developers. If the agreements between the Town and housing developers are approved by Council and executed prior to completion of site development, Self-Help could instead convey the land directly to the partner(s) in a separate land conveyance agreement.

- *The responsibilities of Self-Help in conducting site development for the project*: This includes management of the site development budget and oversight of the site development contract with the general contractor.

- *The Town's funding commitment*: The agreement references the related funding agreement between Self-Help and the Town outlining the requirements for accessing the Town approved funding for the project.

- *Coordination between the Town and Self-Help to draft development agreements with the housing developers (CASA, Community Home Trust, and Habitat for Humanity Orange County):* These agreements will provide, a project financing plan, and the land use restrictions and covenants required to provide a 99-year affordability period, among other things. Each vertical development agreement will be reviewed by Council prior to execution.

**Fiscal Impact/Resources:** The Town Council approved a $3.3 million funding award from the Town's Affordable Housing Bond in June 2020. The Council also approved $173,395 in Affordable Housing Development Reserve funding in November 2020 to fund predevelopment activities and site development costs for the project. This Site Development Agreement does not allocate any additional Town funds toward the project.

**Attachments:**

- Resolution
- Draft Staff Presentation
- 2200 Homestead Project Milestones
- 2200 Homestead Road Site Development Agreement

**A RESOLUTION AUTHORIZING THE TOWN MANAGER TO EXECUTE A SITE DEVELOPMENT AGREEMENT FOR THE 2200 HOMESTEAD ROAD MIXED INCOME AFFORDABLE HOUSING DEVELOPMENT (2021-10-13/R-18)**

WHEREAS, on September 6, 2017, the Council designated 2200 Homestead Road as a mixed-income affordable housing site and authorized the Town Manager to continue to pursue development of mixed-income affordable housing on this site and to engage potential partners in the discussions; and

WHEREAS, on June 20, 2018 the Council gave feedback on a Concept Plan for the development of 2200 Homestead Road where the exploration of development partners was identified as a key next step; and

WHEREAS, on November 28, 2018 the Council authorized the Town Manager to issue a Request for Qualifications to identify potential development partners for 2200 Homestead and to begin negotiations with potential developers; and

WHEREAS, on February 27, 2019 the Town executed a Memorandum of Understanding with Self-Help Ventures Fund to establish the terms and conditions for negotiating an agreement for 2200 Homestead Road site development; and

WHEREAS, on June 17, 2020 the Council approved $3.3M in Affordable Housing Bond funding for the 2200 Homestead Road project; and

WHEREAS, on November 4, 2020 the Council approved $173,395 in Affordable Housing Development Reserve funding for the 2200 Homestead Road project; and

WHEREAS, the Council approved the Conditional Zoning of the 2200 Homestead Rd project on May 19, 2021.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council authorizes the Town Manager to execute a site development agreement with Self-Help Ventures Fund for the 2200 Homestead Rd site, as described in the October 13, 2021 meeting materials.

This the 13th day of October, 2021.

---

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Nate Broman-Fulks, Affordable Housing Manager
Emily Holt, Affordable Housing Development Officer

RECOMMENDATION: That the Council authorize the Town Manager to execute a site development agreement with Self-Help Ventures Fund to prepare the land and infrastructure for the development of mixed income affordable housing at 2200 Homestead Road.

# 2200 Homestead Site Development Agreement

Council Presentation
October 13, 2021

# Agenda

1. Project History and Context

2. Site Development Agreement Summary

3. Discussion and Next Steps

# Council Consideration

- Authorize the Town Manager to execute a site development agreement with Self-Help for the 2200 Homestead Road affordable housing development.

# Project History

**Summer 2017**
Council Dedicates Land for Mixed Income Aff Housing

**Spring 2018**
Council Review of Concept Plan

**Spring 2020**
Council Approves AH Bond funding

2017 — 2021

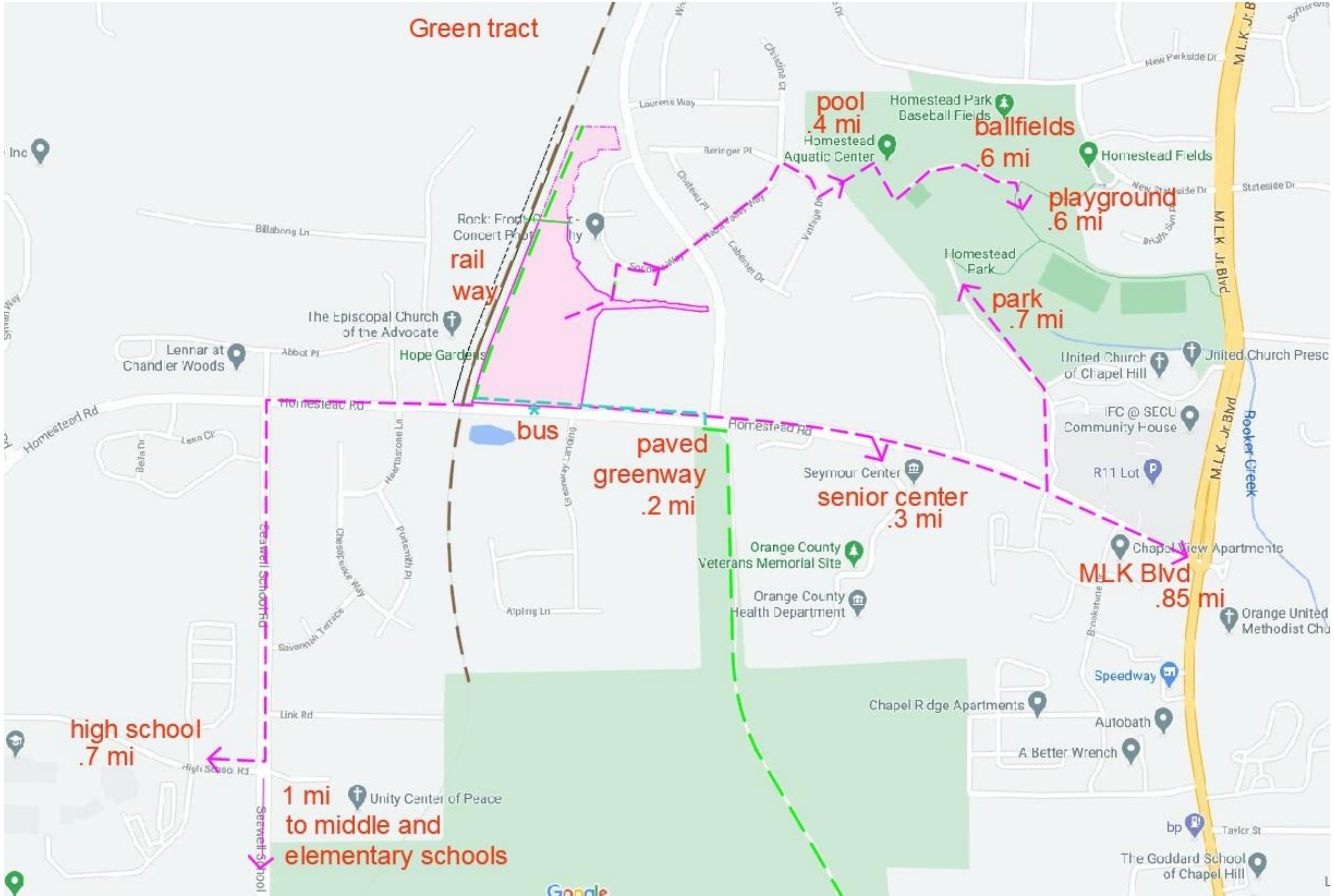
**Fall 2017-Winter 2018**
Project Visioning

**Fall 2018-Winter 2020**
Identify Development Partner, Execute MOU

Self-Help
Habitat for Humanity of Orange County
Community Home Trust
CASA

**Fall 2020-Spring 2021**
CZ Application Submission and Review, Council Approves CZD

# Site Context



# Approved Site Plan

- Site – 13 acres

- Residential Units – 115-126
  - 72 apartments
  - 27-35 townhomes
  - 18 duplexes

- Amenities include:
  - greenway trail
  - nature trails
  - central green with playground, shelter, grills
  - basketball court
  - community garden

# Site Development Agreement Summary

1. Town will temporarily convey property to Self-Help
2. Self-Help will prepare land for development of affordable units by Collaborative Developers
3. Self-Help and Town will work together to draft development agreements with Collaborative Partners for construction of affordable units

# 1. Town conveyance to Self-Help

- Conveyance to occur after contract executed with general contractor
- Once site development complete, Self-Help will reconvey site to the Town within 60 days




- If appropriate, Self-Help could convey land directly to partners

# 2. Self-Help will develop site on behalf of Town

- Manage contract with general contractor for site construction
- Scope includes preparation of land for vertical construction and new community garden

# 3. Development agreements with housing developers

- Self-Help will assist housing developers to prepare development agreements
- Contracts will include:
  - Financing Plan
  - Affordability Plan
  - Land use restrictions and covenants required, including 99-year affordability period

# Next Steps

### Fall 2021

- Execute Site Development Agreement
- Apply for final permits

### Spring 2022

- Execute contract w/ general contractor
- Convey land to Self-Help
- Obtain final approvals

★ Council considers agreements w/ housing developers

### Summer 2022

- Site construction
- Execute agreements with housing developers
- Convey land to housing developers

### Fall 2022 – Summer 2024

- Housing construction

# Council Consideration

- Adopt R-# authorizing the Town Manager to execute a site development agreement with Self-Help Ventures Fund for the 2200 Homestead Road affordable housing development.

# 2200 Homestead Site Development agreement

Council Presentation
October 13, 2021

# Next Steps

| 2200 Homestead Road Project Milestones | FY2018 | | | | FY2019 | | | | FY2020 | | | | FY2021 | | | | FY2022 | | | | FY2023 | | | | FY2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| **DEVELOPMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Council approves site development contract with Self-Help | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | |
| Land conveyance to Self-Help | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Council approves vertical development agreement(s) with vertical Collaborative partners | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | |
| Project receives final approvals and permits | | | | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Project Groundbreaking - site construction begins | | | | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Land conveyance to Vertical Partners | | | | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Vertical construction begins | | | | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Construction Complete | | | | | | | | | | | | | | | | | | | | | | | | | | | X | |

★ Council Item Scheduled
★ Council Item Heard and/or Action Taken

# Project Budget (to be populated from SHVF)

| Sources | Tentative amount ($) |
|---|---|
| Town | 3,500,000 |
| Orange County | |
| [new State funding allocation] | 2,000,000 |
| [more to come] | |
| TOTAL | |

| Uses | Tentative amount ($) |
|---|---|
| Site Development Contract, total | |
| SHVF fee | |
| [more to come] | |
| TOTAL | |

| 2200 Homestead Road Project Milestones | FY2018 | | | | FY2019 | | | | FY2020 | | | | FY2021 | | | | FY2022 | | | | FY2023 | | | | FY2024 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| **DEVELOPMENT** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Council designated land for mixed-income affordable housing | ★ | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Council reviewed concept plan | | | | ★ | | | | | | | | | | | | | | | | | | | | | | | | |
| Council authorized issuance of RFQ for development partners and negotiations with potential developers | | | | | | ★ | | | | | | | | | | | | | | | | | | | | | | |
| Town executes MOU w/ Self-Help as leader of the Homestead Housing Collaborative development team | | | | | | | | | | | ✓ | | | | | | | | | | | | | | | | | |
| Council approved $3.3M in AH bond funding to site construction costs | | | | | | | | | | | | ★ | | | | | | | | | | | | | | | | |
| Council approved $173,395 in AHDR funding for predevelopment and site construction costs | | | | | | | | | | | | | | ★ | | | | | | | | | | | | | | |
| Council approved Conditional Zoning District | | | | | | | | | | | | | | | | ★ | | | | | | | | | | | | |
| Council approves site development agreement with Self-Help | | | | | | | | | | | | | | | | | | ★ | | | | | | | | | | |
| Self-Help executes contract w/ site construction contractor | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Land conveyance to Self-Help | | | | | | | | | | | | | | | | | | | X | | | | | | | | | |
| Council approves development agreement(s) with housing partners | | | | | | | | | | | | | | | | | | | | ★ | | | | | | | | |
| Project receives final approvals and permits | | | | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Groundbreaking - site construction begins | | | | | | | | | | | | | | | | | | | | X | | | | | | | | |
| Land conveyance to vertical partners | | | | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Vertical construction begins | | | | | | | | | | | | | | | | | | | | | X | | | | | | | |
| Construction complete | | | | | | | | | | | | | | | | | | | | | | | | | | | X | |

★ **Council Item Scheduled**
★ **Council Item Heard and/or Action Taken**

Last updated 10-7-2021 by Emily Holt, Town of Chapel Hill

Prepared by and return after recording to:

Brian L. Crawford
Robert M. Jessup Jr.
Sanford Holshouser LLP
209 Lloyd St., Suite 350
Carrboro, NC 27510

**PINs – 9870912947**

**Brief description – 2200 Homestead Road, Chapel Hill**

# Agreement for
# <u>2200 Homestead Road Site Development</u>

**THIS AGREEMENT** is dated as of __________, 2021, and is between the Town of Chapel Hill, a North Carolina municipal corporation (the "Town"), and Self-Help Ventures Fund ("SHVF"), a North Carolina nonprofit corporation.

## *Introduction and Purpose*

The Town owns a parcel of approximately 14 acres at 2200 Homestead Road, Chapel Hill, as more specifically described in Attachment A (the "Site"). In September 2017, the Town dedicated the Site for mixed-income affordable housing, with a focus on providing affordable homes, and requested staff to pursue development. In 2019, the Town accepted a proposal from SHVF, as part of the development team they assembled and refer to as the Homestead Housing Collaborative, to develop the Site as a residential community serving a range of incomes and providing a variety of housing types for homeownership and rental.

This Agreement states the Parties' definitive and binding agreement with respect to SHVF's role in the undertaking to manage Site construction on behalf of the Town.

