STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

January 12, 2023

County: **Wake**

Subject: **Encroachment Contract**
SR 1945, SR 2053
E051-092-22-01147

Preserve at Jones Dairy, LLC
10534 Arnold Palmer Drive
Raleigh, NC 27617

Dear Sir or Madam,

Attached for your files is a copy of Right of Way Encroachment Agreement, which has been properly executed. This contract covers the following:

900 LF of pavement widening on SR 1945, and 2900 LF of pavement widening on SR 2053.

APPROVAL FOR CONSTRUCTION ONLY. ACCESS SHALL BE APPROVED UNDER ASSOCIATED DRIVEWAY PERMIT

A PERFORMANCE AND INDEMNITY BOND IN THE VALUE OF $540,000.00 IS REQUIRED AND SHALL BE POSTED WITH THE DISTRICT OFFICE PRIOR TO BEGINNING WORK. THE BOND SHALL DISPLAY THE ENCROACHMENT AGREEMENT NUMBER.

This encroachment is approved subject to the Standard and Special Provisions which are attached to and made a part of the Encroachment Contract.

Sincerely,

Jeremy Warren Digitally signed by Jeremy Warren
Date: 2023.01.17 15:08:13 -05'00'

Jeremy Warren, PE, District Engineer
for B. H. Jones, PE, Division Engineer
BHJ/jlw/mjn

cc: Mr. Jeremy Warren (w/ orig)
Town of Rolesville

Attachment

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION 5 – DISTRICT 1
1575 MAIL SERVICE CENTER
RALEIGH, NC 27699-1575

Telephone: (919) 814-6115
Fax: (919) 715-5778
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
4009 DISTRICT DRIVE
RALEIGH, NC 27607

Encroachment Special Provisions

1. NCDOT WORK ZONE TRAFFIC CONTROL QUALIFICATIONS AND TRAINING PROGRAM:

   A. Effective July 1, 2010, all flagging operations within NCDOT Right of Way require qualified and trained Work Zone Flaggers.

   B. Effective July 1, 2011, qualified and trained Work Zone Traffic Control Supervisors will be required on Significant Projects.

   C. Training for this certification is provided by NCDOT approved training sources and by private entities that have been pre-approved to train themselves. If you have questions, contact our web site at http://www.ncdot.org/doh/preconstruct/wztc/WZTCTrainingProgram/default.html, or contact Stuart Bourne, P.E. with NCDOT Work Zone Traffic Control Unit at (919) 662-4338 or sbourne@ncdot.gov.

2. Before work begins, please forward the contact information of the general contractor to the District Engineer, Jeremy Warren, P.E. at jlwarren@ncdot.gov. Include contact name, emergency phone number and email.

3. Current and future state projects take precedence over this encroachment.

4. This encroachment is bonded for the full cost estimate provided by the applicant to the District Office. Upon completion of the project, the applicant shall request an inspection by contacting our office. If it is determined that the project is able to be placed under warranty, then the bond shall be able to be reduced to $520,000.00.

5. When the project has been completed for a period of one year, upon written request by the Encroacher to the District Engineer, a final inspection and review will be conducted by NCDOT, and if all work is found to be satisfactory, NCDOT will issue an acceptance letter to the encroacher.

6. The offsite roadway improvements that shall be constructed under this permit include:
   •A Two-Way Left-Turn Lane across the frontage of SR 2053 (Jones Dairy Road) that will provide access for site drives 1, 2, and 4, as shown by the TIA.
   Prior to the plat of any more units in the Central or Southern phases of this development, the following roadway improvements much be constructed under an approved encroachment contract:
   •A left turn lane with 150’ of storage from Northbound SR 1945 (Averette Road) onto SR 2053 (Jones Dairy Road).

7. As of the time this permit is being signed, the developer has not submitted for a driveway permit. The developer has uploaded a Driveway Permit Application that has been signed by the Town of Rolesville, so the department is comfortable approving these improvements for construction, however a driveway permit will need to be submitted and approved prior to these improvements being inspected.

8. This encroachment agreement only covers work within NCDOT Right-of-Way as shown on the attached plans.

9. Any personnel or equipment working within five feet of a travel lane shall require a full lane closure. No lane of traffic shall be closed or restricted between the hours of 6:00 AM to 9:00 AM and 4:00 PM to 7:00 PM Monday thru Friday, during any time of inclement weather, or upon District Engineers' directive. Traffic shall be maintained at all times. Any violation of these hours will result in termination of the Driveway Permit and liquidated damages in the amount of $2,000.00 per hour or any portion thereof will be assessed by the District Engineers Office.

10. A $520,000.00 Performance and Indemnity Bond shall be executed and posted with the District Office at 4009 District Drive, Raleigh, North Carolina 27607, prior to beginning any work on the Right of Way. Once project work has been completed, contact the District Office by written request for an inspection to begin a one-year warranty period. The Warranty begins once all punch list items have been addressed and inspected by the District Office. After the warranty period has elapsed, and upon written request by the Encroacher to the District Office, a final inspection and review will be conducted by NCDOT, and if all work is found satisfactory, the bond will be released.

11. Under Warranty, the Performance and Indemnity Bond may be reduced to $520,000.00 if it still needs to be held.

12. Notify the District Office at 919-814-6115 a minimum of 48 hours prior to beginning work. Please provide name and contact number for the contractor in case of emergency .

13. Notify the Town of Rolesville before starting work.

14. Minimum pavement design on SR 2053 (Jones Dairy Road) shall be as follows:
    For areas 6 feet wide or greater:
    3 inches Bituminous Concrete Surface Course - Type S9.5C (Includes minimum 1.5" overlay)
    4 inches Bituminous Concrete Binder Course - Type I19.0C
    10 inches Aggregate Base Course
    or for areas 6 feet wide or less:
    3 inches Bituminous Concrete Surface Course - Type S9.5C (Includes
    4 inches Bituminous Concrete Binder Course - Type I19.0C
    5 inches Bituminous Concrete Base Course - Type B25.0B

15. A minimum 1.5 inch overlay of Type S9.5C asphalt shall also be required to the centerline of the roadway (included in the required pavement structure) and in any areas of conflict between existing pavement markings and proposed pavement markings. Mill a minimum of 1.5 inches to match the existing pavement.

16. The edges of the existing asphalt shall be saw cut to provide a straight and uniform edge before paving to it. Diagonal joints will not be permitted.

    Any existing attachments or paved shoulder that do not meet the required pavement design shall be removed before any widening begins. All edges shall be saw cut to provide a good longitudinal joint.

    The width of the existing paved shoulder shall be included in addition to the required widening.

17. Pavement pre-markings shall be approved by the District Office before thermoplastic is placed.

18. Pipes shall be installed as necessary to maintain existing drainage patterns. Pipes shall be sized properly to accommodate the drainage area at its point of discharge. Pipes shall be reinforced concrete pipe with a minimum inside diameter of 15 inches. Storm drain crosslines traversing the roadway shall be reinforced concrete pipe with a minimum inside diameter of 18 inches.

19. All (cast-in-place and/or pre-cast) splice boxes, handholes, manholes, drainage structures and other appurtenances within NCDOT Right of Way shall be of a NCDOT approved design for traffic bearing, HS-20 loading, and shall be flush mounted. Manholes, handholes and vaults shall not be placed in the ditch-line, side slopes of the ditch or in the pavement.

    All frames, grates, rings, covers, etc. are to be manufactured in accordance with the requirements of Section 106-1B - “Domestic Steel”. Foreign castings are not approved for use within NCDOT Right of Way.

20. The addition/replacement of curb and gutter next to an existing asphalt roadway shall be constructed as follows:

    1.) The edges of the existing asphalt shall be saw-cut to provide a straight and uniform edge for concrete to be placed along.

    2.) Mill minimum 1.5-in by 1.5-ft section at the edge of pavement along the proposed curb & gutter.

    3.) The contractor shall use an appropriate method to provide a straight, uniform front edge of concrete where tying to the ultimate top of pavement. This office recommends using a 2x4 laid flat and pinned along the milled surface at the edge of pavement. Concrete curb and gutter shall be constructed per NCDOT Standards and Specifications.

    4.) Once the concrete is poured and set, a minimum 1.5-inch lift of surface asphalt, type S9.5C, shall be placed in the milled section. It is the sole responsibility of the contractor to ensure that the proposed curb and gutter is placed at the correct height to provide proper drainage in addition to a smooth tie-in once asphalt is placed. Additional milling may be required to repair any damages done to the existing asphalt during construction.

    For questions feel free to contact the District Engineer's Office at (919) 814-6115.

21. Sidewalks, curb cuts, and ramps for disabled persons shall be constructed in accordance with the current NCDOT "Standard for Wheelchair Ramp Curb Cuts" and the Americans With Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities. NCDOT shall not maintain the proposed sidewalks.

22. All concrete monolithic islands and medians shall be constructed to NCDOT standards and have appropriate signage.

23. All power poles shall be relocated behind the sidewalk at such time the roadway is widen across the property frontage.

24. All Traffic signs moved shall be reinstalled as soon as possible to meet NCDOT specifications.

25. All signage shall be installed as per the NCDOT standard details. Any future roadway projects that require the sign to be relocated shall be done at no cost to NCDOT.

26. Sight distance shall be free and clear of any debris, foliage and/or earth material for a minimum distance of 450 feet on SR 2053 (Jones Dairy Rd). Vegetation removal and/or grading may be necessary to achieve the required sight distance. If the sight distance requirement is not achieved NCDOT reserves the right to deny/close/restrict this/these access(es).

27. All bare and disturbed areas must have a sufficient stand of vegetation. Address any erosion issues that may arise during time of construction. Monitor these areas as needed to assure this requirement is satisfied.

28. The roadway shall be kept free of silt, mud and debris at all times.

29. All costs associated with the multi-use trail shall be the responsibility of the municipality. NCDOT will not maintain the multi-use trail or the area around the multi-use trail. NCDOT may remove the greenway trail and roadway crosswalk if not properly maintained. NCDOT reserves the right to remove any greenway trail and roadway crosswalk found to be a hazard to the traveling public.

30. The encroaching party accepts all liability for the proposed ADA ramps. All costs associated with the proposed ADA ramps shall be the responsibility of the encroacher. NCDOT will not maintain the proposed ADA ramps, or the surrounding area. NCDOT may remove any part of the proposed ADA ramps that is not properly maintained and/or noncompliant with NCDOT regulations. NCDOT reserves the right to remove any of the proposed ADA ramps found to be a hazard to the traveling public.

31. The municipality accepts all liability for the proposed sidewalk. All costs associated with the proposed sidewalk shall be the responsibility of the encroacher. NCDOT will not maintain the sidewalk or the area around them. NCDOT may remove any part of the sidewalk not properly maintained and/or noncompliant with NCDOT regulations. NCDOT reserves the right to remove any part of the sidewalk found to be a hazard to the traveling public. The sidewalk construction must adhere to NCDOT construction standards and specifications.

32. Any/All proposed plantings within the right-of-way shall be reviewed and approved by the Division Roadside Environmental Engineer, Corey Sudderth, at 919-816-9290. District Office does not review/approve landscaping plans or issue permits allwoing landscaping within NCDOT Right of Way.

Encroachment Standard Provisions

1. An executed copy of this encroachment agreement will be present at the construction site at all times during construction. NCDOT reserves the right to stop all work unless evidence of approval can be shown.

2. NCDOT reserves the right to revise, restrict, suspend and/or void this encroachment agreement if the execution and/or operation of said permit is found to be a hazard to the traveling public.

3. This encroachment agreement only covers work within NCDOT Right-of-Way. The encroacher is responsible for verifying all right of way. NCDOT does not guarantee the right of way on this road. If the right of way was not obtained by the fee simple method, it is the responsibility of the encroacher to obtain permission from the underlying property owner/owners.

   Encroacher shall be responsible for obtaining all necessary permanent and/or temporary construction, drainage, utility and/or sight distance easements. All Right of Way and easements necessary for construction and maintenance shall be dedicated to NCDOT with proof of dedication furnished to the District Engineer prior to beginning work.

4. The encroacher is responsible for any claim for damages brought by any property owner by reason of the installation.

5. Notify the District Engineer's Office at (919) 814-6115 or at 4009 District Drive, Raleigh, NC 27607, prior to beginning and after completion of work.

6. The Encroacher shall notify the public, including all adjacent property owners and businesses, a minimum of 2 weeks prior to beginning work.

7. Any and all changes noted in red on the plans shall be incorporated into and made part of the approved permit.

8. The encroaching party shall comply with all applicable local, state and federal environmental regulations, and shall obtain all necessary state and federal environmental permits, including but not limited to, those related to sediment control, storm water, wetland, streams, endangered species, and historical sites.

9. All materials and construction shall be in accordance with NCDOT standards and specifications, including but not limited to, the NCDOT Standard Specifications for Roads and Structures 2012, the NCDOT Roadway Standards Drawings, and NCDOT Policies and Procedures for Accommodating Utilities on Highway Rights of Way.

10. The encroacher shall provide traffic control devices, lane closures, road closures, positive protection and/or any other warning or positive protection devices necessary for the safety of road users during construction and any subsequent maintenance. This shall be performed in conformance with the latest NCDOT Roadway Standard Drawings and Standard Specifications for Roads and Structures and Amendments or Supplements thereto. When there is no guidance provided in the Roadway Standard Drawings or Specifications, comply with the Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. No work shall be performed in the Right of Way unless this requirement is satisfied. NCDOT reserves the right to require a written traffic control plan for encroachment operations.

    Sidewalk closures shall be installed as necessary. Pedestrian traffic shall be detoured around these closures and shall be signed appropriately and in accordance with The American with Disabilities Act Accessibility Guidelines.

11. No parking or material storage shall be allowed along the shoulders of any NCDOT roadways.

12. Two-way traffic shall be maintained at all times.

13. No lane closures shall be permitted between the hours of 6:00 AM to 9:00 AM and 4:00 PM to 7:00 PM, Monday through Friday unless otherwise specified in the Special Provisions of this encroachment agreement.

14. At the end of each working day, equipment shall be parked outside of the clear recovery zone in order to avoid any obstruction to the travelling public. This clear recovery zone is measure from the edge of the nearest travel lane.

15. Work shall not be performed on both sides of the road simultaneously within the same area.

16. Ingress and egress shall be maintained to all businesses and dwellings at all times.

17. The paving of this roadway shall be in accordance with the revised NCDOT 2012 Standard Specifications, Sections 610, 1012 and 1020. The Contractor shall follow all procedures of the attached Quality Management System (QMS) for asphalt pavement - Maintenance Version. The Contractor must adhere to all testing requirements and quality control requirements specified. The Contractor shall contact the NCDOT Division 5 QA Supervisor at (919) 562-0018 prior to producing plant mix and make the Supervisor aware that the mix is being produced for a future NCDOT road. Only NCDOT approved mix designs will be acceptable. A quality control plan shall be submitted to the District Engineer's Office prior to asphalt production. Use form QMS-MV1 for the Quality Control Plan submittal. Failing mixes and/or densities are subject to penalties including monetary payments or removal and replacement.

18. Roadway certification reports sealed by a Professional Engineer shall be submitted to the North Carolina Department of Transportation at 4009 District Drive, Raleigh, North Carolina, indicating the following:
    * Pavement thickness by type
    * Pavement density, core and/or test locations
    * Base thickness
    * Base density
    * Subgrade density

    Test frequency and method shall be in conformance with the NCDOT "Materials and Tests" Manual. Test must be performed by a Certified Technician including name and Certification number on report.

19. Any existing driveways, pavement, sidewalk, curb and gutter or drainage structures that are damaged during construction shall be repaired to their original condition.

20. When surface area in excess of one acre will be disturbed, the Encroacher shall submit a Sediment and Erosion Control Plan which has been approved by the appropriate regulatory agency or authority prior to beginning any work on the Right of Way. Failure to provide this information shall be grounds for suspension of operations.

21. All erosion control devices and measures shall be constructed, installed, maintained, and removed by the Encroacher in accordance with all applicable Federal, State, and Local laws, regulations, ordinances, and policies. All earth areas shall be regraded and seeded in accordance with NCDOT Standards Specifications for Roads and Structures 2012.

22. The applicant is responsible for identifying project impacts to waters of the United States (wetlands, intermittent streams, perennial streams and ponds) located within the NCDOT right-of-way. The discharge of dredged or fill material into waters of the United States requires authorization from the United States Army Corps of Engineers (USACE) and certification from the North Carolina Division of Water Quality (NCDWQ). The applicant is required to obtain pertinent permits or certification from these regulatory agencies if construction of the project impacts waters of the United States within the NCDOT right-of-way. Additional information can be obtained by contacting the USACE or NCDWQ.

23. The applicant is responsible for avoiding impacts to federally protected species during project construction. Bald eagle, Michaux's sumac, smooth coneflower, dwarf wedgemussel, harperella, red-cockaded woodpecker and tar spinymussel are federally protected species that have been identified within NCDOT right-of-way in Durham, Person, Granville, Wake, Franklin, Vance, and Warren counties. Additional information can be obtained by contacting the North Carolina Natural Heritage Program or the United States Fish and Wildlife Services.

24. The applicant is responsible for complying with the Neuse and Tar-Pamlico Riparian Buffer Rule as regulated by the NCDWQ. The Rule regulates activity within a 50-foot buffer along perennial streams, intermittent streams and ponds. Additional information can be obtained by contacting the NCDWQ.

25. Existing drainage patterns shall be maintained at all times throughout the proposed construction. The encroacher shall keep the roadway clean of dirt and debris at all times throughout the duration of the project.

26. All proposed landscaping and plantings located within the NCDOT right of way shall be approved by the Division Roadside Environmental Unit. Contact Corey Sudderth at (919) 816-9290.

    In the event these plants require relocation or removal for highway construction, reconstruction, or maintenance of safety, such removal or relocation will be done immediately by the permittee upon notification by the NCDOT entirely at the expense of the permittee.

27. The Division Traffic Engineer, shall be notified at (919) 220-4600 prior to any excavation within 500 feet of a signalized intersection or if there are existing NCDOT signs in or near the proposed work zone. All traffic signal or detection cables must be located prior to excavation. All signal work and traffic signs shall be coordinated with the Division Traffic Engineer. Costs to relocate, replace, or repair NCDOT signs, signals, or associated equipment shall be the responsibility of the Encroacher.

28. All temporary and final pavement markings, reflective pavement markings, raised pavement markers, non-cast iron snowplowable pavement markers and signage are the responsibility of the Encroacher. All final pavement markings shall be thermoplastic. Any pavement markings/markers that are damaged or obliterated shall be restored at no expense to NCDOT.

29. All Traffic signs moved shall be reinstalled as soon as possible to meet NCDOT specifications.

30. Strict compliance with the Policies and Procedures for Accommodating Utilities on Highway Right of Way manual shall be required.

31. It shall be the responsibility of the Encroacher to determine the location of other utilities within the encroachment area. The Encroacher shall be responsible for notifying other utility owners and providing protection and safeguards to prevent damage or interruption to existing facilities and to maintain accessibility to existing utilities.

32. All earth areas disturbed shall be regraded and reseeded in accordance with Division of Highways Standards and Specifications.

33. The Encroacher shall remove all trees, stumps and vegetative material from the right of way and dispose of in a licensed landfill or disposal site.

34. Excavated material shall not be placed on the roadway at any time.

35. Trenching, bore pits and/or other excavations shall not be left open or unsafe overnight. The Contractor shall comply with all OSHA requirements and provide a competent person on site to supervise excavation at all times.

36. All excavations inside the theoretical 1:1 slope from the existing edge of pavement to the bottom of the nearest excavation wall should be made in accordance with the following conditions. Traffic should be moved to a travel lane outside the limits of a theoretical one-to-one slope from the bottom of the nearest trench wall to the pavement surface. Active excavation shoring, such as sheet piling, shall be installed. The design of the shoring shall include the effects of traffic loads. The shoring system shall be designed and sealed by an engineer registered in North Carolina. Trench boxes shall not be accepted as shoring. The trench backfill material should meet the Statewide Borrow Criteria.

37. Excavated areas adjacent to pavement having more than a 2 inch drop shall be made safe with a 6:1 or flatter slope and shall be designated by appropriate delineation during periods of construction inactivity, including, but not limited to, night and weekend hours.

38. Backfill material is to be placed at a maximum of 6 inch loose layers and each layer thoroughly compacted. All embankment backfill shall be compacted to 95% density and all subgrade to 100% density in accordance with AASHTO T-99 as modified by NCDOT. They shall be signed by a Professional Engineer and sent to the District Engineers Office at 4009 District Drive, Raleigh, NC 27607.

39. No commercial advertising shall be allowed within NCDOT Right of Way.

40. Guardrail shall be installed where warranted and in accordance with the guidelines shown in the 2012 Highway Design Branch Roadway Standard Drawings.

    Guardrail removed or damaged during construction shall be replaced or repaired to their original condition.

41. Poles shall be located/relocated at or as near as possible to the right-of-way line, shall be set outside the Clear Recovery Area as outlined by AASHTO and outside sight distance triangles.

    Poles located within guardrail sections shall be installed a minimum of 5 feet behind any guardrail. When applicable, poles shall be placed behind sidewalk.

    Any associated guy wires to ground anchors and stub poles shall not be placed between a pole and the travel way and should be located outside the clear recovery area.

    Minimum vertical clearance shall be 18' for aerial crossings over NCDOT roadways and 15'-6" for installations parallel to the roadway.

42. Fire Hydrants shall be of the break-away type. Hydrants shall be placed a maximum of one foot inside the right of way in ditch sections or a minimum of 6 feet behind the curb in curb and gutter sections.

43. Retaining walls or other vertical structures shall not be permitted inside NCDOT right of way.

STATE OF NORTH CAROLINA

ROUTE SR 1945 (Averette Road)/SR 2053 (Jones Dairy Road) PROJECT Preserve at Jones Dairy COUNTY OF Wake

DEPARTMENT OF TRANSPORTATION

-AND-

Preserve at Jones Dairy, LLC

10534 Arnold Palmer Drive, Raleigh, NC 27617

RIGHT OF WAY ENCROACHMENT AGREEMENT FOR CURB AND GUTTER, PAVEMENT WIDENING AND STORM DRAINAGE

THIS AGREEMENT, made and entered into this the 12 day of January , 20 23 , by and between the Department of Transportation, party of the first part; and Preserve at Jones Dairy, LLC party of the second part,

W I T N E S S E T H

THAT WHEREAS, the party of the second part desires to encroach on the right of way of the public road designated as Route(s) SR 1945 (Averette Road) and SR 2053 (Jones Dairy Road) , located On Averette Road (SR 1945) north of the intersection of Jones Dairy Road (SR 2053) and Averette Road (SR 1945) and on Jones Dairy Road (SR 2053) west of the intersection of Jones Dairy Road (SR 2053) and Averette Road (SR 1945) with the construction and/or erection of: Approximately 900 LF of road widening on SR 1945 (Averette Road) and approximately 2,900 LF of road widening on SR 2053 (Jones Dairy Road)

WHEREAS, it is to the material advantage of the party of the second part to effect this encroachment, and the party of the first part in the exercise of authority conferred upon it by statute, is willing to permit the encroachment within the limits of the right of way as indicated, subject to the conditions of this agreement;

NOW, THEREFORE, IT IS AGREED that the party of the first part hereby grants to the party of the second part the right and privilege to make this encroachment as shown on attached plan sheet(s), specifications and special provisions which are made a part hereof upon the following conditions, to wit:

That the said party of the second part binds and obligates himself to install the encroaching facility in such safe and proper condition that it will not interfere with or endanger travel upon said highway.

That the party of the second part agrees to provide during construction proper signs, signal lights, flagmen and other warning devices for the protection of traffic in conformance with the latest Manual on Uniform Traffic Control Devices for Streets and Highways and Amendments or Supplements thereto. Information as to the above rules and regulations may be obtained from the Division Engineer of the party of the first part.

That the party of the second part hereby agrees to indemnify and save harmless the party of the first part from all damages and claims for damage that may arise by reason of the installation and maintenance of this encroachment.

It is clearly understood by the party of the second part that the party of the first part will assume no responsibility for any damage that may be caused to such facilities, within the highway rights of way limits, in carrying out its construction.

That the party of the second part agrees to restore all areas disturbed during construction to the satisfaction of the Division Engineer of the party of the first part. The party of the second part agrees to exercise every reasonable precaution during construction and maintenance to prevent eroding of soil; silting or pollution of rivers, streams, lakes, reservoirs, other water impoundments, ground surfaces or other property; or pollution of the air. There shall be compliance with applicable rules and regulations of the North Carolina Division of Environmental Management, North Carolina Sedimentation Control Commission, and with ordinances and regulations of various counties, municipalities and other official agencies relating to pollution prevention and control. When any construction operation disturbs the ground surface and existing ground cover, the party of the second part agrees to remove and replace the sod or otherwise reestablish the grass cover to meet the satisfaction of the Division Engineer of the party of the first part.

That the party of the second part agrees to assume the actual cost of any inspection of the work considered to be necessary by the Division Engineer of the party of the first part.

That the party of the second part agrees to have available at the encroaching site, at all times during construction, a copy of this agreement showing evidence of approval by the party of the first part. The party of the first part reserves the right to stop all work unless evidence of approval can be shown.

Provided the work contained in this agreement is being performed on a completed highway open to traffic; the party of the second part agrees to give written notice to the Division Engineer of the party of the first part when all work contained herein has been completed. Unless specifically requested by the party of the first part, written notice of completion of work on highway projects under construction will not be required.

That in the case of noncompliance with the terms of this agreement by the party of the second part, the party of the first part reserves the right to stop all work until the facility has been brought into compliance or removed from the right of way at no cost to the party of the first part.

That it is agreed by both parties that this agreement shall become void if actual construction of the work contemplated herein is not begun within one (1) year from the date of authorization by the party of the first part unless written waiver is secured by the party of the second part from the party of the first part.

R/W (161B) : Party of the Second Part certifies that this agreement is true and accurate copy of the form

R/W (161B) incorporating all revisions to date.

IN WITNESS WHEREOF, each of the parties to this agreement has caused the same to be executed the day and year first above written.

DEPARTMENT OF TRANSPORTATION

BY: Jeremy Warren Digitally signed by Jeremy Warren Date: 2023.01.17 15:07:53 -05'00'

FOR DIVISION ENGINEER

ATTEST OR WITNESS:

STEVE MACKO

David Peoples

Second Party

INSTRUCTIONS

When the applicant is a corporation or a municipality, this agreement must have the corporate seal and be attested by the corporation secretary or by the empowered city official, unless a waiver of corporate seal and attestation by the secretary or by the empowered City official is on file in the Raleigh office of the State Utilities Manager. In the space provided in this agreement for execution, the name of the corporation or municipality shall be typed above the name, and title of all persons signing the agreement should be typed directly below their signature.

When the applicant is not a corporation, then his signature must be witnessed by one person. The address should be included in this agreement and the names of all persons signing the agreement should be typed directly below their signature.

This agreement must be accompanied, in the form of an attachment, by plans or drawings showing the following applicable information:

1. All roadways and ramps.
2. Right of way lines and where applicable, the control of access lines.
3. Location of the proposed encroachment.
4. Length and type of encroachment.
5. Location by highway survey station number. If station number cannot be obtained, location should be shown by distance from some identifiable point, such as a bridge, road, intersection, etc. (To assist in preparation of the encroachment plan, the Department's roadway plans may be seen at the various Highway Division Offices, or at the Raleigh office.)
6. Drainage structures or bridges if affected by encroachment.
7. Typical section indicating the pavement design and width, and the slopes, widths and details for either a curb and gutter or a shoulder and ditch section, whichever is applicable.
8. Horizontal alignment indicating general curve data, where applicable.
9. Vertical alignment indicated by percent grade, P.I. station and vertical curve length, where applicable.
10. Amount of material to be removed and/or placed on NCDOT right of way, if applicable.
11. Cross-sections of all grading operations, indicating slope ratio and reference by station where applicable.
12. All pertinent drainage structures proposed. Include all hydraulic data, pipe sizes, structure details and other related information.
13. Erosion and sediment control.
14. Any special provisions or specifications as to the performance of the work or the method of construction that may be required by the Department must be shown on a separate sheet attached to encroachment agreement provided that such information cannot be shown on plans or drawings.
15. The Department's Division Engineer should be given notice by the applicant prior to actual starting of installation included in this agreement.
16. Method of handling traffic during construction where applicable.
17. Scale of plans, north arrow, etc.

The Nau Company
Consulting Civil Engineers

PO Box 810
Rolesville, NC 27571
919-435-6395

SUMMARY OF PROBABLE CONSTRUCTION COSTS

Preserve at Jones Dairy - Road Widening (Jones Dairy Road and Averette Road)
Roelsville, NC
18-Oct-22

	Quantity	Unit Cost	Total Cost
Grading			
Fine Grading - Subgrade	26,211 SY	$ 2.00	$ 52,422.00
Backfill Curb	4,495 LF	$ 1.20	$ 5,394.00
Backfill Sidewalk	4,410 LF	$ 1.10	$ 4,851.00
	Subtotal		**$ 62,667.00**
Storm Drainage			
15" RCP - Variable Depth	1,025 LF	$ 24.27	$ 24,876.75
18" RCP - Variable Depth	1,375 LF	$ 27.16	$ 37,345.00
24" RCP - Variable Depth	230 LF	$ 36.00	$ 8,280.00
Curb Inlets - Variable Depth	21 EACH	$ 3,165.00	$ 66,465.00
Inlet Protection	21 EACH	$ 165.00	$ 3,465.00
Inlet Silt Sacks	22 EACH	$ 185.00	$ 4,070.00
Flush Storm Drainage	2,748 LF	$ 3.90	$ 10,717.20
Video Storm Drainage	2748 LF	$ 2.80	$ 7,694.40
	Subtotal		**$ 162,913.35**
Water			
Fire Hydrant Assembly (relocate)	2 EACH	$ 1,750.00	$ 3,500.00
	Subtotal		**$ 3,500.00**
Road Improvements			
30" Standard Curb & Gutter	4495 LF	$ 14.35	$ 64,503.25
ABC (10")	26211 SY	$ 14.00	$ 366,954.00
ABC Under Curb (5.5")	1249 SY	$ 10.50	$ 13,114.50
Asphalt S9.5C (1.5") - 1st Lift	26211 SY	$ 12.65	$ 331,569.15
Asphalt S9.5C (1.5") - 2nd Lift	35505 SY	$ 11.65	$ 413,633.25
Asphalt I19.0C (4")	26211 SY	$ 23.10	$ 605,474.10
Mill Lap Joint (1.5" x 1.5')	4 LS	$ 11,360.00	$ 45,440.00
5' Sidewalk (4" Thick)	22475 SF	$ 3.80	$ 85,405.00
ADA Ramps	12 EACH	$ 1,670.00	$ 20,040.00
Traffic Control	1 LS	$ 20,000.00	$ 20,000.00
Pavement Markings - Thermoplastic	1 LS	$ 9,500.00	$ 9,500.00
Clear and Grub	5.4 ACRE	$ 5,000.00	$ 27,000.00
Hand Locate Existing Utilities	1 LS	$ 5,000.00	$ 5,000.00
Seeding	1 LS	$ 2,000.00	$ 2,000.00
	Subtotal		**$ 2,009,633.25**
	Total Construction Cost:		**$ 2,238,713.60**
	Contingency (15%):		**$ 335,807.04**
	Total Construction Cost with Contingency:		**$ 2,574,520.64**

Notes:
1. Quantities are based on preliminary plans dated 10/11/2022. Quantities are subject to change as construction drawings are developed.
2. Unit costs taken from current construction costs for similar projects.
3. Estimate does not include offsite roadway improvements (other than Jones Dairy Road and Averette Road).
4. Estimate does not include site lighting.
5. Estimate does not account for any mass or trench rock removal.
6. Estimate does not include relocation of existing utilities.
7. Estimate does not include demolition
8. Esimate does not include any stream/wetland mitigation fees.
9. Estimate does not include site landscaping.
10. All other items not specifically specified in this estimate have been excluded.

Storm Drainage Calculations

PRESERVE AT JONES DAIRY - JONES DAIRY ROAD
Rolesville, North Carolina

NOVEMBER 30, 2022

Prepared By:
The Nau Company, PLLC
PO Box 810
Rolesville, North Carolina, 27571
(919) 625-3090
tnau@thenauco.com
NCBELS License # P-0751

Storm Drainage Calculations
November 30, 2022
Preserve at Jones Dairy – Jones Dairy Road

INTRODUCTION

This report presents the storm drainage design for the proposed improvements of Jones Dairy Road at the Preserve at Jones Dairy project located northwest of the intersection of Jones Dairy Road and Averette Road in Rolesville, North Carolina.

BACKGROUND

The Preserve at Jones Dairy – Jones Dairy Road widening project is comprised of approximately 3,000 LF of an existing two-lane ditch section road (~22 feet wide) within a variable width public right-of-way. At full build-out, Jones Dairy Road will be widened to 65 feet wide with curb-and-gutter within a 90 feet wide public right-of-way. Water and sewer construction will only consist of adjusting and/or relocating existing services as necessary to widen the road. All roads will be Town maintained roads. The proposed widening will utilize storm sewer piping to convey runoff beneath the proposed curb lines to connect to existing stormwater conveyance systems.

METHODOLOGY

General

All calculations were performed in accordance with NCDOT requirements including those in the Guidelines for Drainage Studies (1999 Edition).

Runoff

Peak flow runoff rates were calculated using the Rational Formula. Rational runoff coefficients were determined for each inlet based on generalized land use conditions encountered for this project. A minimum time of concentration equal to 5 minutes was used for each inlet due to the relatively small drainage area for each inlet. Rainfall intensities were based on the time of concentration to the inlet.

Storm Drainage Piping

Storm sewer pipes were designed for the 10-year storm using Hydrology Studio/Stormwater Studio. The primary computational methodologies by the software are methods described in FHWA HEC-22. Runoff to each inlet was determined by the rational method. The minimum pipe size for this project is 15 inches.

Inlets and Gutter Spread

Gutter spread for this project was calculated by Hydrology Studio/Stormwater Studio which follows the methodology of FHWA HEC-22. The 4 inch per hour storm was used to calculate the runoff to each inlet. Inlet data used in the software was based on NCDOT frames/grates/hoods shown in NCDOT detail 840.03. The desirable gutter spread was limited to one half of a travel lane.

Pipe Hydraulic Grade Line

The hydraulic grade line (HGL) for this project was calculated by Hydrology Studio/Stormwater Studio which uses the energy-based Standard Step method. The storm systems were designed to maintain the HGL within the pipe for the 10-year storm.

Ditch Calculations

The roadside ditch calculations for this project were calculated by Hydrology Studio/Studio Express which follows the methodology of FHWA HEC-22. Runoff to each ditch was determined by the rational method. All roadside ditches were designed to maintain the HGL within the ditch for the 10-year storm.

APPENDICES

Appendix A – Drainage Area Map

Appendix B – Storm Sewer and Runoff Calculations

Appendix C – Storm Sewer HGL Calculations

Appendix D – Storm Sewer Gutter Spread Calculations

Appendix E – Ditch Calculations

APPENDIX A – DRAINAGE AREA MAPS

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT: PRESERVE AT JONES DAIRY

REVISIONS

PRESERVE AT JONES DAIRY
JONES DAIRY ROAD

ROLESVILLE, NC

STORM SEWER DA MAP - NORTH

NORTH CAROLINA PROFESSIONAL SEAL 26411 ENGINEER JEREMY J. BECKETT

11/30/2022

PROJECT NO:	---
DESIGN BY:	JJB
DRAWN BY:	JJB
SCALE:	1"=60'
DATE:	2022-11-30
SHEET NO:	SD1.1

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY

REVISIONS

PRESERVE AT JONES DAIRY
JONES DAIRY ROAD

ROLESVILLE, NC

STORM SEWER DA MAP - SOUTH

SEAL 26411
11/30/2022

PROJECT NO:	---
DESIGN BY:	JJB
DRAWN BY:	JJB
SCALE:	1"=60'
DATE:	2022-11-30
SHEET NO:	SD1.2

APPENDIX B – STORM SEWER AND RUNOFF CALCULATIONS

Storm Sewer Tabulation

Project Name: Enter Project Name...

Stormwater Studio 2022 v 3.0.0.29

12-05-2022

Line ID	Length	Drng Area		Rational	C x A		Tc		Intensity	Total Q	Capacity	Velocity	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
Line 1	53.80	0.060	1.290	0.85	0.05	1.10	5.0	7.79	6.89	7.57	9.60	4.54	18	0.84	399.25	398.80	400.50	400.30	404.00	398.80	1
102 TO 101	174.83	0.040	1.230	0.85	0.03	1.05	5.0	7.48	6.97	7.30	18.37	7.46	18	3.06	404.60	399.25	405.63	399.94	408.00	404.00	2
103 TO 102	90.02	0.070	1.190	0.89	0.06	1.01	5.0	7.30	7.02	7.12	14.64	6.58	18	1.94	406.35	404.60	407.37	405.39	409.70	408.00	3
104 TO 103	202.14	0.220	1.120	0.85	0.19	0.95	5.0	6.88	7.14	6.80	14.86	6.68	18	2.00	410.40	406.35	411.40	407.08	413.80	409.70	4
105 TO 104	259.66	0.200	0.900	0.85	0.17	0.77	5.0	6.37	7.30	5.58	17.30	6.74	18	2.72	417.45	410.40	418.35	411.00	420.80	413.80	5
106 TO 105	203.79	0.200	0.700	0.85	0.17	0.60	5.0	5.89	7.45	4.43	14.05	3.83	18	1.79	421.10	417.45	421.90	418.59	425.25	420.80	6
107 TO 106	197.35	0.250	0.500	0.85	0.21	0.43	5.0	5.27	7.66	3.26	10.62	3.31	18	1.02	423.12	421.10	423.81	422.13	426.85	425.25	7
108 TO 107	64.00	0.250	0.250	0.85	0.21	0.21	5.0	5.00	7.75	1.65	5.71	2.60	15	0.78	423.62	423.12	424.13	424.02	426.85	426.85	8

Notes: IDF File = RDU-Rainfall Intensity.idf, Return Period = 25-yrs.

Storm Sewer Tabulation

Project Name: Enter Project Name...

Stormwater Studio 2022 v 3.0.0.29

12-05-2022

Line ID	Length	Drng Area		Rational	C x A		Tc		Intensity	Total Q	Capacity	Velocity	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
200	200.05	0.500	0.500	0.85	0.43	0.43	5.0	5.00	7.04	2.99	17.57	2.84	18	2.80	415.85	410.25	416.51	411.75	419.20	413.30	1

Notes: IDF File = RDU-Rainfall Intensity.idf, Return Period = 10-yrs.

Storm Sewer Tabulation

Project Name: Enter Project Name...

Stormwater Studio 2022 v 3.0.0.29

12-05-2022

Line ID	Length	Drng Area		Rational	C x A		Tc		Intensity	Total Q	Capacity	Velocity	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
301	143.04	0.330	1.530	0.85	0.28	1.28	5.0	6.12	6.69	8.59	41.86	3.98	24	3.43	422.00	417.10	423.04	419.10	428.20	424.00	1
302	67.55	0.250	1.200	0.85	0.21	1.00	5.0	5.94	6.75	6.77	21.32	3.95	24	0.89	422.60	422.00	423.52	423.31	428.00	428.20	2
303	149.26	0.020	0.130	0.85	0.02	0.09	5.0	5.24	6.96	0.65	7.09	1.56	15	1.21	424.40	422.60	424.72	423.87	428.65	428.00	3
304	50.00	0.110	0.110	0.70	0.08	0.08	5.0	5.00	7.04	0.54	7.07	2.11	15	1.20	425.00	424.40	425.29	424.77	428.00	428.65	4
305	64.33	0.380	0.820	0.85	0.32	0.70	5.0	5.78	6.79	4.73	16.30	5.91	18	2.41	424.15	422.60	424.98	423.20	428.00	428.00	5
306	173.21	0.220	0.220	0.85	0.19	0.19	5.0	5.00	7.04	1.32	8.14	2.16	15	1.59	426.90	424.15	427.36	425.31	429.90	428.00	6
307	181.55	0.220	0.220	0.85	0.19	0.19	5.0	5.00	7.04	1.32	5.97	2.16	15	0.85	425.70	424.15	426.16	425.31	428.70	428.00	7

Notes: IDF File = RDU-Rainfall Intensity.idf, Return Period = 10-yrs.

