Parks and Greenways Board

Regular Meeting
April 9, 2024, at 9:30 a.m.

ALL MEMBERS WILL BE IN PERSON.
THIS MEETING CAN BE VIEWED ELECTRONICALLY AND IN PERSON
Please visit www.laurelpark.org for more information

1. **Call to Order**
2. **Public Comment**
3. **Approval of the Agenda**
4. **Approval of March 12, 2024, Regular Meeting Minutes**
5. **Budget Report**
6. **Old Business**
   a. Arbor Day
   b. Little Laurel Green
   c. Canal Park
7. **New Business**
   a. Preliminary Site Plan Review: 6 Tudor Lane
   b. Bee Day Proclamation
   c. Volunteer Gardening Day
8. **Park Technician's Report**
9. **Invasives Species Committee Report**
10. **Board and Commissioner Comments**
11. **Adjournment**

Next Meetings:

Thursday, April 25, 2024 @ 4:00 p.m. (Site Meeting)

Tuesday, May 14, 2024 @ 9:30 a.m. (Regular Meeting)

441 White Pine Dr. | Laurel Park, NC 28739 | www.laurelpark.org | office: 828-693-4840

Subject: Staff Report – 6 Tudor Lane
Date: April 9, 2024, at 9:30 AM
Location: Laurel Park Town Hall – 441 White Pine Dr.

Daniel Hayes of DMH Builders Inc. (applicant) is proposing to build a single-family detached dwelling located at 6 Tudor Lane Hendersonville, NC 28739. The parcel is identified on the Henderson County Geographic Information System (GIS) as property identification number (PIN# 9548459747). This property is in the ETJ R-30 zoning district. The estimated acreage is .72 acre, and the slope of the property is estimated at 17% which is considered a steep slope.

The Laurel Park Unified Development Ordinance (UDO) section 2.5.3: Dimensional Standards for the R-30 zone indicates that lots with steep slopes (15% to 25%) require a minimum street setback of 40 feet, however in accordance with note 6, this may be reduced to 25 feet to minimize erosion, sedimentation, or land disturbance and is measured from the existing private street pavement edge in accordance with UDO 2.4.5. With the decrease in street setback, the minimum rear setback increases from 35 feet to 50 feet. The side setback remains at the 35 feet minimum.

The applicant has consulted with Peak Hydrogeologic, PLLC (Peak HG) who conducted a predevelopment investigation. The predevelopment investigation suggests that the site is suitable for development and that dispersal of stormwater runoff is viable for this lot. This report has been reviewed and approved by the Town Engineer. Peak HG further indicates that the setback reduction is necessary to develop in the existing flat area (<15% slope) in the southwestern corner of the property nearest the street. To minimize stormwater infiltration at the top of the slope, a geosynthetic clay liner will be installed in the rain garden.

The Parks and Greenways Map includes the ETJ as part of the study area however no trails are proposed for this specific area. The Land Use Cover Map also includes the ETJ as part of the study area with this specific area being designated as Deciduous/Evergreen Forest.

Board Action Requested:
Review and Comment for impacts on tree protection, parks, and greenways.

Respectfully,

Kaitland Finkle, CZO
Interim Zoning Administrator
Town of Laurel Park

ZONING COMPLIANCE PERMIT APPLICATION FORM

Town of Laurel Park • 441 White Pine Drive • Laurel Park, NC 28739 • P. 828-693-4840 • F. 828-696-4948

APPLICATION LAST UPDATED: 9.1.2021

1. THINGS TO KNOW ABOUT THE ZONING COMPLIANCE PERMIT PROCEDURE

1. The zoning compliance permit review procedure is described in Section 6.3.22 of the Laurel Park Unified Development Ordinance.
2. A zoning compliance permit is issued prior to or along with a building permit for most forms of development, including single-family homes.
3. Henderson County will not issue a building permit for development that does not have an approved zoning compliance permit.
4. Zoning compliance permits are required for decks, patios, fences, walls, signs, temporary uses, and open-air uses that don't require a building permit.
5. Lots with steep or very steep slopes require pre-development investigation report and must provide a stormwater management plan prepared by a licensed professional.
6. Most forms of development, including new single-family homes, must provide perimeter landscaping buffers, streetscape landscaping, and site landscaping as described in Chapter 7 of the UDO.
7. Tree retention or replacement as necessary is required to ensure 25% of the lot or site is covered by tree canopy in accordance with Chapter 3 of the UDO.
8. Additional development on a site with an existing building may require the site to be brought into partial or full compliance with all UDO requirements as described in Section 5.6, Nonconforming Sites.

2. GENERAL APPLICANT INFORMATION

A. Parcel Information

1. Street Address: 6 Tudor Lane Hendersonville NC
2. Parcel Identification Number: 9548-45-9747
3. Lot Area/Acreage: .72 Acres ETJ R-30
4. Zoning District Classification: County ETJ R-30
5. Overlay Zoning District(s) (if applicable): Laurel Park / Henderson
6. Current Use of the Lot or Site: ☑ Vacant ☐ Developed ☐ Other (e.g., vacant building)

   If "Other", please explain current use:

   If "Developed", please identify the current use of the lot or site (attach additional sheets if necessary):

7. Please identify any prior approvals from the Town of Laurel Park (like a variance, special use permit, or site plan) associated with this development (if any) and the approximate date of the approval (attach additional sheets if necessary):

B. Primary Point of Contact Information

1. Primary Point of Contact Name: DMH Builders Inc ... Daniel Hayes
2. Mailing Address: 10 S. Oak Forest Ln, Asheville NC 28803
3. Phone: 828 551 5098
4. Email: dmhbuildersinc@gmail.com
5. Fax: —
6. Relationship to Landowner: Builder / Authorized Person

3. DESCRIPTION OF SITE CONDITIONS

(Please complete each of the following)

1. Landscaping Requirements

(the Town's zoning may be reviewed on the County's Online GIS/Mapping page at https://www.hendersoncountync.gov/gis/page/welcome-gomaps-henderson-countys-online-gis-mapping-system)

a. What is the zoning of the lot to the north? If there is a street bordering the lot to the north, please list its name: ETJ R-30 County/Laurel Park — NO

b. What is the zoning of the lot to the south? If there is a street bordering the lot to the south, please list its name: SAME TUDOR LANE ETJ R30

c. What is the zoning of the lot to the east? If there is a street bordering the lot the east, please list its name: ETJ R30 No street

d. What is the zoning of the lot to the west? If there is a street bordering the lot to the west, please list its name: SAME ETJ R30 No street

2. Tree Canopy Cover

a. Approximate amount of the lot or site covered by tree canopy at the time of this application:

☑ More than 25% covered by tree canopy ☐ Less than 25% covered by tree canopy

b. Does the proposed development include tree removal? ☑ Yes ☐ No

c. If tree removal is proposed as part of this development, how much of the lot or site will be covered by tree canopy after development is complete?

☑ More than 25% covered by tree canopy ☐ Less than 25% covered by tree canopy

The Town may require an applicant to provide an aerial photo, tree survey, or other evidence documenting the amount of tree cover in place at the time of this application.

3. Geologic Hazards, Steep Slopes, or Very Steep Slopes

a. Does the lot or site include any geologic hazards or steep slopes? ☑ Yes ☐ No ☐ Don't know

b. If yes, what is the slope of the steepest part of the site? (see UDO Sec. 10.2.9 for how to determine slope)

☐ 15% or less ☑ 15% to 25% ☑ More than 25% Slope = 17% 40'/225.10' length = .17

4. Utilities

a. Does the development require new potable water or sewage treatment to be provided? ☑ Yes ☐ No

b. If yes, how will these services be provided?

☐ City of Hendersonville public water/sewer ☐ On-site well/septic system ☐ Don't know

c. If the site is to be served by a new well or septic system, have you obtained Health Department approval?

☐ Yes ☑ No (if yes, please attach approval to this application form)

EOMC Engineered septic

5. Please Complete this Portion if you are Proposing a **Temporary Use or Structure**

If this zoning compliance permit is associated with a temporary use or structure, please provide the following details:

a. Please provide a description of the temporary use or structure (attach additional sheets if needed):

b. Anticipated Date of Setup:

c. Anticipated Date of Commencement:

d. Anticipated Date of Cessation:

e. Anticipated Date of Removal and Site Restoration:

f. Duration (in days) from Setup until Removal:

g. Will temporary signage be included? ☐ Yes ☐ No

If yes, please identify the sign's general location:

h. Has this temporary use or structure been established on this lot or site already this year?

☐ Yes ☐ No ☐ Don't Know

If yes, from when to when?

6. Please Complete this Portion if you are Proposing a **New Sign (or changes to an existing sign)**

If this zoning compliance permit application is associated with a new sign or changes to an existing sign, please provide the following details:

a. Please identify the type of sign proposed (check all that apply)

☐ Wall Sign	☐ Parapet Sign	☐ Marquee Sign
☐ Awning Sign	☐ Projecting/Suspended Sign	☐ Electronic Display Sign
☐ Monument Sign	☐ Window/Door Sign	☐ Pylon Sign
☐ Post & Arm Sign	☐ Incidental Sign	☐ Canopy Sign
☐ A-Frame Sign	☐ Subdivision Sign	☐ Temporary Sign

b. Is the proposed signage: ☐ New ☐ Replacement If replacement, please attach photos of signage to be replaced

c. Is the structure supporting the signage: ☐ New ☐ Existing Nonconforming supports may require replacement

d. Please attach detailed drawings and information describing the following for each type of sign proposed:

- The number of signs on the site
- The proposed sign face area in square feet (including if the sign is single-sided or 2-sided)
- The copy height in inches
- The height of the tallest portion of the sign or supporting structure
- If the sign will be illuminated, and if so the method of illumination

4. DESCRIPTION OF THIS REQUEST

(Please complete the following)

1. Please identify the type of development proposed that is the subject of this zoning compliance permit application. Please select all that apply:

☑ Principal Structure ☐ Accessory Structure ☐ Sign

☐ Temporary Structure ☐ Temporary Use ☐ Fence/Wall

☐ Other If "Other" please describe below (attach additional sheets if necessary)

2. All applicants for a zoning compliance permit must attach a site sketch or plot plan that identifies each of the following items:
   - Lot lines
   - Principal structures, including driveways
   - ~~Accessory structures (garages, sheds, play structures, etc.)~~
   - ~~Additions, expansions, or other alterations to existing principal or accessory structures~~
   - ~~Open-air uses of land that do not have structures~~
   - ~~Site features like streams, lakes, ponds, wetlands, rock outcrops, and similar aspects~~
   - Required setbacks
   - ~~Encroachments of structures into setbacks (if proposed)~~
   - Potable water wells, septic tanks, septic drain fields/lines, and reserve or back up drain field location
   - Tree save areas or areas where existing tree canopy will be maintained during and after development
   - Required landscaping features (perimeter buffers, streetscape buffers, site landscaping, parking lot landscaping, etc.)
   - Any other features identified by the applicant or required by the Town Manager in order to demonstrate compliance with the applicable requirements

Site sketches or plot plans do not need to be professionally prepared or drawn to scale but should include verified dimensions and distances if not drawn to scale.

In cases where proposed development is subject to an approved site plan or other development approval that provides the details listed above, applications materials used for the prior approval may be substituted or modified in order to comply with these requirements.

3. Please Complete this Portion if you are Proposing a **New Single-Family Home**

If this zoning compliance permit application is associated with a new single-family home in an area subject to the Town's single-family residential design guidelines (this information should be identified on the subdivision plat that created the lot), then this application must include elevations, plans, or other details that shows how the structure will comply with the standards in Section 7.1 of the UDO.

4. Please Complete this Portion if you are Proposing a **New Accessory Use or Structure**

If this zoning compliance permit is associated with a new accessory use or structure, please provide the following details:

a. Size of principal structure (square feet):

b. Size of accessory structure (square feet):

c. Is the accessory use located entirely within the principal structure? ☐ Yes ☐ No

ZONING COMPLIANCE PERMIT APPLICATION FORM

Town of Laurel Park • 441 White Pine Drive • Laurel Park, NC 28739 • P. 828-693-4840 • F. 828-696-4948

 APPLICATION LAST UPDATED: 9.1.2021

7. Please Complete this Portion if you are Proposing a **New Fence or Wall**

If this zoning compliance permit application is associated with a new fence or wall, please provide the following details:

a. Proposed fence or wall height (in feet) in the following locations:

Front Yard (if applicable) Side Yard (if applicable) Rear Yard (if applicable)

b. Please identify the materials to be used in the fence or wall (including gates, supports, & horizontal members)

5. SUBMITTAL CHECKLIST

(Please ensure your application includes 1 paper copy and 1 digital (pdf) copy of all of the following)

1.	Zoning compliance permit application form	☑
2.	Application fee	$400 ☐
3.	Notes from pre-application conference (if conducted)	☒
4.	Notes from neighborhood information meeting (if conducted)	☒
5.	Slope investigation (if site has slopes or geologic hazards)	☑
6.	Stormwater management plan (if required)	☑
7.	Aerial photo, tree survey, or evidence of tree cover (if requested by the Town)	☑
8.	Copies of any required County approvals for utility service	Need water availability ☐
9.	Soil erosion and sedimentation control plan (if disturbing more than one acre)	☑
10.	Site sketch or plot plan	☑
11.	Copies of prior related approvals (variance, special use permit, site plan, etc.), as appropriate	☒
12.	Copies of an approved fee-in-lieu requests and the appropriate fee	☒
13.	Copies of any approved performance guarantee (if appropriate)	☒
14.	Copies of vested rights certificate (if requested by applicant)	☒
15.	Notes and details related to an administrative adjustment, if requested	☒
16.	Elevations of buildings subject to design standards or guidelines	☑
17.	Detailed drawings and information for each type of permanent sign proposed	☒
18.	Any additional information determined to be necessary by the Town	☐

ZONING COMPLIANCE PERMIT APPLICATION FORM

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APPLICATION LAST UPDATED: 9.1.2021

6. APPLICANT SIGNATURE

I certify that the information provided in these application materials is complete and accurate to the best of my knowledge. I hereby authorize Town officials to enter the subject property for the purposes of determining compliance.

If there are multiple land owners or applicants, a signature is required for each.

Land Owner or Authorized Signature: DMH Builders INC

Date: 9/18/23

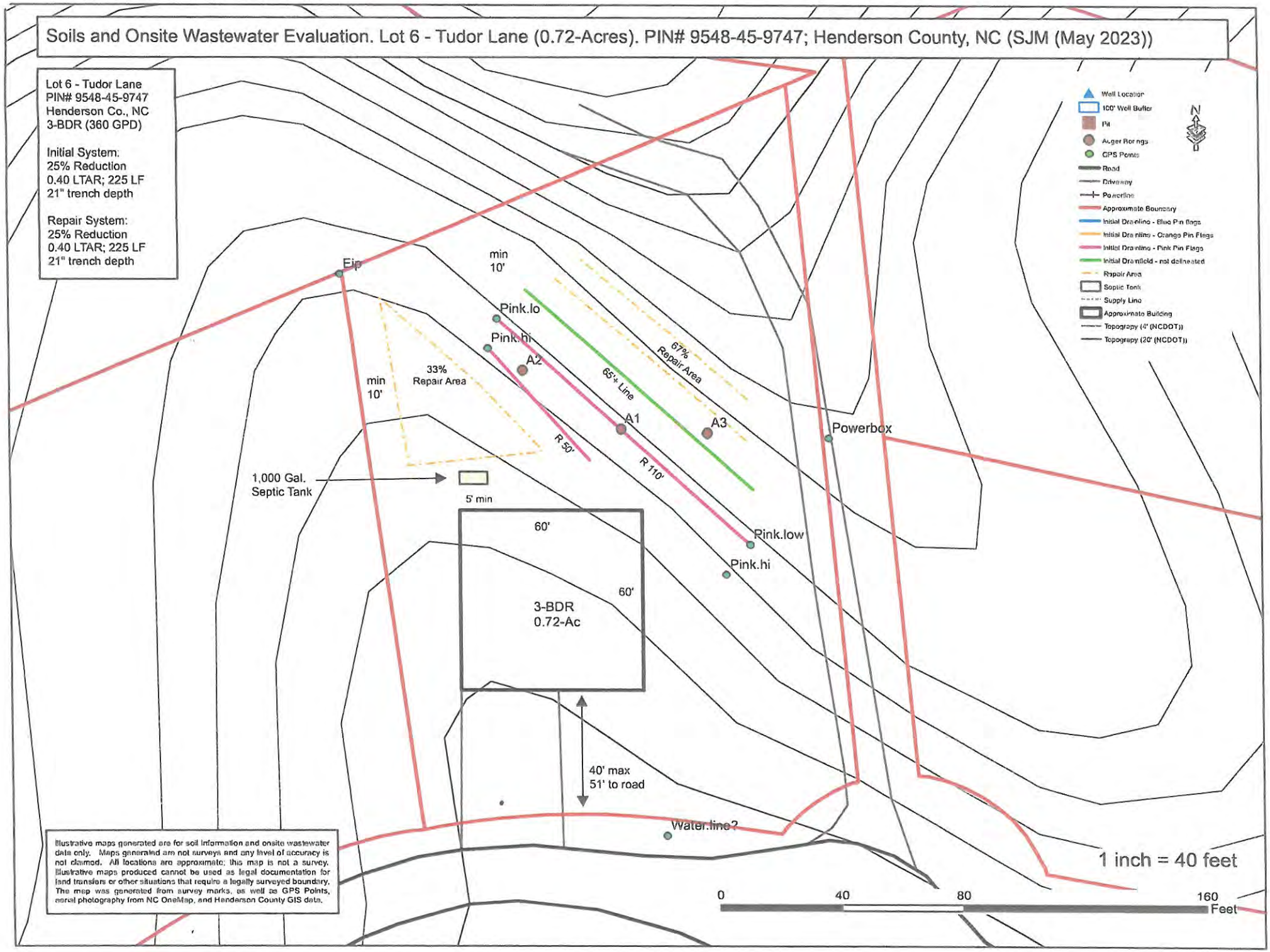
Land Owner or Authorized Signature: _____

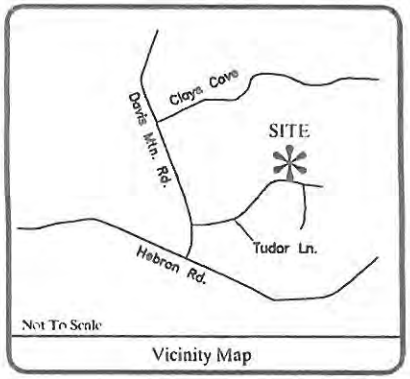
Date: _____

Land Owner or Authorized Signature: _____

Date: _____

OFFICE USE ONLY
Project #:
Associated Project #:
Received By: Kaitlan Finkle
Filing Date: 2/7/24
Accepted as Complete By:
Complete Date:
Decision:
Decision By:
Decision Date:
Pre-application Conference Date (if conducted): 2/7/24
Notes/Comments:


Soils and Onsite Wastewater Evaluation. Lot 6 - Tudor Lane (0.72-Acres). PIN# 9548-45-9747; Henderson County, NC (SJM (May 2023))
Lot 6 - Tudor Lane
PIN# 9548-45-9747
Henderson Co., NC
3-BDR (360 GPD)
Initial System:
25% Reduction
0.40 LTAR; 225 LF
21" trench depth
Repair System:
25% Reduction
0.40 LTAR; 225 LF
21" trench depth
Well Location
100' Well Buffer
Pit
Auger Borings
GPS Points
Road
Driveway
Powerline
Approximate Boundary
Initial Dra-line - Blue Pin flags
Initial Dra nline - Orange Pin Flags
Initial Dra-line - Pink Pin Flags
Initial Drainfield - not delineated
Repair Area
Septic Tank
Supply Line
Approximate Building
Topography (4' (NCDOT))
Topography (20' (NCDOT))
N
Eip
min
10'
Pink.lo
Pink.hi
A2
33%
Repair Area
min
10'
65'+ Line
67%
Repair Area
A1
A3
Powerbox
R 50'
R 110'
1,000 Gal.
Septic Tank
5' min
60'
60'
3-BDR
0.72-Ac
Pink.low
Pink.hi
40' max
51' to road
Water.line?
Illustrative maps generated are for soil information and onsite wastewater data only. Maps generated are not surveys and any level of accuracy is not claimed. All locations are approximate; this map is not a survey. Illustrative maps produced cannot be used as legal documentation for land transfers or other situations that require a legally surveyed boundary. The map was generated from survey marks, as well as GPS Points, aerial photography from NC OneMap, and Henderson County GIS data.
1 inch = 40 feet
0
40
80
160
Feet



Not To Scale

Vicinity Map

LOT 6
0.88 ACRES
38,454.95 Sq. Ft.

Laurel Oaks Property Owners Association, Inc.
D.B. 1440 Pg. 657

Lot 4
Ryan & Kelly Lageman
D.B. 3733 Pg. 464

Lot 5
Michael & Kathleen Gevers
D.B. 1684 Pg. 243

Stephen & Deborah Bauermeister
D.B. 3306 Pg. 650
Plat Slide 3082

PRELIMINARY PLAT
Not For Sales, Conveyance, or Recordation

Slide 3081
Plat North

LEGEND

IPF	Iron Pin Found
IPS	Iron Pin Set 1/2" Rebar
PT	Unmarked Point
	Utility Pole
OHP	Overhead Utilities
	Fire Hydrant
S	Sanitary Sewer Manhole
W	Water Meter
	Catch Basin
	Utility Box
	Building Setback Line
RW	Edge of Right of Way

Date:	September 18, 2023
Ref. Deed Book:	D.B. 4040 Pg. 183
Ref. Plat Book:	Plat Slide 3081
Tax Parcel Number:	9548-45-9747
Drawn By: MDF	Party Chief: CRB
DWG File:	S-2308-110

NOTES:
- All distances are horizontal unless otherwise noted.
- All acreage is by coordinate method.
- This is a Class "A" Survey
- Surveyor has made no investigation or independent search for easements of record, encumbrances, restrictive covenants, ownership title evidence, or any facts that an accurate and current title search may disclose.
- No attempt has been made as a part of this boundary survey to obtain or show data concerning existence, size, depth, condition, capacity, or location of any utility or municipal/public service facility. For information regarding these utilities or facilities, please contact the appropriate agencies.