*Unless the context clearly requires otherwise, capitalized terms used in this Agreement and not otherwise defined have the meanings set forth in Attachment B.*

**NOW, THEREFORE,** for and in consideration of the mutual promises and covenants contained in this Agreement, the Parties agree as follows:

## 1. The Town will convey the Site to SHVF.

**A. <u>Conveyance and acceptance</u>.** The Town will convey the Site to SHVF, for valuable consideration the receipt of which is hereby acknowledged, and SHVF agrees to accept the conveyance under the terms and conditions of this Agreement. The Town is making this conveyance under its statutory authority North Carolina General Statute 160A-279 to convey property to nonprofit organizations carrying out a public purpose and its authority to enter into agreements with private entities to provide housing for persons of low and moderate income.

**B. <u>Termination prior to Closing</u>.** The Town will have no further obligation to convey the Site if the Town has not approved the Site Development Contract by July 1, 2022, with time being of the essence for this purpose. SHVF can terminate this Agreement at any time before the Closing Date for any reason. If under this Section either this Agreement expires or SHVF terminates this Agreement, then neither Party will have any further rights or obligations under this Agreement.

**C. <u>Closing; Special Warranty Deed</u>.** The Town will convey the Site to SHVF by a special warranty deed in form and substance acceptable to both Parties (the "Deed"). The Town will deliver the Deed to SHVF at such time and place within Orange or Durham Counties, North Carolina as SHVF may designate, but SHVF must give the Town five Business Days' notice of the time and place for delivery. In no event will the Town be required to deliver the Deed less than 30 days after the Town's approval of the Site Development Contract. The delivery and acceptance of the Deed are referred to in this Agreement as the "Closing," and the date and time of acceptance are referred to as the "Closing Date."

**D.** **<u>Conditions for closing</u>.** The Town must receive the following items, in form and substance reasonably acceptable to the Town, at or prior to the Closing, as conditions to the Town's obligation to complete the Closing.

1. The Site Development Contract in a form previously approved by the Town, signed by both SHVF and the Site Contractor.

2. The payment and performance bonds called for in Section 2A.2 d.

3. The final Budget referenced in Section 2B.2.

4. The executed Funding Agreement referenced in Section 2B.

5. An agreement by SHVF to reconvey the Site to the Town for no additional consideration at either Party's request (A) within 60 days after the Completion Date or (B) any time on or after the date which is twelve (12) months after the issuance of building permits for the Site Development Contract Work (the "Deadline") if the Completion Date has not previously occurred. The Parties agree that time is of the essence with respect to the dates and timelines specified in this subsection. This agreement to reconvey may be included in the Deed or in a separate agreement as the Parties may agree.

6. The recording of any land use restrictions or covenants related to the overall Site development plan that the Town deems desirable to be in place prior to Closing. These restrictions or covenants will be designed to provide for long-term use of the Site for affordable housing without regard to any specific requirements or obligations of the Collaborative Developers.

**E.** **<u>Delivery of information</u>.** Within ten Business Days after the Effective Date, the Town will deliver to SHVF at the address set forth in Section 6(a) (or make available for SHVF's convenient examination and copying) copies of all the following materials relating to the Site in the Town's possession:

1. Any policies of title insurance issued in favor of the Town or the Town's predecessors in title for any portion of the Site.

2. Any land surveys of any portion of the Site.

3. Any permits, zoning stipulations, agreements, or requirements that affect or that are proposed to affect any portion of the Site.

In addition, the Town will provide to SHVF any information or materials relating to the Site of the same or similar nature to the foregoing coming into the Town's possession or control throughout the term of this Agreement. The Town represents that all such deliveries are being made in good faith, but the Town makes no further representation or warranty, expressed or implied, as to the accuracy or completeness of those documents.

**F.** **Risk of loss.** The Town will bear the risk of loss or damage to the Site until the Closing, except as otherwise provided for in this Agreement.

**G.** **No brokers.** The Town and SHVF represent, one to the other, that it has not dealt with any broker, finder, or other agent in connection with the transaction contemplated by this Agreement. To the extent permitted by law, each party will indemnify, defend, protect, and hold the other harmless from and against any and all claims incurred by the other party by reason of any breach or inaccuracy of the representation contained in this Section.

**H.** **Closing costs.** The Town will pay for the preparation of the Deed, and for all other documents necessary to perform the Town's obligations under this Agreement. SHVF will pay for any title insurance, recording fees for the Deed and any other recordable documents described by this Agreement. Each party is responsible for its own legal fees and costs. As the Site is currently exempt from real estate taxes, there will be no pro-ration payment for real estate taxes.

**I.** **Post-closing obligations.** After Closing, the Town and SHVF will cooperate with one another, at reasonable times and on reasonable conditions, to prepare, execute and deliver documents necessary to fully carry out the intent and purposes of this Agreement. Except for such instruments as the Parties were originally obligated to deliver by the terms of this Agreement, such cooperation will be without additional cost or liability to the Party from which such cooperation is sought.

# 2. SHVF will develop the Site on behalf of the Town for the purpose of passing it to other Collaborative Developers

## A. Site development contract

SHVF will plan, design, build and otherwise carry out the Project. SHVF will act in consultation with the Town and under the terms and conditions of this Agreement, but SHVF has the right and responsibility to manage the Project. SHVF's responsibilities will include the following:

1. SHVF has selected, and the Town hereby approves, WeaverCooke to be the site contractor (the "Site Contractor").

2. SHVF will provide for the preparation of the Site Development Contract, and then will enter into the Site Development Contract with the Site Contractor. The Site Development Contract will be subject to the Town's reasonable approval, but the Site Development Contract must in any event include the following terms and conditions:

    a. For the Site Development Contract to be a guaranteed maximum price contract and may allow for change orders to the scope of work.

    b. For the scope of work for Site Development to be consistent with the Zoning Compliance Permit issued by the Town. The scope for preparing the new site for relocation of Hope Gardens includes: mobilization, erosion control, clearing and grubbing, grading, fine grading, driveway apron, and laying gravel in the parking lot for up to six regular parking spaces (the "Hope Gardens Work"). Notwithstanding the foregoing, the Parties acknowledge and agree that SHVF shall have no obligation to include the Hope Gardens Work in the Site Development Contract if (a) the cost of such work exceeds $95,000; or (b) the final Budget does not include sufficient resources for completing such work.

c. For the Project to be complete not later than the Deadline. SHVF shall notify Town as far in advance as is possible of any anticipated delays beyond the Deadline.

d. For the Site Contractor to provide payment and performance bonds in favor of the Town as would apply if the Town were contracting for work on a public contract covered by Chapter 143 of the North Carolina General Statutes.

e. For the Site Contractor to proceed in a good and workmanlike manner, and to keep the Project free of defects and the Site free of mechanics', materialmen's, and similar liens.

f. For the Site Contractor to maintain general liability, workers compensation, builders' risk and other insurance as the Town may reasonably require, and for those coverages to be subject to such terms and conditions, and extensions of coverage to the Town, as the Town may reasonably specify.

g. For contractors' warranties to be assigned to the Town upon the completion of the Site Contractor's work.

4. SHVF will on its own apply and obtain all permits, entitlements and planning approvals required according to municipal and county ordinances. SHVF will present to the Town the finished contractor documents when the Project is complete. SHVF will at all times carry and maintain, or cause the Contractor to carry and maintain, with responsible carriers general liability insurance in amounts reasonably acceptable to the Town from time to time, with the Town as an additional insured with respect to occurrences at the Site. SHVF will promptly notify the Town of the Completion Date.

## B. <u>Project Budget; Change Orders.</u>

1. The Town and SHVF will agree on a Project budget (the "Budget"). The Budget will show in reasonable detail (a) all primary categories of Project Costs, except that all amounts to be paid under the Site Development Contract may be shown

as a single entry, and (b) all sources of Project funding. Either Party may request additional information concerning items of funding or expense.

2. Attachment D shows a tentative Budget, but the Parties are not bound by this Exhibit in completing the final Budget. SHVF acknowledges that the Town intends to contribute not more than $3,500,000 toward Project Costs. SHVF has no obligation to fund Project Costs beyond sources identified in the Project Budget.

3. SHVF has primary responsibility to manage the Project and the Budget to secure completion of the Project within the Budget, in accordance with the agreed-upon scope of work, and by the Deadline.

4, If the Site Contractor requests a change to the Site Development Contract (a) that does not modify the original scope of such contract and (b) the cost of which does not exceed remaining contingency (a requested "Change Order"), SHVF shall either (a) deny the Change Order or (b) approve the Change Order and provide notice to the Town of the requested Change Order. If the Change Order requires an increase in Project funding, SHVF must also notify the Town of the sources of funding to be made available to resolve that increase.

5. If the Site Contractor requests a change to the Site Development Contract (a) that modifies the original scope of such contract or (b) the costs of which exceeds remaining contingency (a requested "Scope Change Order"), SHVF shall either (a) deny the Scope Change Order or (b) notify the Town of the requested Scope Change Order and SHVF's recommendation that it be approved. If the Scope Change Order requires an increase in Project funding, SHVF must also notify the Town of the sources of funding to be made available to resolve that increase. Within five Business Days of its receipt of the notice and recommendation of a Scope Change Order, the Town Manager (or the Manager's designee) must notify SHVF of either (a) the Town's approval of the Scope Change Order or (b) the Town's reasons, in brief and general terms, for not approving the Scope Change Order or for referring the Scope Change Order for consideration by the Town Council at the next Council meeting for which the agenda has not yet been distributed. If the Town fails to deliver a notice as contemplated under (b), then the Town will be deemed to have approved the Scope Change Order, except that no Scope Change Order that increases the Town Maximum Contribution will be effective without the Town's express consent.

6. The Town grants the Town Manager (or the Manager's designee) full authority to provide approval, or not, under this Section. The Town Manager, in the Manager's discretion, may refer any Scope Change Order to the Town Council for the Town Council's consideration.

7. If conditions require amendments to the Site Development Contract or the Budget, beyond approved Change Orders, the Parties shall negotiate in good faith to amend the Site Development Contract, the Town Maximum Contribution or other aspects of the Budget as possible. Either Party may invoke the provisions of Section 5D for the consideration of any required amendments.

**C. Disbursement of Town Payments.** The Town will make payments toward Project Costs pursuant to a separate Funding Agreement between the Town and SHVF. This agreement will be based on a form commonly used by the Town for similar project payments.

## 3. SHVF and the Town will work together on Development Contracts.

SHVF and the Town expect that when the Project is complete, SHVF and the Town will provide for portions of the Site to be conveyed in separate transactions to the Collaborative Developers. The Site will be conveyed to the Town. If appropriate the Site may be conveyed directly in portions to the Collaborative Developers, as the Town and SHVF may agree as the Project nears its conclusion.

SHVF is the lead member of the Homestead Housing Collaborative and will have primary responsibility for coordination and leadership of its members. As lead member, SHVF will assist each Collaborative Developer to work with the Town to prepare and deliver a Collaborative Development Contract in form and substance reasonably acceptable to both parties. Each Collaborative Development Contract will include at least the information contemplated in Attachment C. The Parties acknowledge that land conveyance to a Collaborative Developer shall not occur until the Town's Collaborative Development Contract with such Developer is effective and includes at least the terms set forth in Attachment C. Once the Collaborative Development Contract are executed and SHVF delivers the Site, the Collaborative Developers will be solely responsible for their vertical construction commitments made in their agreements with the Town. SHVF has no responsibility or obligation with respect to the performance by any Collaborative Developer of its respective Collaborative Development Contract.

## 4. Representations and warranties of the Parties

### A. By SHVF

SHVF makes the following statements of fact, with the understanding and intent that the Town will rely on these statements in making its decision to enter into this Agreement:

(a) SHVF is duly organized, validly existing, and in good standing under the laws of North Carolina.

(b) SHVF has full power and authority to execute and deliver this Agreement and to perform its obligations under this Agreement.

(c) SHVF has duly executed and delivered this Agreement. Assuming due authorization, execution and delivery of this Agreement by the Town, this Agreement constitutes a valid, legal and binding obligations of SHVF, enforceable in accordance with its terms, subject to bankruptcy, insolvency and other similar laws affecting the enforcement of creditors' rights generally and such principals of equity as a court having jurisdiction may impose.

(d) SHVF is solvent, is able to pay its ordinary debts and expenses as they become due, and is not currently the defendant in any bankruptcy, insolvency or similar proceeding under federal or state law.

(e) SHVF has not been barred from participation in any program of federal, state or local assistance for projects or undertakings of the sort contemplated by this Agreement.

(f) Neither the execution and delivery of this Agreement, nor the fulfillment of or compliance with its terms and conditions, nor the consummation of the transactions contemplated by this Agreement, results in any material breach of the terms, conditions and provisions of any agreement or instrument to which SHVF is now a party or by which either is bound, or constitutes a default under any of the foregoing.

(g) There is no litigation or other court or administrative proceeding pending or threatened against SHVF (or against any SHVF official in an official capacity) affecting SHVF's rights to execute or deliver this Agreement or to comply with its obligations under this Agreement.

(h) SHVF hereby agrees to indemnify, protect and save the Town (including its affiliates), any Council member, member, director, officer, agent or employee thereof, harmless from all liability, obligations, losses, claims, damages, actions, suits, proceedings, costs and expenses, including reasonable attorneys' fees, actually incurred, arising out of, connected with, or resulting, directly or indirectly, from SHVF's acts or omissions in completion of the Project, including, without limitation, the possession, condition, construction or use of the Site or the actions of any Site Contractor or its agents, employees and contractors. The indemnification arising under this paragraph shall continue in full force and effect notwithstanding the termination of this Agreement, or any other agreement, document or instrument related to the Project to which SHVF and the Town are Parties. SHVF is not required to indemnify the Town under this paragraph for claims that arise solely from the Town's gross negligence or willful misconduct.

(i) No SHVF representation, covenant or warranty in this Agreement is false or misleading in any material respect.

(j) SHVF will promptly notify the Town of any matter that affects the accuracy of any representation and warranty under this Section, including any change in conditions or any receipt of any notice, action, or other information SHVF receives relating to any representation or warranty under this Section.

