


Request for Quote		Marshall University Office of Purchasing One John Marshall Drive Huntington, WV 25755-4100 Direct all inquiries regarding this order to: (304) 696-2727	Bid# R2501527 Addendum No. 01
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Vendor:	For information call: Purchasing Contact: Michelle Wheeler Phone: (304) 696-2727 Email: michelle.wheeler@marshall.edu & purchasing@marshall.edu
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Sealed requests to bid for furnishing the supplies, equipment or services described below will be received by the Institution. TO RECEIVE CONSIDERATION FOR AWARD, UNLESS OTHERWISE NOTED, THE BID WILL BE SUBMITTED ON THIS FORM AND UPLOADED INTO THE MU BONFIRE PORTAL ON OR BEFORE THE DATE AND TIME SHOWN FOR THE BID OPENING. When applicable, prices will be based on units specified; and Bidders will enter the delivery date or time for items contained herein. The Institution reserves the right to accept or reject bids on each item separately or as a whole, to reject any or all bids, to waive informalities or irregularities and to contract as the best interests of the Institution may require. BIDS ARE SUBJECT TO THE GENERAL TERMS AND CONDITIONS AS SET FORTH HEREIN.

DATE 1/8/2025	MANDATORY PRE-BID MEETING January 16, 2025 @ 2:00pm EST located at MUSCRAT Park, Equipment Building, 1035 Norway Ave, Huntington, WV 25705	DEPARTMENT REQUISITION NO. R2501527	BIDS OPEN: February 10, 2025 at 3:00 PM, EST at the following link: https://tinyurl.com/R2501527-CF4-Bid-Opening	BIDDER MUST ENTER DELIVERY DATE FOR EACH ITEM BID
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Item #	Quantity	Description	Unit Price	Extended Price
<p><u>ADDENDUM NO. 01</u></p> <p>Project Name: R2501527 – Marshall University CF4 - Subterranean Testing Facility</p> <p>Purpose: To update and replace Exhibit A – MU CF4 Specifications and Exhibit B – CF4 Final Draft Plans (pages 33-72 in original Request for Quote packet).</p>				

Total

To the Office of Purchasing,
 In compliance with the above, the undersigned offers and agrees, if this offer is accepted within _____ calendar days (30 calendar days unless a different period is inserted by the purchaser) from the bid open date, specified above, to furnish any or all items upon which prices are offered, at the price set opposite each item, delivered at the designated point(s), within the time specified.

Bidder guarantees shipment from _____ within _____ days	Bidder's name Vendor _____
FOB _____ After receipt of order at address shown	Signed By _____
Terms _____	Typed Name _____
	Title _____
	Email _____
	Street Address _____
	City/State/Zip _____
	Date _____ Phone _____
	Fein _____

SOLICITATION NUMBER: R2501527

Request for Quote
Marshall University
CF4 - Subterranean Testing Facility

Addendum Number: No. 01

The purpose of this addendum is to modify the solicitation identified as ("Solicitation") to reflect the change(s) identified and described below.

Applicable Addendum Category:

- Modify bid opening date and time
- Modify specifications of product or service being sought
- Attachment of vendor questions and responses
- Attachment of pre-bid sign-in sheet
- Correction of error
- Other

Description of Modification to Solicitation:

Addendum issued to publish and distribute the attached documentation to the vendor community.

1. To update and replace Exhibit A – MU CF4 Specifications and Exhibit B – CF4 Final Draft Plans (pages 33-72 in original Request for Quote packet).

NO OTHER CHANGES.

Additional Documentation: Documentation related to this Addendum (if any) has been included herewith and is specifically incorporated herein by reference.

Terms and Conditions:

1. All provisions of the Solicitation and other addenda not modified herein shall remain in full force and effect.
2. Vendor should acknowledge receipt of all addenda issued for this Solicitation by completing an Addendum Acknowledgment, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

Exhibit A

MU CF4 Specifications

SPECIFICATIONS

Table of Contents

<u>Section</u>	<u>Specification</u>
1	Mobilization, Demobilization and Construction Layout
2	Clearing and Grubbing
3	Stone Surfacing Material
4	Storm Sewer Installation
5	Subterranean Research Facility Excavation

<u>Attachment</u>	<u>Description</u>
A	Report of Geotechnical Exploration
B	WVDNR OLS Right of Entry & Fish Spawning Waiver
C	USACE NWP No. 33 Verification

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1.0 MOBILIZATION, DEMOBILIZATION AND CONSTRUCTION LAYOUT

1.1 DESCRIPTION

1.1.1 Mobilization and Demobilization

The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.

1.1.2 Construction Layout

This work shall consist of furnishing all materials, equipment, labor, and incidentals necessary to perform this work. The work shall include, but not be limited to, the placing, replacing and maintaining of the construction layout stakes, primary control points, baseline stationing, and property location monuments. This item will also require determining the exact units of measure for payment and checking, and also making any field adjustments to the plan grades and elevations and line lengths that may be necessary due to any variation in topography or compaction of the inconsistent materials encountered on the project.

Materials shall include all conventional survey stakes, flagging, drafting media, etc.

1.2 APPLICATION

1.2.1 Mobilization and Demobilization

Mobilization shall include all activities and associated costs for transportation of contractor's personnel, equipment, permits and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items as approved by the owner's representative.

The Contractor shall obtain and comply with all required permits. A copy of the permits shall be provided to the OWNER.

Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the

contract from the site; including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

1.2.2 Construction Layout

The ENGINEER has established a benchmark (#10023) and control points (See Sheet C-01) on the drawings for the purpose of general layout of the work.

The CONTRACTOR shall complete the layout of the work and shall be responsible for all measurements that may be required for the execution of the work to the location and limit marks prescribed in the specifications or on the contract drawings, subject to such modifications as the ENGINEER may require to meet changed conditions or as a result of necessary modifications to the contract work.

The CONTRACTOR shall exercise care in preserving the original survey monuments and shall have the monuments reset, at no additional expense to the OWNER, when any are damaged, lost, displaced, or removed. The CONTRACTOR shall use the primary control points for re-establishing the baseline stations, if applicable, wherever previously surveyed stations have been destroyed or removed. At a minimum, the CONTRACTOR shall confirm the location of existing baseline stations by field survey of each station's relationship to a suitable primary control point. Should any discrepancies be found, primary control points shall supersede any existing baseline stations.

The CONTRACTOR shall submit to the OWNER such a schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the OWNER may request concerning the work performed or to be performed under this contract.

The CONTRACTOR shall provide the OWNER existing ground line cross sections and notes for acceptance prior to any shaft activities and as-builts as soon as practical after the completion of construction. As-builts shall be provided to OWNER on clean black line set of drawings prior to issuance of final progress pay estimate. Station numbers, offset distances, elevations (where applicable), and types of the shaft, dates, responsible parties, and a legend shall be clearly illustrated.

All survey notes, calculations, cross sections, plans, or other documents produced pursuant hereto shall be certified as correct by the CONTRACTOR prior to submittal.

1.3 METHOD OF MEASUREMENT

The measurements for the units under this item are determined in the Estimated Quantities Table.

1.4 BASIS FOR PAYMENT

Payment for work performed under this item shall be paid per unit price of the bid items as listed in the Estimated Quantities Table. Payment shall be compensated for furnishing all the materials and performing all the work prescribed in an acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

2.0 CLEARING AND GRUBBING

2.1 DESCRIPTION

Work under this item shall include all labor, material and equipment to perform all clearing and grubbing as shown on the plans and as specified herein.

2.2 MATERIAL

None.

2.3 CONSTRUCTION METHODS

In areas designated for surface improvements within the project area, all vegetation, trash, debris, stumps and other foreign matter shall be removed and disposed of by the CONTRACTOR in an area approved by the OWNER.

2.3.1 Clearing

The limits of clearing shown on the adopted plans shall be within the Limits of Disturbance (LOD). Disturbance beyond the LOD shall not occur without prior approval from the OWNER. The CONTRACTOR is not permitted to work outside of the Leased Boundary Line.

2.3.2 Grubbing

The limits of grubbing shall coincide with the LOD.

The CONTRACTOR shall remove all stumps, roots over four (4) inches in diameter, and matted roots within the LOD to the depths shown on the plans for the access road, pad and walk.

2.3.3 Disposal

Burning of materials on the site will not be permitted. The CONTRACTOR shall remove material from the site daily as it accumulates. Should the CONTRACTOR elect to continue work beyond normal working hours, material to be removed shall not be allowed to accumulate for more than 48 hours. Trees or shrubs not designated to remain shall be cut and removed. Material removed shall be disposed of at a site approved by the OWNER.

2.4 METHOD OF MEASUREMENT

The measurements for the units under this item are determined in the Estimated Quantities Table.

2.5 BASIS FOR PAYMENT

Payment for work performed under this item shall be paid per unit price of the bid items as listed in the Estimated Quantities Table. Payment shall be compensated for furnishing all the materials and performing all the work prescribed in an acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

3.0 STONE SURFACING MATERIAL

3.1 DESCRIPTION

Under this item, the CONTRACTOR shall furnish, deliver, distribute and compact stone material as shown on the plans for the Access Road, Pad and Walk or as directed by the OWNER.

3.2 MATERIALS

Stone or aggregate for the Pad shall be of a grade that meets the West Virginia Department of Highways specifications for the various applications requiring crushed aggregate or stone surfacing materials. The minimum total thickness of five (5) inches is required.

Stone surfaced areas disturbed by construction operations and used for off-street parking and maintained by private residents shall be resurfaced with stone of the type and gradation of that removed from the area.

The separation fabric shall be Mirafi 600X geotextile fabric or equal.

3.3 INSTALLATION

- A. The CONTRACTOR shall distribute the stone material evenly over the area to be covered and then compact the stone with a roller or hand tamper.
- B. Thickness of the stone material on the Access Road, Pad and Walk shall be a minimum as shown on the drawings.
- C. The separation fabric shall be placed between the stone and subgrade.
- D. After the initial stone material is placed, any additional materials placed because of settlement shall be placed at the CONTRACTOR'S expense.

3.4 METHOD OF MEASUREMENT

The measurements for the units under this item are determined in the Estimated Quantities Table.

3.5 BASIS FOR PAYMENT

Payment for work performed under this item shall be paid per unit price of the bid items as listed in the Estimated Quantities Table. Payment shall be compensated for furnishing all the materials and performing all the work prescribed in an acceptable manner, including all labor, tools, equipment, supplies, and incidentals

necessary to complete the work.

4.0 STORM SEWER INSTALLATION

4.1 DESCRIPTION

This work shall consist of the construction of storm sewer pipe within the existing streambed in accordance with detail shown on Sheet C-06 and in reasonably close conformity with the lines, grades, dimensions, and locations shown on the plans.

4.2 METHOD OF MEASUREMENT

The measurements for the units under this item are determined in the Estimated Quantities Table.

4.3 BASIS FOR PAYMENT

Payment for work performed under this item shall be paid per unit price of the bid items as listed in the Estimated Quantities Table. Payment shall be compensated for furnishing all the materials and performing all the work prescribed in an acceptable manner, including all labor, tools, equipment, supplies, and incidentals necessary to complete the work.

5.0 SUBTERRANEAN RESEARCH FACILITY EXCAVATION

5.1 GENERAL

5.1.1 Summary

- A. The Work, in general, consists of the following:
1. The intent of this project is to construct a simulated abandoned mine for research to test various field locating methodologies.
 2. The subterranean research facility will consist of a main “LEG A” mine shaft, a secondary “LEG B” emergency egress / ventilation shaft, and an access portal for each leg.
 3. The “LEG A” main shaft will be 323 LF from access portal to end. The main shaft can be constructed via hand-mining or a bored excavation.
 - a. Hand-Mining: The dimensions are 6’-0” high (minimum clearance) by 4’-8” wide (minimum clearance), supported with 8”x8” timber sets, as needed based on field conditions. The minimum clearance at the locations of the timber is 4’-8”.
 - b. Bored Shaft: The minimum excavated dimension for a bored shaft is 6’-0” diameter. Once excavated, the casing shall be removed. As the casing is removed, shotcrete shall be applied to stabilize and support the shaft as necessary.
 - c. An allowance line item of \$200,000.00 is included with LEG A for support of the shaft and the face of the entrance portal that may be required. This ALLOWANCE FOR LEG A SUPPORT will be used as a contingency budget to pay for the costs of timber sets for the hand-mined shaft or for the costs associated with shotcrete lining of the bored shaft. Rock bolts and other rock support can also be covered by this item. This item would be paid for as outlined in Section 5.5 of this specification.
 4. The secondary “LEG B”, shaft consists of a 340 LF long horizontal bored 36” diameter shaft, except for the portion installed via cut and cover in the approved launch pit

area. The minimum excavated dimension for the bored shaft is 36" diameter. Once excavated, the casing shall be pulled. After the casing is removed, HDPE pipe (36" Nominal IPS) shall be installed to support the shaft. The HDPE pipe shall be extended to daylight (cut and cover) as shown on the plans. The shaft shall intersect with "LEG A" as shown on the plans.

- a. Individual pieces of HDPE piping shall be joined together by butt fusion per ASTM F2620. The CONTRACTOR shall ensure and certify that persons making heat fusion joints have received up-to-date training in the manufacturer's recommended procedure prior to performing the work.
5. The access portal on the "LEG A" main shaft is anticipated to be excavated from the surface until full face rock is encountered. A culvert headwall / retaining wall shall be constructed to provide adequate stability to the shaft entrance and slope retainage to support the final grading. The Contractor shall be responsible for the design of the headwall. The final dimensions can be adjusted as required, but the design shall conform to the requirements of the West Virginia Department of Transportation Division of Highways Standard Detail DR2 for Pipe Culvert Wingwalls. Additional rock stabilization may be required to stabilize the entrance portal face on both the exterior and interior. This would be paid for under the Allowance item discussed in 5.1.1.A.3.c and in 5.5 B.
 6. A 7' x 7' wooden fence gate shall be installed to secure the opening to the main "LEG A" shaft, per the detail on the plans. A 4' x 4' wooden fence gate shall be installed to secure the opening to the "LEG B" shaft, per the detail on the plans, along with a pipe cap.
 7. Permanent support of excavation and final shaft support systems shall be non-metallic. Timber, lumber, cementitious grout, cementitious shotcrete, GRP/FRP rock bolts, etc. are all acceptable and can be left in place permanently. Metallic fasteners are acceptable.
- B. Provide all labor, materials, and equipment necessary for the facility excavation.

- C. Contractor shall provide all engineering for the design of initial / final support systems for the shaft.
1. Hand-mining: Timber sets consisting of 8" x 8" treated lumber shall be used as required to maintain a safe, supported shaft. Side lagging shall be utilized as needed to support the sidewalls from blocky rock falling into the excavated shaft. A minimum of 2'x2' open, uncovered rock every 45 LF along the shaft shall be accommodated. These openings shall be provided on the floor, walls, and ceiling of the shaft. This work shall be covered by the timber set allowance item.
 2. Bored shaft: Bored excavation shall utilize a steel casing pipe for the excavation stage, and shotcrete support for the final support. Shotcrete shall provide for a minimum of 2'x2' open, uncovered rock every 45 LF along the shaft (7 minimum). These openings shall be provided on the bottom, sides, and top of the shaft. Partial circumferential coverage may be acceptable pending the contractor's design and submittal verification.
 3. As noted above, the ALLOWANCE FOR LEG A AND PORTAL FACE SUPPORT will be used as a contingency budget to pay for the support system utilized in the LEG A shaft as outlined in Section 5.5.
- D. No blasting is permitted. Accelerants are permitted to fracture rock.

5.1.2 REFERENCES

- A. Reference Standards:
1. OSHA, 29 CFR Part 1926, Safety and Health Regulations for Construction
 2. National Fire Protection Association (NFPA)
 - a. NFPA 70, National Electrical Code (NEC)
 - b. NFPA 79, Electrical Standards for Industrial Machinery

5.1.3 SUBMITTALS

- A. Submittals are required for all of the materials and equipment necessary for shaft excavation.
- B. Submittals are required for all permanent mechanical components associated with the project. (Fence gates, , end cap, etc.)
- C. A copy of this Section, with any addendum updates included, and all referenced and applicable Sections, with each paragraph check-marked to indicate compliance or marked to indicate requested deviations.
- D. Qualifications: Resumes of the following personnel demonstrating that the requirements of Paragraph 5.1.4.B. herein have been met:
 - 1. Superintendent
 - 2. Surveyor
 - 3. Shaft Excavation Engineer
- E. Excavation Work Plans as outlined in Paragraph 5.3.1.A of this Section.
- F. Design Calculations, Drawings and Product Data: Prepare and submit detailed Shop Drawings, descriptions, data, specifications, schedules, calculations, and other pertinent information for all items to be incorporated into the Work.
- G. Certifications that all materials, testing, and equipment used in the CONTRACTOR's work conform with the design requirements of the CONTRACTOR's working drawings, calculations, and Work Plan.
- H. Submit the following shaft excavation system details:
 - 1. The details of shaft and shaft lighting, ventilation systems (temporary), gas monitoring, shaft safety provisions, communications, emergency evacuation procedures, and electrical systems specified in OSHA regulatory requirements for safety. Provide details of air quality monitoring.
 - 2. The survey methods and procedures proposed for alignment and grade control.
- I. Reports and Records:

Prepare a General Shift Report of the shaft excavation work for each shift worked and provide the OWNER with one copy of the shift report on the following workday. The following information shall be included in these reports:

1. Time and location of shaft face(s) by station or shaft bench elevations at start and end of each work shift.
 2. Method(s) of shaft excavation utilized, and their associated location limits.
 3. Type, quantity, and location of initial support installed.
 4. Initial support system measurements, including records of any observed deformation.
 5. Survey records of shaft excavation including the offset from design line-and-grade, including corrective action for line and grade deviations.
 6. Description of the ground, its behavior, shaft face mapping sketch, and notes regarding occurrences such as work stoppages, delays, and equipment malfunction, including the station or location and time of each occurrence.
 7. Documentation of groundwater inflows encountered, and water control measures implemented.
 8. Location of gas inflows, including recorded gas levels, and action undertaken, if any.
 9. Location of grouting performed, volume of grout pumped, weight of dry cement used, and visually observed effectiveness of grout. Include linear feet of rock drilled for grouting purposes.
 10. Location and length of test holes and location, length, and drilling angle of exploratory test holes.
 11. Crew size and employee classification.
 12. Downtime and causes of downtime.
- J. Design Calculations and Procedures:
1. Prior to beginning of work, submit detailed procedures, including design calculations and working

drawings for review by the ENGINEER, indicating proposed methods of excavation and support.

