UNIONCOUNTY
north carolina

Invitation for Bid No. 2025-028

Union County
Progress Building Parking Lot Improvements

ADDENDUM No. 1

ISSUE DATE: February 19, 2025

Responding Offerors on this project are hereby notified that this Addendum shall be made a part of the above named IFB document.

The following items add to, modify, and/or clarify the IFB documents and shall have the full force and effect of the original Documents. This Addendum shall be acknowledged by the Offeror in the IFB document.

PROJECT MANUAL – 100% CONSTRUCTION DOCUMENTS

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS
00 00 00 Cover Page
00 01 01 Project Title Page
00 01 07 Seals Page
00 01 10 Table of Contents
00 01 15 List of Drawing Sheets
00 11 13 Advertisement for Bids
00 11 16 Invitation to Bid
00 21 00 Instructions to Bidders
00 25 00 Pre-bid Meetings
00 41 13 Bid Form – Stipulated Sum
00 43 13 Bid Security Form
00 43 28 Tax Rebate Form
00 43 39.13 Guidelines for Recruitment and Selection of Minority Business
00 45 19 Non-Collusion Affidavit
00 45 36 Equal Opportunity Employment Affidavit
00 45 39 Minority Business Enterprise (MBE) Provisions Affidavit
00 52 00 Agreement Forms
00 55 00 Notice to Proceed
00 61 00 Bond Forms
00 62 00 Certificate of Insurance
00 72 00 General Conditions of the Contract for Construction
00 91 13 Addenda

DIVISION 01 – GENERAL REQUIREMENTS
01 02 00 General sitework requirements
01 10 00 Summary
01 26 00 Contract Modifications Procedures
01 29 00 Payment Procedures
01 31 00 Project Management and Coordination
01 32 00 Construction Progress Documentation
01 33 00 Submittal Procedures
01 40 00 Quality Requirements
01 41 00 Special Inspections
01 42 00 References
01 50 00 Temporary Facilities and Controls
01 60 00 Product Requirements
01 73 00 Execution
01 73 29 Cutting and Patching
01 74 19 Construction Waste Management and Disposal
01 77 00 Closeout Procedures
01 78 23 Operation and Maintenance Data
01 78 39 Project Record Documents
01 79 00 Demonstration and Testing

DIVISION 02 – EXISTING CONDITIONS
02 41 13 Selective site demolition

DIVISION 10 – SPECIALTIES
10 73 00 Aluminum walkway covers

DIVISION 31 – EARTHWORK
31 10 00 Site clearing
31 20 00 Earthwork
31 25 00 Erosion control

DIVISION 32 – EXTERIOR IMPROVEMENTS
32 12 16 Asphalt pavement
32 13 13 Site concrete
32 14 13.19 Concrete paver materials
32 17 00 Pavement markings, signs and specialties
32 92 00 Lawns and grasses
32 93 00 Exterior plants

DIVISION 33 – UTILITIES
33 41 00 Storm drainage

END OF DOCUMENT 00 01 10

UNION COUNTY, NORTH CAROLINA

ADVERTISEMENT FOR BID
IFB 2025-028

Progress Building Parking Lot Improvements

Sealed Bids for Union County Progress Building Parking Lot Improvements will be **received by the Union County Procurement and Contract Management Department *until* 2:00 PM local time on February 27, 2025,** at the Union County Government Center, 500 N. Main Street, Suite 709, Monroe, NC 28112 at which time the Bids will be publicly opened and read. Late bids will not be accepted.

If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "**BID ENCLOSED – 2025-028**" and shall be addressed to Union County Procurement and Contract Management Department, Corey Brooks, 500 N. Main Street, Suite 709, Monroe, NC 28112.

A Non-Mandatory Pre-Bid meeting will be held on **February 04, 2025, at 10:00 AM** local time at Union County Progress Building 1407 Airport Road Monroe, NC 28110 Attendance at this meeting is strongly encouraged.

Scope of Work: Project consists of parking lot resurfacing and permeable pavement installation. Addition of a free-standing and structurally independent pre-manufactured canopy at the entry to the building.
Bid will be received for a single prime, lump sum Contract.

All questions about the meaning or intent of the Bidding Documents are to be submitted in writing to the Procurement contact person listed on the cover page (corey.brooks@unioncountync.gov). The deadline for questions is 5:00 PM local time on February 13, 2025. Questions will be addressed via Addenda no later than 4 days prior to bid date.

The Issuing Office for the Bidding Documents is:

Gensler
101 South Tryon Street
Suite 2100
Charlotte NC 28280

Bidding Documents may be viewed and ordered online by registering with Duncan Parnell via their bid room https://bidroom.duncan-parnell.com/. Registration with Duncan Parnell is required to obtain the bid documents and be added to the official Plan Holder's List. Addenda notification will be sent to those buying full sets from Duncan Parnell via their bid room. The cost of bid documents and shipping is non-refundable. If you need any assistance ordering or getting registered on https://bidroom.duncan-parnell.com/ please contact: Michaela Bruinius at constech@duncan-parnell.com or 704-526-1856.

Costs of the Bidding Documents and shipping are non-refundable, and are as follows:

- Download (PDF) $111.00 plus tax
- Printed Set (black and white): $148.00 plus tax

Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Architect/Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office or Duncan-Parnell.

Bidders must have a license to do work as a contractor in the State of North Carolina, as set forth under Article 1 chapter 87 of the North Carolina General statutes. The bidder's North Carolina Contractor license number shall be designated on the outside of the sealed envelope containing the Bid.

Bidders are required to provide a non-collusion affidavit, as set forth in the bidding documents.

As provided by statute, a deposit of cash, cashier's check or certified check on some bank or trust company insured by the Federal Deposit insurance Company, or a bid bond executed by corporate surety licensed under the laws of North Carolina to execute such bonds in the amount of 5% of the bid must accompany each bid. The payee shall be "**Union County**". Said deposit shall guarantee that the Agreement will be entered into by the successful bidder if award is made. Such deposit may be held by Union County until the successful bidder has executed and delivered all required Contract documents to Union County.

Bidders should note the provisions of the Supplementary instruction to bidders contained in the Bid Documents regarding minority participation. Union County encourages good faith effort outreach as described in the Union County MBE and Small business Outreach Plan. Compliance with Union County Minority and Small Business Guidelines and Outreach Plan goals apply. Bidders shall submit a completed identification of Minority Participation form and either an Affidavit A or Affidavit B, as applicable along with their Bid.