(k) SHVF will not cause or knowingly permit any action to be taken that will cause any of the foregoing representations or warranties to be untrue on or prior to

Closing, and all of SHVF's representations and warranties under this Agreement will be as of the Closing as though those representations or warranties were made then.

**B. By the Town**

The Town makes the following statements of fact, with the understanding and intent that SHVF will rely on these statements in making its decision to enter into this Agreement:

***Generally –***

(a) The Town is a duly organized and validly existing municipal corporation of the State of North Carolina. The Town will take no action that would adversely affect its existence as a municipal corporation in good standing in the State of North Carolina.

(b) The Town has all powers necessary to enter into the transactions contemplated by this Agreement and to carry out its obligations under this Agreement.

(c) The Town has duly and validly authorized, executed and delivered this Agreement. Assuming due authorization, execution and delivery of this Agreement by SHVF, this Agreement constitutes a valid, legal and binding obligation of the Town, enforceable in accordance with its terms, subject to bankruptcy, insolvency and other similar laws affecting the enforcement of creditors' rights generally and such principals of equity as a court having jurisdiction may impose.

(d) The Town requires no further approval or consent from any governmental authority with respect to the Town's entering into or performing under this Agreement.

(e) Neither the execution and delivery of this Agreement, nor the fulfillment of or compliance with its terms and conditions, nor the consummation of the transactions contemplated by this Agreement, results in any material breach of the terms, conditions and provisions of any agreement or instrument to which the Town is now a party or by which either is bound, or constitutes a default under any of the foregoing.

(f) There is no litigation or other court or administrative proceeding pending or threatened against the Town (or against any Town official in an official capacity) affecting the Town's rights to execute or deliver this Agreement or to comply with its obligations under this Agreement.

(g) No Town representation, covenant or warranty in this Agreement is false or misleading in any material respect.

***With respect to the Site and its title --***

1. The Town holds fee simple title to the Site, free and clear of any and all easements, covenants, conditions, or other encumbrances.

2. The Town is in sole and exclusive possession of the entire Site, and no other person or entity claims any right to possess all or any portion of the Site.

3. No options, rights of first refusal, or other agreements are in effect to purchase or to lease any interest in the Site or any part thereof.

4. The Site is currently exempt from *ad valorem* taxes and is expected to remain tax exempt provided it is developed for affordable housing as planned.

5. The Town is not a "foreign person" within the meaning of the Internal Revenue Code, as amended, Sections 1445 and 7701 or the regulations promulgated thereunder.

6. The Town is not a person with whom U.S. persons or entities are restricted from doing business under regulations of the Office of Foreign Asset Control (the "OFAC"), of the Department of the Treasury (including those named on OFAC's Specially Designated and Blocked Persons List) or under any statute, executive order (including the September 24, 2001, Executive Order Blocking Site and Prohibiting Transactions with Persons Who Commit, Threaten to Commit, or Support Terrorism)

7. The Town has no knowledge of any violation of Environmental Laws (as defined below) related to the Site or the presence or release of Hazardous Materials (as defined below) on or from the Site except as previously disclosed to SHVF in the following reports:

[List by date, title, and contractor; will include existing asbestos report]

The term “Environmental Laws” includes without limitation the Resource Conservation and Recovery Act and the Comprehensive Environmental Response Compensation and Liability Act and other federal laws governing their implementing regulations and guidelines as of the Effective Date, and all state, regional, county, municipal, and other local laws, regulations and ordinances that are equivalent or similar to the federal laws recited above or that purport to regulate Hazardous Materials. The term “Hazardous Materials” includes petroleum, including crude oil or any fraction thereof, natural gas, natural gas liquids, liquified natural gas, or synthetic gas usable for fuel (or mixtures of natural gas or such synthetic gas), asbestos and asbestos containing materials and any substance, material waste, pollutant or contaminant listed or defined as hazardous or toxic under any Environmental Law. The representations and warranties contained in this paragraph will survive Closing for so long as is permitted by applicable law.

***In addition*** **--**

The Town will promptly notify SHVF of any matter that affects the accuracy of any representation and warranty under this Section, including any change in conditions or any receipt of any notice, action, or other information the Town receives relating to any representation or warranty under this Section.

The Town will not cause or knowingly permit any action to be taken that will cause any of the foregoing representations or warranties to be untrue on or prior to the Closing, and all of the Town’s representations and warranties under this Agreement will be true as of the Closing as though those representations or warranties were made then.

## 5. Defaults and Remedies; Dispute Resolution

**A. Defaults.** A Party is in default under this Agreement if it fails to (i) complete the Project, (ii) make required payments, (iii) perform any other obligation under this Agreement, or if it (iii) dissolves, or is subject to a declaration of involuntary or voluntary bankruptcy, or if (v) any warranty, representation or statement in this Agreement or in any other document executed or delivered in connection herewith is found to be incorrect or misleading in any material respect on the date made.

**B.** **<u>Remedies</u>.** Whenever any Event of Default has occurred and has not been remedied within fifteen (15) days of receipt of written notice describing such default, the non-defaulting Party may take either or both of the following remedial steps:

i. At its option, cure the default by paying money or taking any other appropriate action, in which case the defaulting Party must reimburse the non-defaulting Party for all costs and expenses reasonably incurred in curing the default.

ii. Take whatever action at law or in equity may appear necessary or desirable to collect the amounts then due and thereafter to become due, to enforce performance and observance of any obligation, agreement or covenant of a Party under this Agreement, and to recover legal fees and other expenses incurred in pursuing and enforcing any remedy

iii. Any amounts owed to a non-defaulting Party under this Section will bear interest payable by the defaulting Party, from the date of the non-defaulting Party's payment, at the annual rate of 4.00%, calculated based on a 360-day year consisting of twelve 30-day months.

**C.** **<u>No remedy exclusive; other provisions.</u>** No remedy conferred or reserved in this Agreement is intended to be exclusive, but the remedies are instead intended to be cumulative. No delay or omission to exercise any right or power accruing upon any default constitutes a waiver of that right or power. A waiver of any default is limited to the default so waived and does not waive any other default.

**D.** **<u>Dispute resolution</u>.** In the event of a dispute between the Parties concerning the terms or performance of this Agreement, the Parties will take the following steps prior to commencing any proceeding before a court or administrative body:

1. <u>Exchange of positions</u>. Any Party noting a dispute under this Agreement will notify the other Party of the nature of the dispute and the first Party's pro-

posed resolution. Within ten days after the notice date, the other Party must respond in writing as to its view of the dispute and its position on the proposed resolution.

2. Meet and confer. If the Parties are unable to reach an agreement on the dispute and upon notice from any Party, the Parties will promptly hold a meeting attended by representatives with appropriate authority to resolve the dispute. At this meeting, the Parties will attempt in good faith to negotiate a resolution of the dispute.

3. Mediation. If the dispute remains unsettled by negotiation, the Parties will engage the services of a professional mediator certified by the Dispute Resolution Commission as a Superior Court mediator and agreed upon by the Parties. The Parties will then attempt in good faith to resolve the dispute through mediation. The Town and SHVF will each pay one-half of the mediator's fees and expenses, and each Party will pay all its own legal fees and other expenses related to the mediation. Each Party must be represented at the mediation by a representative with appropriate authority to resolve the matters in dispute. Only after mediation may a Party initiate legal or administrative proceedings.

## 6. Additional Provisions

**a. Notices.** (i) Any communication provided for in this Agreement must be in English and must be in writing. Under this Agreement, "writing" includes facsimile transmission and electronic mail.

(ii) For the purposes of this Agreement, any communication sent by facsimile transmission or electronic mail will be deemed to have been given on the date the communication is similarly acknowledged by the Town Manager or the director of the Town's office of Housing and Community, (in the case of the Town), or other authorized representative (in the case of SHVF). No such communication will be deemed given or effective without such an acknowledgment.

(iii) Any other communication under this Agreement will be deemed given on the delivery date shown on a United States Postal Service certified mail receipt, or a delivery receipt (or similar evidence) from a national commercial package delivery service, if addressed as follows:

A) If to the Town, to the Town of Chapel Hill Manager, Re: Notice under 2021 2200 Homestead Road Agreement, 405 Martin Luther King Jr. Blvd., Chapel Hill, NC 27514

B) If to SHVF, to Self-Help Ventures Fund, Attn: Real Estate Team Leader, 301 W. Main Street, Durham NC 27701

(iv) The Town will send a copy of any notice sent to SHVF to Self-Help Ventures Fund, Attn: General Counsel, 301 W. Main Street, Durham NC 27701, but no failure or defect in this second notice affects the validity of a notice otherwise deemed given to the address shown in (iii)(B) (or any successor address designated under (iv) below).

(v) Any addressee may designate additional or different addresses for communications by notice given under this Section to each of the others, but in no event is a Party required to give notice to more than one addressee for the notice to be otherwise effective under this Section.

(vi) Whenever this Agreement requires the giving of a notice, the person entitled to receive the notice may waive the notice, in writing. The giving or receipt of the notice will then not be a condition to the validity of any action taken in reliance upon the waiver.

**b. Each Party will bear its own costs.** Each Party will bear its own costs of the fees and expenses of its counsel and consultants, and of the studies or surveys required under this Agreement or that it otherwise commissions or obtains for its use under this Agreement.

**c. Limitation on liability of officers and agents.** No officer, agent or employee of the Town will be subject to any personal liability or accountability because of the execution of this Agreement, or any other documents related to the transactions contemplated by this Agreement. Those officers, agents or employees will be deemed to execute documents in their official capacities only, and not in their individual capacities. This provision does not relieve any officer, agent or employee from the performance of any official duty provided by law.

**d.** **No assignment.** Neither Party may assign any of its rights or obligations under this Agreement without the express consent of the other.

**e.** **Amendments.** Neither this Agreement, nor any provision hereof may be changed, waived, discharged, modified or terminated orally, but only by an instrument in writing signed by the Party against whom enforcement is sought.

**f.** **Further instruments.** Upon a Party's request, the other Party will execute, acknowledge and deliver any further instruments reasonably necessary or desired to carry out more effectively the purposes of this Agreement or any other document related to the transactions contemplated by this Agreement.

**g.** **Governing law.** The Parties intend that North Carolina law will govern this Agreement and all matters of its interpretation. To the extent permitted by law, the Parties agree that any action brought with respect to this Agreement must be brought in the North Carolina General Court of Justice in Orange County, North Carolina.

**h.** **Time not of the essence**. The Parties agree that time is not of the essence with respect to the deadlines and other limits of this Agreement, except where expressly stated.

**i.** **Not a partnership**. This Agreement describes and defines an arm's-length contract between the Town and SHVF. The Town and SHVF are not partners or otherwise participants in a joint venture.

**j.** **Entire agreement.** This Agreement constitutes the entire agreement between the Town and SHVF with respect to its general subject matter.

**k.** **No third-party beneficiaries.** There are no persons or entities intended as third-party beneficiaries of this Agreement. No person or entity, including the Collaborative Developers, is intended to have any rights to enforce any rights or obligations under this Agreement, other than the Town, SHVF and their respective successors and assigns.

**l.** **Counterparts.** This Agreement may be executed in several counterparts, including separate counterparts. Each will be an original, but all of them together constitute the same instrument.

**m.** **Recording allowed**. Either Party may provide for this Agreement to be recorded in the office of the Register of Deeds of Orange County, North Carolina.

**n.** **Execution; Effective date.** This Agreement will become effective as of the last date and time indicated on the signature page for a signature (the “Effective Date”). If the Agreement has not become effective, however, prior to ___________, 2021, then any offer represented by the first Party’s signature is automatically revoked, and no Party has any further rights or obligations under this Agreement. Each Party must promptly give notice of its execution to the other Party.

***Attachments –***

A – Site description
B – Definitions; rules of interpretation
C – Development Contract components
D – Tentative Project Budget

***[The remainder of this page has been left blank intentionally.]***

**IN WITNESS WHEREOF,** the Town and SHVF have caused this Agreement to be executed and delivered by duly authorized officers.

**(SEAL)**

**TOWN OF CHAPEL HILL, NORTH CAROLINA**

**ATTEST:**

______________________________
Sabrina Oliver
Town Clerk

By: ________________________
Maurice Jones
Town Manager

Date and time: ______________

**STATE OF NORTH CAROLINA;**
**ORANGE COUNTY**

I,___________________________, a Notary Public of such Town and State, certify that Sabrina Oliver and Maurice Jones personally came before me this day and acknowledged that they are the Town Clerk and the Town Manager, respectively, of the Town of Chapel Hill, North Carolina, and that by authority duly given and as the act of such Town, the foregoing instrument was signed in the Town's name by such Town Manager, sealed with its corporate seal and attested by such Town Clerk.

**WITNESS** my hand and official stamp or seal, this _____ day of __________, 2021.

**[SEAL]**

___________________________
Notary Public

My commission expires: ___________

[Agreement for 2200 Homestead Road Site Development, dated as of ___________, 2021]

**IN WITNESS WHEREOF,** the Town and SHVF have caused this Agreement to be executed and delivered by duly authorized officers.

**(SEAL)**
**ATTEST:**

______________________________

Printed name: _____________________

Title: _____________________

**SELF-HELP VENTURES FUND**

By: __________________________

Printed name: _____________________

Title: _____________________

Date and time: ______________

**STATE OF NORTH CAROLINA;**
**ORANGE COUNTY**

I, a Notary Public of such Town and State, certify that ___________ and ___________ personally came before me this day and acknowledged that they are the ___________ and the ___________, respectively, of Self Help Ventures Fund, a corporation, and that by authority duly given and as the act of such corporation, the foregoing instrument was signed in the corporation's name by such ___________, sealed with its corporate seal and attested by such ___________.