Storm Sewer Tabulation

Project Name: Enter Project Name...

Stormwater Studio 2022 v 3.0.0.29

12-05-2022

Line ID	Length	Drng Area		Rational	C x A		Tc		Intensity	Total Q	Capacity	Velocity	Line		Invert Elev		HGL Elev		Surface Elev		Line No
		Incr	Total		Incr	Total	Inlet	Syst					Size	Slope	Up	Dn	Up	Dn	Up	Dn	
	(ft)	(ac)	(ac)	(C)			(min)	(min)	(in/hr)	(cfs)	(cfs)	(ft/s)	(in)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	
401	110.00	0.360	0.360	0.85	0.31	0.31	5.0	5.00	7.04	2.15	4.57	2.15	15	0.50	424.55	424.00	425.37	425.25	428.07	425.50	1

Notes: IDF File = RDU-Rainfall Intensity.idf, Return Period = 10-yrs.

APPENDIX C – STORM SEWER HGL CALCULATIONS

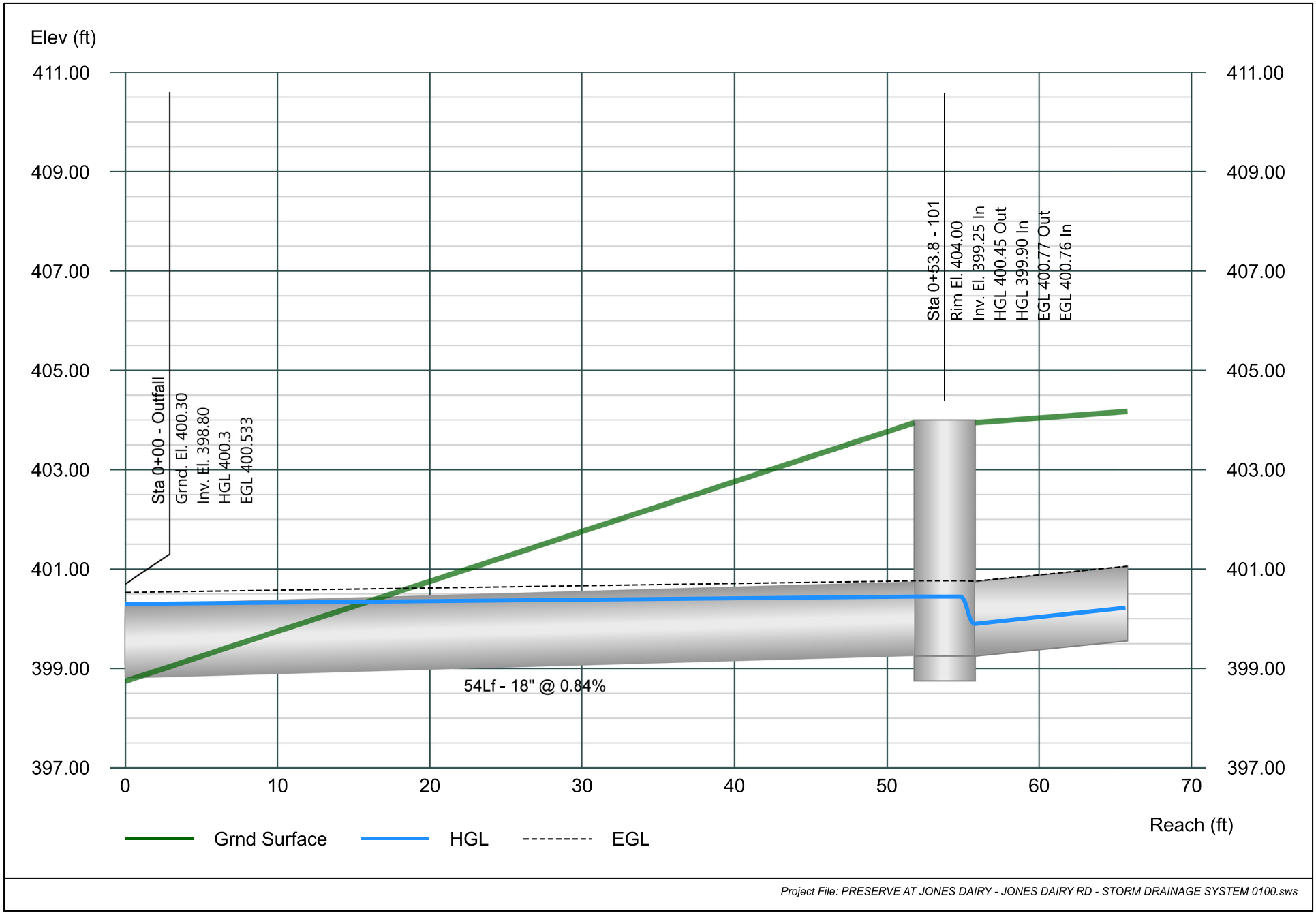
10-YEAR HGL

Line 1

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

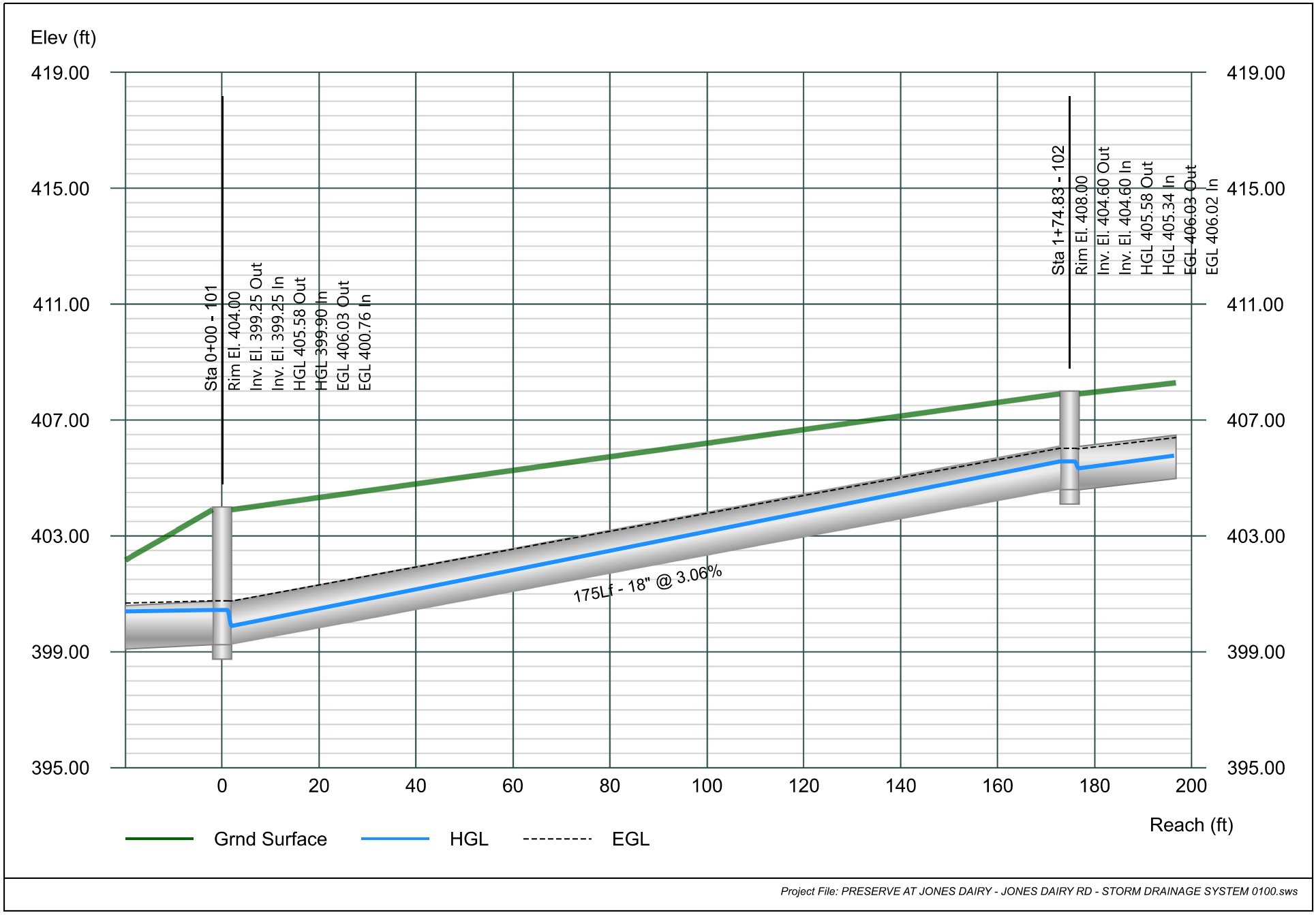


Line 2 - 102 TO 101

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

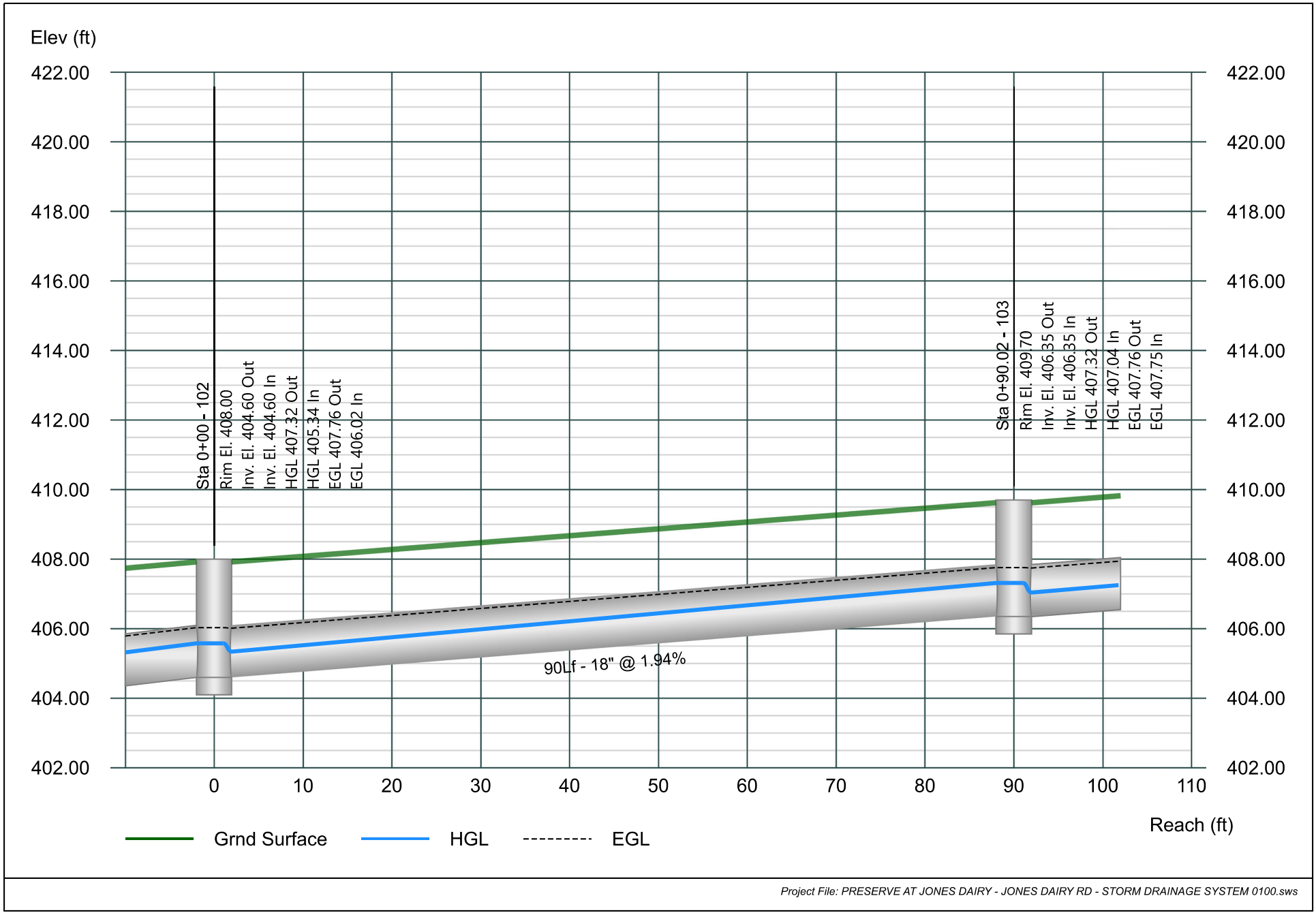


Line 3 - 103 TO 102

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

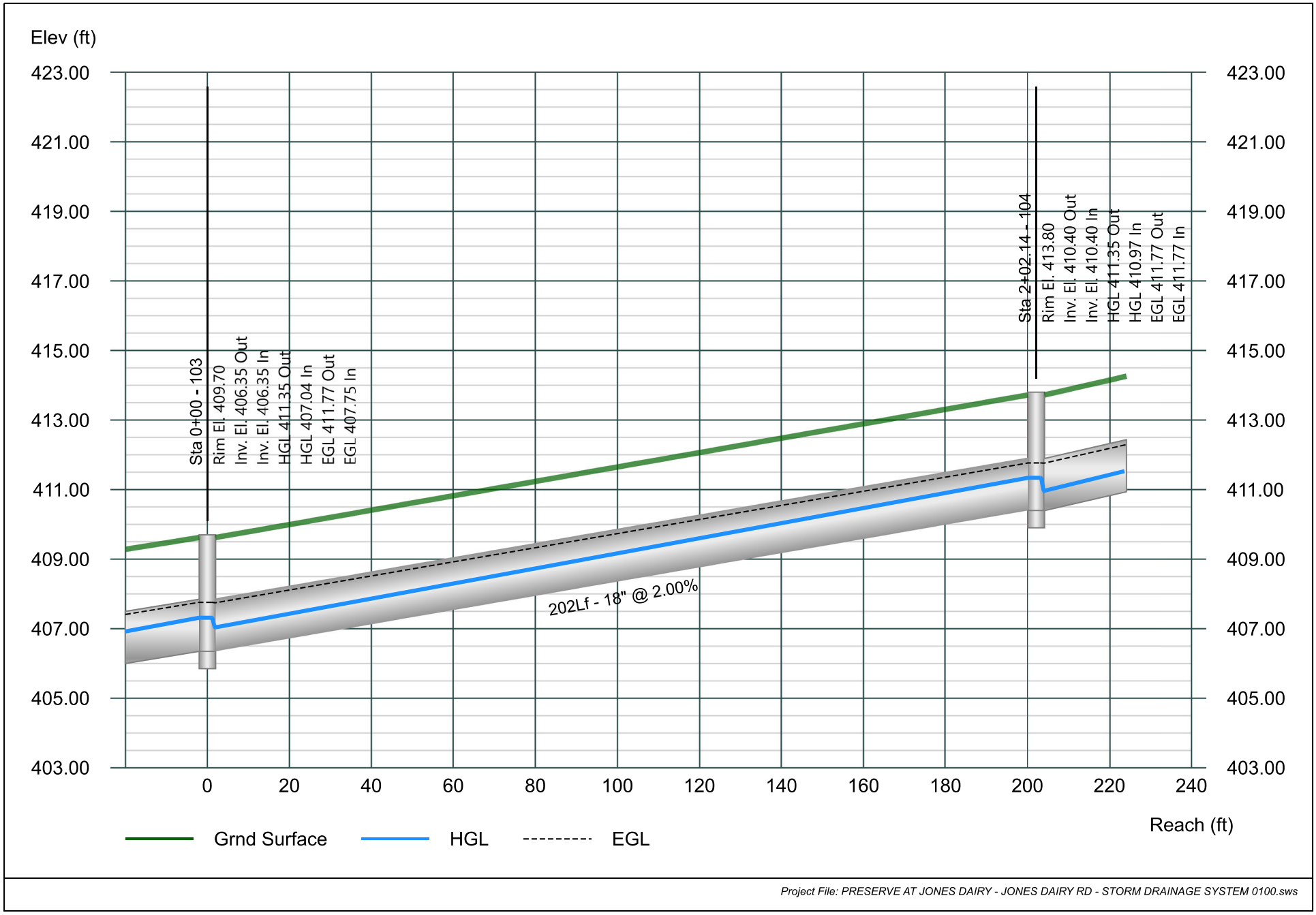


Line 4 - 104 TO 103

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022



Line 5 - 105 TO 104

Stormwater Studio 2022 v 3.0.0.29

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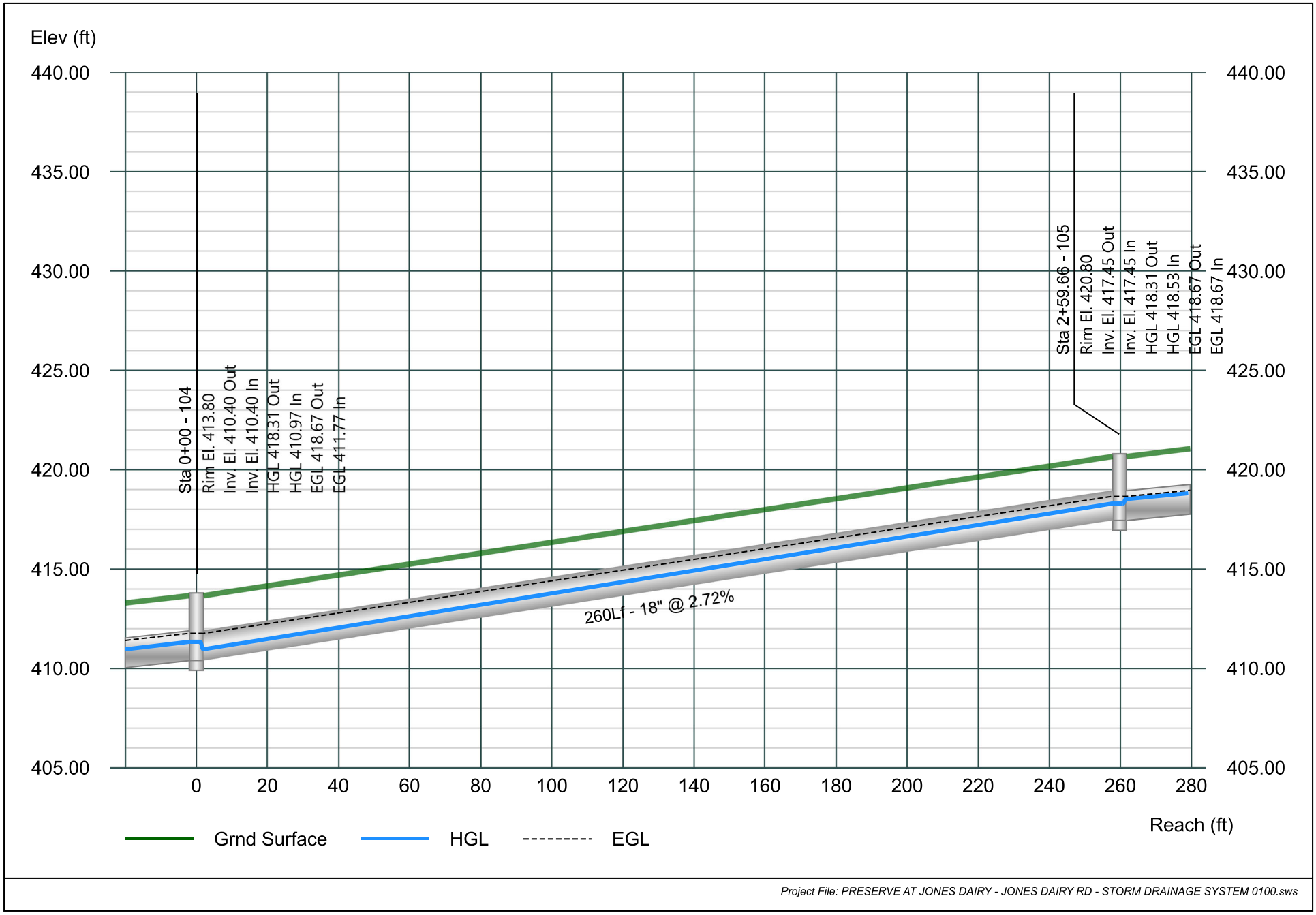
12-05-2022

