

TECHNICAL MEMORANDUM



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TO:	Vincent Chirichella, PE Durham County
FROM:	Scott Haberstroh, PE
SUBJECT:	Lift Station Land Acquisition
PROJECT:	DMH18589
DATE:	March 10, 2021



3/10/2021

1.00 INTRODUCTION

Freese and Nichols, Inc. (FNI) was retained by the County of Durham (County) to perform a land acquisition evaluation for three lift stations: Paige Point, Chin Page (General Electric), and Slater Road. This task involved the evaluation of potential sites that the County could acquire to build new lift stations and to determine potential constraints that could affect where a new lift station could be built. This evaluation included the consideration of potential sites in undeveloped parcels close to the existing lift stations and available utilities, feasibility to tie-in to the existing sewer network (gravity sewer and force main), site access and power, property owners, location of utility easements, lift station site layout, and a desktop environmental assessment of wetlands, soils, and endangered species. For the purposes of this evaluation the following assumptions were made for the proposed lift station site sizes and layouts; a 100-ft x 100-ft site with 20-ft property line setbacks¹, each site with a 20-ft x 20-ft Electrical Building, 20-ft x 5-ft Generator, 6-12-ft Diameter Wet Well and 9-ft x 6-ft Valve Vault. **Table 1-1** summarizes the required setbacks needed for each lift station site. The required setbacks are the distance between the property line and any building/structure inside the fence line.

Table 1-1. Required Setbacks

	Paige Point	Chin Page (General Electric)	Slater
Zoning	CG Suburban	IL Suburban	IL Suburban
Setbacks (minimum)	Street Yard: 25' Side Yard: 25' Rear Yard: 25'	Street Yard: 40' Side Yard: 30' Rear Yard: 25'	Street Yard: 40' Side Yard: 30' Rear Yard: 25'

¹ The 20-foot setback is the distance between the property line and the fence line. There is adequate room within the fence to meet the required setbacks listed in **Table 1-1**.

2.00 LIFT STATION SITE EVALUATION

2.01 PAIGE POINT LIFT STATION

Existing Conditions

The existing lift station is located at 3452 US 70, Durham, NC 27703. **Figure 1** shows a map of the existing and proposed lift station locations. The North Carolina Department of Transportation (NCDOT) STIP Project U-5518, currently on hold for the foreseeable future, involves widening US 70 (Glenwood Avenue) from SR 2095 (Page Road Extension) to I-540 to a six-lane divided facility with a 36-foot median. The road widening will displace the existing Paige Point lift station and decrease the buildable land available for a new lift station site.

Proposed Lift Station Site

There are two potential lift station sites identified – parcel ID 164057 and 164054.

- Parcel ID 164057

Parcel 3506 US 70 (PIN 0759-04-73-2305) was selected as an alternative for the proposed Paige Point lift station site. This parcel is owned by NCDOT. The southern portion of the parcel could be used for the 100-ft x 100-ft lift station footprint which leaves enough room to the north for the road widening proposed from STIP U-5518. This 100-ft x 100-ft lift station footprint can be setback at least 20-ft from any of the parcel's boundaries.

The gravity sewer and force main easement would be approximately 40-ft wide and 200-ft long. Power for the site should be easily accessible due to the site's proximity to power lines.

- Parcel ID 164054

Parcel 3512 US 70 (PIN 0759-04-73-3251) was selected as an alternative for the proposed Paige Point lift station site. This parcel is owned by LCL CORP. The southern portion of the parcel could be used for the 100-ft x 100-ft lift station footprint which leaves enough room to the north for the road widening proposed from STIP U-5518. This 100-ft x 100-ft lift station footprint can be setback at least 20-ft from any of the parcel's boundaries.

The gravity sewer and force main easement would be approximately 40-ft wide and 350-ft long. Power for the site should be easily accessible due to the site's proximity to power lines.