**WITNESS** my hand and official stamp or seal, this _____ day of _________, 2021.

**[SEAL]**

___________________________
Notary Public

My commission expires: ___________

[Agreement for
2200 Homestead Road Site Development,
dated as of __________, 2021]

# Attachment A – Legal description of Site

[To come]

# Schedule B -- Definitions; Rules of Interpretation

***Definitions.*** For all purposes of this Agreement, unless the context requires otherwise, the following terms have the following meanings.

"Budget" means the budget for the sources of uses of Project Funds referenced in Section 2B1.

"Business Day" means any day other than a day that Town offices have previously been scheduled to be closed.

"Closing" and "Closing Date" have the meanings assigned in Section 1C.

"Collaborative Developer" or "Developers" means the partners under the Memorandum of Understanding dated February 27, 2020 with the Town and SHVF, and specifically means CASA, Community Home Trust, and Habitat for Humanity of Orange County.

"Collaborative Development Contract" means an agreement between a Collaborative Developer and the Town for the vertical development of a portion of the Site as contemplated by Section 3.

"Completion Date" means the first date substantially all Project is complete.

"Deadline" means the deadline for Project completion as designated in Section 1D5.

"Deed" means the deed to convey the Site to SHVF referenced in Section 1C.

"Effective Date" has the meaning assigned in Section 6(n).

SHVF or the Town may be referred to individually as a "Party" and together as the "Parties."

“Hope Gardens” or “” Hope Gardens Work” means the specific work and site relocation that support the nonprofit and student run Hope Gardens.

“Project” means the preparation of the Site to make it suitable for the vertical development contemplated by the Introduction, including carrying out the work contemplated by Site Development Contract.

“Project Costs” means all costs of carrying-out of the Project, including the costs of the design, planning, constructing, acquiring, installing, equipping of improvements to the Project. “Project Costs” includes sums required to reimburse SHVF for advances made for any costs otherwise described in this definition, and all financing costs.

“Site”” means the parcel of approximately 14 acres located at 2200 Homestead Road, as more particularly described in Attachment A.

“Site Contractor” means any firm obligated to carry out any portion of the Project under the Site Development Contract.

“Site Development Contract” means any and all contracts between SHVF and one or more third party Site Contractors to carry out any portion of the Project.

“Town Maximum Contribution” means $3,500,000, as the maximum amount the Town intends to pay toward Project Costs.

***Rules of Interpretation.*** Unless the context otherwise requires,

(a) An accounting term not otherwise defined has the meaning assigned to it in accordance with generally accepted accounting principles, and any accounting term should be understood to include any successor term or other new term with a substantially equivalent function.

(b) Unless otherwise indicated, references to Sections and Attachments are to the Sections and Attachments of this Agreement.

(c) Words importing the singular will include the plural and vice versa, and words importing any gender will include all other genders.

(d) The headings on sections and articles are solely for convenience of reference. They do not constitute a part of this Agreement, nor should they affect its meanings, construction or effect.

(e) Reference to any statute or regulation should be understood to include any successor provision.

(f) The use of the term “including” should in all cases be understood to mean “including, without limitation.”

**Attachment C – required contents of Collaborative Developer Agreements**

Each Collaborative Developer Agreement will be between the Town and a Collaborative Developer. It will include at least the information specified in this Attachment, and such other provisions as the Town may require or accept.

1. Name of developer entity, relationship to Collaborative member, and organization chart

2. A list of all its project team members including architects, civil engineer and legal counsel that will be involved in the transactions. This section includes any knowledge of proposed management entities or agents working on the collaborative member's project. The Town may require additional information on the identity and qualifications of organizations or individuals.

3. Proposed development program for the Site, including schematic design, development timeline, and physical descriptions such as number and square footage of each dwelling unit, bedroom and bathroom count for each unit, footprints of all proposed buildings, description of amenities, number and location of parking stalls, pedestrian and vehicular circulation, and allowances for access roads, utilities, setbacks and other site plan elements required by the Town's development standards.

4. Project financing plan: The financing plan will illustrate the developer's plan for how to finance the approved development plan, including the sources, amounts and timing of different funding sources and the sources and uses of funds. Each financing plan must also specify the terms of any expected Town financial participation. The financing plan must disclose all fees and all amounts paid to entities under common control. The financing plan must also include a 30-year pro forma of the development's financial performance and show provisions for adequate reserves for routine maintenance and capital repairs.

5. An undertaking to provide the Town with an as-built Survey and other as-built construction documents.

6. Affordability plan, stating each Collaborative Developer's program to insure extended long-term affordability consistent with that Developer's expertise and role in the overall collaborative. For example:

    **CASA** will finance, construct, own, and manage affordable multifamily rental units targeting households between 0% and 80% of AMI. CASA is expected to partner with the UNC Horizons program to designate a portion (approximately 34 units in a single building) of the multifamily units for participants and/or graduates of the Horizons program. There are expected to be approximately 74 total multifamily rental units developed by CASA.

    **Habitat for Humanity** will finance, construct, market, and sell approximately 18 affordable duplex units (9 buildings, each with two units) targeted to households earning between 30% and 80% of AMI, with the majority of units targeted to households below 60% AMI.

    **Community Home Trust** will finance, construct, market, and find residents for approximately 26 affordable townhomes targeted to households earning between 65% and 115% of AMI. The vast majority of these units will be available for sale to first-time homebuyers; a small number of units may be used as affordable rentals serving households under 65% AMI.

7. Appropriate land use restrictions and covenants governing both the behavior of the Collaborative Developer and the land to provide for the Town's typical 99-year affordability period consistent with the affordability plan. The restrictions covenants will be in place prior to fee simple conveyance to the Collaborative Developer.

8. Appropriate representations and warranties from the Collaborative Developer as to such matters as existence and good standing, proper authorization, financial and technical capability, absence of litigation or conflict with other agreements, lack of debarment, and other customary matters.

9. Indemnification by the Developer of the Town with respect to all activities at the Developer's portion of the Site after conveyance.

10. Designation of appropriate project contact for decision making purposes. Additional provisions for notices, resolution of disputes and similar matters.

# Attachment D – Draft Project Budget

***Sources of funds***
*All sources are committed unless indicated otherwise.*

| Source | Tentative amount ($) |
|---|---|
| Town of Chapel Hill Affordable Housing Bond | 3,300,000 |
| Town of Chapel Hill AHDR | 170,000 |
| Orange County Affordable Housing Bond | 1,500,000 |
| Community Project Funding, Rep. Price *(anticipated)* | 1,871,349 |
| **TOTAL** | 6,841,349 |

***Uses of funds***
*Numbers shown are preliminary and subject to change based on construction cost escalations and other unforeseen project costs that may arise.*

| Use | Tentative amount ($) |
|---|---|
| Site Development Costs | 4,943,236 |
| Contribution to Hope Gardens Site Costs | 95,000 |
| Hard Cost Contingency | 988,647 |
| Design, Survey, & Geotech Testing | 289,435 |
| Other Soft Costs | 203,776 |
| Developer Fee | 321,255 |
| **TOTAL** | 6,841,349 |

*Last updated October 1, 2021 by Self-Help Ventures Fund staff.

# TOWN OF CHAPEL HILL

Town Hall
405 Martin Luther King Jr. Boulevard
Chapel Hill, NC 27514

## Item Overview

**Item #:** 14., **File #:** [21-0772], **Version:** 1 **Meeting Date:** 10/13/2021

**Concept Plan Review: 5500 and 5502 Old Chapel Hill Road.**

See the Summary Report on the next page.

**The Agenda will reflect the text below and/or the motion text will be used during the meeting.**

PRESENTER: Corey Liles, Principal Planner

a. Review of process
b. Presentation by the applicant
c. Comments from the Community Design Commission
d. Comments from the public
e. Comments and questions from the Mayor and Town Council
f. Motion to adopt a resolution transmitting Council comments to the applicant.

RECOMMENDATION: That the Council adopt the resolution transmitting comments to the applicant.

# CONCEPT PLAN REPORT

**CONCEPT PLAN REVIEW: 5500 AND 5502 OLD CHAPEL HILL ROAD (PROJECT #21-055)**

**SUMMARY REPORT**

TOWN OF CHAPEL HILL PLANNING DEPARTMENT
Colleen Willger, Director
Judy Johnson, Assistant Director

| PROPERTY ADDRESS | MEETING DATE | APPLICANT |
|---|---|---|
| 5500 and 5502 Old Chapel Hill Road | October 13, 2021 | CJT, PA, on behalf of EB Capital Partners |

**STAFF RECOMMENDATION**

That the Council adopt the resolution transmitting comments to the applicant regarding the proposed development.

**PROCESS**

- The Council will hear the applicant's presentation, receive comments from the Community Design Commission, Housing Advisory Board, and Stormwater Utility Management Advisory Board, hear public comments, and offer suggestions to the applicant.
- Because this review is a Concept Plan submittal, statements by individual Council members this evening do not represent an official position or commitment on the part of a Council member with respect to the position he or she may take when and if the Council considers a formal application.
- The Community Design Commission reviewed a concept plan for this site on September 28, 2021.
- The Housing Advisory Board reviewed a concept plan for this site on September 14, 2021.
- The Stormwater Utility Management Advisory Board reviewed a concept plan for this site on September 28, 2021.

**DECISION POINTS**

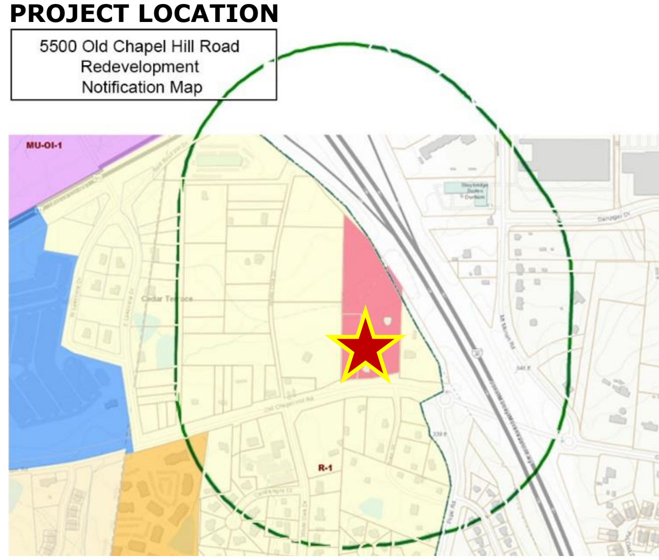
- The site is located in the North 15-501 Corridor Area of the Future Land Use Map (FLUM).
- The FLUM identifies multifamily residential as one of the primary land uses.

**PROJECT OVERVIEW**

This approximately 6.5-acre site is located on the north side of Old Chapel Hill Road, just to the west of Interstate 40 (I-40). The site is zoned Residential-1 (R-1). There are currently a single-family dwelling unit and several outbuildings on the property.

The applicant proposes to construct a 90-unit, four-to-five story apartment building and 126 parking spaces. The plan shows the portion of the parcel south of the stream being developed as part of this proposal. The proposal does not propose any encroachment into the stream buffer.

**PROJECT LOCATION**




**ATTACHMENTS**

1. Concept Plan Report
2. Draft Staff Presentation
3. Resolution A, transmitting comments to the applicant
4. Advisory Board recommendations (*to be attached*)
5. Applicant Materials

## LONG-RANGE PLANS EVALUATION

# 5500 and 5502 Old Chapel Hill Road

The following report provides an evaluation by Planning Staff of the Concept Plan site, based on long-range planning considerations.

| PROPERTY ADDRESS | APPLICANT | CURRENT ZONING DISTRICT |
|---|---|---|
| 5500 and 5502 Old Chapel Hill Road | Wendi Ramsden<br>CJT, PA | Residential-1 (R-1) |

| EXISTING LAND USE | PROPOSED LAND USE |
|---|---|
| Vacant / Undeveloped | Multifamily Residential |
| **SURROUNDING PROPERTIES – EXISTING LAND USES**<br>I-40 freeway (North/East), Single-family residence (East, West, and South) | |
| **FUTURE LAND USE MAP (FLUM) FOCUS AREA**<br>North 15-501 Corridor | **FLUM SUB-AREA**<br>A |

**OTHER APPLICABLE ADOPTED PLANS**

☒ Mobility and Connectivity Plan

☒ Parks Comprehensive Plan

☒ Greenways Master Plan

☒ Chapel Hill Bike Plan

☒ Cultural Arts Plan

☒ Stormwater Management Master Plan

☒ Climate Action and Response Plan ***(NEW)***

☐ West Rosemary Street Development Guide

☐ Central West Small Area Plan

**SUMMARY OF PLAN CONSIDERATIONS AFFECTING SITE**

Map excerpts on following pages demonstrate the Plan Considerations listed below. The location of 5500 Old Chapel Hill Road is marked with the ★ symbol.

### Future Land Use Map (FLUM)

- The project is located in the North 15-501 Corridor Sub-Area A.
- Multifamily Residential is identified as one of the appropriate Primary land uses.
- Typical Height in the Sub-Area is 4-6 stories.
- Transitional Area is on the south side of the site.

### Mobility and Connectivity Plan

- NC Department of Transportation is nearing completion of a project to upgrade Old Chapel Hill Road with pedestrian and bicycle facilities.

### Parks Comprehensive Plan

- The site does not fall within a Community Park or Neighborhood Park Service Area.
- No additional Neighborhood Parks or Community Parks are proposed in the vicinity of the site.

### Greenways Master Plan

- The applicant should **coordinate with Chapel Hill Parks & Recreation** for the latest information on trail alignment, design, and construction timing.

### Chapel Hill Bike Plan

- Mapping of future bike facilities in the Bike Plan is superseded by the Mobility and Connectivity Plan. The Bike Plan provides some additional detail on facility design.

## Cultural Arts Plan

- No opportunities for integrating public art are identified at locations that impact the site.