The Owner reserves the right to reject any or all bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserve the right to reject the Bid and Bidder whom they find, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid and Bidder if the Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities and technicalities not involving price, time, or changes in the Work and to negotiate, as allowed by law, contract terms with the Successful Bidder.

END OF DOCUMENT 00 11 13

ADDENDUM NO. 01

Union County
Progress Building Parking Lot Improvements
Project No.: **IFB 2025-028**

Union County, Owner
Contract Document Date:
Architectural, **Structural** - **November 25, 2024**
Civil – September 12, 2024
Addendum Date: **February 19, 2025**

Issue to: **Bidders**

A. NOTICE TO BIDDER

1.1 This Addendum is issued pursuant to the Conditions of the Contract and is hereby made part of the Contract Documents. The addendum serves to clarify, revise, and supersede information in the Project Manual, the Drawings, and previously issued Addenda. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form. Failure to do so may subject the Bidder to disqualification. A list of attachments, if any, is part of this document.

1.2 The date for receipt of bids for this project **is unchanged by this Addendum.** Sealed Bids for Union County Progress Building Parking Lot Improvements will be **received by the Union County Procurement and Contract Management Department until 2:00 PM local time on February 27, 2025,** at the Union County Government Center, 500 N. Main Street, Suite 709, Monroe, NC 28112.

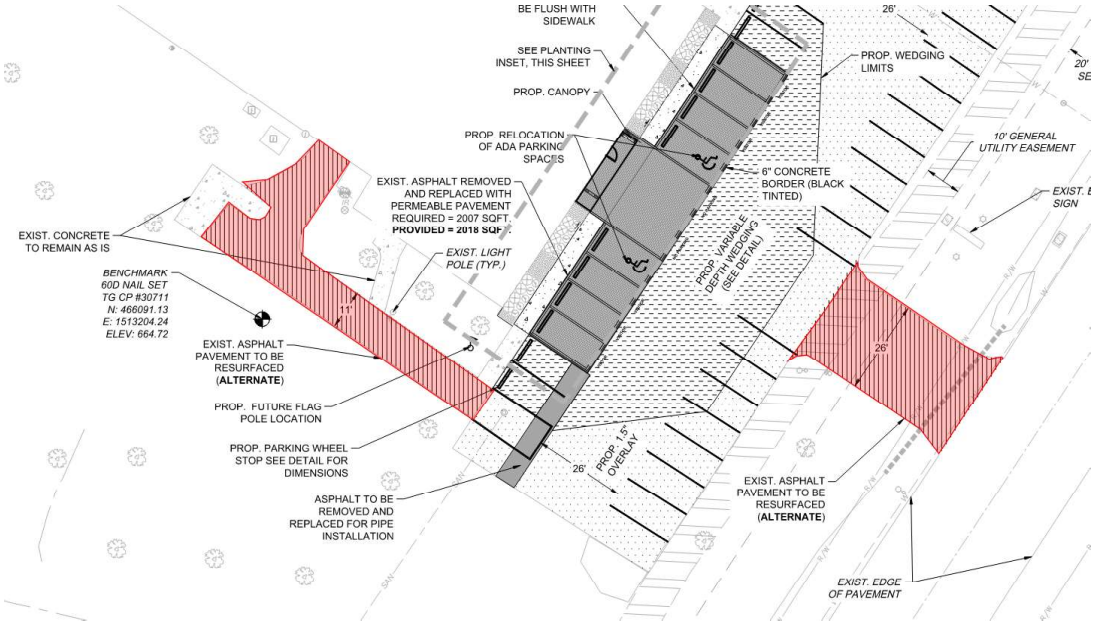
1.3 All questions about the meaning or intent of the Bidding Documents are to be submitted in writing to the Procurement contact person listed on the cover page (**e-mail corey.brooks@unioncountync.gov**). **Deadline for questions is 5:00 PM local time on February 13, 2025.** Questions will be addressed via Addenda no later than seven calendar days prior to the date for receipt of bids. All addenda and updates will be posted to the following websites: Union County, NC State eVP, Duncan Parnell Planroom: https://bidroom.duncan-parnell.com/

B. QUESTION AND ANSWER SECTION

1. Please advise if this project includes the installation of a solar PV system.
Answer:
There is no solar PV system scope at this project.

2. I was wondering if construction materials testing will be necessary for this project? If so, could you tell me how it will be procured?
Answer:
No material testing is anticipated.

3. Per review of the bid documents the resurface spec for the alternate resurface location on plan sheet noted above is not clear. Please confirm resurface spec for this alternate pricing area.
Answer:
The alternate asphalt resurfacing (shown below in red) will be milled (1.5″) and overlaid (1.5″) with asphalt, similar to the resurfacing in the base bid.



C. MODIFICATIONS TO DRAWINGS

1.4 Drawing revisions to address plan review comments. Refer to Revisions Narrative.

D. MODIFICATIONS TO SPECIFICATIONS

1.5.1 Update to Section 00 01 10 "Table of Content" to include Section 00 91 13 "Addenda".
1.5.2 Update to Section 00 11 13 "Advertisement for Bid" – revised Issuing Office to Gensler.

E. ATTACHMENTS

1.6.1 Sign-in Sheet from Pre-Bid meeting.
1.6.2 Planholders/bidders list.

END OF ADDENDUM

Meeting Attendance Record

UNIONCOUNTY north carolina **Gensler**

Project	Progress Building Parking Lot Improvements IFB 2025-028	**Project Number**	059.6957.100
Meeting Location	1407 Airport Road Monroe, NC 28110	**Meeting Date**	February 4, 2025
		File	6B
		This is page	1 of 5

Name	Company	Contact Tel. No.	E-mail Address
Hoss Hinson	Hoss Contracting	704-361-2299	hoss@hosscontracting.com
Jason Taylor	J Taylor	704 281-0502	dana taylor 331@hotmail.com
John Hoskins	TG & R Const.	803 517 8489	john@tyrlandscape.com
Matthew Gibson	HGC Masonry	704-506-0781	hgmasonry@outlook.com
Seth Nichols	Timmons Group	434-390-3578	seth.nichols@timmons.com
Jennifer Stamp	Ike's Construction	704-797-6873	jennifer@ikesconstruction.com

101 S Tryon Street
Suite 2100
Charlotte NC 28202
Tel: +1 704.377.2725
Fax: +1 704.377.2807

Union County, NC - Progress Building Parking Lot Improvements

Project consists of parking lot resurfacing and permeable pavement installation. Addition of a free-standing and structurally independent pre-manufactured canopy at the entry to the building.