"I certify that this map was drawn under my supervision from an actual survey made under my supervision (deed description recorded in Book 4040, Pg. 183 or other reference source _____); that the boundaries not surveyed are indicated as drawn from information in Book____, Pg.____ or other reference source_____; that the ratio of precision or positional accuracy is 1:10000; and that this map meets the requirements of The Standards Of Practice for Land Surveying in North Carolina (21 NCAC 56. 1600)." This 18th day of September, 2023.

NORTH CAROLINA PROFESSIONAL SEAL L-3903 LAND SURVEYOR MARK D. FREEMAN

Mark D. Freeman, PLS L-3903

Survey of
Lot 6 of Laurel Oaks Subdivision
For
The James Rodney Pratt and
Gayle Morene Pratt Revocable Trust

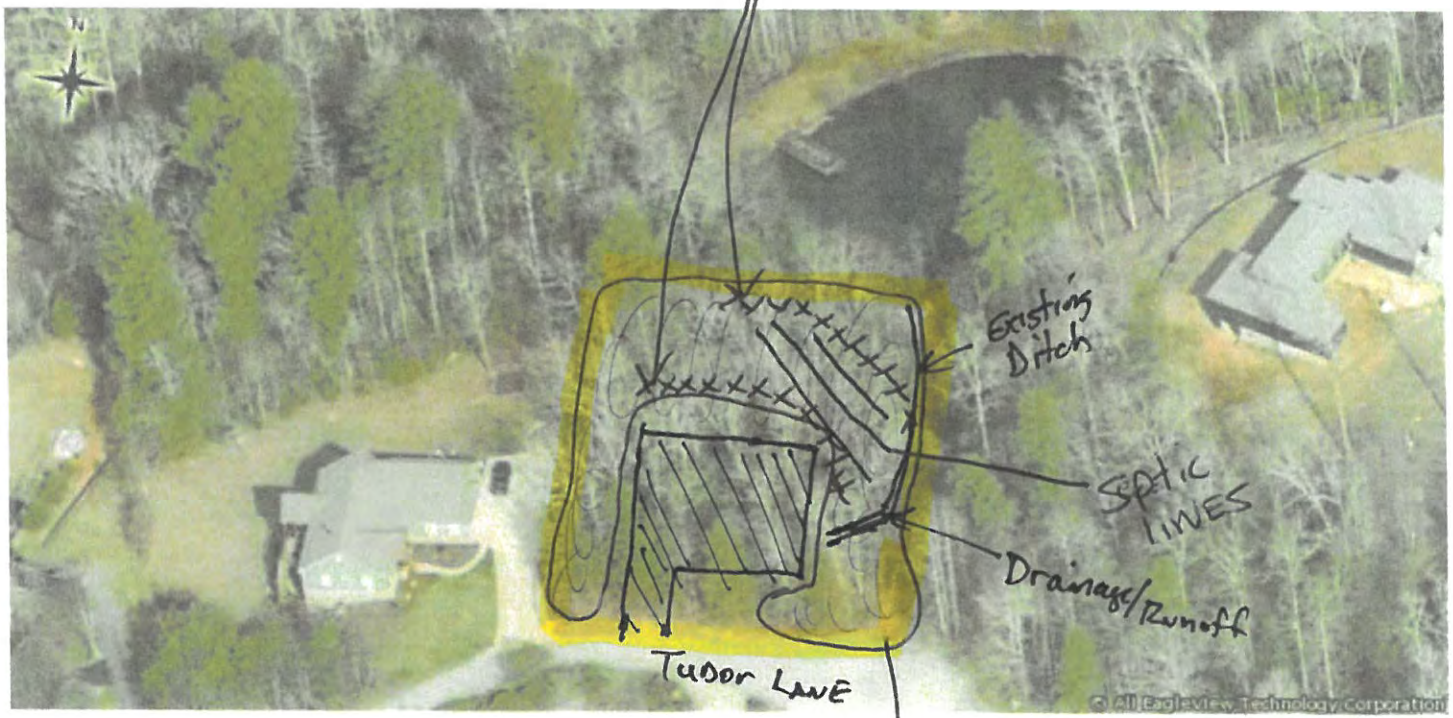
State of North Carolina
Henderson County
Crab Creek Township

FREEMAN LAND SURVEYING, PLLC
P.O. BOX 10
EDNEYVILLE, NORTH CAROLINA 28727
(828)-259-9759
License No. P-0164

CURVE	RADIUS	CHORD BEARING	CHORD DISTANCE	ARC LENGTH
C1	238.54'	S 86°14'40" W	75.59'	75.91'

SCALE
30 0 15 30 60
30 Feet to the Inch

6 Tudor Lane



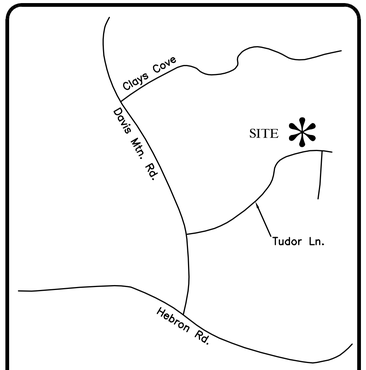
Landscape plan/site plan

3000 sqft of House pad & Driveway Disturbed

Leaving existing trees & foliage for Buffers

02/23/2020

LOT 6
0.88 ACRES
38,454.95 Sq. Ft.



Not To Scale

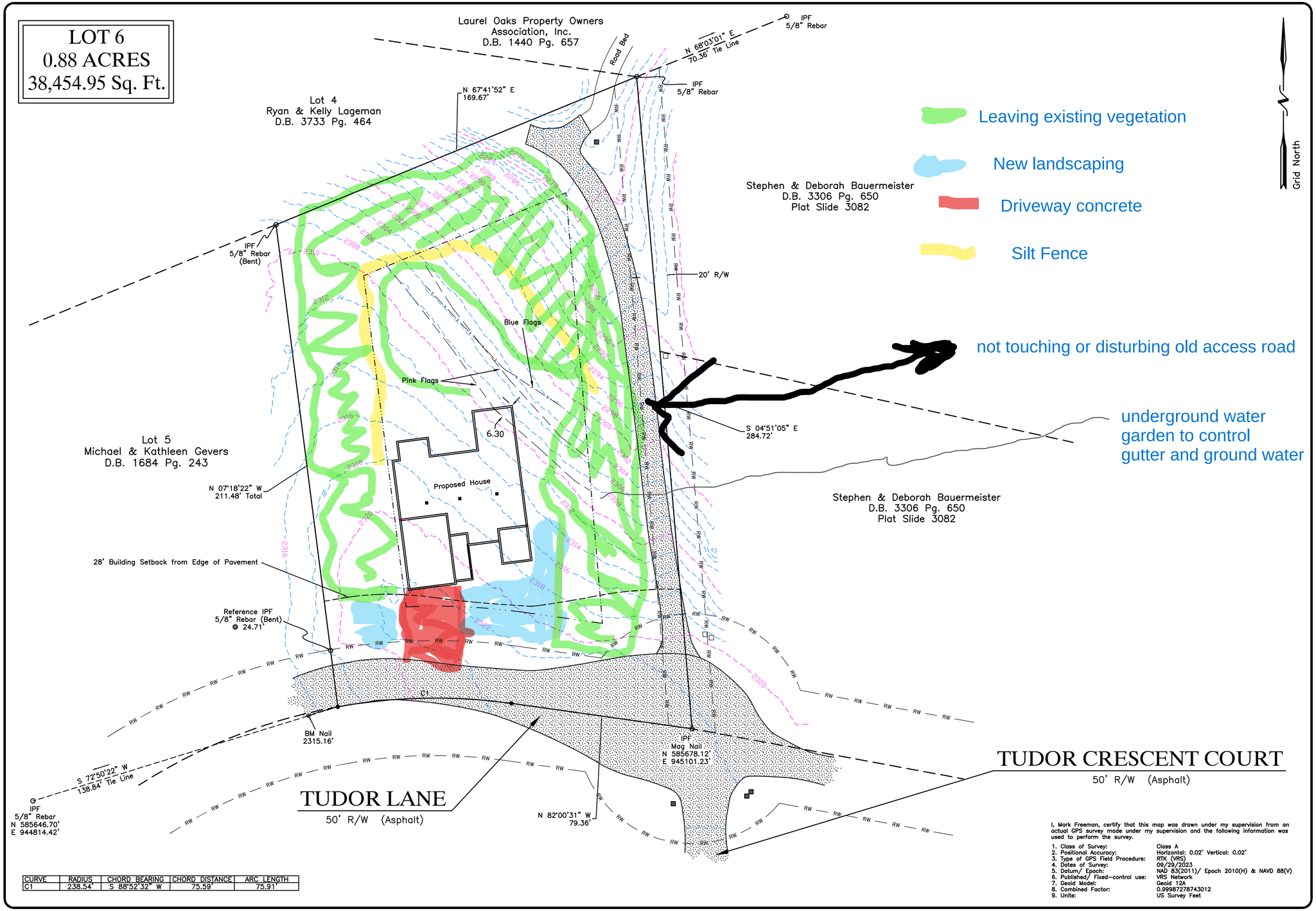
Vicinity Map

LEGEND	
IPF	Iron Pin Found
IPS	Iron Pin Set 1/2" Rebar
PT	Unmarked Point
	Utility Pole
— OHP —	Overhead Utilities
	Fire Hydrant
S	Sanitary Sewer Manhole
W	Water Meter
	Catch Basin
	Utility Box
	Building Setback Line
— RW — RW —	Edge of Right of Way

Date:	October 2, 2023
Ref. Deed Book:	D.B. 4040 Pg. 183
Ref. Plat Book:	Plat Slide 3081
Tax Parcel Number:	9548-45-9747
Drawn By: MDF	Party Chief: CRB
DWG File:	S-2309-110B

NOTES

- Surveyor has made no investigation or independent search for easements of record, encumbrances, restrictive covenants, ownership title evidence, or any other facts that an accurate and current title search may disclose.
- All distances are horizontal unless otherwise noted.
- All acreage is by coordinate method.
- No attempt has been made as a part of this boundary survey to obtain or show data concerning existence, size, depth, condition, capacity, or location of any utility or municipal/public service facility. For information regarding these utilities or facilities, please contact the appropriate agencies.
- Except as specifically stated or shown on this plat, this survey does not purport to reflect any of the following which may be applicable to the subject real estate: easements, other than possible easements that were visible at the time of making of this survey; building setback lines; restrictive covenants; subdivision restrictions; zoning or other land use regulations; and any other facts that an accurate and current title search may disclose.
- Topographic information shown was downloaded and processed from the North Carolina Spatial Download site. The topographic information was not field verified.
- This is to certify that the property shown on this plat was surveyed under my direct supervision. Property lines and improvements shown are located correctly, and that no visible encroachments exist unless otherwise shown.
- The error of closure is 1:10,000.
- This is a Class "A" Survey.



CURVE	RADIUS	CHORD BEARING	CHORD DISTANCE	ARC LENGTH
C1	238.54'	S 88°52'32" W	75.59'	75.91'

I, Mark Freeman, certify that this map was drawn under my supervision from an actual GPS survey made under my supervision and the following information was used to perform the survey.

1. Class of Survey:	Class A
2. Positional Accuracy:	Horizontal: 0.02' Vertical: 0.02'
3. Type of GPS Field Procedure:	RTK (VRS)
4. Dates of Survey:	09/29/2023
5. Datum/ Epoch:	NAD 83(2011)/ Epoch 2010(H) & NAVD 88(V)
6. Published/ Fixed-control use:	VRS Network
7. Geoid Model:	Geoid 12A
8. Combined Factor:	0.99987278743012
9. Units:	US Survey Feet

I, Mark Freeman, certify that this plat was drawn under my supervision from an actual survey made under my supervision (deed description recorded in Book 4040, page 183, etc.); that the boundaries not surveyed are clearly indicated as drawn from information found in Book ___, page ___; that the ration of precision or positional accuracy as calculated is 1:10000; that this plat was prepared in accordance with G.S. 47-30 as amended. Witness my original signature, license number and seal this 2nd day of October, A.D., 2023.

DocuSigned by:
Mark Freeman
7CFD6768026946...

Mark D. Freeman, PLS L-3903

NORTH CAROLINA PROFESSIONAL SEAL L-3903 LAND SURVEYOR MARK D. FREEMAN

Contour Interval is 2 Feet

SCALE

20 0 10 20 40 80

20 Feet to the Inch

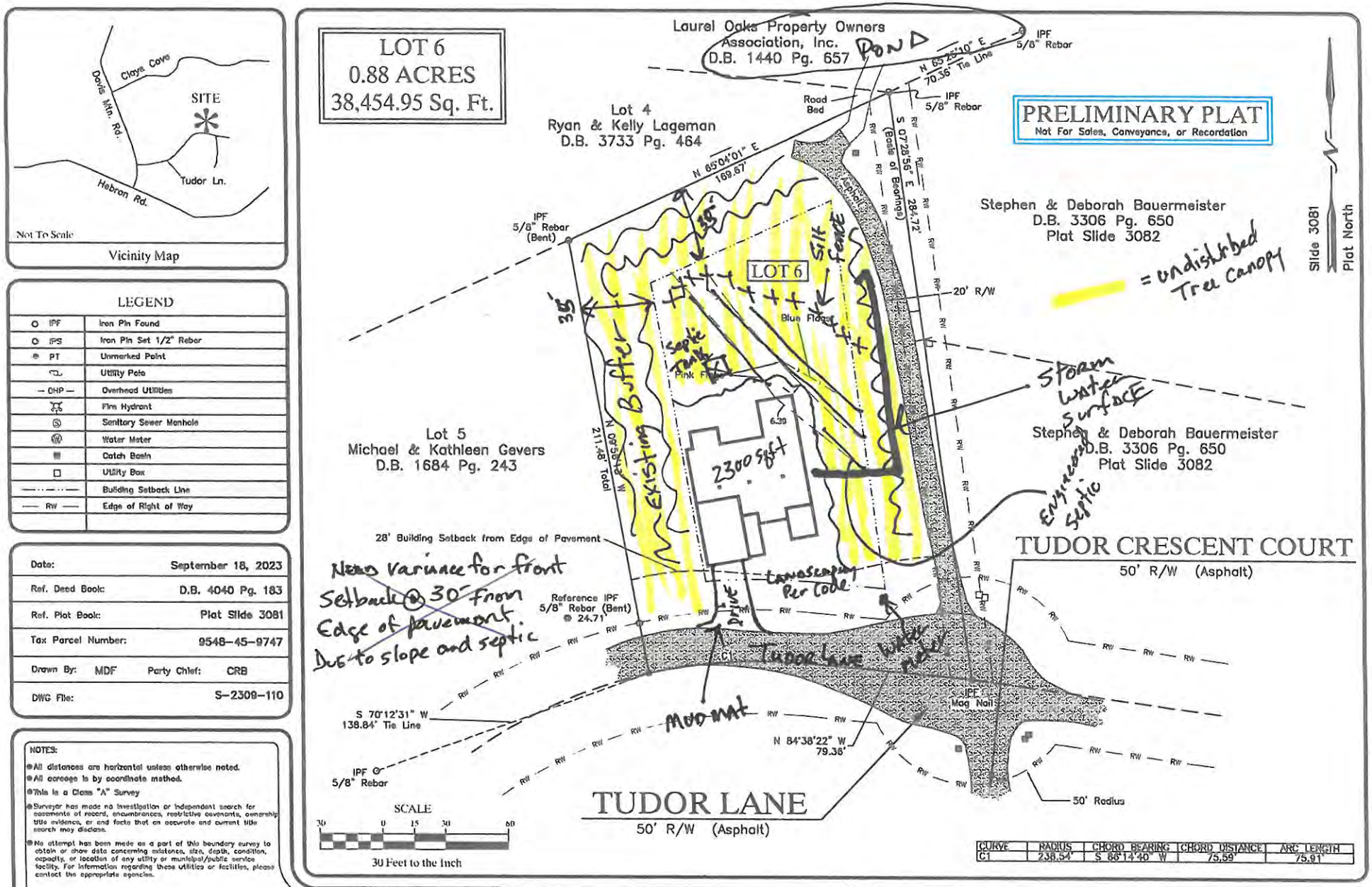
Survey of
Lot 6 of Laurel Oaks Subdivision & LIDAR Topographic Data
For
The James Rodney Pratt & Gayle Morene Pratt
Revocable Trust

State of North Carolina
Henderson County
Crab Creek Township

FREEMAN LAND SURVEYING, PLLC

P.O. BOX 40
EDNEYVILLE, NORTH CAROLINA 28727
(828)-259-9759

License No. P-0164



Vicinity Map

LEGEND

O IPF	Iron Pin Found
O IPS	Iron Pin Set 1/2" Rebar
⊕ PT	Unmarked Point
	Utility Pole
— OHP —	Overhead Utilities
	Fire Hydrant
Ⓢ	Sanitary Sewer Manhole
Ⓦ	Water Meter
	Catch Basin
□	Utility Box
— · — · —	Building Setback Line
— RW —	Edge of Right of Way

Date:	September 18, 2023
Ref. Deed Book:	D.B. 4040 Pg. 183
Ref. Plat Book:	Plat Slide 3081
Tax Parcel Number:	9548-45-9747
Drawn By: MDF	Party Chief: CRB
DWG File:	S-2309-110

NOTES:

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- This is a Class "A" Survey
- Surveyor has made no investigation or independent search for easements of record, encumbrances, restrictive covenants, ownership title evidence, or any facts that an accurate and current title search may disclose.
- No attempt has been made as a part of this boundary survey to obtain or show data concerning existence, size, depth, condition, capacity, or location of any utility or municipal/public service facility. For information regarding these utilities or facilities, please contact the appropriate agencies.

"I certify that this map was drawn under my supervision from an actual survey made under my supervision (deed description recorded in Book 4040, Pg. 183 or other reference source _____); that the boundaries not surveyed are indicated as drawn from information in Book_____ Pg._____ or other reference source_____; that the ratio of precision or positional accuracy is 1:10000; and that this map meets the requirements of The Standards Of Practice for Land Surveying in North Carolina (21 NCAC 56. 1600)." This 18th day of September, 2023.

NORTH CAROLINA PROFESSIONAL SEAL L-3903 LAND SURVEYOR MARK D. FREEMAN

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Lot 6 of Laurel Oaks Subdivision
For
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State of North Carolina
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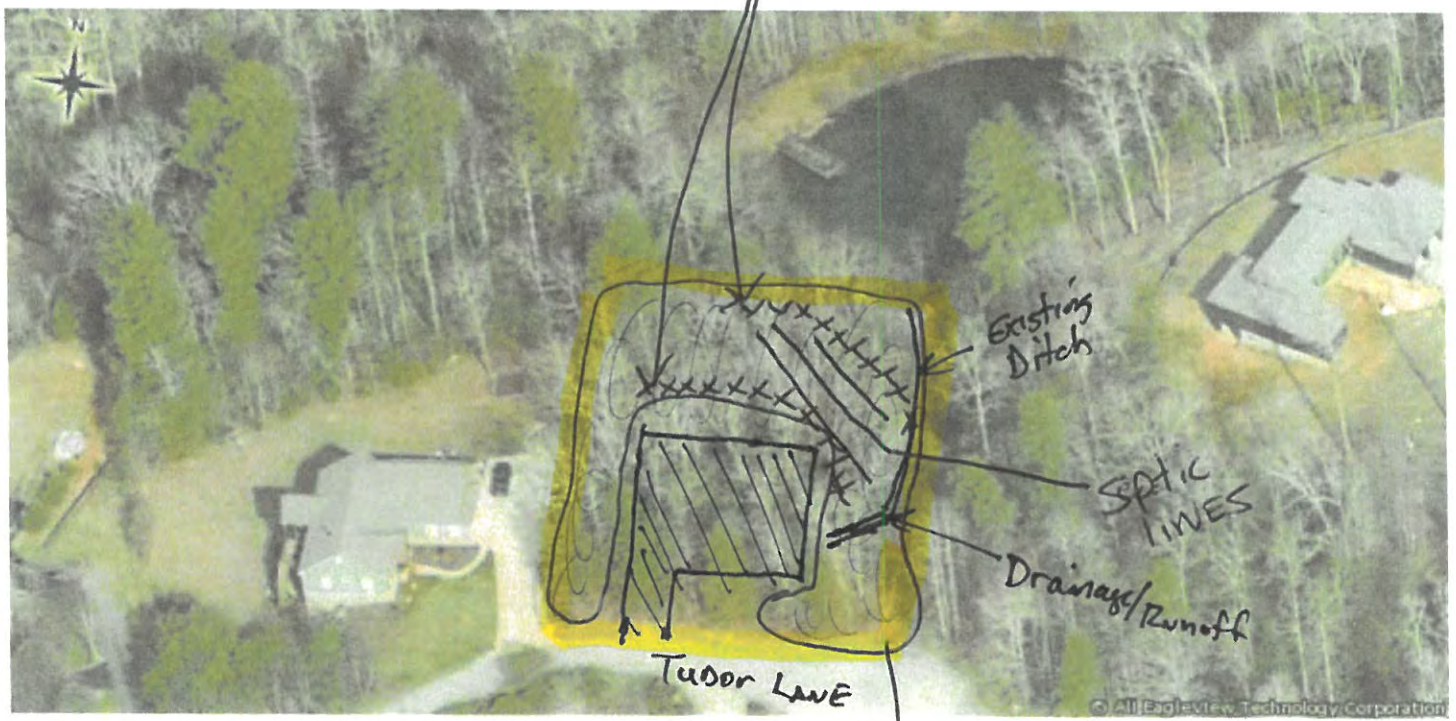
EDNEYVILLE, NORTH CAROLINA 28727
(828)-259-9759
License No. P-0184

6 Tudor Lane



Landscape plan/site plan

3000 sqft of House pad & Driveway Disturbed

Leaving existing trees & foliage for Buffers

02/23/2020

PEAK HYDROGEOLOGIC

VIA EMAIL

March 2, 2024

Mr. Danny Hayes
DMH Builders, Inc.
dmhbuildersinc@gmail.com

Re: Laurel Park Pre-Development Investigation
Tudor Lane, Lot 6, Hendersonville, NC 28739
Peak Hydrogeologic, PLLC Project No. 453-24

Dear Mr. Hayes,

Peak Hydrogeologic, PLLC (Peak HG) is pleased to provide you with this letter report for the Laurel Park Pre-Development Investigation that was performed by a Professional Geologist (NC LG #2515). Peak HG is a NC-licensed geological consulting firm (#C-543) that maintains $2M in commercial, professional, and pollution-liability insurance coverages. The report below documents Peak HG's understanding, scope of services, investigative results, and conclusions/recommendations.