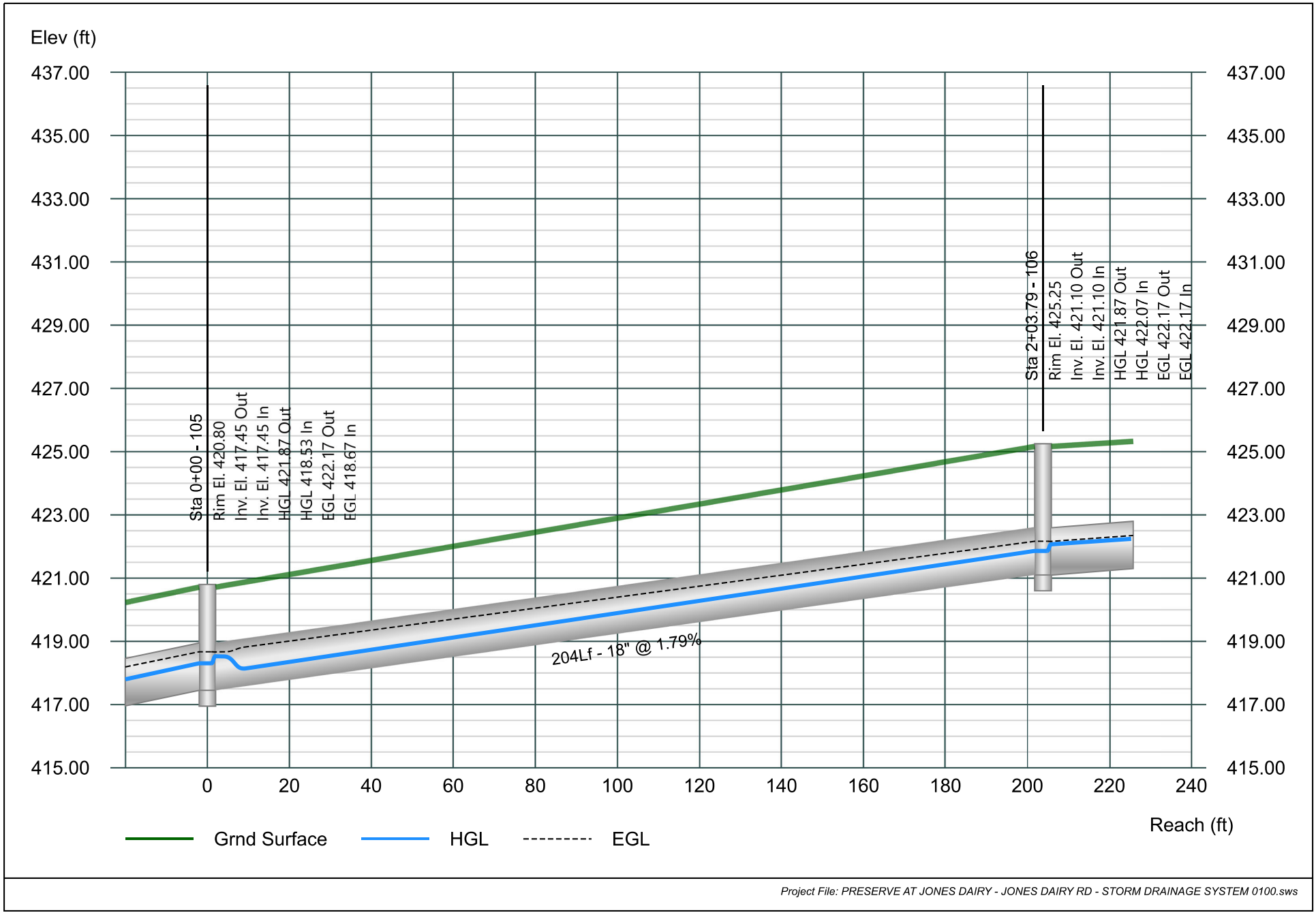


Line 6 - 106 TO 105

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

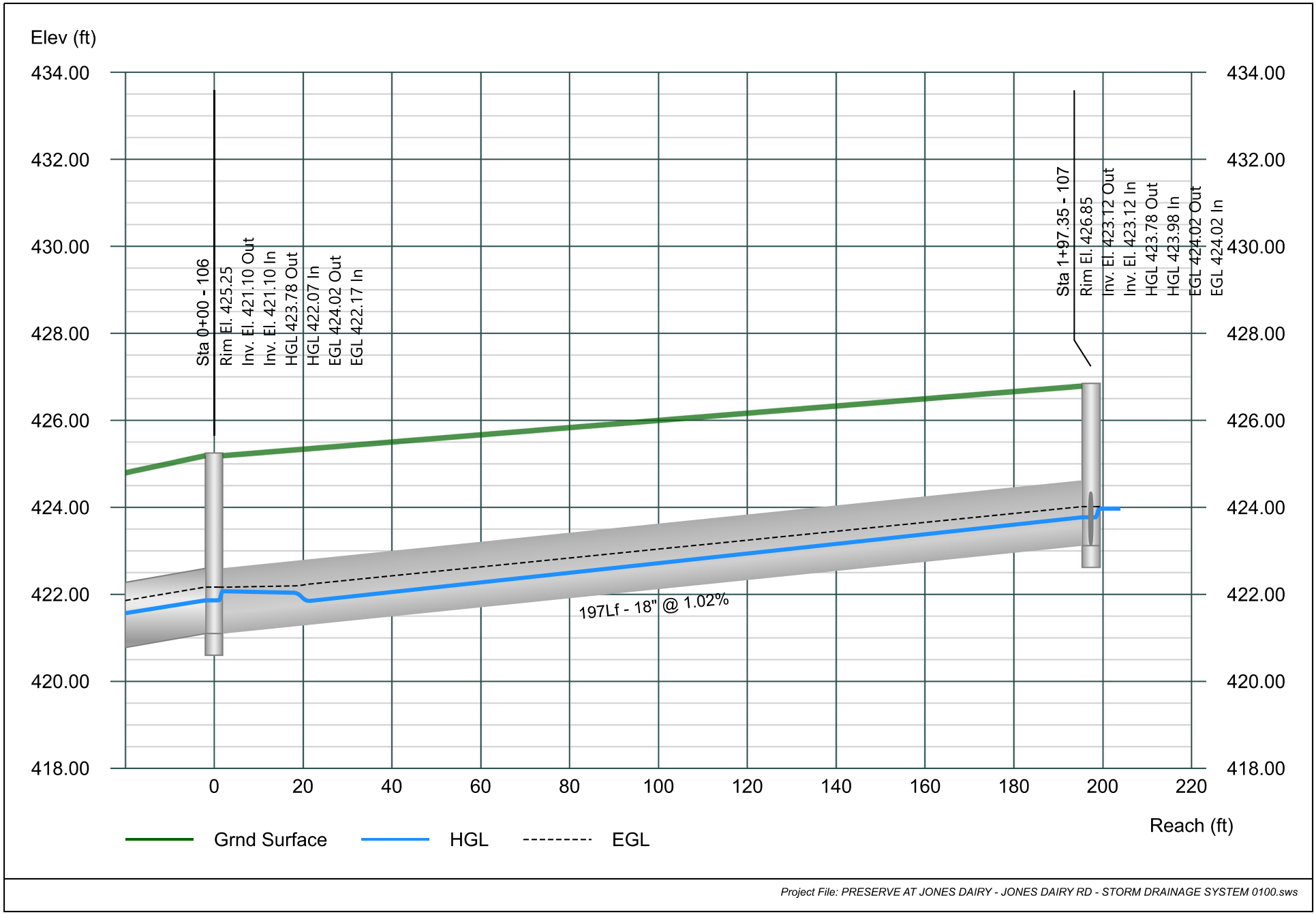


Line 7 - 107 TO 106

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

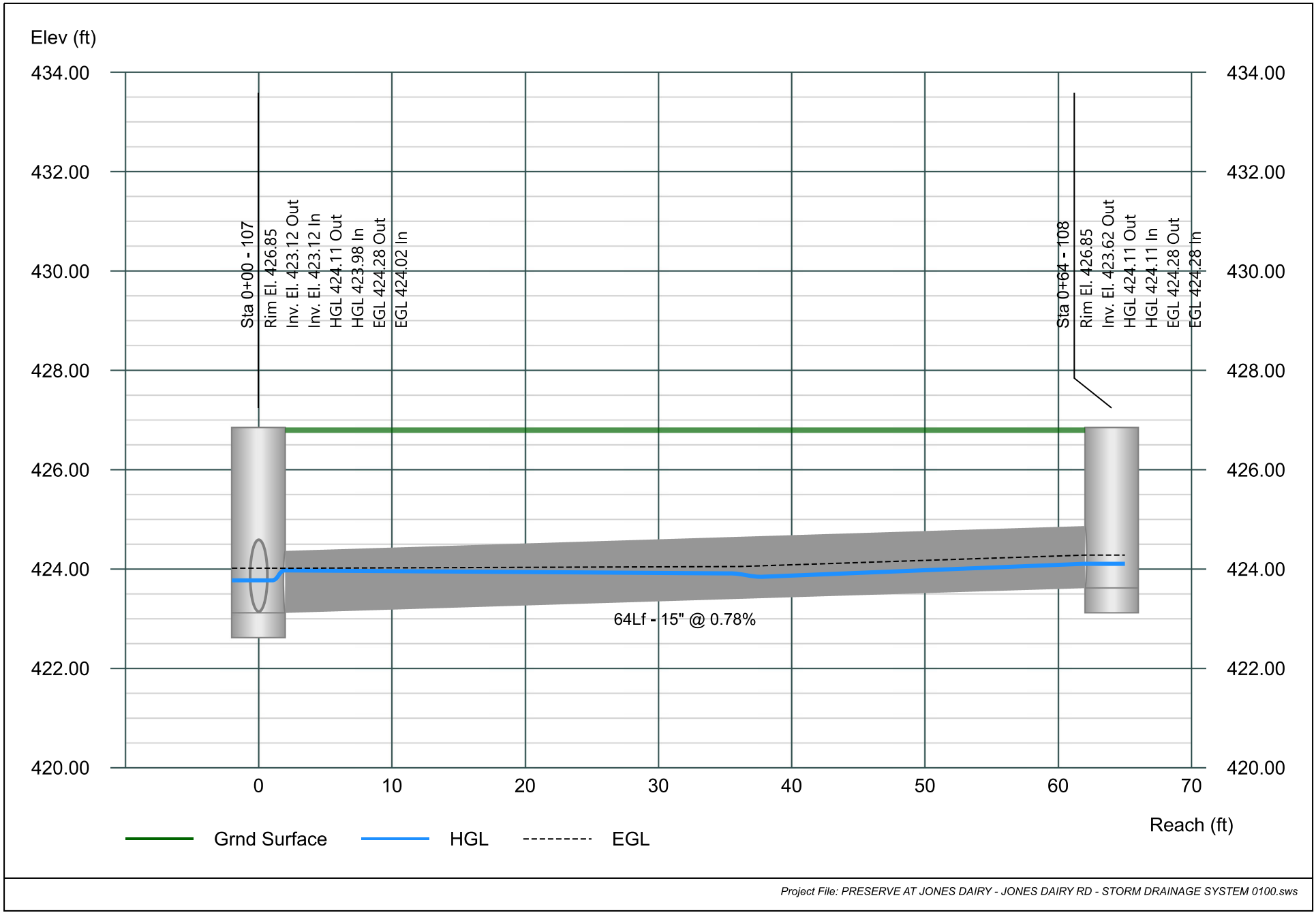


Line 8 - 108 TO 107

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

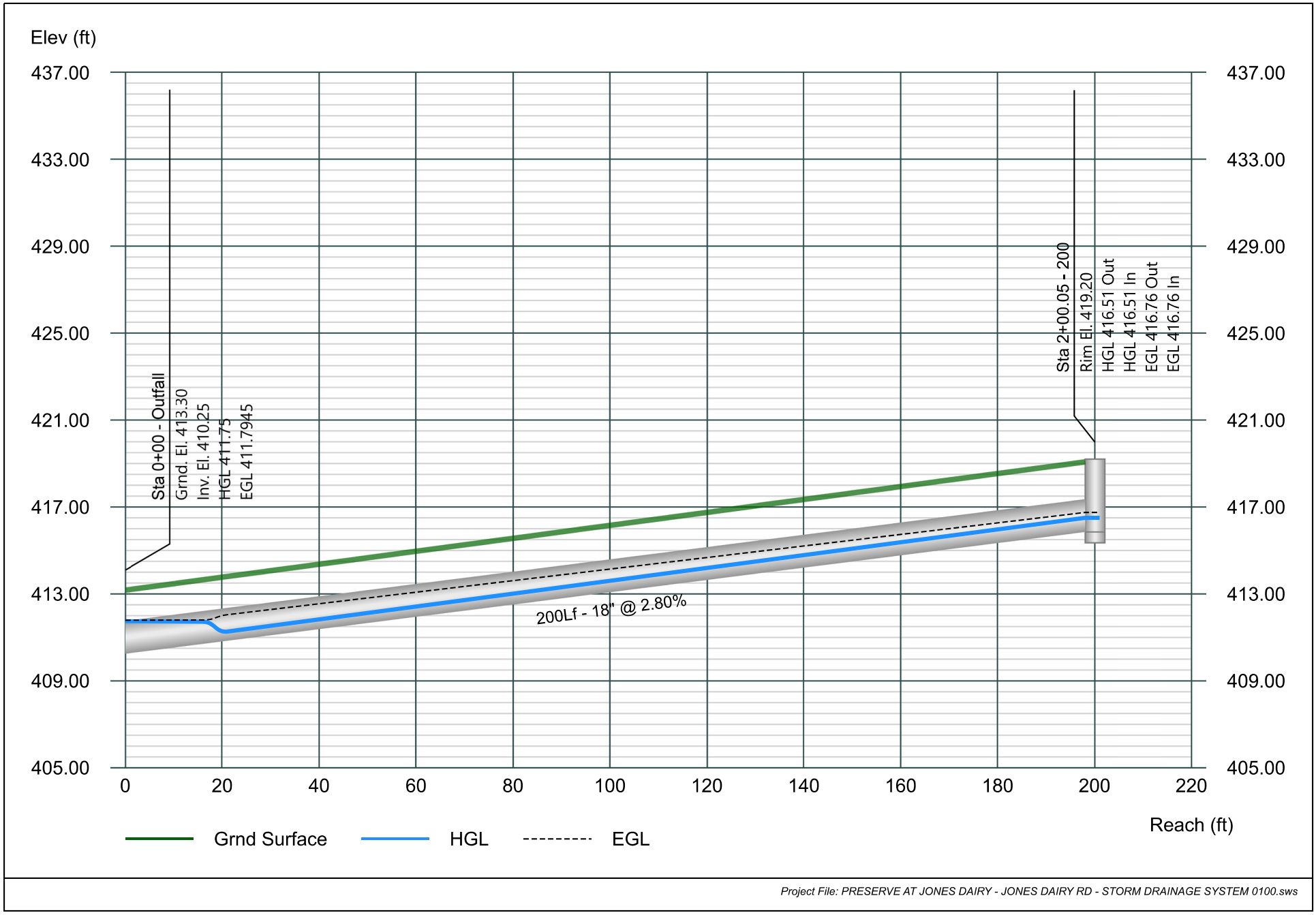


Line 1 - 200

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

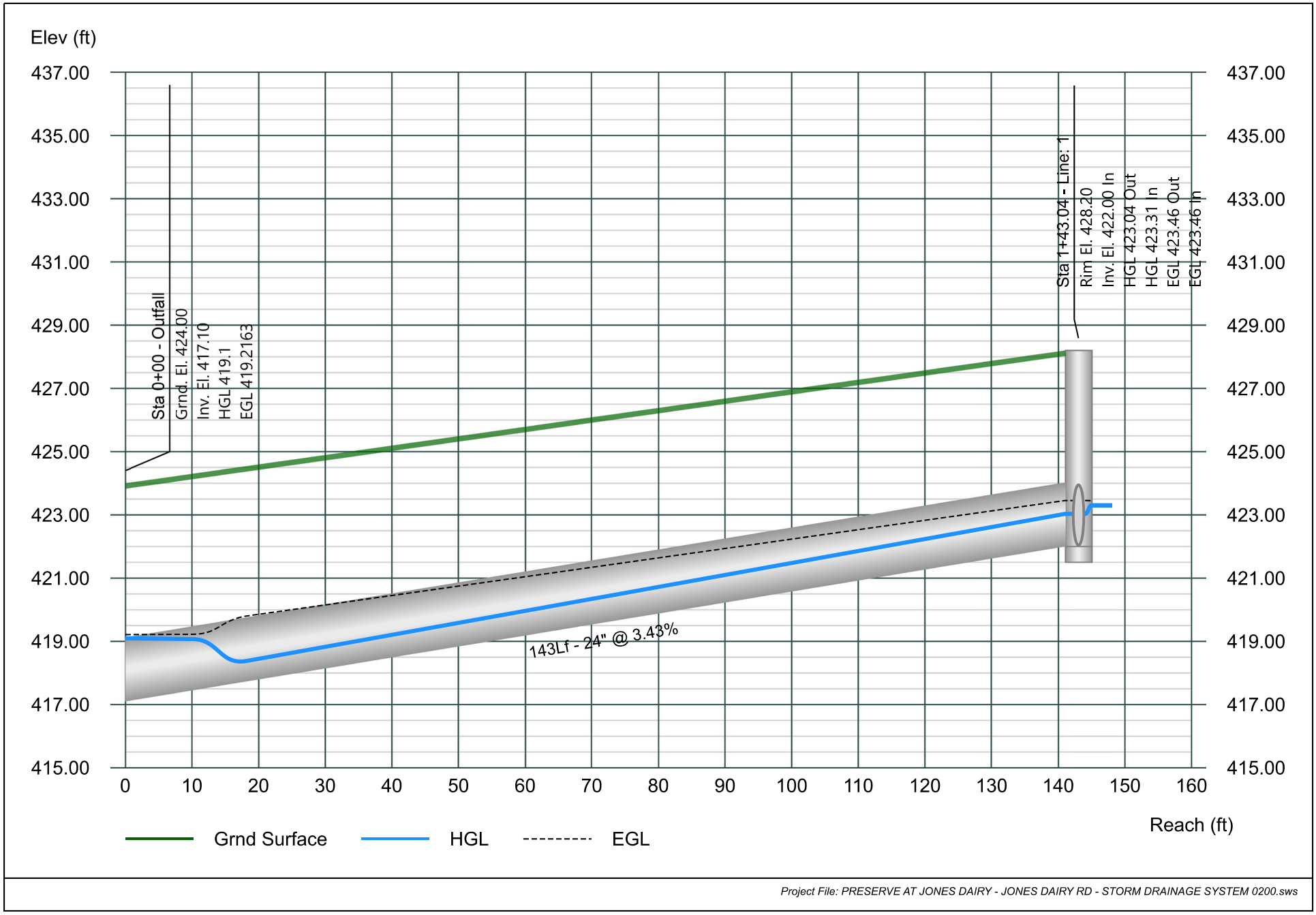


Line 1 - 301

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

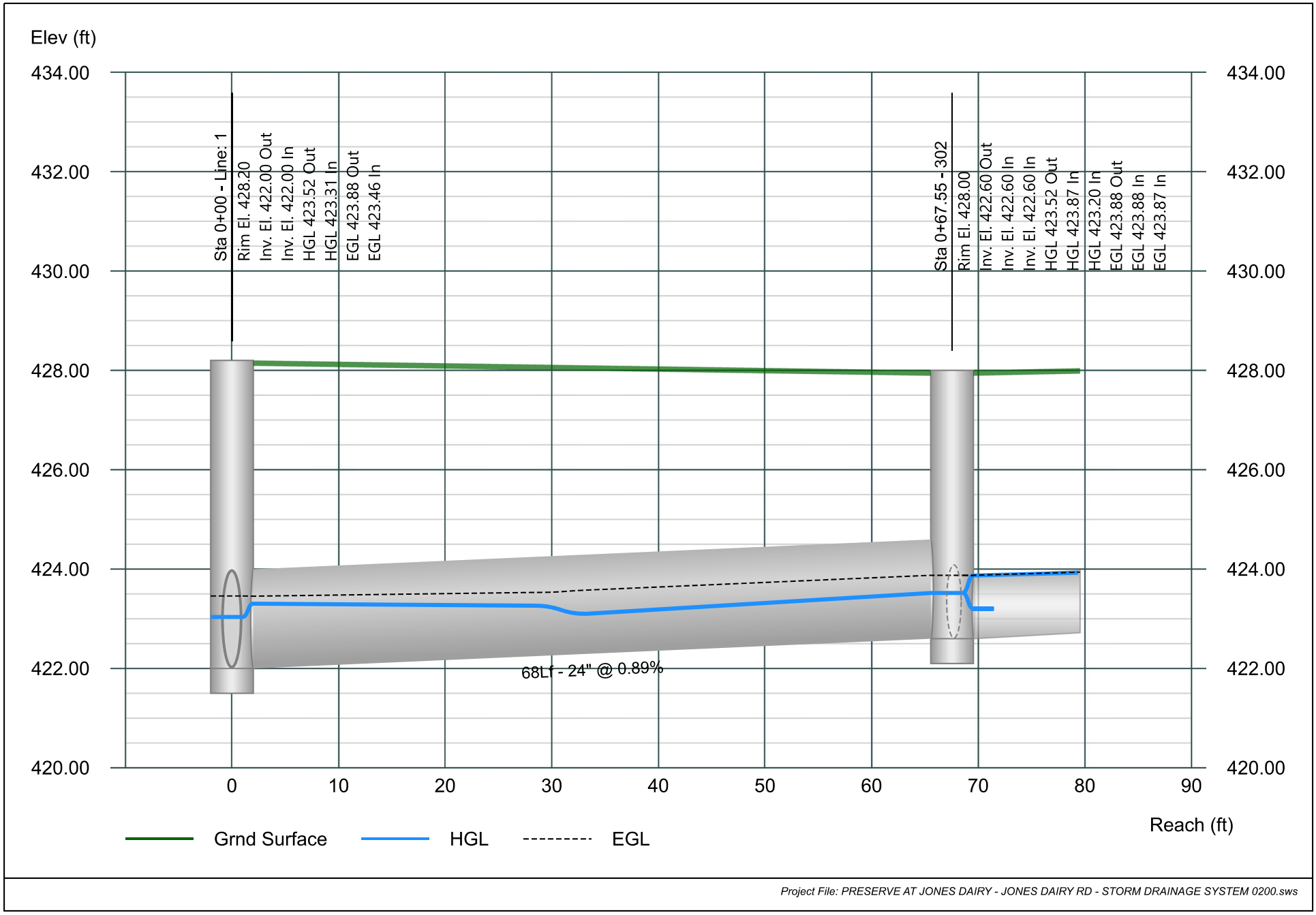


Line 2 - 302

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

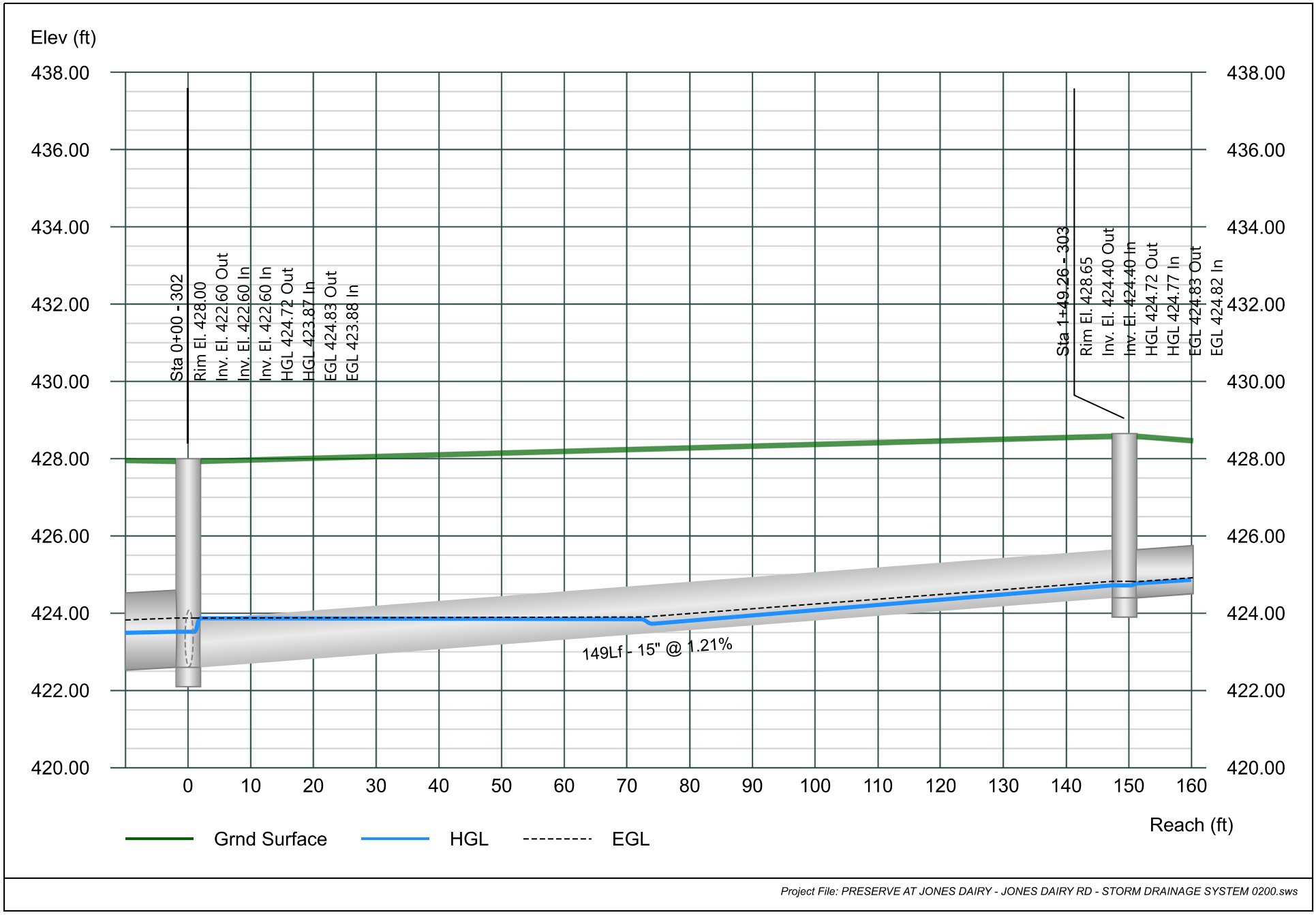


Line 3 - 303

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

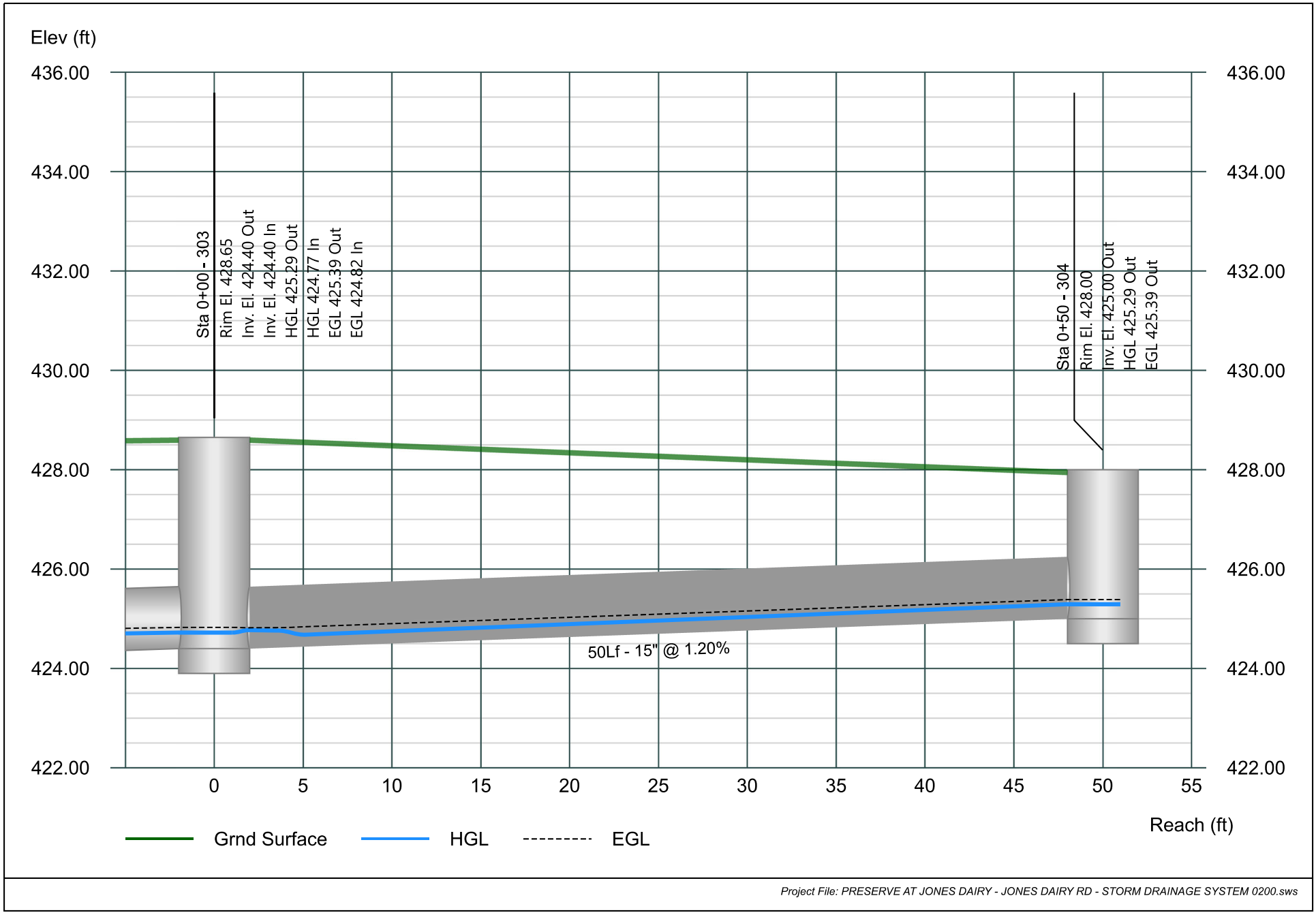


Line 4 - 304

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022



Line 5 - 305

Stormwater Studio 2022 v 3.0.0.29

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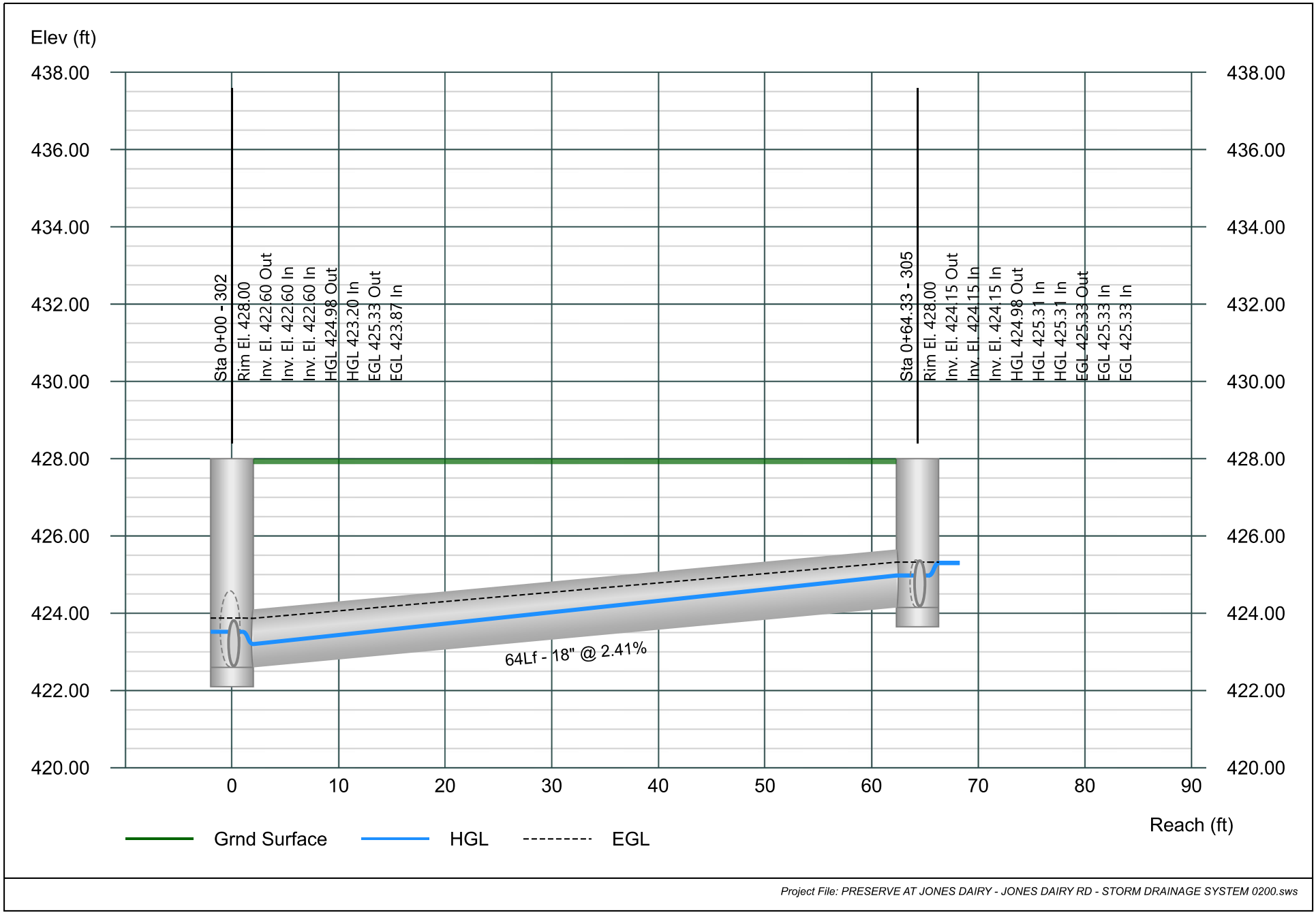
12-05-2022



Line 6 - 306

Stormwater Studio 2022 v 3.0.0.29

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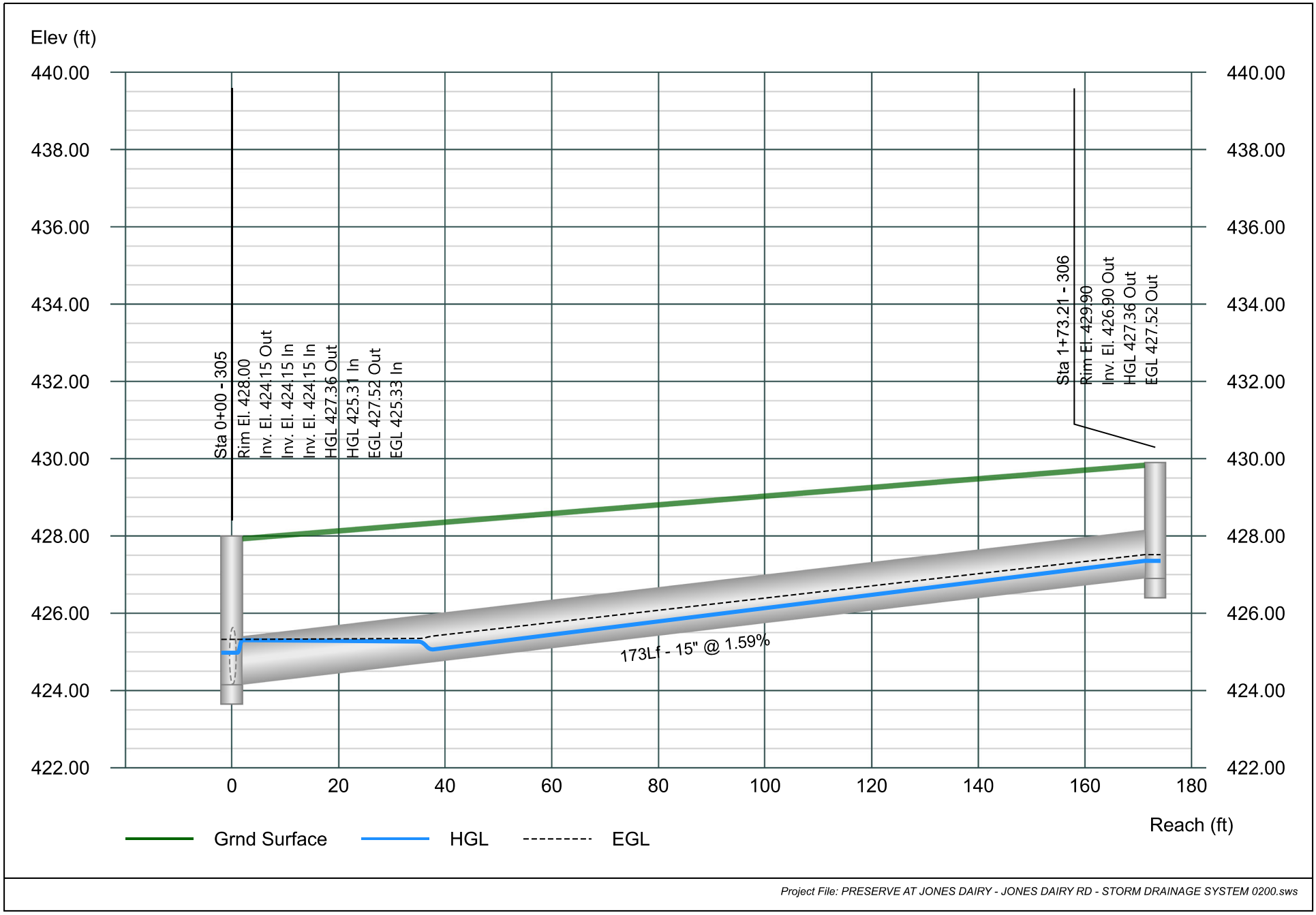
12-05-2022



Line 7 - 307

Stormwater Studio 2022 v 3.0.0.29

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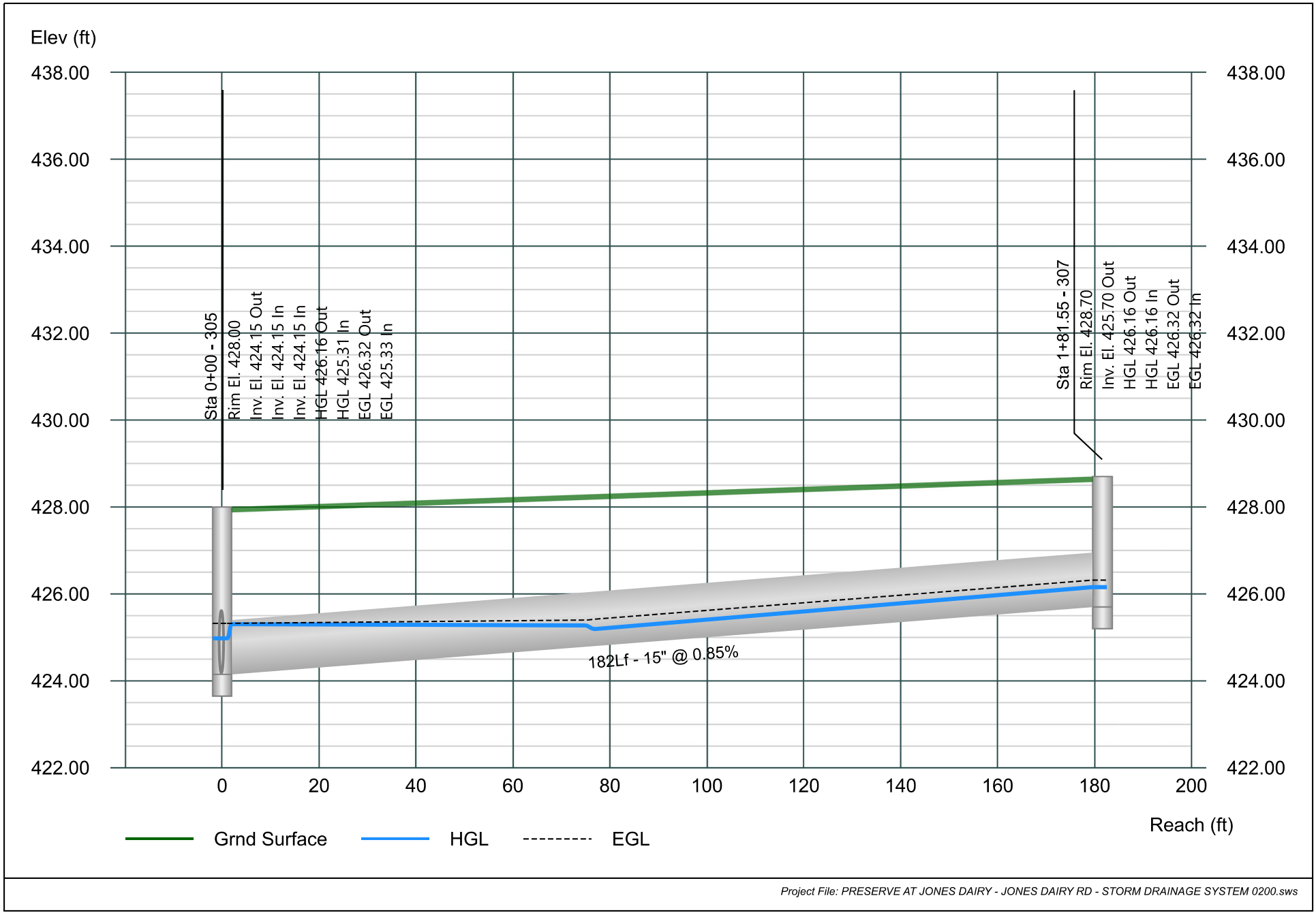
12-05-2022

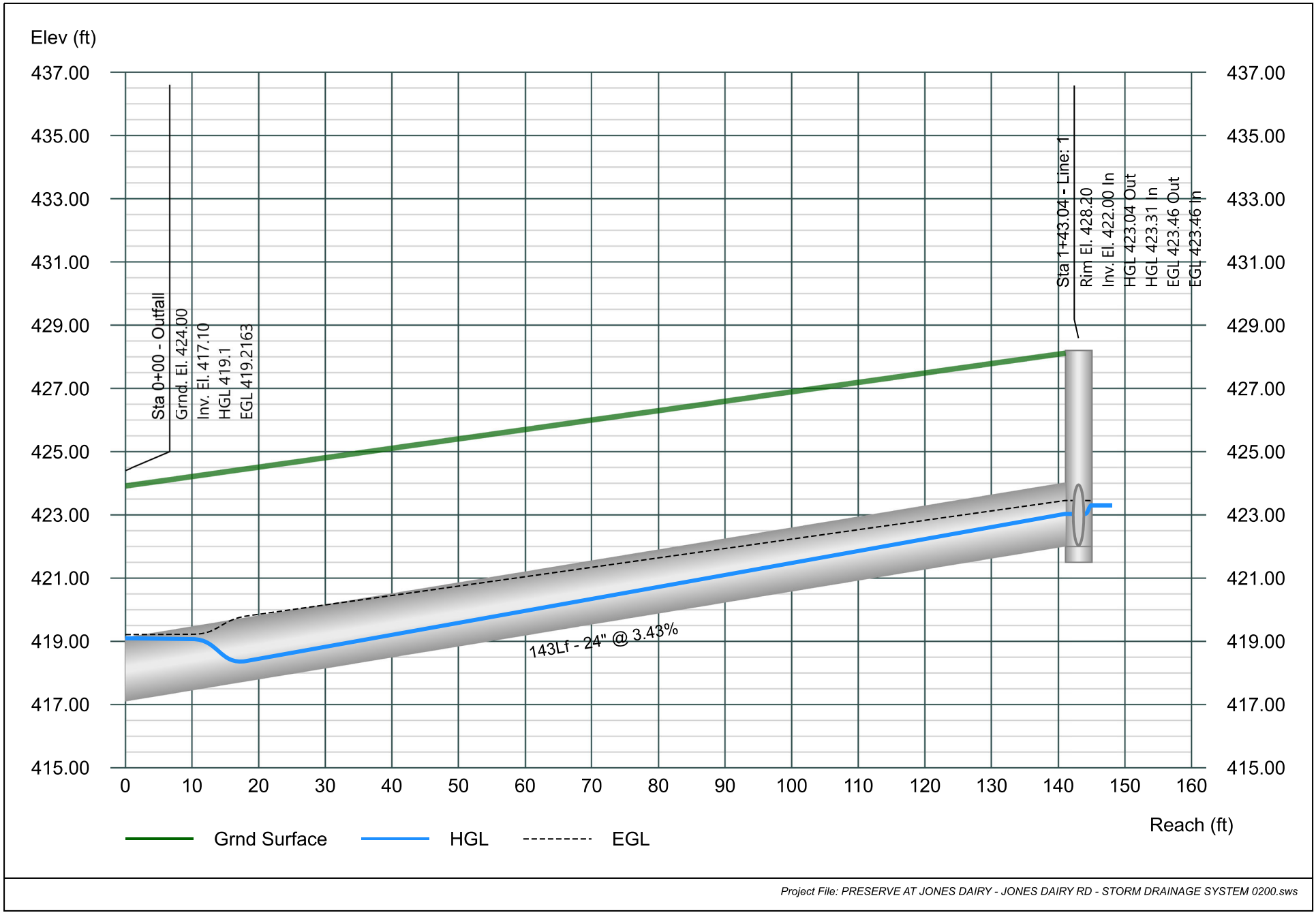


Line 1 - 301

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022



Line 2 - 302

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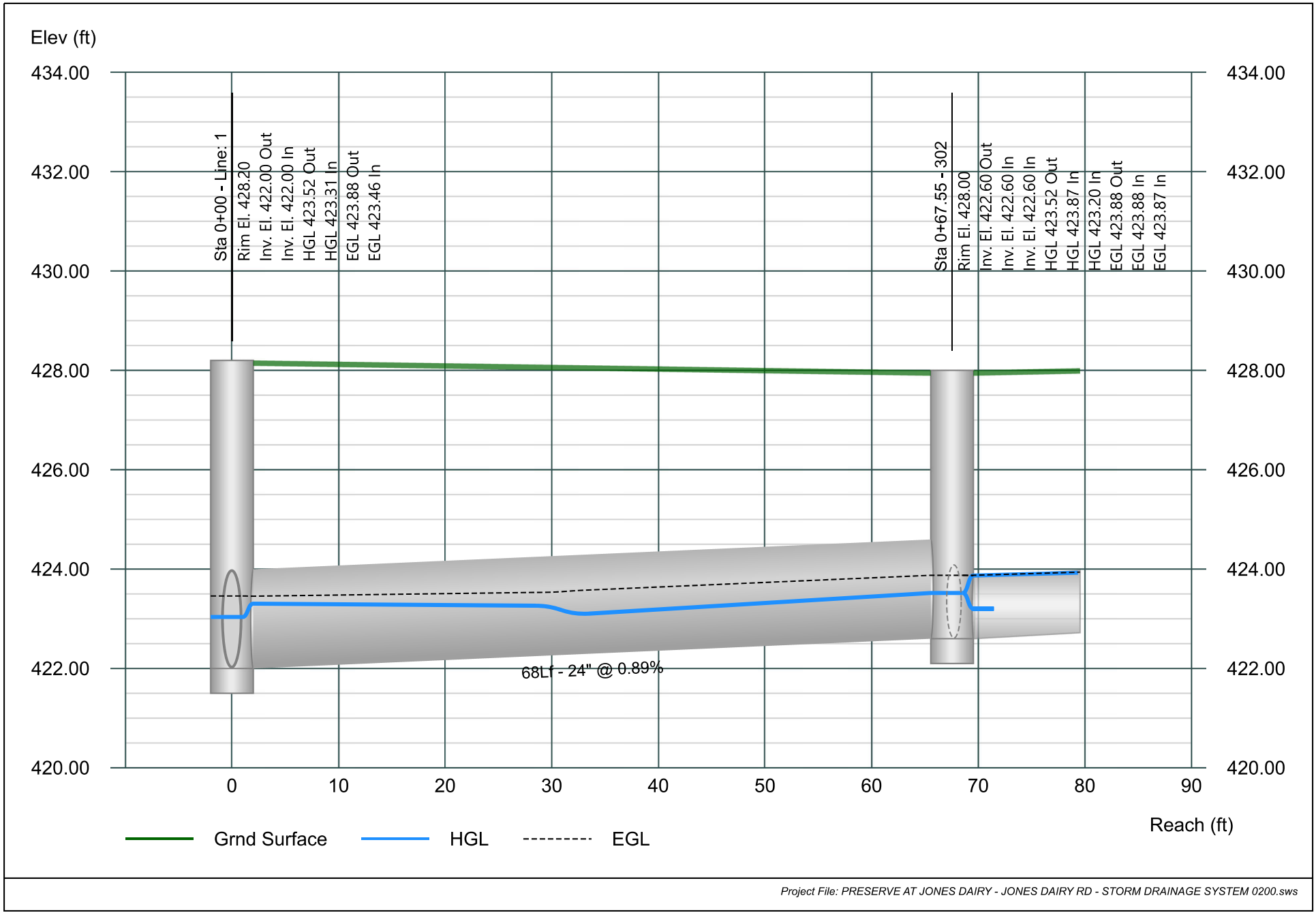
12-05-2022