2. Proposed procedures shall provide for immediate and adequate support of rock and adjacent structures and other facilities.

K. Working Drawings:

Prepare and submit working drawings, product data sheets, technical specifications, schedules, and other pertinent information associated with the shaft construction.

Information shall include, but not be limited to:

Temporary and permanent ventilation systems and equipment including capacities and exchange rates; site power and lighting system; drilling equipment for rock bolts and brow bolts; excavation equipment & muck handling; and all other related information required to completely describe the work.

- L. Contingency Plans: Prepare written documents with supporting drawings containing procedures to address the potential conditions described in Paragraph 5.3.1.B of this Section.

5.1.4 QUALITY ASSURANCE

A. Safety:

1. The entire length of shafts and shafts is classified as "Potentially Gassy."
2. Comply with all applicable provisions of 29 CFR Part 1926, Subpart S, "Underground Construction" Standard Number 1926.800 by OSHA.
3. Perform all work in accordance with all current applicable regulations and codes of federal, state, and local agencies.

B. Qualifications:

1. Superintendent: Minimum of 10 years of shaft excavation construction experience.

2. Surveyor: Licensed Professional Land Surveyor registered in the State of West Virginia, with a minimum of 5 years of experience in underground construction.
3. Shaft Excavation Engineers: Minimum of 5 years of experience in underground construction, 3 years of experience in shaft construction. Responsible for identifying rock geologic conditions in the field. The Shaft Excavation Engineer shall classify the ground on a weekly basis at a minimum and issue any changes to the excavation sequence and Ground Support, if considered by the CONTRACTOR's design, based on field observations. One Shaft Engineer is required to be on site weekly at a minimum, to ensure the construction follows the Excavation Work Plan, that adequate monitoring and survey controls are performed, and that contingency plans are implemented as needed.
4. Certify, through records of training and a written statement that CONTRACTOR's crew are prepared and equipped to apply or install all support measures required and/or as shown on CONTRACTOR's submittal drawings.

5.1.5 DELIVERY, STORAGE AND HANDLING

Have adequate supply of required materials ready for application at all times during excavation as follows:

- A. Groundwater Controls: As determined necessary by the CONTRACTOR's Work Plan have sufficient face drains, drainage mats, pipes, hoses, pumps and other materials for installation and operation of water control available on site before commencing excavation.
- B. Support of Excavation: As determined to be necessary by the CONTRACTOR's Work Plan, have sufficient materials to support the excavation as the work progresses. The contractor shall have the support installation equipment and enough material on hand to install shaft support within a minimum of 10% of the LEG A shaft (either shotcrete 32 LF of bored shaft or timber sets at 4' spacing for 32 LF). The intent is to avoid any potential delays in the event the

supports are required based on the actual conditions encountered.

5.1.6 PROJECT/SITE CONDITIONS

- A. Geological and hydro-geological conditions are presented in the Geotechnical Report, where the boring logs, laboratory testing results, and geotechnical data are presented.
- B. Hazardous Gas:
 - 1. Classification: Shafts are classified as “Potentially Gassy.”
 - 2. Hazardous gas control measures specified herein are supplemental to OSHA requirements. Consider measures specified herein minimum additional measures.
 - 3. Assume sole responsibility for development and implementation of measures to control gas emissions and for proposing alternative or more stringent means, if necessary, to accomplish the objectives of these provisions.

5.2 PRODUCTS

5.2.1 MATERIALS

- A. Structural Supports: Final Support of Excavation systems shall be non-metallic. Treated lumber, timber sets, shotcrete, grout, GRP/FRP rock bolts, etc. are all acceptable structural support components. Metallic fasteners are acceptable.
- B. Pre-excavation Grouting: Can be used as desired by the Contractor.

5.2.2 MANUFACTURED UNITS

- A. End Cap: Provide a M&P 36” plastic pipe end cap.
- B. 36” Nominal (IPS) Diameter HDPE: PE4710 with a minimum concentration of 2.0% carbon black; DR 32.5

5.2.3 EQUIPMENT (*USED DURING CONSTRUCTION*)

- A. All equipment necessary to execute the CONTRACTOR's Work Plan. At a minimum, the following criteria shall be used for support system design and equipment selection:
1. Electrical and Lighting Systems:
 - a. Primary lighting system for the entire length of the shaft to be NEC Class I, Division 2 standard.
 - b. Emergency lighting system for the entire length of the shaft to be NEC Class I, Division 1 standard.
 - c. Additional lighting in shaft shall be sufficient for inspection of construction operations by the OWNER.
 - d. Flashlights and Cap Lights: Meeting OSHA permissible requirements.
 - e. Ventilation, air quality monitoring and alarm systems: Rated for use in NEC Class 1 Division 1 hazardous locations.
 - f. All other equipment: Rated for use in NEC Class 1 Division 2 hazardous locations.
 2. Ventilation System (for use during mining):
 - a. Meet all 29 CFR 1926 regulatory requirements, and in accordance with NEC standards for Class I, Division 1 areas.
 - b. Fully reversible with ability to meet all performance and air quality criteria in exhaust or intake mode.
 - c. Make main ventilation duct of non-combustible materials.
 - d. Locate exhaust stacks of the ventilation system to prevent recirculation of exhaust air into the air intake shaft or shaft excavation.
 - e. Design:
 - (1) Unless otherwise indicated, meet or exceed minimum requirements of OSHA 29 CFR 1926.

- (2) Design and equip the ventilation system with silencers as needed to meet local noise standards with maximum necessary air flows.
- f. Ensure power to the primary ventilation system is not interrupted in the event of a gas detection system alarm. Use primary ventilation and booster fans for shaft ventilation and related electrical equipment and cables located within the shaft excavations approved for use in gassy locations.
- 3. An air quality monitoring and alarm system to monitor gas concentrations including but not limited to, carbon monoxide, nitrogen oxides, hydrogen sulfide, oxygen, methane and airborne particulate concentrations at each excavation.
 - a. Place sensors at locations that provide the most effective measurement of combustible and toxic gases. Do not place sensors within a fresh air stream.

5.3 EXECUTION

5.3.1 PREPARATION

A. Excavation Work Plan:

Submit the work plan for the excavation to the OWNER a minimum of 15 days before the start of the work. Work plan to include:

- 1. Statement of anticipated rock conditions.
- 2. Initial and final support designs. Note that the payment for LEG A shaft support will be monitored and paid for under the ALLOWANCE FOR LEG A SUPPORT budget, as outlined in Section 5.5.
- 3. A LEG A tunnel portal stabilization plan that discusses how thin rock at the top of the portal to LEG A will be permanently stabilized, if necessary. If necessary, this stabilization work will be paid for under the ALLOWANCE for LEG A SUPPORT budget, as outlined in Section 5.5.

4. Review and actions levels for convergence monitoring.
5. Construction schedule, groundwater management, excavation, initial support system, installation of any needed final support system improvements, and culvert headwall.
6. Proposed materials, facilities, and equipment to be used including clearances of the equipment for the excavation sizes proposed.
7. Details of temporary ventilation and air quality monitoring.
8. Details of final ventilation system.
9. Key excavation plan including proposed excavation and support sequence, including:
 - A. Sequence and timing of pre-support installation, top heading and bench/invert (if any) excavation, max lengths, and anticipated advance rates.
 - B. Methods of construction including support of excavation installation details, and all pre-support and ground support elements.
 - C. Pre-Excavation grouting plan, if used.
 - D. Methods of controlling groundwater inflows.
10. Information for the equipment proposed by the CONTRACTOR, including but not limited to:
 - A. Excavation equipment for all excavations including make and model numbers, manufacturer's literature, and maintenance record.
 - B. Shotcrete batching plants, pumps, and associated delivery equipment (where used to stabilize rock face).
 - C. Drilling equipment.
 - D. Face and wall drain equipment.
 - E. Grouting equipment, if used.

F. Air quality monitoring and alarm system.

11. Plans detailing in-shaft water control measures to be used including drain pipes, drainage mats, temporary sumps, construction drains, pumps, procedures to be followed, and standby power supply.
12. Product data for all Ground Support elements including, but not limited to, rock bolts, treated timbering components, shotcrete, pre-support and face support elements that will be incorporated into the work.
13. Instrument installation and/or observation plan to monitor for shaft deformations and support damage during the excavation.

B. Contingency Plan:

1. Submit the Contingency Plan with the Excavation Work Plan. Contingency plan to include:
 - a. Unanticipated face instability.
 - b. Unanticipated groundwater inflows exceeding normal anticipated flows.
 - c. Actions for in the event shaft deformations or support damage occurs.
2. Include steps used to assess conditions that require additional measures not described herein.
3. Address modifications in the proposed excavation sequences and support requirements, that would be needed to address each of the unanticipated conditions.
4. Include in each Contingency Plan:
 - a. Name and qualification of personnel responsible for implementing contingency procedures.
 - b. Surveillance during stoppages such as weekends and holidays as well as directed stoppages.

- c. Measures required to be put in place prior to the re-start of excavation.

5.3.2 APPLICATION

A. General:

1. Methods of excavation shall be in accordance with standard practice for the equipment selected with additional requirements specified herein.
2. Excavate shaft and support of surrounding rock in such a manner as to minimize disturbance or movement of rock beyond the intended excavation limits. Take all necessary precautions to prevent damage, injury or loss to existing properties, utilities, and structures.
3. Provide support types for ground as described in the Contractor's approved Work Plan.
4. Blasting shall not be used on this project.

B. Excavation and Support:

1. Assess all ground and groundwater conditions, ground movement, and support system deflection during the construction. Immediately install remedial support when movements may lead to instability of the excavation.
2. Use equipment and methods that do not damage previously placed shaft supports.
3. Supports:
 - a. Installation: Conform to approved Shop Drawings.
 - b. Inspection: Check supports in previously excavated sections for continuous structural integrity, but not less frequently than every 48 hours. Document observations and clearly indicate the absence of signs of distress such as drummy shotcretes, spalling, cracks, new rocks in the invert, dished face plates, or if distress is observed or suspected, document conditions and immediately report same to supervision.

c. Maintenance: Re-tighten and re-block supports as necessary.

4. Follow the excavation and support sequence and maximum lengths for shaft as designed. At a minimum, the Work Plan shall include the following steps in the excavation and support sequence:
 1. Evaluate the ground conditions encountered and confirm that the appropriate Ground Support is installed.
 2. Continuously review conditions encountered as the shaft excavation is advanced. CONTRACTOR to ensure shaft support is installed per CONTRACTOR's design, and monitoring instruments are functioning and reporting accurate measurements.
 3. The OWNER may suspend excavation and associated activities at any location where observations indicate excessive ground movement or distress in initial support.
5. If the Shaft Engineer observes field conditions different than design assumptions, the OWNER shall be consulted. No adjustments to the approved Work Plan shall be made without written authorization from the ENGINEER.
6. In case of emergency or work stoppage likely to endanger excavation stability or adjacent structures, continuously maintain full work force 24 hours per day including weekends and holidays until emergency or hazardous conditions no longer jeopardize stability of the excavation.

C. Test Hole Drilling:

1. The CONTRACTOR may use Test Hole drilling ahead of the excavation face that are intended to confirm the predicted geological conditions and to detect groundwater.

D. In-Shaft Water Control:

1. Drain and/or pump out of the shaft all infiltrating groundwater during construction. It is intended that all groundwater flows can drain out of the shafts by gravity. Perched groundwater may present short term increases in flow.
2. Remove groundwater and construction water from the operation as quickly as possible.
3. Collect water seepage and drain away by means of drain hoses or other approved means. Install and maintain at all times drainage systems to divert all inflow of water out of the excavated shaft and provide adequate runoff pollution prevention controls to eliminate excessive erosion or siltation on the site.

E. Associated Operations:

1. Emergency Measures: Continuous 24-hour operations, seven days a week shall be performed when the stability of the excavation or adjacent structures are in danger.

F. Utilities:

1. Arrange for and provide all utilities necessary to perform the work required in this Section.

5.3.3 CONSTRUCTION

A. General:

1. Perform work in accordance with the approved Work Plan.
2. Excavate to the lines and grades shown on the Drawings.

B. Re-Installation:

Immediately replace any damaged rock support element by installing a like element as close to the location of the damaged element as practical.

5.4 METHOD OF MEASUREMENT

The measurements for the units under this item are determined in the Estimated Quantities Table.

5.5 BASIS FOR PAYMENT

- A. Payment for work performed under this specification shall be based on units as established in the Estimated Quantities Table.
- B. The ALLOWANCE FOR LEG A SUPPORT will be used as a contingency budget to pay for the required shaft and portal face support system(s). It is generally anticipated that the rock being mined is strong enough to stand up on its own, but it is recognized that support may be required in portions of the shaft or at the entrance portal.

The ALLOWANCE item shall be monitored and paid for as follows:

- 1. The Contractor is required to submit an Excavation Work Plan and Contingency Plan. This will outline the support system being utilized.
- 2. A detailed equipment, material, and labor cost breakdown associated with the installation of the support system shall be submitted along with the Excavation Work Plan. The approved cost breakdown shall be used as a basis for monitoring the support system installation work actually required and the payment for it.
 - a. Labor: The Contractor shall supply the wage rates that apply for the project and for the support system installation work. The OWNER will pay a 15% mark-up for overhead and profit on labor.
 - b. Materials: Material costs shall be based upon actual invoice costs, including applicable taxes and freight charges for Engineer-approved materials. The OWNER will pay a 15% mark-up for overhead and profit on materials.
 - c. Equipment: Payment for required support system installation shall be based on established rates given in Equipment Watch Cost Recovery (formerly Rental Rate Blue Book) for equipment in actual operation and ½ that rate for equipment that is idle. Equipment or tools that cost less than \$500 will not be reimbursed. The schedule for equipment must be approved prior to any reimbursement. Actual invoices may be used for rental equipment. The OWNER will pay a 5% mark-up for overhead and profit on rental equipment.

- d. The OWNER will pay a 5% mark-up for administrative costs associated with work performed by an approved subcontractor.
- 3. The Contractor is required to have the installation equipment and enough material on hand to provide support for at least 10% of the LEG A shaft. The Contractor will be paid for having the installation equipment on site and for the support materials required for up to 10% of the LEG A shaft. Labor will be tracked on an hourly basis for actual installation work.
- 4. The equipment operation, material, and labor work required above the initial 10% will be tracked by the OWNER and paid for based on the approved equipment rates, material invoices, and labor rates.