Either proposed lift station site could be accessed through the large, wooded parcel southwest of the proposed site. A conceptual plan for a residential development that is planned for the large, wooded parcel is included in Appendix B. The development road layout will allow for access to either proposed site. Both sites will require a driveway easement.

A desktop environmental review of the proposed lift station site was completed and is described in **Section 3.00**. No major environmental concerns were identified, though field verification will be required to confirm the potential for stream, wetland, and endangered species impacts.

2.02 CHIN PAGE (GENERAL ELECTRIC) LIFT STATION

Existing Conditions

The existing lift station is located at 4809 Chin Page Road, Durham, NC 27703. **Figure 2** shows a map of the existing and proposed lift stations. The lift station is currently offline and located in an existing floodway.

Proposed Lift Station Site

The southern portion of parcel 4205 South Miami Boulevard (PIN 0748-43-68-8080), at the intersection of South Miami Boulevard and Chin Page road, was identified as a suitable location for a new site because the current lift station is in the floodway. The parcel is owned by International Business Machine Corp. This location allows for a 100-ft x 100-ft lift station footprint that is setback at least 20-ft from the roadway as well as outside the flood zone.

The proposed lift station site can still be accessed via Chin Page Road. The proposed gravity sewer and force main can be installed within the NCDOT ROW along Chin Page Road (SR1969); therefore, an easement would not be necessary. Power for the site should be easily accessible due to the site's close proximity to power lines. Due to the depth of the wet well, a temporary construction easement may be necessary during the wet well excavation.

A desktop environmental review of the proposed lift station site was completed and is described in **Section 3.00**. The site is located outside of the FEMA flood zone and no additional major environmental concerns were identified, though field verification will be required to confirm any impacts to the FEMA 100-year floodplain and floodway, wetlands, and endangered species.

2.03 SLATER ROAD LIFT STATION

Existing Conditions

The existing lift station is located at 3055 Carrington Mill Boulevard, Morrisville, NC 27605. The existing lift station is located outside of Durham County limits, in Wake County. **Figure 3** shows a map of the existing and proposed lift stations.

Proposed Lift Station Site

Parcel 1211 Shiloh Glenn Drive (PIN 0747-04-71-8017) was selected for the proposed Slater lift station site. This parcel is owned by E. C. Perry. This location will move the lift station back into the Durham County limits as well as bringing the gravity sewer and force main back to the east of Interstate 540; therefore, eliminating the need for the gravity sewer and force main to cross under Interstate 540. This approach is possible since there does not appear to be any sewer laterals downstream of the rerouted sewer. However, a more detailed review of the sewer system will need to be performed, including CCTV to confirm that there are no service connections downstream of the reroute point.

The 100-ft x 100-ft lift station footprint has two general locations that it can be placed within the parcel – along the western border or eastern border (to the east of the powerlines). The stream and flood zone are located throughout most of the northern and eastern portions of the property. Either location allows for the lift station footprint to be setback at least 20-ft from any of the parcel's boundaries as well as outside the flood zone and stream boundaries.

Each lift station site alternative could be accessed from the south between the stormwater basin and the powerlines while using the powerline easement. The alternative to the west requires 1,300-ft of 20-ft wide access drive easement (alternative 1A). The alternative to the east requires 1,250-ft of 20-ft wide access drive easement (alternative 2). The western lift station site could be accessed via the NC Volleyball Academy parking lot as well (alternative 1B).

The gravity sewer and force main easement would be approximately 40-ft wide x 600-ft long for the western alternative and approximately 40-ft wide x 300-ft long. Power for the site should be easily accessible due to the site's proximity to power lines.

A desktop environmental review of the proposed lift station site was completed and is described in **Section 3.00**. In addition to avoiding the FEMA flood zone on-site, the contours indicate a potentially jurisdictional stream to the north of the lift station, therefore a 50-ft buffer was maintained from that feature. No additional major environmental concerns were identified, though field verification will be required to confirm any impacts to the FEMA 100-year floodplain, streams, wetlands, and endangered species.