## Stormwater Management Master Plan

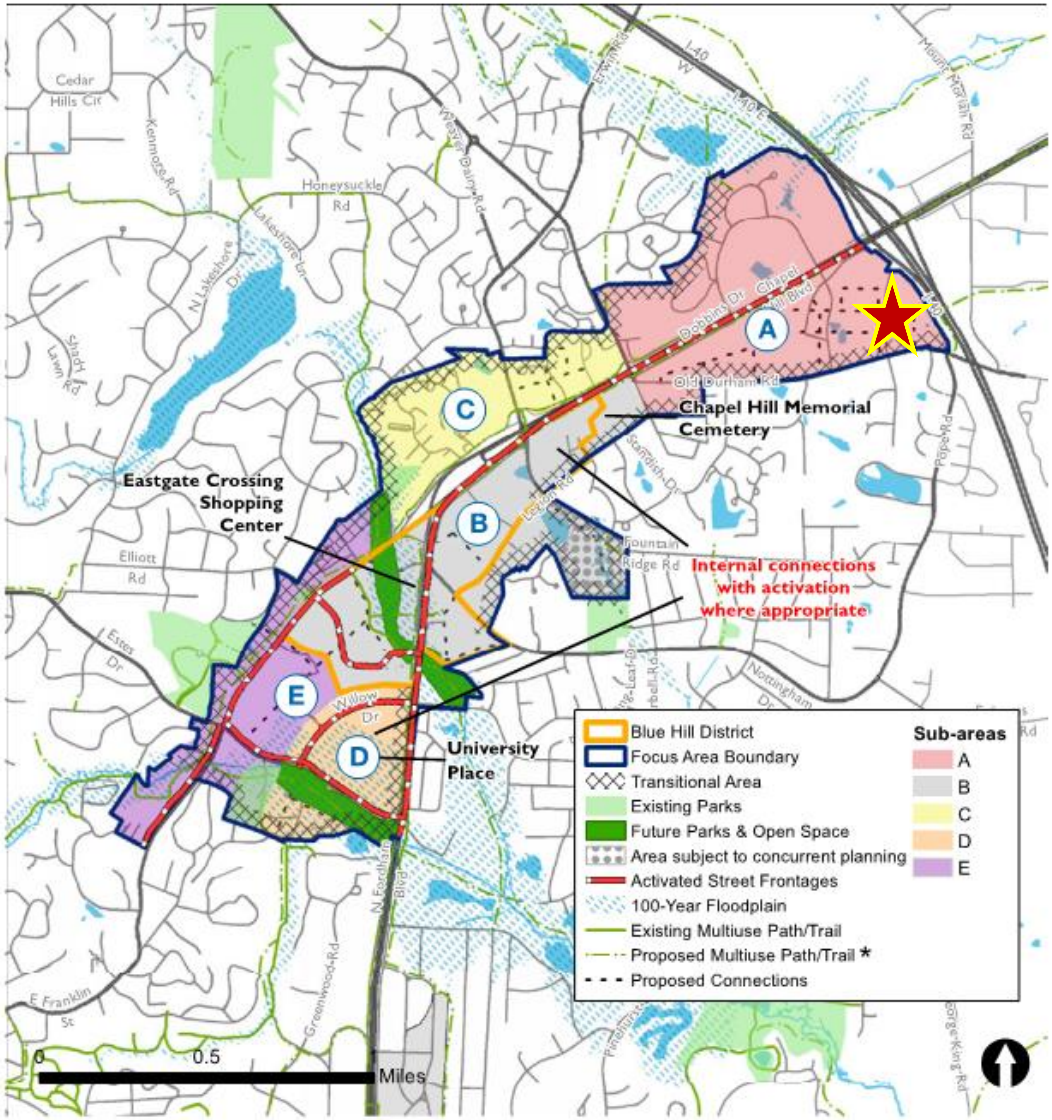
- The site is mostly located in the Clark Lake 1 (JL1) Basin. The applicant should **coordinate with Chapel Hill's Stormwater Management Division** to understand relevant stormwater considerations.

## Climate Action and Response Plan *(NEW)*

*(Note: no map excerpt provided, as the Plan is generally text-based)*

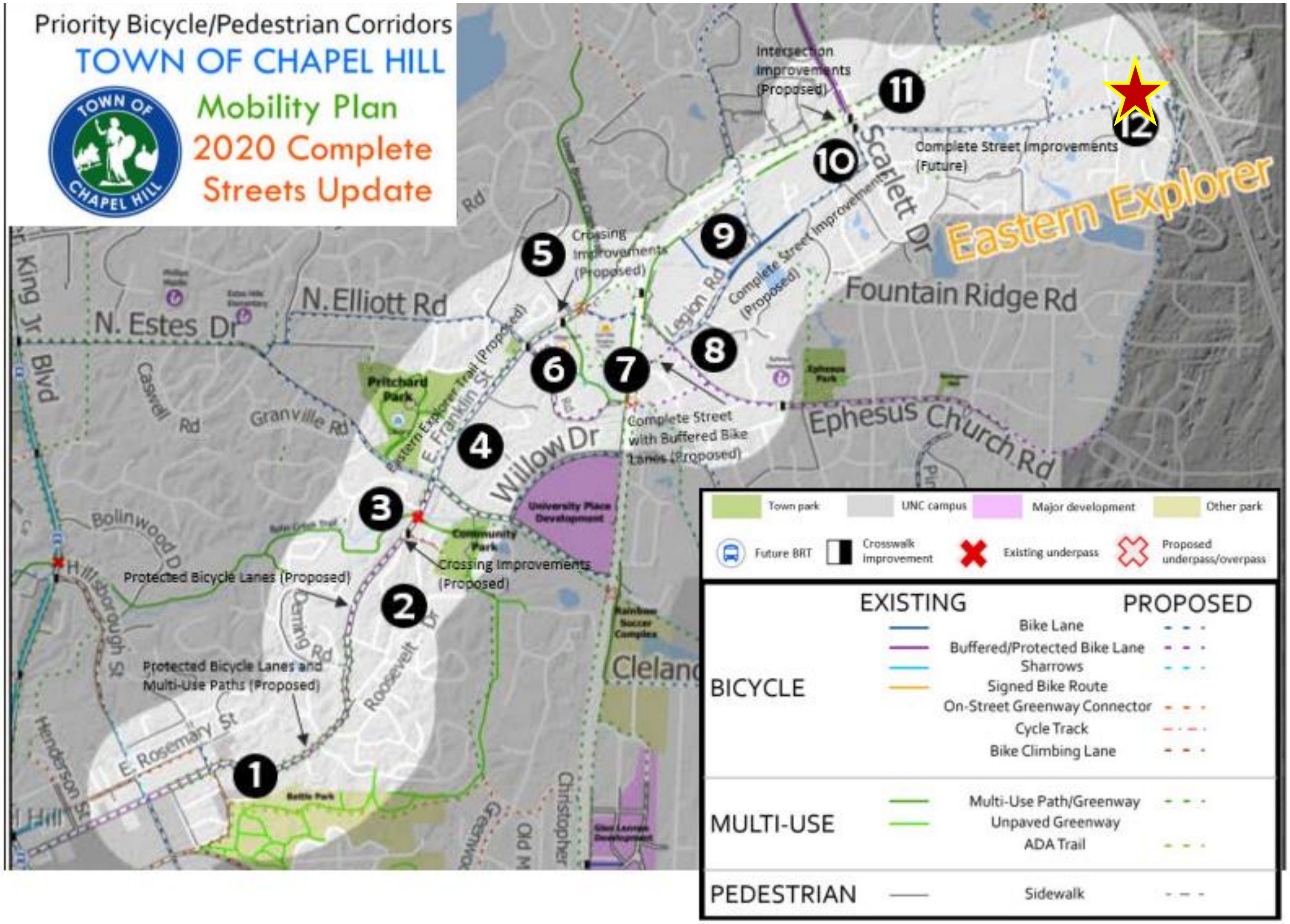
- Developing the site in accordance with the Future Land Use Map and Mobility Plan would contribute to the following Plan actions:
  - Create walkable, bikeable, transit-served neighborhoods
  - Increase bicycling, walking, and transit use
- Conditions for development could contribute to the other actions in the plan such as:
  - Net-zero emissions for new construction
  - Create a town-wide EV charging station network
  - Protect water quality, natural, and agricultural resources
  - Enhance green infrastructure