Exhibit B

CF4 Final Draft Plans

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EXISTING CONDITIONS LINETYPES

PROPOSED CONDITIONS LINETYPES

BOTTOM OF SLOPE		
BORE PIT		
CONSTRUCTION CENTERLINE		
DITCH/STREAM FLOW LINE		
EDGE OF PAVEMENT		
FENCE		
GUARDRAIL		
MINOR CONTOUR		
MAJOR CONTOUR		
LAYDOWN AREA		
LEASED BOUNDARY		
LIMITS OF DISTURBANCE		
OVERHEAD ELECTRIC		
PROPERTY LINE/LOT LINE		
RIGHT OF WAY		
SANITARY SEWER		
SHAFT (TUNNEL)		
SILT FENCE		
STORM SEWER/CULVERT		
TOP OF SLOPE		
TREELINE		
UNDERGROUND ELECTRIC		

EXISTING CONDITIONS SYMBOLS

	BENCHMARK/TEMPORARY BENCHMARK
	FIRE HYDRANT
	GAS VALVE
	GEOTECHNICAL BORING
	LIGHT POLE
	NORTH ARROW
	SANITARY MANHOLE
	SANITARY CLEANOUT
	UTILITY POLE
	WAYFINDING SIGNAGE

EXISTING CONDITIONS HATCHING

PROPOSED CONDITIONS HATCHING

ASPHALT ROAD		
BUILDING		
CONCRETE		
ENERGY DISSIPATOR		
GRAVEL ROAD		
WOOD		
FEATURE REMOVED		
ROADWAY INSPECTION/SURVEY/PHOTOGRAPH		
SEEDING		

SYMBOLS

&	AND
@	AT
'	FEET, MINUTES
"	INCHES, SECONDS
#	NUMBER
%	PERCENT
+	PLUS OR MINUS
Ø	ROUND, DIAMETER
∠	DEGREE OF CURVATURE ALONG THE ARC
∠	OR ANGLE OF DEFLECTION (DEGREES)

ABBREVIATIONS

ABAND, ABND	ABANDON(ED)	HR	HOUR(S)
ADD	ADDENDUM	HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
ADD'L	ADDITIONAL	HWL	HIGH WATER LEVEL
APPX, APPROX	APPROXIMATE(LY)	HWY	HIGHWAY
ASPH	ASPHALT	ID	INSIDE DIAMETER
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	IN	INCH(ES)
AVE	AVENUE	INV	INVERT
AVG	AVERAGE	IP	IRON PIPE
AWWA	AMERICAN WATER WORKS ASSOCIATION	LAT	LATERAL
BH	BULKHEAD	LB	POUND(S)
BLDG	BUILDING	LF	LINEAR FEET
BLVD	BOULEVARD	LS	LUMP SUM
BM	BENCH MARK	LT	LEFT
BOT	BOTTOM	MAX	MAXIMUM
CATV	CABLE TELEVISION	ME M/E	MATCH EXISTING
CB	CATCH BASIN	MFR	MANUFACTURE(R)
CDF	CONTROLLED DENSITY FILL	MGD	MILLION GALLONS PER DAY
CF	CUBIC FEET	MH	MANHOLE
CFM	CUBIC FEET PER MINUTE	MI	MILE(S)
CFS	CUBIC FEET PER SECOND	MIN	MINIMUM, MINUTE(S)
CIP	CAST IRON PIPE	MISC	MISCELLANEOUS
C/L, CL	CENTER LINE	MNS	MAG NAIL SET
CLR	CLEAR OR CLEARANCE	MOD	MODIFIED
CMP	CORRUGATED METAL PIPE	MON	SURVEY MONUMENT
CO	CLEAN OUT, COMPANY	MOT	MAINTENANCE OF TRAFFIC
COMM	COMMUNICATIONS	MPH	MILES PER HOUR
CONC, CON	CONCRETE	MTL	METAL
CT	COURT	N	NORTH
CTR	CENTER	NAD	NORTH AMERICAN DATUM
CWA	CONCRETE WASHOUT AREA	NAVD	NORTH AMERICAN VERTICAL DATUM
CY	CUBIC YARD(S)	NB	NORTH BOUND
C&G	CURB AND GUTTER	NE	NORTHEAST
C/C	CENTER TO CENTER	NF	NOT FOUND
DEG	DEGREE	NGVD	NATIONAL GEODETIC VERTICAL DATUM
DEMO	DEMOLITION, DEMOUSH	NO.	NUMBER
DEPT	DEPARTMENT	NOI	NOTICE OF INTENT
DIA	DIAMETER	NPDES	NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM
DIM	DIMENSION	NTS	NOT TO SCALE
DIP	DUCTILE IRON PIPE	NW	NORTHWEST
DND	DO NOT DISTURB	N/A	NOT APPLICABLE
DWG	DRAWING(S)	OC	ON CENTER, ODOR CONTROL
E&SC	EROSION & SEDIMENT CONTROL	OD	OUTSIDE DIAMETER
E	EAST, ELECTRIC	OH	OVERHEAD
EA	EACH	OHE	OVERHEAD ELECTRIC
EL	ELEVATION (VERTICAL DISTANCE ABOVE MEAN SEA LEVEL)	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
ELEC	ELECTRICAL, ELECTRIC	O&M	OPERATION AND MAINTENANCE
EOP, E/P	EDGE OF PAVEMENT	PC	POINT OF CURVATURE
ESMT	EASEMENT	PH	PHASE
EST	ESTIMATE(D)	PID	PARCEL IDENTIFICATION
ETC	ET CETERA AND SO FORTH	P/L	PROPERTY LINE
EXIST, EXST, EX	EXISTING	PKF	PK (NAIL) FOUND
FAB	FABRICATE(D)	PKS	PK (NAIL) SET
FCDF	FLOWABLE CONTROLLED DENSITY FILL	PROP, PR	PROPOSED
FDN	FOUNDATION	PSI	POUNDS FORCE PER SQUARE INCH
FEN	FENCE	PVC	POLYVINYL CHLORIDE
FH	FIRE HYDRANT	PVMT	PAVEMENT
FM	FORCE MAIN	PW	POTABLE WATER
FO	FIBER OPTIC	Q	FLOW
FPS	FEET PER SECOND	QTY	QUANTITY
FRP	FIBERGLASS REINFORCED POLYMER OR PLASTIC	RCE	ROCK CONSTRUCTION ENTRANCE
FRPM	FIBERGLASS REINFORCED POLYMER MORTAR	RCP	REINFORCED CONCRETE PIPE, ROCK CHANNEL PROTECTION
FT	FOOT OR FEET	RD	ROAD
F/GRADE	FINISH GRADE	REBAR	REINFORCING BAR, REINFORCING STEEL
GAL	GALLON(S)	REF	REFERENCE
GND	GROUND	REINF	REINFORCE(D), (ING), (MENT)
GPM	GALLONS PER MINUTE	REQD	REQUIRED
GRAV	GRAVEL	RP	RECORD PLAN
HDPE	HIGH-DENSITY POLYETHYLENE	RPM	REVOLUTIONS PER MINUTE
HORIZ	HORIZONTAL	RR	RAILROAD
		RT	RIGHT
		R/W	RIGHT-OF-WAY
		S	SOUTH
		SAN	SANITARY
		SB	STORM BASIN, SOUTH BOUND
		SD	STORM DRAIN, STANDARD DRAWING
		SDR	STANDARD DIMENSION RATIO
		SE	SOUTHEAST
		SEC	SECONDARY, SECOND(S)
		SECT	SECTION
		SFSQ FT	SQUARE FOOT OR FEET
		SHT	SHEET
		SL	SPRING LINE, SERVICE LINE
		SPEC	SPECIFICATION(S)
		SQ	SQUARE
		SR	STATE ROUTE
		SS	SANITARY SEWER, STAINLESS STEEL
		ST	STREET
		STA	STATION
		STD	STANDARD
		STL	STEEL
		STM	STORM SEWER
		SW	SOUTHWEST, SWITCH
		SY	SQUARE YARD(S)
		S/W	SIDEWALK
		TBA	TO BE ABANDONED
		TBM	TEMPORARY BENCH MARK
		TBR	TO BE REMOVED
		TBRL	TO BE RELOCATED
		TBRR	TO BE REMOVED AND REPLACED
		TDH	TOTAL DYNAMIC HEAD
		TEL	TELEPHONE
		TEMP	TEMPORARY
		TOB	TOP OF BANK
		TOC	TOP OF CURB
		TOT	TOTAL
		TR	TRAFFIC/TRANSPORTATION
		TYP	TYPICAL
		TC T/C	TOP OF CONCRETE OR CASTING
		UG	UNDERGROUND
		UGE	UNDERGROUND ELECTRIC
		UNK	UNKNOWN
		USACE	UNITED STATES ARMY CORPS OF ENGINEERS
		USGS	UNITED STATES GEOLOGICAL SURVEY
		VCP	VITRIFIED CLAY PIPE
		VERT	VERTICAL
		VF	VERTICAL FOOT
		W	WEST
		WL	WATER LINE
		WM	WATER MAIN, WATER METER
		WT	WEIGHT
		WWF	WELDED WIRE FABRIC
		WWTP	WASTEWATER TREATMENT PLANT
		W/	WITH
		W/O	WITHOUT
		XFER	TRANSFER
		YD	YARD(S)
		YR	YEAR(S) YR

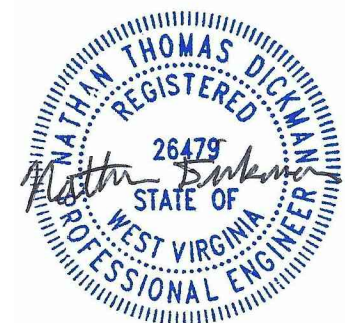
SHEET NUMBERING CONVENTION

EACH SHEET CONTAINS AN IDENTIFYING LETTER THAT COMES FIRST, THIS LETTER DEFINES THE GROUP OF DRAWINGS EACH SHEET BELONGS TO AS FOLLOWS:
 G GENERAL PLANS, NOTES, AND DETAILS
 C SITE CIVIL PLANS, NOTES, AND DETAILS
 T SHAFT (TUNNEL) PLANS, PROFILES, NOTES, AND DETAILS

EACH IDENTIFYING LETTER IS FOLLOWED BY A DASH AND THE A TWO NUMBER SEQUENCE IN ORDER (01, 02, 03, ETC)

DLZ CORPORATION
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 COLUMBUS, OH 43229
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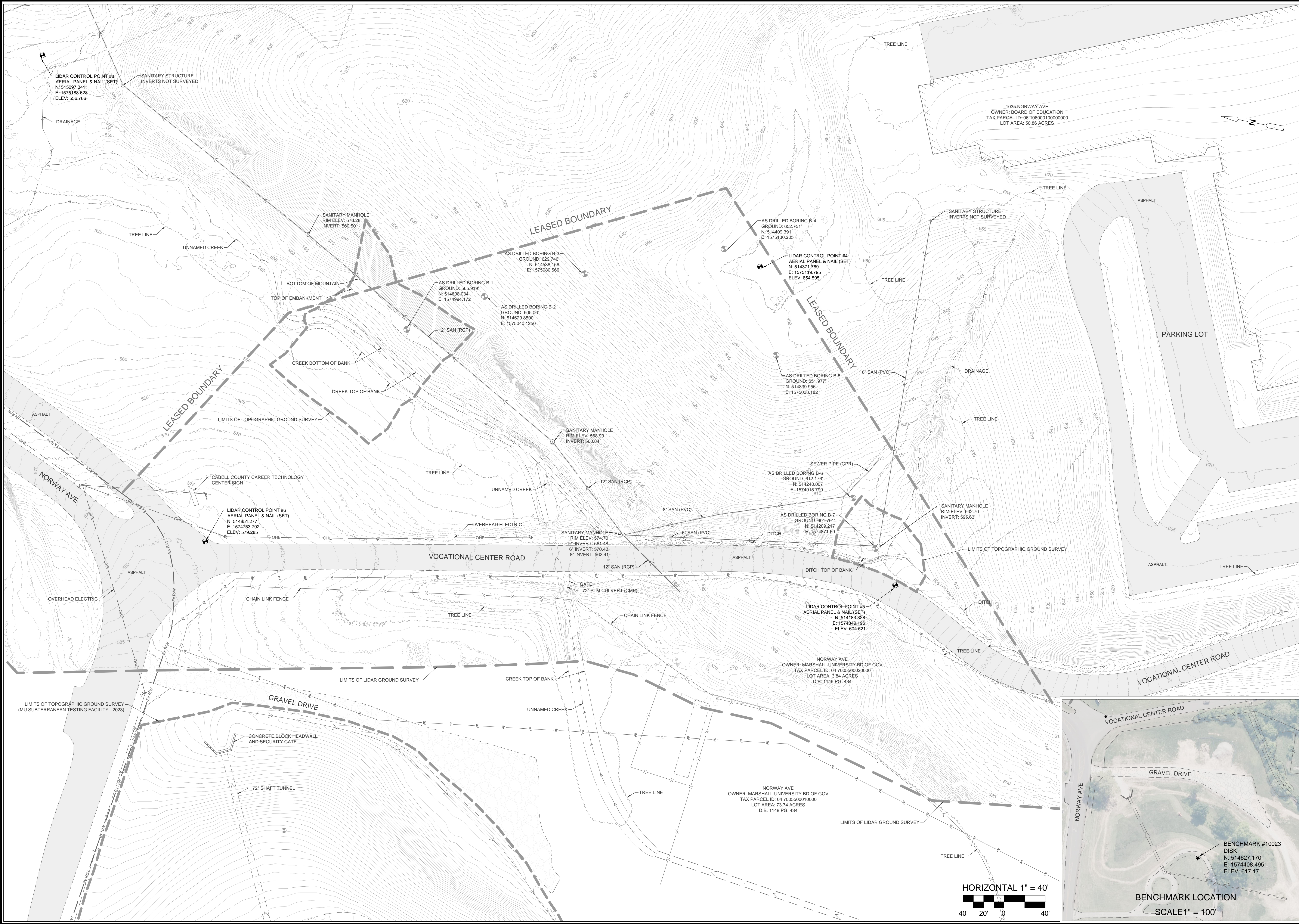
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 CABELL COUNTY, WEST VIRGINIA

LEGEND AND ABBREVIATIONS



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G-02

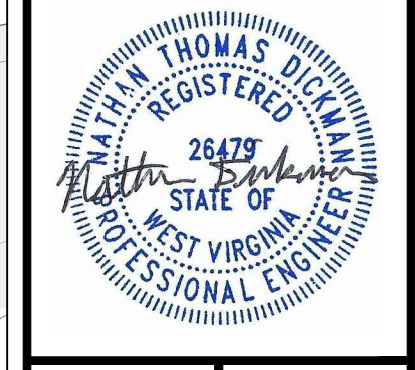
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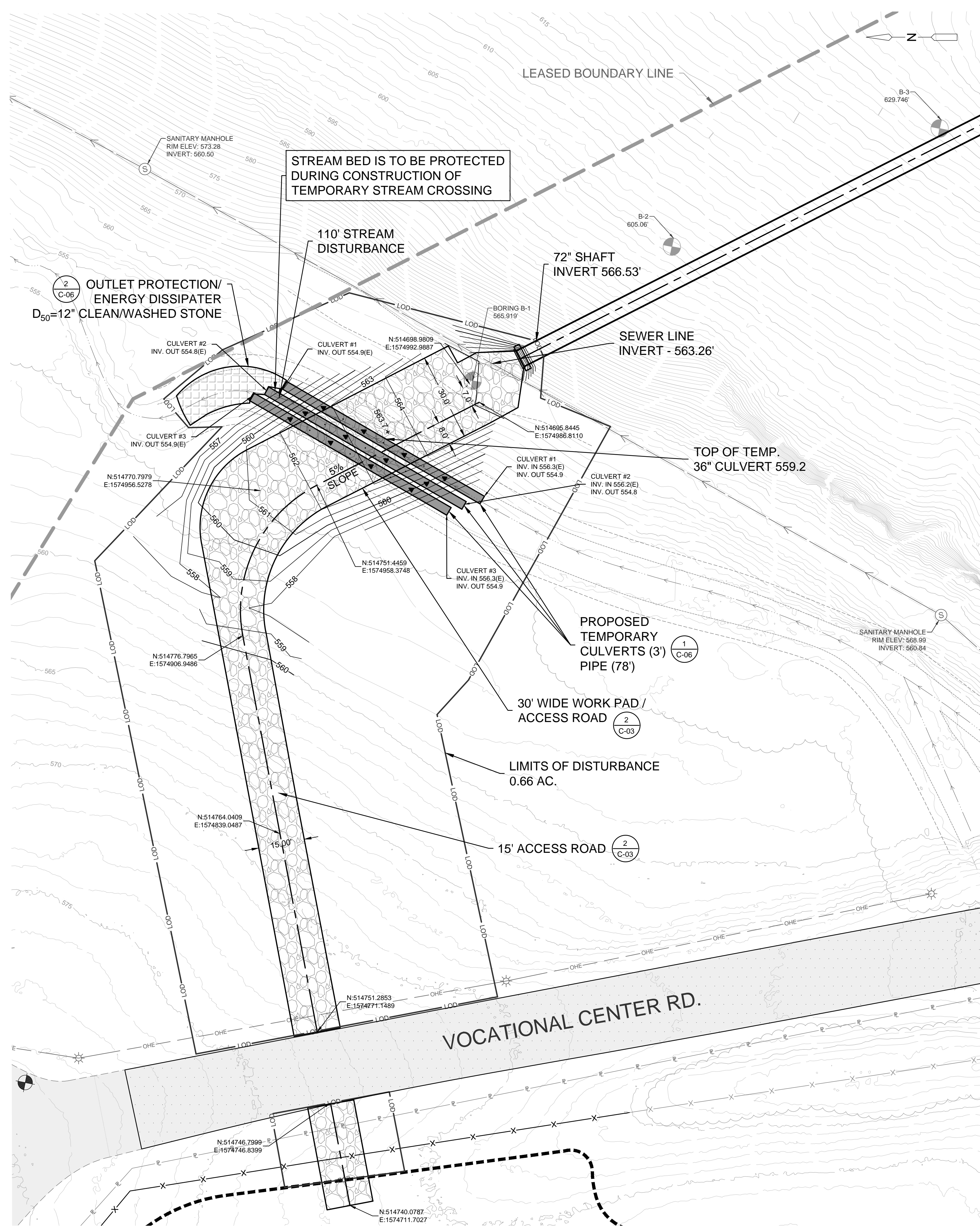


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CABELL COUNTY, WEST VIRGINIA