3.00 DESKTOP ENVIRONMENTAL EVALUATION

A desktop environmental review of the three proposed lift station sites was completed to ensure the sites will meet regulatory requirements and minimize environmental impacts. The lift station sites are all located outside of the FEMA floodplain, but impact will likely be required for connection to existing utilities at Chin Page and Slater Road Lift Stations, as can be seen in the figures in **Appendix A**.

Stream and wetland impact was reviewed based on aerial imagery, Web Soil Survey soils, NC Quality Level 2 LiDAR topography, and the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI). The soils at the proposed sites are listed as Mayodian sandy loam (MfD/MfE) and White Store sandy loam (WsB/WsC), which are not shown as hydric, and no wetlands are indicated in the NWI. While no streams or wetlands were identified within the lift station boundaries, existing features may be identified during field assessment. Additionally, stream and/or potential wetland crossings were identified at each site for connection to existing utilities, as can be seen in the figures in **Appendix A**. A field investigation will be required to verify the presence of jurisdictional streams and/or wetlands. All three lift stations are in the Lower Neuse Regulatory Basin, so a 50-ft stream buffer will be required for any existing streams.

The USFWS Information for Planning and Consultation (IPaC) website lists seven threatened or endangered species that are known or are believed to occur in the general vicinity of the lift station sites. One bird, two plants, and one clam, the Red-cockaded woodpecker (*Picoides borealis*), Michaux's Sumac (*Rhus michauxii*), Smooth Coneflower (*Echinacae laevigata*), and Dwarf Wedgemussel (*Alasmodonta heterodon*) are listed as endangered. One amphibian and one clam, the Neuse River Waterdog (*Necturus lewisi*) and Atlantic Pigtoe (*Fusconaia masoni*), are listed as proposed threatened, and one fish, the Carolina Madtom (*Noturus furiosus*), is proposed endangered. The sites will have to be evaluated for any potential habitat for these species.

According to the North Carolina State Historic Preservation Office (NC SHPO) HPOWEB GIS Service, there are no historic resources in the vicinity of the lift station site, but if any suspected cultural resources are observed on-site, this will have to be further investigated.

4.00 SUMMARY

The sites recommended for each of the three existing lift stations will provide the County viable options for sites nearby existing lift stations that will need to be replaced in the future. **Table 4-1** summarizes the major considerations for each lift station site, which were described in more detail herein.

Table 4-1. Summary of Site Evaluation

	Paige Point	Chin Page (General Electric)	Slater Road
Site Access	Via Harris Tract Development	Via Chin Page Road	Via the South Along the Powerline Easement
Electrical Power	Proximity to Power Lines	Proximity to Power Lines	Proximity to Power Lines
FEMA Flood Zone	No Impact	Impact for Connection to Existing Utilities	Impact for Connection to Existing Utilities
Streams/Wetlands (Field Verify)	Impact for Connection to Existing Utilities	Impact for Connection to Existing Utilities	Impact for Connection to Existing Utilities
Existing Parcel ID and Size	Parcel ID: 164057 Acres: 0.76 Parcel ID: 164054 Acres: 0.72	Parcel ID: 157755 Acres: 86.64	Parcel ID: 219423 Acres: 11.47
Utility Easement	Gravity Sewer and Force Main: 40-ft x 200-ft ² Gravity Sewer and Force Main: 40-ft x 350-ft ³	-	Gravity Sewer and Force Main: 40-ft x 600-ft ⁴ Gravity Sewer and Force Main: 40-ft x 300-ft ⁵
Wet Well	Ground Elevation: 400-ft *Bottom of Wet Well: 370-ft Total Depth: 30-ft ² Ground Elevation: 410-ft *Bottom of Wet Well: 370-ft Total Depth: 40-ft ³	Ground Elevation: 344-ft *Bottom of Wet Well: 284-ft Total Depth: 60-ft	Ground Elevation: 355-ft *Bottom of Wet Well: 305-ft Total Depth: 50-ft ⁴ Ground Elevation: 335-ft *Bottom of Wet Well: 305-ft Total Depth: 30-ft ⁵

* Estimated using best available GIS and record data.