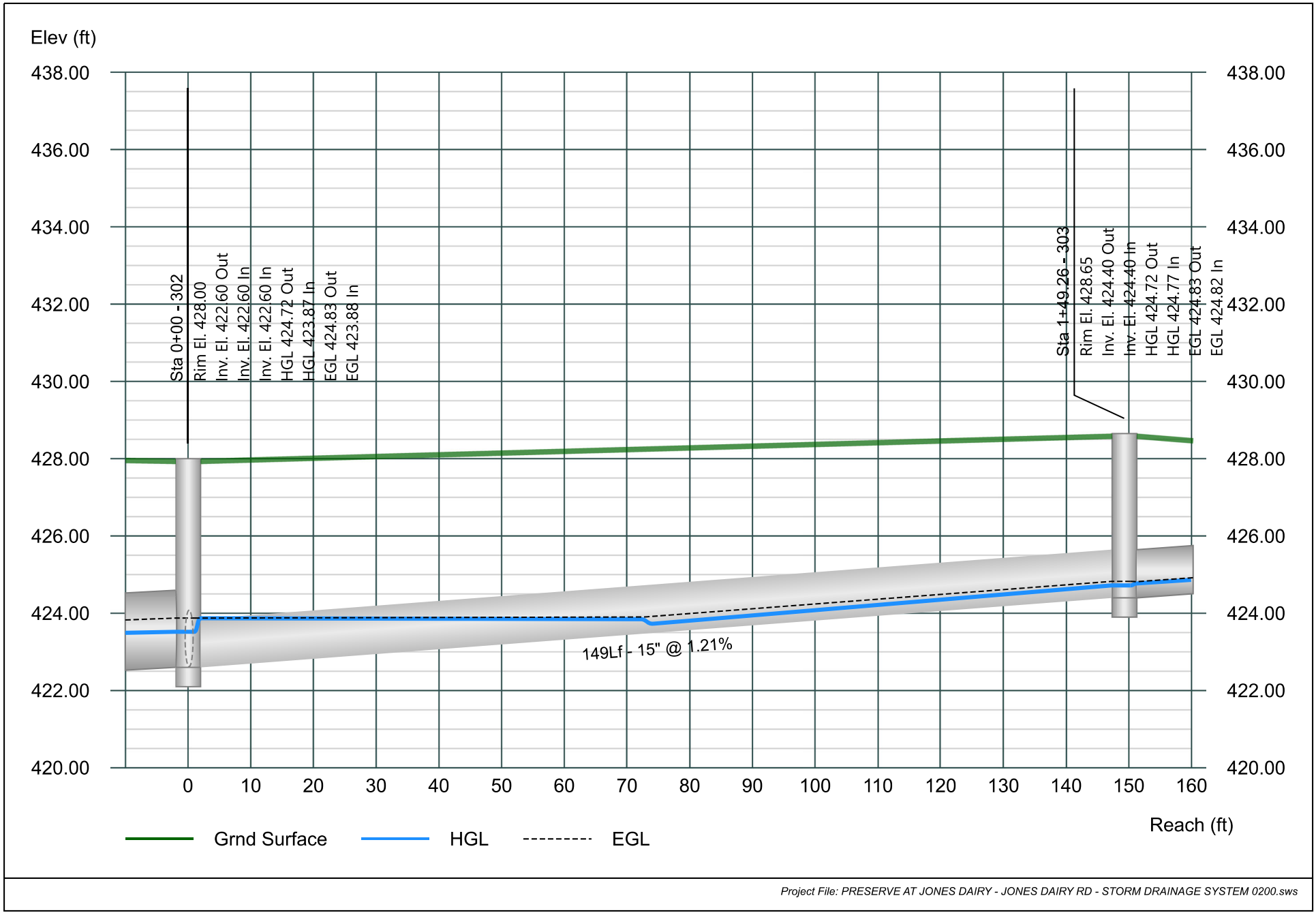


Line 3 - 303

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

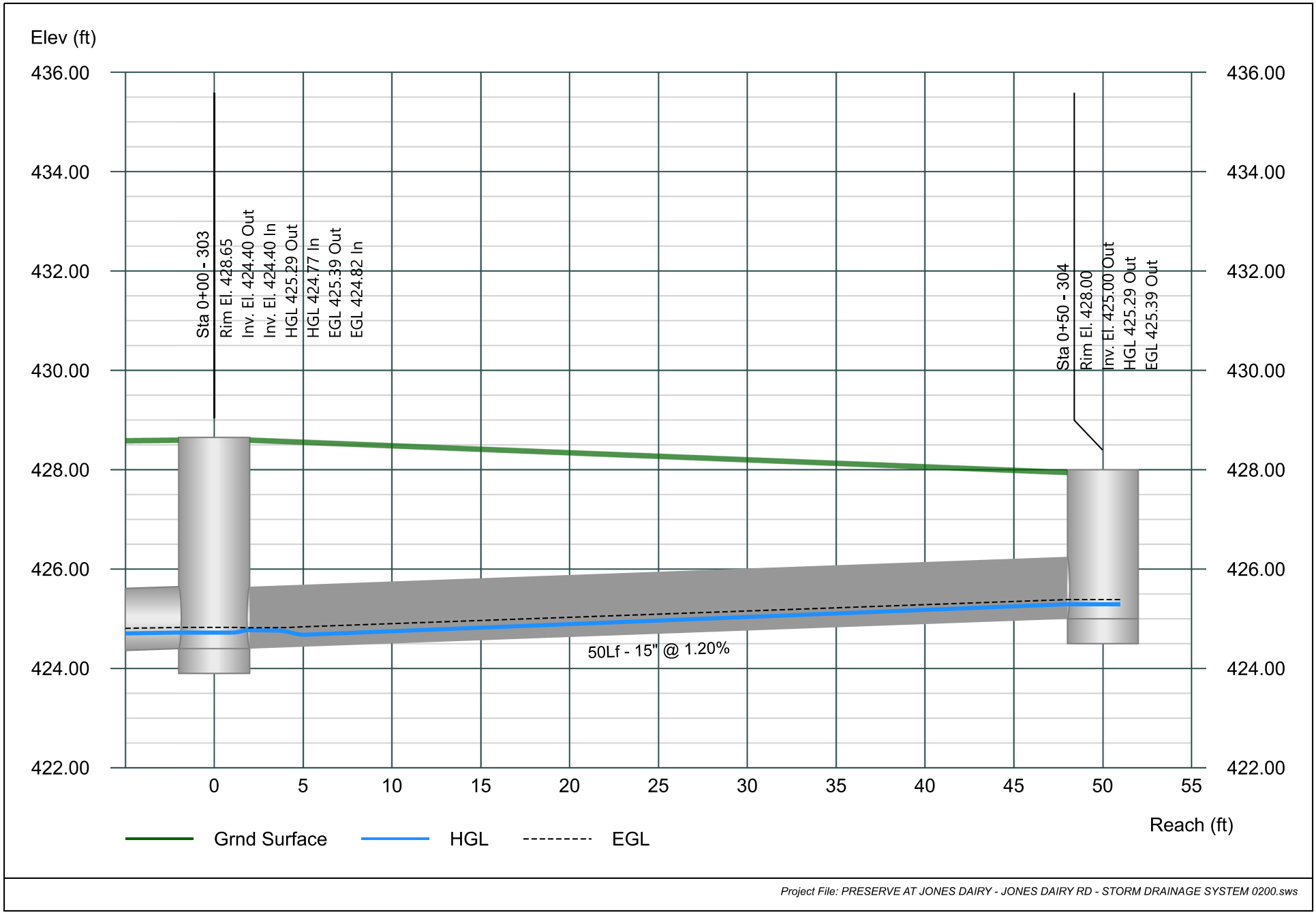


Line 4 - 304

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

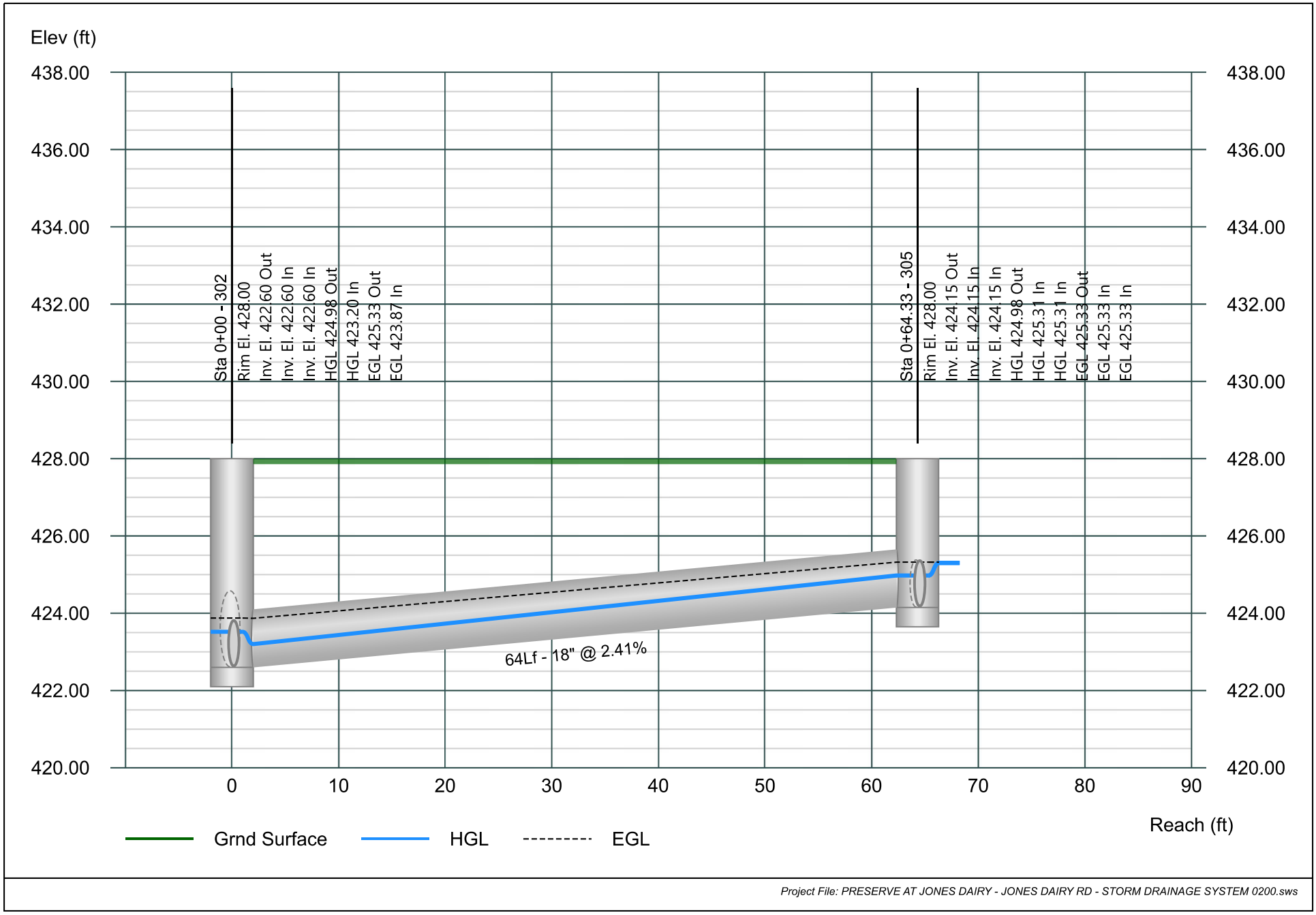


Line 5 - 305

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

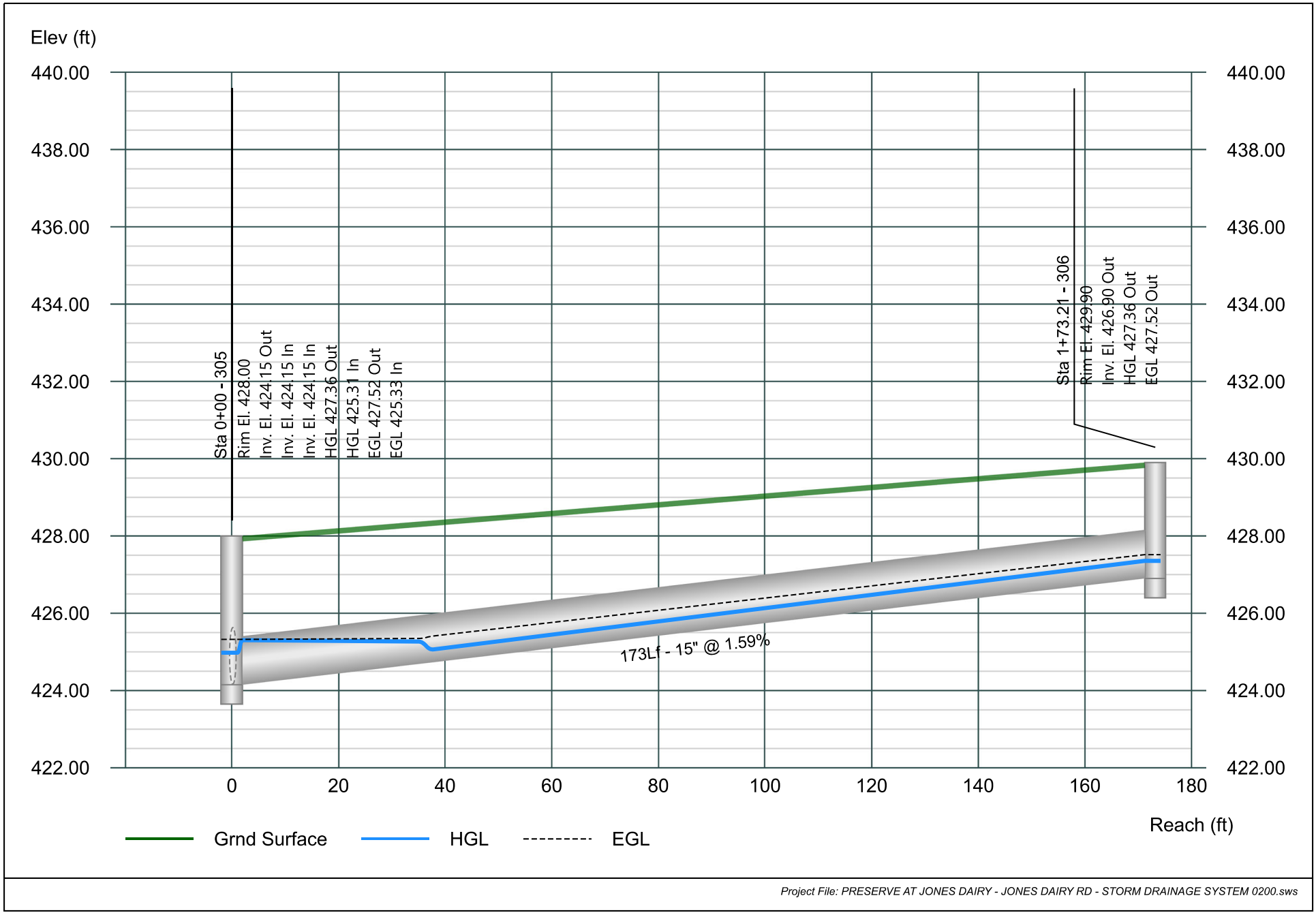


Line 6 - 306

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

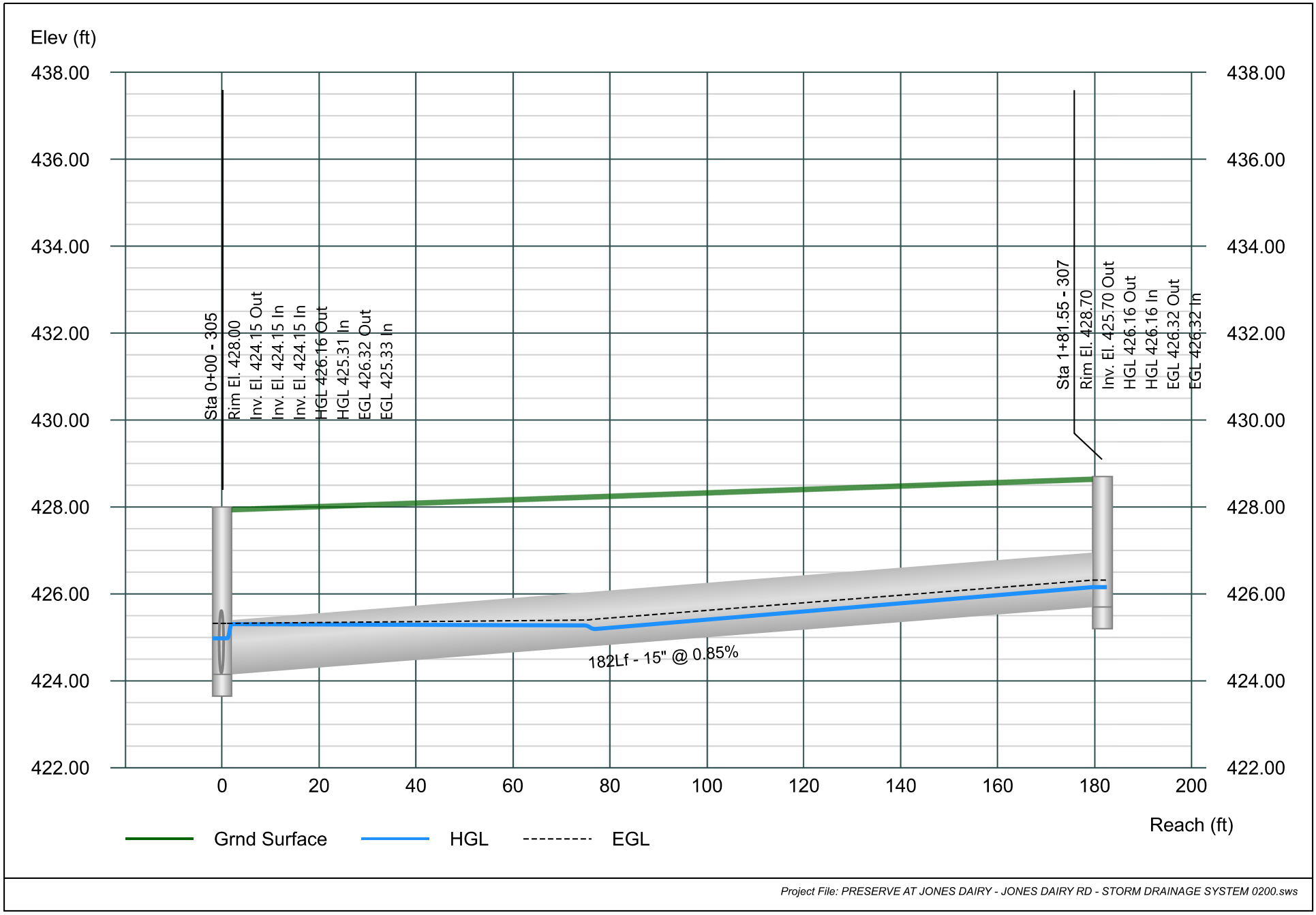


Line 7 - 307

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

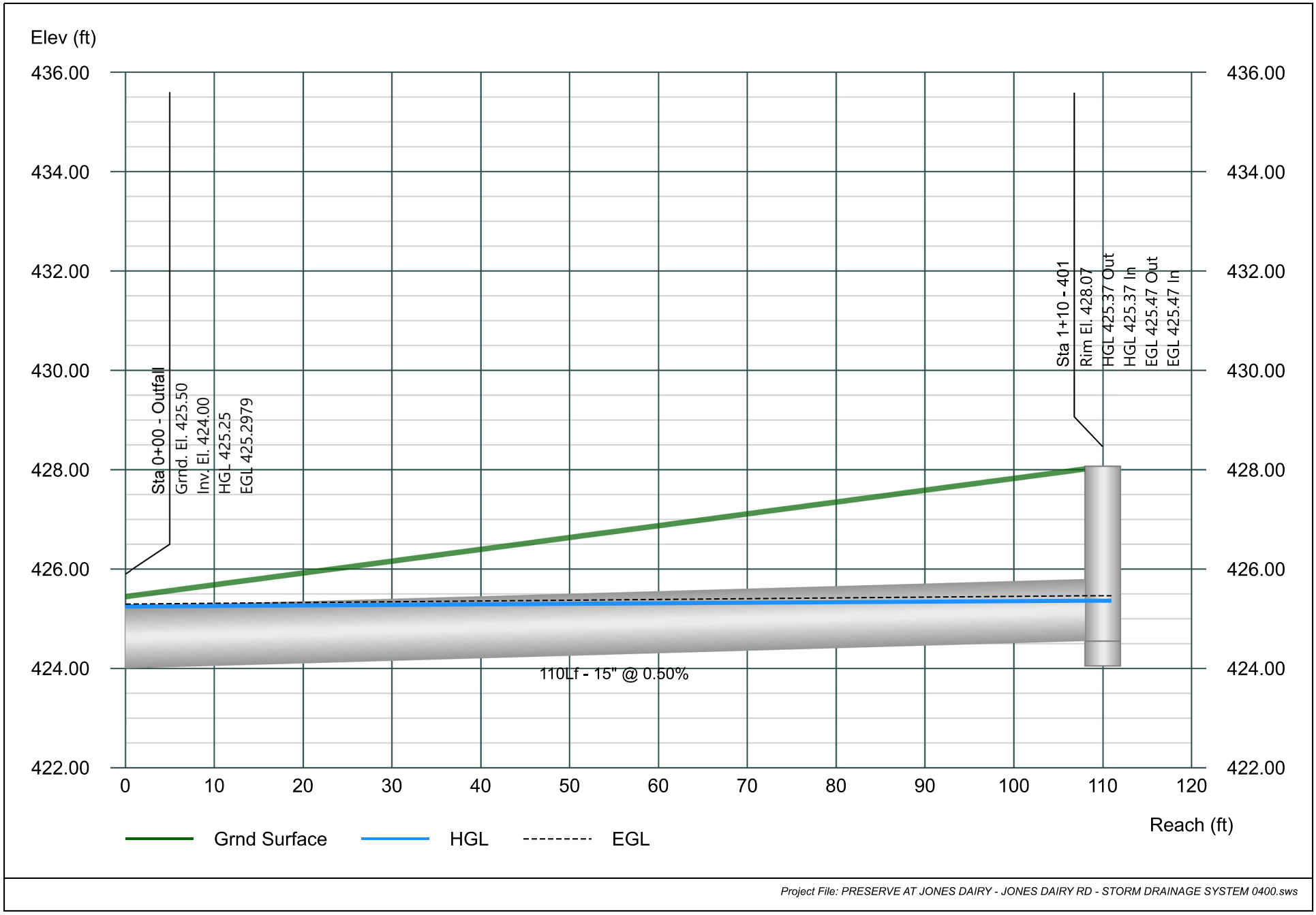


Line 1 - 401

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022



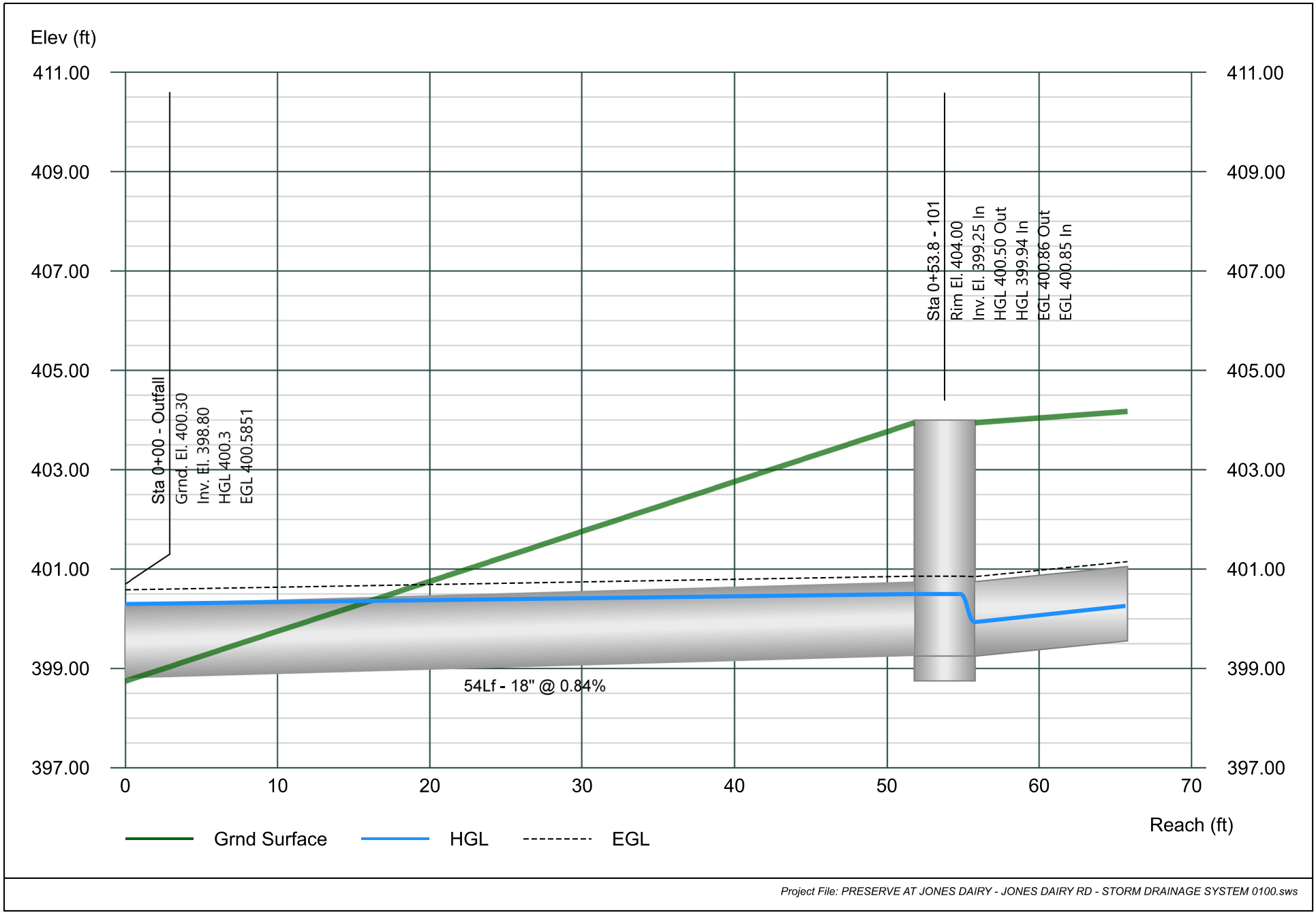
25-YEAR HGL

Line 1

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

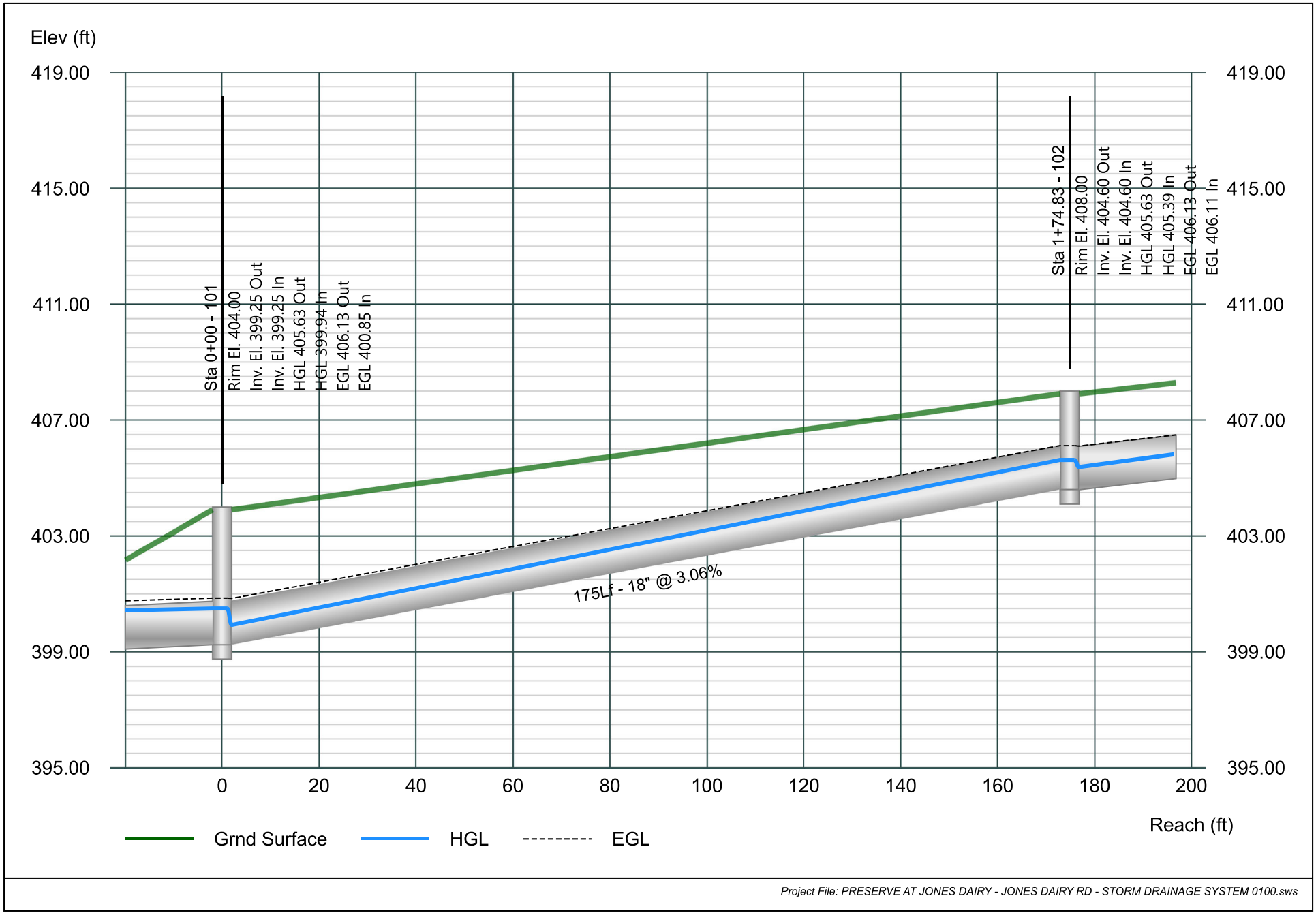


Line 2 - 102 TO 101

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

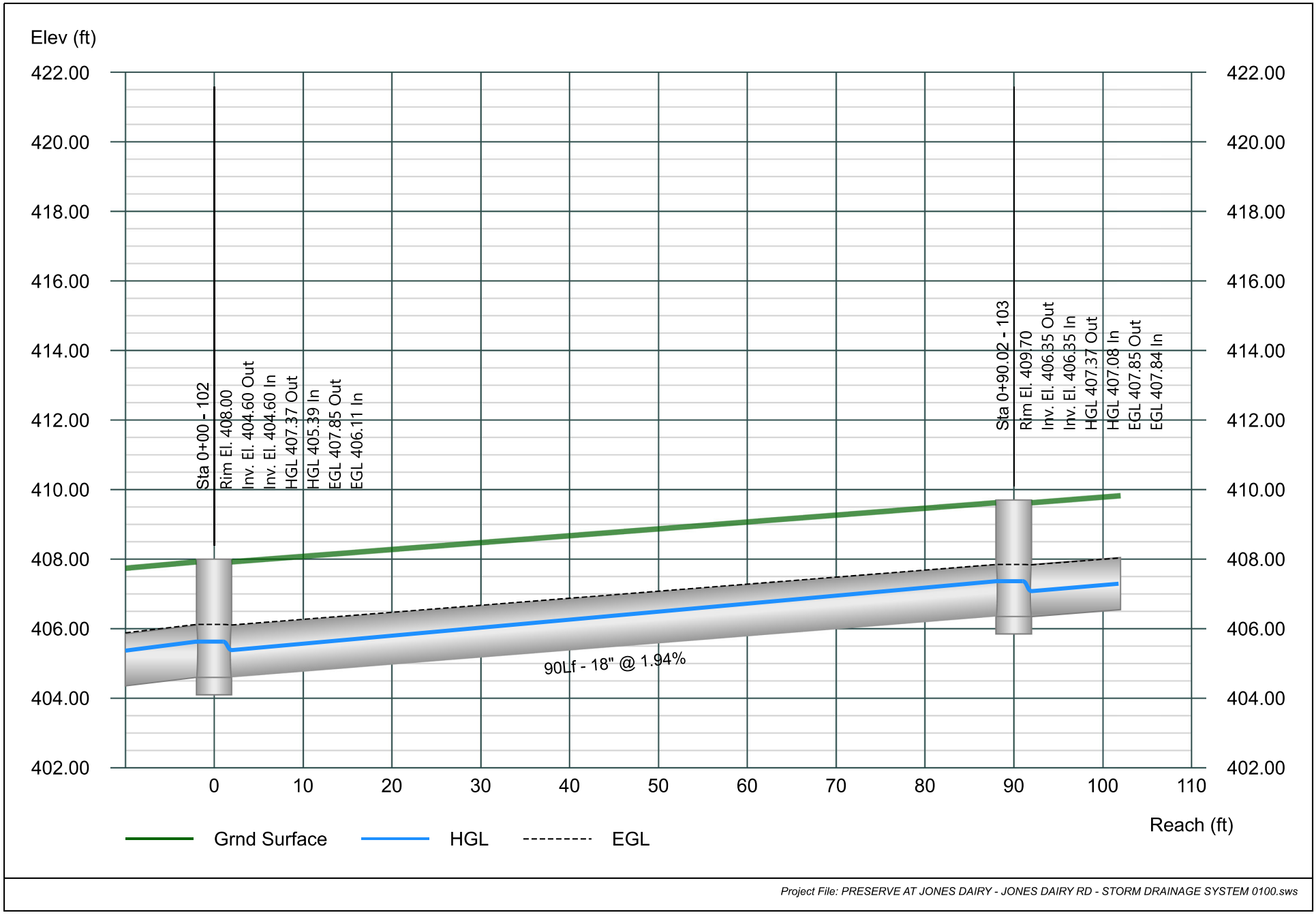


Line 3 - 103 TO 102

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

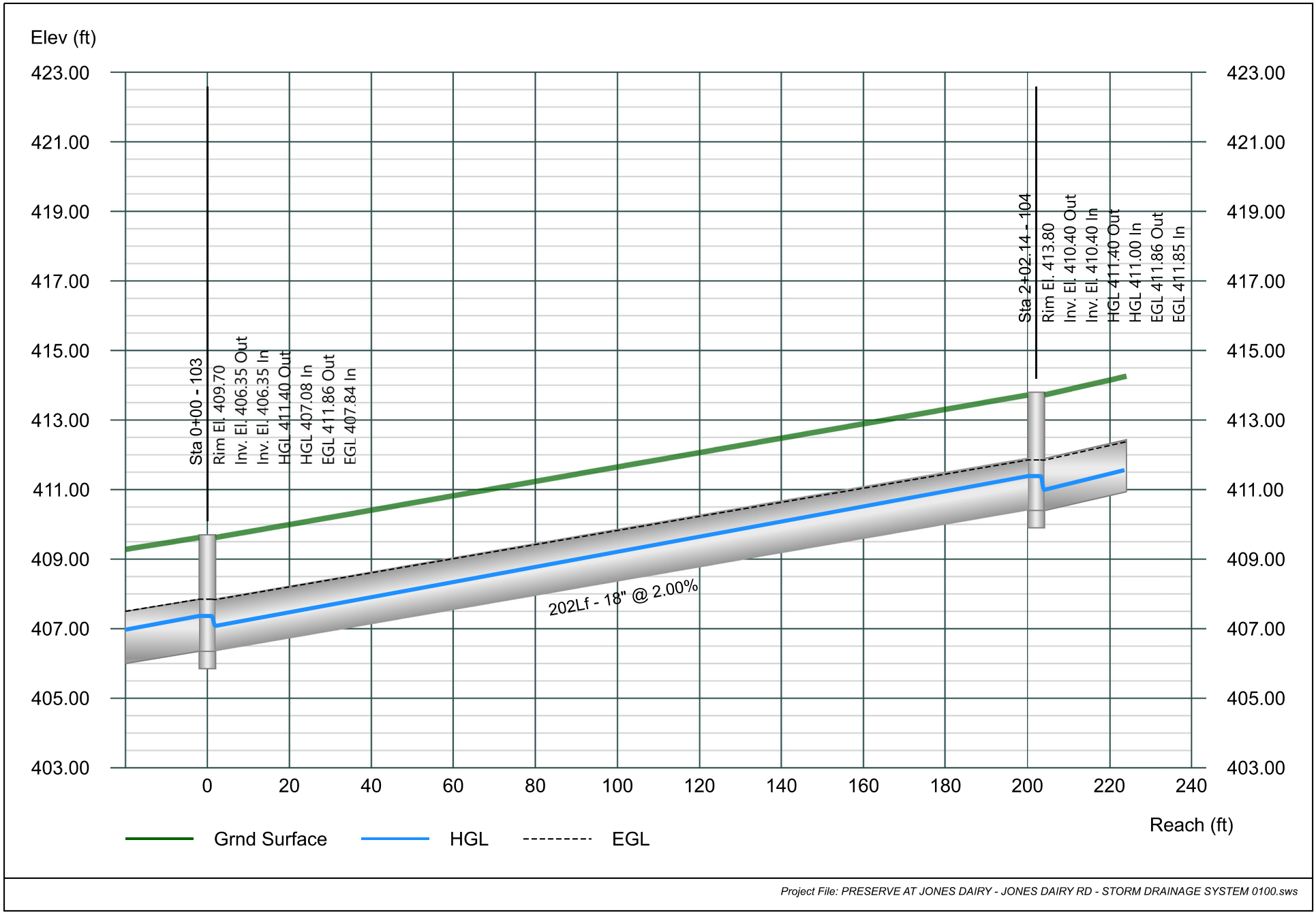


Line 4 - 104 TO 103

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

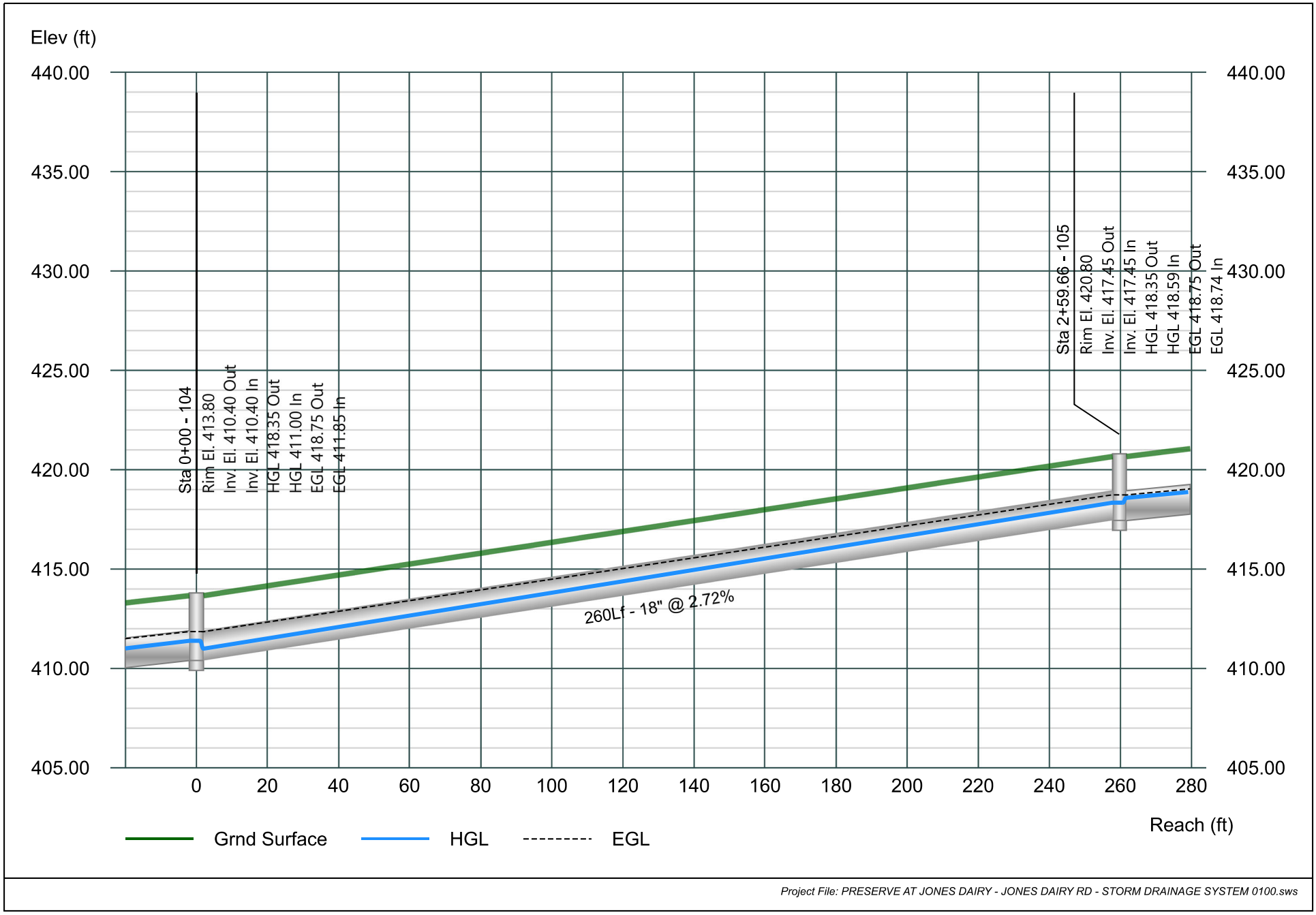


Line 5 - 105 TO 104

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

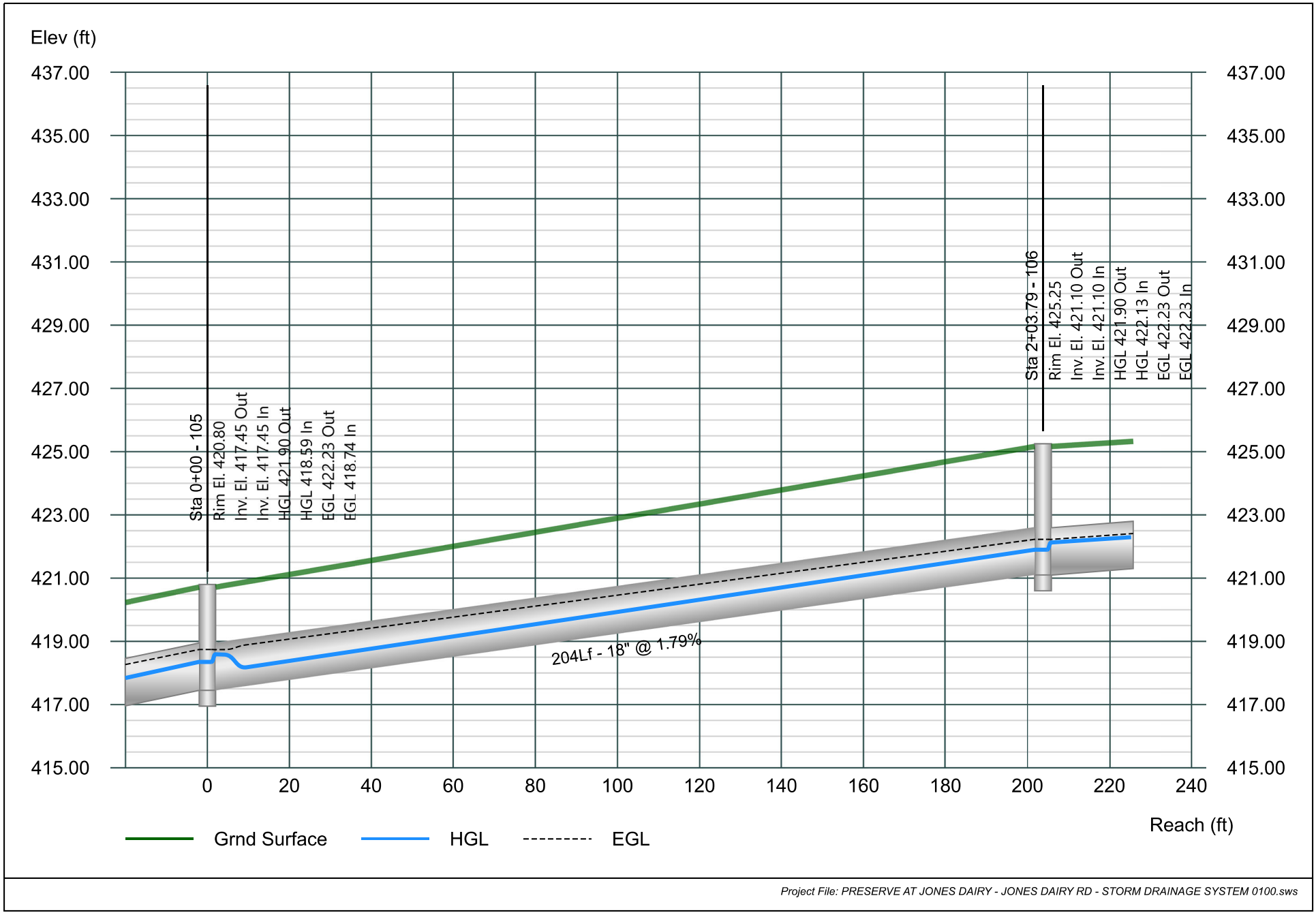


Line 6 - 106 TO 105

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

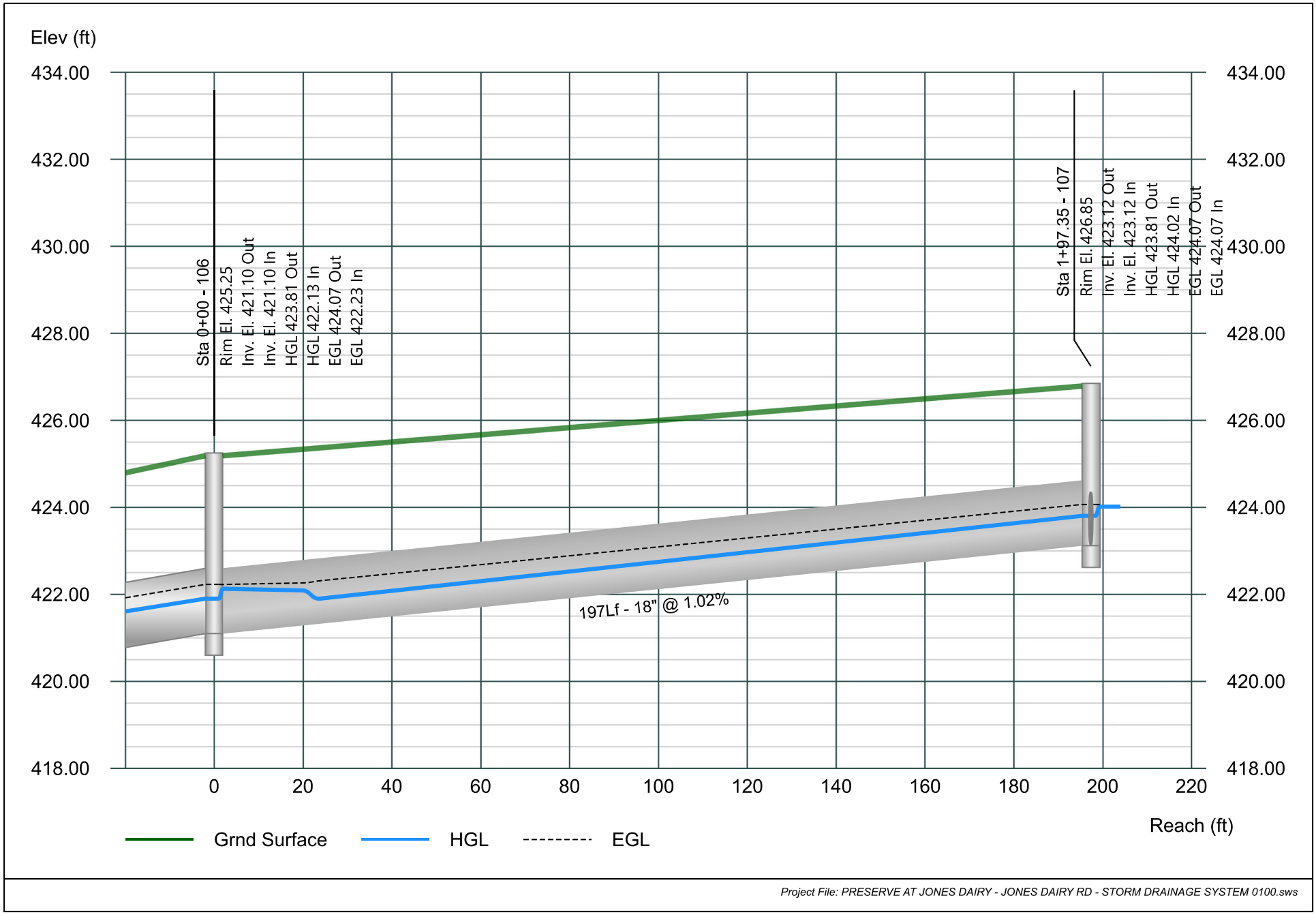


Line 7 - 107 TO 106

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

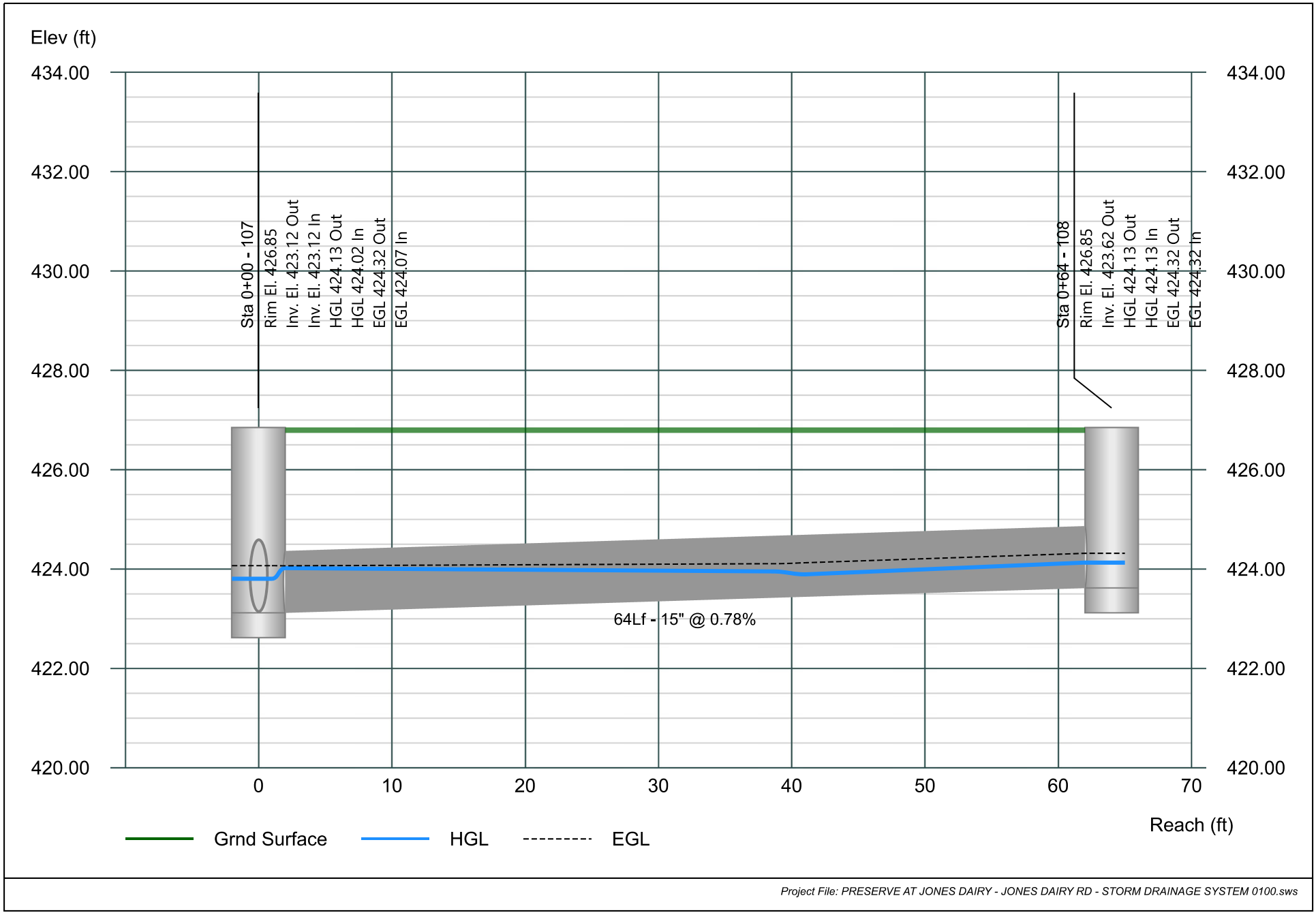


Line 8 - 108 TO 107

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

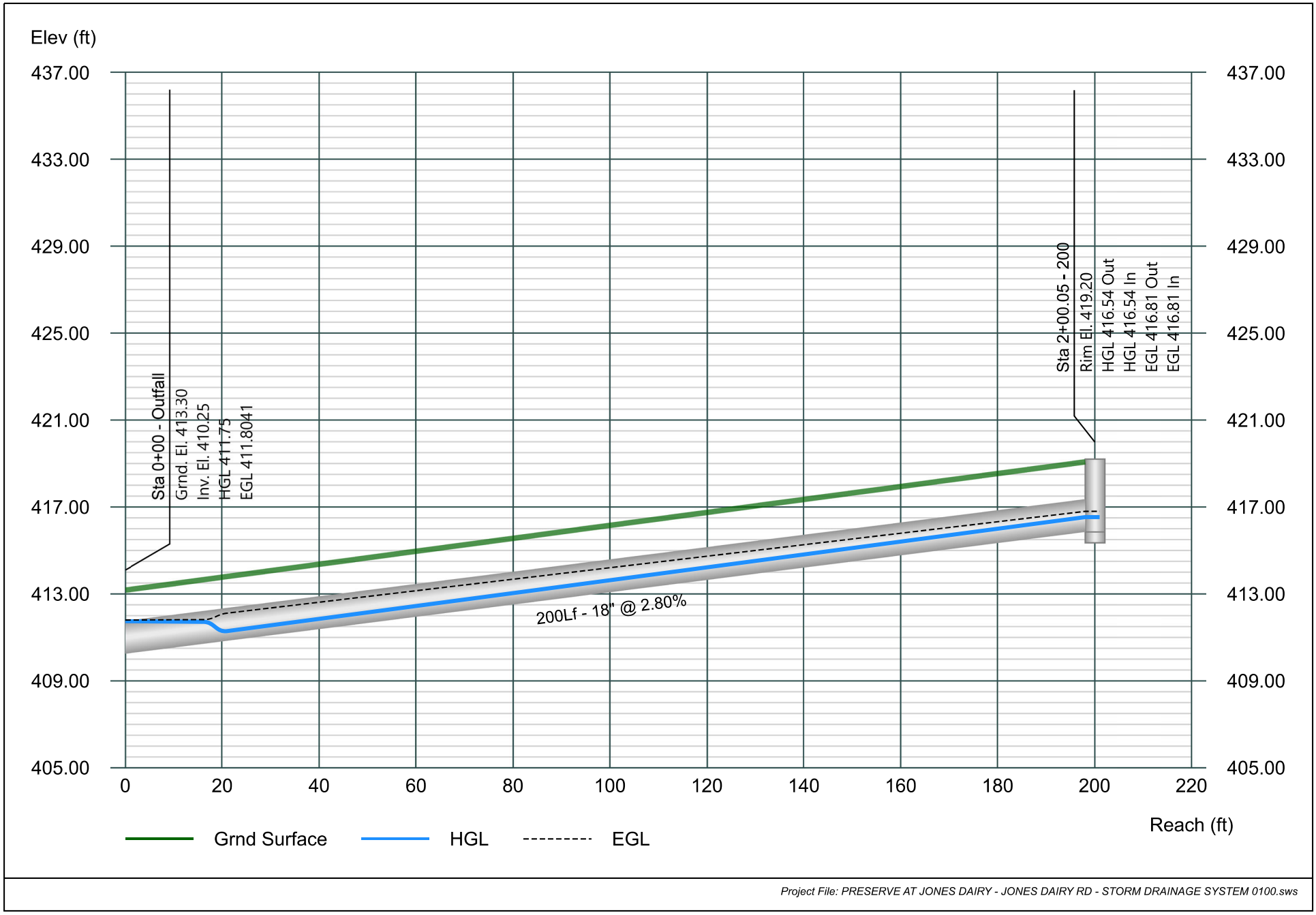


Line 1 - 200

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

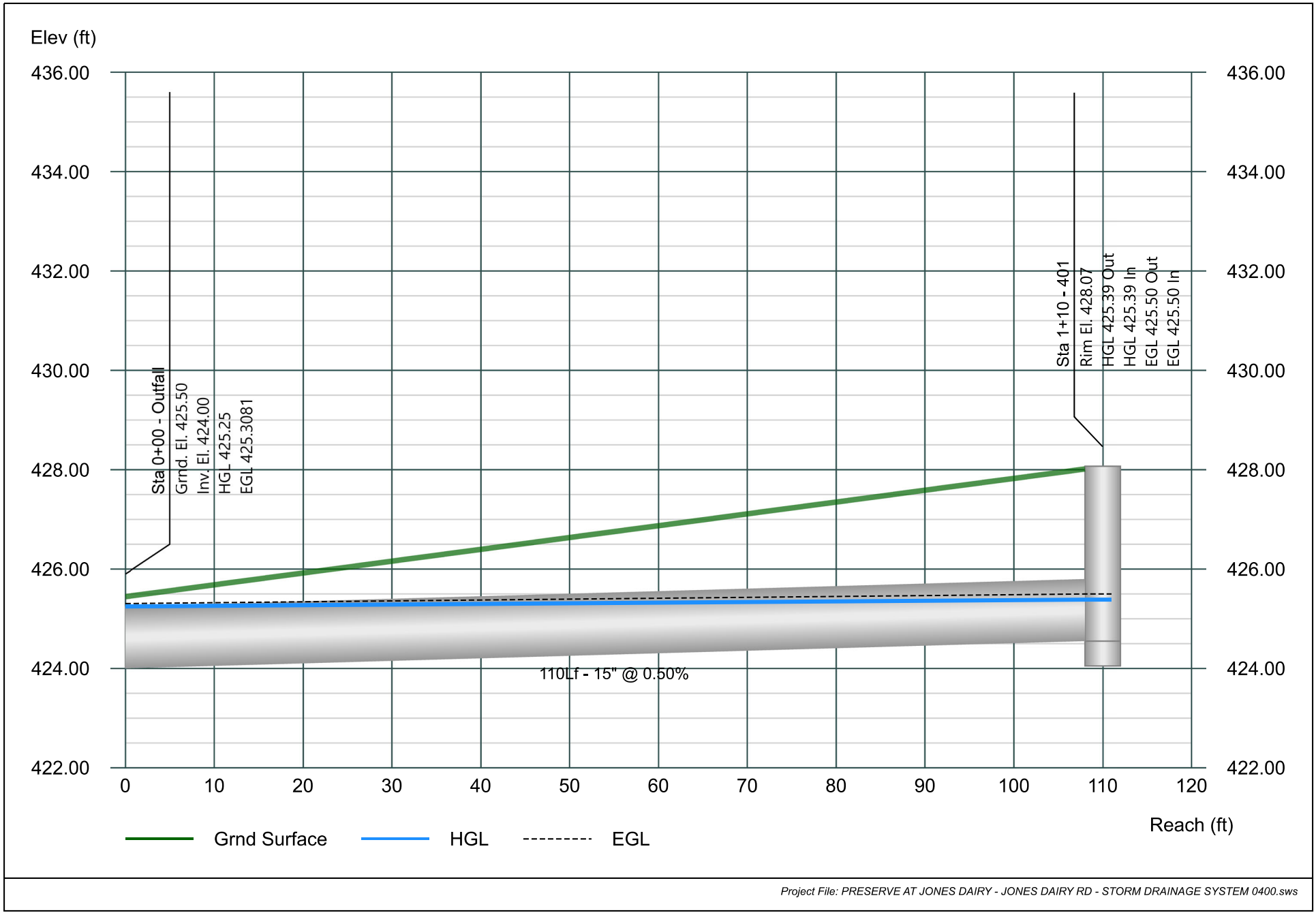


Line 1 - 401

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022



APPENDIX D – STORM SEWER GUTTER SPREAD CALCULATIONS

Spread Report

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

Line No.	Inlet ID	Area ID	Junct Type	Drain Area (ac)	Runoff Coeff (C)	i Inlet (in/hr)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Bypass (cfs)	Gutter Spread (ft)	Inlet Spread (ft)	
1	101	101	Comb.	0.060	0.85	4.00	0.20	0.00	0.20	0.00	2.10	1.56	
2	102	102	Comb.	0.040	0.85	4.00	0.14	0.08	0.22	0.00	2.20	1.59	
3	103	103	Comb.	0.070	0.89	4.00	0.25	0.15	0.32	0.08	4.70	2.23	
4	104	104	Comb.	0.220	0.85	4.00	0.75	0.10	0.69	0.15	5.53	4.51	
5	105	105	Comb.	0.200	0.85	4.00	0.68	0.13	0.72	0.10	4.45	3.58	
6	106	106	Comb.	0.200	0.85	4.00	0.68	0.13	0.68	0.13	5.35	4.63	
7	107	107	Comb.	0.250	0.85	4.00	0.85	0.00	0.72	0.13	5.30	4.53	
8	108	108	Comb.	0.250	0.85	4.00	0.85	0.00	0.72	0.13	5.30	4.53	

Notes: IDF File = Gutter Spread - 4 inches per hour.idf, Return Period = 10-yrs.

Spread Report

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

Line No.	Inlet ID	Area ID	Junct Type	Drain Area (ac)	Runoff Coeff (C)	i Inlet (in/hr)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Bypass (cfs)	Gutter Spread (ft)	Inlet Spread (ft)	
1	200	200	Comb.	0.500	0.85	4.00	1.70	0.00	1.37	0.33	5.40	4.83	

Notes: IDF File = Gutter Spread - 4 inches per hour.idf, Return Period = 10-yrs.

Spread Report

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

Line No.	Inlet ID	Area ID	Junct Type	Drain Area (ac)	Runoff Coeff (C)	i Inlet (in/hr)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Bypass (cfs)	Gutter Spread (ft)	Inlet Spread (ft)	
1		301	Comb.	0.330	0.85	4.00	1.12	0.00	0.92	0.20	5.38	4.78	
2	302	302	Comb.	0.250	0.85	4.00	0.85	0.00	0.85	0.00	4.92	4.92	
3	303	303	Comb.	0.020	0.85	4.00	0.07	0.00	0.07	0.00	2.80	1.61	
4	304	304	Dp-Curb	0.110	0.70	4.00	0.31	0.00	0.31	0.00	3.67	3.67	
5	305	305	Comb.	0.380	0.85	4.00	1.29	0.17	1.46	0.00	5.47	5.47	
6	306	306	Comb.	0.220	0.85	4.00	0.75	0.00	0.69	0.05	5.15	4.33	
7	307	307	Comb.	0.220	0.85	4.00	0.75	0.00	0.63	0.11	5.40	4.63	

Notes: IDF File = Gutter Spread - 4 inches per hour.idf, Return Period = 10-yrs.

Spread Report

Stormwater Studio 2022 v 3.0.0.29

Project Name: Enter Project Name...

12-05-2022

Line No.	Inlet ID	Area ID	Junct Type	Drain Area (ac)	Runoff Coeff (C)	i Inlet (in/hr)	Incr Q (cfs)	Q Carry (cfs)	Q Capt (cfs)	Q Bypass (cfs)	Gutter Spread (ft)	Inlet Spread (ft)	
1	401	401	Comb.	0.360	0.85	4.00	1.22	0.00	1.01	0.22	5.48	4.99	

Notes: IDF File = Gutter Spread - 4 inches per hour.idf, Return Period = 2-yrs.

APPENDIX E – DITCH CALCULATIONS

Channel Report

Project filename: PRESERVE AT JONES DAIRY - JONES DAIRY ROAD - DITCH 0100.stx

Studio Express by Hydrology Studio v 1.0.0.12

12-06-2022

FES100

Channel 1

TRIANGULAR

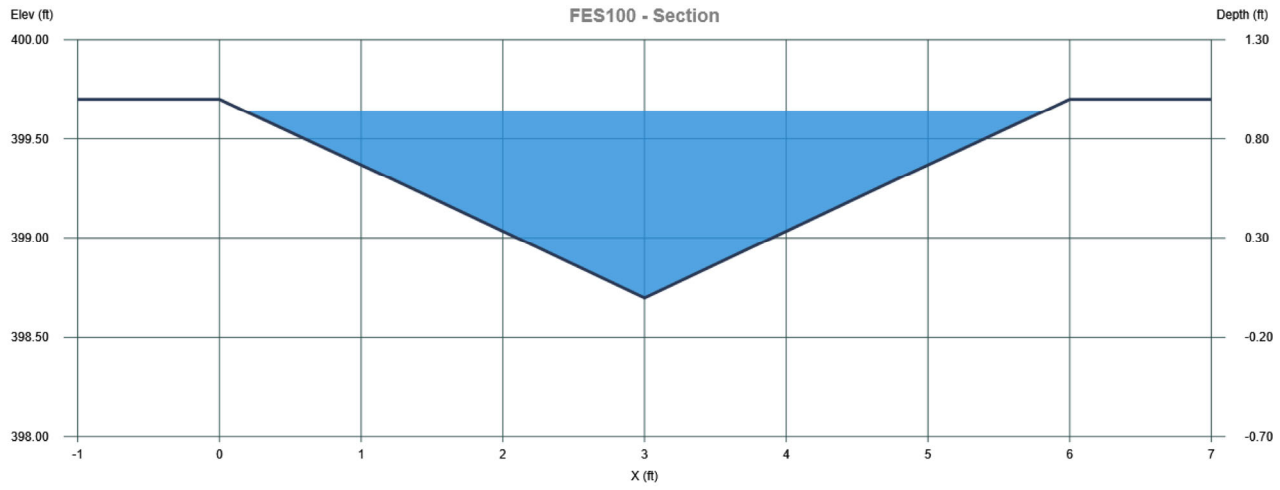
Bottom Width	= 0.00 ft
Side Slope Left, z:1	= 3.00
Side Slope Right, z:1	= 3.00
Total Depth	= 1.00 ft
Invert Elevation	= 398.70 ft
Channel Slope	= 1.000 %
Manning's n	= 0.033

DISCHARGE

Method	= Known Q
Known Q	= 6.84 cfs

CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)		(ft)	(ft)	(ft)	(lb/sqft)	(ft)
6.84	0.94	2.65	2.58	5.95	0.033	0.80	399.64	399.74	0.59	5.64



Channel Report

Project filename: PRESERVE AT JONES DAIRY - JONES DAIRY ROAD - DITCH 0100.stx

Studio Express by Hydrology Studio v 1.0.0.12

12-06-2022

FES304a

Channel 3

TRIANGULAR

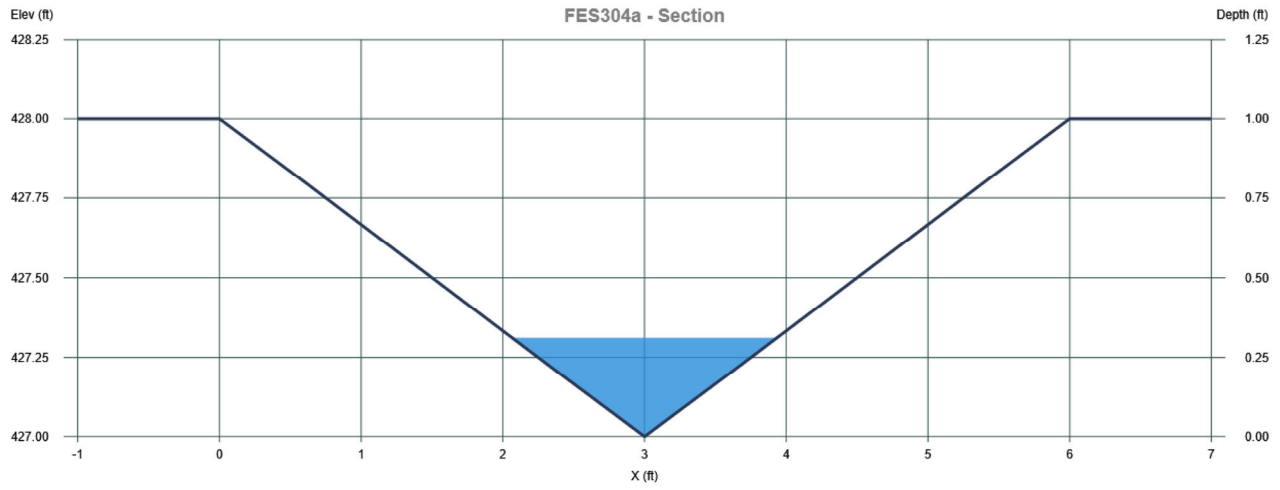
Bottom Width	= 0.00 ft
Side Slope Left, z:1	= 3.00
Side Slope Right, z:1	= 3.00
Total Depth	= 1.00 ft
Invert Elevation	= 427.00 ft
Channel Slope	= 1.000 %
Manning's n	= 0.033

DISCHARGE

Method	= Known Q
Known Q	= 0.35 cfs

CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)		(ft)	(ft)	(ft)	(lb/sqft)	(ft)
0.35	0.31	0.29	1.21	1.96	0.033	0.25	427.31	427.33	0.19	1.86



Channel Report

Project filename: PRESERVE AT JONES DAIRY - JONES DAIRY ROAD - DITCH 0100.stx

Studio Express by Hydrology Studio v 1.0.0.12

12-06-2022

FES400

Channel 2

TRIANGULAR

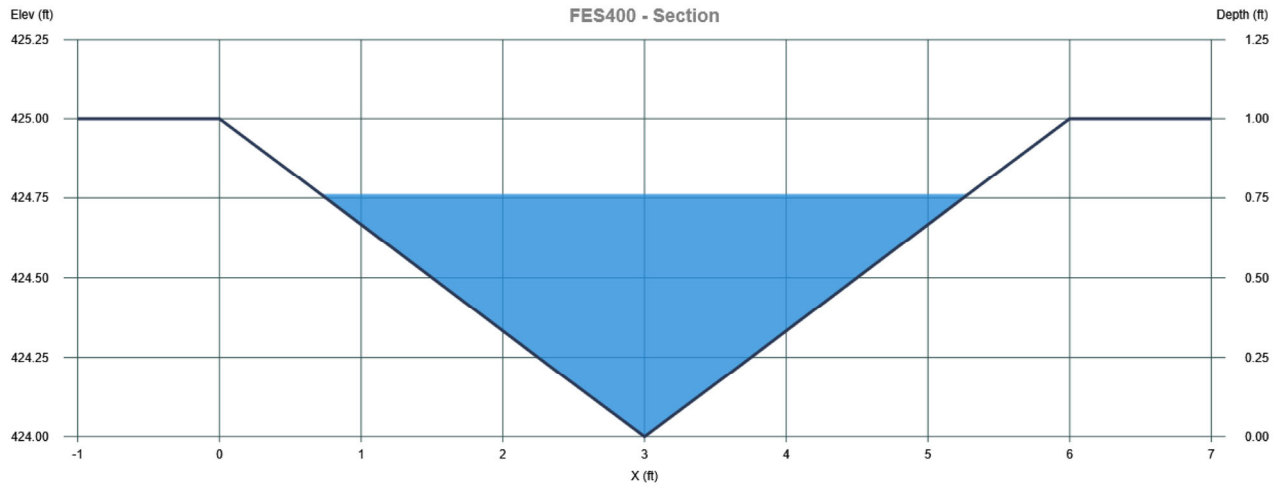
Bottom Width	= 0.00 ft
Side Slope Left, z:1	= 3.00
Side Slope Right, z:1	= 3.00
Total Depth	= 1.00 ft
Invert Elevation	= 424.00 ft
Channel Slope	= 1.000 %
Manning's n	= 0.033

DISCHARGE

Method	= Known Q
Known Q	= 3.90 cfs

CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)		(ft)	(ft)	(ft)	(lb/sqft)	(ft)
3.90	0.76	1.73	2.25	4.81	0.033	0.64	424.76	424.84	0.47	4.56



Channel Report

Project filename: PRESERVE AT JONES DAIRY - JONES DAIRY ROAD - DITCH 0100.stx

Studio Express by Hydrology Studio v 1.0.0.12

12-06-2022

DITCH1

Channel 4

TRIANGULAR

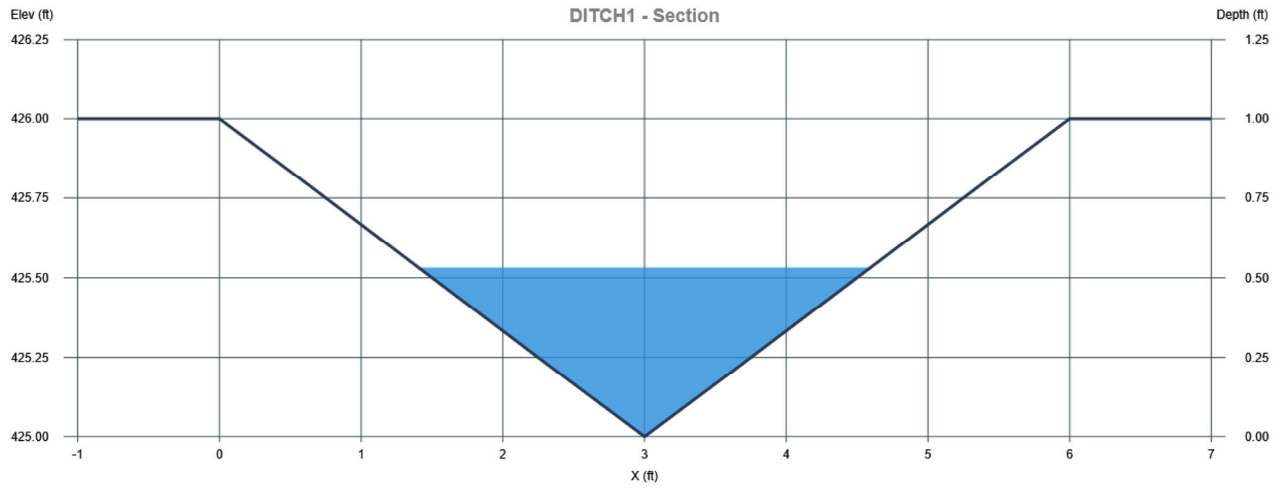
Bottom Width	= 0.00 ft
Side Slope Left, z:1	= 3.00
Side Slope Right, z:1	= 3.00
Total Depth	= 1.00 ft
Invert Elevation	= 425.00 ft
Channel Slope	= 1.000 %
Manning's n	= 0.033

DISCHARGE

Method	= Known Q
Known Q	= 1.50 cfs

CALCULATION SAMPLE

Flow	Depth	Area	Velocity	WP	n-value	Crit Depth	HGL	EGL	Max Shear	Top Width
(cfs)	(ft)	(sqft)	(ft/s)	(ft)		(ft)	(ft)	(ft)	(lb/sqft)	(ft)
1.50	0.53	0.84	1.78	3.35	0.033	0.44	425.53	425.58	0.33	3.18