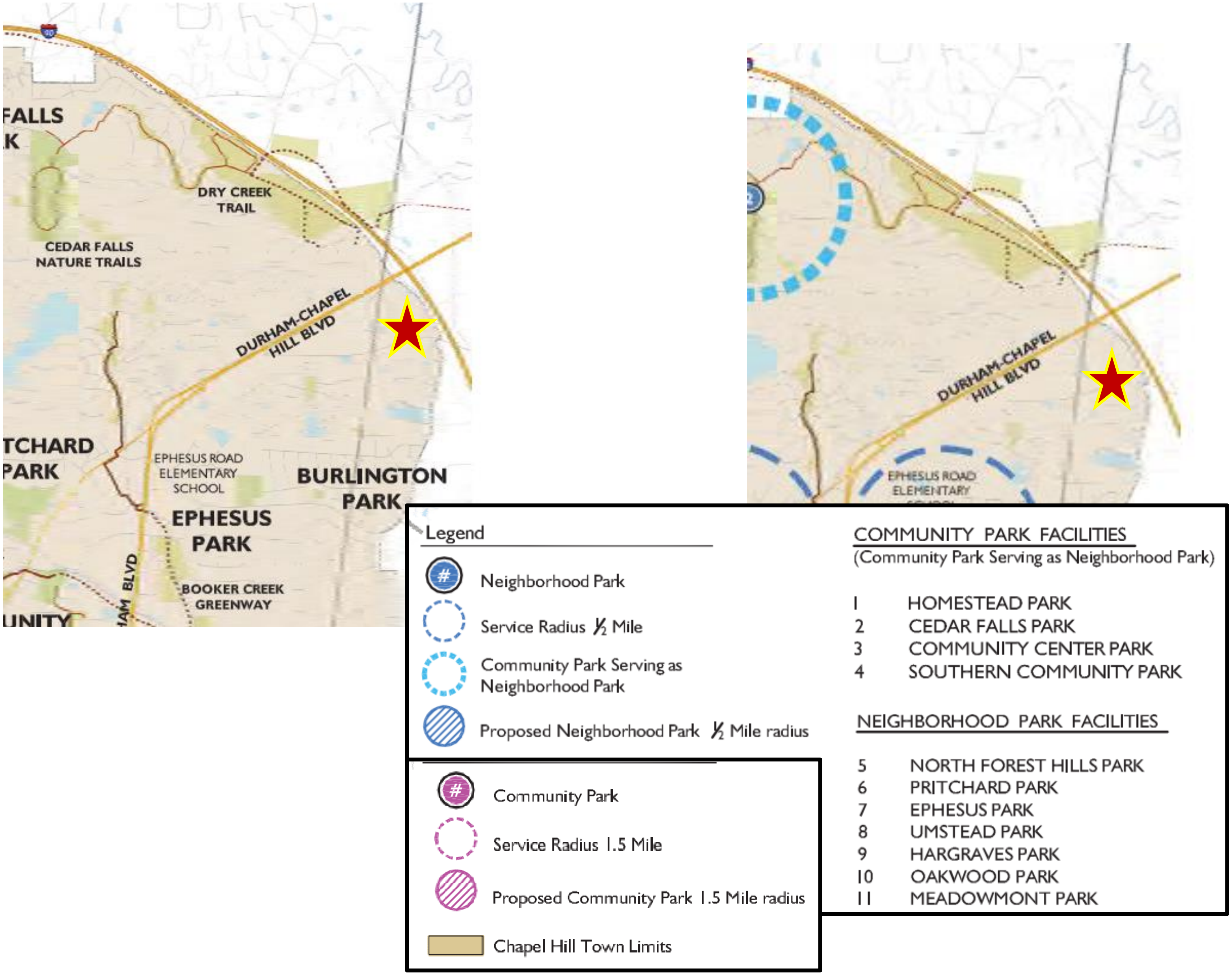
**Future Land Use Map (Excerpt)**



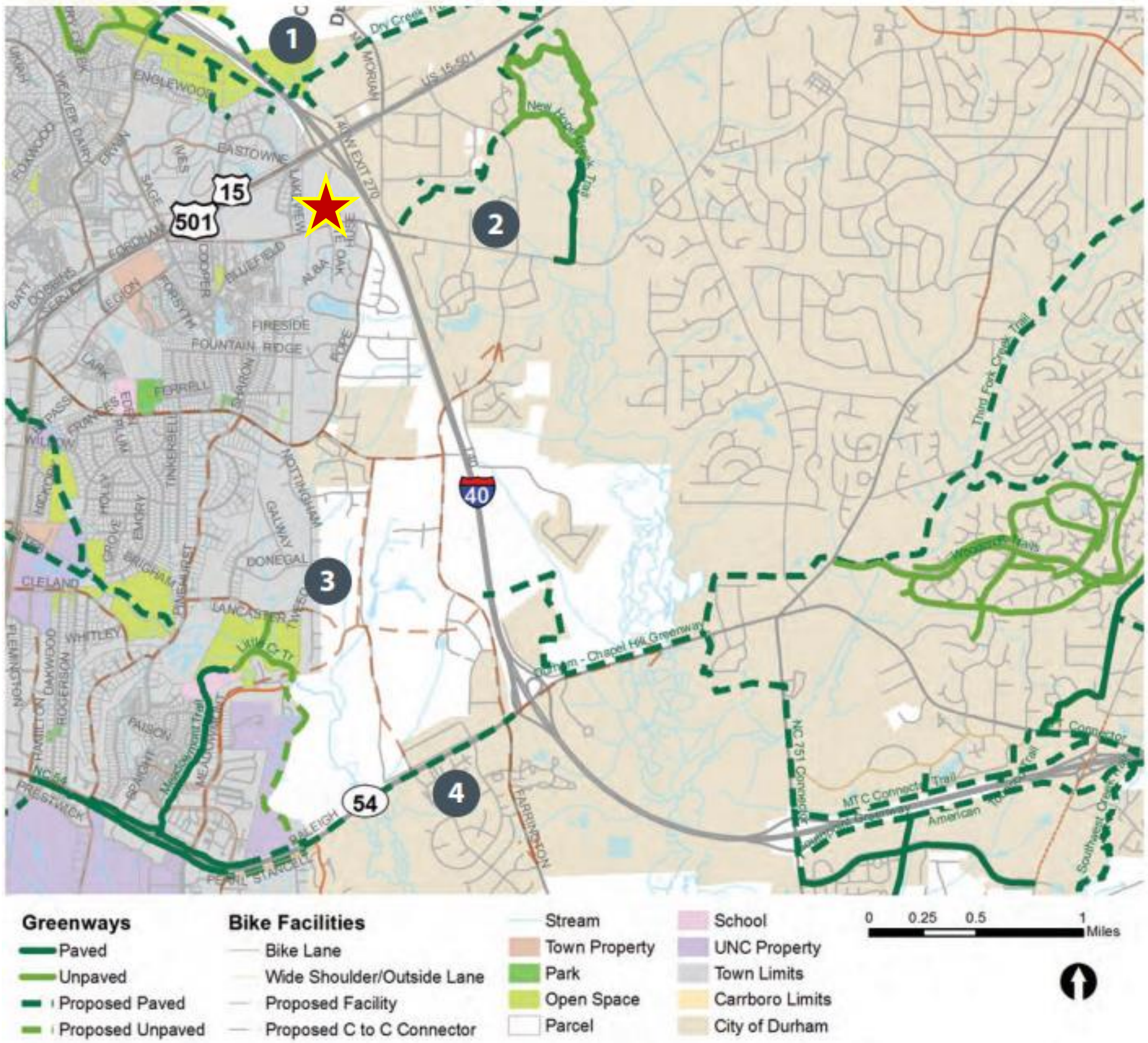

* See Mobility Plan for more information about proposed multi-modal improvements

**Mobility and Connectivity Plan (Excerpt)**




FALLS
K
DRY CREEK
TRAIL
CEDAR FALLS
NATURE TRAILS
DURHAM-CHAPEL
HILL BLVD
TCHARD
PARK
EPHESUS ROAD
ELEMENTARY
SCHOOL
BURLINGTON
PARK
EPHESUS
PARK
BOOKER CREEK
GREENWAY
UNITY
DURHAM-CHAPEL
HILL BLVD
EPHESUS ROAD
ELEMENTARY
Legend
Neighborhood Park
Service Radius ½ Mile
Community Park Serving as
Neighborhood Park
Proposed Neighborhood Park ½ Mile radius
Community Park
Service Radius 1.5 Mile
Proposed Community Park 1.5 Mile radius
Chapel Hill Town Limits
COMMUNITY PARK FACILITIES
(Community Park Serving as Neighborhood Park)
1 HOMESTEAD PARK
2 CEDAR FALLS PARK
3 COMMUNITY CENTER PARK
4 SOUTHERN COMMUNITY PARK
NEIGHBORHOOD PARK FACILITIES
5 NORTH FOREST HILLS PARK
6 PRITCHARD PARK
7 EPHESUS PARK
8 UMSTEAD PARK
9 HARGRAVES PARK
10 OAKWOOD PARK
11 MEADOWMONT PARK

**Greenways Master Plan (Excerpt)**



**Cultural Arts Plan (Excerpt)**


**Stormwater Management Master Plan (Excerpt)**

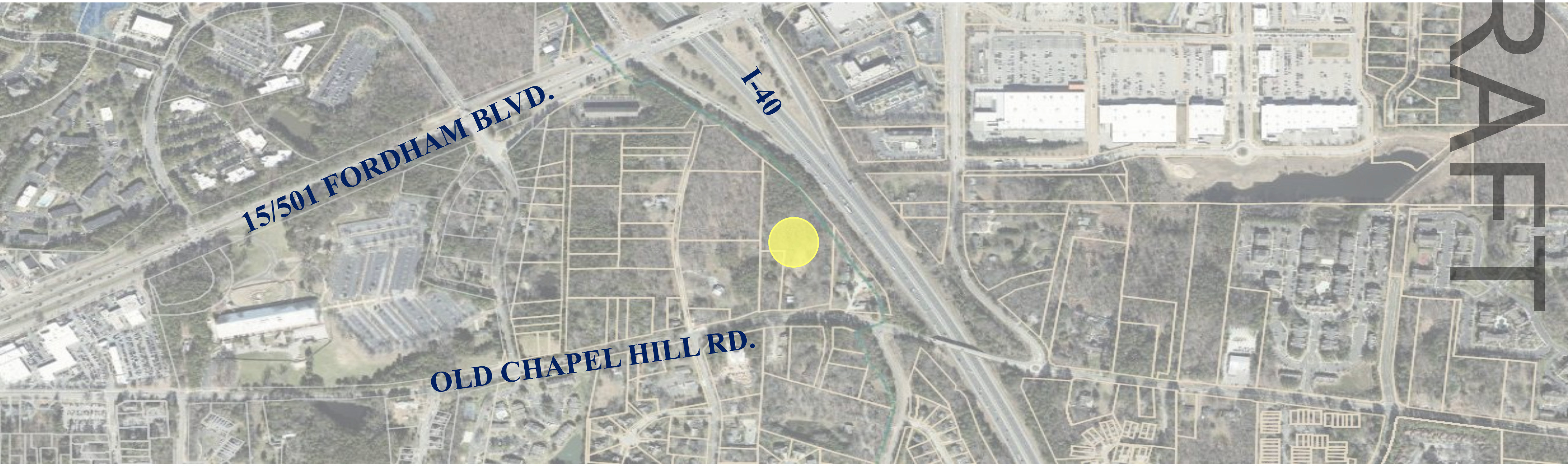
# Council

CONCEPT PLAN
10/13/2021

DRAFT

## 5500 Old Chapel Hill Road

5500/5502 Old Chapel Hill Rd . Chapel Hill, NC . 27514



# RECOMMENDATION

- Adopt Resolution, transmitting comments to the Applicant regarding the proposed development

# CONCEPT PLANS

- No Decision; Feedback Only
- Applicant provides a rough sketch
- Staff does not conduct a formal review of concept plans
- Sketch is forwarded to advisory boards for preliminary feedback

DRAFT

# PROCESS OVERVIEW

Concept Plans

- Special Use Permit
- Conditional Zoning
- Development Agreement

DRAFT

# PROJECT SUMMARY

- Existing Zoning-R1
- Multi-Family Res.
- Approx. 90 Units
- Approx. 126 Parking
- Recreational Amenities

DRAFT

# KEY POINTS-*Evaluation*

- 15/501 N. Future Focus Area

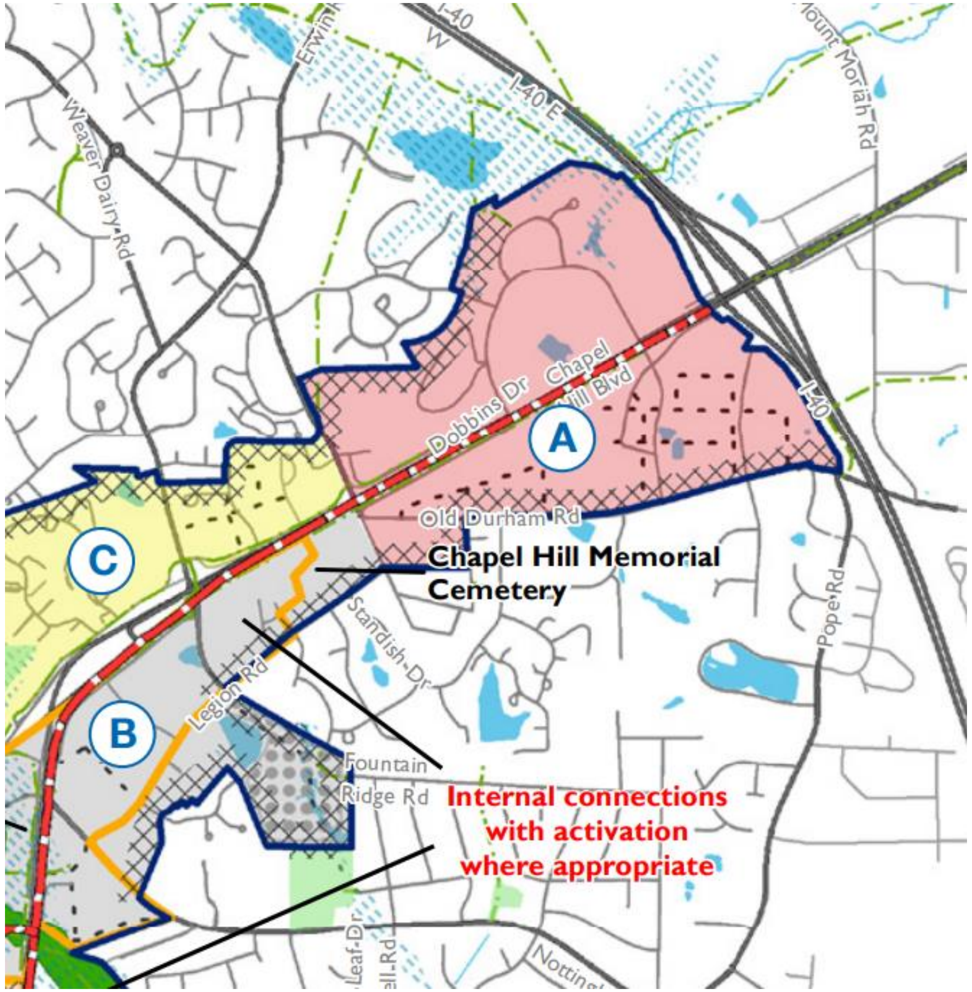
  *-Sub Area A*

  *-Multifamily, shops, offices & commercial/office*

  *-Parks and Green/Gathering Spaces*

  *-Townhouse and Residences*

  *-Typical Height 4-6 stories*



# RECOMMENDATION

- Adopt Resolution, transmitting comments to the Applicant regarding the proposed development


DRAFT

**A RESOLUTION TRANSMITTING COUNCIL COMMENTS ON A CONCEPT PLAN FOR 5500 AND 5502 OLD CHAPEL HILL ROAD (PROJECT #21-055) (2021-10-13/R-19)**

WHEREAS, a Concept Plan has been submitted for review by the Council of the Town of Chapel Hill for 5500 and 5502 Old Chapel Hill Road, further identified by Durham County Parcel Identifier Numbers 0709-01-09-7325 and 0709-01-09-8651; and

WHEREAS, the Council has the opportunity tonight to hear this applicant's presentation, receive a set of comments from the Community Design Commission, the Stormwater Management Utility Advisory Board, and the Housing Advisory Board, hear public comments, and offer suggestions to the applicant; and

WHEREAS, the Council has heard presentations from the applicant and members of the public; and

WHEREAS, statements by individual Council members this evening are not an official position or commitment on the part of a Council member with respect to the position he or she may take when and if a formal application for development is subsequently submitted to the Council for formal consideration; and

WHEREAS, the Council has discussed the proposal, with Council members offering reactions and suggestions.

NOW, THEREFORE, BE IT RESOLVED by the Council of the Town of Chapel Hill that the Council transmits comments to the applicant regarding this proposal, as expressed by Council members during discussions on October 13, 2021 and reflected in minutes of that meeting.

This the 13th day of October, 2021.

# CONCEPT PLAN APPLICATION

Parcel Identifier Number (PIN): 0709-01-097325 / 0709-01-09-8651

Date: 26 July 2021

## Section A: Project Information

Project Name: 5500 Old Chapel Hill Road

Property Address: 5500 and 5502 Old Chapel Hill Road

Zip Code: 27707

Use Groups (A, B, and/or C): A

Existing Zoning District: R-1

Project Description: 90 unit apartment building with 126 parking spaces and recreational amenities

## Section B: Applicant, Owner and/or Contract Purchaser Information

**Applicant Information** (to whom correspondence will be mailed)

Name: CJT, PA Attn: Wendi Ramsden

Address: 111 W Main Street

City: Durham State: NC Zip Code: 27701

Phone: 919-682-0368 Email: wramsden@cjtpa.com

The undersigned applicant hereby certifies that, to the best of his knowledge and belief, all information supplied with this application is true and accurate.

Signature: Wendi Ramsden Date: 7.26.2021

**Owner/Contract Purchaser Information:**

☐ **Owner** ☒ **Contract Purchaser**

Name: EB Capital Partners, Attn: Ernest Brown

Address: 100 Silers Fen Court

City: Chapel Hill State: NC Zip Code: 27517

Phone: 202-586-3062 Email: ebrown@ebcapitalpartners.com

The undersigned applicant hereby certifies that, to the best of his knowledge and belief, all information supplied with this application is true and accurate.

Signature: Date:

# 5500 Old Chapel Hill Road

## Concept Plan Application 26 July 2021

Response to Project Summary Questions

1. Would this project demonstrate compliance with the Comprehensive Plan?
   - Small Area Plan – *N/A*
   - Overall Zone – *Yes* / NCD - *N/A*
   - Study Area – *N/A*
   - Land Use Plan – *Complies with the guidelines and design as characterized for the North 15 501 Corridor Focus Area as described in the Future Land Use Map / Charting Our Future report December 2020*

   *The site is within Town limits.*

2. Would the proposed project comply with the Land Use map?

   *Yes, the project complies with the December 2020 Future Land Use report.*

3. Would the proposed project require a rezoning?

   *Yes.*

4. What is the proposed zoning district?

   *Existing zoning is R-1.*
   *Zoning to accommodate multi-family residential at a density of 14 units/ac and an FAR of .482 could be OI-3.*

5. Would the proposed project require modifications to the existing regulations?

   *It is expected that the applicant would ask for modifications to the street landscape buffer. There would also be modification request for disturbance of steep slopes. There is only 1,300 sf of steep slope on site broken up into 7 areas. The largest steep slope area is about 600 sf. The project would disturb 75% of the steep slopes.*

6. If there is a residential component to the project, does the applicant propose to address affordable housing?

   *The entire project will be residential. The developer is expected to offer some percentage of the units as affordable and workforce. The developer has reached out to the Town's housing staff, and expects to meet with them prior to the board presentations.*

   a. Has the applicant presented its concept plan to the Housing Advisory Board?
      *No. This will happen during the concept plan review process.*

b. Has the applicant met with appropriate Town staff to discuss affordable housing policy, expectations, and options?
*The developer has reached out to the Town housing department and has an appointment to meet with them about policy, expectations, and options prior to the Housing Advisory Board presentation.*

c. Is the project for ownership or rental?
*Rental.*

7. Are there existing conditions that impact the site design (i.e. environmental features such as RCD, slopes, erosion and sedimentation, retention of trees and tree stands, stormwater drainage patterns, significant views into and out of the site)?