I. PROJECT UNDERSTANDING

This project involves the construction of a single-family residential home, driveway, and stormwater dispersal rain garden at Tudor Lane, Lot 6 (Henderson Co. PIN 9548-45-9747) in Hendersonville, NC, 28739.

Because "Very Steep Slopes" exist on portions of the property, the Laurel Park Unified Development Ordinance ("UDO", last amended 8.15.23) Environmental Section 3.1.5.A requires a NC-Licensed Geologist to perform a pre-development investigation to characterize geologic hazards at the site and determine if either stormwater dispersal (3.1.5.C) or retention (3.1.5.D) is necessary to manage stormwater runoff from the proposed development. Pertinent sections of the UDO are below:

"Very Steep Slope- Lots or tracts having slopes in excess of 25 percent, with or without geologic hazards present"

"The standards in this section shall apply to all lots or tracts with geologic hazards present as well as to lots or tracts with steep or very steep slopes on any portion of the lot or tract, whether such slopes existed prior to or after land- disturbing activity or grading."

"Whenever new development is proposed which involves land disturbing activity on land subject to these standards, or if geological hazard indicators are observed on the land which will be disturbed by the development, the applicant shall provide investigation(s) documents

prepared by a North Carolina licensed geologist or professional engineer licensed by the State, as appropriate, as part of the development application materials."

"Investigation documents shall include an analysis and conclusion about the likelihood of landslide hazards or soil instability because of utilization of typical stormwater dispersal measures such as disconnected downspouts, level spreaders, or similar techniques for disbursing stormwater across a development site."

"Applications for development proposed on lands with very steep slopes must be accompanied by a site-specific geologic analysis of the very steep slope portion of the site to be disturbed by the proposed development plan, paid for by the applicant, and conducted by a North Carolina licensed geologist, to determine whether that plan can be developed on the site without jeopardizing slope stability on the site itself or on properties surrounding the site."

II. SCOPE OF SERVICES

To satisfy the Laurel Park UDO requirements for performance of a pre-development investigation, Peak HG has performed the following:

- Desktop literature review of site development plans, Henderson County GIS property data, topographic maps, geologic maps, soil maps, and LiDAR terrain data to characterize the site hydrogeological setting and potential for landslide hazards and soil instability. Online resources reviewed for the property include the Henderson County GIS, the USDA Web Soil Survey, the USGS National Geologic Mapping Database, and the NC Spatial Data Downloads LiDAR data.

- Field reconnaissance to evaluate the site setting, including slope steepness, existing vegetative cover, and soil characteristics at/near the proposed area for a home, driveway, and rain garden. Soils were evaluated at three borehole locations along a linear transect on the hillside at and downhill from the proposed development area. Boreholes were installed with a 3.2-inch diameter hand-auger down to auger refusal on bedrock or to 13-feet below ground surface (whichever came first). Soil cuttings were logged in field notes to document changes in lithology, degree of saturation, and depth to bedrock. Borehole XYZ locations along the transect were recorded with a hand-held GPS and photographed.

- Reporting that includes documentation of investigative methods, results of the desktop literature review, results of the field reconnaissance, and conclusions about the likelihood for landslides and soil instability from the proposed development.

III. RESULTS

Based on a review of site plans (Quible and Associates P23137, January 2024), development is proposed in the existing flat area (<15% slope) in the southwestern corner of the property, and it will include disturbance of approximately 0.19-acres of the 0.88-acre lot as needed to construct a house, driveway, and stormwater dispersal rain garden. According to the plans, stormwater runoff from the roof of the home will be directed to a rain garden. To avoid stormwater infiltration at the top of the slope, Peak HG understands a geosynthetic clay liner will be installed under bio media and plantings in the rain garden. Based on Peak HG's review

of the site plans, it appears that water loss from the rain garden will consist of evaporation, transpiration by plantings, and non-erosive overflow (beyond the first 1.19 inches of stormwater runoff) across an approximately 55-ft long weir (level spreader) at the edge of the rain garden.

Based on a review of Henderson County GIS data (https://henderson.roktech.net/gomaps4; accessed February 23, 2023) for the subject property, topographic relief at the site ranges a total of approximately 46-ft, from a topographic maximum elevation of approximately 2,322-ft amsl at the southwestern property extent (at proposed driveway access off of Tudor Ln.) to a minimum elevation of approximately 2,276-ft amsl at the northeastern property extent (at a man-made pond). According to Henderson County GIS data, the slope of the site in the proposed development area (southwestern portion of the property) is mostly flat (0-15% slope). To the northeast and downhill of the proposed development area, the slope steepness increases from 15-25% to 25-60%, and there is a very small portion in the northeastern corner of the property at a road cut where slopes are 60% or greater.

The USDA Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov; accessed February 23, 2023) Soil Map for the property indicates that soils at the site consist of Delanco (Dillard) loam ("DeB" Unit). The DeB Unit is described as loam, clay loam, and sandy loam soils that are well drained. Depth to restrictive feature is >80-inches, the soils are assigned to hydrologic soil group C, and there is no hydric soil rating. The capacity of the most limiting layer to transmit water (Ksat) in the DeB is moderately high to high (0.57 to 1.98 in/hr). DeB is composed of alluvium and colluvium derived from weathered igneous and metamorphic bedrock.

The Bedrock Geologic Map of the Horse Shoe 7.5-minute Quadrangle, Henderson and Transylvania Counties, North Carolina (Cattanach, B.L., and Merschat, C. E., 2009, North Carolina Geological Survey, Open-File Report 2009-04, 1:24,000 scale) indicates that bedrock at the property and surrounding areas consists of metamorphic rock of the Henderson Augen Gneiss. The geologic map indicates the presence of several intersecting joint sets measured in bedrock outcrops near the property, however, no joints nor faults are mapped at the subject property.

A hydrogeologist with Peak HG met with the builder and site owner on February 23, 2024, to discuss the proposed development plan and to walk the undeveloped/forested property and proposed layout for the home and rain garden. After the meeting, Peak HG evaluated the presence and/or potential for development of geologic hazards from mass wasting (landslides) at the site. Note that the field reconnaissance was performed immediately following a light rain shower. Due to the proposed development area's location near the summit of a hill on the north side of Tudor Ln. (Figure 1), Peak HG observed that the proposed development area does not receive appreciable quantities of stormwater runoff from up-gradient properties to the south, across Tudor Ln.

The site map (Figure 1) includes map overlays of property lines and previously mapped landslides (Henderson County GIS data) and NC 1-meter LiDAR terrain imagery (NCEM SDD) to better identify areas of bedrock deformation and known or potential mass wasting locations near the site. While a potential debris flow pathway is mapped by the NC Geologic Survey on properties to the northeast of the subject property, there are no landslide features

mapped at the subject property, nor on any adjoining properties. At the subject property, neither the LiDAR imagery nor the field reconnaissance indicated the presence of bedrock outcrops, boulder/debris fields, slump, scarps, zones of brittle bedrock deformation (as indicated by topographic lineaments and hummocky terrain), nor other evidence of geologic hazard indicators at the property.

Figure 1 also shows the proposed development area and borehole locations along a 75-ft linear transect of the hillside at and below the proposed rain garden. Results of the borehole characterization are detailed in the table below, and photographs are included as an attachment to this report.

Borehole ID	Position along hillside transect	Borehole depth	Borehole description
B1	0-ft	13-ft (down to maximum possible auger depth)	Located within rain garden and approximately 25 east from western property boundary. Reddish brown poorly structured SiCL 0-3ft (moist to 6-in bgs from recent rain). Moderately structured dry grayish brown SiCL at 3-5.5 ft. Well structured damp reddish brown SSi 5.5-7 ft. Well structured, mottled, moist, and resistant saprolite block at 7-7.5 ft bgs (trace gravel). Well structured damp reddish brown SSiCL 7.5-10 ft bgs and roots observed to 10 ft bgs. Well structured damp mottled grayish brown SSiC saprolite 10-13 ft bgs (max auger depth). No auger refusal, no bedrock, no saturated soil conditions, and no measurable water in borehole approximately 4 hours after borehole installation.
B2	30-ft	10-ft (down to auger refusal on competent saprolite)	Located below proposed rain garden level spreader and approximately 30 east of B1. Reddish brown poorly structured SiCL 0-2.5ft (moist to 6-in bgs from recent rain). Well structured (damp at 4.5-5.5 ft) grayish brown SiCL at 2.5-5.5 ft bgs. Well structured damp reddish brown SSi 5.5-7 ft. Well structured, mottled, moist, and resistant saprolite block at 7-7.25 ft (trace gravel). Well structured damp reddish brown SSiCL 7.25-8.25 ft. Well structured damp mottled grayish brown SSiC saprolite 8.25-10.25 ft. Auger refusal on competent saprolite at 10.25 ft. No saturated soils.
B3	75-ft	10-ft (down to auger refusal on competent saprolite)	Located 75 ft northeast of B1 and downgradient from the proposed rain garden. R. brown SiCL 0-4ft. Brownish gray structured 4-6.25 ft. Well structured, moist, and resistant saprolite block at 6.25-6.75 ft (trace gravel). Well structured damp mottled grayish brown SSiC saprolite 6.75-9.9 ft. Auger refusal on competent saprolite at 10 ft bgs. No saturated soils conditions

Based on the results of the soils characterization, soils at and topographically down-gradient from the proposed development area are predominantly well drained, sandy silty clay loams. Soils near the flat area at the top of the hill (where the rain garden is proposed) are at least 13-ft thick. Moving down hill to at least 75-ft northeast of the rain garden (and below where stormwater runoff will be directed across the rain garden's 55-ft long overflow weir), soils are at least 10-ft thick and underlain by saprolite (weathered bedrock). No significant aquitards (low permeability layers) nor perched aquifer conditions (shallow water table and saturated soils) were observed in any of the boreholes despite the occurrence of rain before the field reconnaissance.

IV. CONCLUSIONS

In accordance with requirements posed by the Laurel Park Unified Development Ordinance Environmental Section 3.1.5, a NC-licensed Professional Geologist with Peak HG has performed a Pre-Development Investigation of the proposed residential property at Lot 6 on Tudor Lane in Hendersonville, NC (Henderson County PIN 9548-45-9747). The work was performed to characterize geologic hazard indicators at the site and determine if either stormwater dispersal or retention is necessary to manage stormwater runoff from the proposed development. As detailed in site plans and engineering calculations (Quible and Associates P23137, January 2024), a single family home, driveway, and stormwater dispersal rain garden are proposed in the mostly flat area (<15% slopes) in the southwestern portion of the property.

As detailed in the preceding section, Peak HG has performed a desktop literature review and field reconnaissance. A site map is provided as Figure 1, and photographs and other supporting documentation from the literature review are provided as attachments to this report. Based on Peak HG's review: 1- no landslide features are mapped at the property; 2- no intersecting bedrock joint sets are mapped at the property; 3- the proposed development area does not receive appreciable quantities of stormwater runoff from near by up-gradient properties; 4- neither the LiDAR imagery nor the field reconnaissance indicated the presence of bedrock outcrops, boulder/debris fields, slump, scarps, zones of brittle bedrock deformation (as indicated by topographic lineaments and hummocky terrain), nor other evidence of geologic hazard indicators at the property; 5- based on the results of soils characterization along a 75-ft linear transect of the hillside at and below the proposed rain garden, soils at and topographically down-gradient from the proposed rain garden are predominantly well-drained, sandy silty clay loams; 6- soils near the flat area at the top of the hill (where the rain garden is proposed) are at least 13-ft thick, and moving down hill to at least 75-ft east of the rain garden (and below where stormwater runoff will be directed across the rain garden's 55-ft long overflow weir/level spreader), soils are at least 10-ft thick and underlain by saprolite (weathered bedrock); 7- no significant aquitards (low permeability layers) nor perched aquifer conditions (shallow water table and saturated soils) were observed in any of the boreholes despite the occurrence of rain before the field reconnaissance.

Based on the results of the investigation, Peak HG concludes that there is not a significant likelihood that landslide hazards nor soil instability will develop as a result of the proposed home, driveway, and stormwater dispersal rain garden that are proposed in engineer's site plans (Quible and Associates P23137, January 2024).

V. LIMITATIONS

While every effort was made for this site evaluation to provide representative site information as needed to evaluate landslide hazards and slope instability; it is not within the scope of this project to document all conditions that may alter the conclusions and recommendations provided in this report. As such, the results of this investigation are applicable as of the date of the investigation and only under the limited parameters of the investigation. Peak HG makes no guarantees about unknown or future site conditions. Any deviations from the proposed development plan, which were reviewed as part of this investigation, may alter or void the conclusions presented above.

VI. CLOSING

Peak Hydrogeologic, PLLC sincerely appreciates the opportunity to provide you with this report. Please contact me at (828) 817-5209 or by email at jgerst@peakhydrogeologic.com if you have any questions.

Sincerely,

Peak Hydrogeologic, PLLC (NC C-543 Geology)
Environmental & Water Resources Consulting

Jonathan D. Gerst, MS, PG (NC #2515 / SC #2644)
Principal Hydrogeologist

Enclosures: Figure 1- Site Map & Borehole Locations
Field Reconnaissance Photographs
Screen Shots of Supporting Documentation

THIS IS NOT A SURVEY.

SOURCES: Henderson County GIS, NCEM SDD, Quible P23137

PEAK HYDROGEOLOGIC, PLLC

ENVIRONMENTAL & WATER RESOURCES CONSULTING

LAUREL PARK PRE-DEVELOPMENT INVESTIGATION

Site Map & Borehole Locations
Tudor Lane, Lot 6
Hendersonville, NC 28739

PROJ. NO.: 453-24	DRAWN BY: JDG	FIGURE: 1
SCALE: 1-in ≈ 200-ft		DATE: 03/01/2024

Image 1- Proposed develpment area within flat, southwestern portion of the property.

Image 2- No development proposed at/near the very steep slope portion (road cut) in the northeastern portion of the property.

Image 3- Borehole B1 location within proposed rain garden area and beside western property boundary.

Image 4- Borehole B2 location approximately 30-ft northeast and downhill of borehole B1.

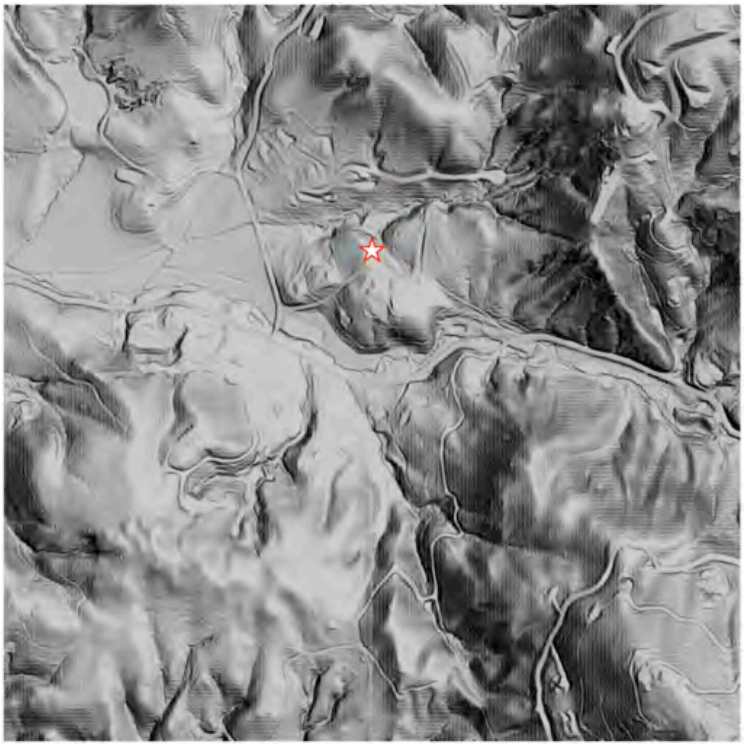
Image 5- Borehole B3 location approximately 75-ft northeast and downhill of borehole B1.

Image 6- Tools (extendable hand auger and utility probe) used to excavate soils for borehole characterization.

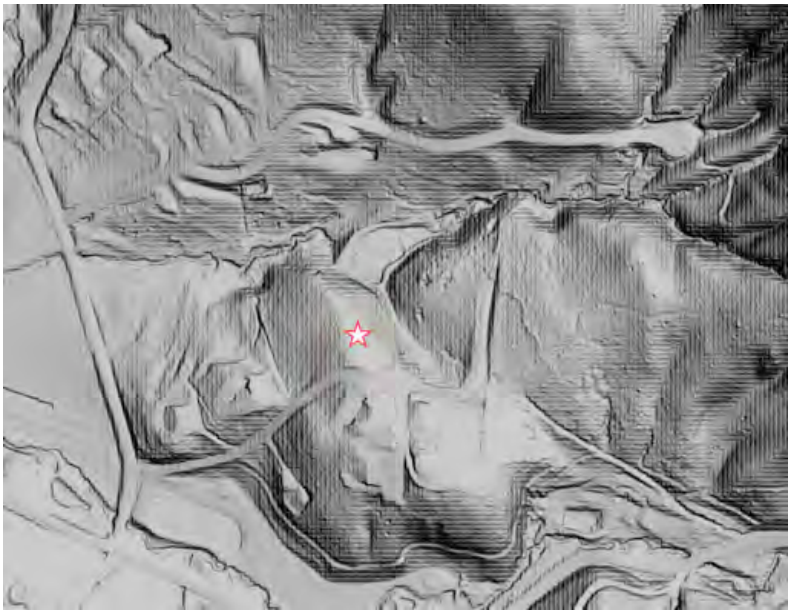
Image 7- Example 1 of silty clay loam.

Image 8- Example 2 of silty clay loam.

Henderson GIS Parcels & NCGS Potential Landslides.png



LiDAR overview.png



LiDAR site.png

Soil Map.png

Henderson County, North Carolina

DaB—Dalanco (dillard) loam, 2 to 7 percent slopes

Map Unit Setting
National map unit symbol: 1c1c
Elevation: 1,500 to 3,000 feet
Mean annual precipitation: 55 to 75 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 150 to 180 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Dillard and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dillard

Setting
Landform: Depressions on stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium and/or colluvium derived from igneous and metamorphic rock

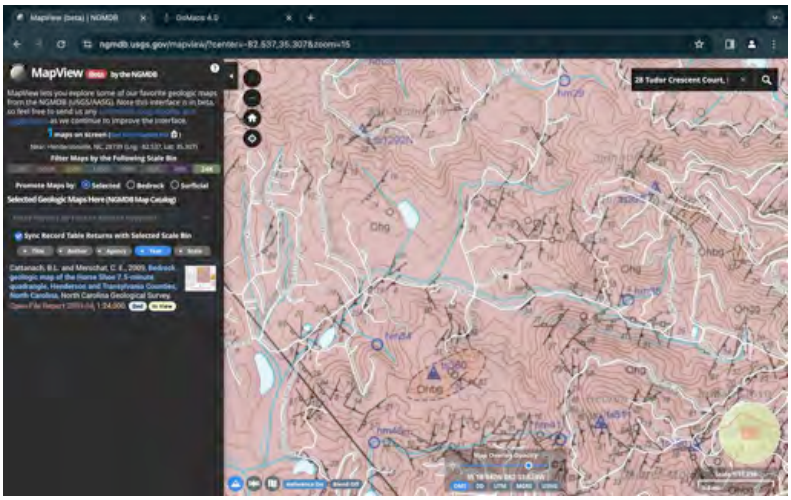
Typical profile
Ap - 0 to 10 inches: loam
Bt - 10 to 30 inches: clay loam
BCg - 30 to 40 inches: sandy loam
Cg - 40 to 80 inches: sandy loam

Properties and qualities
Slope: 2 to 7 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 30 to 42 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 8.2 inches)

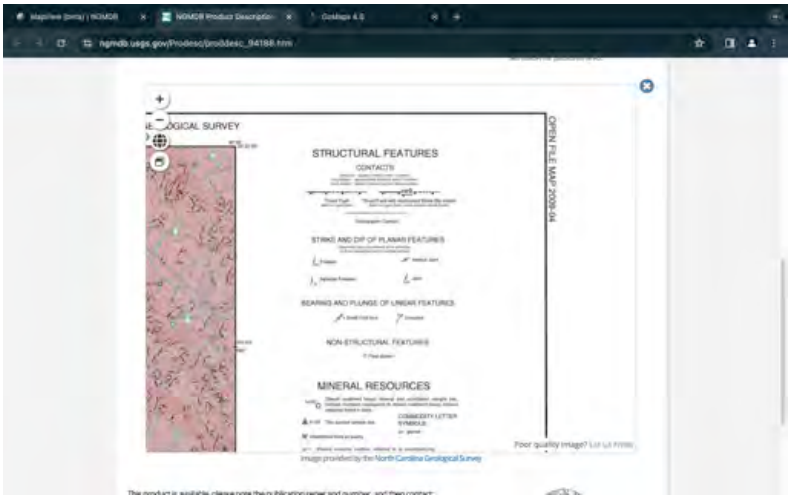
Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: F133BY101WV - Terraces

Natural Resources Conservation Service

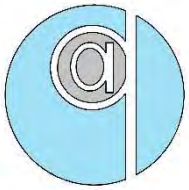
Soil description.png



Geologic Map.png



Geologic map legend.png



SINCE 1959

Laurel Park Stormwater Management Report

Tudor Lane, Lot 6
Hendersonville NC, 28739

Prepared For:

DMH Builders
10 South Oak Forrest Dr.
Asheville, NC 28803

Prepared By:

Quible & Associates, P.C.
Engineering · Environmental Sciences · Surveying · Planning
90 Church Street, Suite B
Black Mountain, North Carolina 28711
(828) 280-8375
Quible.com

Project Number P23137
January 11, 2024

Quible

Quible & Associates, P.C.
ENGINEERING • ENVIRONMENTAL SCIENCES • PLANNING • RESTORATION
SINCE 1959

90 Church St., Suite B
Black Mountain, NC 28711
Phone: 828-793-0398
Web: quible.com
Engineering Services

STORMWATER NARRATIVE

Tudor Lane, Lot 6
PIN(S): 9548-45-9747, Henderson County
February 5, 2024

Project Description

This project involves the construction of a single-family home on Lot 6 off Tudor Lane in Laurel Park, NC. The site is 0.88 acres with an average slope of 23.5%. A portion of the lot has steep and very steep slopes according to the Laurel Park Unified Development Ordinance (UDO).