PRESERVE AT JONES DAIRY

CONSTRUCTION DRAWINGS

JONES DAIRY ROAD IMPROVEMENTS

ROLESVILLE, NC

VICINITY MAP

NOVEMBER 24, 2021 (PREVIOUS SUBMITTAL BY OTHERS)
AUGUST 31, 2022
REVISED: OCTOBER 11, 2022
REVISED: DECEMBER 5, 2022

CLIENT

PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

SHEET INDEX

SHEET NO.	SHEET NAME	MOST CURRENT REVISION DATE
C1.0	EXISTING CONDITIONS PLAN	10/11/2022
C2.0	OVERALL SITE PLAN	12/05/2022
C3.1	SITE AND GRADING PLAN - JONES DAIRY ROAD (STA. 10+00 THRU 20+00)	12/05/2022
C3.2	SITE AND GRADING PLAN - JONES DAIRY ROAD (STA. 20+00 THRU 30+00)	12/05/2022
C3.3	SITE AND GRADING PLAN - JONES DAIRY ROAD (STA. 30+00 THRU 40+00)	12/05/2022
XS1.1	CROSS SECTIONS - JONES DAIRY ROAD (STA. 10+00 THRU 19+00)	12/05/2022
XS1.2	CROSS SECTIONS - JONES DAIRY ROAD (STA. 19+50 THRU 29+00)	12/05/2022
XS1.3	CROSS SECTIONS - JONES DAIRY ROAD (STA. 29+50 THRU 39+00)	12/05/2022
D1.1	DETAILS	08/31/2022
D1.2	DETAILS	08/31/2022
D1.3	DETAILS	08/31/2022
D1.4	DETAILS	08/31/2022
D1.5	DETAILS	08/31/2022
D1.6	DETAILS	08/31/2022
D1.7	DETAILS	08/31/2022
D1.8	DETAILS	08/31/2022
D1.9	DETAILS	08/31/2022
D1.10	DETAILS	08/31/2022
PLANS FOR REFERENCE ONLY		
P1.1	CATTLE DRIVE PLAN AND PROFILE	09/16/2022
P4.1	FIGHTING BULL DRIVE PLAN AND PROFILE	09/16/2022
P10.2	BELGIAN RED WAY PLAN AND PROFILE	12/01/2022
C25	SHADOWDALE LANE PLAN AND PROFILE	02/12/2021

GENERAL NOTES

1. THE DEVELOPER, CONTRACTOR, SUBCONTRACTORS AND SURVEYOR SHALL CONFIRM THAT THE MOST CURRENT SET OF PLANS AND/OR PLAN SHEET(S) ARE BEING USED FOR CONSTRUCTION AND SHALL KEEP A COPY OF SAID PLANS ON-SITE OR OTHERWISE AVAILABLE FOR REVIEW BY THE OWNER, THE OWNER'S REPRESENTATIVE(S) AND THE PERMITTING AUTHORITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SCHEDULE A PRECONSTRUCTION CONFERENCE WITH REPRESENTATIVES OF THE PERMITTING AUTHORITIES AND A REPRESENTATIVE OF THE OWNER.
3. THE CONTRACTOR SHALL CONFIRM THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED FOR THE PROPOSED CONSTRUCTION. BEGINNING ANY ASPECT OF CONSTRUCTION OR FABRICATING ANY ITEM PRIOR TO RECIEVING ALL PLANS AND APPROPRIATE DOCUMENTATION OF APPROVAL SHALL CAUSE THE CONTRACTOR TO ASSUME FULL REPONSIBILITY FOR ANY SUBSEQUENT MODIFICATIONS TO THEIR WORK.
4. THE CONTRACTOR SHALL CONFIRM THAT ALL CONSTRUCTION AND CONSTRUCTION MATERIALS ARE IN ACCORDANCE WITH THE PERMITS ISSUED AND THE LATEST APPLICABLE FEDERAL, STATE, COUNTY, AND LOCAL CODES. IN THE EVENT OF CONFLICT BETWEEN ANY OF THESE STANDARDS, SPECIFICATIONS, OR PLANS, THE MOST STRINGENT SHALL GOVERN.
5. THE CONTRACTOR SHALL DETERMINE AND BE RESPONSIBLE FOR THE MEANS AND METHODS NECESSARY FOR THE CONSTRUCTION OF THE PROJECT AS SHOWN ON THESE PLANS.
6. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE APPROPRIATE PERMITTING AUTHORITY TO PROVIDE THE REQUIRED COORDINATION, DOCUMENTATION AND INSPECTIONS FOR THE RELOCATION OF, OR CONNECTION TO ANY EXISTING UTILITIES.
7. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSPECTIONS REQUIRED TO PREPARE AS-BUILT CERTIFICATIONS.
8. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ANY OFFSITE EASEMENTS.
9. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY THAT ALL NECESSARY RIGHT OF WAY, EASEMENTS AND ENCROACHMENT AGREEMENTS HAVE BEEN OBTAINED.
10. THE CONTRACTOR SHALL CONFIRM THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES (INCLUDING STORM STRUCTURES) WITHIN THE LIMITS OF CONSTRUCTION PRIOR TO BEGINNING CONSTRUCTION AND NOTIFY THE OWNER OR ENGINEER OF ANY DISCREPANCIES. BEGINNING CONSTRUCTION PRIOR TO LOCATING UTILITIES WITHIN THE LIMITS OF CONSTRUCTION AND NOTIFYING THE OWNER OR ENGINEER OF ANY DISCREPANCIES SHALL CAUSE THE CONTRACTOR TO ASSUME FULL RESPONSIBILITY FOR ANY SUBSEQUENT MODIFICATIONS TO THEIR WORK.
11. DEPARTURES FROM THE APPROVED CONSTRUCTION DRAWINGS, MUNICIPAL SPECIFICATIONS OR ISSUED PERMITS THAT ARE DEEMED NECESSARY SHALL COORDINATED WITH THE APPROPRIATE PERMITTING AUTHORITY. CHANGES MADE WITHOUT THE APPROPRIATE APPROVAL SHALL CAUSE THE CONTRACTOR TO ASSUME RESPONSIBILITY FOR ANY SUBSEQUENT MODIFICATIONS TO THEIR WORK.
12. THE STAKING SURVEYOR AND/OR THEIR SUBCONTRACTOR SHALL INDEPENDENTLY VERIFY THE HORIZONTAL AND VERTICAL DATUM FOR THIS PROJECT PRIOR TO CONSTRUCTION.
13. THE CONTRACTOR SHALL NOTE THAT THE PLANS DO NOT SHOW EVERY OFFSET, TRANSITION, FITTING ETC. THAT MAY BE REQUIRED FOR CONSTRUCTION.
14. ALL GRADING, DIMENSIONS, SLOPES TO BUILDING ACCESS/EGRESS POINTS, HANDICAP RAMPS/PARKING SPACES, STRIPING AND PAVEMENT MARKINGS SHALL CONFORM TO ADA REQUIREMENTS AND THE NORTH CAROLINA STATE BUILDING CODE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ADA CONFORMANCE PRIOR TO ANY CONSTRUCTION.
15. ALL DIMENSIONS ARE TO BACK-OF-CURB UNLESS OTHERWISE NOTED.
16. CONTRACTOR SHALL CONFIRM ALL COMPACTION REQUIREMENTS WITH THE GEOTECHNICAL ENGINEER.

REVISIONS

REV NO.	DESCRIPTION	DETAILS	REVISION DATE
1	NCDOT COMMENTS #1	REVISED CROSS SECTIONS, ADDED SITE PLAN, ADDED EXISTING CONDITIONS PLAN, REVISED ROAD SECTIONS, ADDED DRIVEWAY STEM PROFILES, UPDATED TWLTL, ADDED LEFT TURN LANES, REVISED STRIPING, MOVED MID-BLOCK CROSSING, ADDED HC RAMP DESIGN AT ALL INTERSECTIONS, REVISED STORM DRAINAGE	10/11/2022
2	NCDOT COMMENTS #2	REVISED CROSS SECTIONS, REVISED PROPOSED STRIPING, REVISED STORM DRAINAGE, RELOCATED EXISTING FIRE HYDRANTS	12/05/2022

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 ENGINEER JEREMY J. BECKETT

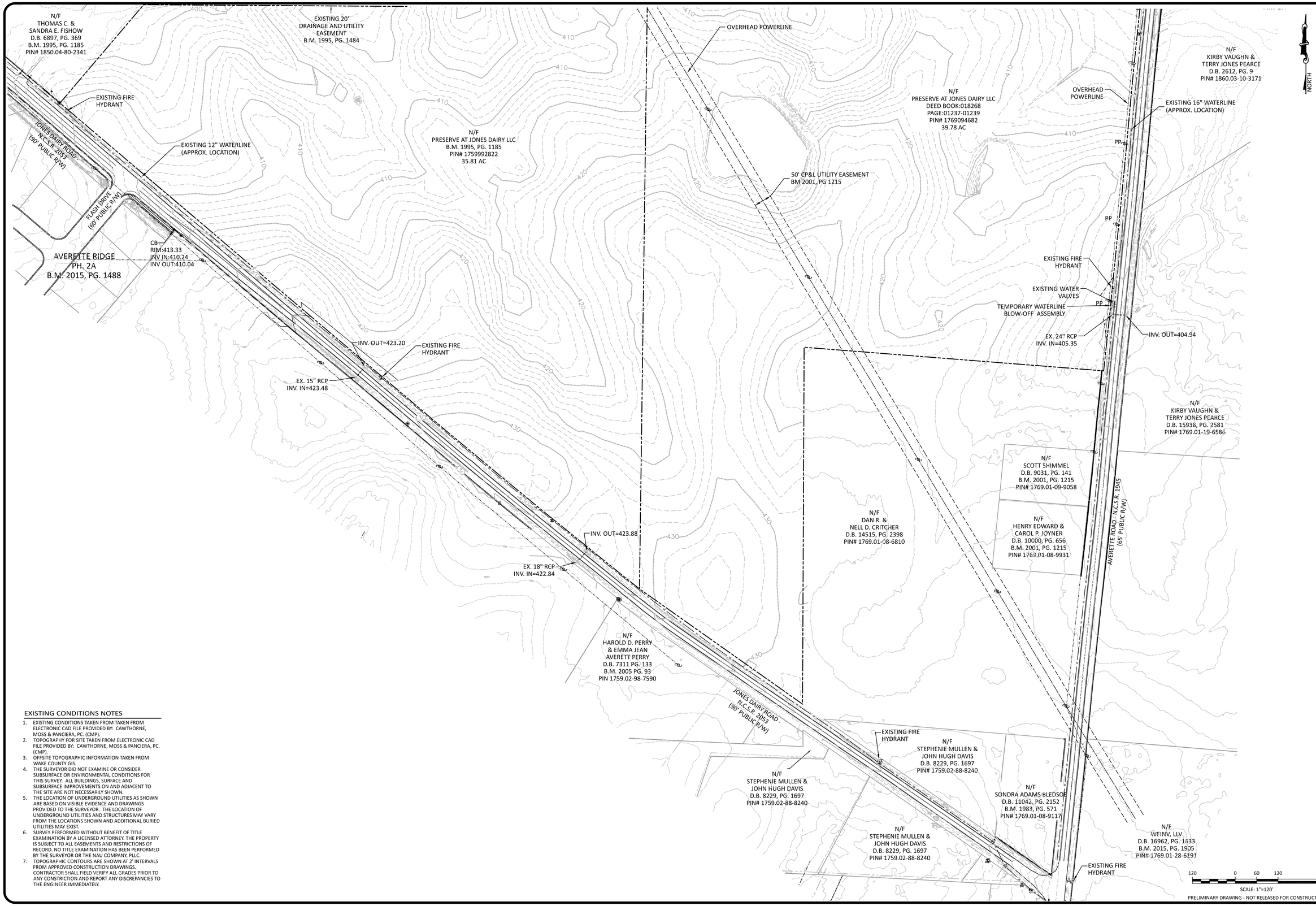
2022-12-05

TOWN OF ROLESVILLE
PROJECT IDENTIFICATION #
CD-21-04

ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH NCDOT STANDARDS AND SPECIFICATIONS

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION



EXISTING CONDITIONS NOTES

1. EXISTING CONDITIONS TAKEN FROM TAKEN FROM ELECTRONIC CAD FILE PROVIDED BY: CAWTHORNE, MOSS & PANCIERA, PC. (CMP).
2. TOPOGRAPHY FOR SITE TAKEN FROM ELECTRONIC CAD FILE PROVIDED BY: CAWTHORNE, MOSS & PANCIERA, PC. (CMP).
3. OFFSITE TOPOGRAPHIC INFORMATION TAKEN FROM WAKE COUNTY GIS.
4. THE SURVEYOR DID NOT EXAMINE OR CONSIDER SUBSURFACE OR ENVIRONMENTAL CONDITIONS FOR THIS SURVEY. ALL BUILDINGS, SURFACE AND SUBSURFACE IMPROVEMENTS ON AND ADJACENT TO THE SITE ARE NOT NECESSARILY SHOWN.
5. THE LOCATION OF UNDERGROUND UTILITIES AS SHOWN ARE BASED ON VISIBLE EVIDENCE AND DRAWINGS PROVIDED TO THE SURVEYOR. THE LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES MAY VARY FROM THE LOCATIONS SHOWN AND ADDITIONAL BURIED UTILITIES MAY EXIST.
6. SURVEY PERFORMED WITHOUT BENEFIT OF TITLE EXAMINATION BY A LICENSED ATTORNEY. THE PROPERTY IS SUBJECT TO ALL EASEMENTS AND RESTRICTIONS OF RECORD. NO TITLE EXAMINATION HAS BEEN PERFORMED BY THE SURVEYOR OR THE NAU COMPANY, PLLC.
7. TOPOGRAPHIC CONTOURS ARE SHOWN AT 2' INTERVALS FROM APPROVED CONSTRUCTION DRAWINGS. CONTRACTOR SHALL FIELD VERIFY ALL GRADES PRIOR TO ANY CONSTRICTION AND REPORT ANY DISCREPANCIES TO THE ENGINEER IMMEDIATELY.