   *Yes.*

   *There is an existing intermittent stream on site, running west to east. The associated RCD is 50' each side of the stream. This zone effectively divides the property in two, with the southern portion slightly larger than the northern portion.*

   *There are many utilities along the frontage – overhead power lines, underground stormwater lines, and water utilities, all with associated easements.*

8. Has the applicant addressed traffic impact? Traffic and circulation issues?

   *Traffic impacts will be assessed at the time of formal conditional zoning application. Recent improvements have been made to Old Chapel Hill Road with the addition of the round-about at Pope, widening of the street, and addition of sidewalks to the east.*

9. How is the application compatible with he surrounding neighborhood and/or district?
   *The project is compatible with the Town's initiatives for development in the North 15 501 Corridor focus area.*

10. Has the applicant discussed the project with adjacent neighbors?

    *The contract purchaser has not formally spoken with adjacent landowners.*

# 5500 Old Chapel Hill Road

## Concept Plan Application 26 July 2021

### Developer's Program

The project includes a 90-unit 4-5 story apartment building with 126 parking spaces. The building will be an urban style apartment with access through a central lobby space and units accessed off interior corridors. The design will include a mix of materials such as brick and aluminum storefronts on the ground level, and a mix of fiber cement board and batten siding along with metal on the upper floors. The building will be 4 stories facing Old Chapel Hill Road and will take advantage of slope to add a lower level on the north side of the building. That lower level will be the location for the leasing office and indoor amenities. The project will also include exterior site amenities such as a pool, dog park, disc golf, and walking trails. The residential units will all be accessed from interior corridors on the top four floors.

The project is accessible to public transit and also close to I-40 for easy access for commuters. The service functions (for example trash collection) will be handled inside the lower level of the building.

The northeastern portion of the parcel fronts the highway (I-40) – that portion of the site is intended to remain undeveloped but will be used for recreation, and the full 100'wide landscape buffer will be satisfied with retained tree coverage. The development will be contained in the southern portion of the site, accessible from Old Chapel Hill Road. The site frontage is almost 360 lf, and two driveways are planned on that frontage.

The site is served by a Chapel Hill Transit route which will carry passengers into downtown Chapel Hill.

The property is a rectangular parcel approximately 6.5 acres in size with a stream and related buffer running west to east through the center.

The current concept includes plans for the development of the approximately 4 acres south of the stream and related buffer zone. There are no current plans to develop the 2.5 acres of buildable area north of the stream but that may be developed in the future in a compatible use, or as adjacent parcels develop and provide access. As part of the current development plan, nature trails or a disc golf course may be incorporated into the forest area north of the stream, and would be field located to avoid grading, large tree removal, and tree clearing in general. Pedestrian creek crossing would be made by stepping stones or by low flow crossing strategies.

A pond stormwater management facility will be constructed to handle runoff from the development and will meet the current storm management requirements.

The RCD zones will remain forested and the minimum requirement of 30% tree coverage will be exceeded by existing forest to remain. It is expected that approximately 35% of the site will remain forested, and additional canopy and understory trees will be added in the design. West, south and eastern required buffers would be 10’-20’ wide and the project design includes constructed buffers to meet the internal buffer requirements. The buffer along the I-40 frontage would be 100’ wide and is expected to remain in forest.

## Statement of Compliance with Comprehensive Plan

The proposed residential project is being designed to comply with the Chapel Hill Comprehensive Plan, and with the Future Land Use Map (FLUM).

The main applicable concepts from the Comprehensive Plan are Community Choices, and Sustainability.

**Community Choices:**
The project will provide small apartments in an urban style building. This gives Town residents a choice of apartment style living which is not garden-style walk up, but a more urban framework. The building will be an urban style corridor loaded facility with interior amenities as well as site recreation facilities. This facility will be marketed to young professionals and empty nesters. Because the majority of units are 1-bedroom, it is unlikely to attract families or student populations.

**Sustainability:**
This apartment project will take advantage of dense development to concentrate site disturbance and allow for a greater amount of forest to remain, as well as staying out of RCD zones on site.

**Charting Our Future Guiding Principals**

The following principals are identified in the Town’s Land Use Initiative published in December 2020.

1. Demonstrate the Town’s commitment to effectively respond to the threats associated with climate change as well as environmental stewardship and resiliency.
2. Ensure equitable planning and development.
3. Encourage a diversity of housing types.
4. Promote distinctive, safe, and attractive neighborhoods.
5. Cultivate a vibrant and inclusive community.

6. Direct investment along key transportation corridors and promote construction of transit and multi-modal transportation options in concert with the Town's regional transportation partners.
7. Support and facilitate economic development, including the development of flexible and varied types of retail and offices spaces; job creation; innovation; and entrepreneurship, through redevelopment and infill development, in order to expand and diversify the Town's tax base to enable the Town's fiscal resiliency.
8. Provide appropriate transition between land uses and buildings of different scales.
9. Preserve and maintain Chapel Hill's appearance and create the quality of design and development the Town desires.
10. Cooperate and collaborate with all of the Town's regional partners especially the University of North Carolina at Chapel Hill and UNC Health.

The proposed multi-family project complies with the majority of these guidelines and does not contradict the others. Multi family use has been identified as a primary desired use in this zone (Sub Area A of the North 15-501 Corridor) in the Charting Our Future report. The 4-5 story height falls in the range of typical height and transitional height desired in this area.

The project will implement sustainable design measures to promote environmental sustainability. Many recreational amenities will involve low impact use of stream buffers and retained forest area. The stream buffer on site will be protected, and the retained forest on site will exceed Town codes. Additional plantings will be included in the design to provide parking lot shade, hardscape shade, building shade, as well as aesthetic benefit. Stormwater runoff from new impervious surfaces will be treated on site for both peak flow and for water quality improvement.

The project will offer urban style apartment living new to this part of town. Sidewalks will be added to the street frontage.

## Statement of Compliance with Design Guidelines

The portion of the site to be developed is a rectangular 4-acre piece fronting Old Chapel Hill Road. Located in Durham County, the parcel is within the limits of the Town of Chapel Hill.

The Town has a Design Manual which provide guidance for the design of new projects, intended “to assure that new designs remain in continuity with the Town’s existing design ‘successes’ and at the same time inspire exciting and creative additions to the community’s blend of distinctive buildings from many eras” (p.1)

These guidelines regulate site design as it relates to services, utilities, and landscaping.

**Stormwater Treatment** - The project will meet stormwater quantity and quality controls at the time of final plan development and approval. A surface pond is anticipated which will treat for both water quality and peak flow. The approximate size of this facility has been accommodated on the proposed layout plan.

**Landscaping and tree protection** - The project will meet most parts of this guideline including but not limited to: total tree coverage, parking lot screening, perimeter landscape buffers, landscaping around the building, and storm pond plantings. Because of the multiple overhead and underground utilities along Old Chapel Hill Road, and due to the large and irregular distance of the property line from the street edge, the applicant would expect to ask for a modification to reduce the street buffer planting or modify the location of the plantings.

It is expected that the retained tree coverage on site will be about 35%, exceeding the minimum requirement.

There is no current plan for development of the site north of the stream buffer. Though it is possible that mulch trails and disc golf would be incorporated into the plan, these are uses which would be accommodated without tree removal or grading.

**Access and circulation** - The project will be designed to comply with Town standards for circulation, parking, emergency access, and access for services such as utility maintenance and trash collection. Street frontage is approximately 360 LF, and the applicant expects to have 2 driveway entries along this frontage. There is no current opportunity for connection to other public streets, but the project could accommodate a future connection to potential development on the parcel to the west. As the west portion of the site will include an access drive, and parking on site will exceed minimum requirements, it would be easy to accommodate off-street connections to future adjacent development.

**Parking and loading** - The LUMO calls for 1-1.25 parking spaces per 1 bedroom unit, and 1.4-1.75 spaces per 2-bedroom unit. Total required parking for this project would be a minimum of 100 spaces and maximum of 126 spaces. The concept plan accommodates 126 parking spaces total. Bicycle parking will meet Town codes, and the majority of bicycle parking will be located inside the building. Electric charging stations will be provided on site as well as bike storage and bike wash station to encourage alternative transportation usage.

**Street lights, signs and markings** – It is not anticipated that public street improvements will be required.

**Utilities and easements** - There is electric service along the parcel frontage. There is also water service along the frontage.

Sanitary sewer will involve some extension of a sanitary main, and possible a pump station within the project.

New easements will be recorded as necessary for utility mains and stormwater mitigation facilities on site, and also to recombine the two existing parcels.

**Solid waste management** – A trash compactor will be located in the lower level of the building. A recycling and cardboard dumpster collection facility will be located at the end of the surface parking area. Access to the collection areas will meet Town and County requirements, or will accommodate private pickup.

## Affordable Housing Plan

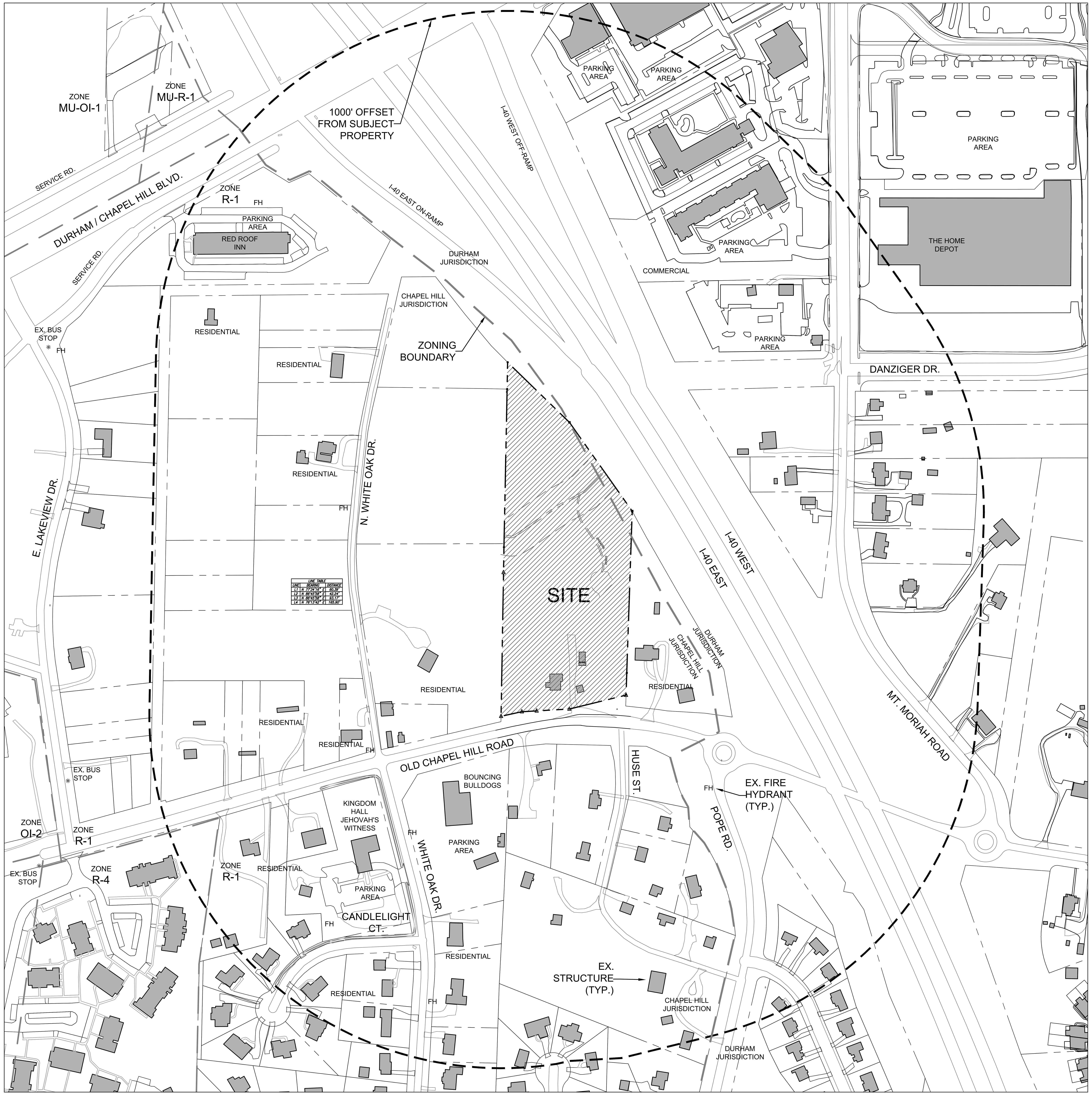
This concept plan proposes multi-family housing at the east edge of Town. Of the 90 proposed units, some portion will be offered for affordable housing. These units will be located within the main building and will be constructed and leased concurrent with the market rate units.

The developer is currently working with Town staff to formulate an affordable housing plan offering.