Plan Holders

Date	Company	Contact
2/4/25 12:22 pm	**ConstructConstruct** 3825 Edwards Road Suite 800 CINCINNATI, OH 45209	**Construct Connect** Tel: 18003642059
1/29/25 2:16 pm	**Dave's Construction Service Inc** 1416 Washington Street Eden, NC 27288	**Randy Nance** **Director of Charlotte Operations** Tel: (336) 613-4835
1/30/25 10:49 am	**Enbloc Construction** 1026 Jay St B203 Charlotte, NC 28208	**Kaitlyn Fife** Tel: 9804130818
1/30/25 12:20 pm	**Gitto Enterprises Inc** 7320 Basset Hall Ct Raleigh, NC 27616	**Peter Gitto** Tel: 9198092860
2/6/25 12:20 pm	**Hoss Contracting, Inc.** PO Box 968 Monroe, NC 28111	**Hoss Hinson** **President** Tel: 7042330488
2/7/25 3:38 pm	**Hostetter and Son Construction, Inc.** 9305 Monroe Rd STE H Charlotte, NC 28270	**Franklin Hostetter** Tel: 7044993077
2/3/25 10:35 am	**Ike's Construction** 303 Executive Park Drive Concord, NC 28025	**Jason Schultz** **Estimator** Tel: 7044565296 Fax: 704-788-2164
1/30/25 1:35 pm	**J Taylor Inc** PO Box 1034 Monroe, NC 28111	**Dana Taylor** Tel: 7042910502

Gensler

101 South Tryon Street
Suite 2100
Charlotte NC 28280
USA

Tel 704.377.2725
Fax 704.377.2807

February 18, 2025

Subject: Response to Permit Review Comments
Progress Building Parking Lot Improvements. #2025-028
1407 Airport Rd, Monroe, NC 28110
Permit Application #PRPK202501422

Thank you for the code review of the Progress Building Parking Lot Improvements. Below is our written response to each comment / question provided in the Trade Review.

Engineering Services

1. hold for Stormwater Management Permit Approval.

Response: Noted.

2. Complete the Non-Residential ESC Installation and Maintenance Agreement (PDF) located in the Document and Images section of Cityview. Include the completed form with the next submittal.

Response: Please find enclosed.

Planning and Zoning Review

1. An Alternative Parking Plan (City of Monroe UDO Section 8.4.2 Parking Requirements) should include a parking study that is prepared by a registered Professional Engineer or Certified Land Use Planner .The study must include the size, type, and use(s) of the development; anticipated peak parking; anticipated normal parking amounts; and a narrative and data as to why the parking requirements of the UDO do not accurately reflect the needs of the proposed development.

Response: Please see enclosed correspondence with *Keri Mendler* and approval of Alternative Parking Plan.

2. Per Table 8.4.1 Parking Requirements in the City of Monroe UDO, Warehouse and Storage has a minimum of 0.5 spaces per 1,000 square feet and a maximum of 2 spaces per 1,000 square feet. This parcel is nonconforming as it does not provide parking spaces within these parameters. Without an APP, parking cannot be reduced to further increase the nonconformity (City of Monroe UDO Section 10.2 Nonconforming Lots).

Response: Refer to comment #1 above.

3. Parking areas shall include parking spaces of a minimum of nine (9) feet in width by twenty (20) feet in length (City of Monroe UDO Section 8.4.3 Parking Design Standards).

Response: Civil and Architectural drawings were updated to meet the requirements of Parking Design Standards.

Please note that revised Civil drawings address Stormwater plan review comments and Bid RFIs. Enclosed are "Parking Lot Calculation" prepared by Timmons Group and "Seasonal High-Water Table and In-Situ Infiltration Testing" prepared by Kleinfelder.
Summary of Civil Drawing revisions:

- C-000 - Updated parking summary
- C-200 - Updated pavement note for asphalt resurfacing to list 'alternate'
- C-300 - Added infiltration results

Please feel free to contact me at any time with questions.

Taras Kes AIA, LEED AP BD+C
He/Him/His
Architect | Associate

+1 704.338.0221 Direct
+1 704.377.2725 Main

NON-RESIDENTIAL
EROSION AND SEDIMENT CONTROL
INSTALLATION & MAINTENANCE AGREEMENT
ANY LAND-DISTURBING ACTIVITY LESS THAN 12,000 SQUARE FEET

TO BE SUBMITTED WITH BLANK PERMIT REQUEST, ZONING PERMIT, OR SUBDIVISION PLAT AS APPLICABLE

CITY OF MONROE
a heritage of progress

STREET # (N,S,E,W) STREET NAME
1407 Airport Road

SUBDIVISION: _____

ANTICIPATED STARTING DATE OF CONSTRUCTION: April 01, 2025
EXPECTED COMPLETION OF CONSTRUCTION: October 01, 2025
Note: All sediment control measures must be in place prior to any land-disturbing activity.

PROPERTY OWNER Union County, NC TAX PARCEL # 09369007C80

LOT #: _____

Lot Acreage: 12.665

Total Acreage Disturbed: 0.40 Acres

PLEASE REFER TO THE BACK OF THIS FORM BEFORE COMPLETING

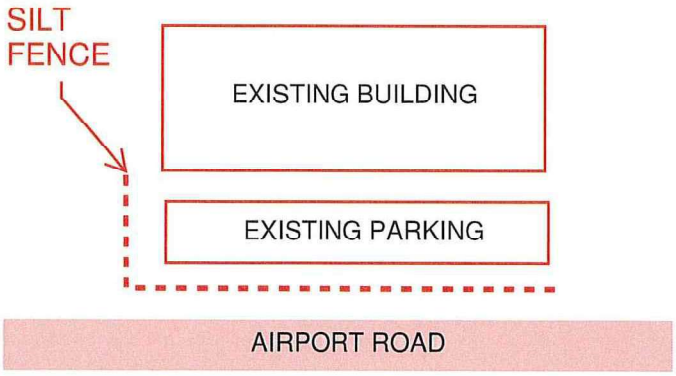
For non-residential sites, choose one of the following:

☐ Option ____, or a combination of Options ____ & _____, best suit this site. Sediment control measures will be installed as detailed.

☒ The sediment control measures will be installed as indicated in the space to the right.

Note: If the disturbed area of the residential site is to exceed one acre, a complete erosion control plan and financial responsibility form must be submitted to and approved by the City prior to any land-disturbing activity.