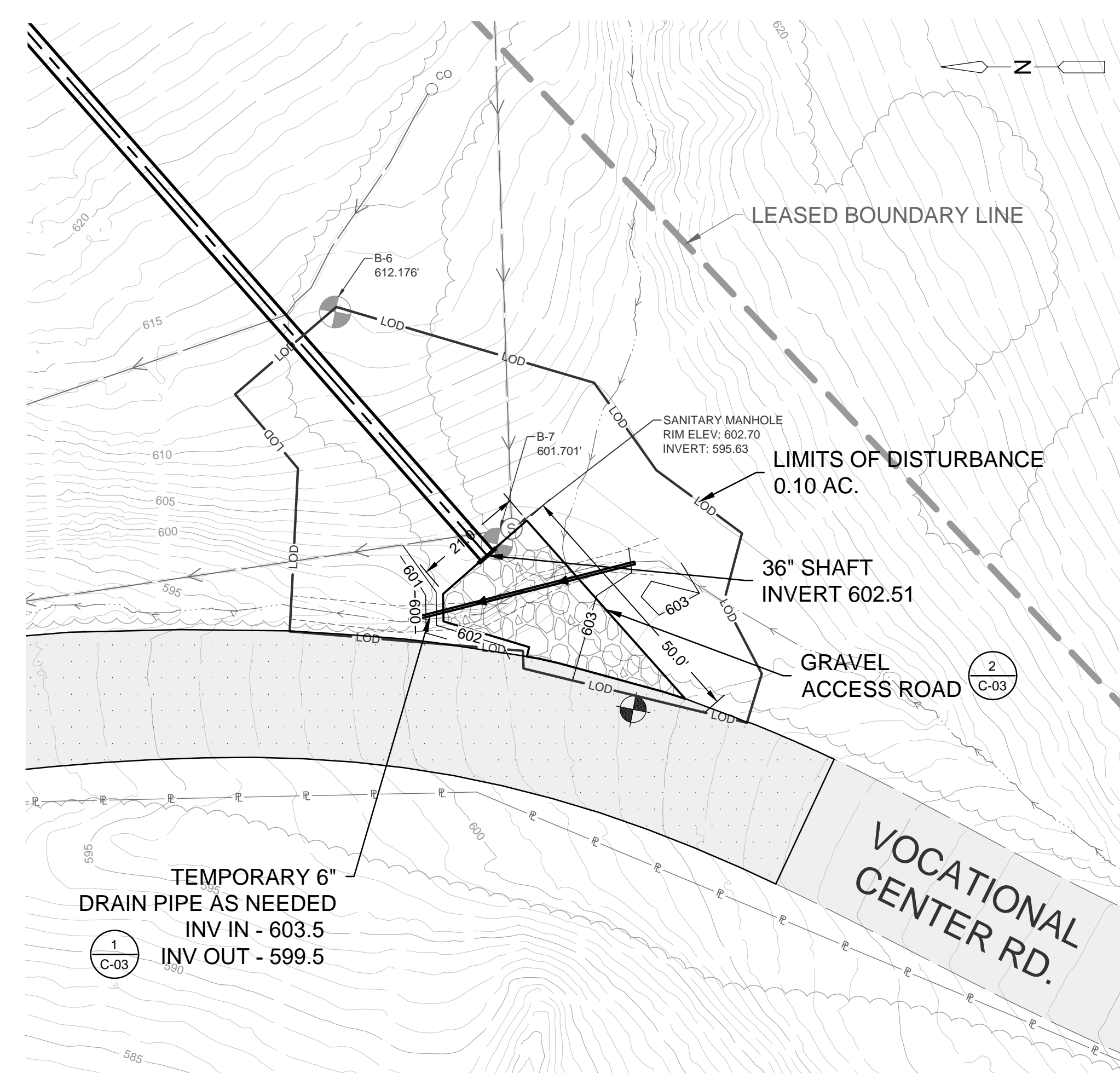
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SITE / LAYOUT / GRADING PLAN



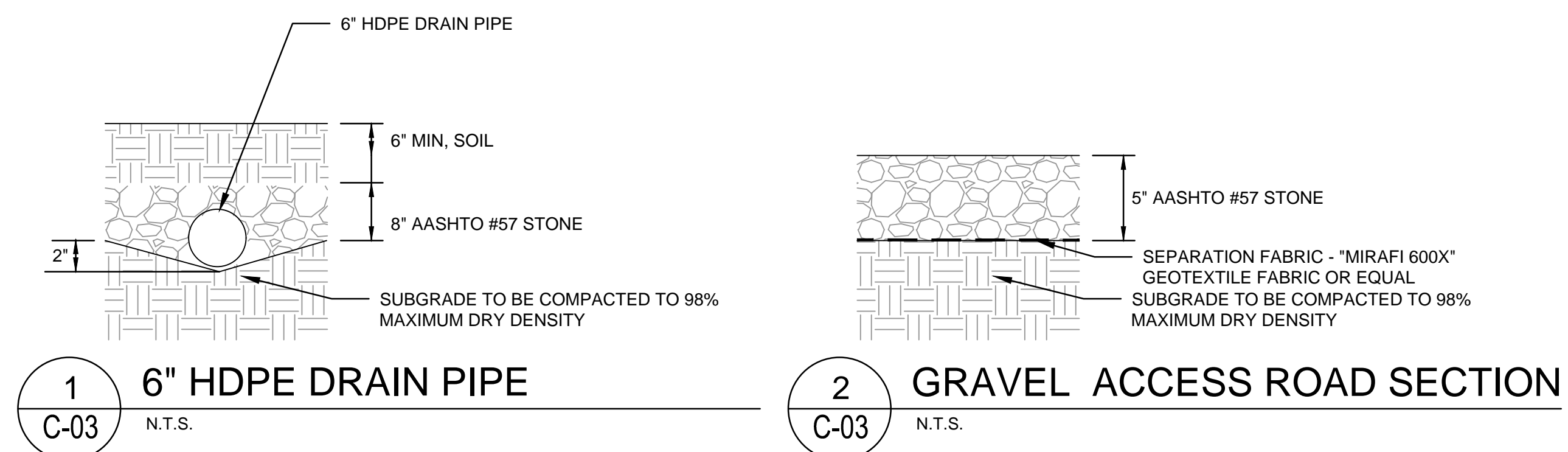
SITE / LAYOUT / GRADING PLAN

SHEET NOTES:

- CONTRACTOR IS RESPONSIBLE FOR LOCATING AND VERIFYING ALL EXISTING UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION.
- CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE TO THE EXISTING UTILITIES DURING CONSTRUCTION AND ALL DAMAGE SHALL BE REPAIRED TO ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER, CITY, OR COUNTY.
- ALL CONSTRUCTION METHODS AND MATERIAL MUST CONFORM TO CURRENT STANDARDS AND SPECIFICATIONS OF THE FEDERAL, STATE, COUNTY, CITY OR LOCAL REQUIREMENTS, WHICHEVER HAS JURISDICTION.
- ALL DISTURBED AREAS ARE TO BE SEEDED. SEE SPECIFICATIONS.

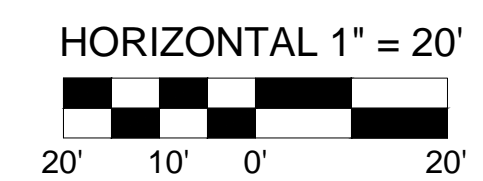
DEWATERING GENERAL NOTE (SEE DETAIL 3, SHEET C-06):

THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE DEWATERING MEASURES TO MANAGE WATER DISCHARGE FROM CONSTRUCTION ACTIVITIES. DEWATERING BAGS SHALL BE USED IN A STABILIZED AREA DOWNSTREAM OF THE TEMPORARY STREAM CROSSING TO FILTER SEDIMENT FROM WATER BEFORE IT IS DISCHARGED. THE CHOSEN DEWATERING AREA MUST BE STABLE, PROPERLY GRADED, AND PROTECTED AGAINST EROSION TO MAINTAIN WATER QUALITY AND PREVENT DOWNSTREAM SEDIMENTATION. ALL DEWATERING OPERATIONS SHALL COMPLY WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND BEST MANAGEMENT PRACTICES TO MINIMIZE IMPACTS ON THE SURROUNDING ECOSYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR MONITORING AND MAINTAINING DEWATERING EQUIPMENT TO ENSURE EFFECTIVE PERFORMANCE THROUGHOUT THE PROJECT DURATION.



1 6" HDPE DRAIN PIPE
C-03 N.T.S.

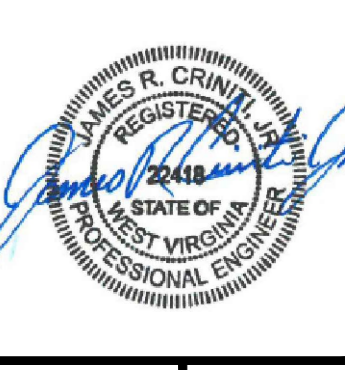
2 GRAVEL ACCESS ROAD SECTION
C-03 N.T.S.



TRIAD ENGINEERING, INC.
10541 TEAYS VALLEY ROAD
SCOTT DEPOT, WV 25560
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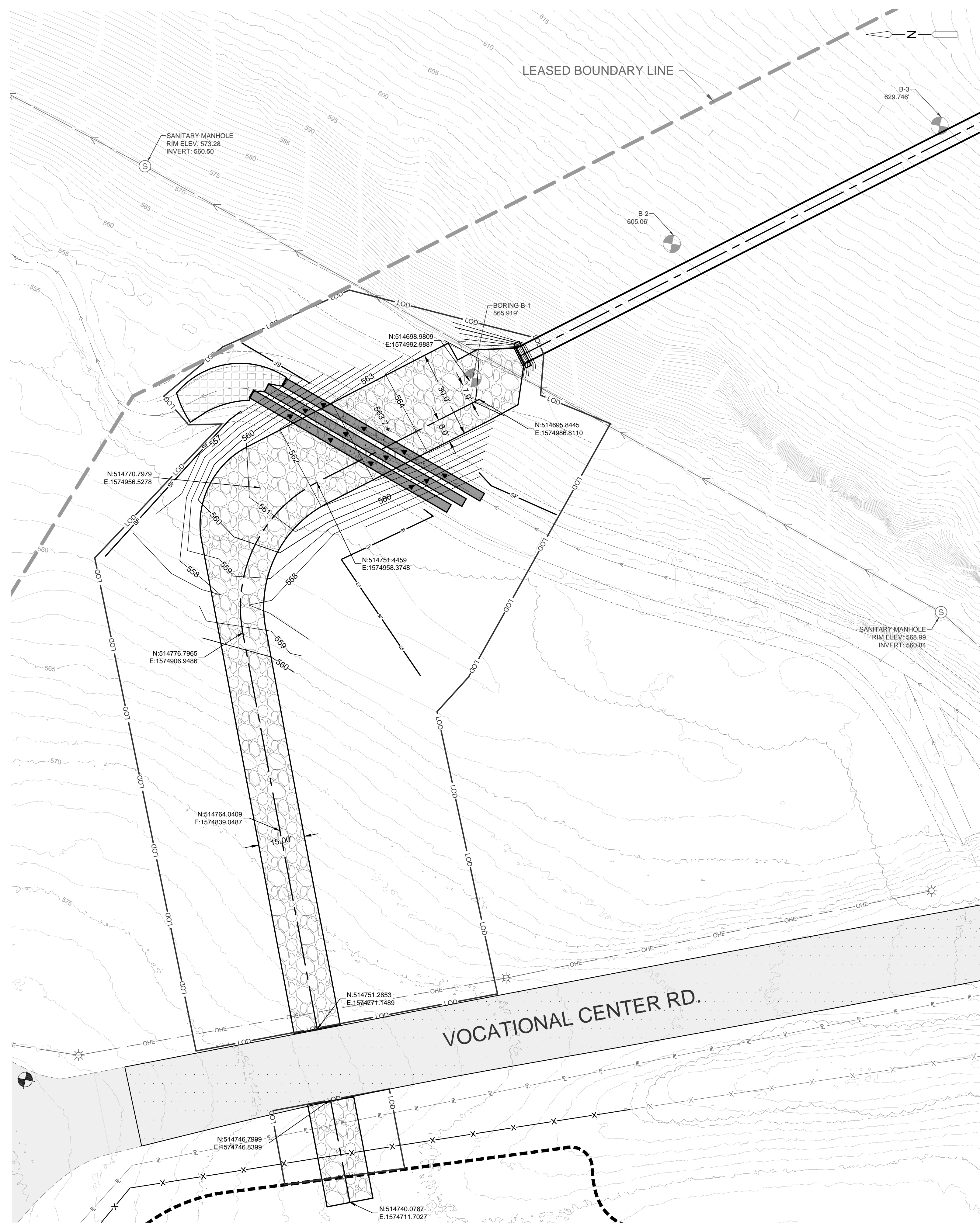
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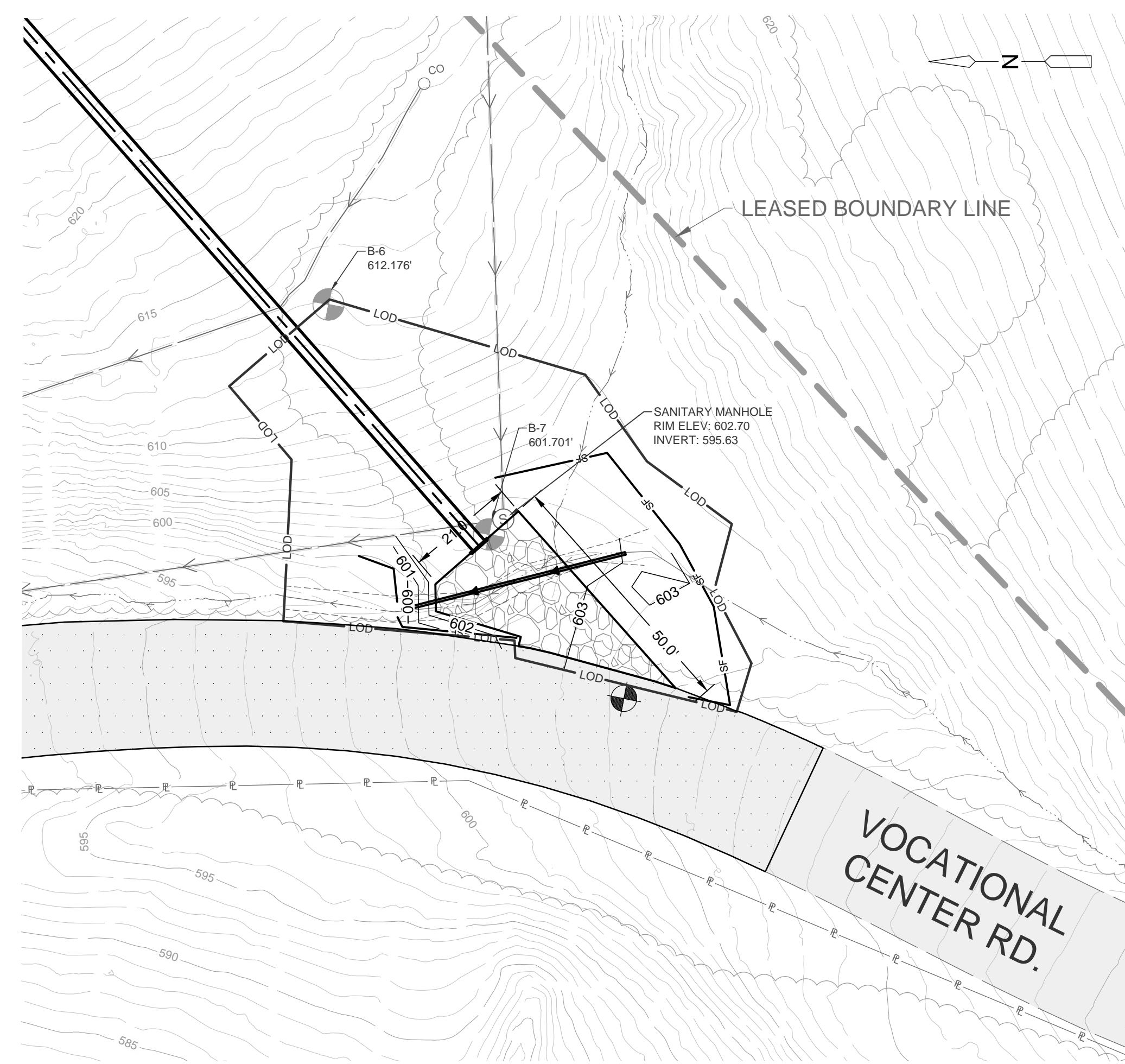
MARSHALL UNIVERSITY CF4
CABELL COUNTY, WEST VIRGINIA
SITE LAYOUT AND GRADING PLAN

TRIAD
TRIAD ENGINEERING, INC.
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SHEET NUMBER:
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PROJECT No.: 04-23-0374

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EROSION AND SEDIMENT CONTROL PLAN



EROSION AND SEDIMENT CONTROL PLAN

DEWATERING GENERAL NOTE (SEE DETAIL 3, SHEET C-06):

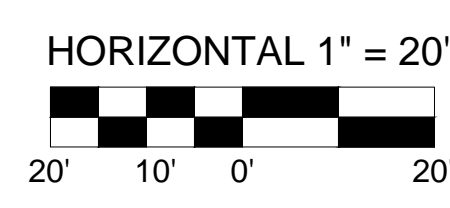
THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE DEWATERING MEASURES TO MANAGE WATER DISCHARGE FROM CONSTRUCTION ACTIVITIES. DEWATERING BAGS SHALL BE USED IN A STABILIZED AREA DOWNSTREAM OF THE TEMPORARY STREAM CROSSING TO FILTER SEDIMENT FROM WATER BEFORE IT IS DISCHARGED. THE CHOSEN DEWATERING AREA MUST BE STABLE, PROPERLY GRADED, AND PROTECTED AGAINST EROSION TO MAINTAIN WATER QUALITY AND PREVENT DOWNSTREAM SEDIMENTATION. ALL DEWATERING OPERATIONS SHALL COMPLY WITH APPLICABLE ENVIRONMENTAL REGULATIONS AND BEST MANAGEMENT PRACTICES TO MINIMIZE IMPACTS ON THE SURROUNDING ECOSYSTEM. THE CONTRACTOR IS RESPONSIBLE FOR MONITORING AND MAINTAINING DEWATERING EQUIPMENT TO ENSURE EFFECTIVE PERFORMANCE THROUGHOUT THE PROJECT DURATION.