At each location, additional considerations will be required prior to moving forward with the acquisition process, such as an onsite environmental investigation, detailed evaluation for tying into and rerouting existing utilities, topographic survey, discussion with property owners, lot size, impervious area, surrounding development plans, land features, potential stormwater BMPs, and special zoning requirements. Below is a summary of assumptions and considerations used during the lift station site evaluations.

1. The capacities of Paige Point and Slater Road are 177 gpm and 425 gpm respectively. Based on these flows the wet well diameter of 6-8-ft is anticipated. Based on the October 22, 2020 memo by AECOM, the future peak flow for Chin Page (General Electric) is approximately 4.74 MGD and the wet well will likely need to be 12-ft diameter or greater.

² Parcel ID 164057 (Paige Point)

³ Parcel ID 164054 (Paige Point)

⁴ Western Alternative (Slater Road)

⁵ Eastern Alternative (Slater Road)

2. The depth of each wet well was estimated using the existing upstream manhole inverts and standard pipe slopes.
 - a. For Paige Point, the wet well depth will be approximately 10-ft less (30-ft total) if moved to parcel 0759-04-73-2305.
 - b. Chin Page is the deepest and biggest lift station of the three. The depth is controlled by the need to relocate the Chin Page lift station outside of the floodplain and based on the soil and rock conditions, additional temporary construction easement may be required for wet well excavation.
 - c. The Slater Road wet well depth may be decreased by approximately 20-ft (30-ft total) by using the lift station location to the east of the transmission line easement. However, this lift station site is located closer to the flood zone and wetland boundaries; therefore, this site would require more in-depth analysis to determine if this is an adequate location.
3. Ground water will likely be encountered at all three sites. If so, the contractor will need to install well points around the excavation to keep it dry.
4. Submersible type lift stations were assumed for all three lift stations; therefore, regular access to the bottom of the well would not be required.

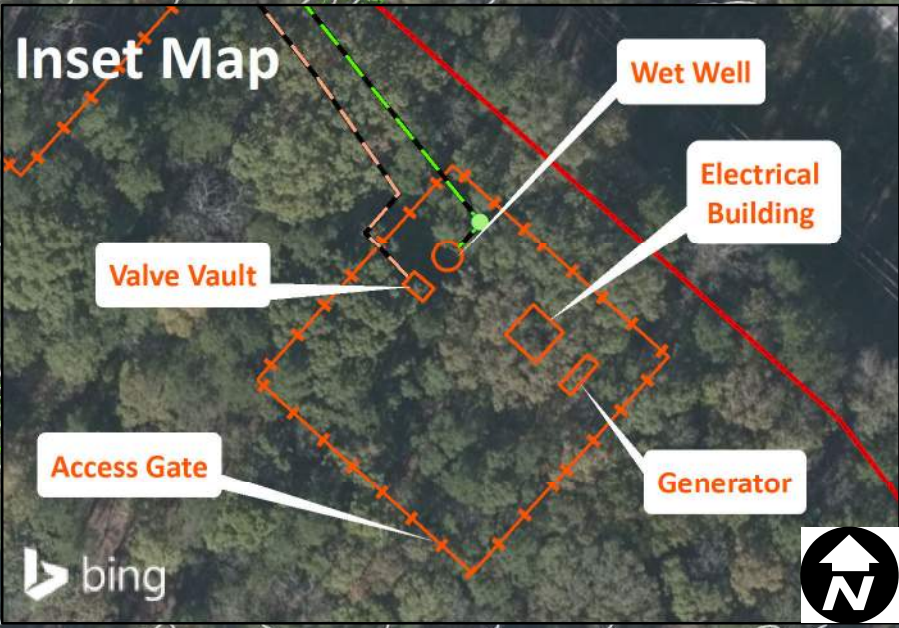
APPENDIX A

FIGURES

FIGURE 1
COUNTY OF DURHAM
LIFT STATION LAND ACQUISITION
PAIGE POINT LIFT STATION

Legend

- Existing Lift Station Site
- Existing Manhole
- Existing Force Main
- Existing Gravity Main
- Proposed Manhole
- Proposed Force Main
- Proposed Gravity Sewer
- Future NCDOT ROW
- National Wetland Inventory
- Lift Station Boundary
- Proposed Parcel Boundary
- 40' Utility Easement
- Existing Parcel Boundary
- Parcel Boundary
- 5' Contours