SITE DRAWING – may be attached
(Sketch of proposed building site, including adjacent drainage features and public right-of-way)



Person(s) or Firm(s) who are financially responsible for this land-disturbing activity:

Company Name: Union County, NC

Company President: Director, Facilities and Fleet Management

Email Address: Christopher.Boyd@unioncountync.gov

Company Address: 1407 Airport Road Monroe

Construction Manager: _____

Email Address: _____

Other (704): 283.3836

Field Office Telephone Number: _____

Field Office Fax Number: _____

Home Office Telephone Number: _____

Home Office Fax Number: _____

Applicant's Signature 01.30.2025 Date

Erosion & Sediment Control Review Officer Date

THE APPLICANT HEREBY CERTIFIES THAT HE/SHE HAS READ THE INFORMATION ON THE BACK OF THIS FORM AND IS AWARE OF THE STATED REQUIREMENTS OF THE SOIL EROSION AND SEDIMENTATION CONTROL. THE OWNER MUST COMPLY WITH THE PROVISIONS OF THESE ORDINANCES.

The City of Monroe Erosion and Sediment Control Ordinance requires that anyone conducting land-disturbing activity control sediment and provide adequate measures to retain sediment at the disturbed site. The total disturbed area of the site includes any borrow or waste areas that are used for the residential site, if the borrow or waste areas are not currently permitted by the City of Monroe or NC DENR. Land-disturbing activities include demolition and land clearing. Erosion Control measures must be installed in accordance with the City of Monroe Standard Specifications and Detail Manual.

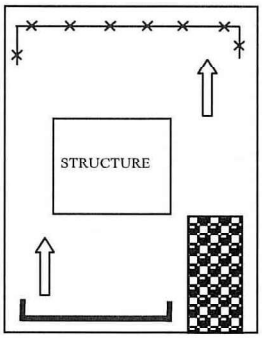
Failure to install or maintain erosion control measures may result in penalties of up to $5000 per day.

If any indicated Erosion and Sedimentation Control (ESC) measures are not installed, a re-inspection fee will be required.

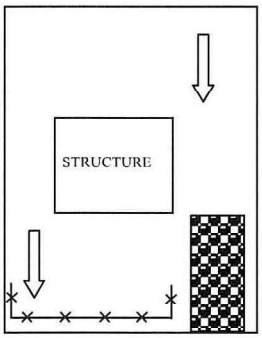
INSTRUCTIONS: IDENTIFY ONE OR A COMBINATION OF OPTIONS THAT BEST DESCRIBES THE EROSION CONTROL MEASURES THAT WILL BE USED DURING CONSTRUCTION.

EROSION CONTROL OPTIONS

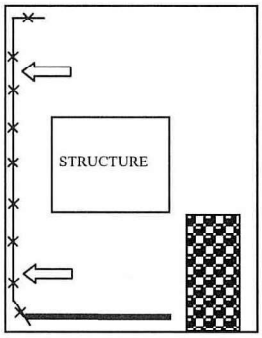
A. Flow to the Rear



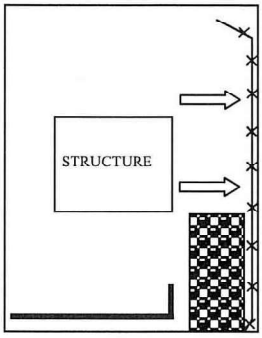
B. Flow to the Front



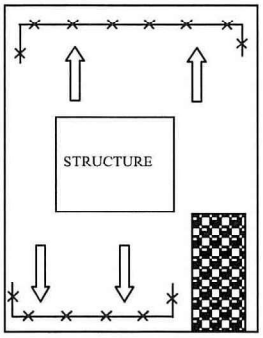
C. Flow to the Left



D. Flow to the Right



E. Flow to the Front & Rear



LEGEND

- Silt Fence
- Construction Entrance
- Direction of flow
- Vehicle Barrier

Taras Kes

From: Keri Mendler <khutchins@monroenc.org>
Sent: Friday, January 31, 2025 11:15 AM
To: Jason.Dolan@timmons.com
Cc: Taras Kes; Doug Britt; Megan Brightharp
Subject: RE: 68148 Union County Progress Building - Alternate Parking Plan

Jason,

The Alternate Parking Plan is acceptable, we will pass this information on to the permit reviewer.

Thank you,

Keri Mendler, AICP, CZO
Senior Planner
City of Monroe
300 W. Crowell Street/ P.O. Box 69
Monroe, NC 28112-0069
(704)-282-5797 p
(704)-283-7704 f
kmendler@monroenc.org

From: Jason Dolan <Jason.Dolan@timmons.com>
Sent: Wednesday, January 29, 2025 6:14 PM
To: Lisa Stiwinter <lstiwinter@monroenc.org>
Cc: Taras Kes <Taras_Kes@gensler.com>
Subject: 68148 Union County Progress Building - Alternate Parking Plan

Lisa,

We are requesting your review of our proposed Alternate Parking request for the referenced project at 1407 Airport Road.

The existing office building and warehouse has been submitted to the City and County proposing some interior renovations and exterior improvements that include replacing existing asphalt pavement with pervious pavers as required as part of the Events Center project.

The existing building (which is not undergoing any change of use or increase in staff) does not currently meet the existing parking requirements of UDO section 8.4.2, primarily due to the size of the existing warehouse square footage and low number of staff needed for the space.

We are proposing an Alternate Parking Plan that will reduce the minimum required parking from 94 spaces to 42 spaces as outlined in the Parking Summary shown below. As a result of the improvements in front of the building

(addition of an entrance canopy), the existing parking spaces will be reduced by 2 (from 49 to 47). The total provided parking will be 64.

PARKING SUMMARY

SITE ACREAGE:	12.665 ACRES
BUILDING SF:	138,500 SQUARE FEET
OFFICE (2 STORY):	10,000 SQUARE FEET
WAREHOUSE:	128,500 SQUARE FEET
REQUIRED PARKING (TABLE 8.4.1):	94 TOTAL SPACES REQUIRED
OFFICE (3.0/1,000 SF):	30 SPACES REQUIRED
WAREHOUSE (0.5/1,000 SF):	64 SPACES REQUIRED
ALTERNATE PARKING PLAN	
PROPOSED PARKING:	64 TOTAL SPACES PROVIDED
OFFICE PROVIDED PARKING:	47 SPACES (39 REGULAR, 6 VISITOR, 2 ACCESSIBLE)
WAREHOUSE PROVIDED PARKING:	17 SPACES
OFFICE STAFF:	26
WAREHOUSE STAFF:	2
ANTICIPATED PEAK STAFF PARKING:	28
OFFICE VISITORS (DAILY):	6
WAREHOUSE VISITORS (DAILY):	8
ANTICIPATED PEAK VISITOR PARKING:	14
TOTAL ANTICIPATED PEAK PARKING:	42

Please feel free to contact me if you have any questions.