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

1	2022-10-11	NCDOT COMMENTS #1

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

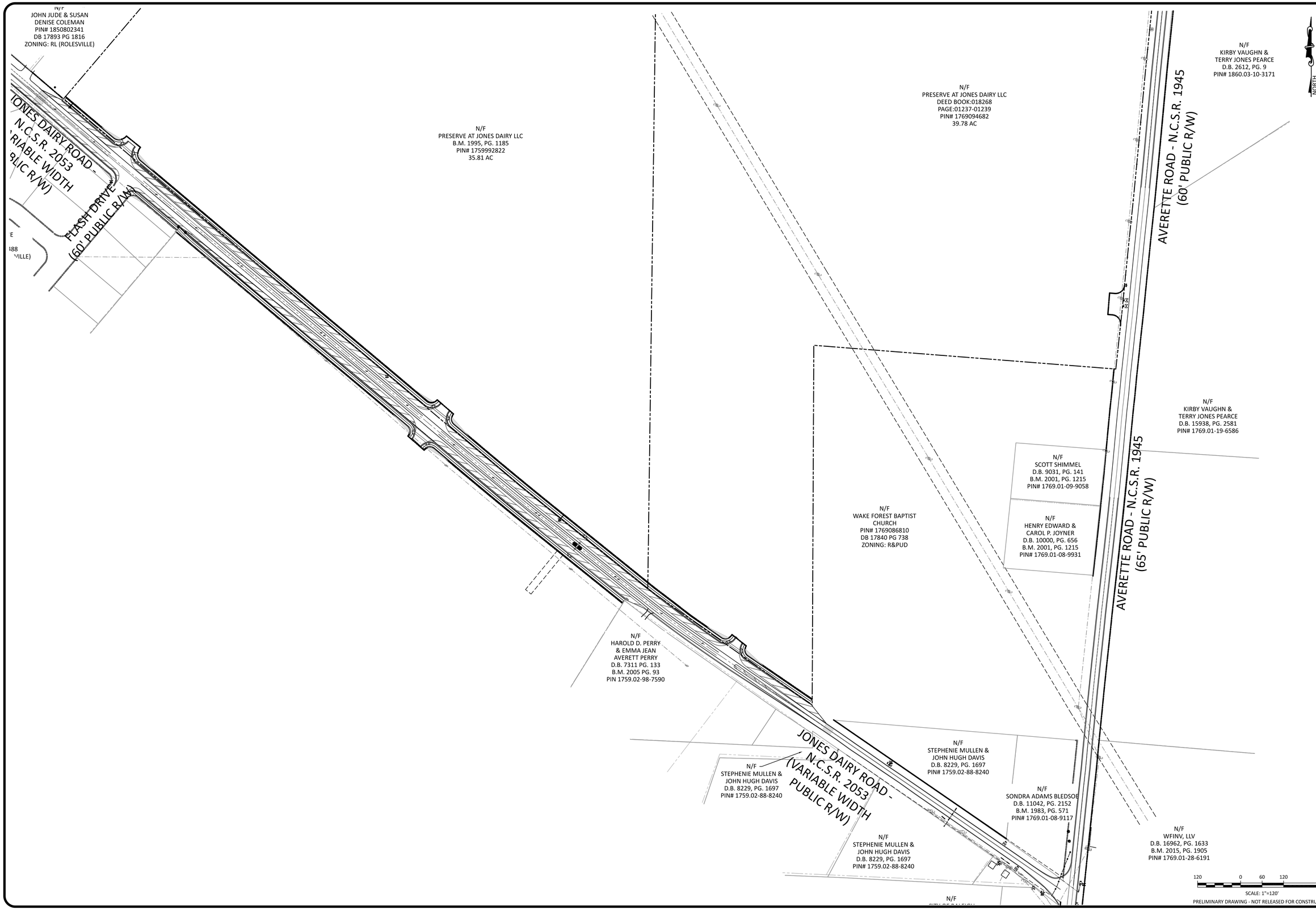
ROLESVILLE, NC

EXISTING CONDITIONS PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-10-11

PROJECT NO:	---
DESIGN BY:	JJB
DRAWN BY:	JJB
SCALE:	1"=120'
DATE:	2022-08-31
SHEET NO:	C1.0

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION



PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

OVERALL SITE PLAN

NORTH CAROLINA
PROFESSIONAL ENGINEER
SEAL
26411
JEREMY J. BECKETT

2022-12-05

PROJECT NO: ---

DESIGN BY: JJB

DRAWN BY: JJB

SCALE: 1"=120'

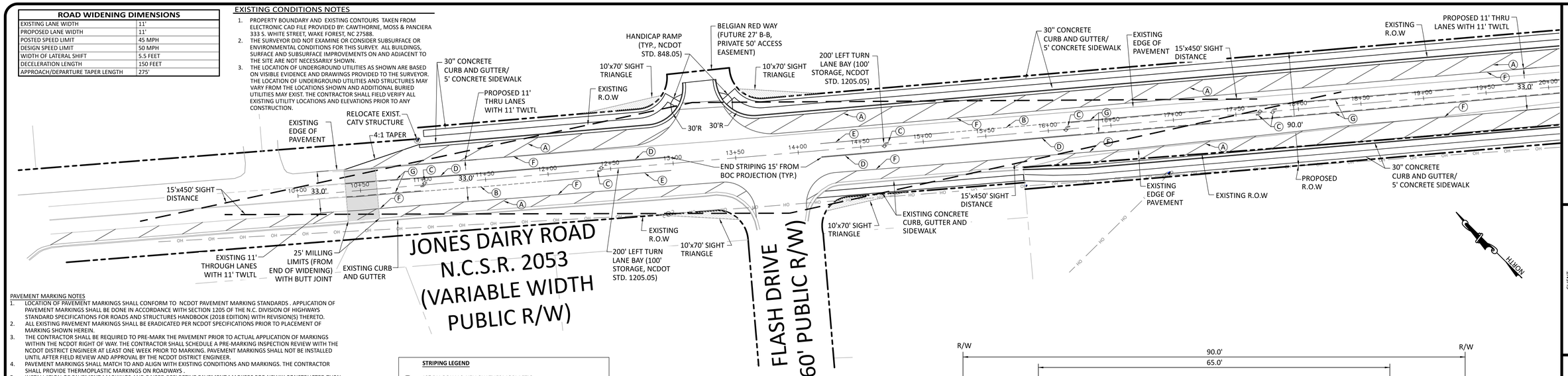
DATE: 2022-08-31

SHEET NO: **C2.0**

ROAD WIDENING DIMENSIONS	
EXISTING LANE WIDTH	11'
PROPOSED LANE WIDTH	11'
POSTED SPEED LIMIT	45 MPH
DESIGN SPEED LIMIT	50 MPH
WIDTH OF LATERAL SHIFT	5.5 FEET
DECELERATION LENGTH	150 FEET
APPROACH/DEPARTURE TAPER LENGTH	275'

EXISTING CONDITIONS NOTES

1. PROPERTY BOUNDARY AND EXISTING CONTOURS TAKEN FROM ELECTRONIC CAD FILE PROVIDED BY: CAWTHORNE, MOSS & PANCIERA 333 S. WHITE STREET, WAKE FOREST, NC 27588.
2. THE SURVEYOR DID NOT EXAMINE OR CONSIDER SUBSURFACE OR ENVIRONMENTAL CONDITIONS FOR THIS SURVEY. ALL BUILDINGS, SURFACE AND SUBSURFACE IMPROVEMENTS ON AND ADJACENT TO THE SITE ARE NOT NECESSARILY SHOWN.
3. THE LOCATION OF UNDERGROUND UTILITIES AS SHOWN ARE BASED ON VISIBLE EVIDENCE AND DRAWINGS PROVIDED TO THE SURVEYOR. THE LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES MAY VARY FROM THE LOCATIONS SHOWN AND ADDITIONAL BURIED UTILITIES MAY EXIST. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITY LOCATIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.



PAVEMENT MARKING NOTES

1. LOCATION OF PAVEMENT MARKINGS SHALL CONFORM TO NCDOT PAVEMENT MARKING STANDARDS . APPLICATION OF PAVEMENT MARKINGS SHALL BE DONE IN ACCORDANCE WITH SECTION 1205 OF THE N.C. DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES HANDBOOK (2018 EDITION) WITH REVISION(S) THERETO.
2. ALL EXISTING PAVEMENT MARKINGS SHALL BE ERADICATED PER NCDOT SPECIFICATIONS PRIOR TO PLACEMENT OF MARKING SHOWN HEREIN.
3. THE CONTRACTOR SHALL BE REQUIRED TO PRE-MARK THE PAVEMENT PRIOR TO ACTUAL APPLICATION OF MARKINGS WITHIN THE NCDOT RIGHT OF WAY. THE CONTRACTOR SHALL SCHEDULE A PRE-MARKING INSPECTION REVIEW WITH THE NCDOT DISTRICT ENGINEER AT LEAST ONE WEEK PRIOR TO MARKING. PAVEMENT MARKINGS SHALL NOT BE INSTALLED UNTIL AFTER FIELD REVIEW AND APPROVAL BY THE NCDOT DISTRICT ENGINEER.
4. PAVEMENT MARKINGS SHALL MATCH TO AND ALIGN WITH EXISTING CONDITIONS AND MARKINGS. THE CONTRACTOR SHALL PROVIDE THERMOPLASTIC MARKINGS ON ROADWAYS .
5. INSTALLATION OF PAVEMENT MARKINGS AND RAISED REFLECTIVE PAVEMENT MARKERS FOR NEWLY CONSTRUCTED TURN LANES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR .

CONSTRUCTION NOTES:

1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE PERMITS ISSUED AND THE LATEST APPLICABLE FEDERAL, STATE, COUNTY, AND LOCAL CODES.
2. THE CONTRACTOR SHALL DETERMINE AND BE RESPONSIBLE FOR THE MEANS AND METHODS NECESSARY FOR THE CONSTRUCTION OF THE PROJECT AS SHOWN ON THESE PLANS.
3. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ANY OFFSITE EASEMENTS. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY THAT ALL NECESSARY RIGHT OF WAY, EASEMENTS AND ENCROACHMENT AGREEMENTS HAVE BEEN OBTAINED.
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5. EXISTING UTILITIES AND STRUCTURES SHOWN ON THE PLANS ARE BASED ON A FIELD SURVEY.
6. THE CONTRACTOR SHALL CONFIRM THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES WITHIN THE LIMITS OF CONSTRUCTION PRIOR TO BEGINNING CONSTRUCTION AND NOTIFY THE OWNER OR ENGINEER OF ANY DISCREPANCIES. BEGINNING CONSTRUCTION PRIOR TO LOCATING UTILITIES WITHIN THE LIMITS OF CONSTRUCTION AND NOTIFYING THE OWNER OR ENGINEER OF ANY DISCREPANCIES SHALL CAUSE THE CONTRACTOR TO ASSUME FULL RESPONSIBILITY FOR ANY SUBSEQUENT MODIFICATIONS TO THEIR WORK.
7. THE STAKING SURVEYOR AND/OR THEIR SUBCONTRACTOR SHALL INDEPENDENTLY VERIFY THE HORIZONTAL AND VERTICAL DATUM FOR THIS PROJECT PRIOR TO CONSUTRCTION.

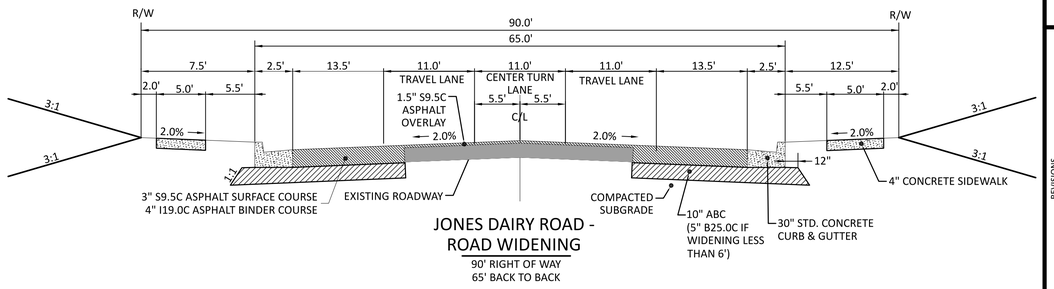
STRIPING LEGEND

- (A) 12" DIAGONALS, YELLOW THERMOPLASTIC NCDOT STD. 1205.01
- (B) 3" WHITE MINI SKIP LINE NCDOT STD. 1205.05
- (C) THERMOPLASTIC WHITE DIRECTIONAL ARROW NCDOT STD. 1205.08
- (D) 4" WIDE THERMOPLASTIC DOUBLE YELLOW CENTERLINE - SOLID LINE NCDOT STD. 1205.01
- (E) 4" WIDE WHITE TURN LANE LINE NCDOT STD. 1205.01
- (F) 4" WIDE WHITE EDGE LINE NCDOT STD. 1205.01
- (G) 4" YELLOW CENTER LINE WITH 4" YELLOW SKIP CENTER LINE NCDOT STD. 1205.02

NOTES:
ALL STRIPING SHALL BE THERMOPLASTIC.

ALL STRIPING AND SIGNAGE TO COMPLY WITH NCDOT STANDARDS AND SPECIFICATONS.

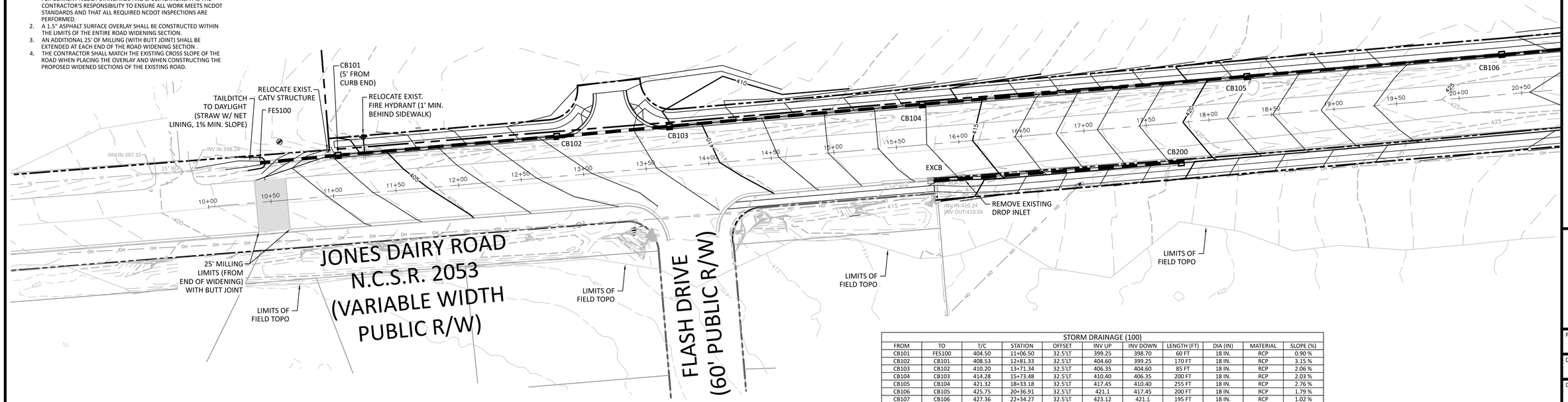
SITE PLAN



JONES DAIRY ROAD - ROAD WIDENING
90' RIGHT OF WAY
65' BACK TO BACK

ROAD WIDENING NOTES

1. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED PER CURRENT NCDOT STANDARDS AND SPECIFICATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL WORK MEETS NCDOT STANDARDS AND THAT ALL REQUIRED NCDOT INSPECTIONS ARE PERFORMED.
2. A 1.5" ASPHALT SURFACE OVERLAY SHALL BE CONSTRUCTED WITHIN THE LIMITS OF THE ENTIRE ROAD WIDENING SECTION.
3. AN ADDITIONAL 25' OF MILLING (WITH BUTT JOINT) SHALL BE EXTENDED AT EACH END OF THE ROAD WIDENING SECTION .
4. THE CONTRACTOR SHALL MATCH THE EXISTING CROSS SLOPE OF THE ROAD WHEN PLACING THE OVERLAY AND WHEN CONSTRUCTING THE PROPOSED WIDENED SECTIONS OF THE EXISTING ROAD.



STORM DRAINAGE (100)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB101	FES100	404.50	11+06.50	32.5'LT	399.25	398.70	60 FT	18 IN.	RCP	0.90 %
CB102	CB101	408.53	12+81.33	32.5'LT	404.60	399.25	170 FT	18 IN.	RCP	3.15 %
CB103	CB102	410.20	13+71.34	32.5'LT	406.35	404.60	85 FT	18 IN.	RCP	2.06 %
CB104	CB103	414.28	15+73.48	32.5'LT	410.40	406.35	200 FT	18 IN.	RCP	2.03 %
CB105	CB104	421.32	18+33.18	32.5'LT	417.45	410.40	255 FT	18 IN.	RCP	2.76 %
CB106	CB105	425.75	20+36.91	32.5'LT	421.1	417.45	200 FT	18 IN.	RCP	1.79 %
CB107	CB106	427.36	22+34.27	32.5'LT	423.12	421.1	195 FT	18 IN.	RCP	1.02 %
EXFES	CB107	-	-	-	423.20 (EXIST.)	423.12	10 FT	15 IN.	RCP	0.80 % (EXIST.)
CB108	EXFES	427.36	22+33.80	32.5'RT	423.62	423.50 (EXIST.)	15 FT	15 IN.	RCP	0.80 % (EXIST.)

STORM DRAINAGE (200)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB200	EXCB	419.70	17+75.00	32.5'RT	415.85	410.25 (EXIST.)	2OO FT	18 IN.	RCP	2.82 %

GRADING PLAN

40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS
ROLESVILLE, NC

SITE/GRADING PLAN - JONES DAIRY ROAD

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-12-05

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: 1"=40'
DATE: 2022-08-31
SHEET NO: C3.1

EXISTING CONDITIONS NOTES

1. PROPERTY BOUNDARY AND EXISTING CONTOURS TAKEN FROM ELECTRONIC CAD FILE PROVIDED BY: CAWTHORNE, MOSS & PANCIERA 333 S. WHITE STREET, WAKE FOREST, NC 27588.
2. THE SURVEYOR DID NOT EXAMINE OR CONSIDER SUBSURFACE OR ENVIRONMENTAL CONDITIONS FOR THIS SURVEY. ALL BUILDINGS, SURFACE AND SUBSURFACE IMPROVEMENTS ON AND ADJACENT TO THE SITE ARE NOT NECESSARILY SHOWN.
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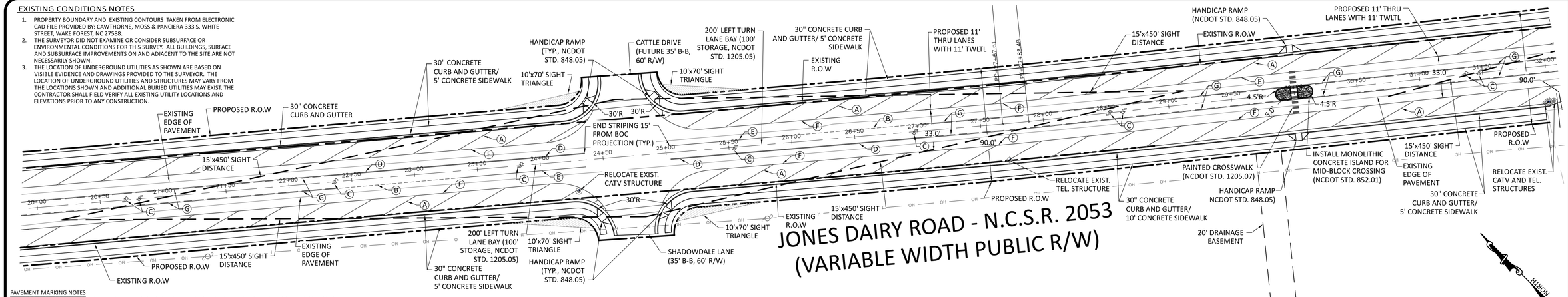

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CONSTRUCTION NOTES:

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STRIPING LEGEND

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- (B) 3" WHITE MINI SKIP LINE NCDOT STD. 1205.05
- (C) THERMOPLASTIC WHITE DIRECTIONAL ARROW NCDOT STD. 1205.08
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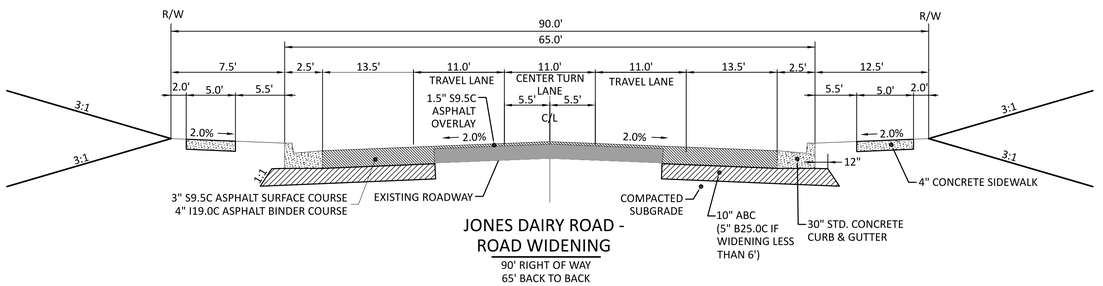
- (E) 4" WIDE WHITE TURN LANE LINE NCDOT STD. 1205.01
- (F) 4" WIDE WHITE EDGE LINE NCDOT STD. 1205.01
- (G) 4" YELLOW CENTER LINE WITH 4" YELLOW SKIP CENTER LINE NCDOT STD. 1205.02

NOTES:
ALL STRIPING SHALL BE THERMOPLASTIC.

ALL STRIPING AND SIGNAGE TO COMPLY WITH NCDOT STANDARDS AND SPECIFICATAONS.

ROAD WIDENING DIMENSIONS	
EXISTING LANE WIDTH	11'
PROPOSED LANE WIDTH	11'
POSTED SPEED LIMIT	45 MPH
DESIGN SPEED LIMIT	50 MPH
WIDTH OF LATERAL SHIFT	5.5 FEET
DECELERATION LENGTH	150 FEET
APPROACH/DEPARTURE TAPER LENGTH	275'

SITE PLAN



JONES DAIRY ROAD - ROAD WIDENING
90' RIGHT OF WAY
65' BACK TO BACK

ROAD WIDENING NOTES

1. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED PER CURRENT NCDOT STANDARDS AND SPECIFICATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL WORK MEETS NCDOT STANDARDS AND THAT ALL REQUIRED NCDOT INSPECTIONS ARE PERFORMED.
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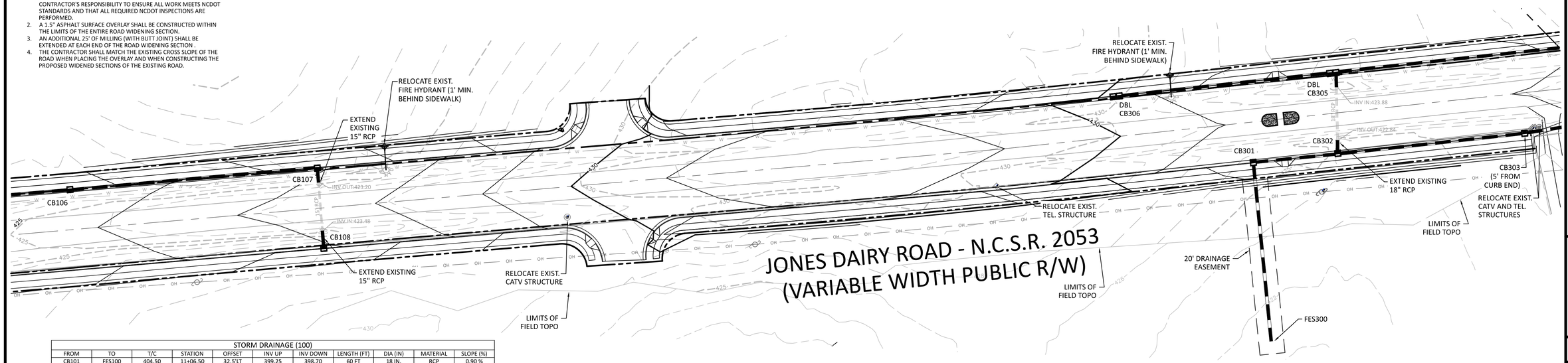

GRADING PLAN

STORM DRAINAGE (100)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB101	FES100	404.50	11+06.50	32.5'LT	399.25	398.70	60 FT	18 IN.	RCP	0.90 %
CB102	CB101	408.53	12+81.33	32.5'LT	404.60	399.25	170 FT	18 IN.	RCP	3.15 %
CB103	CB102	410.20	13+71.34	32.5'LT	406.35	404.60	85 FT	18 IN.	RCP	2.06 %
CB104	CB103	414.28	15+73.48	32.5'LT	410.40	406.35	200 FT	18 IN.	RCP	2.03 %
CB105	CB104	421.32	18+33.18	32.5'LT	417.45	410.40	255 FT	18 IN.	RCP	2.76 %
CB106	CB105	425.75	20+36.91	32.5'LT	421.1	417.45	200 FT	18 IN.	RCP	1.79 %
CB107	CB106	427.36	22+34.27	32.5'LT	423.12	421.1	195 FT	18 IN.	RCP	1.02 %
EXFES	CB107	-	-	-	423.20 (EXIST.)	423.12	10 FT	15 IN.	RCP	0.80 % (EXIST.)
CB108	EXFES	427.36	22+33.80	32.5'RT	423.62	423.50 (EXIST.)	15 FT	15 IN.	RCP	0.80 % (EXIST.)

STORM DRAINAGE (200)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB200	EXCB	419.70	17+75.00	32.5'RT	415.85	410.25 (EXIST.)	2OO FT	18 IN.	RCP	2.82 %

STORM DRAINAGE (300)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB301	FES300	428.71	29+74.90	32.5'RT	422.00	417.10	140 FT	24 IN.	RCP	3.43 %
CB302	CB301	428.47	30+42.44	32.5'RT	422.60	422.00	65 FT	24 IN.	RCP	0.89 %
CB303	CB302	429.17	31+91.70	32.5'RT	424.40	422.60	150 FT	15 IN.	RCP	1.21 %
DI304	CB303	428.00 (T/G)	32+45.20	29.46'RT	425.00	424.40	50 FT	15 IN.	RCP	1.20 %
FES304a	DI304	-	32+44.61	31.17'RT	427.00	425.00	40 FT	15 IN.	RCP	5.00 %
EXFES	CB302	-	32+82.26	28.26' RT	422.85	422.60	10 FT	18 IN.	RCP	2.50 % (EXIST.)
CB305	EXFES	428.46	30+47.95	32.5'LT	424.15	423.90	10 FT	18 IN.	RCP	2.50 % (EXIST.)
CB306	CB305	430.43	28+74.73	32.5'LT	426.90	424.15	170 FT	15 IN.	RCP	1.60 %
CB307	CB305	429.20	32+29.71	32.5'LT	425.70	424.15	180 FT	15 IN.	RCP	0.85 %

40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS
ROLESVILLE, NC

SITE/GRADING PLAN - JONES DAIRY ROAD

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-12-05

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: 1"=40'
DATE: 2022-08-31
SHEET NO: C3.2

ROAD WIDENING DIMENSIONS	
EXISTING LANE WIDTH	11'
PROPOSED LANE WIDTH	11'
POSTED SPEED LIMIT	45 MPH
DESIGN SPEED LIMIT	50 MPH
WIDTH OF LATERAL SHIFT	5.5 FEET
DECELERATION LENGTH	150 FEET
APPROACH/DEPARTURE TAPER LENGTH	275'

EXISTING CONDITIONS NOTES

1. PROPERTY BOUNDARY AND EXISTING CONTOURS TAKEN FROM ELECTRONIC CAD FILE PROVIDED BY: CAWTHORNE, MOSS & PANCIERA 333 S. WHITE STREET, WAKE FOREST, NC 27588.
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CONSTRUCTION NOTES:

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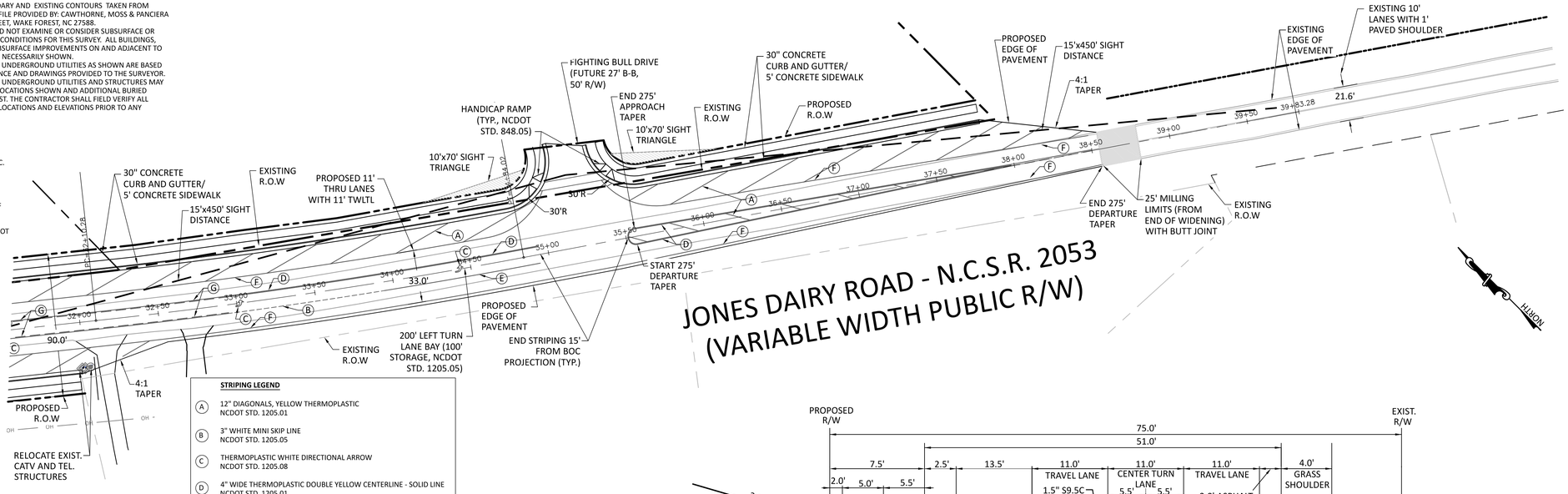
2. THE CONTRACTOR SHALL DETERMINE AND BE RESPONSIBLE FOR THE MEANS AND METHODS NECESSARY FOR THE CONSTRUCTION OF THE PROJECT AS SHOWN ON THESE PLANS.
3. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ANY OFFSITE EASEMENTS. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL VERIFY THAT ALL NECESSARY RIGHT OF WAY, EASEMENTS AND ENCROACHMENT AGREEMENTS HAVE BEEN OBTAINED.
4. THE CONTRACTOR SHALL CONFIRM THAT ALL REQUIRED PERMITS AND APPROVALS HAVE BEEN OBTAINED FOR THE PROPOSED CONSTRUCTION. BEGINNING ANY ASPECT OF CONSTRUCTION OR FABRICATING ANY ITEM PRIOR TO RECIEVING ALL PLANS AND APPROPRIATE DOCUMENTATION OF APPROVAL SHALL CAUSE THE CONTRACTOR TO ASSUME FULL REPONSIBILITY FOR ANY SUBSEQUENT MODIFICATIONS TO THEIR WORK.
5. EXISTING UTILITIES AND STRUCTURES SHOWN ON THE PLANS ARE BASED ON A FIELD SURVEY.
6. THE CONTRACTOR SHALL CONFIRM THE LOCATION AND ELEVATION OF ALL EXISTING UTILITIES WITHIN THE LIMITS OF CONSTRUCTION PRIOR TO BEGINNING CONSTRUCTION AND NOTIFY THE OWNER OR ENGINEER OF ANY DISCREPANCIES. BEGINNING CONSTRUCTION PRIOR TO LOCATING UTILITIES WITHIN THE LIMITS OF CONSTRUCTION AND NOTIFYING THE OWNER OR ENGINEER OF ANY DISCREPANCIES SHALL CAUSE THE CONTRACTOR TO ASSUME FULL RESPONSIBILITY FOR ANY SUBSEQUENT MODIFICATIONS TO THEIR WORK.
7. THE STAKING SURVEYOR AND/OR THEIR SUBCONTRACTOR SHALL INDEPENDENTLY VERIFY THE HORIZONTAL AND VERTICAL DATUM FOR THIS PROJECT PRIOR TO CONSUTRCTION.



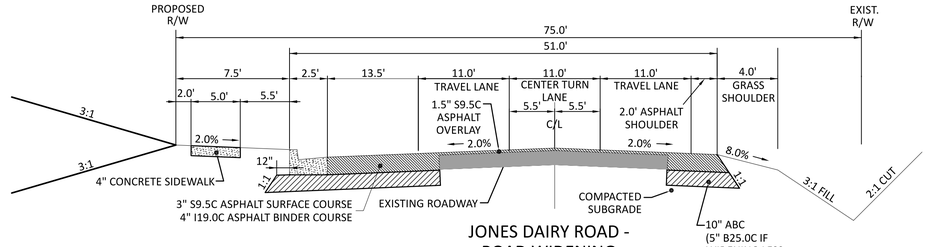
STRIPING LEGEND

- (A) 12" DIAGONALS, YELLOW THERMOPLASTIC NCDOT STD. 1205.01
- (B) 3" WHITE MINI SKIP LINE NCDOT STD. 1205.05
- (C) THERMOPLASTIC WHITE DIRECTIONAL ARROW NCDOT STD. 1205.08
- (D) 4" WIDE THERMOPLASTIC DOUBLE YELLOW CENTERLINE - SOLID LINE NCDOT STD. 1205.01
- (E) 4" WIDE WHITE TURN LANE LINE NCDOT STD. 1205.01
- (F) 4" WIDE WHITE EDGE LINE NCDOT STD. 1205.01
- (G) 4" YELLOW CENTER LINE WITH 4" YELLOW SKIP CENTER LINE NCDOT STD. 1205.02

NOTES:
ALL STRIPING SHALL BE THERMOPLASTIC.

ALL STRIPING AND SIGNAGE TO COMPLY WITH NCDOT STANDARDS AND SPECIFICATONS.

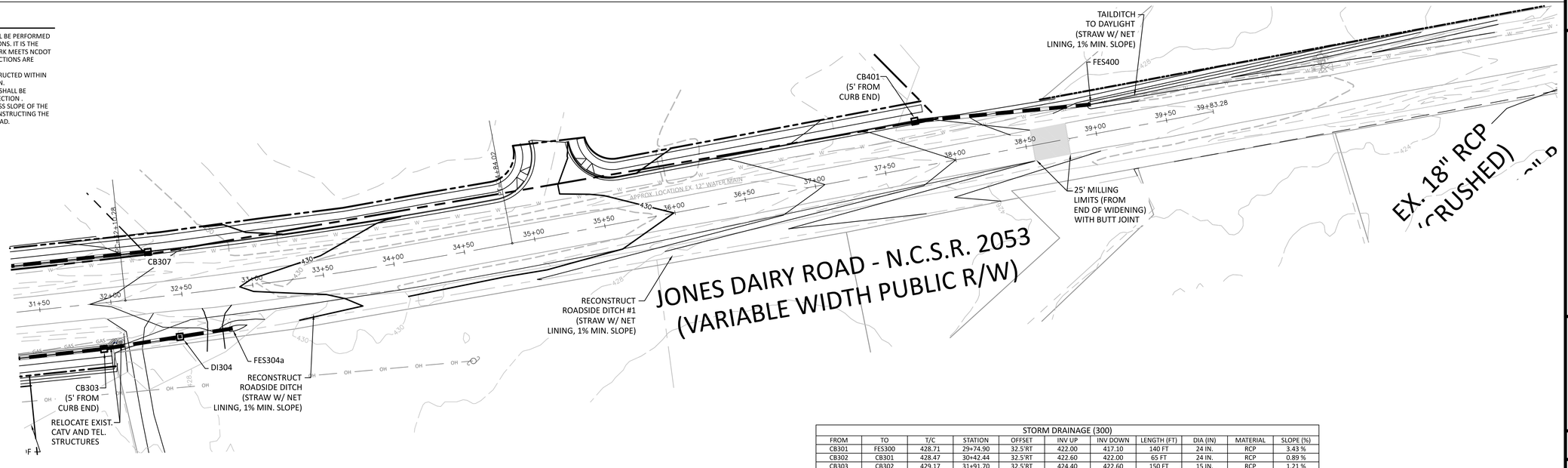
SITE PLAN



JONES DAIRY ROAD - ROAD WIDENING
75' RIGHT OF WAY
51' BOC TO EOP

ROAD WIDENING NOTES

1. ALL WORK WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE PERFORMED PER CURRENT NCDOT STANDARDS AND SPECIFICATIONS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE ALL WORK MEETS NCDOT STANDARDS AND THAT ALL REQUIRED NCDOT INSPECTIONS ARE PERFORMED.
2. A 1.5" ASPHALT SURFACE OVERLAY SHALL BE CONSTRUCTED WITHIN THE LIMITS OF THE ENTIRE ROAD WIDENING SECTION.
3. AN ADDITIONAL 25' OF MILLING (WITH BUTT JOINT) SHALL BE EXTENDED AT EACH END OF THE ROAD WIDENING SECTION .
4. THE CONTRACTOR SHALL MATCH THE EXISTING CROSS SLOPE OF THE ROAD WHEN PLACING THE OVERLAY AND WHEN CONSTRUCTING THE PROPOSED WIDENED SECTIONS OF THE EXISTING ROAD.