Proposed
Paige Point Parcel
Parcel ID: 164057

PIN: 0759-72-20-8717.DW
Parcel ID: 164050

See Inset Map
for Lift Station Layout

PIN: 0759-04-73-3251
Parcel ID: 164054

See Inset Map
for Lift Station Layout

Access lift station site
via Harris Tract
(see Appendix B).

Proposed
Paige Point Parcel
Parcel ID: 164054



FIGURE 2
COUNTY OF DURHAM
LIFT STATION LAND ACQUISITION
CHIN PAGE LIFT STATION

Legend

- Existing Lift Station Site
- Existing Manhole
- Existing Gravity Main
- Proposed Manhole
- Proposed Force Main
- Proposed Gravity Sewer
- Stream
- National Wetland Inventory
- FEMA 100-yr Floodplain
- FEMA Floodway
- FEMA 100-yr Future Floodplain
- Lift Station Boundary
- Proposed Parcel Boundary
- Existing Parcel Boundary
- Parcel Boundary
- 5' Contours



PIN: 0748-43-68-8080
Parcel ID: 157755

PIN: 0748-04-53-8252
Parcel ID: 157802

See Inset Map
for Lift Station Layout

Proposed
Chin Page Parcel

Tie into existing
Force Main

PIN: 0748-04-51-5762
Parcel ID: 157777

Access lift station site
via Chin Page Road.