# 5500 OLD CHAPEL HILL ROAD APARTMENTS

## CONCEPT PLAN APPLICATION

## DURHAM, NC




1 / CP-1
AREA MAP
SCALE: 1" = 150'

## CONTACT INFORMATION

*OWNER*
*TERRI BENFORADFO*
*1026 NICKELBY ST, DURHAM NC 27703*

*CONTRACT PURCHASER / DEVELOPER*
*EB CAPITAL PARTNERS*
*100 SILERS FEN COURT*
*CHAPEL HILL NC 27517*
*CONTACT: Ernest Brown, 205-586-3062*
*ebrown@ebcapitalpartners.com*

*APPLICANT / LANDSCAPE ARCHITECT*
*CJT PA*
*111 WEST MAIN STREET,*
*DURHAM NC 27701*
*CONTACT: Wendi Ramsden, 919-682-0368*
*wramsden@cjtpa.com*

## SITE DATA

| | |
|---|---|
| PIN | 0709-01-09-7325<br>0709-01-09-8651 |
| NET LAND AREA | 283,682 SF / 6.51 AC NET |
| GROSS LAND AREA | 293,519 SF / 6.74 AC GROSS |
| EXISTING ZONING: | R-1 |
| PROPOSED ZONING: | CZ-OI-3 |
| EXISTING USE: | RESIDENTIAL, WOODED |
| PROPOSED USES: | MULTI-FAMILY RESIDENTIAL |

## LIST OF SHEETS




ENGINEERING . PLANNING . LANDSCAPE ARCHITECTURE

CJT P.A.

**111 West Main Street**
**Durham, N.C. 27701**
**p 919.682.0368**
**f 919.688.5646**
**www.cjtpa.com**

NC BOARD OF EXAMINERS FOR ENGINEERS AND SURVEYORS LIC # C-1209

NC BOARD OF LANDSCAPE ARCHITECTS LIC # C-104


NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 1302 WENDI L. RAMSDEN
7.26.2021

Project

5500/5502 OLD CHAPEL HILL RD APARTMENTS

5500 OLD CHAPEL HILL RD
DURHAM, NC 27707
DURHAM COUNTY NC

PLANNING JURISDICTION:
TOWN OF CHAPEL HILL

5500 OLD CHAPEL HILL RD
P.I.N. 0709-01-09-7325
5502 OLD CHAPEL HILL RD
P.I.N. 0709-01-09-8651

Job Number 2126

Drawn WLR, MTC
Checked WLR
Date 07.26.2021
Revisions

**CONCEPT PLAN PLANS NOT ISSUED FOR CONSTRUCTION**

Sheet Title

**COVER & AREA MAP**

Sheet Number

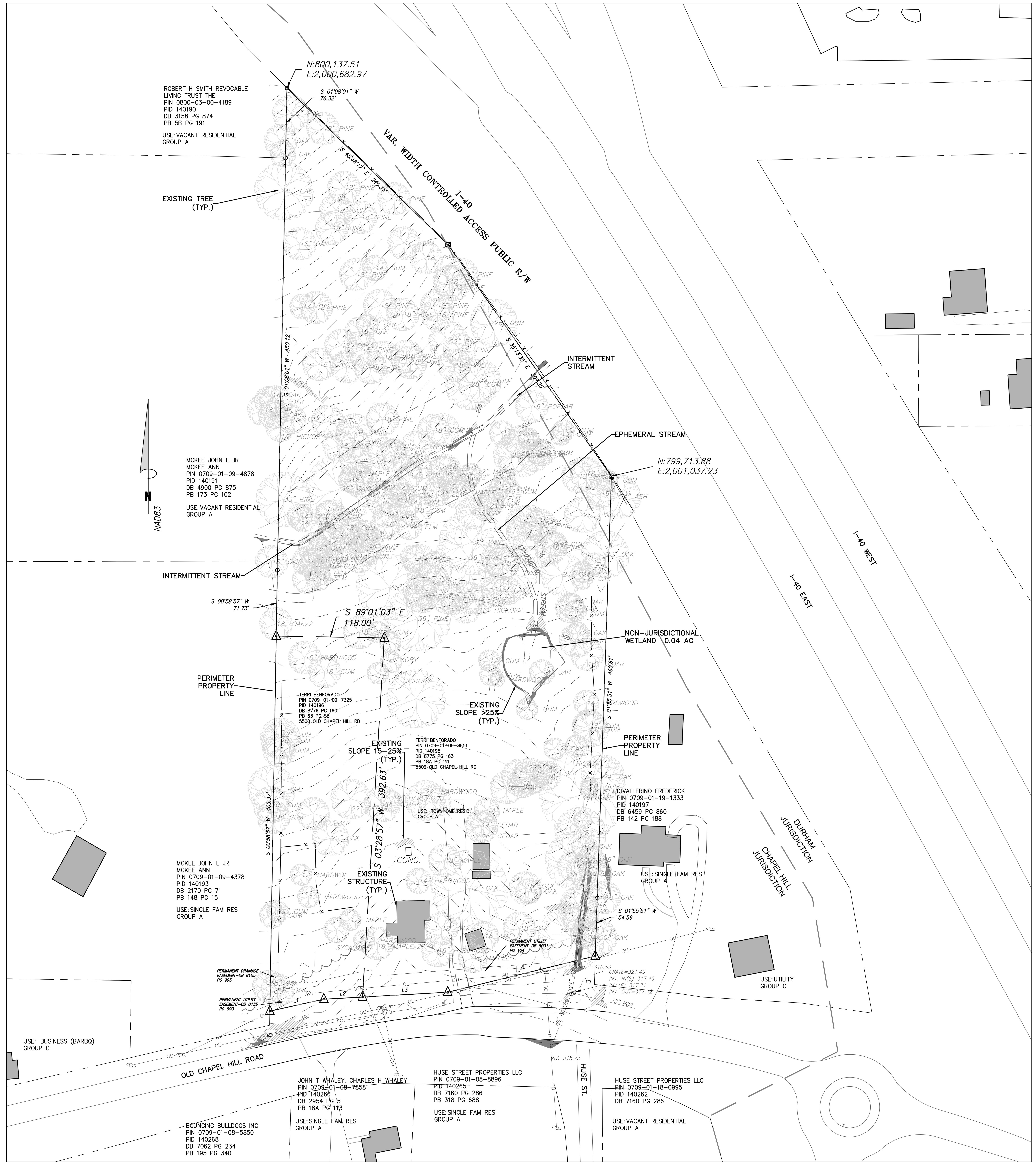
**CP-1**

## SITE DATA

| | |
|---|---|
| ENVIRONMENTAL CONSTRAINTS | SLOPES > 25% ON SITE = 1,315 SF |
| | POTENTIAL WETLAND = 3,170 SF |
| | INTERMITTENT STREAM WITH 50' STREAMSIDE RCD & 50' BUFFER |

SLOPES > 25%

SLOPES 15–25%




1 / CP-2
EXISTING CONDITIONS
SCALE: 1" = 60'

60' 0 60' 120' 180'
Scale 1" = 60'

ENGINEERING . PLANNING . LANDSCAPE ARCHITECTURE

CJT P.A.

111 West Main Street
Durham, N.C. 27701
p 919.682.0368
f 919.688.5646
www.cjtpa.com

NC BOARD OF EXAMINERS FOR ENGINEERS AND SURVEYORS
LIC # C-1209

NC BOARD OF LANDSCAPE ARCHITECTS
LIC # C-104

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 1302 WENDI L. RAMSDEN
7.26.2021

Project
5500/5502 OLD CHAPEL HILL RD APARTMENTS

5500 OLD CHAPEL HILL RD
DURHAM, NC 27707
DURHAM COUNTY NC

PLANNING JURISDICTION:
TOWN OF CHAPEL HILL

5500 OLD CHAPEL HILL RD
P.I.N. 0709-01-09-7325
5502 OLD CHAPEL HILL RD
P.I.N. 0709-01-09-8651

Job Number 2126

Drawn WLR, MTC
Checked WLR
Date 07.26.2021
Revisions

CONCEPT PLAN
PLANS NOT ISSUED FOR CONSTRUCTION

Sheet Title
EXISTING CONDITIONS

Sheet Number
CP-2

RESIDENTIAL OFFERING

90 APARTMENTS IN 4–5 STORY BUILDING
63 STUDIO/1–BDROM
27 2–BDRM

ANTICIPATED BUILDING SIZE: 141,500 SF

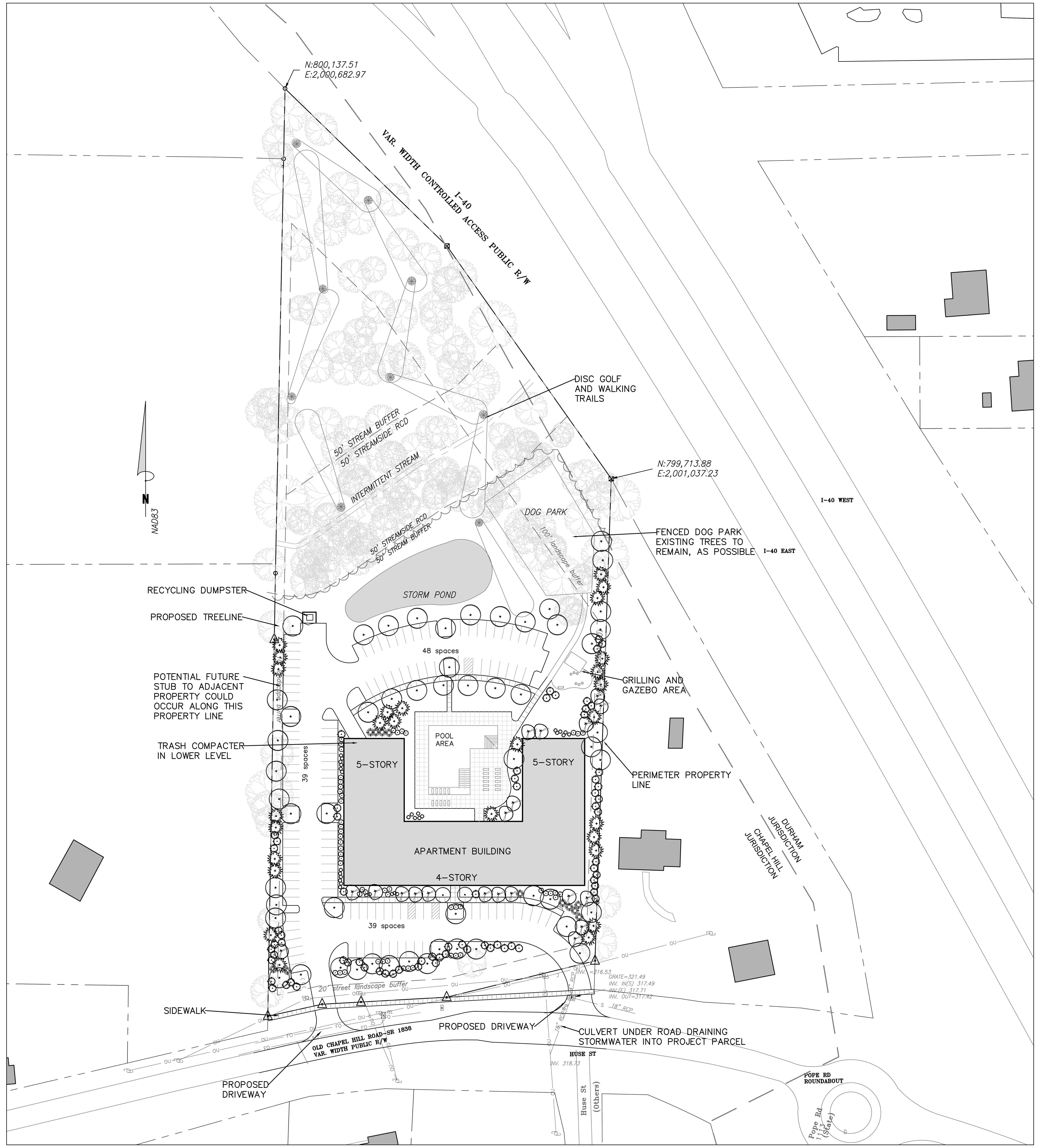
REQUIRED PARKING: 100 MIN, 126 MAX
STUDIO/1–BEDROOM: 63–78 SPACES
2–BEDROOM: 37–48
PARKING PROVIDED: 126 SPACES

RECREATION FACILITIES

- POOL
- COMMUNITY GAZEBO AND GRILLING AREA
- DISC GOLF
- DOG PARK
- WALKING TRAILS
- LOWER LEVEL BUILDING TO HAVE AMENITIES SUCH AS LEASING OFFICE, FITNESS ROOM, BIKE STORAGE, RESIDENT WORKSPACE

ENVIRONMENTAL CONSIDERATIONS

- PROTECTION OF STREAMSIDE RCD
- STORMWATER MITIGATION IN SURFACE POND
- MINIMAL STEEP SLOPES
- MULTIPLE UNDERGROUND AND ABOVE GROUND UTILITIES ALONG STREET FRONTAGE




1 / CP-3
CONCEPT LAYOUT
SCALE: 1" = 60'

60' 0 60' 120' 180'
Scale 1" = 60'

ENGINEERING . PLANNING . LANDSCAPE ARCHITECTURE
CJT P.A.
111 West Main Street
Durham, N.C. 27701
p 919.682.0368
f 919.688.5646
www.cjtpa.com

NC BOARD OF EXAMINERS FOR ENGINEERS AND SURVEYORS LIC # C-1209

NC BOARD OF LANDSCAPE ARCHITECTS LIC # C-104

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT 1302 WENDI L. RAMSDEN
7.26.2021

Project
5500/5502 OLD CHAPEL HILL RD APARTMENTS

5500 OLD CHAPEL HILL RD
DURHAM, NC 27707
DURHAM COUNTY NC

PLANNING JURISDICTION:
TOWN OF CHAPEL HILL

5500 OLD CHAPEL HILL RD
P.I.N. 0709-01-09-7325
5502 OLD CHAPEL HILL RD
P.I.N. 0709-01-09-8651

Job Number 2126

Drawn WLR, MTC
Checked WLR
Date 07.26.2021
Revisions

CONCEPT PLAN
PLANS NOT ISSUED FOR CONSTRUCTION

Sheet Title
CONCEPT LAYOUT

Sheet Number
CP-3


1"=70' (11x17)

CJTpa
SURVEYING / ENGINEERING / LANDSCAPE ARCHITECTURE

# 5500 Old Chapel Hill Road

## Conceptual Site Plan - Chapel Hill, NC