Thank you,

Jason Dolan, RLA
Sr Project Manager

TIMMONS GROUP | www.timmons.com
610 East Morehead Street, Suite 250 | Charlotte, NC 28202
Office: 704.227.1563 | Fax: 704.376.1076
Mobile: 704.900.4945 jason.dolan@timmons.com
Your Vision Achieved Through Ours

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

610 East Morehead Street, Suite 250
Charlotte, North Carolina 28202

NC License No. C-1652

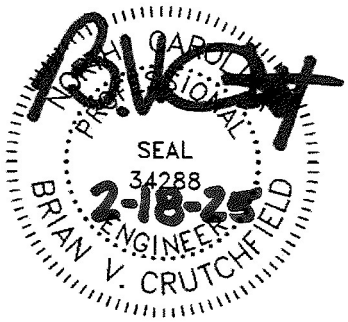
Union County Progress Building

JOB #: **68148**

CALCULATIONS FOR:

DRAWDOWN TIME

DATE: **02/18/25**



DRAWDOWN CALCULATIONS

Simple Method for Runoff Volume

$R_V = 0.05 + 0.9 * I_A$

Where:

R_V	=	Runoff coefficient (unitless)
I_A	=	Impervious fraction (unitless)

$DV = 3630 * R_D * R_V * A$

Where:

DV	=	Design volume (cu ft)
R_D	=	Design storm depth (in)
A	=	Drainage area (ac)

Equation 2: Drawdown Time

$$T = 12\left(\frac{V_R}{i * A_{PP} * FS}\right)$$

where:

T	=	Drawdown time (hours)
V_R	=	Required treatment volume (cubic feet)
A_{PP}	=	Permeable pavement area
SF	=	Safety factor (0.2)
i	=	Measured in-situ soil (or fill soil) infiltration rate (in/hr)

RV=0.05+0.9*Ia

Ia=	0.88	
RV=	0.842	

DV=3630*Rd*Rv*A

Rd=	1	
Rv=	0.842	
A=	0.049	
DV=	149.7665	

T=12(Vr/(i*App*FS))

i=	0.036	
Vr=	149.7665	
App=	2129.15	
FS=	0.2	
T=	117.2350	hours
	4.8848	days

Example 15.2 A permeable pavement covers an area 15 ft by 300 ft. Its rock storage layer is 10 in. deep, with a porosity of 0.4. The storage must be drained from full to a 1-in. depth within 24 h through the underdrain. Find the required orifice diameter

Solution The orifice equation for describing flow with a decreasing head and constant cross-sectional area was presented in Chapter 7. This equation can be rearranged to solve for the orifice area:

$$A_o = \left(h_0^{\frac{1}{2}} - h^{\frac{1}{2}}\right)\left(\frac{2}{g}\right)^{\frac{1}{2}} \frac{A_s \varepsilon}{C_d t}$$

where:

- A_o is the orifice area
- h_0 is the initial water height over the orifice centerline
- h is the final water height over the orifice centerline
- g is gravity
- A_s is the area of the permeable pavement being drained
- ε is the storage zone porosity
- C_d is the orifice discharge coefficient (0.6)
- t is the drain time

The pavement area is 15 × 300 = 4500 ft^2. The 24-h drainage time corresponds to 86,400 s.

$$A_o = \left(\frac{10^{\frac{1}{2}}}{12} - \frac{1^{\frac{1}{2}}}{12}\right) ft^{\frac{1}{2}} \left(\frac{2}{32.2\frac{ft^2}{s}}\right)^{\frac{1}{2}} \frac{(4500\,ft^2)0.4}{(0.6)(86400s)}$$

$$= 5.4 \times 10^{-3}\, ft^2 = 0.778\, in^2 = \pi D^2 / 4$$

$$D = 1.0\, in$$

h0=	12	"	
h=	1	"	
g=	32.2		
As=	1950		
ε=	0.4		
Cd=	0.6		
t=	422046	seconds	(from drawdown calculation)
A0=	0.000136	ft^2	
	0.019597	in^2	
D=	0.158	in	(diameter of underdrain orifices)

January 14, 2025
Kleinfelder File No. CLT25L176738

Ms. Linda Whitaker
Project Manager
Union County Government Facilities
1407 Airport Road
Monroe, North Carolina 28110

SUBJECT: Report of Geotechnical Services
Seasonal High-Water Table and In-Situ Infiltration Testing
Progress Building
1407 Airport Road
Monroe, North Carolina 28110
Kleinfelder Project No. 25003386.001A

Dear Ms. Whitaker,

This letter presents the results of the stormwater control measures soil testing seasonal high-water table (SHWT) evaluation for the subject project.

BACKGROUND & RESULTS

The project site is located at 1407 Airport Road, Monroe, NC. Based on review of aerial imagery, the site consists of an at-grade parking lot which is associated with the existing Progress Building. We understand that a field exploration consisting of a SHWT evaluation and in-situ hydraulic conductivity testing is required to obtain a permit for construction of pervious pavers for the facility. In-situ hydraulic conductivity testing was not performed at proposed boring B-2 due to artificially perched water encountered at a shallow depth within the hand auger excavation. This perched water would have influenced the measured hydraulic conductivity. The results of the referenced field exploration are summarized in the table below and can be found in the attached report prepared by Wilcox & Mabe.

TABLE 1:
APPROXIMATED SHWT AND CALCULATED HYDRAULIC CONDUCTIVITY RATE

BORING LOCATION	SEASONAL HIGH-WATER TABLE (SHWT) (INCHES BGS)	DEPTH BORING TERMINATED (INCHES BGS)	IN-SITU TESTING DEPTH (INCHES BGS)	IN-SITU HYDRAULIC CONDUCTIVITY (IN/HR)
B-1	60	80	30 to 36	0.036

KLEINFELDER 9009 Perimeter Woods Dr. Suite E, Charlotte NC, 28216 p | 704.598.1049

CLOSURE

Kleinfelder appreciates the opportunity to be of service to you during this phase of the project. Should you have any questions or require additional information, please contact the undersigned.