Inset Map

Generator

Electrical
Building

Valve Vault

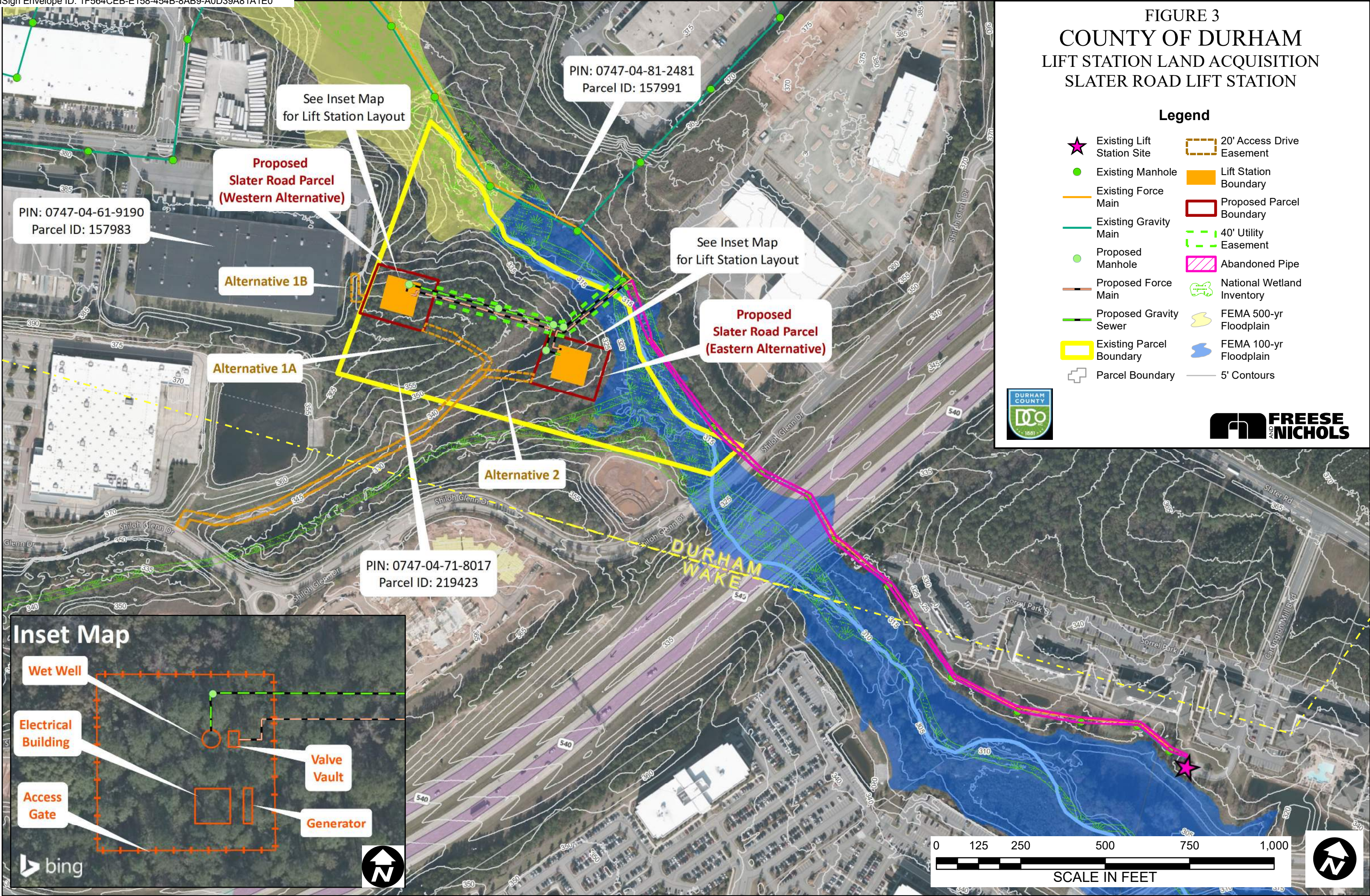
Wet Well

Access Gate



Note:
Temporary construction easements may be needed for the wet well excavation.