GENERAL NOTES:

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE STANDARDS AND SPECIFICATIONS OF THE WEST VIRGINIA EROSION AND SEDIMENT CONTROL BMP MANUAL. THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION. ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING. A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED AT THE SITE AT ALL TIMES, PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS). THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.

SITE GRADING IS TO DRAIN TO THE SEDIMENT TRAPPING DEVICES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED. ALL EROSION AND CONTROL STRUCTURES MUST BE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND AFTER EVERY STORM EVENT OF 0.5 INCHES OR GREATER. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY. INITIAL EFFORTS SHOULD BE TO LIMIT THE AMOUNT OF AREA DISTURBED BY MAINTAINING AS MUCH OF THE ORIGINAL VEGETATIVE COVER AS POSSIBLE. SEDIMENT CONTROL MEASURES SHALL REMAIN ACTIVE UNTIL ALL DISTURBED AREAS HAVE BEEN SATISFACTORY STABILIZED. ALL STATE AND LOCAL REQUIREMENTS SHALL BE MET CONCERNING FENCING AND SIGNS WARNING THE PUBLIC OF THE HAZARDS OF SOFT, SATURATED SEDIMENT AND FLOOD WATERS. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 4 DAYS OF REACHING FINAL GRADE. TEMPORARY STABILIZATION IS ALSO TO BE APPLIED WITHIN 4 DAYS OF A WORK STOPPAGE OF 14 DAYS OR MORE. INSPECTION OF ALL BMP'S ONCE EVERY 4 CALENDAR DAYS AND WITHIN A 24 HOUR PERIOD OF A PRECIPITATION/RUNOFF EVENT OF MORE THAN 0.25" IN A 24 HOUR PERIOD.

THE CONTRACTOR SHALL PROVIDE A DETAILED PLAN AND SCHEDULE FOR ALL ELEMENTS OF THE EROSION CONTROL PLAN. THE PLAN SHOULD BE POSTED AT THE JOB SITE AND STRICTLY FOLLOWED. THE MINIMUM STANDARD OF PERFORMANCE WILL BE A PLAN THAT REQUIRES THAT AN INSPECTION OF ALL PLAN ELEMENTS BE CONDUCTED AT LEAST ONCE EVERY FOUR DAYS, UPON REPORT OF AN OBSERVED FAILURE, OR WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN 0.25 INCHES OF RAIN PER 24 HOUR PERIOD. SPECIAL ATTENTION SHOULD BE GIVEN TO AREAS OF EQUIPMENT FUELING AND CLEANING. MITIGATION MEASURES SUCH AS WATER DIVERSION AND CONTAINMENT, ETC. SHOULD BE EMPLOYED TO MINIMIZE THE POTENTIAL FOR CONTAMINANTS TO REACH SURFACE WATERS. INSPECTION OF GROUNDWATER FACILITIES ARE REQUIRED QUARTERLY, AT MINIMUM.



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 OFFICE LOCATIONS
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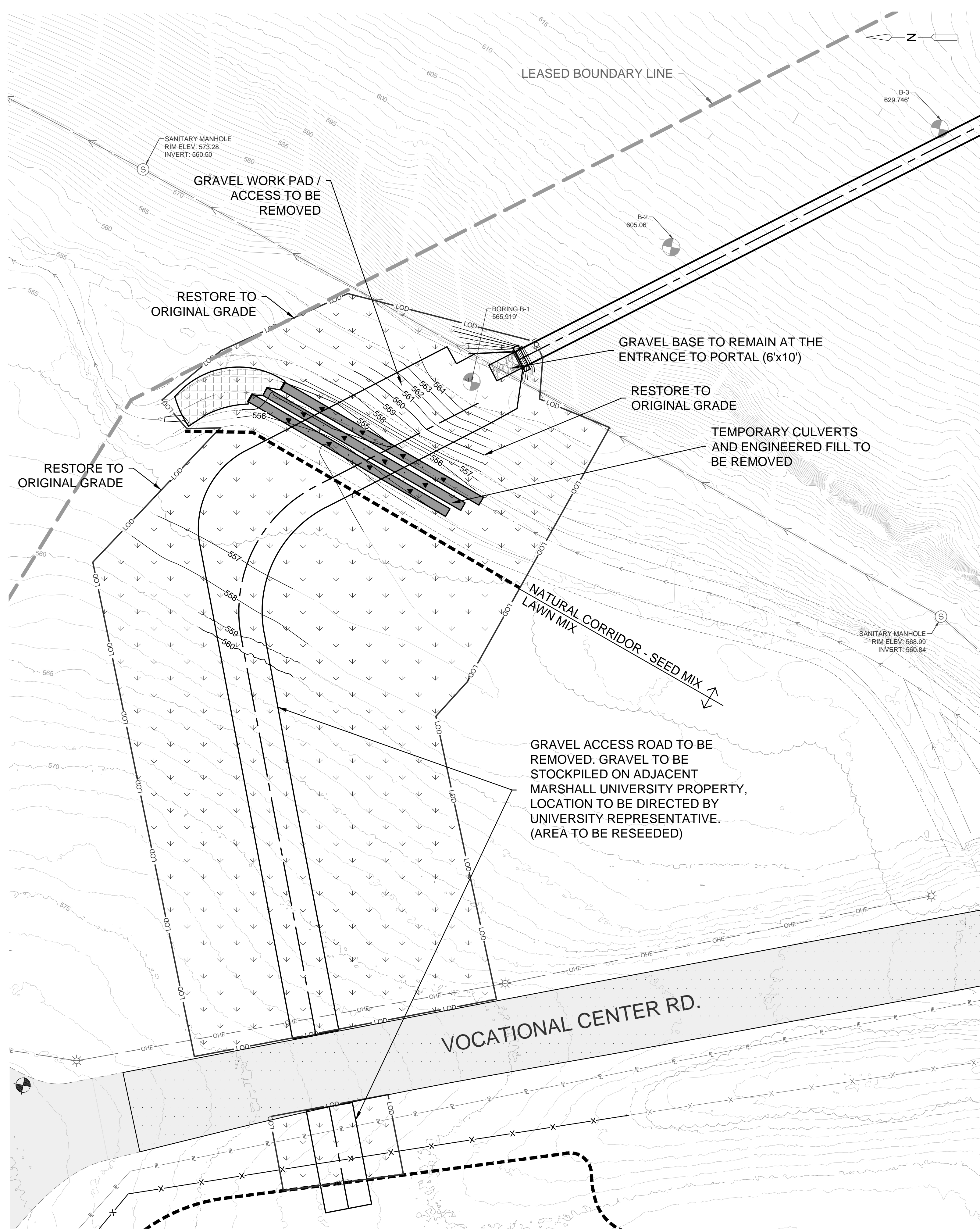
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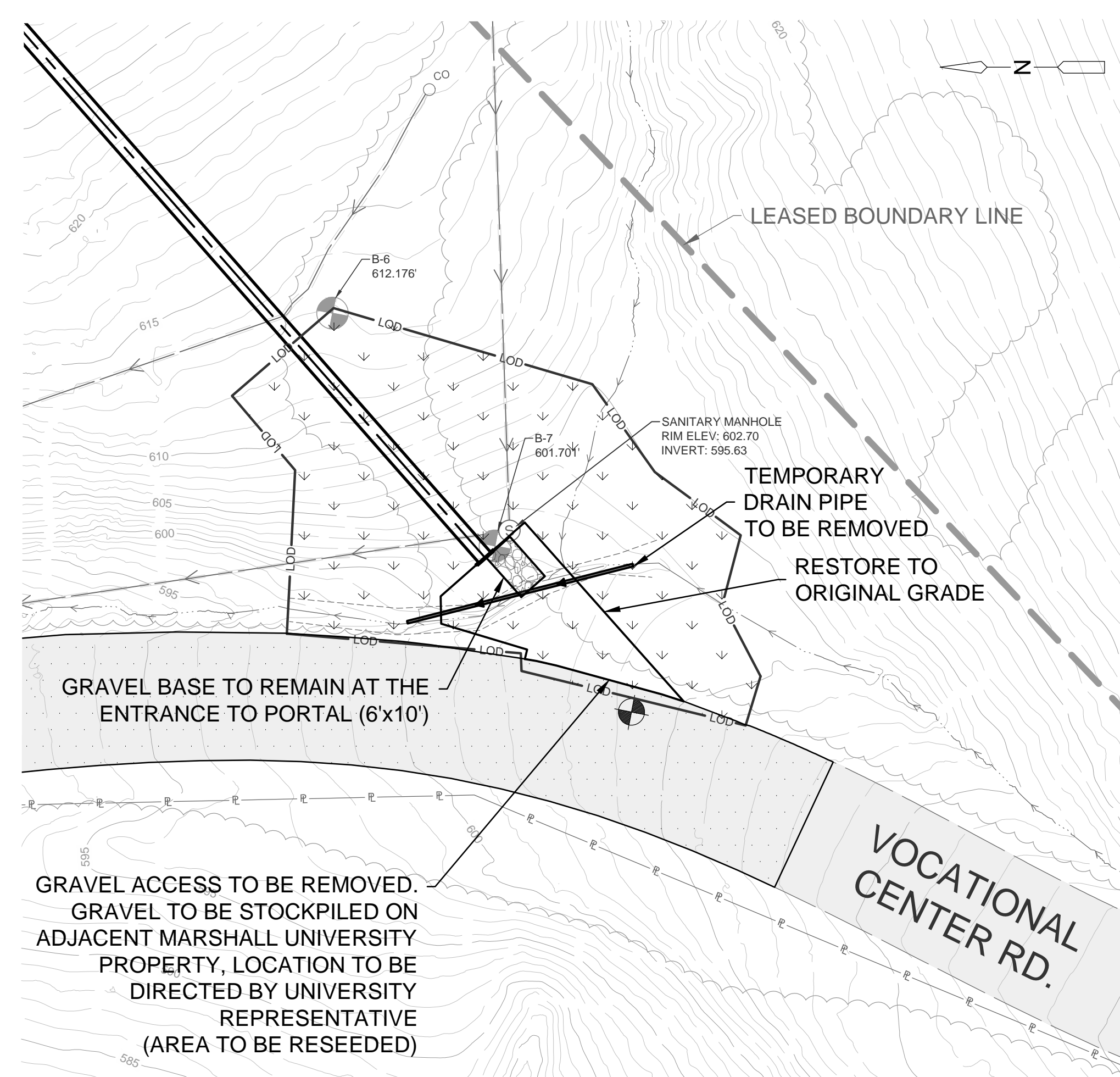
MARSHALL UNIVERSITY CF4
 CABELL COUNTY, WEST VIRGINIA
EROSION AND SEDIMENT CONTROL PLAN

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RECONSTRUCTION PLAN



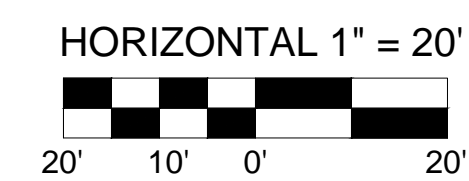
RECONSTRUCTION PLAN

SLOPE STABILITY & NATURAL CORRIDORS SEED MIX
SEE SPECIFICATIONS FOR MEAN AND METHODS

TEMPORARY MATRIX		
OZ/AC	GRASSES	
512	AVENA SATIVA	SEED OATS
160	LOLIUM MULTIFLORUM	ANNUAL RYEGRASS

PERMANENT MATRIX		
OZ/ACRE	GRASSES	
16	ANDROPOGON GERARDII	BIG BLUESTEM
16	BOUTELOUA CURTIPENDULA	SIDE-OATS GRAMA
48	ELYMUS CANADENSIS	CANADA WILE RYE
48	ELYMUS VIRGINICUS	VIRGINIA WILD RYE
32	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM
16	SORGHASTRUM NUTANS	INDIAN GRASS
OZ/ACRE	FORBS	
1	MONDARDA FISTULOSA	BERGAMOT
2	COREOPSIS LANCEOLATA	LANCELEAF COREOPIS
4	RUDBECKA HIRTA	BLACK-EYED SUSAN
2	SOLIDAGO NEMORALIS	GREY GOLDENROD
2	SOLIDAGO SPECIOSA	SHOWY GOLDENROD

LAWN MIX - SUN TO PARTIAL SHADE		
LBS/ACRE	GRASSES	
20	LOLIUM MULTIFLORUM	ANNUAL RYEGRASS
100	POA PRATENSIS	KENTUCKY BLUEGRASS
100	LOLIUM PERENNE	PERENNIAL RYEGRASS



TRIAD ENGINEERING, INC.
10641 TEAYS VALLEY ROAD
SCOTT DEPOT, WV 25560
PH: 304.755.0721 FAX: 304.755.1880
OFFICE LOCATIONS
MARYLAND PENNSYLVANIA VIRGINIA WEST VIRGINIA OHIO