GRADING PLAN

STORM DRAINAGE (300)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB301	FES300	428.71	29+74.90	32.5'RT	422.00	417.10	140 FT	24 IN.	RCP	3.43 %
CB302	CB301	428.47	30+42.44	32.5'RT	422.60	422.00	65 FT	24 IN.	RCP	0.89 %
CB303	CB302	429.17	31+91.70	32.5'RT	424.40	422.60	150 FT	15 IN.	RCP	1.21 %
DI304	CB303	428.00 (T/G)	32+45.20	29.46'RT	425.00	424.40	50 FT	15 IN.	RCP	1.20 %
FES304a	DI304	-	32+44.61	31.17'RT	427.00	425.00	40 FT	15 IN.	RCP	5.00 %
EXFES	CB302	-	32+82.26	28.26' RT	422.85	422.60	10 FT	18 IN.	RCP	2.50 % (EXIST.)
CB305	EXFES	428.46	30+47.95	32.5'LT	424.15	423.90	10 FT	18 IN.	RCP	2.50 % (EXIST.)
CB306	CB305	430.43	28+74.73	32.5'LT	426.90	424.15	170 FT	15 IN.	RCP	1.60 %
CB307	CB305	429.20	32+29.71	32.5'LT	425.70	424.15	180 FT	15 IN.	RCP	0.85 %

STORM DRAINAGE (400)										
FROM	TO	T/C	STATION	OFFSET	INV UP	INV DOWN	LENGTH (FT)	DIA (IN)	MATERIAL	SLOPE (%)
CB401	FES400	428.07	37+76.76	32.5'LT	424.55	424.00	110 FT	15 IN.	RCP	0.50 %

40 0 20 40 80
SCALE: 1"=40'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
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PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS		
1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS
ROLESVILLE, NC

SITE/GRADING PLAN - JONES DAIRY ROAD

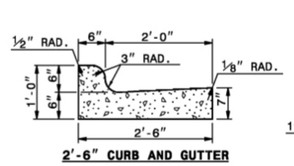
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-12-05

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: 1"=40'
DATE: 2022-08-31
SHEET NO: **C3.3**

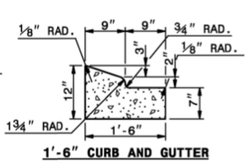
STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

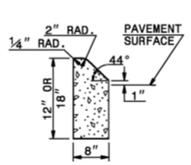
ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER



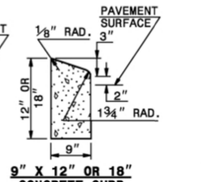
2'-6" CURB AND GUTTER



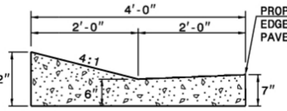
1'-6" CURB AND GUTTER



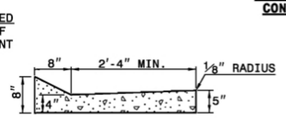
8" X 12" OR 18" CONCRETE CURB



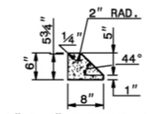
9" X 12" OR 18" CONCRETE CURB



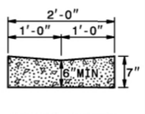
EXPRESSWAY GUTTER



SHOULDER BERM GUTTER



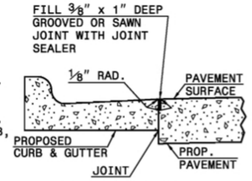
8" X 6" MEDIAN CURB



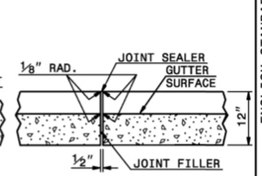
VALLEY GUTTER

SECTION VIEW OF CURBS OR CURBS AND GUTTERS

GENERAL NOTES:
- -PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
- -JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
- -CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1½" DEEP.
- -FILL ALL CONSTRUCTION JOINTS, EXCEPT IN 8"x6" MEDIAN CURB, WITH JOINT FILLER AND SEALER.
- -SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT IN CURB AND GUTTER

SECTION VIEW OF JOINTS

SHEET 1 OF 3
846.01

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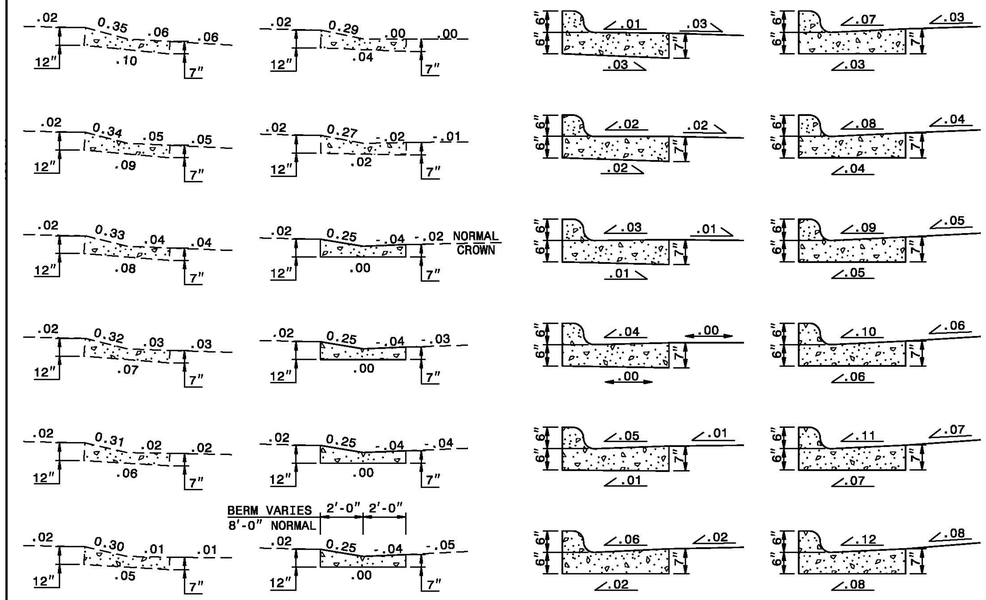
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER



SECTION VIEWS OF EXPRESSWAY GUTTER IN SUPER ELEVATION

SECTION VIEWS OF 2'-6" CURB AND GUTTER SUPERELEVATION RATES

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

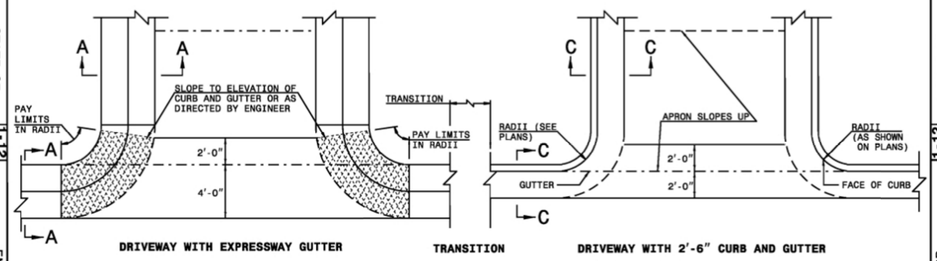
ROADWAY STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER

SHEET 2 OF 3
846.01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

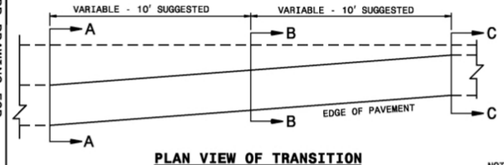
1-12

ENGLISH STANDARD DRAWING FOR
CONCRETE CURB, GUTTER AND CURB & GUTTER

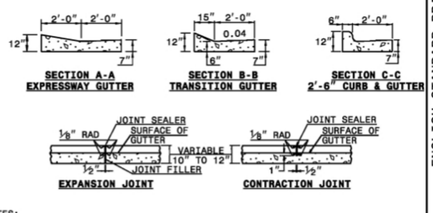


DRIVEWAY WITH EXPRESSWAY GUTTER **TRANSITION** **DRIVEWAY WITH 2'-6" CURB AND GUTTER**

PLAN VIEW OF TYPICAL CURB AND GUTTER OCCURENCES

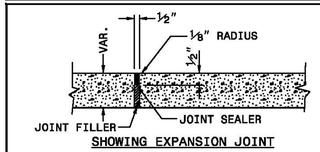


PLAN VIEW OF TRANSITION
EXPRESSWAY GUTTER TO 2'-6" CURB AND GUTTER

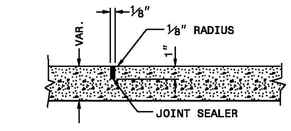


NOTES:
- -IN THE TRANSITION FROM 4'-0" CONCRETE EXPRESSWAY GUTTER TO 2'-6" CONCRETE CURB AND GUTTER, PLACE ½" EXPANSION JOINTS AT 25' INTERVALS.
- -PLACE GROOVE JOINTS 1" DEEP AT 12'-6" INTERVALS BETWEEN EXPANSION JOINTS.
- -FILL AND SEAL THE TOP ½" OF THE EXPANSION JOINTS AND 1" OF CONTRACTION JOINTS WITH APPROVED JOINT SEALING COMPOUND.

SHEET 3 OF 3
846.01



SHOWING EXPANSION JOINT



SHOWING GROOVED JOINT

PARTIAL LONGITUDINAL SECTIONS OF PAVED ISLANDS

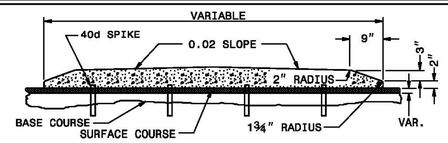
NOTE:

WHEN MONOLITHIC CONCRETE ISLAND IS ON TOP OF SURFACE COURSE, DRIVE 40d SPIKES INTO SURFACE UNDER MONOLITHIC CONCRETE ISLAND. STAGGER SPIKES ON 2' CENTERS EACH WAY.

IN THE CONCRETE PAVEMENT (ISLAND) AND CONCRETE ISLAND (MONOLITHIC) PLACE ½" EXPANSION JOINTS AT 30' INTERVALS AND GROOVED JOINTS 1" DEEP AT 10' INTERVALS BETWEEN EXPANSION JOINTS.

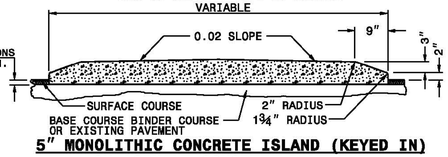
LINE UP THE JOINTS IN THE CONCRETE PAVEMENT (ISLAND) WITH THE JOINTS IN THE CURB OR CURB AND GUTTER. FILL AND SEAL THE TOP ½" OF THE EXPANSION JOINTS AND THE ENTIRE DEPTH OF GROOVED JOINTS WITH JOINT SEALER.

FOR JOINTS IN THE CURB AND/OR CURB AND GUTTER, SEE STANDARD NO. 846.01

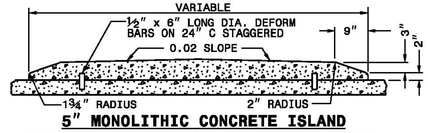


5" MONOLITHIC CONCRETE ISLAND (SURFACE MOUNTED) ON ASPHALT CONCRETE PAVEMENT
(USE ON ISLAND 4' WIDE OR GREATER)

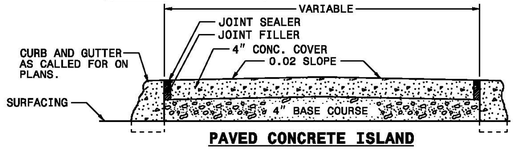
SEE TYPICAL SECTIONS FOR PAVEMENT DEPTH. KEY IN ON THE LAST LAYER OF PAVEMENT SURFACE COURSE



5" MONOLITHIC CONCRETE ISLAND (KEYED IN) ON ASPHALT CONCRETE PAVEMENT
(USE ON ISLAND LESS THAN 4' WIDE)



5" MONOLITHIC CONCRETE ISLAND (SURFACE MOUNTED) ON CONCRETE PAVEMENT



PAVED CONCRETE ISLAND

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR
CONCRETE ISLANDS

SHEET 1 OF 1
852.01

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
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NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS
1
2
3
4

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-08-31

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: AS SHOWN
DATE: 2022-08-31
SHEET NO: **D1.1**

PRESERVE AT JONES DAIRY OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS

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NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

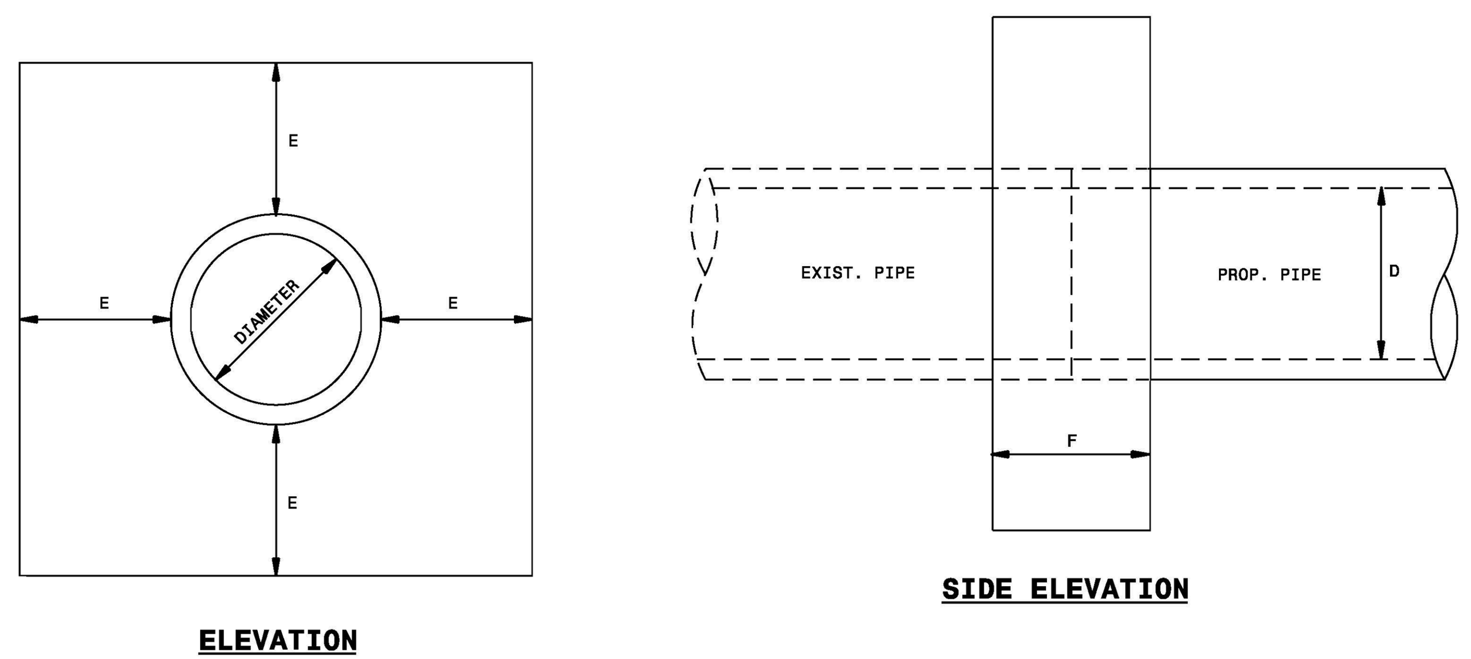
REVISIONS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT 2022-08-31

PROJECT NO:	---
DESIGN BY:	JJB
DRAWN BY:	JJB
SCALE:	AS SHOWN
DATE:	2022-08-31
SHEET NO:	D1.2

ENGLISH STANDARD DRAWING FOR PIPE COLLAR

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12



GENERAL NOTES:

USE PIPE COLLAR FOR EXTENDING EXISTING CONCRETE PIPE CULVERTS AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER. THIS INCLUDES EXTENDING EXISTING PIPES WITH PIPES OF DIFFERENT MATERIALS.

CONSTRUCT THE PIPE COLLAR WITH CLASS "B" OR BETTER CONCRETE.

OBSERVE ALL REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.

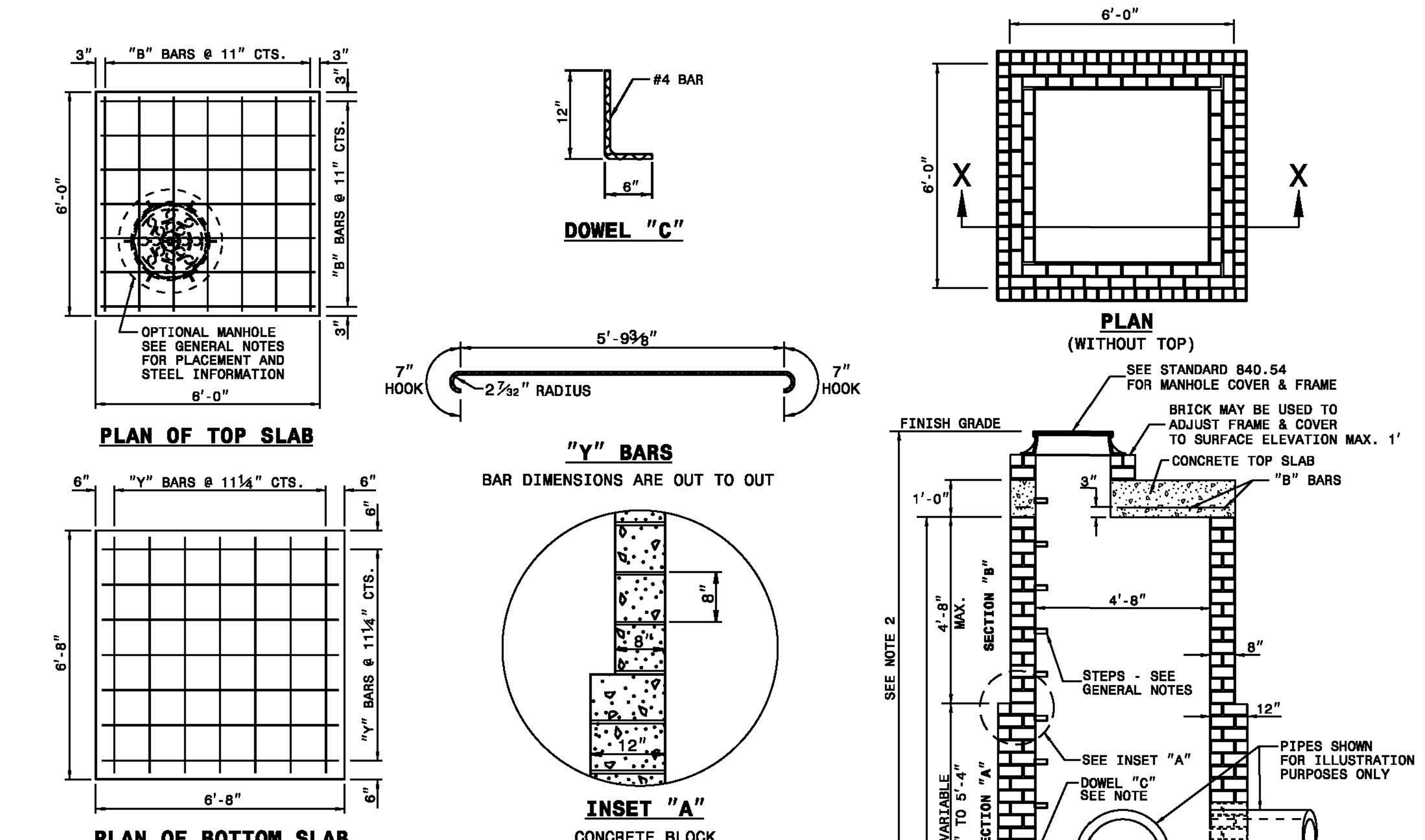
* USE 12 INCH DIAMETER VALUES FOR PIPE DIAMETERS LESS THAN 12 INCH.

D	E	F	CU. YD.
12"	12"	12"	0.3528
15"	12"	12"	0.3990
18"	12"	12"	0.4465
24"	12"	12"	0.5526
30"	12"	12"	0.6560
36"	12"	12"	0.7640
42"	12"	12"	0.8856
48"	12"	12"	1.0126
54"	18"	18"	2.5793
60"	18"	18"	2.8506
66"	18"	18"	3.1307
72"	18"	18"	3.4176

SHEET 1 OF 1 840.72

ROADWAY STANDARD DRAWING FOR TRAFFIC BEARING JUNCTION BOX FOR USE WITH PIPES 42" AND UNDER

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18



NOTE 1: CONSTRUCT SECTION "B" OF THE PROPOSED WALL 8" THICK. AND SECTION "A" 12" THICK.
NOTE 2: IF PROPOSED STRUCTURE EXCEEDS 12'-0" VERTICAL HEIGHT A DESIGN WILL BE REQUIRED FOR APPROVAL.
NOTE 3: USE SINGLE MAT REINFORCING STEEL; EXCEPT DOUBLE MAT STEEL MAY BE USED IN LIEU OF HOOK BARS IN BASE SLAB.

SHEET 1 OF 2 840.34

GENERAL NOTES:

USE STANDARD OR JUMBO BRICK FOR WALL CONSTRUCTION. SOLID CONCRETE BRICK OR BLOCK ARE OPTIONAL WALL CONSTRUCTION MATERIAL

INCLUDE ALL ADJUSTMENTS TO WALLS, SLABS OR REINFORCING MATERIAL IN THE UNIT PRICE BID FOR EACH UNIT.

INSTALL OPTIONAL MANHOLE IN POSITION AS DIRECTED BY THE ENGINEER. CUT OR BEND ALL REBAR CROSSING THIS OPENING TO ALLOW 2" MINIMUM CONCRETE COVERAGE. ENCLOSE THE OPENING WITH 8 "A" BARS TIED TO TO THE REBAR MAT AND SET SO A MINIMUM OF 3" CONCRETE COVER IS ATTAINED. REFERENCE STD. NO. 840.54 FOR MANHOLE INFORMATION.

PROVIDE JUNCTION BOXES WITH MAHNOLES OVER 3'-6" IN DEPTH WITH STEPS PLACED ON 12" CENTERS. REFERENCE STD. NO. 840.66.

SPACE DOWEL "C" BARS AT A MAXIMUM OF 12" CENTERS.

MAXIMUM DEPTH OF THIS UNIT AS SHOWN IS 12'.

CONSTRUCT THE JUNCTION BOX IN ACCORDANCE WITH SECTIONS 830, 832, 834 AND 840 OF THE STANDARD SPECIFICATIONS.

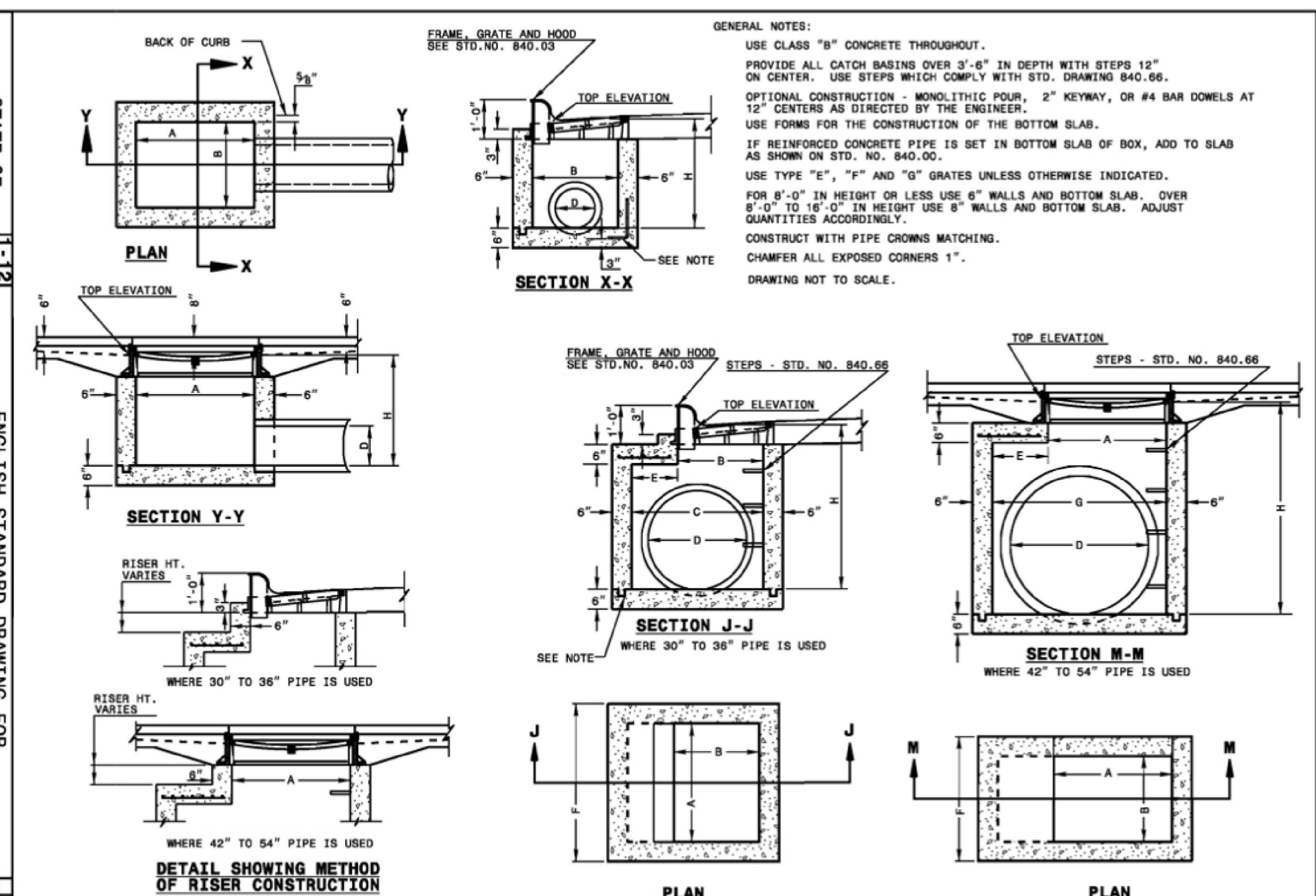
BILL OF MATERIAL

BAR	QTY.	SIZE	LENGTH	WEIGHT
A	8	#5	1'-2"	9.7
B	14	#5	5'-6"	80.3
C	26	#4	1'-6"	26.1
Y	14	#5	6'-11⅜"	101.5
STEEL TOTAL WEIGHT				217.6
CU. YDS. CLASS "AA" CONC.				2.6
CU. YDS. BRICK/FT. HT. (8")				0.53
CU. YDS. BRICK/FT. HT. (12")				0.84

SHEET 2 OF 2 840.34

ENGLISH STANDARD DRAWING FOR CONCRETE CATCH BASIN 12" THRU 54" PIPE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12



GENERAL NOTES:

USE CLASS "B" CONCRETE THROUGHOUT.

PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.

OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2" KEYWAY, OR #4 BAR DOWELS AT 12" CENTERS AS DIRECTED BY THE ENGINEER.

USE FORMS FOR THE CONSTRUCTION OF THE BOTTOM SLAB.

IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.

USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.

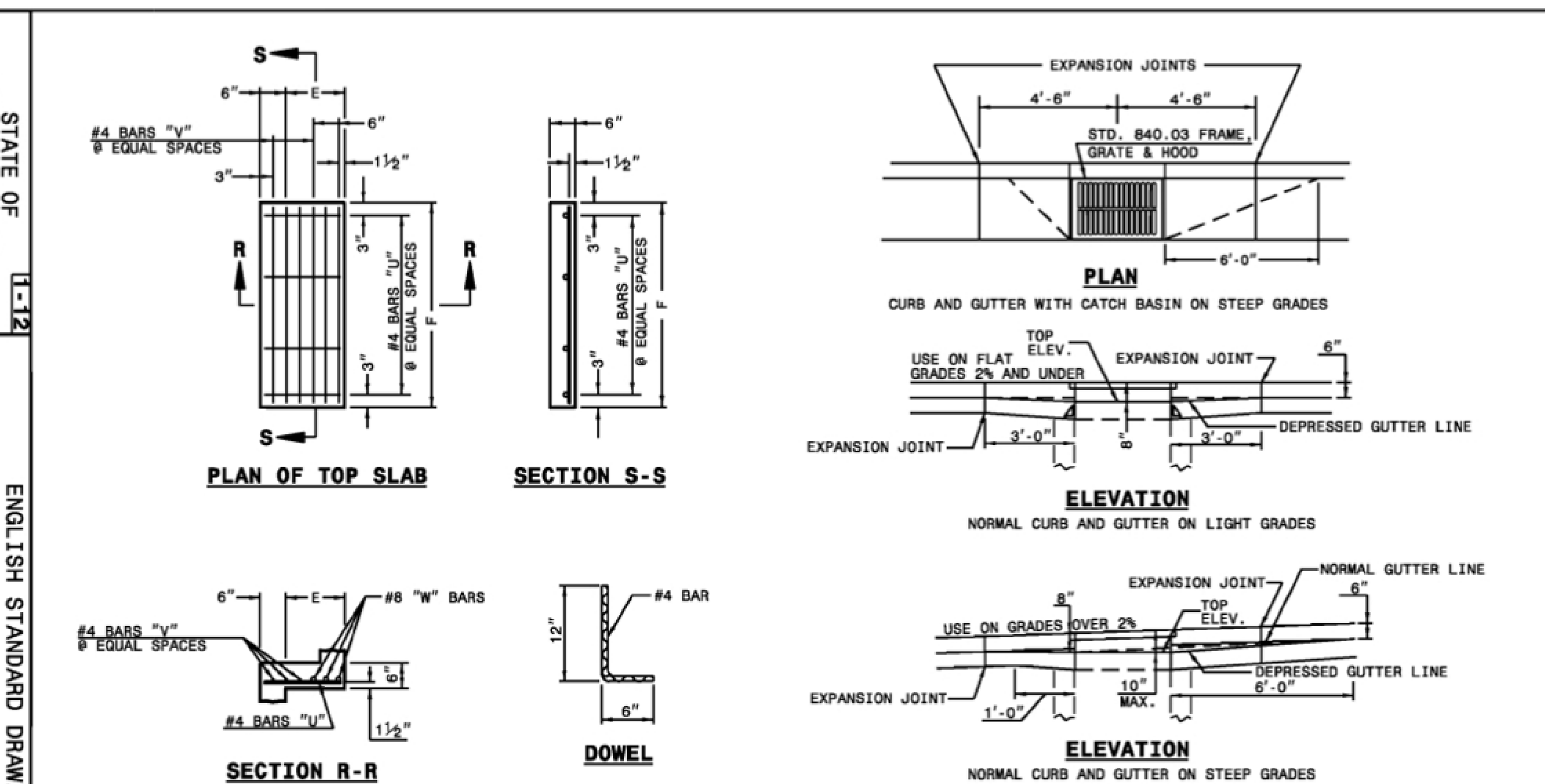
FOR 8'-0" IN HEIGHT OR LESS USE 6" WALLS AND BOTTOM SLAB. OVER 8'-0" TO 16'-0" IN HEIGHT USE 8" WALLS AND BOTTOM SLAB. ADJUST QUANTITIES ACCORDINGLY.

CONSTRUCT WITH PIPE CROWNS MATCHING.

CHAMFER ALL EXPOSED CORNERS 1".

DRAWING NOT TO SCALE.

SHEET 1 OF 2 840.02



MINIMUM DIMENSIONS AND QUANTITIES FOR CONCRETE CATCH BASIN (BASED ON MIN. HEIGHT, H, WITH NO RISER) *

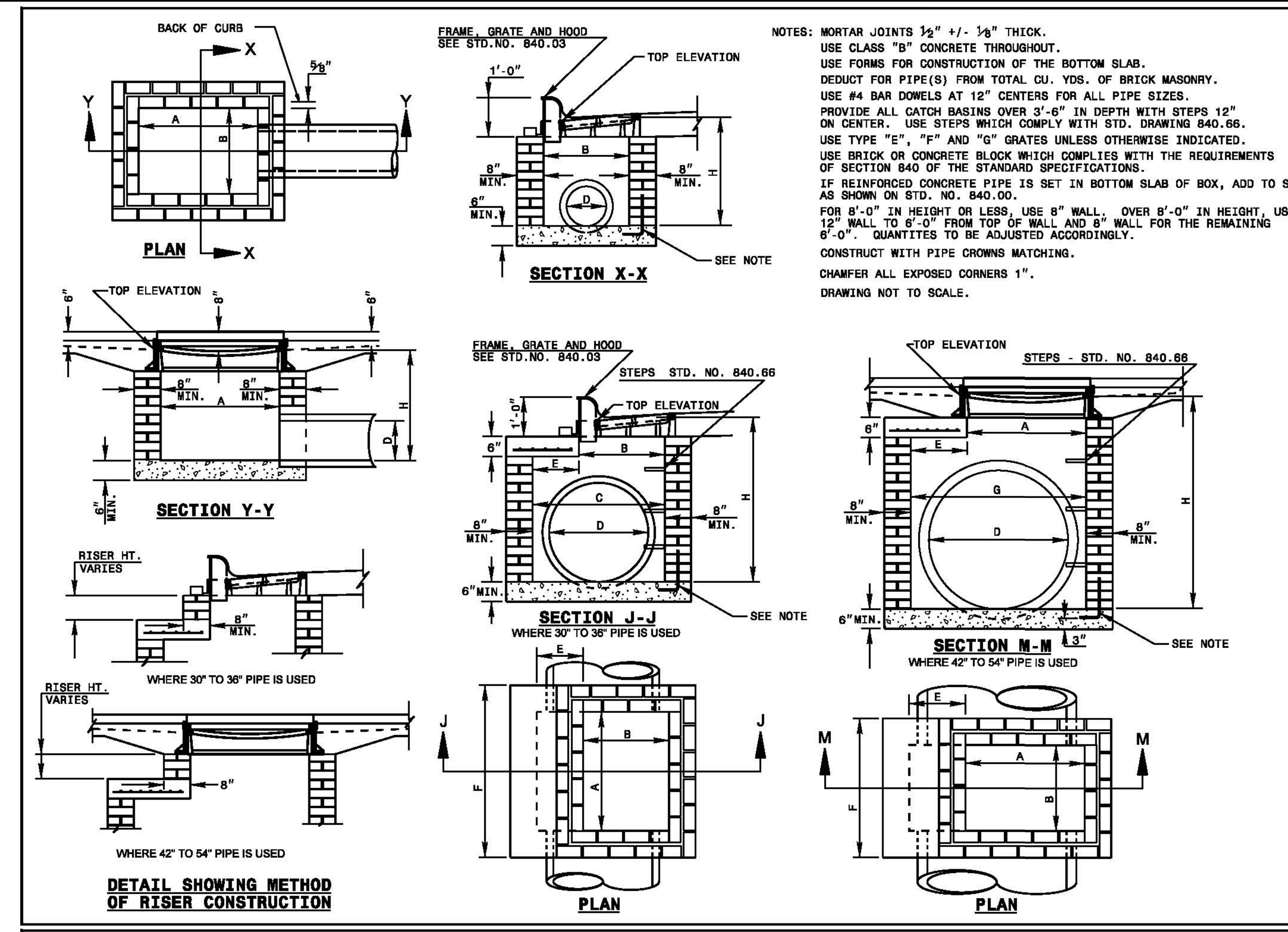
DIMENSIONS OF BOX AND PIPE						COVER DIMENSION									CU.YDS. CONC. IN BOX			DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT			BARS-U		BARS-V		BARS-W		TOTAL LBS.	TOP SLAB	BOTTOM SLAB	TOT. CONC. FOR MINIMUM HEIGHT, H		
D	A	B	C	G	H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH					C.M.	R.C.
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	--	0.235	0.772	0.015	0.026
15"	3'-0"	2'-2"			3'-0"											0.235	0.829	0.023	0.036
18"	3'-0"	2'-2"			3'-3"											0.235	0.887	0.033	0.049
24"	3'-0"	2'-2"			3'-9"											0.235	1.001	0.059	0.085
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-0"	4	1'-5"	2	3'-9"	3	3'-9"	39	0.123	0.321	1.433	0.092	0.127
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-0"	4	1'-11"	3	3'-9"	3	3'-9"	43	0.161	0.358	1.714	0.132	0.178
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-2"	4	1'-8"	2	2'-11"	3	2'-11"	32	0.112	0.318	1.738	0.180	0.243
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-2"	4	2'-3"	3	2'-11"	3	2'-11"	35	0.145	0.352	2.052	0.235	0.317
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-2"	4	2'-10"	5	2'-11"	3	2'-11"	41	0.180	0.386	2.387	0.297	0.401

* RISER HAS .228 CUBIC YARDS OF CONCRETE PER FOOT HEIGHT

SHEET 2 OF 2 840.02

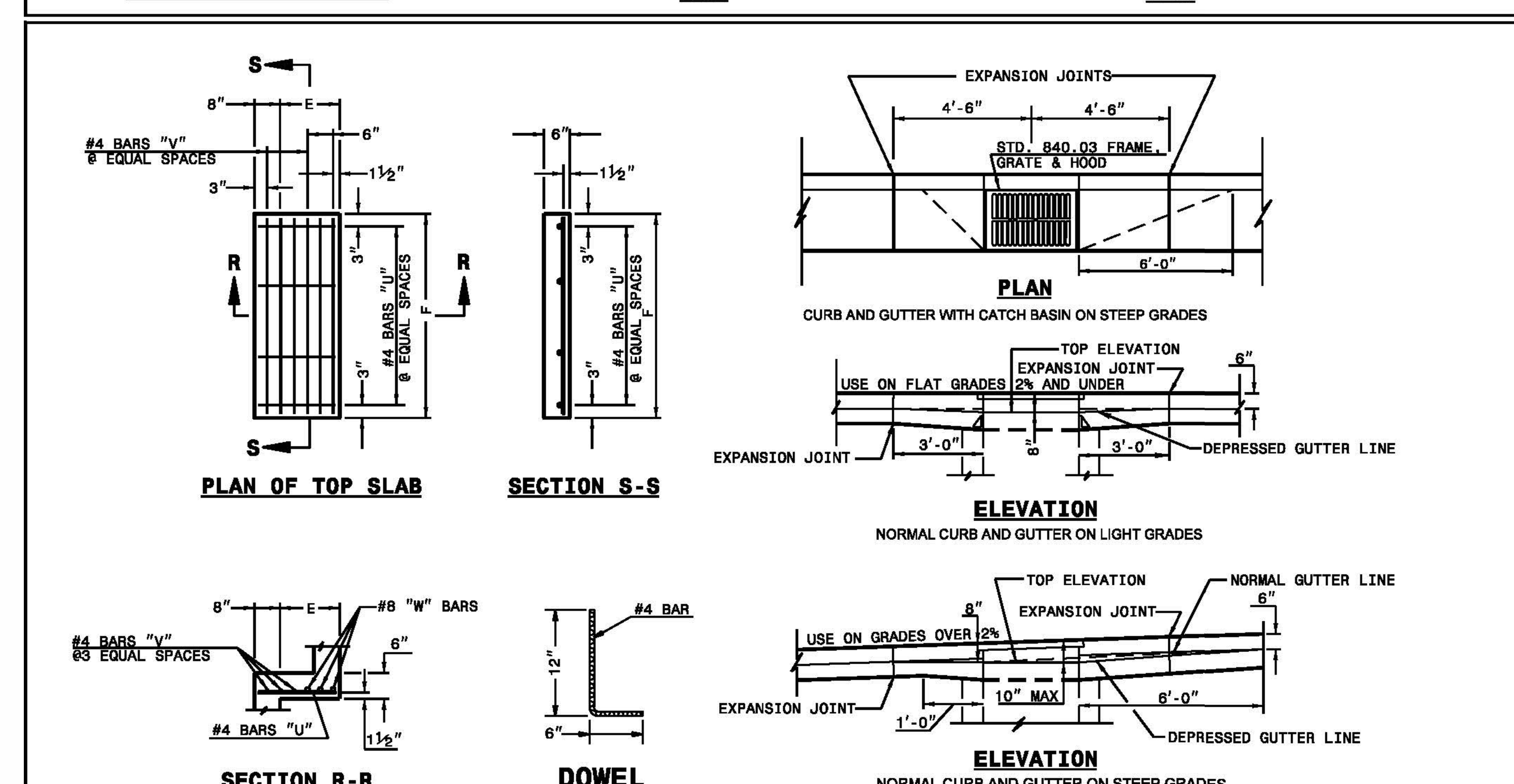
ROADWAY STANDARD DRAWING FOR BRICK CATCH BASIN 12" THRU 54" PIPE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-18



NOTES: MORTAR JOINTS ½" +/- ⅛" THICK.
USE CLASS "B" CONCRETE THROUGHOUT.
USE FORMS FOR CONSTRUCTION OF THE BOTTOM SLAB.
DEDUCT FOR PIPE(S) FROM TOTAL CU. YDS. OF BRICK MASONRY.
USE #4 BAR DOWELS AT 12" CENTERS FOR ALL PIPE SIZES.
PROVIDE ALL CATCH BASINS OVER 3'-6" IN DEPTH WITH STEPS 12" ON CENTER. USE STEPS WHICH COMPLY WITH STD. DRAWING 840.66.
USE TYPE "E", "F" AND "G" GRATES UNLESS OTHERWISE INDICATED.
USE BRICK OR CONCRETE BLOCK WHICH COMPLIES WITH THE REQUIREMENTS OF SECTION 840 OF THE STANDARD SPECIFICATIONS.
IF REINFORCED CONCRETE PIPE IS SET IN BOTTOM SLAB OF BOX, ADD TO SLAB AS SHOWN ON STD. NO. 840.00.
FOR 8'-0" IN HEIGHT OR LESS, USE 8" WALL. OVER 8'-0" IN HEIGHT, USE 12" WALL TO 6'-0" FROM TOP OF WALL AND 8" WALL FOR THE REMAINING 6'-0". QUANTITES TO BE ADJUSTED ACCORDINGLY.
CONSTRUCT WITH PIPE CROWNS MATCHING.
CHAMFER ALL EXPOSED CORNERS 1".
DRAWING NOT TO SCALE.