Laurel Park UDO § 3.1.4 requires an investigation by a professional geotechnical engineer that includes an analysis and conclusion about the likelihood of landslide hazards or soil instability because of the utilization of typical stormwater dispersal measure such as disconnected downspouts, level spreaders, or similar techniques for disbursing stormwater across a development site.

The proposed design incorporates the rain garden option of dispersal. To minimize the impact of runoff to the steep and very steep slopes, the proposed rain garden is located in a flatter part of the site and avoids the steep and very steep parts of the site completely. Additionally, the design proposes using a geosynthetic clay liner (GCL) placed around the raingarden media to prevent any infiltration of runoff to the media from entering the steeper slopes on site.

To achieve the object of stormwater dispersal the proposed rain garden has a long overflow weir of 55.5 feet.

The majority of the house, and all of the rain garden will be built within the area that is 15% slope or less. Approximately 0.19 of the 0.88 acres will be disturbed for the construction of the house, driveway, and rain garden.

The rain garden has been designed to treat the first 1.19 inches of runoff per the Laurel Park UDO. The total area that will be flowing into the rain garden totals 5,928 sq ft, 4,163.5 sq ft comprise of the house roof and the other 1,764.5 sq ft comprise of open space that drains to the rain garden. Stormwater runoff will be treated by the rain garden and be discharged over a 55-foot weir in the same direction as the predevelopment conditions. An earthen berm will be built up with 3:1 side slope to achieve the volume needed for treatment.

The Site is owned by James and Gayle Pratt with a mailing address of 51598 State Highway 6, Bigfork MN, 56628. The parcel is undeveloped and has not been assigned an address. The parcel is located at Lat: 35.4169, Lon: -82.1966 on Tudor Lane.

HydroCAD model results

The HydroCAD model for the proposed design indicates the following flows over the raingarden overflow weir:

25-year, 24-hour = 1.15 CFS @ 55.5' length = 0.021 CFS/LF of weir
100-year, 24-hour = 1.60 CFS @ 55.5' length = 0.029 CFS/LF of weir

As noted above, the proposed design meets the object of stormwater dispersal for steep and very steep slopes. The flow per linear foot of overflow weir is considered insignificant.

Soils
Information from the United States Department of Agriculture National Resources Conservation Service (NRCS) Soil Survey indicates there is one soil on the site:

- DeB - Delanco (dillard) Loam, 2 to 7 percent slopes, with a drainage class of "moderately well drained", a runoff class of "medium" and Hydrologic Soil Group (HSG) C.

For the purposes of determining Curve Number for use in TR-55 modeling, a conservative HSG "C" was used.

Adjacent Property
Adjacent parcels are residential privately owned properties zoned as ETJ R-30 (Low Density Residential).

Methods
The components and materials for the proposed stormwater management plan were selected and sized using engineering analyses as follows:

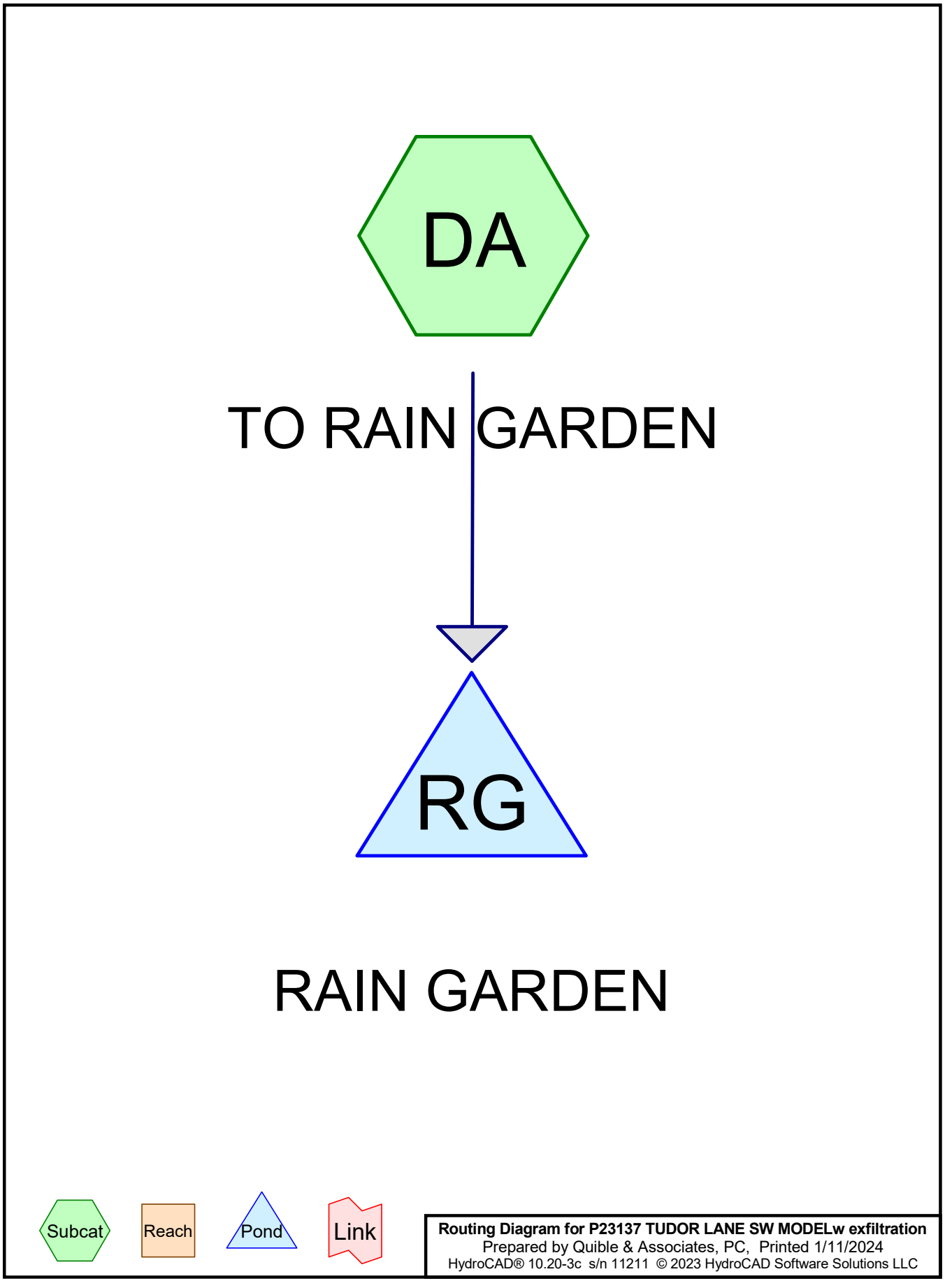
1. Rain Garden
    a. HydroCAD, was used to produce hydrographs for watershed modeling, inflow hydrograph development, and routing calculations:
        i. The NOAA Atlas 14 was accessed for rainfall depths associated with specific storm events.
        ii. The unit hydrograph method was used to develop runoff hydrographs.
        iii. The TR-55 method was used to predict time of concentration and routing calculations.

Results

Additional information and final configurations can be found in the construction drawings and calculation package attached to this report.

SCM Inspection and Maintenance

The responsible party for the maintenance and repair of the stormwater control measures is the owner listed to the parcel. Maintenance of the rain garden media and plantings are the responsibility of the homeowner.



Routing Diagram for P23137 TUDOR LANE SW MODELw exfiltration
Prepared by Quible & Associates, PC, Printed 1/11/2024

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25YR-24HR	Type II 24-hr		Default	24.00	1	6.98	2
2	100YR-24HR	Type II 24-hr		Default	24.00	1	8.72	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
1,765	74	>75% Grass cover, Good, HSG C (DA)
4,164	98	Roofs, HSG C (DA)
5,929	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
0	HSG B	
5,929	HSG C	DA
0	HSG D	
0	Other	
5,929		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Su Nu
0	0	1,765	0	0	1,765	>75% Grass cover, Good	
0	0	4,164	0	0	4,164	Roofs	
0	**0**	**5,929**	**0**	**0**	**5,929**	**TOTAL AREA**	

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA: TO RAIN GARDEN Runoff Area=5,929 sf 70.23% Impervious Runoff Depth=5.92"
Tc=5.0 min CN=91 Runoff=1.34 cfs 2,925 cf

Pond RG: RAIN GARDEN Peak Elev=2,315.03' Storage=935 cf Inflow=1.34 cfs 2,925 cf
Discarded=0.09 cfs 2,514 cf Primary=1.15 cfs 410 cf Outflow=1.24 cfs 2,925 cf

Total Runoff Area = 5,929 sf Runoff Volume = 2,925 cf Average Runoff Depth = 5.92"
29.77% Pervious = 1,765 sf 70.23% Impervious = 4,164 sf

Summary for Subcatchment DA: TO RAIN GARDEN

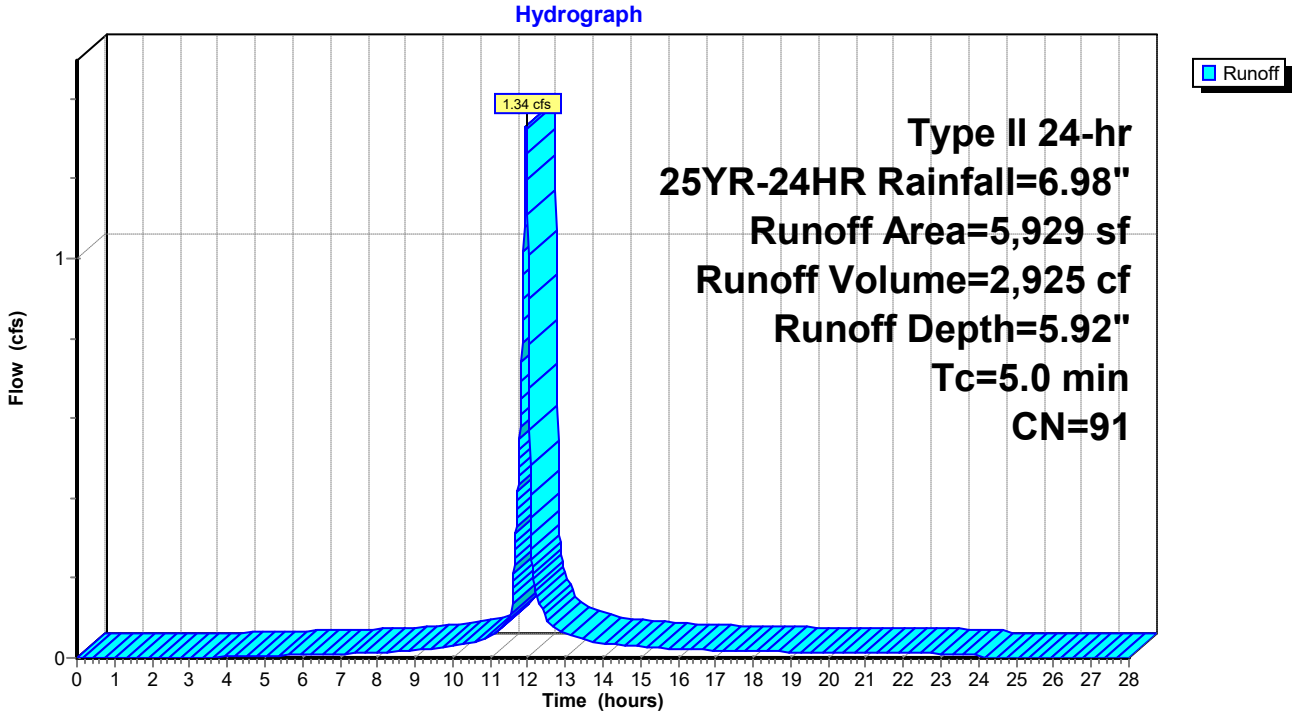
Runoff = 1.34 cfs @ 11.96 hrs, Volume= 2,925 cf, Depth= 5.92"
Routed to Pond RG : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type II 24-hr 25YR-24HR Rainfall=6.98"

Area (sf)	CN	Description
4,164	98	Roofs, HSG C
1,765	74	>75% Grass cover, Good, HSG C
5,929	91	Weighted Average
1,765		29.77% Pervious Area
4,164		70.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TIME OF CONCENTRATION**

Subcatchment DA: TO RAIN GARDEN



Hydrograph for Subcatchment DA: TO RAIN GARDEN

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.07	0.00	0.00
1.50	0.11	0.00	0.00
2.00	0.15	0.00	0.00
2.50	0.20	0.00	0.00
3.00	0.24	0.00	0.00
3.50	0.29	0.01	0.00
4.00	0.34	0.02	0.00
4.50	0.39	0.03	0.00
5.00	0.44	0.05	0.01
5.50	0.50	0.07	0.01
6.00	0.56	0.10	0.01
6.50	0.62	0.13	0.01
7.00	0.69	0.16	0.01
7.50	0.76	0.21	0.01
8.00	0.84	0.25	0.01
8.50	0.92	0.31	0.02
9.00	1.03	0.38	0.02
9.50	1.14	0.46	0.02
10.00	1.26	0.55	0.03
10.50	1.42	0.68	0.04
11.00	1.64	0.86	0.05
11.50	1.98	1.14	**0.09**
12.00	4.63	3.62	**1.11**
12.50	5.13	4.11	0.10
13.00	5.39	4.36	0.06
13.50	5.58	4.54	0.05
14.00	5.72	4.69	0.04
14.50	5.85	4.81	0.03
15.00	5.96	4.92	0.03
15.50	6.06	5.01	0.03
16.00	6.14	5.10	0.02
16.50	6.22	5.17	0.02
17.00	6.29	5.25	0.02
17.50	6.36	5.31	0.02
18.00	6.43	5.38	0.02
18.50	6.49	5.44	0.02
19.00	6.55	5.49	0.01
19.50	6.60	5.54	0.01
20.00	6.64	5.59	0.01
20.50	6.69	5.63	0.01
21.00	6.73	5.68	0.01
21.50	6.78	5.72	0.01
22.00	6.82	5.76	0.01
22.50	6.86	5.80	0.01
23.00	6.90	5.84	0.01
23.50	6.94	5.88	0.01
24.00	**6.98**	**5.92**	0.01
24.50	6.98	5.92	0.00
25.00	6.98	5.92	0.00
25.50	6.98	5.92	0.00
26.00	6.98	5.92	0.00
26.50	6.98	5.92	0.00
27.00	6.98	5.92	0.00
27.50	6.98	5.92	0.00
28.00	6.98	5.92	0.00

Summary for Pond RG: RAIN GARDEN

Inflow Area = 5,929 sf, 70.23% Impervious, Inflow Depth = 5.92" for 25YR-24HR event
Inflow = 1.34 cfs @ 11.96 hrs, Volume= 2,925 cf
Outflow = 1.24 cfs @ 11.99 hrs, Volume= 2,925 cf, Atten= 7%, Lag= 2.1 min
Discarded = 0.09 cfs @ 11.99 hrs, Volume= 2,514 cf
Primary = 1.15 cfs @ 11.99 hrs, Volume= 410 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Peak Elev= 2,315.03' @ 11.99 hrs Surf.Area= 1,675 sf Storage= 935 cf

Plug-Flow detention time= 79.6 min calculated for 2,923 cf (100% of inflow)
Center-of-Mass det. time= 79.6 min (851.7 - 772.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2,314.25'	1,605 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
#2	2,312.25'	278 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 1,390 cf Overall x 20.0% Voids
		1,883 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2,314.25	695	133.9	0	0	695
2,315.00	980	154.4	625	625	1,178
2,316.00	980	154.4	980	1,605	1,332

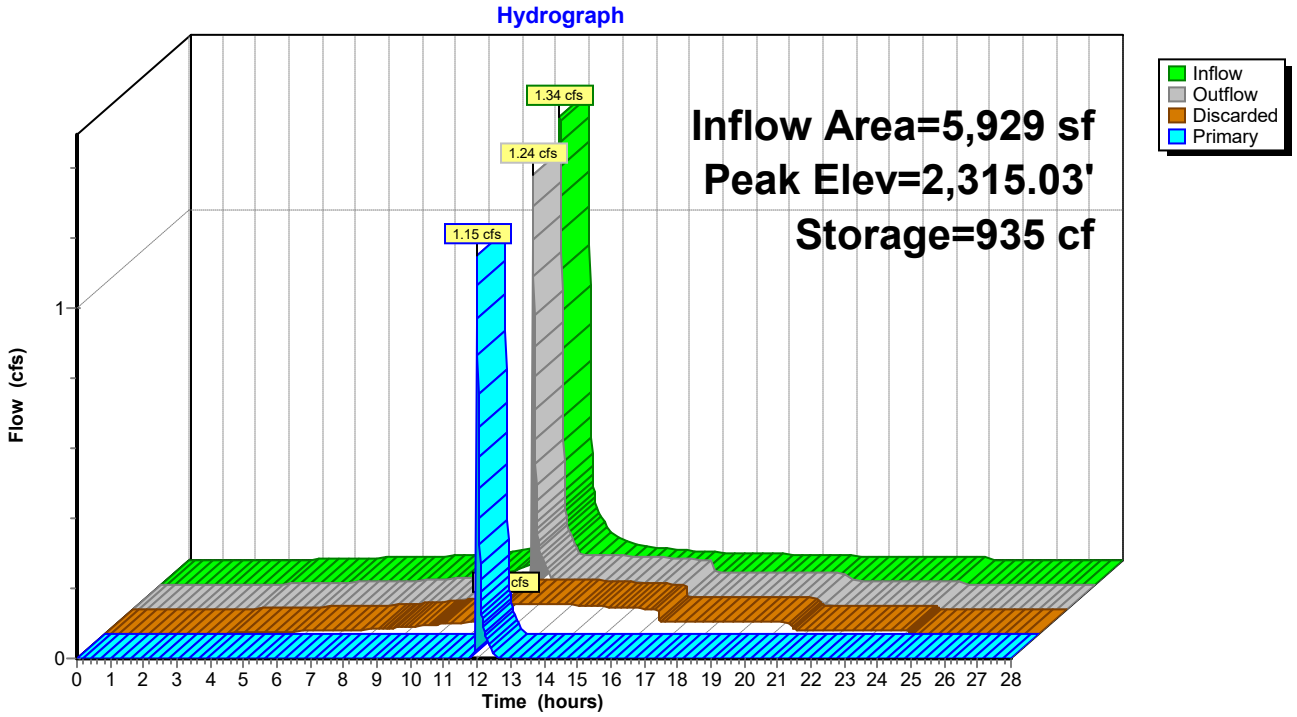
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2,312.25	695	134.0	0	0	695
2,313.25	695	134.0	695	695	829
2,314.25	695	134.0	695	1,390	963

Device	Routing	Invert	Outlet Devices
#1	Primary	2,315.00'	**54.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#2	Discarded	2,312.25'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2,300.00' Phase-In= 0.01'

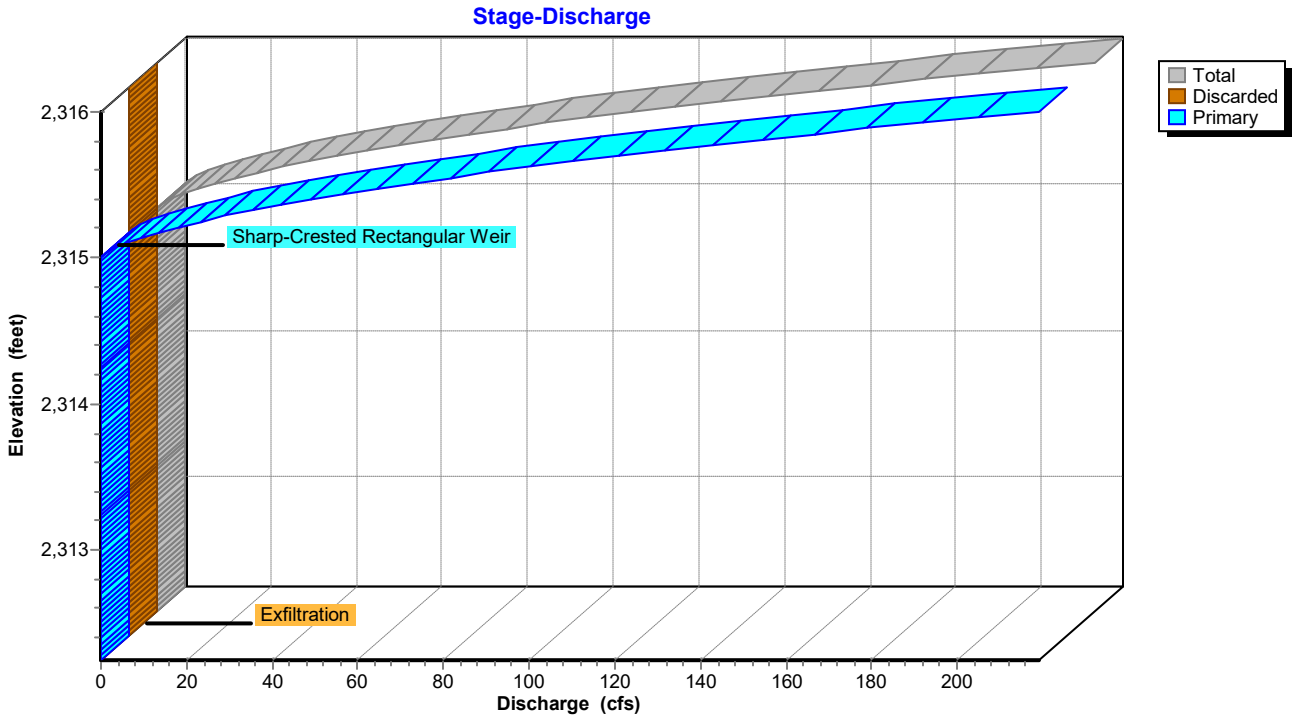
Discarded OutFlow Max=0.09 cfs @ 11.99 hrs HW=2,315.03' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=1.05 cfs @ 11.99 hrs HW=2,315.03' (Free Discharge)
↑—**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.05 cfs @ 0.60 fps)