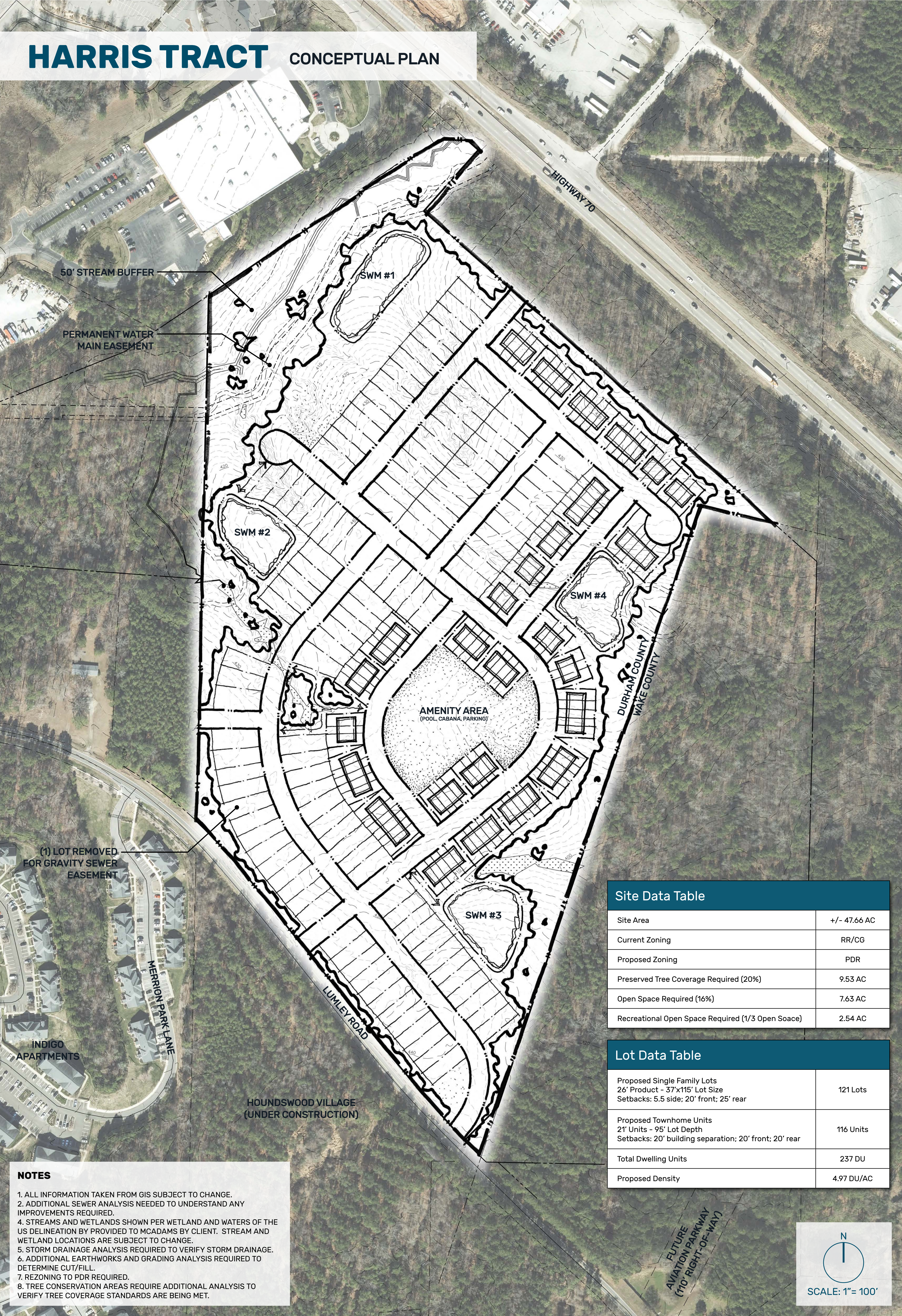
FIGURE 3
COUNTY OF DURHAM
LIFT STATION LAND ACQUISITION
SLATER ROAD LIFT STATION



APPENDIX B
HARRIS TRACT
CONCEPTUAL PLAN

HARRIS TRACT

CONCEPTUAL PLAN



Site Data Table

Site Area	+/- 47.66 AC
Current Zoning	RR/CG
Proposed Zoning	PDR
Preserved Tree Coverage Required (20%)	9.53 AC
Open Space Required (16%)	7.63 AC
Recreational Open Space Required (1/3 Open Soace)	2.54 AC

Lot Data Table

Proposed Single Family Lots 26' Product - 37'x115' Lot Size Setbacks: 5.5 side; 20' front; 25' rear	121 Lots
Proposed Townhome Units 21' Units - 95' Lot Depth Setbacks: 20' building separation; 20' front; 20' rear	116 Units
Total Dwelling Units	237 DU
Proposed Density	4.97 DU/AC

NOTES

1. ALL INFORMATION TAKEN FROM GIS SUBJECT TO CHANGE.
2. ADDITIONAL SEWER ANALYSIS NEEDED TO UNDERSTAND ANY IMPROVEMENTS REQUIRED.
3. STREAMS AND WETLANDS SHOWN PER WETLAND AND WATERS OF THE US DELINEATION BY PROVIDED TO MCADAMS BY CLIENT. STREAM AND WETLAND LOCATIONS ARE SUBJECT TO CHANGE.
4. STORM DRAINAGE ANALYSIS REQUIRED TO VERIFY STORM DRAINAGE.
5. ADDITIONAL EARTHWORKS AND GRADING ANALYSIS REQUIRED TO DETERMINE CUT/FILL.
6. REZONING TO PDR REQUIRED.
7. TREE CONSERVATION AREAS REQUIRE ADDITIONAL ANALYSIS TO VERIFY TREE COVERAGE STANDARDS ARE BEING MET.