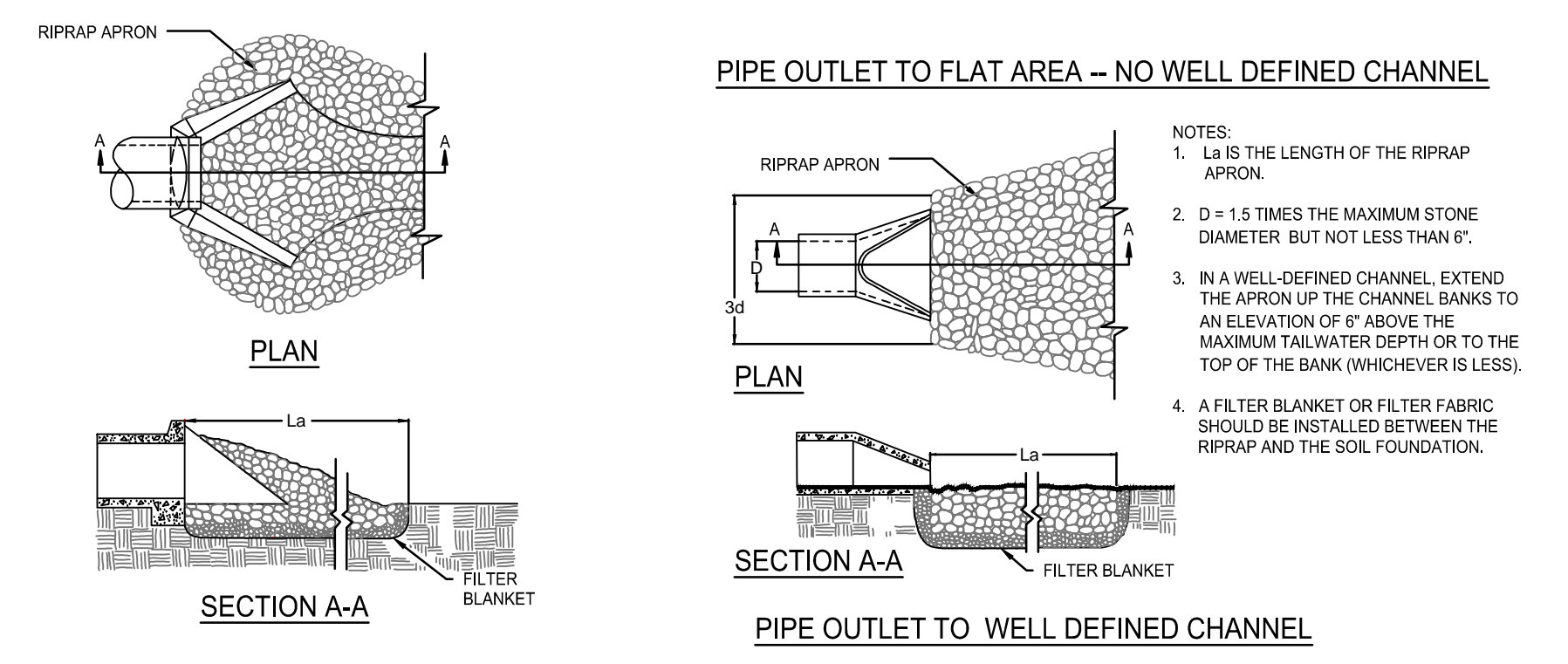
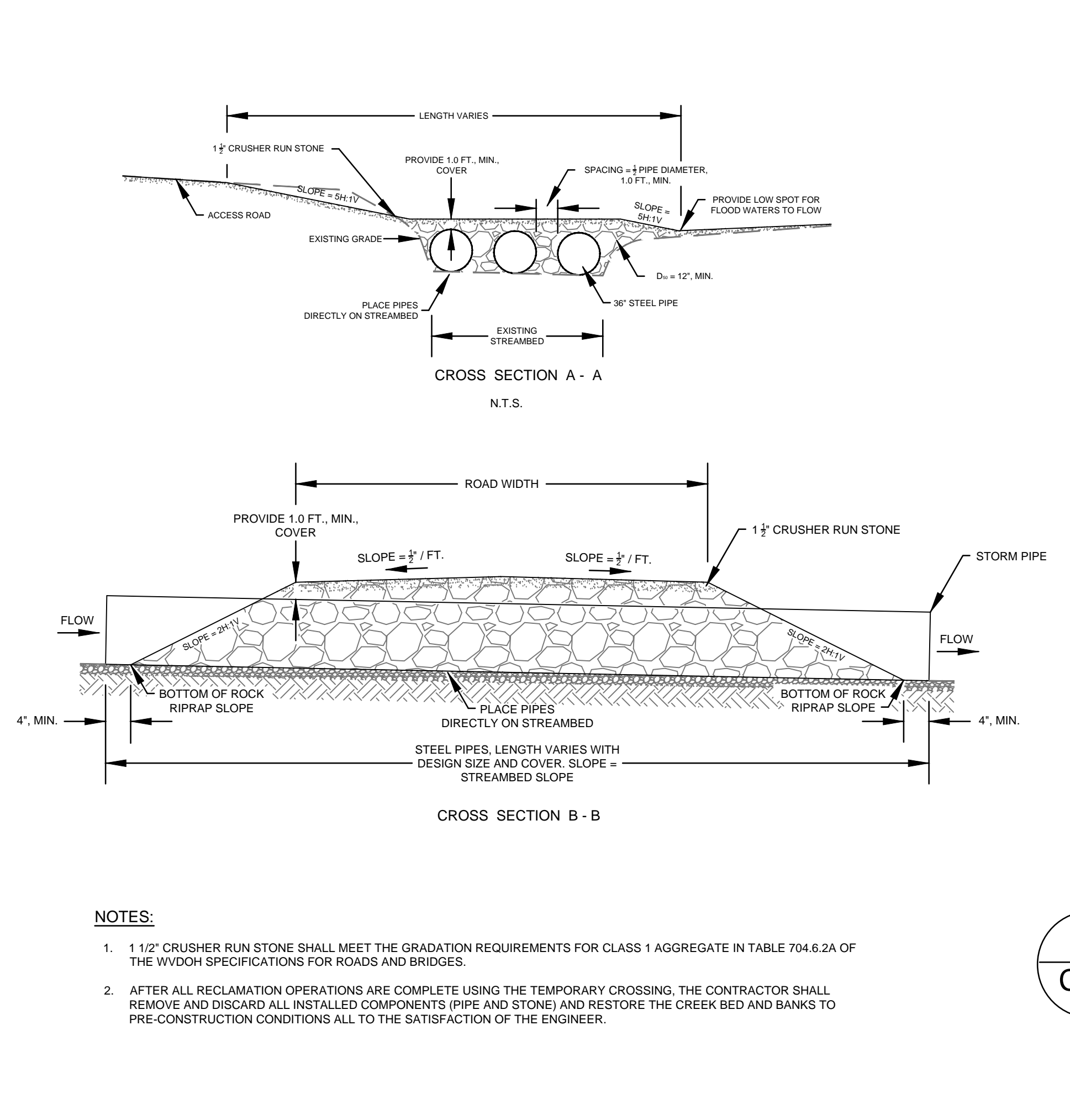
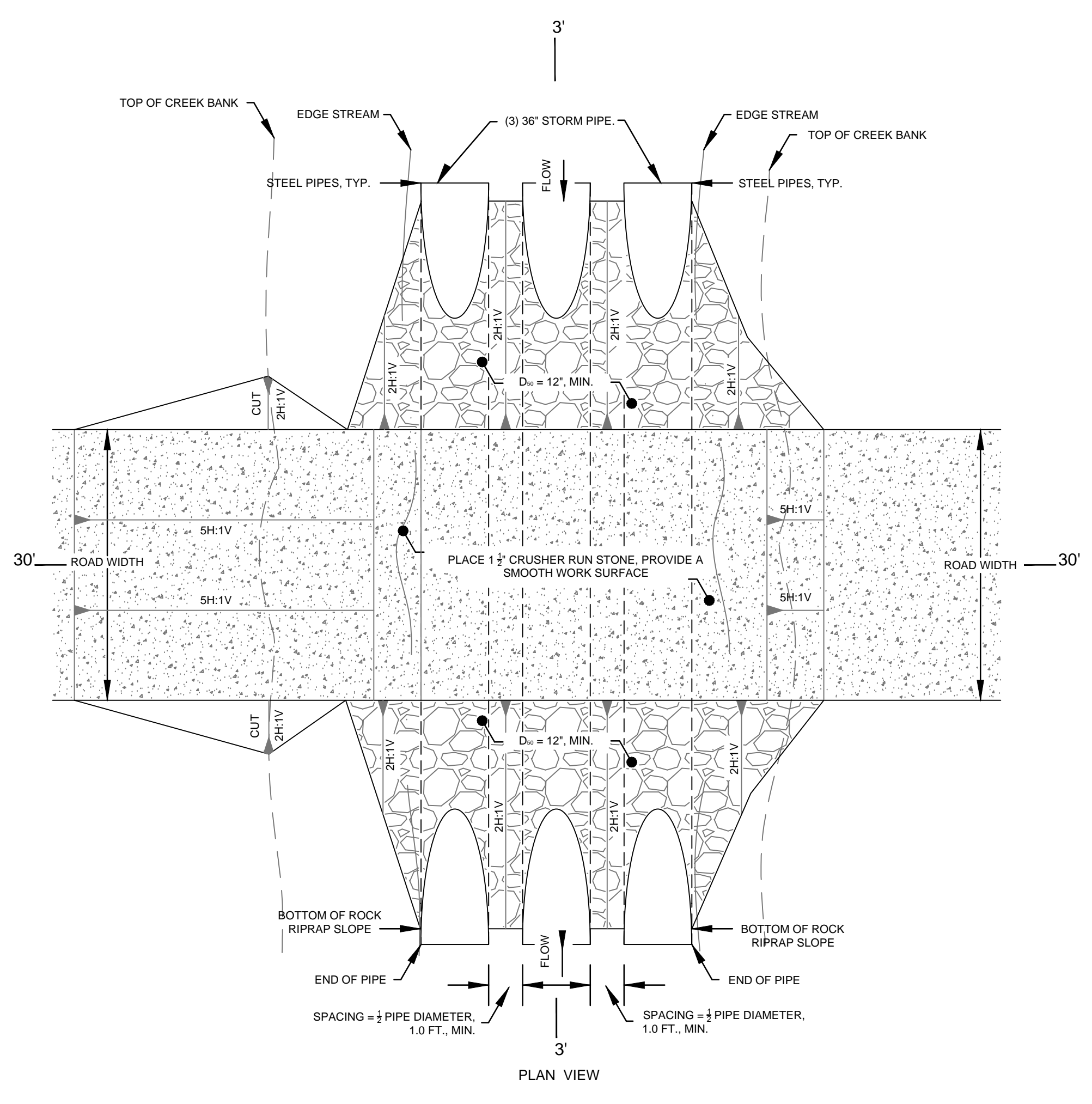
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MARSHALL UNIVERSITY CF4
CABELL COUNTY, WEST VIRGINIA
RECONSTRUCTION PLAN

TRIAD
TRIAD ENGINEERING, INC.
www.triadeng.com
SHEET NUMBER:
C-05
PROJECT No.: 04-23-0374

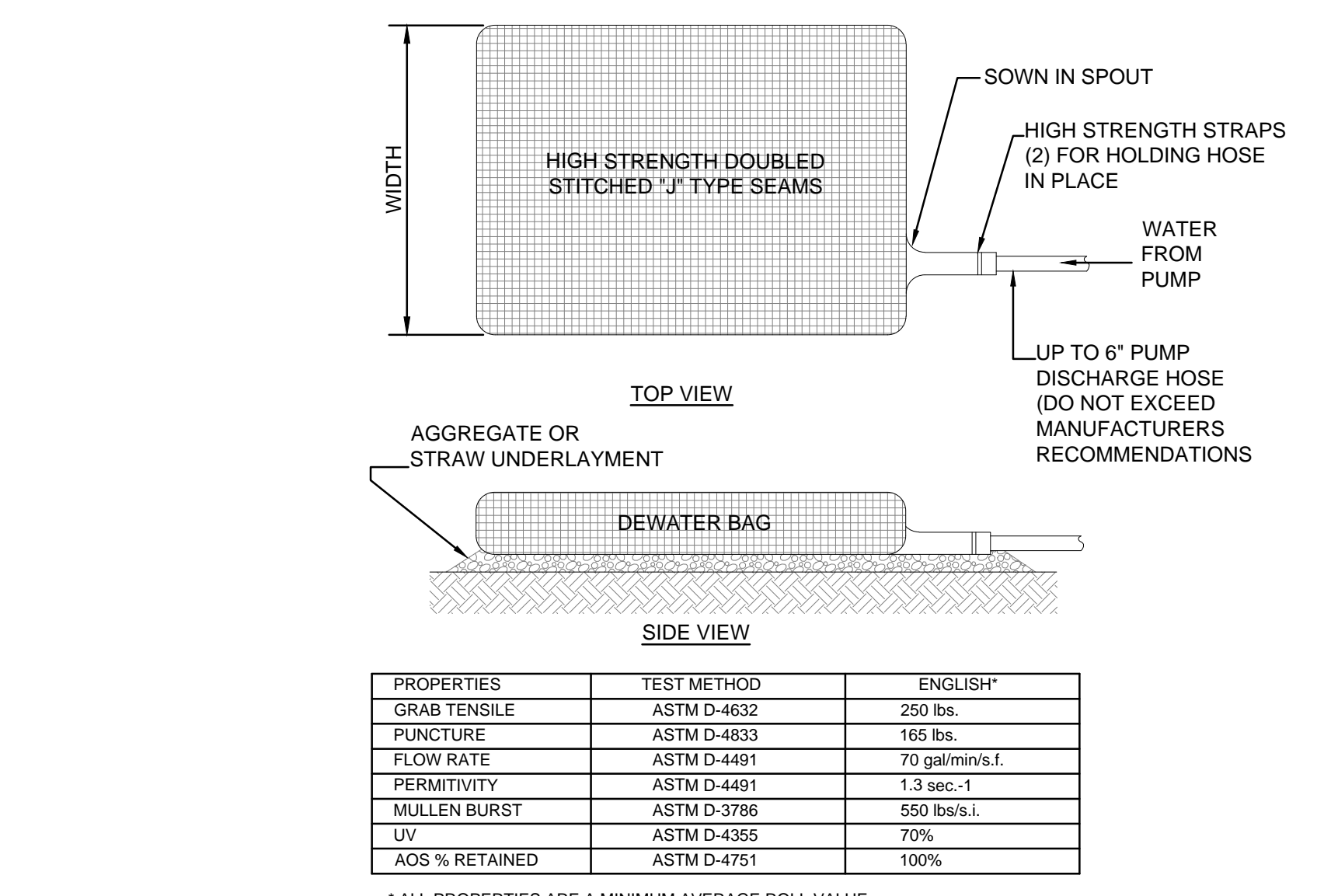


1
C-06
TEMPORARY STREAM CROSSING
N.T.S.

NOTES:

- 1 1/2" CRUSHER RUN STONE SHALL MEET THE GRADATION REQUIREMENTS FOR CLASS 1 AGGREGATE IN TABLE 704.6.2A OF THE WDOGH SPECIFICATIONS FOR ROADS AND BRIDGES.
- AFTER ALL RECLAMATION OPERATIONS ARE COMPLETE USING THE TEMPORARY CROSSING, THE CONTRACTOR SHALL REMOVE AND DISCARD ALL INSTALLED COMPONENTS (PIPE AND STONE) AND RESTORE THE CREEK BED AND BANKS TO PRE-CONSTRUCTION CONDITIONS ALL TO THE SATISFACTION OF THE ENGINEER.

2
C-06
RIPRAP OUTLET PROTECTION
N.T.S.



NOTES:

- THE BAG SHALL BE INSTALLED ON A VERY SLIGHT SLOPE SO INCOMING WATER FLOWS DOWNHILL THROUGH THE BAG WITHOUT CREATING MORE EROSION.
- THE NECK OF THE FILTER BAG SHALL BE TIGHTLY STRAPPED (MINIMUM TWO STRAPS) TO THE DISCHARGE HOSE.
- THE BAG SHOULD BE PLACED ON AN AGGREGATE OR HAY BALE BED TO MAXIMIZE WATER FLOW THROUGH THE ENTIRE SURFACE AREA OF THE BAG.
- THE FILTER BAG IS FULL WHEN IT NO LONGER CAN EFFICIENTLY FILTER SEDIMENT OR PASS WATER AT A REASONABLE RATE.
- FLOW RATES VARY DEPENDING ON THE SIZE OF THE DEWATERING DEVICE, AMOUNT OF SEDIMENT DISCHARGED INTO THE DEWATERING DEVICE, THE TYPE OF GROUND, ROCK OR OTHER SUBSTANCE UNDER THE BAG AND THE DEGREE OF THE SLOPE ON WHICH THE BAG LIES. THE FILTER BAG SHOULD BE SIZED TO ACCOMMODATE THE ANTICIPATED FLOW RATES FROM THE TYPE OF PUMP USED. TYPICALLY, FILTER BAGS CAN HANDLE FLOW RATES OF UP TO 1,000 GALLONS PER MINUTE, BUT IN ALL CASES FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR FLOW RATES.
- USE OF EXCESSIVE FLOW RATES OR OVERFILLING THE DEWATERING DEVICE WITH SEDIMENT WILL CAUSE RUPTURES OF THE BAG OR FAILURE OF THE HOSE ATTACHMENT STRAPS.
- THE FILTER BAG CAN BE LEFT IN PLACE AFTER CUTTING THE TOP OFF AND SEEDING AND MULCHING THE ACCUMULATED SEDIMENT, OR REMOVED AND DISPOSED OF OFFSITE IN AN APPROVED LANDFILL.
- EACH STANDARD DEWATERING DEVICE SHALL HAVE A FILL SPOUT LARGE ENOUGH TO ACCOMMODATE THE DISCHARGE HOSE. USE TWO STAINLESS STEEL STRAPS TO SECURE THE HOSE AND PREVENT PUMPED WATER FROM ESCAPING WITHOUT BEING FILTERED.
- THE DEWATERING DEVICE SHALL BE A NON-WOVEN BAG WHICH IS SEWN WITH A DOUBLE NEEDLE STITCHING USING A HIGH STRENGTH THREAD.
- THE DEWATERING DEVICE SEAMS SHALL HAVE AN AVERAGE WIDE WIDTH STRENGTH PER ASTM D 4884 OF 100 LB/IN (1.14 kg/meter).
- THE GEOTEXTILE FABRIC SHALL BE A NON-WOVEN FABRIC.

4
C-06
SMART FENCE DETAIL

3
C-06
DEWATERING BAG
N.T.S.

SMART FENCE 36" INSTALLATION NOTES:

STEP 1: EXCAVATE TRENCH A MAXIMUM OF 2' WIDE AND 4" DEEP. THE TRENCH SHALL BE HAND-CLEANED FOLLOWING EXCAVATION TO REMOVE BULKY DEBRIS SUCH AS ROCKS, STICKS, AND SOIL CLODS FROM THE TRENCH. DRIVE HARDWOOD POSTS, HAVING MINIMUM 1" X 2" CROSS-SECTION DIMENSIONS AND 48" LONG, INTO THE GROUND. DRIVE POST INTO GROUND A MINIMUM OF 16" DEPTH. POST SPACING MUST BE NO GREATER THAN 6 FT MAXIMUM.

STEP 2: LAYOUT SMARTFENCE 36 ALONG PROPOSED FENCE LINE NEXT TO ANCHOR TRENCH. LOCATE ONE END OF THE SMARTFENCE 36 AND POSITION NEAR THE INITIAL POST. POSITION SMARTFENCE 36 VERTICALLY ALONG THE INITIAL POST.

STEP 3: FOR THE INITIAL POST, PLACE THE END OF SMARTFENCE 36 ALONG THE POST HEIGHT AND ROTATE THE POST 360 DEGREES, MAINTAINING TENSION ON THE FENCE SYSTEM. SECURE THE FENCE TO THE POST USING HEAVY-DUTY WIRE STAPLES (HAVING 1/2 INCH LENGTH AND 1" WIDTH) AT THE TWO (2) ORANGE-COLORED BAND LOCATIONS AND AT A LOCATION HALFWAY BETWEEN THE TWO ORANGE BANDS (MINIMUM 3 ATTACHMENT LOCATIONS). ALTERNATE STAPLES MAY BE USED OF A SIZE AND TYPE AS APPROVED BY THE STATE DOT.

STEP 4: DRIVE THE INITIAL POST WITH THE ATTACHED FENCE INTO THE GROUND TO 16" DEPTH.

STEP 5: DRIVE THE INTERIOR POSTS OF THE FENCE SYSTEM INTO THE GROUND AT LEAST 16".

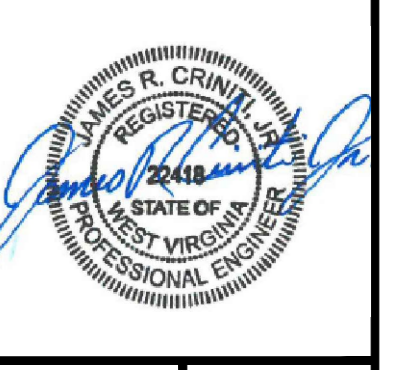
STEP 6: MOVE TO THE NEXT POST WHILE PULLING SMARTFENCE 36 TIGHTLY. POSITION THE SMARTFENCE 36 IN FRONT OF THE ADJACENT POST IN PREPARATION FOR FASTENING THE FENCE TO THE POST. SECURE THE FENCE TO THE POST USING STAPLES AT THE TWO (2) ORANGE-COLORED BAND LOCATIONS AND AT A LOCATION HALFWAY BETWEEN THE TWO ORANGE BANDS (MINIMUM 3 ATTACHMENT LOCATIONS) AS INSTRUCTED IN STEP 3.