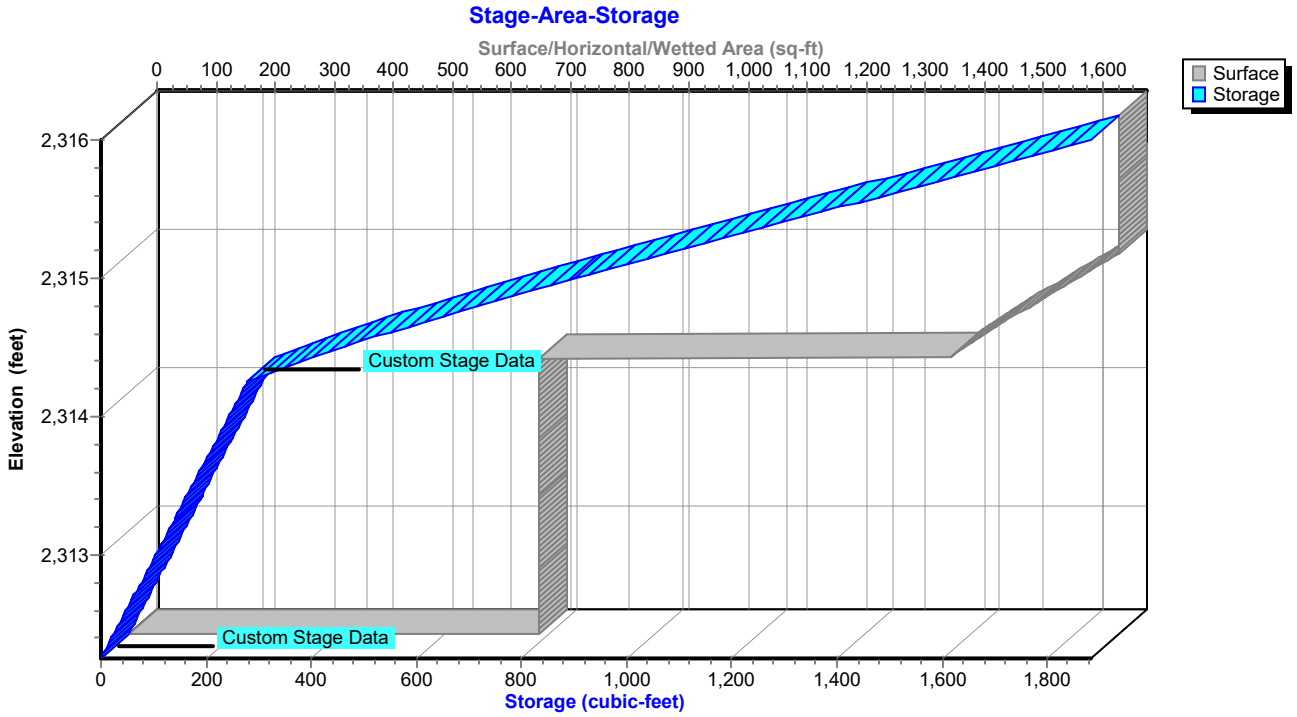
Pond RG: RAIN GARDEN



Pond RG: RAIN GARDEN



Pond RG: RAIN GARDEN



Hydrograph for Pond RG: RAIN GARDEN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	2,312.25	0.00	0.00	0.00
1.00	0.00	0	2,312.25	0.00	0.00	0.00
2.00	0.00	0	2,312.25	0.00	0.00	0.00
3.00	0.00	0	2,312.25	0.00	0.00	0.00
4.00	0.00	0	2,312.25	0.00	0.00	0.00
5.00	0.01	1	2,312.26	0.01	0.01	0.00
6.00	0.01	1	2,312.26	0.01	0.01	0.00
7.00	0.01	2	2,312.26	0.01	0.01	0.00
8.00	0.01	2	2,312.27	0.01	0.01	0.00
9.00	0.02	3	2,312.27	0.02	0.02	0.00
10.00	0.03	4	2,312.28	0.03	0.03	0.00
11.00	**0.05**	**32**	**2,312.48**	**0.03**	**0.03**	**0.00**
12.00	**1.11**	**934**	**2,315.03**	**1.15**	**0.09**	**1.06**
13.00	0.06	879	2,314.98	0.09	0.09	0.00
14.00	0.04	743	2,314.83	0.08	0.08	0.00
15.00	0.03	569	2,314.63	0.08	0.08	0.00
16.00	0.02	389	2,314.40	0.07	0.07	0.00
17.00	0.02	253	2,314.07	0.04	0.04	0.00
18.00	0.02	188	2,313.60	0.04	0.04	0.00
19.00	0.01	119	2,313.11	0.03	0.03	0.00
20.00	0.01	47	2,312.59	0.03	0.03	0.00
21.00	0.01	2	2,312.26	0.01	0.01	0.00
22.00	0.01	2	2,312.26	0.01	0.01	0.00
23.00	0.01	2	2,312.26	0.01	0.01	0.00
24.00	0.01	2	2,312.26	0.01	0.01	0.00
25.00	0.00	0	2,312.25	0.00	0.00	0.00
26.00	0.00	0	2,312.25	0.00	0.00	0.00
27.00	0.00	0	2,312.25	0.00	0.00	0.00
28.00	0.00	0	2,312.25	0.00	0.00	0.00

Stage-Discharge for Pond RG: RAIN GARDEN

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
2,312.25	0.00	0.00	0.00
2,312.30	0.03	0.03	0.00
2,312.35	0.03	0.03	0.00
2,312.40	0.03	0.03	0.00
2,312.45	0.03	0.03	0.00
2,312.50	0.03	0.03	0.00
2,312.55	0.03	0.03	0.00
2,312.60	0.03	0.03	0.00
2,312.65	0.03	0.03	0.00
2,312.70	0.03	0.03	0.00
2,312.75	0.03	0.03	0.00
2,312.80	0.03	0.03	0.00
2,312.85	0.03	0.03	0.00
2,312.90	0.03	0.03	0.00
2,312.95	0.03	0.03	0.00
2,313.00	0.03	0.03	0.00
2,313.05	0.03	0.03	0.00
2,313.10	0.03	0.03	0.00
2,313.15	0.03	0.03	0.00
2,313.20	0.03	0.03	0.00
2,313.25	0.03	0.03	0.00
2,313.30	0.03	0.03	0.00
2,313.35	0.04	0.04	0.00
2,313.40	0.04	0.04	0.00
2,313.45	0.04	0.04	0.00
2,313.50	0.04	0.04	0.00
2,313.55	0.04	0.04	0.00
2,313.60	0.04	0.04	0.00
2,313.65	0.04	0.04	0.00
2,313.70	0.04	0.04	0.00
2,313.75	0.04	0.04	0.00
2,313.80	0.04	0.04	0.00
2,313.85	0.04	0.04	0.00
2,313.90	0.04	0.04	0.00
2,313.95	0.04	0.04	0.00
2,314.00	0.04	0.04	0.00
2,314.05	0.04	0.04	0.00
2,314.10	0.04	0.04	0.00
2,314.15	0.04	0.04	0.00
2,314.20	0.04	0.04	0.00
2,314.25	0.07	0.07	0.00
2,314.30	0.07	0.07	0.00
2,314.35	0.07	0.07	0.00
2,314.40	0.07	0.07	0.00
2,314.45	0.07	0.07	0.00
2,314.50	0.07	0.07	0.00
2,314.55	0.08	0.08	0.00
2,314.60	0.08	0.08	0.00
2,314.65	0.08	0.08	0.00
2,314.70	0.08	0.08	0.00
2,314.75	0.08	0.08	0.00
2,314.80	0.08	0.08	0.00
2,314.85	0.08	0.08	0.00
2,314.90	0.08	0.08	0.00
2,314.95	0.09	0.09	0.00
2,315.00	0.09	0.09	0.00
2,315.05	2.09	0.09	2.00
2,315.10	5.81	0.09	5.72
2,315.15	10.72	0.09	10.63
2,315.20	16.64	0.09	16.55
2,315.25	23.49	0.09	23.40
2,315.30	31.20	0.09	31.11
2,315.35	39.73	0.09	39.64
2,315.40	49.06	0.09	48.97
2,315.45	59.16	0.09	59.07
2,315.50	70.03	0.09	69.94
2,315.55	81.64	0.09	81.55
2,315.60	93.99	0.09	93.90
2,315.65	107.08	0.09	106.99
2,315.70	120.90	0.09	120.81
2,315.75	135.45	0.09	135.36
2,315.80	150.72	0.09	150.63
2,315.85	166.72	0.09	166.63
2,315.90	183.44	0.09	183.35
2,315.95	200.89	0.09	200.80
2,316.00	**219.06**	**0.09**	**218.97**

Stage-Area-Storage for Pond RG: RAIN GARDEN

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
2,312.25	695	0
2,312.30	695	7
2,312.35	695	14
2,312.40	695	21
2,312.45	695	28
2,312.50	695	35
2,312.55	695	42
2,312.60	695	49
2,312.65	695	56
2,312.70	695	63
2,312.75	695	70
2,312.80	695	76
2,312.85	695	83
2,312.90	695	90
2,312.95	695	97
2,313.00	695	104
2,313.05	695	111
2,313.10	695	118
2,313.15	695	125
2,313.20	695	132
2,313.25	695	139
2,313.30	695	146
2,313.35	695	153
2,313.40	695	160
2,313.45	695	167
2,313.50	695	174
2,313.55	695	181
2,313.60	695	188
2,313.65	695	195
2,313.70	695	202
2,313.75	695	209
2,313.80	695	215
2,313.85	695	222
2,313.90	695	229
2,313.95	695	236
2,314.00	695	243
2,314.05	695	250
2,314.10	695	257
2,314.15	695	264
2,314.20	695	271
2,314.25	1,390	278
2,314.30	1,407	313
2,314.35	1,425	349
2,314.40	1,443	386
2,314.45	1,461	424
2,314.50	1,480	463
2,314.55	1,498	503
2,314.60	1,517	543
2,314.65	1,536	585
2,314.70	1,555	627
2,314.75	1,575	671
2,314.80	1,594	715
2,314.85	1,614	761
2,314.90	1,634	807
2,314.95	1,654	855
2,315.00	**1,675**	903
2,315.05	1,675	952
2,315.10	1,675	1,001
2,315.15	1,675	1,050
2,315.20	1,675	1,099
2,315.25	1,675	1,148
2,315.30	1,675	1,197
2,315.35	1,675	1,246
2,315.40	1,675	1,295
2,315.45	1,675	1,344
2,315.50	1,675	1,393
2,315.55	1,675	1,442
2,315.60	1,675	1,491
2,315.65	1,675	1,540
2,315.70	1,675	1,589
2,315.75	1,675	1,638
2,315.80	1,675	1,687
2,315.85	1,675	1,736
2,315.90	1,675	1,785
2,315.95	1,675	1,834
2,316.00	1,675	**1,883**

Time span=0.00-28.00 hrs, dt=0.01 hrs, 2801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA: TO RAIN GARDEN Runoff Area=5,929 sf 70.23% Impervious Runoff Depth=7.64"
Tc=5.0 min CN=91 Runoff=1.70 cfs 3,773 cf

Pond RG: RAIN GARDEN Peak Elev=2,315.04' Storage=943 cf Inflow=1.70 cfs 3,773 cf
Discarded=0.09 cfs 2,879 cf Primary=1.60 cfs 894 cf Outflow=1.69 cfs 3,773 cf

Total Runoff Area = 5,929 sf Runoff Volume = 3,773 cf Average Runoff Depth = 7.64"
29.77% Pervious = 1,765 sf 70.23% Impervious = 4,164 sf

Summary for Subcatchment DA: TO RAIN GARDEN

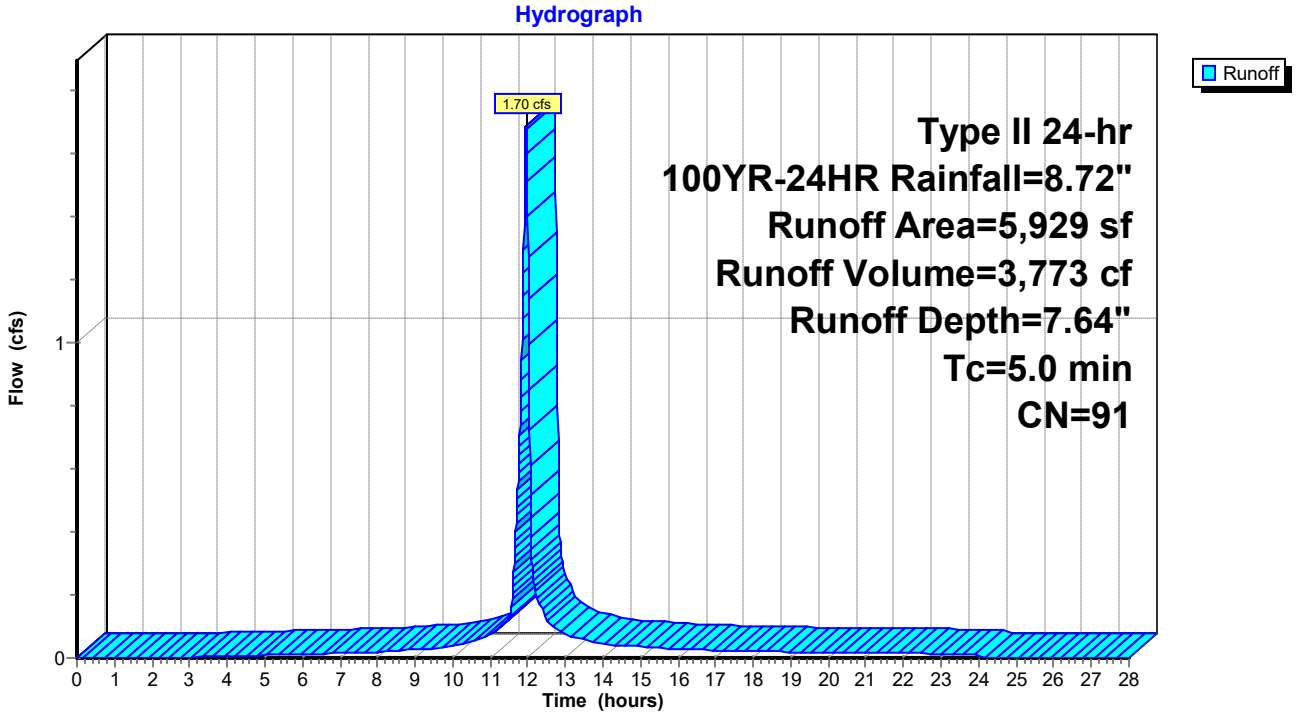
Runoff = 1.70 cfs @ 11.96 hrs, Volume= 3,773 cf, Depth= 7.64"
Routed to Pond RG : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Type II 24-hr 100YR-24HR Rainfall=8.72"

Area (sf)	CN	Description
4,164	98	Roofs, HSG C
1,765	74	>75% Grass cover, Good, HSG C
5,929	91	Weighted Average
1,765		29.77% Pervious Area
4,164		70.23% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry, TIME OF CONCENTRATION**

Subcatchment DA: TO RAIN GARDEN



Hydrograph for Subcatchment DA: TO RAIN GARDEN

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.09	0.00	0.00
1.50	0.14	0.00	0.00
2.00	0.19	0.00	0.00
2.50	0.25	0.00	0.00
3.00	0.30	0.01	0.00
3.50	0.36	0.02	0.00
4.00	0.42	0.04	0.01
4.50	0.48	0.06	0.01
5.00	0.55	0.09	0.01
5.50	0.62	0.13	0.01
6.00	0.70	0.17	0.01
6.50	0.78	0.21	0.01
7.00	0.86	0.27	0.02
7.50	0.95	0.33	0.02
8.00	1.05	0.39	0.02
8.50	1.15	0.47	0.02
9.00	1.28	0.57	0.03
9.50	1.42	0.68	0.03
10.00	1.58	0.80	0.04
10.50	1.78	0.97	0.05
11.00	2.05	1.21	0.07
11.50	2.47	1.58	**0.12**
12.00	5.78	4.74	**1.40**
12.50	6.41	5.36	0.12
13.00	6.73	5.68	0.08
13.50	6.97	5.91	0.06
14.00	7.15	6.09	0.05
14.50	7.30	6.24	0.04
15.00	7.44	6.37	0.04
15.50	7.57	6.50	0.03
16.00	7.67	6.60	0.03
16.50	7.77	6.70	0.03
17.00	7.86	6.79	0.02
17.50	7.95	6.88	0.02
18.00	8.03	6.96	0.02
18.50	8.11	7.03	0.02
19.00	8.18	7.10	0.02
19.50	8.24	7.16	0.02
20.00	8.30	7.22	0.02
20.50	8.36	7.28	0.02
21.00	8.41	7.33	0.01
21.50	8.47	7.39	0.01
22.00	8.52	7.44	0.01
22.50	8.57	7.49	0.01
23.00	8.62	7.54	0.01
23.50	8.67	7.59	0.01
24.00	**8.72**	**7.64**	0.01
24.50	8.72	7.64	0.00
25.00	8.72	7.64	0.00
25.50	8.72	7.64	0.00
26.00	8.72	7.64	0.00
26.50	8.72	7.64	0.00
27.00	8.72	7.64	0.00
27.50	8.72	7.64	0.00
28.00	8.72	7.64	0.00

Summary for Pond RG: RAIN GARDEN

Inflow Area = 5,929 sf, 70.23% Impervious, Inflow Depth = 7.64" for 100YR-24HR event
Inflow = 1.70 cfs @ 11.96 hrs, Volume= 3,773 cf
Outflow = 1.69 cfs @ 11.96 hrs, Volume= 3,773 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.09 cfs @ 11.96 hrs, Volume= 2,879 cf
Primary = 1.60 cfs @ 11.96 hrs, Volume= 894 cf

Routing by Stor-Ind method, Time Span= 0.00-28.00 hrs, dt= 0.01 hrs
Peak Elev= 2,315.04' @ 11.96 hrs Surf.Area= 1,675 sf Storage= 943 cf

Plug-Flow detention time= 72.5 min calculated for 3,771 cf (100% of inflow)
Center-of-Mass det. time= 72.5 min (838.2 - 765.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2,314.25'	1,605 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)
#2	2,312.25'	278 cf	**Custom Stage Data (Irregular)** Listed below (Recalc) 1,390 cf Overall x 20.0% Voids
		1,883 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2,314.25	695	133.9	0	0	695
2,315.00	980	154.4	625	625	1,178
2,316.00	980	154.4	980	1,605	1,332

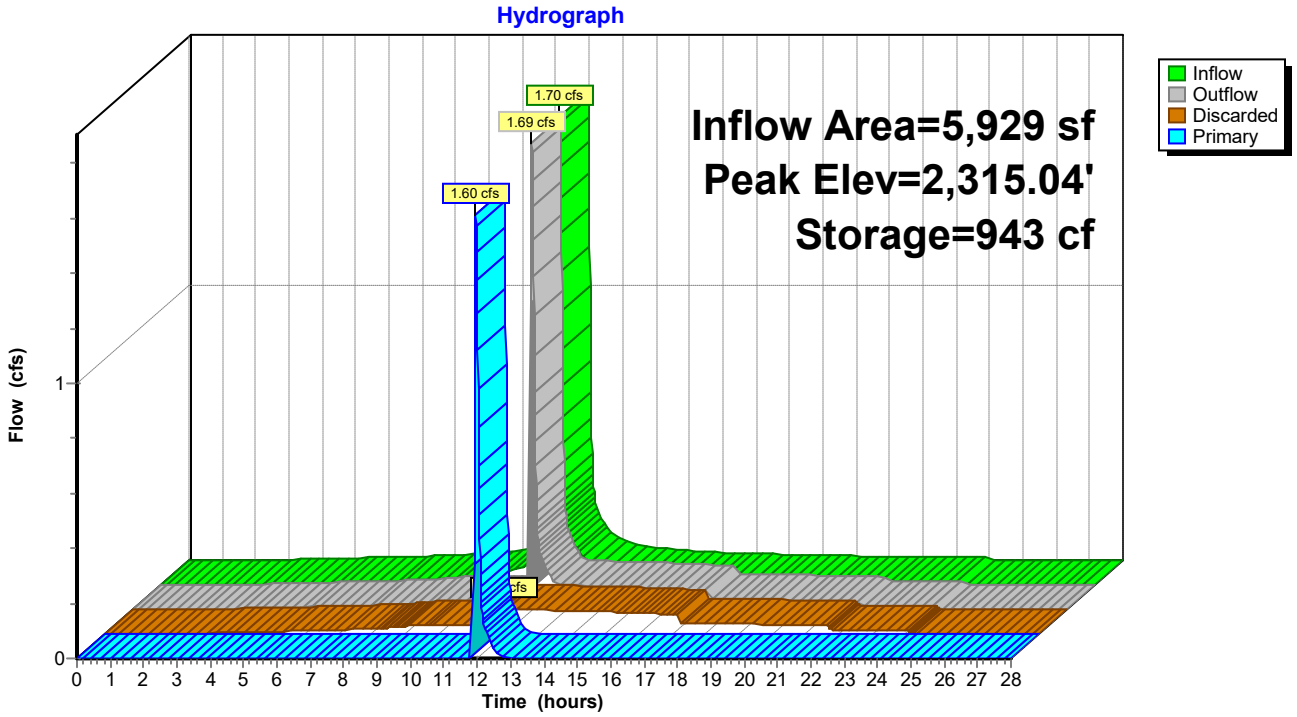
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2,312.25	695	134.0	0	0	695
2,313.25	695	134.0	695	695	829
2,314.25	695	134.0	695	1,390	963