Respectfully submitted,

KLEINFELDER, INC.
Firm License No. F-1312

Hugo Santana, PE
Senior Professional

Joshua Fregosi, PE
Geotechnical Service Line Lead

HS/JDF:asp
Attachment: Report - Stormwater Control Measures (SCM) Soil Testing SHWT Evaluation and Hydraulic Conductivity (Ksat) Testing

STORMWATER CONTROL MEASURES (SCM) SOIL TESTING SHWT EVALUATION AND HYDRAULIC CONDUCTIVITY (Ksat) TESTING

December 31, 2024

Kleinfelder, Inc.
200 Regency Forest Drive, Suite 225
Cary, North Carolina 27518

Attention: Ms. Candace Dziwanowski

Transmitted by e-mail to: cdziwanowski@kleinfelder.com

Reference: **Stormwater Control Measure (SCM) Soil Testing**
Seasonal High Water Table (SHWT) Evaluation and
Hydraulic Conductivity (Ksat) Testing
Progress Building
Monroe; Union County, N.C.
Willcox & Mabe Soil Solutions, PLLC Project No. 21-01; Phase: 06

Dear Ms. Dziwanowski:

Willcox & Mabe Soil Solutions, PLLC (WMSS) has conducted Stormwater Control Measures (SCM) Soil Testing in accordance with Kleinfelder, Inc. (Kleinfelder) Subcontractor Master Services Agreement RAL21C120783 dated January 14, 2021, and WMSS Work Authorization No. 05-24 dated November 14, 2024. The SCM Soil Testing was performed to provide information for technical assistance with the design of a proposed SCM. A soil scientist investigation was conducted to evaluate the soil properties at one (1) proposed SCM location, to determine suitability for stormwater management systems. The soil scientist investigation was conducted to evaluate: seasonal high water table (SHWT) elevation below existing ground surface (bgs), along with hydraulic conductivity (Ksat) testing at the location evaluated for SHWT. A "Site Plan" was provided to WMSS by Kleinfelder that identified relative site features and potential location for the proposed SHWT evaluation & Ksat testing.

PROJECT BACKGROUND

The area evaluated was located within the area identified by Kleinfelder. The SCM is planned in conjunction with proposed site improvements associated with the Progress Building site in Union County, North Carolina (N.C.). The location evaluated, boring location B-1, was located within a grassed area along the edge of an existing parking lot within the proposed development site. The site is located north of the intersection of Airport Road and Corporate Center Drive in Monroe, N.C (**Figure 1)**.

Use of on-site stormwater management systems, is being considered to comply with stormwater management requirements. The use of stormwater SCMs is subject to the suitability of site soils and regulatory approval. Regulatory guidance on requirements for

permitting of stormwater SCMs is provided in the North Carolina Department of Environmental Quality (NCDEQ), Division of Energy, Mineral and Land Resources (DEMLR) – Stormwater Design Manual (NCDEQ-DEMLR-SDM), (Revised, 2017). The NCDEQ-DEMLR-SDM requires that the SHWT shall be taken into consideration for the design of most SCMs.

A WMSS soil scientist conducted an evaluation of the soils through the review of a hand auger boring within the area identified on a base map provided by Kleinfelder, and was located in the field by Kleinfelder. Maps were prepared using Arcview 10.8 a Geographic Information System (GIS). Base maps were generated using information from the ESRI Web site and maps provided by Kleinfelder **(Figures 1 and 2)**.

FINDINGS

Seasonal High Water Table Evaluation

The SHWT evaluation was performed on December 30, 2024 by evaluating 1 hand auger boring location, B-1, to a depth of approximately 80 inches bgs (**Figure 2**). The soils were evaluated by a NC Licensed Soil Scientist for evidence of seasonal high water table influence. This evaluation involved observing the actual moisture content in the soil and observing the matrix and mottle colors. Depending on the soil texture, the soil color will indicate processes that are driven by SHWT fluctuations such as iron reduction and oxidation and organic matter staining.

B-1 was observed to consist of approximately 42 inches of varying layers of fill material followed by brown sandy clay loam and yellowish brown clay in the subsurface horizons. B-1 transitioned into yellowish brown clay with massive structure at approximately 54 inches bgs that transitioned to multicolored clay and gray clay until the boring was terminated at approximately 80 inches bgs. Evidence of a SHWT was identified at approximately 60 inches bgs. Reference attached **Figure 2** for the approximate SHWT test location, and **Table 1** and the attached soil profile description for the approximated SHWT depth.

Please note that SHWT evaluations are based on secondary evidence and not on direct groundwater level measurements. Groundwater levels fluctuate for numerous reasons and these findings do not indicate that groundwater levels have not or will not rise above the noted depths.

Hydraulic Conductivity Testing

WMSS was requested to perform in-situ saturated hydraulic conductivity (Ksat) testing at the location evaluated for SHWT. Conductivity testing was performed by using a compact constant head permeameter adjacent to SHWT boring, B-1, at approximately 30 to 36 inches bgs.

This procedure is described in Methods of Soil Analysis, Part 1., Chapter 29 – Hydraulic Conductivity of Saturated Soils: Field Methods, 29 – 3.2 Shallow Well Pump In Method, pp. 758-763 and in the Soil Science Society of America Journal, Vol. 53, No. 5, Sept. –

Oct. 1989*, "A Constant-head Permeameter for Measuring Saturated Hydraulic Conductivity of the Vadose Zone"* and *"Comparison of the Glover Solution with the Simultaneous – Equations Approach for Measuring Hydraulic Conductivity."*
A hand auger boring was advanced with a 2-inch diameter bucket to the testing depth, and is in close proximity to the hand auger boring location conducted for the SHWT evaluation. The water dissipating unit was lowered to the bottom of the hole, and water was dispensed from the permeameter. The water was allowed to move through the unit until steady-state flow was achieved and then the flow rates were recorded. This volume/time with steady state was used to calculate the in-situ soil hydraulic conductivity rate or KSAT of the subsoil by the Glover equation.

The last three measurements were averaged to achieve the most representative value to express the saturated hydraulic conductivity. The depth interval of the test corresponded to a layer of material approximately 6 inches thick at the selected testing depth. The hydraulic conductivity rate calculated for B-1 at 30 to 36 inches bgs was approximately 0.036 in/hr. Reference **Table 1** for the calculated hydraulic conductivity rate and **Figure 2** for the approximate test location.