STEP 7: AFTER THE INTERIOR POSTS HAVE BEEN FASTENED TO THE SMARTFENCE 36, SECURE THE FENCE TO THE FINAL POST BY PULLING THE FINAL SECTION OF FENCING TAUT. THEN ROTATING THE POST 360 DEGREES, MAINTAINING TENSION ON THE FENCE SYSTEM. SECURE THE FENCE TO THE POST USING STAPLES AT THE TWO (2) ORANGE-COLORED BAND LOCATIONS AND AT A LOCATION HALFWAY BETWEEN THE TWO ORANGE BANDS (MINIMUM 3 ATTACHMENT LOCATIONS) AS INSTRUCTED IN STEP 3. DRIVE THE FINAL POST INTO THE GROUND TO 16" DEPTH.

STEP 8: PLACE BOTTOM 6 INCHES OF FABRIC INTO THE TRENCH. BACKFILL TRENCH (OVERFILL) WITH SOIL PLACED AROUND FABRIC. COMPACT SOIL BACKFILL WITH EITHER MANUAL TAMPING (OR OTHER MANUAL MEANS) OR VIA MECHANICAL EQUIPMENT SUCH AS THE FRONT WHEEL OF A TRACTOR, SKID STEER, ROLLER, OR OTHER DEVICE (PER NOTE 5 OF ASTM D 6462 STANDARD PRACTICE FOR SILT FENCE INSTALLATION). DO NOT DAMAGE THE FABRIC DURING COMPACTION (DAMAGED FABRIC SHALL BE REPLACED).

REV. #	DATE	DESCRIPTION	BY

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CHECKED BY:	dm
DATE:	12/02/2024
SCALE:	AS SHOWN

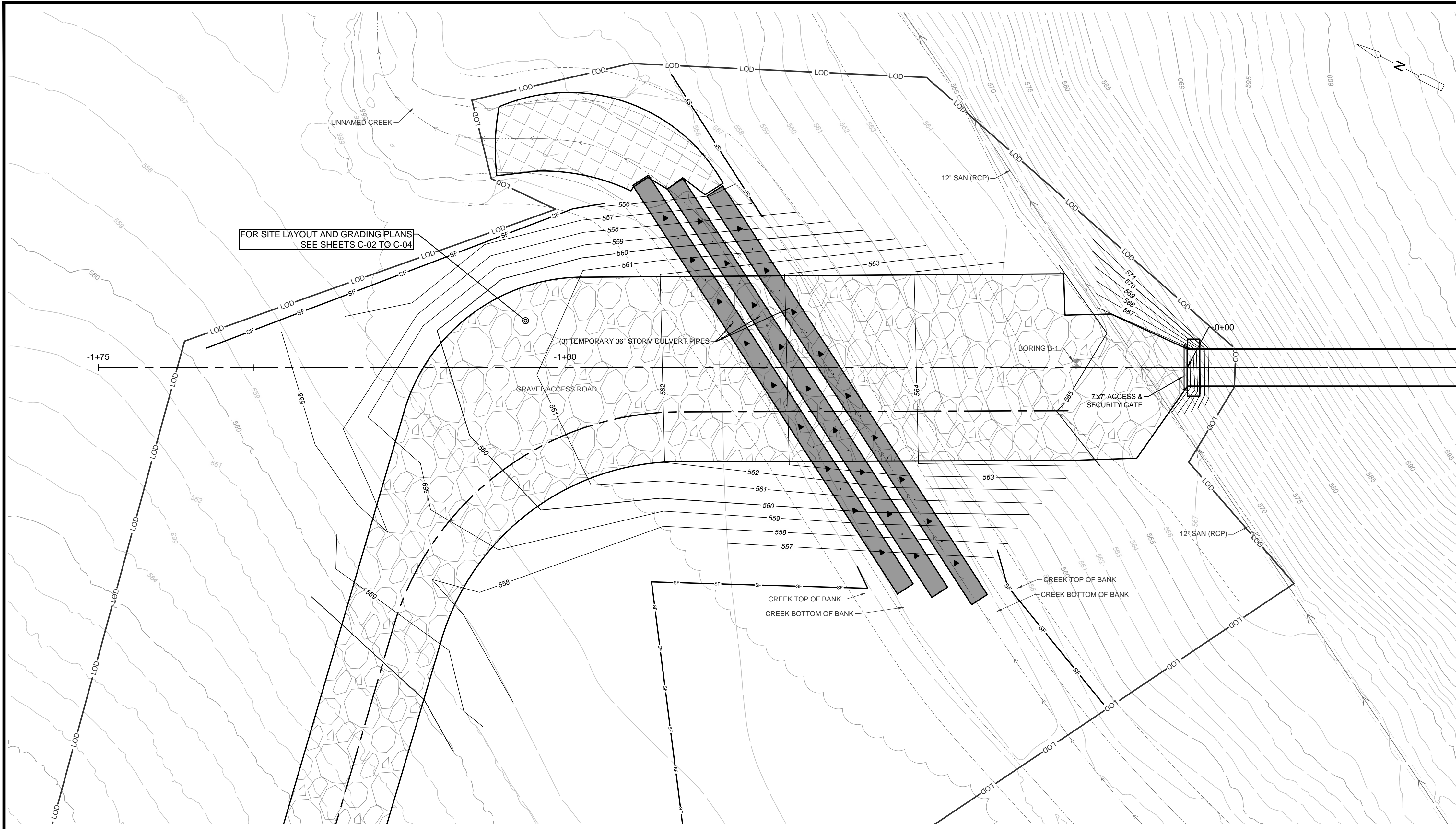


MARSHALL UNIVERSITY CF4
CABELL COUNTY, WEST VIRGINIA

DETAILS

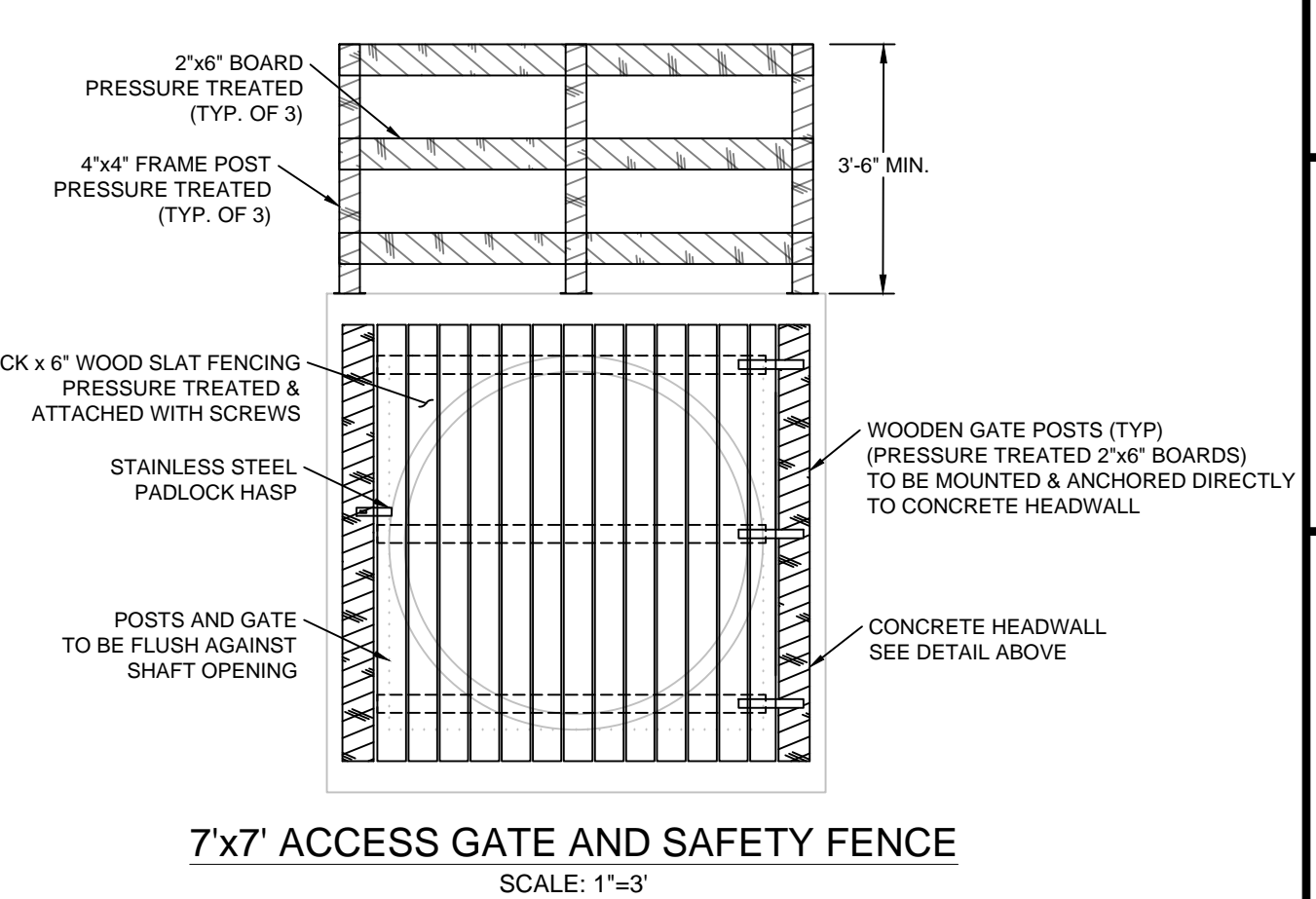
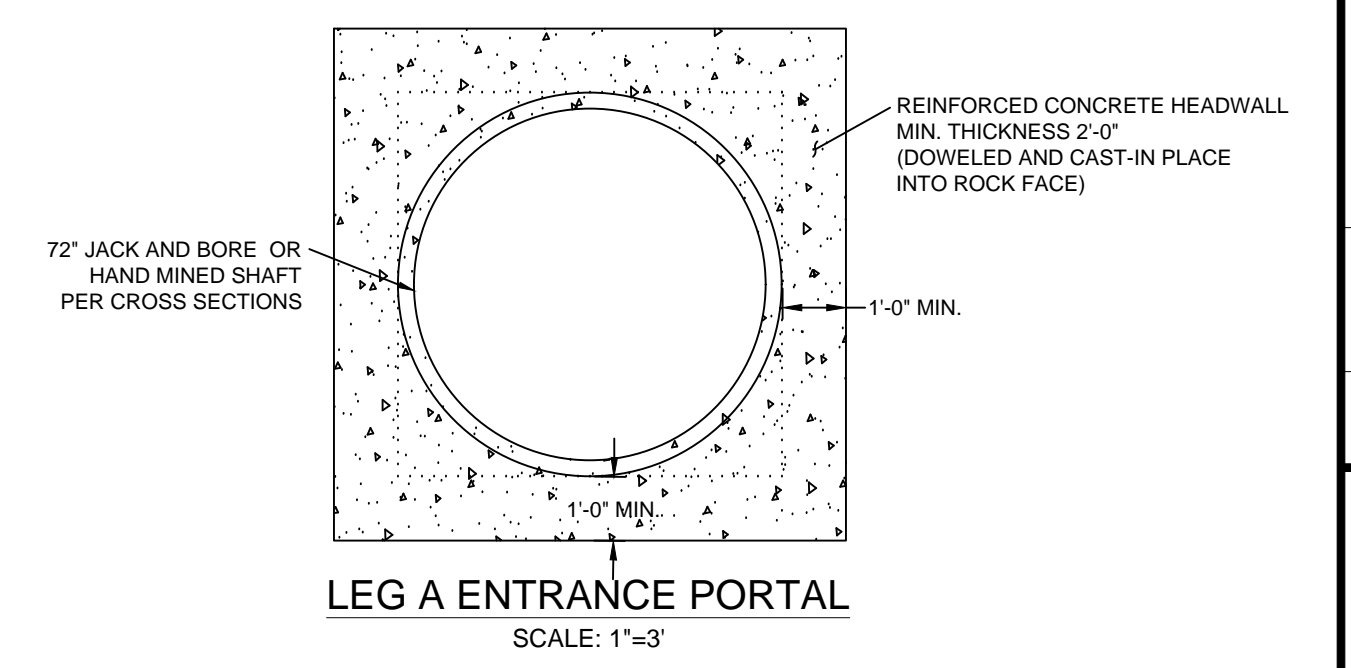
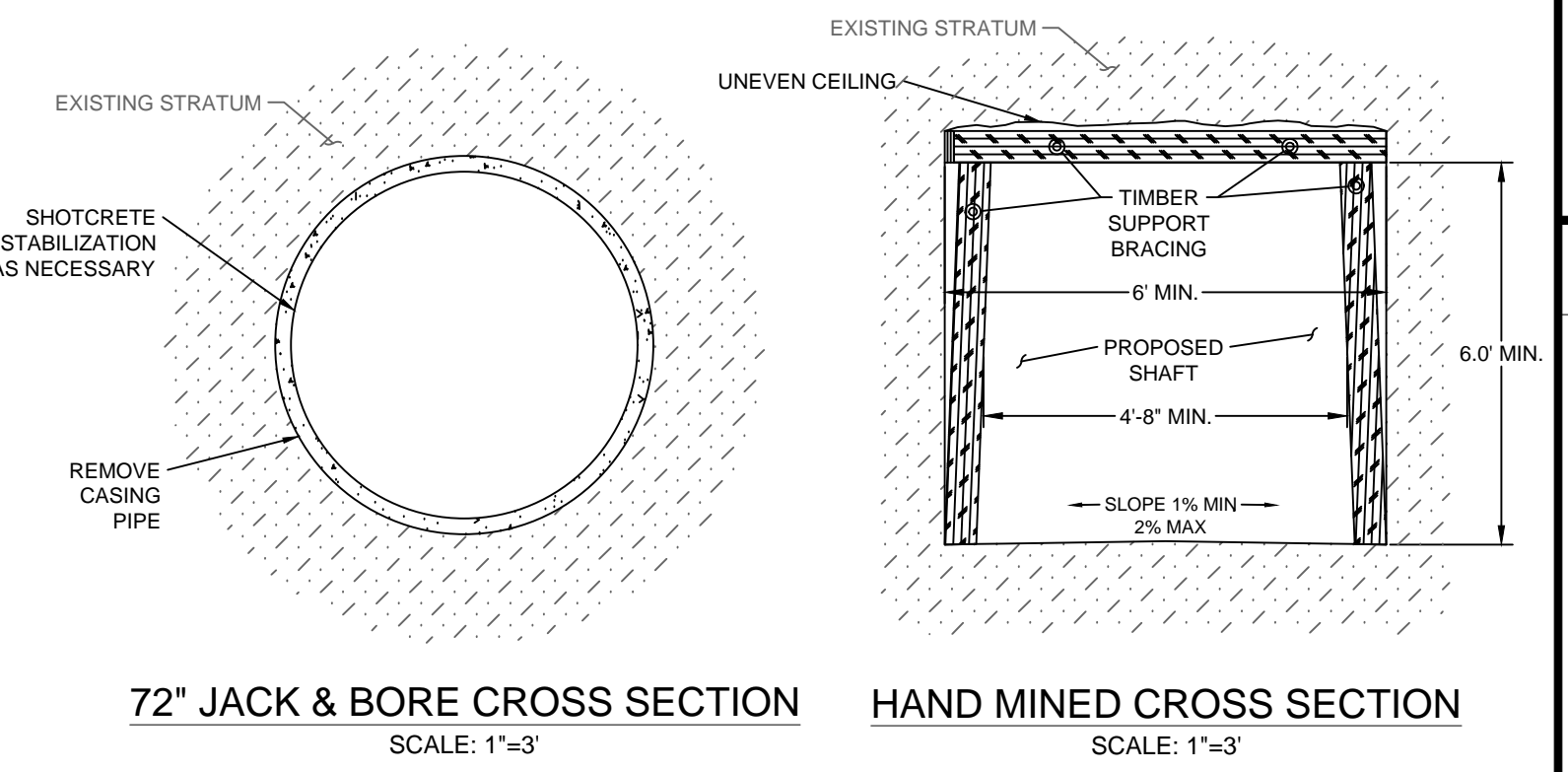
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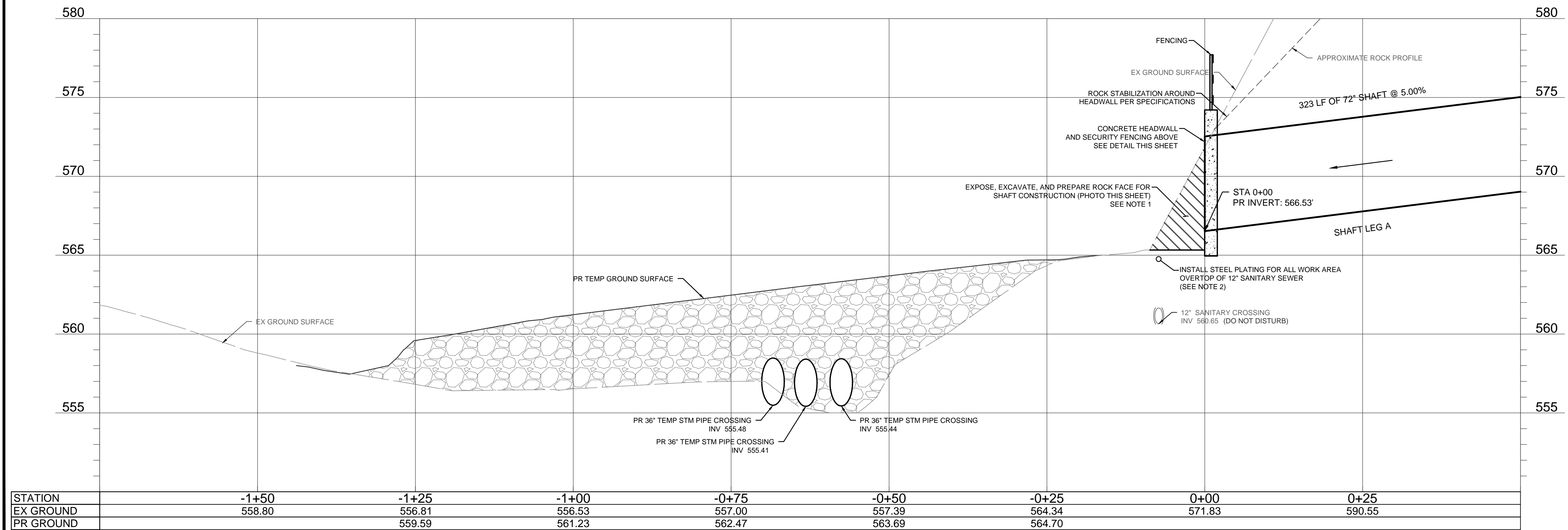
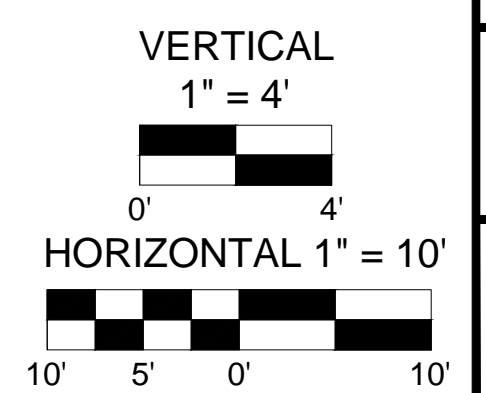