Device	Routing	Invert	Outlet Devices
#1	Primary	2,315.00'	**54.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#2	Discarded	2,312.25'	**2.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2,300.00' Phase-In= 0.01'

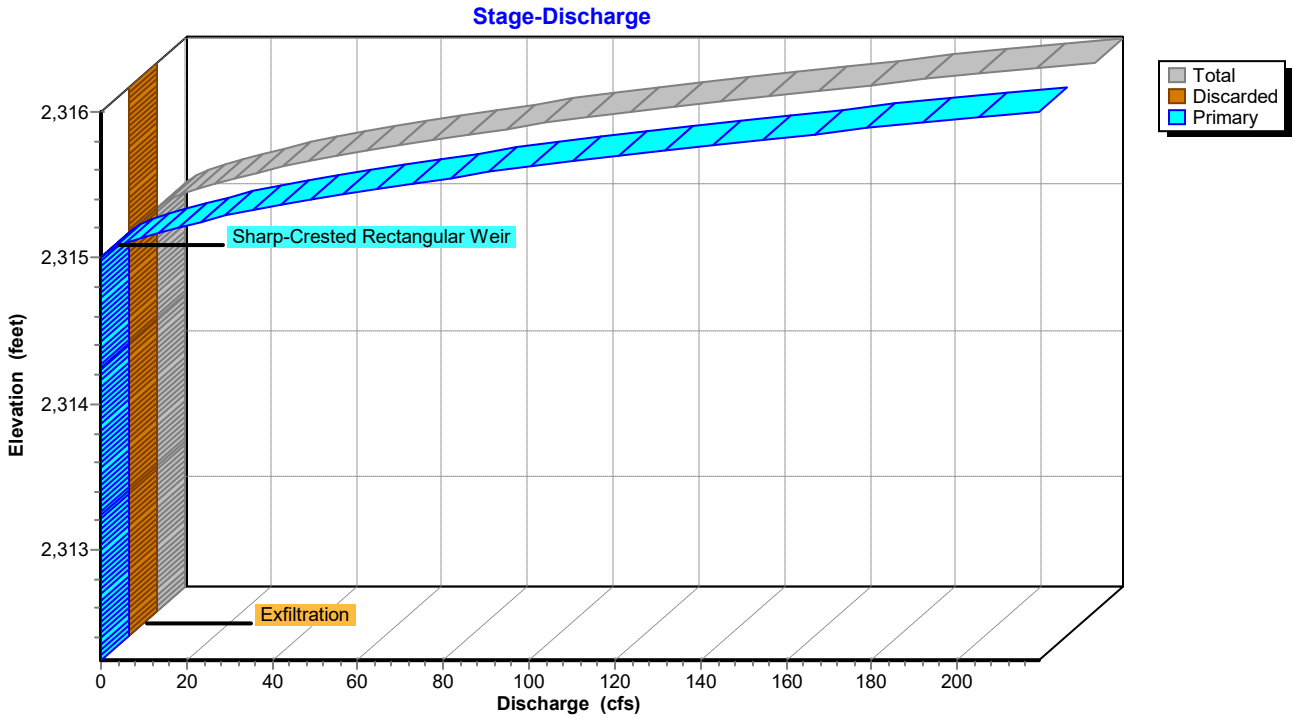
Discarded OutFlow Max=0.09 cfs @ 11.96 hrs HW=2,315.04' (Free Discharge)
↑**2=Exfiltration** (Controls 0.09 cfs)

Primary OutFlow Max=1.49 cfs @ 11.96 hrs HW=2,315.04' (Free Discharge)
↑**1=Sharp-Crested Rectangular Weir** (Weir Controls 1.49 cfs @ 0.67 fps)

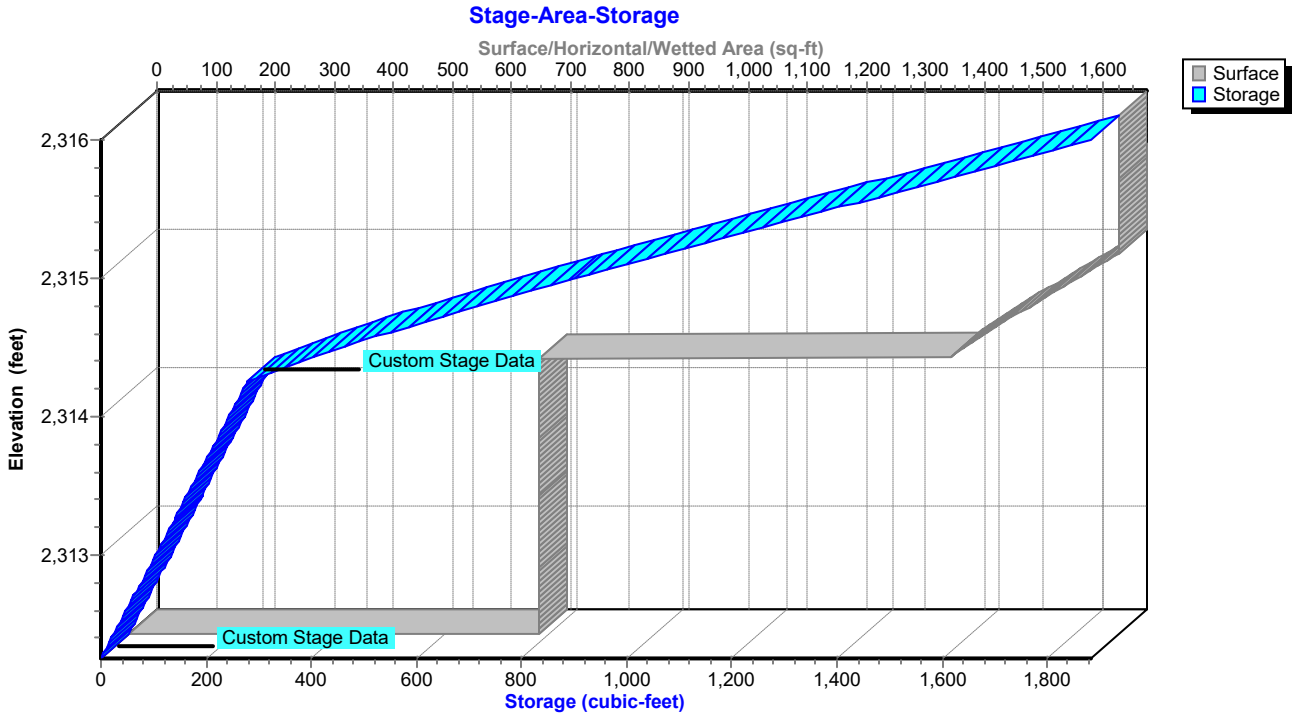
Pond RG: RAIN GARDEN



Pond RG: RAIN GARDEN



Pond RG: RAIN GARDEN



Hydrograph for Pond RG: RAIN GARDEN

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
0.00	0.00	0	2,312.25	0.00	0.00	0.00
1.00	0.00	0	2,312.25	0.00	0.00	0.00
2.00	0.00	0	2,312.25	0.00	0.00	0.00
3.00	0.00	0	2,312.25	0.00	0.00	0.00
4.00	0.01	1	2,312.26	0.01	0.01	0.00
5.00	0.01	1	2,312.26	0.01	0.01	0.00
6.00	0.01	2	2,312.26	0.01	0.01	0.00
7.00	0.02	2	2,312.27	0.01	0.01	0.00
8.00	0.02	3	2,312.27	0.02	0.02	0.00
9.00	0.03	5	2,312.28	0.03	0.03	0.00
10.00	0.04	9	2,312.31	0.03	0.03	0.00
11.00	**0.07**	**80**	**2,312.82**	**0.03**	**0.03**	**0.00**
12.00	**1.40**	**939**	**2,315.04**	**1.46**	**0.09**	**1.37**
13.00	0.08	900	2,315.00	0.09	0.09	0.00
14.00	0.05	804	2,314.90	0.08	0.08	0.00
15.00	0.04	652	2,314.73	0.08	0.08	0.00
16.00	0.03	486	2,314.53	0.08	0.08	0.00
17.00	0.02	316	2,314.30	0.07	0.07	0.00
18.00	0.02	237	2,313.96	0.04	0.04	0.00
19.00	0.02	179	2,313.54	0.04	0.04	0.00
20.00	0.02	115	2,313.08	0.03	0.03	0.00
21.00	0.01	48	2,312.60	0.03	0.03	0.00
22.00	0.01	2	2,312.27	0.01	0.01	0.00
23.00	0.01	2	2,312.27	0.01	0.01	0.00
24.00	0.01	2	2,312.27	0.01	0.01	0.00
25.00	0.00	0	2,312.25	0.00	0.00	0.00
26.00	0.00	0	2,312.25	0.00	0.00	0.00
27.00	0.00	0	2,312.25	0.00	0.00	0.00
28.00	0.00	0	2,312.25	0.00	0.00	0.00

Stage-Discharge for Pond RG: RAIN GARDEN

Elevation (feet)	Discharge (cfs)	Discarded (cfs)	Primary (cfs)
2,312.25	0.00	0.00	0.00
2,312.30	0.03	0.03	0.00
2,312.35	0.03	0.03	0.00
2,312.40	0.03	0.03	0.00
2,312.45	0.03	0.03	0.00
2,312.50	0.03	0.03	0.00
2,312.55	0.03	0.03	0.00
2,312.60	0.03	0.03	0.00
2,312.65	0.03	0.03	0.00
2,312.70	0.03	0.03	0.00
2,312.75	0.03	0.03	0.00
2,312.80	0.03	0.03	0.00
2,312.85	0.03	0.03	0.00
2,312.90	0.03	0.03	0.00
2,312.95	0.03	0.03	0.00
2,313.00	0.03	0.03	0.00
2,313.05	0.03	0.03	0.00
2,313.10	0.03	0.03	0.00
2,313.15	0.03	0.03	0.00
2,313.20	0.03	0.03	0.00
2,313.25	0.03	0.03	0.00
2,313.30	0.03	0.03	0.00
2,313.35	0.04	0.04	0.00
2,313.40	0.04	0.04	0.00
2,313.45	0.04	0.04	0.00
2,313.50	0.04	0.04	0.00
2,313.55	0.04	0.04	0.00
2,313.60	0.04	0.04	0.00
2,313.65	0.04	0.04	0.00
2,313.70	0.04	0.04	0.00
2,313.75	0.04	0.04	0.00
2,313.80	0.04	0.04	0.00
2,313.85	0.04	0.04	0.00
2,313.90	0.04	0.04	0.00
2,313.95	0.04	0.04	0.00
2,314.00	0.04	0.04	0.00
2,314.05	0.04	0.04	0.00
2,314.10	0.04	0.04	0.00
2,314.15	0.04	0.04	0.00
2,314.20	0.04	0.04	0.00
2,314.25	0.07	0.07	0.00
2,314.30	0.07	0.07	0.00
2,314.35	0.07	0.07	0.00
2,314.40	0.07	0.07	0.00
2,314.45	0.07	0.07	0.00
2,314.50	0.07	0.07	0.00
2,314.55	0.08	0.08	0.00
2,314.60	0.08	0.08	0.00
2,314.65	0.08	0.08	0.00
2,314.70	0.08	0.08	0.00
2,314.75	0.08	0.08	0.00
2,314.80	0.08	0.08	0.00
2,314.85	0.08	0.08	0.00
2,314.90	0.08	0.08	0.00
2,314.95	0.09	0.09	0.00
2,315.00	0.09	0.09	0.00
2,315.05	2.09	0.09	2.00
2,315.10	5.81	0.09	5.72
2,315.15	10.72	0.09	10.63
2,315.20	16.64	0.09	16.55
2,315.25	23.49	0.09	23.40
2,315.30	31.20	0.09	31.11
2,315.35	39.73	0.09	39.64
2,315.40	49.06	0.09	48.97
2,315.45	59.16	0.09	59.07
2,315.50	70.03	0.09	69.94
2,315.55	81.64	0.09	81.55
2,315.60	93.99	0.09	93.90
2,315.65	107.08	0.09	106.99
2,315.70	120.90	0.09	120.81
2,315.75	135.45	0.09	135.36
2,315.80	150.72	0.09	150.63
2,315.85	166.72	0.09	166.63
2,315.90	183.44	0.09	183.35
2,315.95	200.89	0.09	200.80
2,316.00	**219.06**	**0.09**	**218.97**

Stage-Area-Storage for Pond RG: RAIN GARDEN

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
2,312.25	695	0
2,312.30	695	7
2,312.35	695	14
2,312.40	695	21
2,312.45	695	28
2,312.50	695	35
2,312.55	695	42
2,312.60	695	49
2,312.65	695	56
2,312.70	695	63
2,312.75	695	70
2,312.80	695	76
2,312.85	695	83
2,312.90	695	90
2,312.95	695	97
2,313.00	695	104
2,313.05	695	111
2,313.10	695	118
2,313.15	695	125
2,313.20	695	132
2,313.25	695	139
2,313.30	695	146
2,313.35	695	153
2,313.40	695	160
2,313.45	695	167
2,313.50	695	174
2,313.55	695	181
2,313.60	695	188
2,313.65	695	195
2,313.70	695	202
2,313.75	695	209
2,313.80	695	215
2,313.85	695	222
2,313.90	695	229
2,313.95	695	236
2,314.00	695	243
2,314.05	695	250
2,314.10	695	257
2,314.15	695	264
2,314.20	695	271
2,314.25	1,390	278
2,314.30	1,407	313
2,314.35	1,425	349
2,314.40	1,443	386
2,314.45	1,461	424
2,314.50	1,480	463
2,314.55	1,498	503
2,314.60	1,517	543
2,314.65	1,536	585
2,314.70	1,555	627
2,314.75	1,575	671
2,314.80	1,594	715
2,314.85	1,614	761
2,314.90	1,634	807
2,314.95	1,654	855
2,315.00	**1,675**	903
2,315.05	1,675	952
2,315.10	1,675	1,001
2,315.15	1,675	1,050
2,315.20	1,675	1,099
2,315.25	1,675	1,148
2,315.30	1,675	1,197
2,315.35	1,675	1,246
2,315.40	1,675	1,295
2,315.45	1,675	1,344
2,315.50	1,675	1,393
2,315.55	1,675	1,442
2,315.60	1,675	1,491
2,315.65	1,675	1,540
2,315.70	1,675	1,589
2,315.75	1,675	1,638
2,315.80	1,675	1,687
2,315.85	1,675	1,736
2,315.90	1,675	1,785
2,315.95	1,675	1,834
2,316.00	1,675	**1,883**

NOTES:

CURRENT OWNER: PRATT, JAMES RODNEY;PRATT, GAYLE MORENE;
THE JAMES RODNEY PRATT AND GAYLE MORENE PRATT
REVOCABLE TRUST
51598 STATE HWY 6
BIGFORK, MN 56628

1. PROPERTY INFORMATION:
   - ZONING DISTRICT: RESIDENTIAL BUILDING (ETJ R-30)
   - PIN: 9548-45-9747
   - ACREAGE: 0.72 ACRES
   - LAT/LONG: 35.4169°, -82.1966°
   - ADDRESS: LOT 6 LAUREL OAKS, HENDERSONVILLE NC

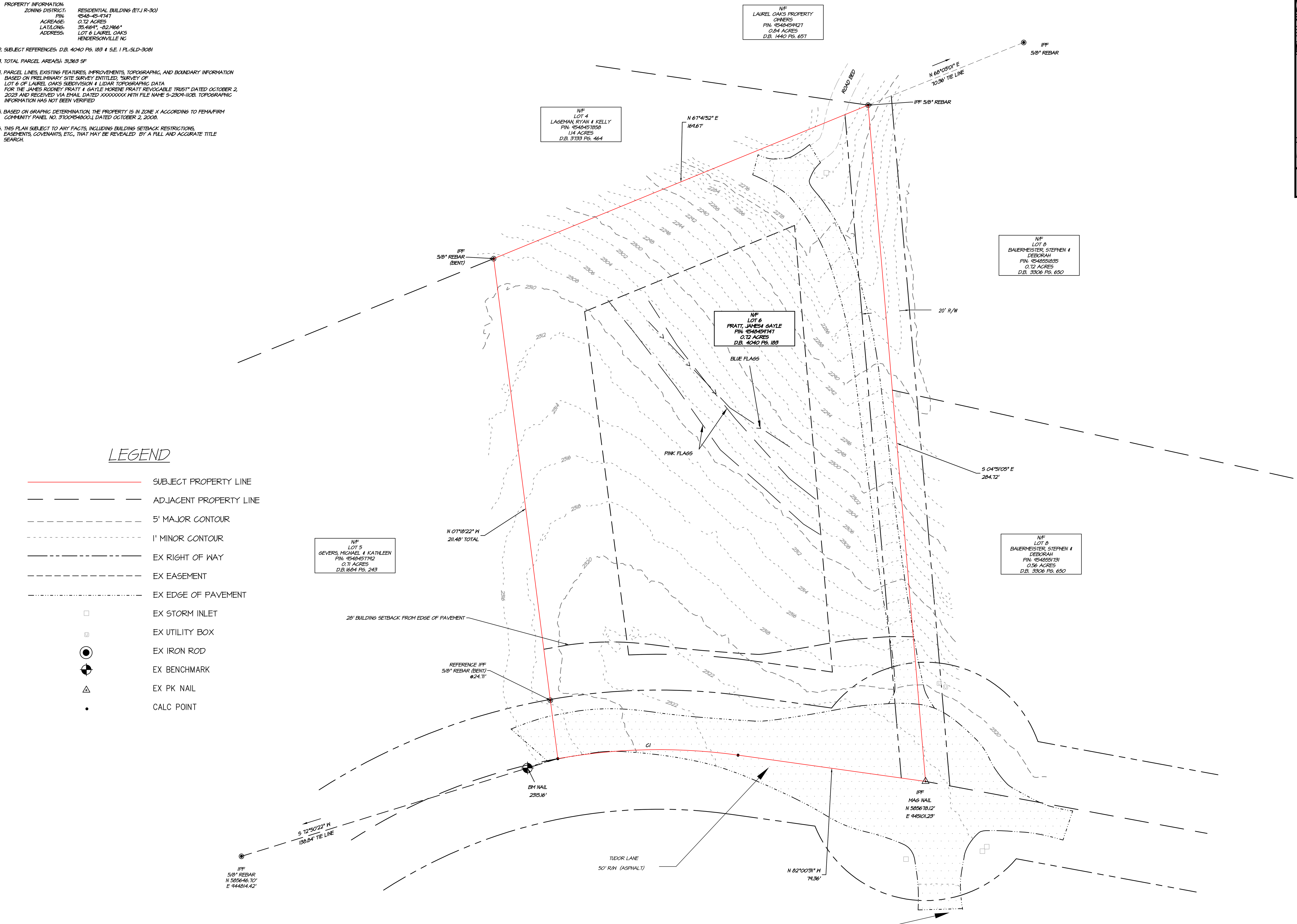
2. SUBJECT REFERENCES: D.B. 4040 PG. 183 & S.E. 1 PL:SLD-3081

3. TOTAL PARCEL AREA(S): 31,363 SF

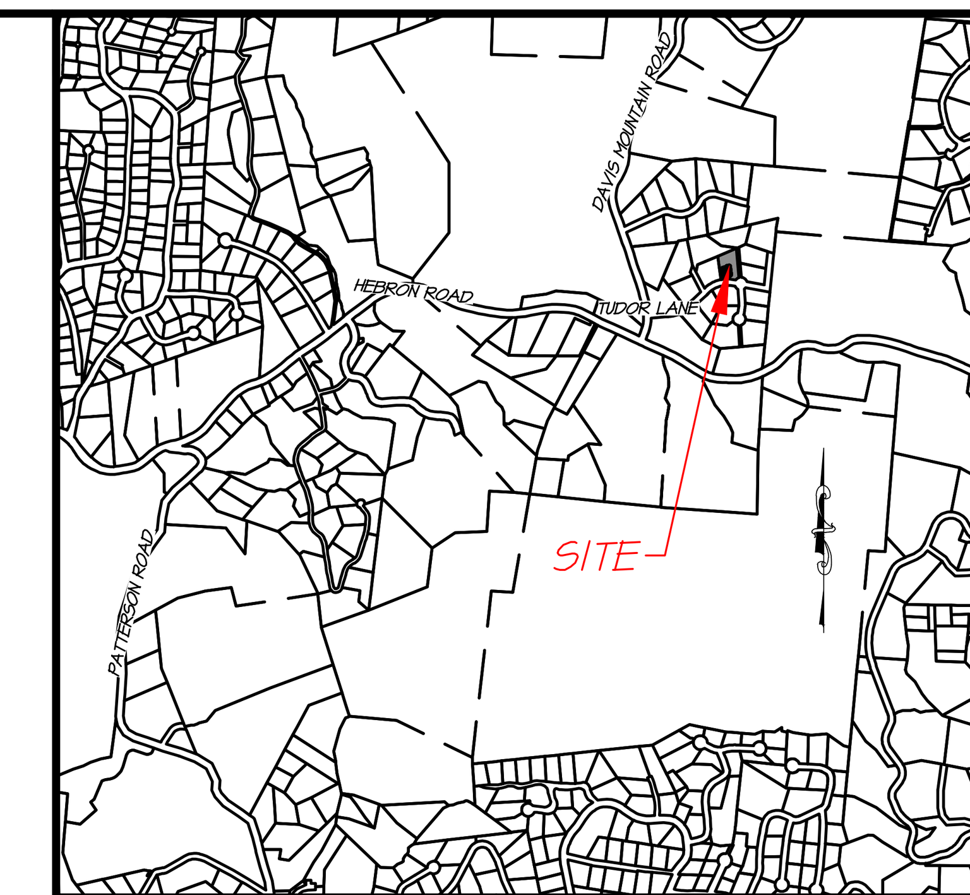
4. PARCEL LINES, EXISTING FEATURES, IMPROVEMENTS, TOPOGRAPHIC, AND BOUNDARY INFORMATION BASED ON PRELIMINARY SITE SURVEY ENTITLED, "SURVEY OF LOT 6 OF LAUREL OAKS SUBDIVISION & LIDAR TOPOGRAPHIC DATA FOR THE JAMES RODNEY PRATT & GAYLE MORENE PRATT REVOCABLE TRUST" DATED OCTOBER 2, 2023 AND RECEIVED VIA EMAIL DATED XXXXXXXX WITH FILE NAME S-2309-110B. TOPOGRAPHIC INFORMATION HAS NOT BEEN VERIFIED

5. BASED ON GRAPHIC DETERMINATION, THE PROPERTY IS IN ZONE X ACCORDING TO FEMA/FIRM COMMUNITY PANEL NO. 3700954800J, DATED OCTOBER 2, 2008.