Table 1: Approximated SHWT and Calculated Hydraulic Conductivity Rate

Boring Location	Seasonal High Water Table (SHWT) (inches bgs)	Depth Boring Terminated (inches bgs)	In-situ testing depth (inches bgs)	In-situ Hydraulic Conductivity (in/hr)
B-1	60	80	30 to 36	0.036

CONCLUSIONS

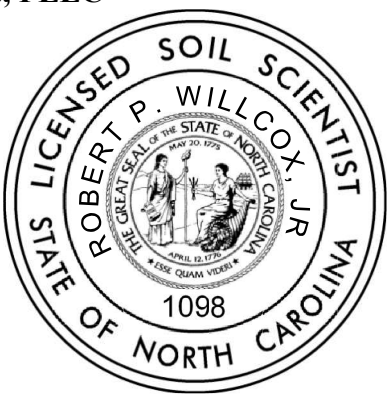
Based upon our findings associated with the location evaluated, a SHWT was identified at approximately 60 inches bgs. Ksat testing has indicated that soil permeability within the location evaluated is moderately low. These findings should be taken into careful consideration when designing an appropriate SCM for the proposed location. If the proposed SCM location changes from the location evaluated, further evaluation may be necessary.

CLOSING

Willcox & Mabe Soil Solutions appreciates the opportunity to provide soil science services to you. If you have any questions, please contact us.

Sincerely,

Willcox & Mabe Soil Solutions, PLLC



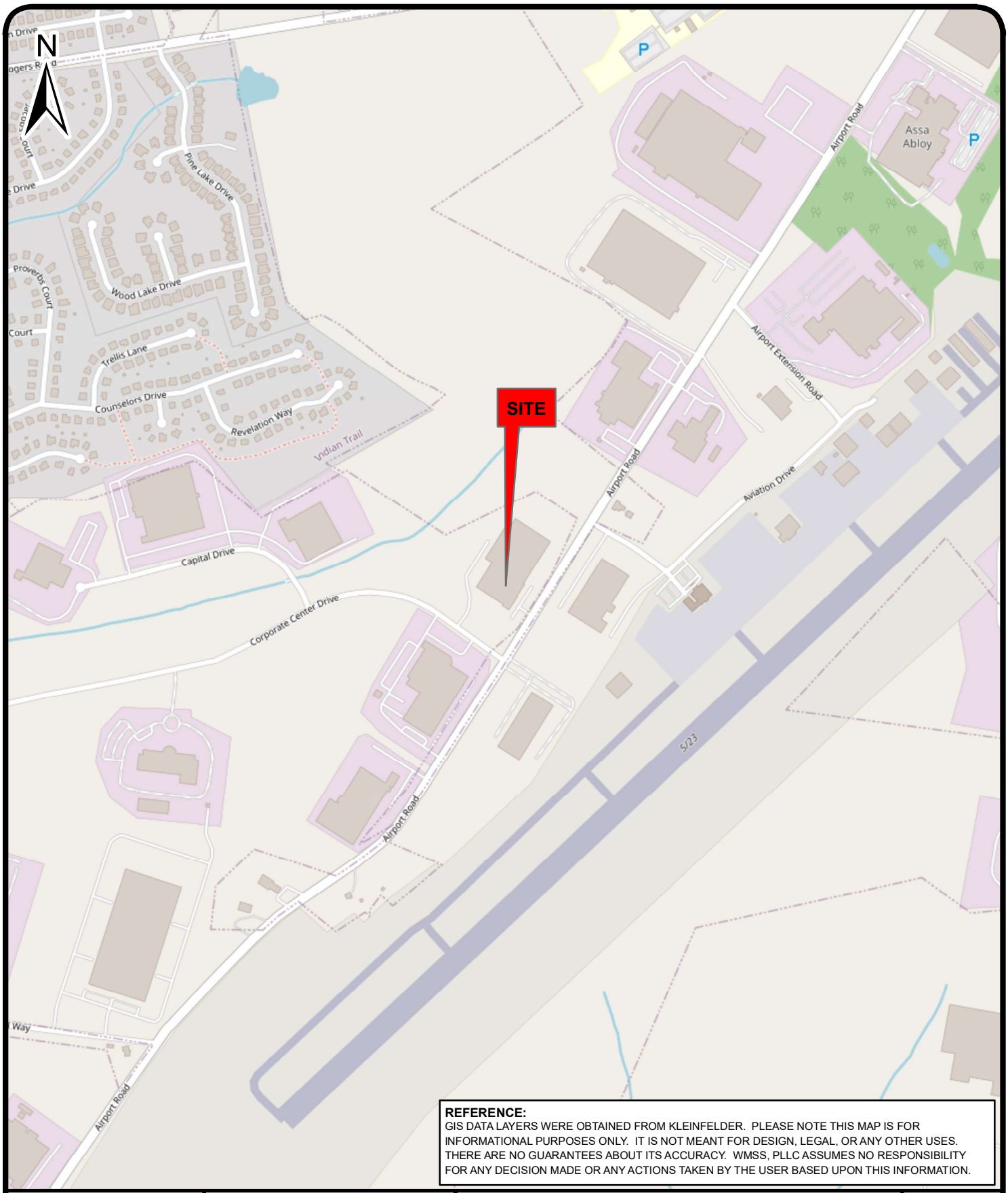
Martin Mabe
Partner / Agronomist

Rob Willcox, L.S.S.
Partner / Soil Scientist

Tables: Approximated SHWT and Calculated Hydraulic Conductivity Rate

Attachments: Figure 1 – Vicinity Map
Figure 2 – Boring Location Map
Boring Profile Sheet
In-situ Constant Head Permeameter Calculations

Shared\WMSS Projects\2021\21-01 Kleinfelder, Inc\Phase 06 - Progress Building SHWT & Ksat\21-04 Progress Building Stormwater SCM Soil Report.doc



REFERENCE:
GIS DATA LAYERS WERE OBTAINED FROM KLEINFELDER. PLEASE NOTE THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. WMSS, PLLC ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON THIS INFORMATION.

SCALE:	1 " = 1,000 '
DATE:	12-23-24
DRAWN BY:	MEM
PROJECT NO:	21-01 Ph:06

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VICINITY MAP

PROGRESS BUILDING SITE
UNION COUNTY, NORTH CAROLINA

FIGURE NO.