SHEET NOTES:

1. THE TOPOGRAPHY AT THE 72" ENTRY PORTAL IS AN EXISTING ROCK OUTCROP WITHIN THE HILLSIDE (SEE APPROXIMATE PHOTO LOCATION THIS SHEET). THE CONTRACTOR IS RESPONSIBLE FOR EXCAVATING AND PREPARING THE ROCK FACE FOR SHAFT CONSTRUCTION. CONTRACTOR TO PROVIDE A TUNNEL PORTAL STABILIZATION SHOP DRAWING FOR REVIEW BY THE ENGINEER BASED ON THE CONDITIONS ENCOUNTERED. SEE SPECIFICATIONS.
2. PRIOR TO SHAFT CONSTRUCTION, CONTRACTOR SHALL LOCATE AND EXPOSE THE EXISTING 12" SANITARY SEWER AT THE 72" ENTRY PORTAL TO VERIFY THE ELEVATION OF THE PIPE. THE CONTRACTOR SHALL INSTALL A STEEL PLATE AND PROTECT THE SEWER AT ALL TIMES.
3. FOR THE 72" ENTRY PORTAL AND LEG A, THE CONTRACTOR SHALL CONSTRUCT THE SHAFT PER THE 72" JACK & BORE CROSS SECTION OR THE HAND MINED CROSS SECTION. SEE DETAILS THIS SHEET.
4. IF CONSTRUCTION OCCURS VIA JACK & BORE, CONSTRUCTION OF A BACKSTOP IS ANTICIPATED. THE BACKSTOP SHALL BE CONSTRUCTED TO AVOID IMPACTS TO THE PROPOSED CULVERT PIPES. ALL INFRASTRUCTURE RELATED TO THE BACKSTOP SHALL BE REMOVED WHEN CONSTRUCTION IS COMPLETE.



SITE PHOTO - APPROXIMATE LOCATION OF LEG A ENTRANCE PORTAL



DLZ CORPORATION
6121 HUNTLEY ROAD
COLUMBUS, OH 43229
PH: 614.888.0040 FAX: 614.431.3854

OFFICE LOCATIONS
ILLINOIS INDIANA KENTUCKY MICHIGAN OHIO PENNSYLVANIA WISCONSIN

CADD FILE: PROPOSED MODEL.DWG
DRAWN BY: A/JM
CHECKED BY: NTD
DATE: 12/02/2024

SCALE: AS SHOWN

DATE: 12/02/2024

MARSHALL UNIVERSITY CF4
CABELL COUNTY, WEST VIRGINIA

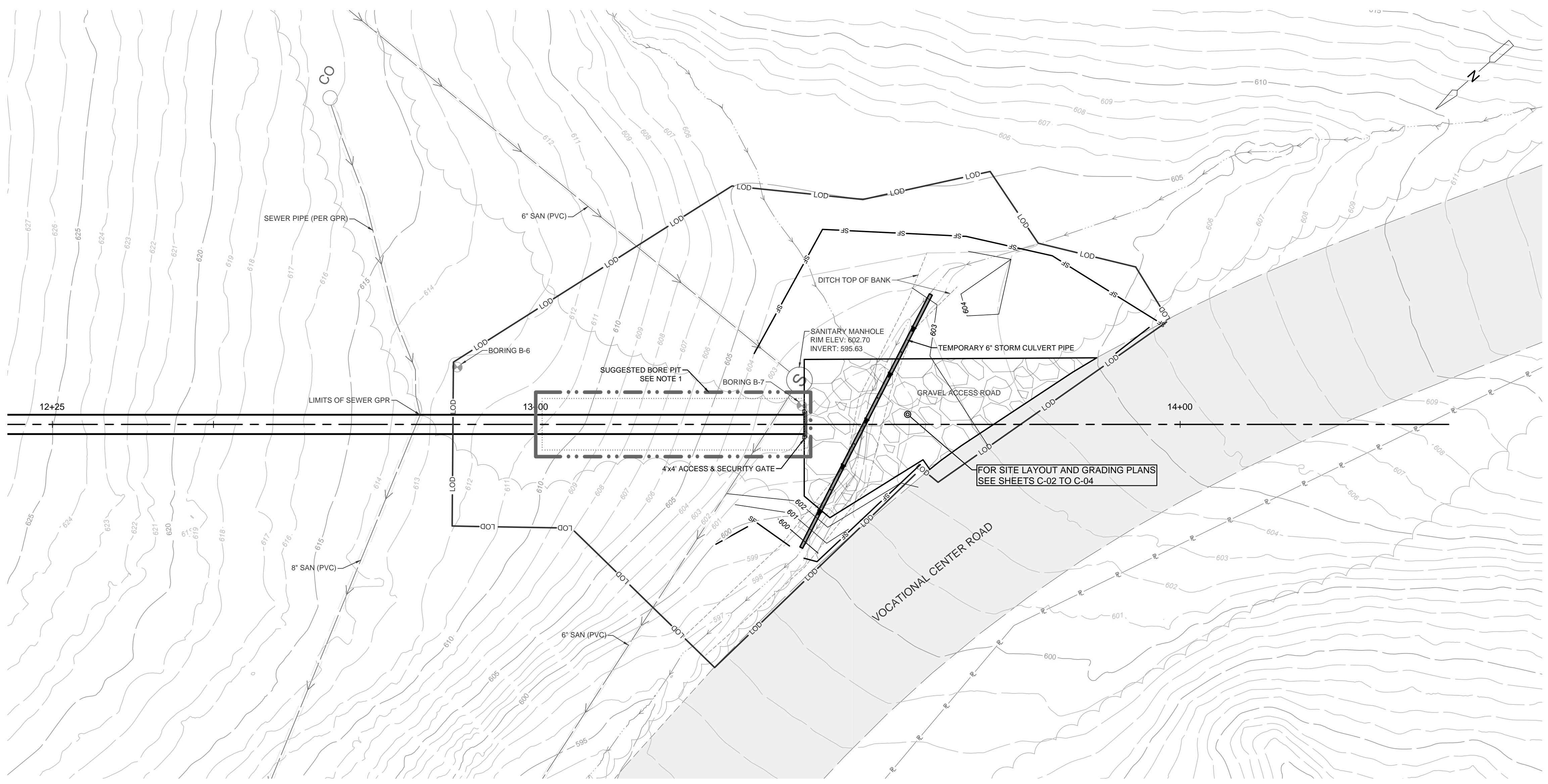
**72 INCH SHAFT ENTRY PORTAL
PLAN AND PROFILE**

PROFESSIONAL ENGINEER
WEST VIRGINIA
28475
2018

REVISIONS

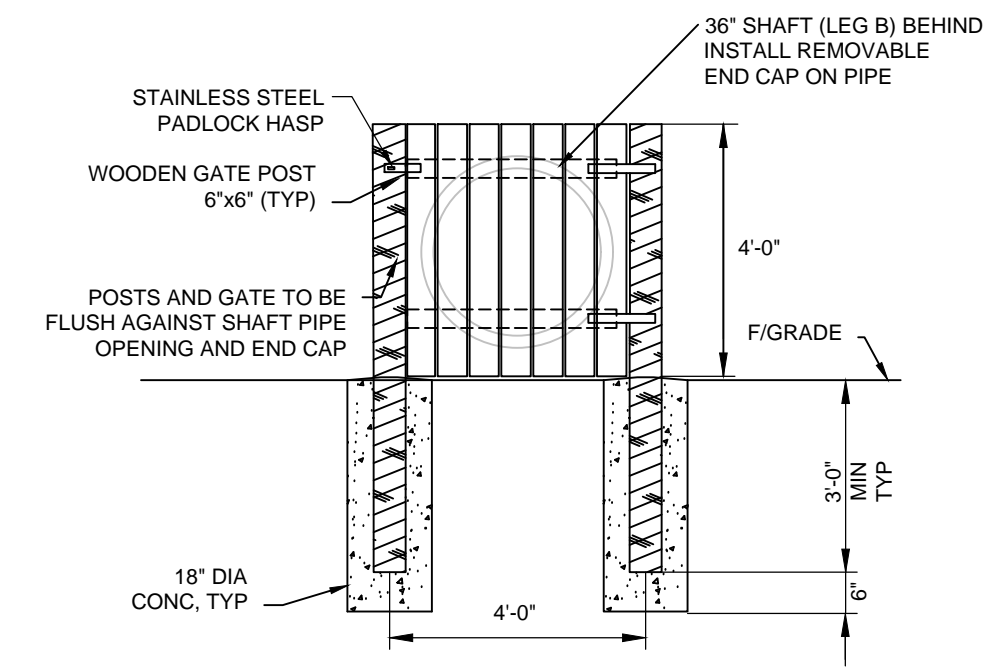
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T-02

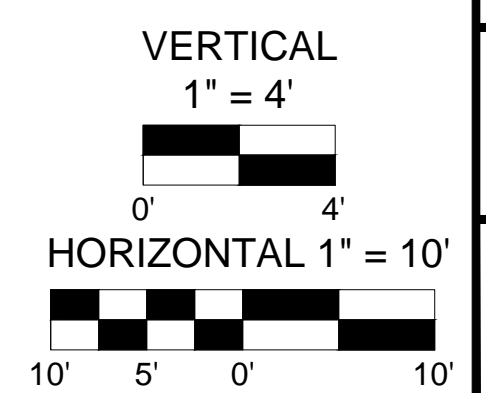
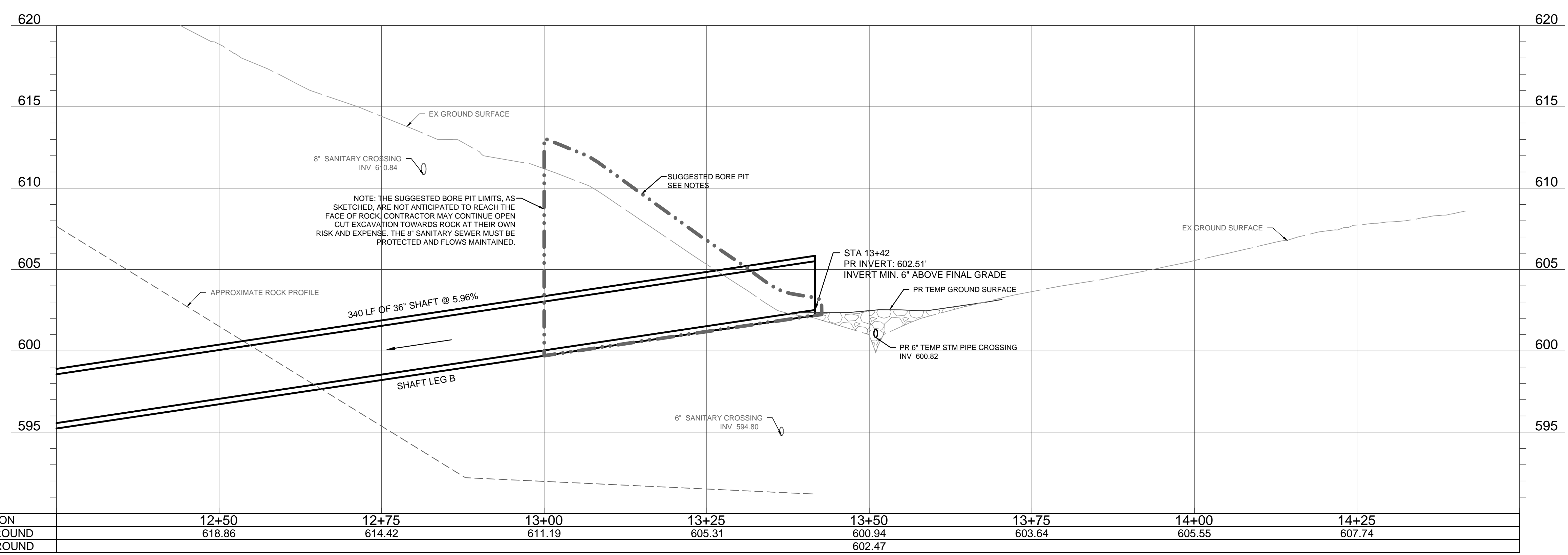


SHEET NOTES:

1. THE TOPOGRAPHY AT THE 36" ENTRY PORTAL IS A PARTIALLY CLEARED WOODY AREA WITH SOIL OVERBURDEN. THE CONTRACTOR IS RESPONSIBLE FOR PREPARING THIS SITE FOR THE 36" SHAFT CONSTRUCTION, INCLUDING BUT NOT LIMITED TO CLEARING & GRUBBING, EXCAVATION, AND GRADING. THE SITE SHALL BE RESTORED TO LIKE OR BETTER CONDITIONS FOLLOWING INSTALLATION OF THE SUGGESTED BORE PIT AND SHAFT CONSTRUCTION.
2. PRIOR TO SHAFT CONSTRUCTION, CONTRACTOR SHALL LOCATE AND EXPOSE THE EXISTING 6" AND 8" SANITARY SEWERS AT THE 36" ENTRY PORTAL TO VERIFY THE ELEVATIONS OF THE PIPES. THE CONTRACTOR SHALL PROTECT THE SEWERS AT ALL TIMES.
3. THE MAJORITY OF THE 36" LEG B SHAFT IS ANTICIPATED TO BE CONSTRUCTED USING JACK AND BORE CONSTRUCTION METHODS. PIPE WITHIN THE APPROVED BORE PIT MAY BE INSTALLED VIA CUT AND COVER FOLLOWING THE COMPLETION OF JACKING OPERATIONS.
4. PROVIDE END CAP FOR 36" PIPE BETWEEN THE ENTRY AND ACCESS/SECURITY GATE.
5. CONSTRUCTION OF A BACKSTOP IS ANTICIPATED. THE BACKSTOP SHALL BE CONSTRUCTED TO AVOID IMPACTS TO EXISTING SEWER PIPES. ALL INFRASTRUCTURE RELATED TO THE BACKSTOP SHALL BE REMOVED WHEN CONSTRUCTION IS COMPLETE.



4"x4" ACCESS GATE AND END CAP
SCALE: 1"=3'



DLZ CORPORATION
6121 HUNTLEY ROAD
COLUMBUS, OH 43229
PH: 614.888.0040 FAX: 614.431.3854
OFFICE LOCATIONS: ILLINOIS INDIANA KENTUCKY MICHIGAN OHIO PENNSYLVANIA WISCONSIN

CADD FILE:	PROPOSED MODEL.DWG	CHECKED BY:	NTD	SCALE:	AS SHOWN
DRAWN BY:	AJM	DATE:	12/02/2024	REV. #	DATE

MARSHALL UNIVERSITY CF-4
CABELL COUNTY, WEST VIRGINIA

**36 INCH SHAFT ENTRY PORTAL
PLAN AND PROFILE**

DLZ

SHEET NUMBER:
T-03

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ADDENDUM ACKNOWLEDGEMENT

FORM SOLICITATION NO.: R2501527 Addendum No. 1

Marshall University

CF4 - Subterranean Testing Facility

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specifications, etc.

Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any University personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Company

Authorized Signature

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.