6. THIS PLAN SUBJECT TO ANY FACTS, INCLUDING BUILDING SETBACK RESTRICTIONS, EASEMENTS, COVENANTS, ETC., THAT MAY BE REVEALED BY A FULL AND ACCURATE TITLE SEARCH.



CURVE	RADIUS	CHORD BEARING	CHORD DISTANCE	ARC LENGTH
C1	238.54'	S 88°32'32" W	73.54'	73.91'



VICINITY MAP(HENDERSONVILLE)
N.T.S.

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GRAPHIC SCALE
20' 0 10' 20' 40'
(IN FEET)
1 inch = 20 ft.

NC License#: C-0208
SINCE 1959
Quible & Associates, P.C.
ENGINEERING** * CONSULTING * PLANNING
ENVIRONMENTAL SCIENCES * SURVEYING**
ENGINEERING/SURVEYING NOT OFFERED AT BLACK MTN. OFFICE
8466 CARATOKE HWY, BLDG 400, POWELLS POINT, NC 27966, Phone: (252) 491-8147, administrator@quible.com
90 CHURCH STREET, SUITE B, BLACK MOUNTAIN, NC 28711, Phone: (828) 357-5149, administrator@quible.com

FINAL DRAWINGS FOR PERMITTING ONLY

CERTIFICATION

NO.	DATE	REVISIONS

EXISTING CONDITIONS

LAUREL OAKS SUBDIVISION
TUDOR LANE LOT 6

CRAB CREEK TOWNSHIP HENDERSON COUNTY NORTH CAROLINA

PROJECT NO.	P23137
DESIGNED BY	LAS
DRAWN BY	LAS
CHECKED BY	TMG
ISSUE DATE	2/2/24

SHEET NO. 1 OF 4 SHEETS

Q:\2023\P23137 – Tudor Lane, Laurel Park Stormwater\Drawings\P-23137-BASE.dwg 2/5/2024 10:58 AM Lsmith

NOTES:

CURRENT OWNER: PRATT, JAMES RODNEY;PRATT, GAYLE MORENE;
THE JAMES RODNEY PRATT AND GAYLE MORENE PRATT
REVOCABLE TRUST
51598 STATE HWY 6
BIGFORK, MN 56628

1. PROPERTY INFORMATION:
   - ZONING DISTRICT: RESIDENTIAL BUILDING (ETJ R-30)
   - PIN: 9548-45-9747
   - ACREAGE: 0.88 ACRES
   - LAT/LONG: 35.4169°, -82.1966°
   - ADDRESS: LOT 6 LAUREL OAKS, HENDERSONVILLE NC, 28739

2. SUBJECT REFERENCES: D.B. 4040 PG. 183 & S.E. 1 PL: SLD-3081

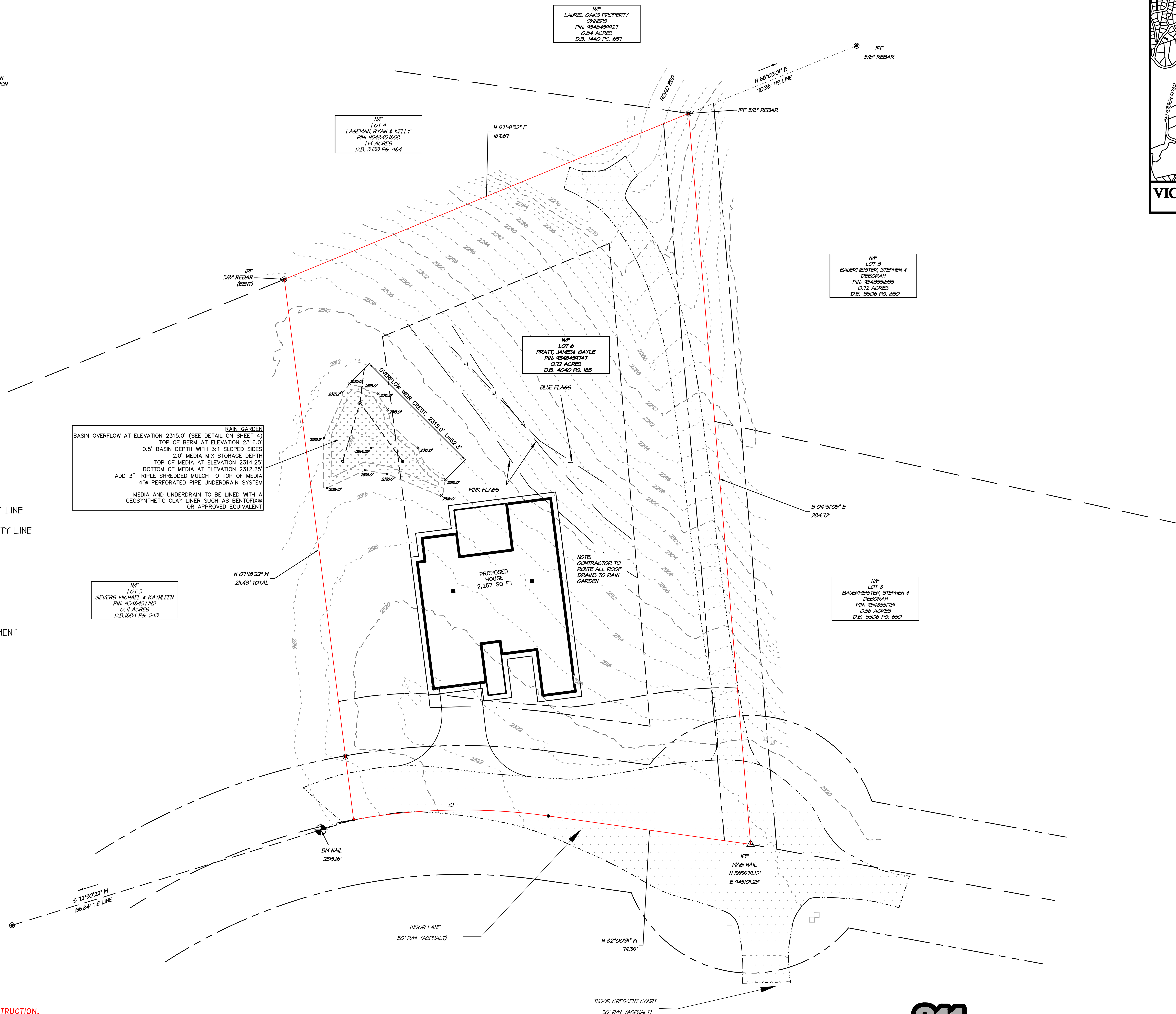
3. TOTAL PARCEL AREA(S): 38454.95 SQ. FT.

4. PARCEL LINES, EXISTING FEATURES, IMPROVEMENTS, TOPOGRAPHIC, AND BOUNDARY INFORMATION BASED ON PRELIMINARY SITE SURVEY ENTITLED, "SURVEY OF LOT 6 OF LAUREL OAKS SUBDIVISION & LIDAR TOPOGRAPHIC DATA FOR THE JAMES RODNEY PRATT & GAYLE MORENE PRATT REVOCABLE TRUST" DATED OCTOBER 2, 2023 AND RECEIVED VIA EMAIL DATED OCTOBER 9, 2023, WITH FILE NAME S-2309-110B. TOPOGRAPHIC INFORMATION HAS NOT BEEN VERIFIED.

5. BASED ON GRAPHIC DETERMINATION, THE PROPERTY IS IN ZONE X ACCORDING TO FEMA/FIRM COMMUNITY PANEL NO. 3700954800J, DATED OCTOBER 2, 2008.

6. THIS PLAN SUBJECT TO ANY FACTS, INCLUDING BUILDING SETBACK RESTRICTIONS, EASEMENTS, COVENANTS, ETC., THAT MAY BE REVEALED BY A FULL AND ACCURATE TITLE SEARCH.

7. PROPOSED IMPERVIOUS AREA: 4,746.09 SQ. FT.



LEGEND

- SUBJECT PROPERTY LINE
- ADJACENT PROPERTY LINE
- 5' MAJOR CONTOUR
- 1' MINOR CONTOUR
- EX RIGHT OF WAY
- EX EASEMENT
- EX EDGE OF PAVEMENT
- RAIN GARDEN
- EX STORM INLET
- EX UTILITY BOX
- EX IRON ROD
- EX BENCHMARK
- EX PK NAIL
- CALC POINT

CURVE	RADIUS	CHORD BEARING	CHORD DISTANCE	ARC LENGTH
C1	238.34'	S 88°32'32" W	75.34'	75.41'

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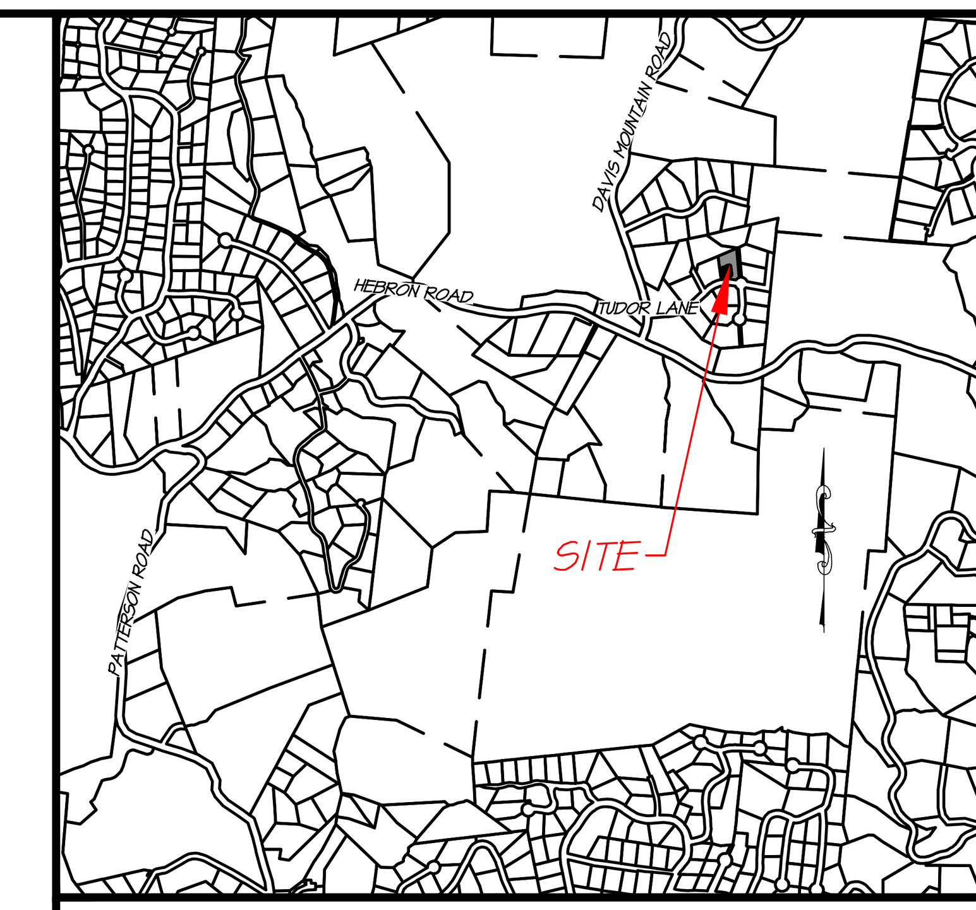
GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.



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FINAL DRAWINGS FOR PERMITTING ONLY

CERTIFICATION

NO.	DATE	REVISIONS

PROPOSED CONDITIONS

LAUREL OAKS SUBDIVISION
TUDOR LANE LOT 6
CRAB CREEK TOWNSHIP — HENDERSON COUNTY — NORTH CAROLINA

PROJECT NO.	P23137
DESIGNED BY	LAS
DRAWN BY	LAS
CHECKED BY	TMG
ISSUE DATE	2/2/24

<u>NOTES:</u>

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1. PROPERTY INFORMATION:
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   - PIN: 9548-45-9747
   - ACREAGE: 0.72 ACRES
   - LAT/LONG: 35.4169°, -82.1966°
   - ADDRESS: LOT 6 LAUREL OAKS, HENDERSONVILLE NC, 28739
2. SUBJECT REFERENCES: D.B. 4040 PG. 183 & S.E. 1 PL: SLD-3081
3. TOTAL PARCEL AREA(S): 31,363.0 SQ. FT.
4. PARCEL LINES, EXISTING FEATURES, IMPROVEMENTS, TOPOGRAPHIC, AND BOUNDARY INFORMATION BASED ON PRELIMINARY SITE SURVEY ENTITLED, "SURVEY OF LOT 6 OF LAUREL OAKS SUBDIVISION & LIDAR TOPOGRAPHIC DATA FOR THE JAMES RODNEY PRATT & GAYLE MORENE PRATT REVOCABLE TRUST" DATED OCTOBER 2, 2023 AND RECEIVED VIA EMAIL DATED XXXXXXXX WITH FILE NAME S-2309-110B. TOPOGRAPHIC INFORMATION HAS NOT BEEN VERIFIED
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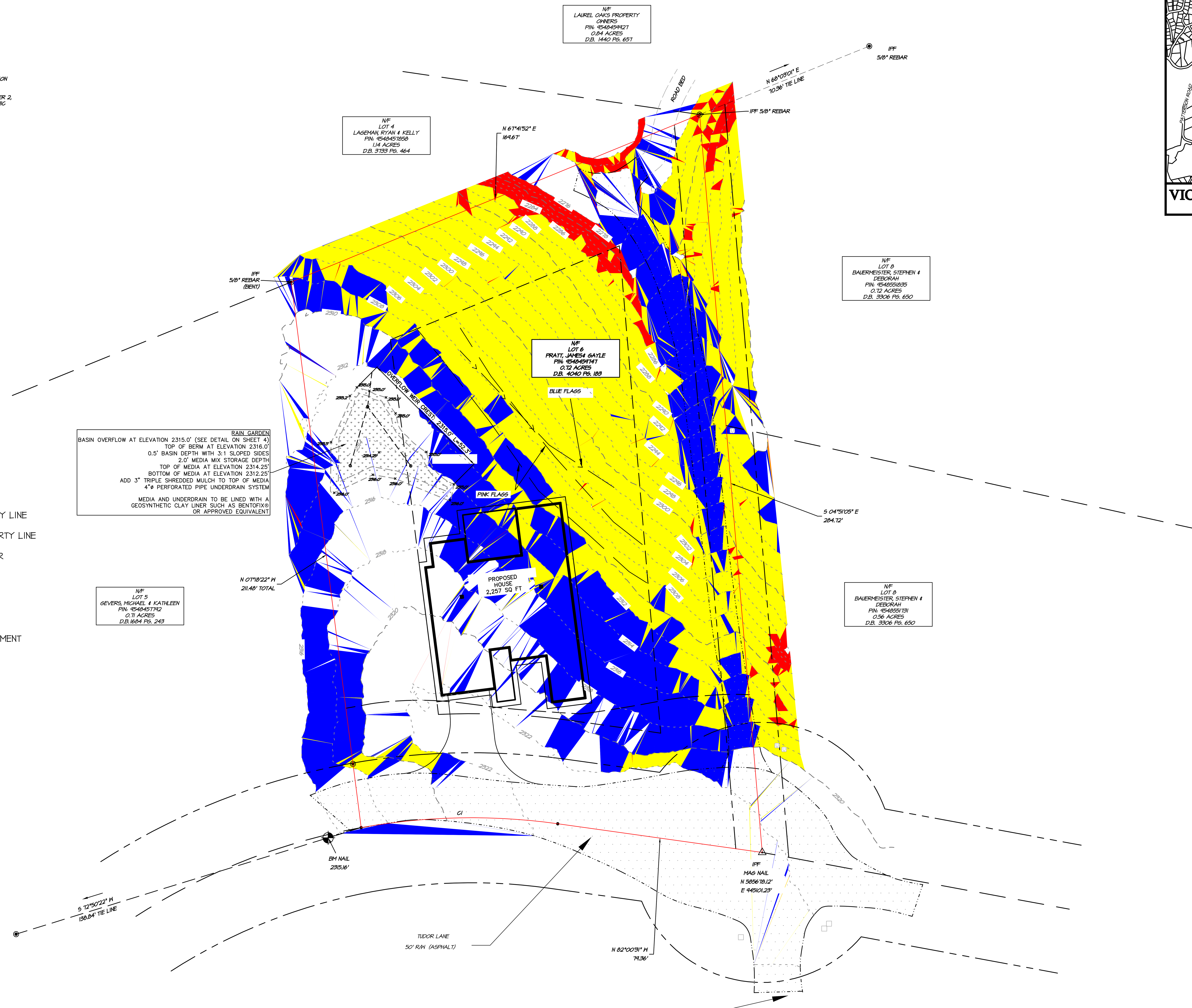
7. BUA:
   PROPOSED IMPERVIOUS AREA: 4,746.09 SQ. FT.

NOTE: CONTRACTOR TO ROUTE ALL ROOF DRAINS TO RAIN GARDEN



LEGEND

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- 5' MAJOR CONTOUR
- 1' MINOR CONTOUR
- EX RIGHT OF WAY
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CURVE	RADIUS	CHORD BEARING	CHORD DISTANCE	ARC LENGTH
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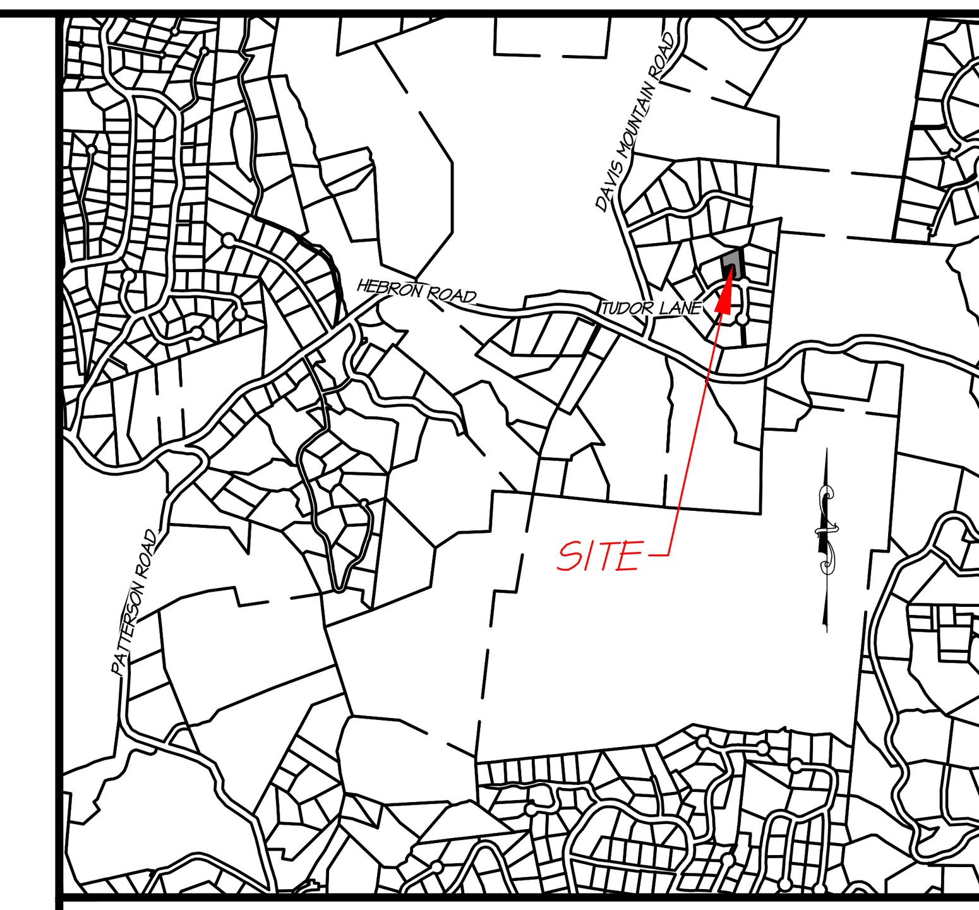
SLOPE LEGEND		
SLOPE MINIMUM	SLOPE MAXIMUM	COLOR
0.00%	15.00%	(white)
15.00%	25.00%	(blue)
25.00%	60.00%	(yellow)
60.00%	N/A	(red)

AVERAGE SLOPE: 23.5%
LAUREL PARK STEEP SLOPE : 15% – 25%

AVERAGE SLOPE = ((I*L)/A)*100
23.5% = ((2*4513.97)/38454.95)*100
'L' = TOTAL CONTOUR LENGTH: 4,513.97 FT
'I' = CONTOUR INTERVAL: 2'
'A' = LOT SIZE: 0.88 ACRES (38,454.95 SQ. FT.)