1

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REFERENCE:
GIS DATA LAYERS WERE OBTAINED FROM KLEINFELDER. PLEASE NOTE THIS MAP IS FOR INFORMATIONAL PURPOSES ONLY. IT IS NOT MEANT FOR DESIGN, LEGAL, OR ANY OTHER USES. THERE ARE NO GUARANTEES ABOUT ITS ACCURACY. WMSS, PLLC ASSUMES NO RESPONSIBILITY FOR ANY DECISION MADE OR ANY ACTIONS TAKEN BY THE USER BASED UPON THIS INFORMATION.

SCALE:	1 " = 100 '
DATE:	12-30-24
DRAWN BY:	MEM
PROJECT NO:	21-01 Ph:06

willcox&mabe SOIL SOLUTIONS

BORING LOCATION MAP

PROGRESS BUILDING SITE
UNION COUNTY, NORTH CAROLINA

FIGURE NO.

2

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WILLCOX & MABE SOIL SOLUTIONS, PLLC
SITE/SOIL EVALUATION

Project No. 21-01, PHASE 06 **Phone No.** _____ **Date:** 12/30/24
Location PROGRESS BLDG. **Pin** _____ **County:** UNION **Property Size** _____

Proposed Facility: STORMWATER BMP **Water Supply:** **On-Site Well** ☐ **Community** ☐ **Public** ☐ **Evaluation:** **Auger Boring** ☒ **Pit** ☐ **Cut** ☐

Described By: ROB WILLCOX
Weather: SUNNY; WARM **Antecedent Moisture** MOIST **Surface Water:** N/A
GRASSED AREA

FACTORS	PROFILE B-1	PROFILE B-1 (con't)	PROFILE	PROFILE
Landscape Position %	EDGE OF PARKING LOT			
Horizon Depth I	0-42			
Color Munsell	VARYING LAYERS			
Texture	OF FILL MATERIAL			
Structure				
Consistence				
Boundary				
Horizon Depth II	42-46	60-70		
Color – Munsell	10YR 4/3	multi		
Texture	scl	C		
Mottles	—	m-10YR 6/2		
Structure	WSBK	massive		
Consistence	SS SP FR	VS VP FI		
Boundary				
Horizon Depth III	46-54	70-80		
Color – Munsell	10YR 5/8	10YR 6/1		
Texture	C	C		
Mottles	—	m-10YR 5/6		
Structure	WABK/MASSIVE	MASSIVE		
Consistence	VS VP FI	VS VP FI		
Boundary				
Horizon Depth IV	54-60			
Color – Munsell	10YR 5/8			
Texture	C			
Mottles	F/C-10YR 6/4			
Structure	MASSIVE			
Consistence	VS VP FI			
Boundary				
Soil Wetness		SHWT-60"		
Restrictive Horizon				
Saprolite		54"-MASSIVE		
LTAR				
Classification				
		AWT->80"		

LEGEND

LANDSCAPE POSITION

R	Ridge Interfluve
S	Shoulder
L	Linear Slope
FS	Foot Slope
N	Nose Slope
H	Head Slope
Cc	Concave Slope
Cv	Convex Slope
T	Terrace
P	Flood Plain

TEXTURE

s	sand
ls	loamy sand
sl	sandy loam
l	loam
si	silt
sil	silt loam
sicl	silty clay loam
cl	clay loam
scl	sandy clay loam
sc	sandy clay
sic	silty clay
c	clay

CONSISTENCE WET

Ns	non-sticky
Ss	slightly sticky
S	sticky
Vs	very sticky
Np	non-plastic
Sp	slightly plastic
P	plastic
Vp	very plastic

MOIST

vfr	Very friable
fr	friable
fi	firm
vfi	Very firm

STRUCTURE

sg	single grain
m	massive
cr	crumb
gr	granular
sbk	subangular blocky
abk	angular blocky
pl	platy
pr	prismatic

Calculated Hydraulic Conductivity Rates

Progress Building - Union County		
Test Location	**In-situ testing depth (inches bgs)**	**In-situ Hydraulic Conductivity (in/hr)**
B-1	30 to 36	0.036

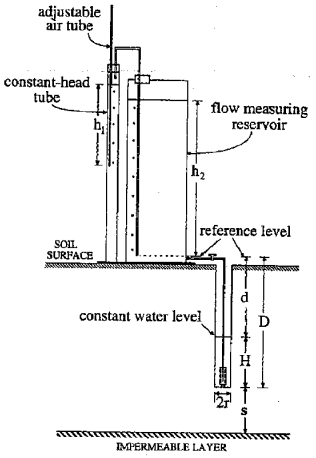
WILLCOX & MABE SOIL SOLUTIONS, PLLC
"IN-SITU" CONSTANT HEAD PERMEAMETER

Date: 10/30/2024
Location: B-1
Horizon: Fill Material
Client: Kleinfelder
Project Name: Progress Building
Project #: 21-01, Phase: 06

Hole Depth:	3.00	Feet
Hole Radius (r):	0.08	Feet
Bubble Tube to Surface:	0.25	Feet
Reference Tube to Hole Bottom (D):	3.25	Feet
Water Depth in Hole (H):	0.50	Feet
CHT Tube(s) Setting (h_1):	2.75	Feet

Chamber Used:	0.11	Ft^2

Initial Water in Hole:	0.50	Feet
Final Water in Hole:	0.50	Feet



Ksat = CQ/(2PiH^2)

C = sinh^{-1} (H/r) - [(r/H)^2 + 1]$^{1/2}$ + r/H

sinh^{-1} = inverse hyperbolic sin of a number
H = Height of water in hole (cm)
r = radius of hole (cm)
Q = Constant Flow Rate (Gal/day)
= Cross Sectional Area of Resevior x Length of Drop in Water Column over Time

r = **0.08** ft
H = **0.50** ft

C = 1.64
Q = 0.51 Gallons/Day

Time	Drop in Water Column (ft) (ft)	(cm)
0-5 min.	0.115	3.50
5-10 min.	0.007	0.20
10-15 min.	0.003	0.10
15-20 min.	0.003	0.10
20-25 min.	0.000	0.00
25-30 min.	0.003	0.10
30-35 min.	0.000	0.00
35-40 min.	0.003	0.10
40-45 min.	0.003	0.10
45-50 min.	**0.000**	**0.00**
50-55 min.	**0.003**	**0.10**
55-60 min.	**0.003**	**0.10**
Avg.	**0.002**	

Time (min) = 5

Cross Sectional Area = **0.11** ft^2
Length of Drop in Water Column = **0.60** ft/day

K_{sat} = **0.53 Gallons/Day/ft^2**

Inches/Hour = 0.036

Note: Ksat calculations are based on average drop in Water Column (ft) after equilibrium is reached.