GRAPHIC SCALE
20' 0 10' 20' 40'
(IN FEET)
1 inch = 20 ft.



VICINITY MAP(HENDERSONVILLE)
N.T.S.

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ENGINEERING** * CONSULTING * PLANNING
ENVIRONMENTAL SCIENCES * SURVEYING**
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90 CHURCH STREET, SUITE B, BLACK MOUNTAIN, NC 28711, Phone: (828) 357-5149, administrator@quible.com

FINAL DRAWINGS FOR PERMITTING ONLY

CERTIFICATION

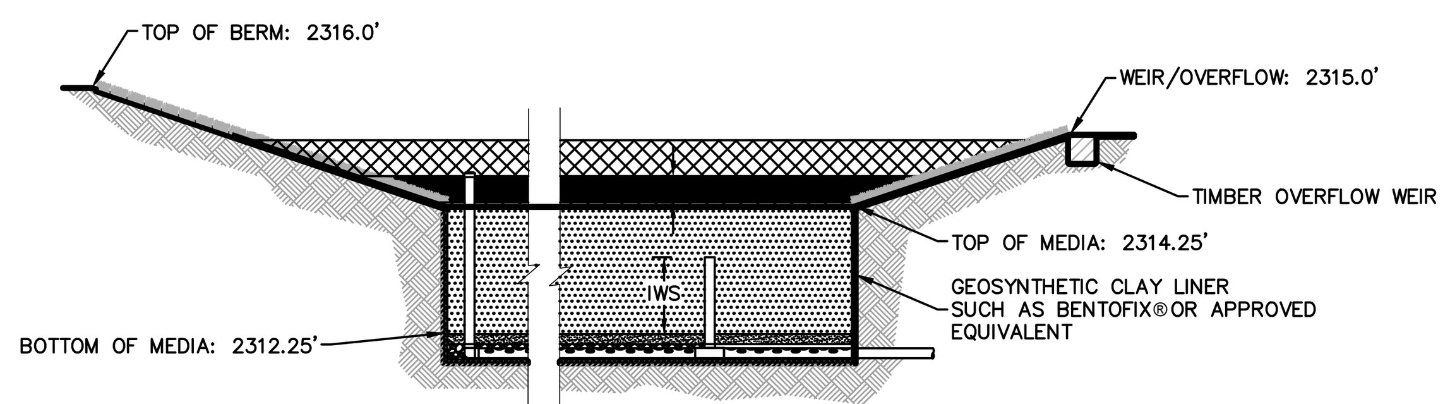
REVISIONS | NO. | DATE

STEEP SLOPE OVERLAY

LAUREL OAKS SUBDIVISION
TUDOR LANE LOT 6

CRAB CREEK TOWNSHIP — HENDERSON COUNTY — NORTH CAROLINA

PROJECT NO.	P23137
DESIGNED BY	LAS
DRAWN BY	LAS
CHECKED BY	TMG
ISSUE DATE	2/2/24



SECTIONAL VIEW

N.T.S.

TYPICAL RAIN GARDEN DETAIL

PROJECT DOES NOT REQUIRE RISER STRUCTURE
UNDERDRAIN PIPING TO CONNECT TO IT-1 DRAIN PIPE
N.T.S.

RAIN GARDEN PLANTING NOTES:

TREES FOR RAINGARDEN

AMELANCHIER ARBOREA AMELANCHIER CANADENSIS	SERVICEBERRY
BETULA NIGRA	RIVER BIRCH
CERCIS CANADENSIS	EASTERN REDBUD
PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE

SHRUBS FOR RAINGARDE

CAMUS AMOMUM	SILKY DOGWOOD
HALESIA CAROLINA	CAROLINA SILVERBELL
LLEX VERTICILLATE	WINTERBERRRY
PHYSOCARPUS OPULIFOLIUS	NINEBARK
SAMBUCUS CANADENSIS	AMERICAN BLACK ELDERBERRY
VACCINIUM ARBOREUM	FARKLEBERRY
VACCINIUM CORYMBOSUM	HIGHBUSH BLUEBERRY
VACCINIUM FUSCATUM	BLACK HIGHBUSH BLUEBERRY

HERBACEOUS PLANTS FOR RAINGARDEN

AMSONIA TABERNAEMONTANA	EASTERN BLUE STAR
CHASMANTHIUM LATIFOLIUM	RIVER OATS
CHASMANTHIUM LAXUM	SLENDER WOODOATS
HEUCHERA AMERICANA	CORAL BELLS
JUNCUS CORIACEUS	LEATHERY RUSH
JUNCUS EFFUSUS	SOFT RUSH
JUNCUS TENUIS	PATH RUSH
PANICUM VIRGATUM AND CULTIVARS	SWITCH GRASS
PYCNANTHEMUM MUTICUM	MOUNTAIN MINT
SOLIDAGO CANADENSIS	GOLDENROD
SORGHASTRUM NUTANS	LNDIANGRASS

BIO RETENTION BASIN STAGE STORAGE TABLE

STORAGE LEVEL	ELEVATION, FT	CONTOUR AREA, SQ FT
SURFACE STORAGE	2315.0	980.3
	2314.25	695.2
	DEPTH	9 IN
	VOID RATIO	1.0
	STORAGE VOLUME	625.26 CU. FT.
MEDIA STORAGE	2314.25	695.2
	2313.25	695.2
	2312.25	695.2
	DEPTH	2.0 FT
	VOID RATIO	0.2
	STORAGE VOLUME	278.08 CU. FT.
	TOTAL STORAGE PROVIDED	903.34 CU FT

PLANTING NOTES:

PLANT COMMUNITY	SHOULD BE DIVERSE PLANTS TO AVOID SUSCEPTIBILITY TO INSECTS, DROUGHT, AND/OR DISEASE.
SOD MEDIA FOR SOD	SOD MUST NOT BE INSTALLED THAT HAS BEEN GROWN IN SOIL THAT HAS AN IMPERMEABLE LAYER, SUCH AS CLAY.
STANDARDS FOR PLANT MATERIALS	PLANT MATERIAL SHOULD CONFORM TO THE CURRENT EDITION OF AMERICAN STANDARDS FOR NURSERY STOCK.
UPON DELIVERY OF PLANTS, CHECK:	NORMAL, WELL-DEVELOPED BRANCHES AND VIGOROUS ROOT SYSTEMS, AND BE FREE FROM PHYSICAL DEFECTS, PLANT DISEASES, AND INSECT PEST, TAGGED FOR IDENTIFICATION, NOT ROOT-BOUND.
CONTAINER SIZE	IN MOST CASES, HERBACEOUS PLANTS INSTALLED IN RAIN GARDENS ARE GROWN IN CONTAINERS HOLDING 3.6 TO 6.8 CUBIC INCHES OF MEDIA. OTHER CONTAINER SIZES OR BARE ROOT STOCK MAY BE APPROPRIATE FOR SOME SPECIES AND CONDITIONS. NO CONTAINER SIZE IS SPECIFIED FOR TREES AND SHRUBS.
OPTIMAL PLANTING TIME	FALL AND WINTER PLANTING ARE BEST (WILL VARY FOR WESTERN PIEDMONT AND MOUNTAINS). SPRING IS ACCEPTABLE BUT WILL REQUIRE MORE SUMMER WATERING THAN FALL PLANTING. SUMMER PLANTING DRASTICALLY INCREASES PLANT MORTALITY AND REQUIRES REGULAR WATERING IMMEDIATELY FOLLOWING INSTALLATION.
HOW THE PLANTS SHOULD BE PLANTED	FOR BEST SURVIVAL, TREES SHOULD BE PLANTED WITH THE TOP OF THE ROOT BALL PARTIALLY OUT OF THE MEDIA. FOR TREES AND SHRUBS, THE TOP OF THE ROOT BALL SHOULD BE 1-3" ABOVE THE MEDIA. IF LARGE TREES ARE TO BE PLANTED IN DEEP FILL MEDIA, CARE SHOULD BE TAKEN TO ENSURE THAT THEY WOULD BE STABLE AND NOT FALL OVER.
LOCAL JURISDICTION CODES	LOCAL JURISDICTIONS OFTEN HAVE SPECIFIC GUIDELINES FOR THE TYPES AND LOCATION OF TREES AND OTHER LANDSCAPE PLANTS PLANTED ALONG PUBLIC STREETS OR RIGHTS-OF-WAY. ADDITIONALLY, LOCAL LANDSCAPE ORDINANCES MST BE FOLLOWED. CONTACT LOCAL AUTHORITIES WHEN MAKING PLANT SELECTIONS FOR YOUR PROJECT.

SODDED RAIN GARDENS ONLY:
USE NON-CLUMPING, DEEP ROOTED SPECIES

VEGETATION OTHER THAN SOD:
AFTER 5 YEARS OF PLANTING:

- PLANTING PLAN SHOULD ACHIEVE MIN. OF 75% OF PLANT COVERAGE
- MAX. COVERAGE WITH TREE OR SHRUB CANOPY IS 50%

MULCHING:
FOR RAIN GARDENS WITH VEGETATION OTHER THAN SOD, PLACE TWO TO FOUR INCHES OF TRIPLE SHREDDED HARD WOOD MULCH FOR THE PORTION OF THE GARDEN THAT WILL BE INUNDATED.

BASIN EMBANKMENTS:
BASIN EMBANKMENTS SHALL BE SODDED USING NON-CLUMPING, DEEP ROOTED SPECIES. USE COOL SEASON TURF GRASS SUCH AS FESCUE OR BLUEGRASS. AVOID SOD THAT IS GROWN IN SOIL THAT HAS AN IMPERMEABLE LAYER.

OPERATION AND MAINTENANCE PROCEDURES:

1. IMMEDIATELY AFTER THE RAIN GARDEN IS ESTABLISHED, THE PLANTS WILL BE WATERED TWICE WEEKLY IF NEEDED UNTIL THE PLANTS BECOME ESTABLISHED.
2. MULCH, SNOW, OR OTHER MATERIAL WILL NOT BE PILED ON THE SURFACE OF THE RAIN GARDEN.
3. HEAVY EQUIPMENT WILL NEVER BE DRIVEN OVER THE BIO RETENTION CELL.
4. SPECIAL CARE WILL BE TAKEN TO PREVENT SEDIMENT FROM ENTERING THE RAIN GARDEN.
5. ONCE A YEAR, A SOIL TEST OF THE SOIL MEDIA WILL BE CONDUCTED.
6. REMOVE TOP LAYER OF FILL MEDIA WHEN THE POOL DOES NOT DRAIN WITHIN 24 HOURS.

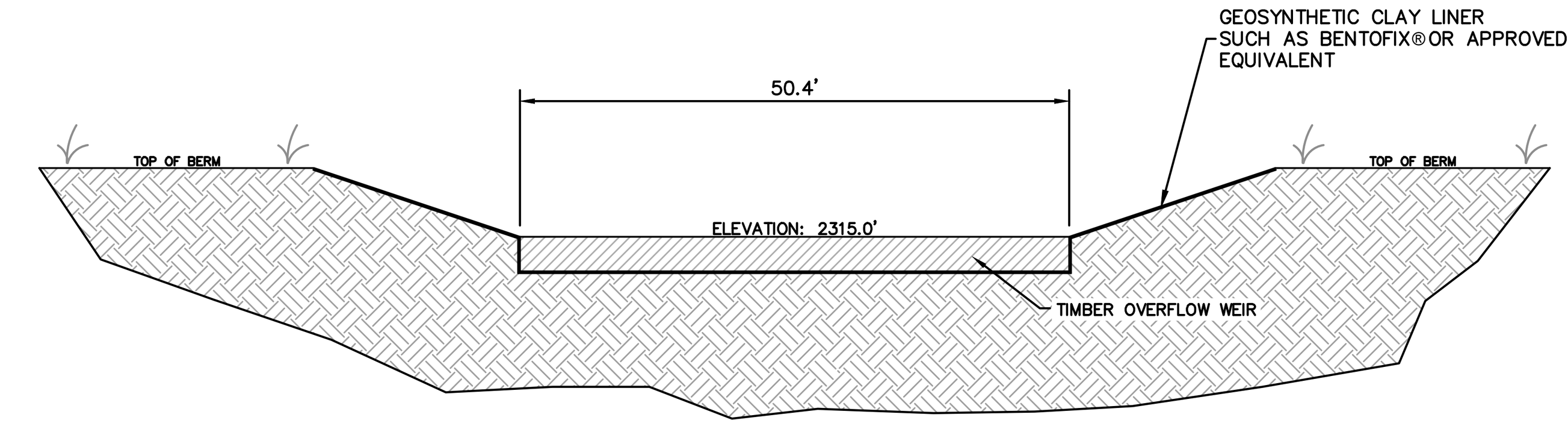
THE RAIN GARDEN WILL BE INSPECTED QUARTERLY AND WITH 24 HOURS AFTER EVERY STORM EVENT GREATER THAN 1.0 INCHES. RECORDS OF OPERATION AND MAINTENANCE SHALL BE KEPT IN A KNOWN SET LOCATION AND SHALL BE AVAILABLE UPON REQUEST.

MAINTENANCE REQUIREMENTS EXTENDING BEYOND THE PLANTING PHASE.

RAIN GARDEN MAINTENANCE REQUIREMENTS ARE TYPICAL LANDSCAPE CARE PROCEDURES AND INCLUDE:

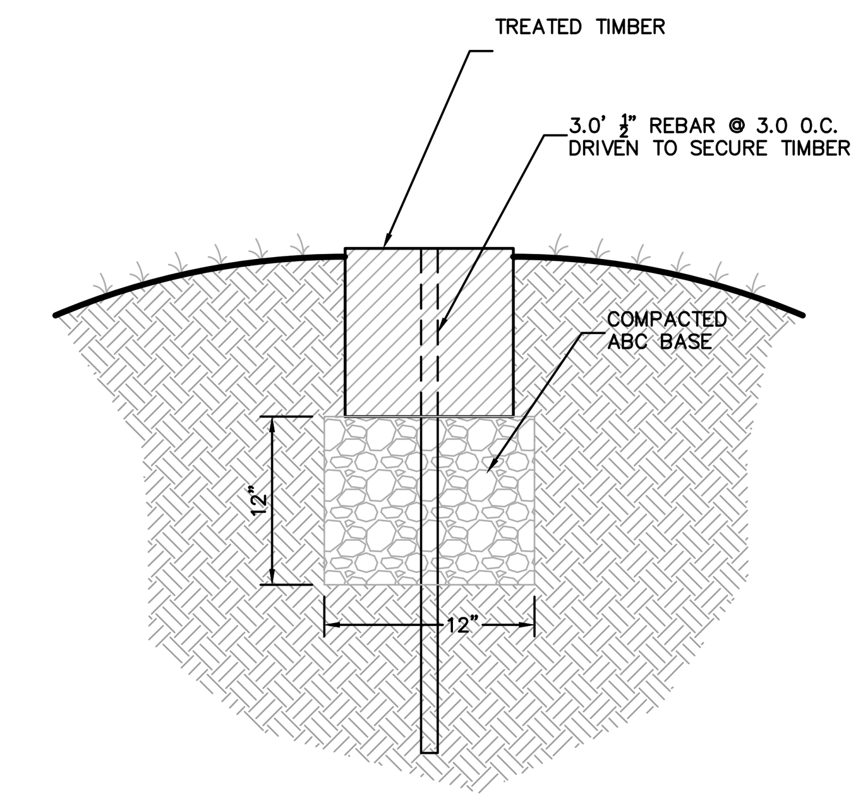
- WATERING: WATERING MAY BE REQUIRED TO INITIALLY ESTABLISH THE VEGETATION. WATERING SHOULD BOT BE REQUIRED AFTER ESTABLISHMENT (ABOUT 2 TO 3 YEARS). HOWEVER, WATERING MAY BE REQUIRED DURING PROLONGED DRY PERIODS AFTER PLANTS ARE ESTABLISHED.
- EROSION CONTROL: INSPECT FLOW ENTRANCES, PONDING AREA, AND SURFACE OVERFLOW AREAS PERIODICALLY. REPLACE SOIL, PLANT MATERIAL, AND/OR MULCH IN AREAS WHERE EROSION HAS OCCURRED. IF SEDIMENT IS DEPOSITED IN THE RAIN GARDEN, IMMEDIATELY DETERMINE THE SOURCE, REMOVE EXCESS DEPOSITS, AND CORRECT THE PROBLEM.
- PLANT MATERIAL: OCCASIONAL PRUNING AND REMOVAL OF DEAD PLANT MATERIAL MAY BE NECESSARY DEPENDING ON PLANTS SELECTED AND AESTHETIC REQUIREMENTS. CAREFUL PRUNING SHOULD MAINTAIN LINES OF SIGHT IN PARKING LOTS AND ALONG ROADWAYS. REPLACE ALL DEAD PLANTS. IF A SPECIFIC PLANTS CONSISTENTLY HAVE A HIGH MORTALITY RATE, ASSESS THE CAUSE AND REPLACE WITH APPROPRIATE SPECIES. PERIODIC WEEDING IS NECESSARY UNTIL GROUNDCOVER PLANTS ARE ESTABLISHED. WEEDING SHOULD BECOME LESS FREQUENT WHEN APPROPRIATE PLANT DENSITY HAS BEEN ESTABLISHED.
- NUTRIENTS AND PESTICIDES: NUTRIENT AND PESTICIDE INPUTS SHOULD NOT BE REQUIRED AND WILL DEGRADE THE POLLUTANT PROCESSING CAPABILITY OF THE RAIN GARDEN, AS WELL AS CONTRIBUTE TO ADDITIONAL POLLUTANT LOADING TO RECEIVING WATERS. ADDITION OF COMMERCIAL FERTILIZER OR COMPOST TO THE RAIN GARDEN WILL LIKELY RESULT IN NUTRIENT EXPORT FROM THE BED.
- MULCH: REPLACE MULCH ANNUALLY IN THE RAIN GARDEN WHERE HEAVY METAL DEPOSITION IS LIKELY, SUCH AS DRAINAGE AREAS THAT INCLUDE COMMERCIAL/INDUSTRIAL USES, PARKING LOTS, OR ROADS, AND WHERE WATER CONCENTRATIONS ENTER THE GARDEN. REPLACE OR ADD MULCH TO MAINTAIN A 2 TO 4-INCH DEPTH OF MULCH.
- FILTERING CAPACITY: WHEN THE FILTERING CAPACITY DIMINISHES SUBSTANTIALLY, WHEN WATER PONDS ON THE SURFACE FOR MORE THAN 12 HOURS, REMEDIAL ACTIONS MUST BE TAKEN. IF WATER PONDS FOR MORE THAN 12 HOURS, THE TOP FEW INCHES OF MATERIAL SHOULD BE REMOVED AND REPLACED WITH FRESH MATERIAL. THE REMOVED SEDIMENTS SHOULD BE DISPOSED OF IN AN ACCEPTABLE MANNER OR LAND APPLICATION. IF THE PROBLEM IS NOT REMEDIED BY THIS ACTION, MORE EXTENSIVE REBUILDING IS REQUIRED. IF THE BED HAS FILTER FABRIC INSTALLED UNDER THE MEDIA MIX AND ABOVE THE WASHED ROCK, THE FILITER FABRIC MAY BE CLOGGED WITH SEDIMENT. IF CLOGGED FILTER FABRIC IS PRESENT, THE BED WILL NEED TO BE REBUILT.

RAIN GARDEN PLANTING PLAN RECOMMENDATIONS



OVERFLOW WEIR CROSS SECTION

N.T.S.



OVERFLOW WEIR INSTALLATION DETAIL

N.T.S.

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FINAL DRAWINGS FOR PERMITTING ONLY

CERTIFICATION

NO.	DATE	REVISIONS

DETAILS 1 OF 1

LAUREL OAKS SUBDIVISION
TUDOR LANE LOT 6

CRAB CREEK TOWNSHIP HENDERSON COUNTY NORTH CAROLINA

PROJECT NO.	P23137
DESIGNED BY	LAS
DRAWN BY	LAS
CHECKED BY	TMG
ISSUE DATE	2/2/24

Town of Laurel Park
PROCLAMATION
WORLD BEE DAY May 20, 2024

WHEREAS, most of the 25,000 to 30,000 species of bees (Hymenoptera: Apidae) are effective pollinators, and together with moths, flies, wasps, beetles, and butterflies, they make up the majority of pollinating species; and

WHEREAS, Pollination is a keystone process, critical for food production and human livelihoods, making bees and other pollinators critical to ensuring the global safety of the food supply chain. A third of all food produced in the world, i.e. every third spoon of food, depends on pollination; and

WHEREAS, bees also serve as sentinels for emergent environmental risks, signaling the health of local ecosystems. Without their service, many interconnected species and processes functioning within the ecosystem would collapse; and

WHEREAS, Beyond food, pollinators also contribute directly to medicines, biofuels, fibers like cotton and linen, and construction materials; and

WHEREAS. Studies of United Nations and the International Union for Conservation of Nature show that bee populations have significantly decreased, due to numerous factors including intensive agriculture, widespread use of pesticides and pollution caused by waste, loss of habitat, exposure to new diseases and pests; and

WHEREAS, the Town of Laurel Park manages parks, public landscaping, and other public lands that may include greenways and wildlife habitats; and

WHEREAS, the Town of Laurel Park of Henderson County, North Carolina, USA, provides recommendations to developers and residents regarding landscaping to promote wise conservation stewardship, including the protection of pollinators and maintenance of their habitats; and

NOW, THEREFORE, I, J. Carey O'Cain, Mayor of the Town of Laurel Park, do hereby proclaim the May 20, 2024, as our municipality's observance of

World Bee Day

And, as Laurel Park is an affiliate of **Bee City USA®**, do urge all citizens to recognize this observance.

In witness whereof, I have hereunto set my hand and caused the seal of Laurel Park, NC, to be affixed this day of April, 2024.

J. Carey O'Cain, Mayor

ATTEST:

Tamara Amin, CMC, NCCMC
Town Clerk/Deputy Tax Collector