SHEET 1 OF 2 840.01



MINIMUM DIMENSIONS AND QUANTITIES FOR BRICK CATCH BASIN (BASED ON MIN. HEIGHT, H, WITH NO RISER) *

DIMENSIONS OF BOX AND PIPE						TOP SLAB DIMENSIONS									CU.YDS. CONC. IN BOX			BRICK MASONRY		DEDUCTIONS ONE PIPE	
PIPE	SPAN	WIDTH	WIDTH	SPAN	MIN. HEIGHT			BARS-U		BARS-V		BARS-W		TOTAL LBS.	TOP SLAB	BOTTOM SLAB	TOTAL CONC.	BRICK MSNR. IN WALLS	TOTAL BRICK AND CONCRETE		
D	A	B	C	G	H	E	F	NO.	LENGTH	NO.	LENGTH	NO.	LENGTH							C.M.	R.C.
12"	3'-0"	2'-2"	--	--	2'-9"	--	--	--	--	--	--	--	--	--	--	0.281	0.281	0.883	1.164	0.020	0.042
15"	3'-0"	2'-2"			3'-0"											0.281	0.281	0.963	1.244	0.031	0.047
18"	3'-0"	2'-2"			3'-3"											0.281	0.281	1.043	1.324	0.044	0.065
24"	3'-0"	2'-2"			3'-9"											0.281	0.281	1.204	1.485	0.078	0.121
30"	3'-0"	2'-2"	3'-4"		4'-3"	1'-2"	4'-4"	4	1'-6"	3	4'-1"	3	4'-1"	45	0.147	0.374	0.521	1.606	2.217	0.122	0.184
36"	3'-0"	2'-2"	3'-10"		4'-9"	1'-8"	4'-4"	4	2'-0"	4	4'-1"	3	4'-1"	49	0.187	0.415	0.602	1.914	2.516	0.176	0.261
42"	3'-0"	2'-2"		4'-5"	5'-3"	1'-5"	3'-6"	4	1'-9"	3	3'-3"	3	3'-3"	38	0.135	0.373	0.508	2.152	2.660	0.240	0.371
48"	3'-0"	2'-2"		5'-0"	5'-9"	2'-0"	3'-6"	4	2'-6"	4	3'-3"	3	3'-3"	41	0.173	0.410	0.583	2.415	2.998	0.313	0.477
54"	3'-0"	2'-2"		5'-7"	6'-3"	2'-7"	3'-6"	4	3'-0"	6	3'-3"	3	3'-3"	47	0.211	0.448	0.659	2.806	3.465	0.396	0.595

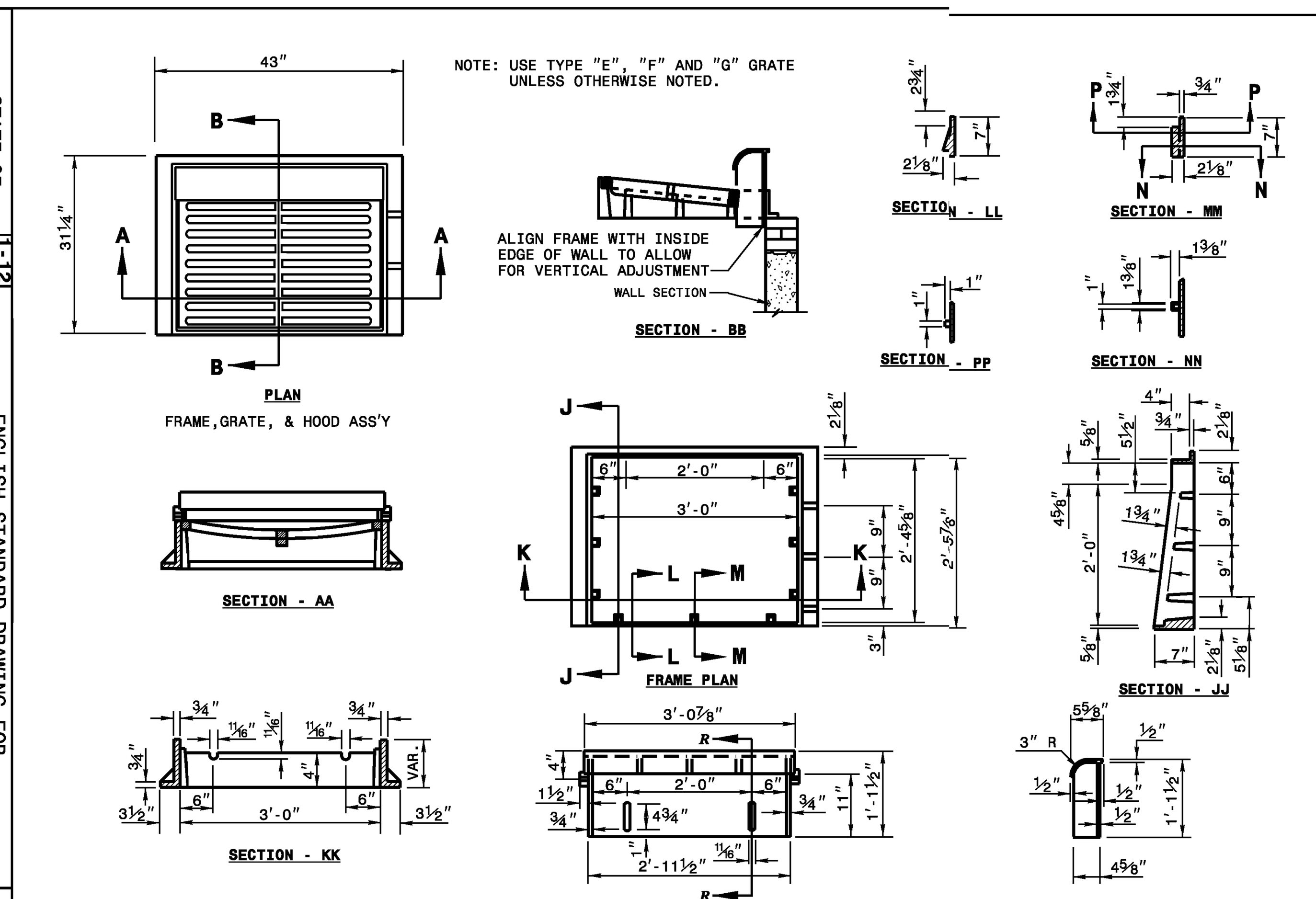
* RISER HAS .321 CUBIC YARDS OF BRICK MASONRY PER FOOT HEIGHT

SHEET 2 OF 2 840.01

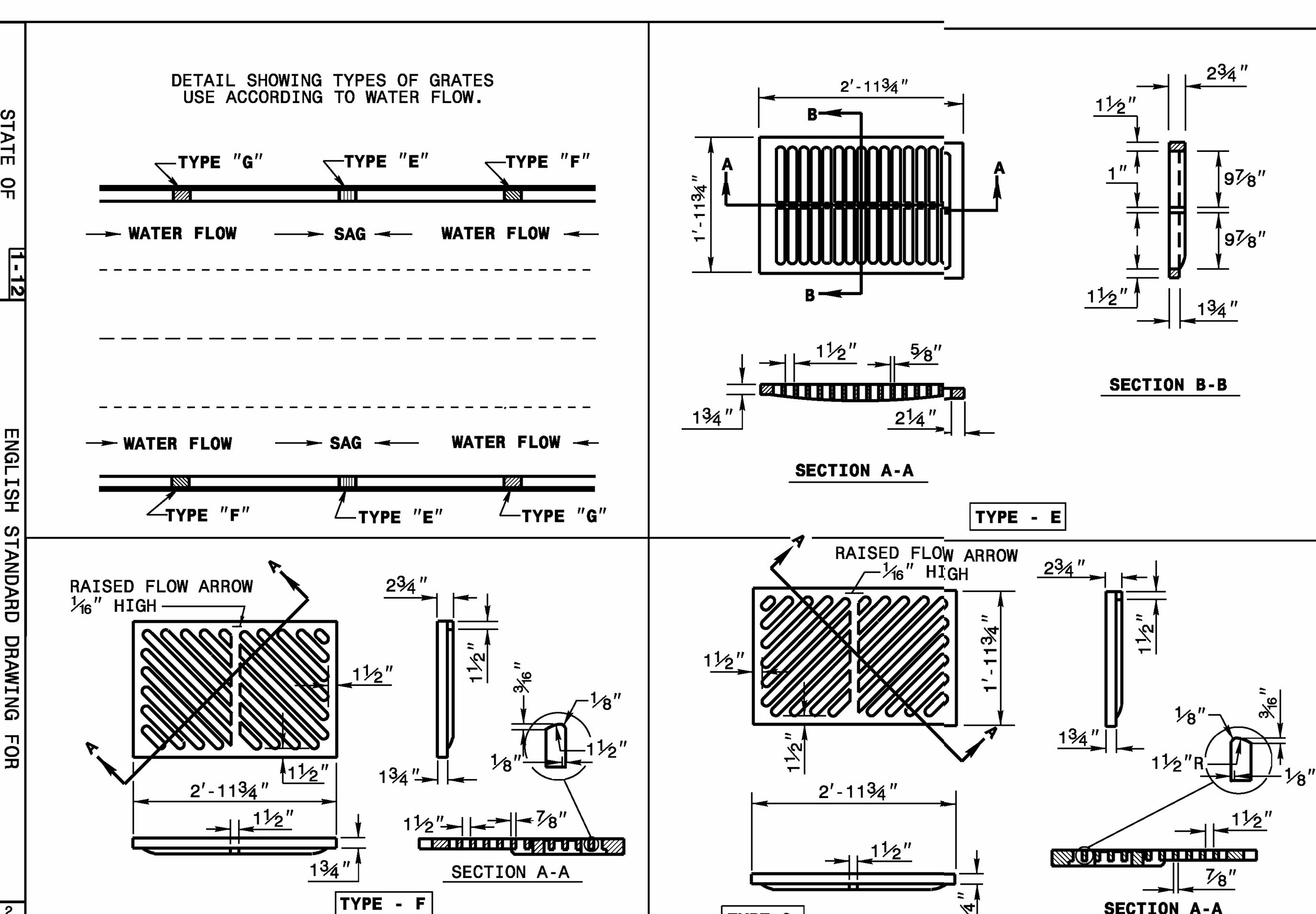
ENGLISH STANDARD DRAWING FOR FRAME, GRATES, AND HOOD FOR USE ON STANDARD CATCH BASIN

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

NOTE: USE TYPE "E", "F" AND "G" GRATE UNLESS OTHERWISE NOTED.



SHEET 1 OF 2 840.03



SHEET 2 OF 2 840.03

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR

CONCRETE SIDEWALK

SHEET 1 OF 1

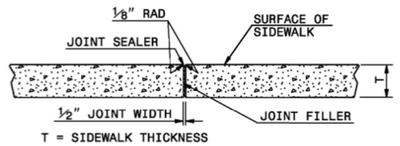
848.01

NOTES:

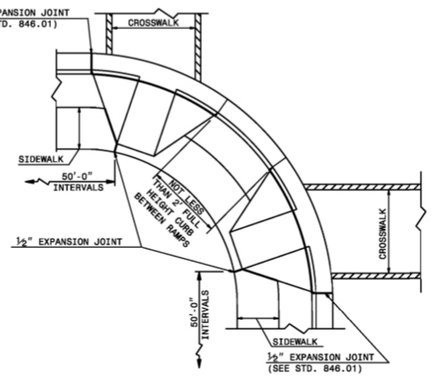
CONSTRUCT STANDARD SIDEWALK 5′ WIDE AND 4" THICK UNLESS OTHERWISE DENOTED ON PLANS.

PLACE A GROOVE JOINT 1" DEEP WITH ⅛" RADII IN THE CONCRETE SIDEWALK AT 5′ INTERVALS. ONE ½" EXPANSION JOINT WILL BE REQUIRED AT 50′ INTERVALS. A ½" EXPANSION JOINT WILL BE REQUIRED WHERE THE SIDEWALK JOINS ANY RIGID STRUCTURE.

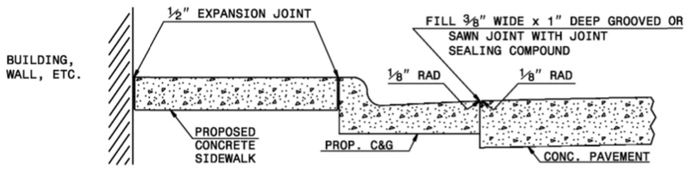
SEE STD. DWG. 848.05 FOR WHEELCHAIR RAMP LOCATION REQUIREMENTS AND CONSTRUCTION GUIDELINES.



TRANSVERSE EXPANSION JOINT IN SIDEWALK



PLAN VIEW



DETAILS SHOWING JOINTS IN CONCRETE SIDEWALK

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

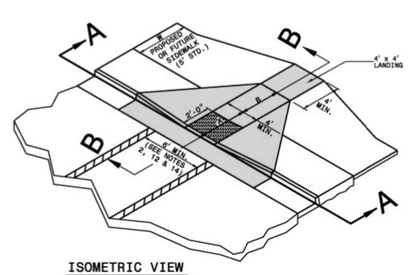
ENGLISH STANDARD DRAWING FOR

CURB RAMP

PROPOSED CURB AND GUTTER

SHEET 1 OF 3

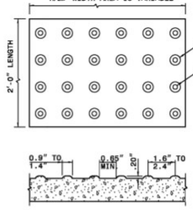
848.05



ISOMETRIC VIEW

PAY LIMITS FOR CURB RAMP

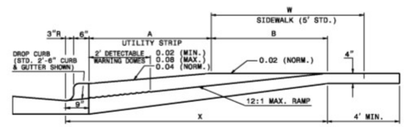
NOTES:
1. DETECTABLE WARNING DOMES WILL COVER 2′-0" LENGTH AND FULL WIDTH OF THE RAMP FLOOR AS SHOWN ON THE DETAILS.
2. DETECTABLE WARNING DOMES WILL CONTRAST VISIBILITY WITH ADJOINING SURFACE, EITHER LIGHT-ON-DARK, OR DARK-ON-LIGHT SEQUENCE COVERING THE ENTIRE RAMP.



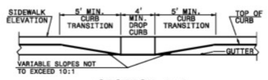
DETECTABLE WARNING DOMES

W	A	W+A+9"	X	B
5′	0.0′	5.8′	5.8′	5.0"*
6′	0.0′	6.8′	6.8′	6.0"*
7′	0.0′	7.8′	7.3′	6.5"*
8′	0.0′	8.8′	7.3′	6.5"*
5′	2.0′	7.8′	7.8′	5.0′
5′	2.5′	8.3′	8.1′	4.8′
5′	3.0′	8.8′	8.3′	4.4′
5′	3.5′	9.3′	8.4′	4.1′
5′	4.0′	9.8′	8.6′	3.8′
5′	4.5′	10.3′	8.7′	3.4′
5′	5.0′	10.8′	8.9′	3.1′

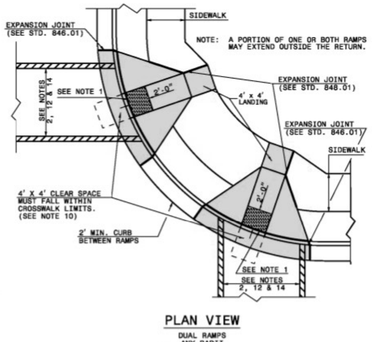
B = X-(A+9")
B = DISTANCE FROM FRONT EDGE OF SIDEWALK TO BACK POINT OF 12:1 (8.33%) SLOPE.
* BACK OF SIDEWALK DROP REQUIRED FOR ALL SIDEWALK SLOPES.
** BACK OF SIDEWALK DROP REQUIRED FOR SIDEWALK SLOPES 0.04.



SECTION B-B



SECTION A-A



PLAN VIEW

DUAL RAMPS
ANY RADII
(4' MIN. FLOOR WIDTH)

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

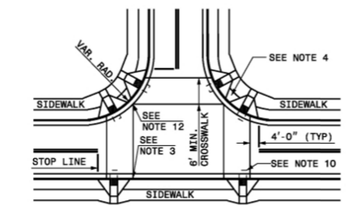
ENGLISH STANDARD DRAWING FOR

CURB RAMP

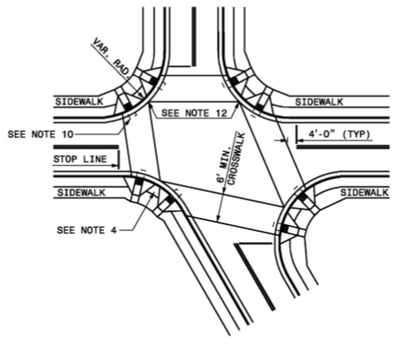
PROPOSED CURB AND GUTTER

SHEET 2 OF 3

848.05



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES FOR TEE INTERSECTIONS



DETAIL SHOWING TYPICAL LOCATION OF CURB RAMPS, PEDESTRIAN CROSSWALKS AND STOP LINES

ROADWAY PLAN SYMBOL
CR
FOR PROPOSED CURB RAMP

PROPOSED CURB RAMP W/ LANDING
PROPOSED OR FUTURE SIDEWALK

ALLOWABLE LOCATIONS
DUAL RAMP RADII.....ANY

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. 1-12

ENGLISH STANDARD DRAWING FOR

CURB RAMPS

NOTES

SHEET 3 OF 3

848.05

NOTES:

1. CONSTRUCT THE RAMP SURFACE TO BE STABLE, FIRM, AND SLIP RESISTANT. CONSTRUCT THE CURB RAMP TYPE AS SHOWN IN THE PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER.
2. LOCATE CURB RAMPS AND PLACE PEDESTRIAN CROSSWALK MARKINGS AS SHOWN IN THE PAVEMENT MARKING PLANS. WHEN FIELD ADJUSTMENTS REQUIRE MOVING CURB RAMPS OR MARKINGS AS SHOWN, CONTACT THE SIGNING AND DELINEATION UNIT OR LOCATE AS DIRECTED BY THE ENGINEER.
3. COORDINATE THE CURB RAMP AND THE PEDESTRIAN CROSSWALK MARKINGS SO A 4′x4′ CLEAR SPACE AT THE BASE OF THE CURB RAMP WILL FALL WITHIN THE PEDESTRIAN CROSSWALK LINES.
4. SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL LANE IS 4′ MINIMUM.
5. REFER TO THE PAVEMENT MARKING PLANS FOR STOP BAR LOCATIONS AT SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR LOCATE AS DIRECTED BY THE ENGINEER.
6. TERMINATE PARKING A MINIMUM OF 20′ BACK OF A PEDESTRIAN CROSSWALK.
7. CONSTRUCT CURB RAMPS A MINIMUM OF 4′ WIDE.
8. CONSTRUCT THE RUNNING SLOPE OF THE RAMP 8.33% MAXIMUM.
9. ALLOWABLE CROSS SLOPE ON SIDEWALKS AND CURB RAMPS WILL BE 2% MAXIMUM.
10. CONSTRUCT THE SIDE FLARE SLOPE A MAXIMUM OF 10% MEASURED ALONG THE CURB LINE.
11. CONSTRUCT THE COUNTER SLOPE OF THE GUTTER OR STREET AT THE BASE OF THE CURB RAMP A MAXIMUM OF 5% AND MAINTAIN A SMOOTH TRANSITION.
12. CONSTRUCT LANDINGS FOR SIDEWALK A MINIMUM OF 4′x4′ WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION. CONSTRUCT LANDINGS FOR MEDIAN ISLANDS A MINIMUM OF 5′x5′ WITH A MAXIMUM SLOPE OF 2% IN ANY DIRECTION.
13. TO USE A MEDIAN ISLAND AS A PEDESTRIAN REFUGE AREA, MEDIAN ISLANDS WILL BE A MINIMUM OF 6′ WIDE. CONSTRUCT MEDIAN ISLANDS TO PROVIDE PASSAGE OVER OR THROUGHT THE ISLAND.
14. SMALL CHANNELIZATION ISLANDS THAT CAN NOT PROVIDE A 5′X5′ LANDING AT THE TOP OF A RAMPS, WILL BE CUT THROUGH LEVEL WITH THE SURFACE STREET.
15. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP. THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED.
16. PLACE A ½" EXPANSION JOINT WHERE THE CONCRETE CURB RAMP JOINS THE CURB AS SHOWN IN ROADWAY STANDARD DRAWING 848.01
17. PLACE ALL PEDESTRIAN PUSH BUTTON ACTUATORS AND CROSSING SIGNALS AS SHOWN IN THE PLANS OR AS SHOWN IN THE MUTCD.
18. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR THE DETAILS OR FOR A SPECIAL DESIGN.

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS
ROLESVILLE, NC
DETAILS

NORTH CAROLINA PROFESSIONAL SEAL 26411 ENGINEER JEREMY J. BECKETT
2022-08-31

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: AS SHOWN
DATE: 2022-08-31
SHEET NO: D1.3

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

1-12

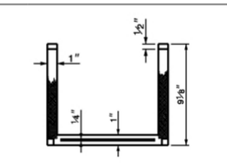
ENGLISH STANDARD DRAWING FOR

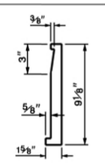
DRAINAGE STRUCTURE STEPS

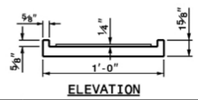
SHEET 1 OF 1

840.66

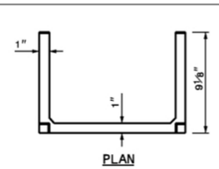
NOTES:
INSTALL ALL STEPS PROTRUDING 4" FROM INSIDE FACE OF STRUCTURE WALL.
STEPS DIFFERING IN DIMENSIONS, CONFIGURATION, OR MATERIALS FROM THOSE SHOWN MAY ALSO BE USED PROVIDED THE CONTRACTOR HAS FURNISHED THE ENGINEER WITH DETAILS OF THE PROPOSED STEPS AND HAS RECEIVED WRITTEN APPROVAL FROM THE ENGINEER FOR THE USE OF SUCH STEPS.

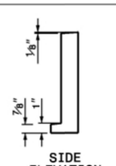


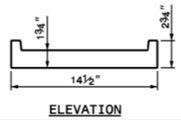




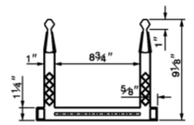
CAST IRON

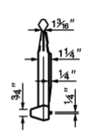


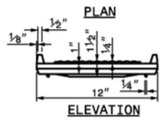


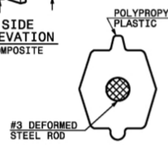


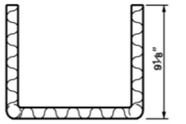
CAST IRON

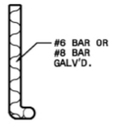




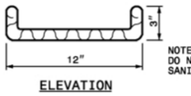








REINFORCING STEEL



NOTE:
DO NOT USE IN SANITARY SEWER MANHOLES.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

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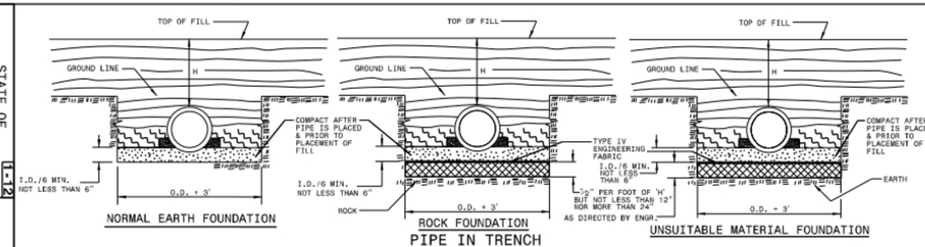
ENGLISH STANDARD DRAWING FOR

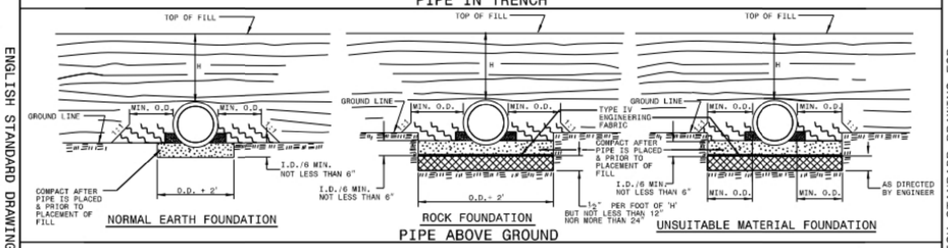
METHOD OF PIPE INSTALLATION

RIGID PIPE

SHEET 2 OF 3

300.01





GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA
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RALEIGH, N.C.

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ENGLISH STANDARD DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300.01

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	216	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 60"
* (Maximum fill) 20' for pipe diameters ≤ 24"
17' for pipe diameters ≥ 30" and ≤ 60"

PVC - * (Minimum fill) 2' for pipe diameters ≥ 12" and ≤ 36"
* (Maximum fill) 30' for pipe diameters ≥ 12" and ≤ 36"

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1' for Class IV & CLASS V
2' for Class III & Class II

* (Maximum fill) 10' - Class II pipe
20' - Class III pipe
30' - Class IV pipe
40' - Class V pipe

(For fills > 40' & < 80' use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1' MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
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RALEIGH, N.C.

1-12

ENGLISH STANDARD DRAWING FOR

METHOD OF PIPE INSTALLATION

FILL HEIGHT TABLES

SHEET 3 OF 3

300.01

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NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-08-31

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: AS SHOWN
DATE: 2022-08-31
SHEET NO: D1.4

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

CONTINUOUS LINES

EDGE LINE — 4"/6" — YELLOW OR WHITE

LANE LINE — 4"/6" — WHITE

CENTER LINE — 4"/6" — YELLOW

GORE LINE — 8"/12" — WHITE

DIAGONAL LINE — 12" 45 MPH OR HIGHER; 8" LESS THAN 45 MPH — YELLOW OR WHITE

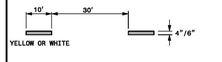
CROSSWALK LINE — 8" TRANSVERSE, 24" LONGITUDINAL — WHITE

RxR LINE — 16" — WHITE

STOP OR TRANSVERSE BAR — 24" — WHITE

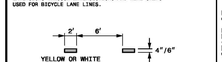
10'-30'/SP SKIP LINE

UNLESS OTHERWISED SHOWN, USE 10'-30'/SP SKIPS FOR SKIP LANE LINES AND SKIP CENTER LINES.



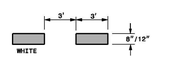
2'-6'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 2'-6'/SP MINI-SKIPS FOR LANE LINE EXTENSIONS THROUGH INTERSECTIONS, EDGE LINE EXTENSIONS THROUGH INTERSECTIONS AND MINI-SKIPS USED FOR BICYCLE LANE LINES.



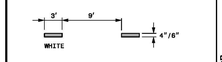
3'-3'/SP MINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 3'-3'/SP MINI-SKIPS FOR THE WHITE EDGE LINE EXTENSIONS AT ROUNDABOUTS.



3'-9'/SP WINI-SKIP LINE

UNLESS OTHERWISED SHOWN, USE 9'-9'/SP MINI-SKIPS FOR MINI-SKIP LANE LINES AND LINE EXTENSIONS THROUGH TAPERS.



GENERAL NOTES:

1- USE 6" LANE, EDGE, AND CENTER LINES ON ALL FULL CONTROL OF ACCESS FACILITIES AND OTHER ROUTES AS DIRECTED BY THE ENGINEER.

2- LANE LINES INDICATED AS "WIDE" ON THE ROADWAY STANDARD DRAWINGS SHALL BE AT LEAST TWICE THE WIDTH OF THE NORMAL LINE.

3- GORE LINES SHALL BE TWICE THE WIDTH OF THE NORMAL LINE.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

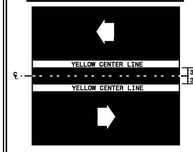
ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** LINE TYPES AND OFFSETS

SHEET 1 OF 2

1205.01

EDGE LINE OFFSET DETAIL

CENTER LINE OFFSET DETAIL



LANE LINE OFFSET DETAIL

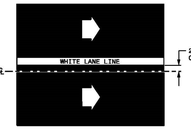


TABLE 1

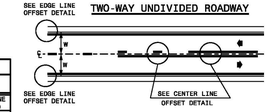
EDGE LINE OFFSETS FOR 2-LANE, 2-WAY ROADWAYS WITH UN-PAVED SHOULDERS

WIDTH (W) OF TRAVEL PAVEMENT	MAX. EDGE LINE OFFSET FROM E.O.T.	MINIMUM LANE WIDTH (W)
16' - 18'	2"	8' - 9'
19'	4"	9'
20'	6"	9.5'
21'	8"	10'
22'	10"	10'
23'	10"	10.5'
24'	1'	11'
26'	2'	11'
28'	2'	12'
30'	3'	12'
32'	4'	12'

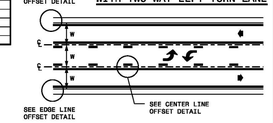
LEGEND

W = WIDTH OF TRAVEL LANE
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW

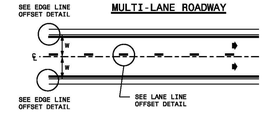
TWO-WAY UNDIVIDED ROADWAY



TWO-WAY UNDIVIDED ROADWAY WITH TWO-WAY LEFT TURN LANE



MULTI-LANE ROADWAY



STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

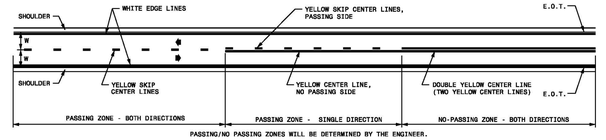
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** LINE TYPES AND OFFSETS

SHEET 2 OF 2

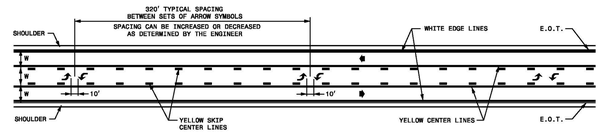
1205.01

TWO-LANE, TWO-WAY ROADWAY



PASSING/NO PASSING ZONES WILL BE DETERMINED BY THE ENGINEER.

TWO-LANE, TWO-WAY ROADWAY WITH TWO-WAY LEFT TURN LANE



GENERAL NOTES:

1- EDGE LINES ARE NOT REQUIRED ALONG CURB AND GUTTER LOCATIONS.

2- CONTINUE EDGE LINES THROUGH MINOR DRIVEWAYS. DO NOT CONTINUE EDGE LINES AT INTERSECTIONS AND MAJOR DRIVEWAYS, SEE ROADWAY STANDARD DRAWING 1205.05 FOR ADDITIONAL GUIDANCE.

3- REFER TO ROADWAY STANDARD DRAWINGS 1205.01 AND 1205.08 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

W = WIDTH OF TRAVEL LANE
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW
PAVEMENT MARKING SYMBOLS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

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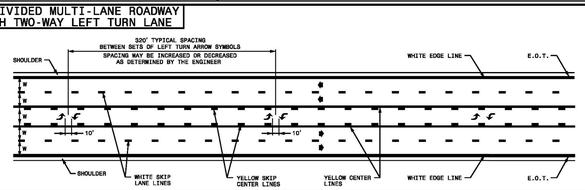
ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** TWO-LANE AND MULTI-LANE ROADWAYS

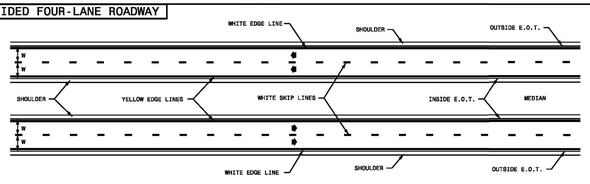
SHEET 1 OF 2

1205.02

UNDIVIDED MULTI-LANE ROADWAY WITH TWO-WAY LEFT TURN LANE



DIVIDED FOUR-LANE ROADWAY



GENERAL NOTES:

1- EDGE LINES ARE NOT REQUIRED ALONG CURB AND GUTTER LOCATIONS.

2- CONTINUE EDGE LINES THROUGH MINOR DRIVEWAYS. DO NOT CONTINUE EDGE LINES AT INTERSECTIONS AND MAJOR DRIVEWAYS, SEE ROADWAY STANDARD DRAWING 1205.08 FOR ADDITIONAL GUIDANCE.

3- REFER TO ROADWAY STANDARD DRAWINGS 1205.01 AND 1205.08 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

W = WIDTH OF TRAVEL LANE
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW
PAVEMENT MARKING SYMBOLS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

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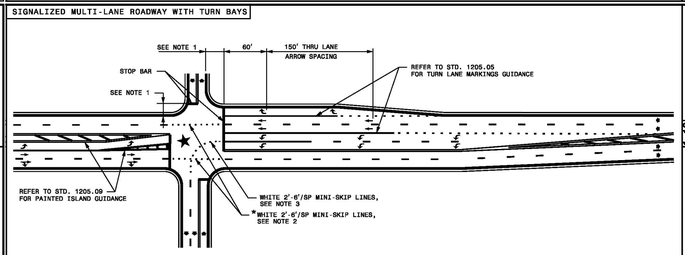
ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** TWO-LANE AND MULTI-LANE ROADWAYS

SHEET 2 OF 2

1205.02

SIGNALIZED MULTI-LANE ROADWAY WITH TURN BAYS



GENERAL NOTES:

1- REFER TO THE PAVEMENT MARKING PLAN FOR STOP BAR LOCATIONS FOR SIGNALIZED INTERSECTIONS. IF A PAVEMENT MARKING PLAN IS NOT PROVIDED, CONTACT THE SIGNAL DESIGN SECTION FOR THE STOP BAR LOCATIONS OR AS DIRECTED BY THE ENGINEER.

2- WINI-SKIP LANE LINE EXTENSIONS SHOULD BE USED AT INTERSECTIONS THAT HAVE REDUCED VISIBILITY CONDITIONS SUCH AS OFFSET, SKEWED, OR CURVED ROADWAYS.

3- WINI-SKIP LANE LINE EXTENSIONS SHALL BE USED WHERE MULTIPLE TURN LANES ARE USED.

4- REFER TO ROADWAY STANDARD DRAWINGS 1205.01, 1205.02, 1205.05, 1205.08 AND 1205.09 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

DIRECTION OF TRAFFIC FLOW
PAVEMENT MARKING SYMBOLS
* OPTIONAL

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

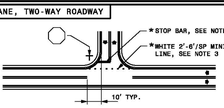
1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** INTERSECTIONS

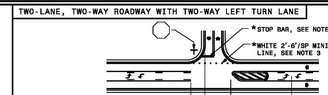
SHEET 1 OF 2

1205.04

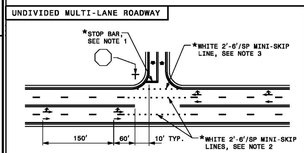
TWO-LANE, TWO-WAY ROADWAY



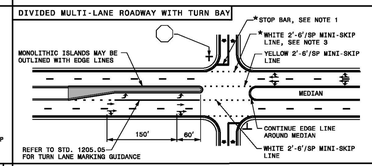
TWO-LANE, TWO-WAY ROADWAY WITH TWO-WAY LEFT TURN LANE



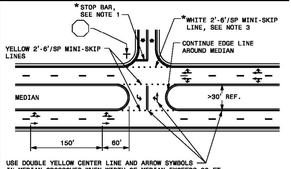
UNDIVIDED MULTI-LANE ROADWAY



DIVIDED MULTI-LANE ROADWAY WITH TURN BAY



DIVIDED MULTI-LANE ROADWAY WITH WIDE MEDIAN CROSSOVER



USE DOUBLE YELLOW CENTER LINE AND ARROW SYMBOLS IN MEDIAN CROSSOVER WHEN WIDTH OF MEDIAN EXCEEDS 30 FT, OTHERWISE THEY ARE NOT REQUIRED.

GENERAL NOTES:

1- PLACEMENT OF STOP BARS AT NON-SIGNALIZED INTERSECTIONS IS OPTIONAL AND USED WHERE IT IS IMPORTANT TO INDICATE THE POINT WHICH VEHICLES ARE REQUIRED TO STOP. PLACE STOP BARS NO LESS THAN 4 FEET AND NO MORE THAN 30 FEET FROM THE NEAREST EDGE OF THE INTERSECTING ROADWAY. USE 10 FEET AS THE TYPICAL SETBACK DISTANCE OR AS DIRECTED BY THE ENGINEER.

2- WINI-SKIP LANE LINE EXTENSIONS SHOULD BE USED AT INTERSECTIONS THAT HAVE REDUCED VISIBILITY CONDITIONS SUCH AS OFFSET, SKEWED, OR CURVED ROADWAYS.

3- WINI-SKIP EDGE LINE EXTENSIONS MAY BE PLACED THROUGH INTERSECTIONS AND MAJOR DRIVEWAYS.

4- REFER TO ROADWAY STANDARD DRAWINGS 1205.01, 1205.02, 1205.05, 1205.08 AND 1205.09 FOR ADDITIONAL PAVEMENT MARKING GUIDANCE.

LEGEND

STOP SIGN
STATIONARY SIGN
DIRECTION OF TRAFFIC FLOW
PAVEMENT MARKING SYMBOLS
* OPTIONAL

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1-18

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** INTERSECTIONS

SHEET 2 OF 2

1205.04

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
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10534 ARNOLD PALMER DRIVE
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919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-08-31

PROJECT NO: ---

DESIGN BY: JJB

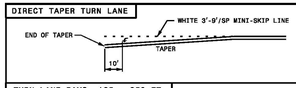
DRAWN BY: JJB

SCALE: AS SHOWN

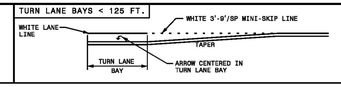
DATE: 2022-08-31

SHEET NO: **D1.5**

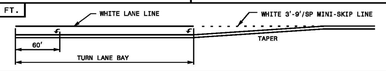
DIRECT TAPER TURN LANE



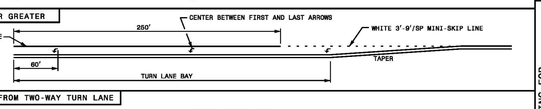
TURN LANE BAYS < 125 FT.



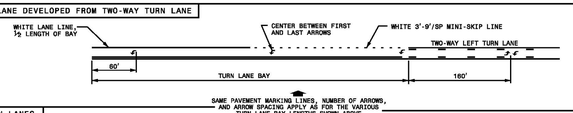
TURN LANE BAYS 125 - 250 FT.



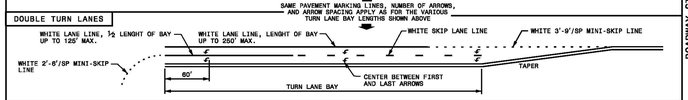
TURN LANE BAYS 250 FT. OR GREATER



LEFT TURN LANE DEVELOPED FROM TWO-WAY TURN LANE



DOUBLE TURN LANES



GENERAL NOTES:

1- USE THE GUIDANCE SHOWN ABOVE IN CONJUNCTION WITH THE INTERSECTION GUIDANCE SHOWN ON ROADWAY STANDARD DRAWING 1205.04.

2- THE NUMBER OF ARROWS SHOWN IS THE MINIMUM REQUIRED. USE ADDITIONAL ARROWS AS DIRECTED BY THE ENGINEER.

LEGEND
PAVEMENT MARKING SYMBOL

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

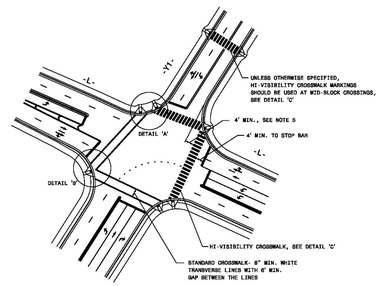
1:1.5B

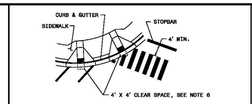
ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** TURN LANES

SHEET 1 OF 1

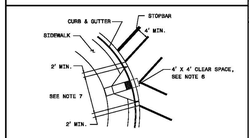
1205.05

CROSSWALK PLACEMENT GUIDANCE

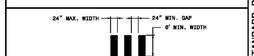




DETAIL 'A'- DUAL CURB RAMPS



DETAIL 'B'- SINGLE DIAGONAL CURB RAMP



DETAIL 'C'- HI-VISIBILITY CROSSWALK

GENERAL NOTES:

1- USE THE DETAILS ABOVE AND THE FOLLOWING NOTES FOR GUIDANCE IN PLACING CROSSWALK MARKINGS. REFER TO NCDOT ROADWAY STANDARD DRAWINGS, MUTCD AND ADA STANDARDS FOR ADDITIONAL GUIDANCE.

2- THE LOCATION AND TYPE OF CROSSWALK MARKINGS SHOWN ON THE ABOVE DETAILS ARE FOR REFERENCE ONLY. LOCATE CROSSWALK MARKINGS AS SHOWN ON THE PROJECT DETAIL SHEETS OR AS DIRECTED BY THE ENGINEER. THE CROSSWALK MARKING TYPE, STANDARD OR HI-VISIBILITY, SHALL BE INSTALLED AS SPECIFIED ON THE PROJECT DETAIL SHEETS OR AS DIRECTED BY THE ENGINEER.

3- THE STANDARD CROSSWALK IS TWO WHITE 6" MIN. TRANSVERSE LINES WITH A 6' MIN. GAP BETWEEN THE LINES. THE HI-VISIBILITY CROSSWALK IS WHITE 24" MAX. WIDE LONGITUDINAL LINES WITH 24" MIN. GAPS BETWEEN LINES, SEE DETAIL 'C'. HI-VISIBILITY CROSSWALKS SHOULD BE A MINIMUM OF 8' WIDE. CURB RAMPS SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS, EXCLUDING ANY FLARES.

4- STOP BARS SHOULD BE PLACED A 4' MIN. IN ADVANCE OF NEAREST CROSSWALK LINE.

5- SET BACK DISTANCE FROM INSIDE CROSSWALK MARKING TO NEAREST EDGE OF TRAVEL IS 4' MIN.

6- BEYOND THE BOTTOM GRADE BREAK, A CLEAR SPACE OF 4' X 4' MIN. SHALL BE PROVIDED WITHIN THE MARKINGS.

7- SINGLE DIAGONAL CURB RAMPS WITH FLARED SIDES SHALL HAVE A SEGMENT OF CURB 2' MIN. LONG LOCATED ON EACH SIDE OF THE CURB RAMP AND WITHIN THE MARKED CROSSING, SEE DETAIL 'B'.

8- CURB RAMPS SHALL BE CONSTRUCTED IN ACCORDANCE TO THE LATEST NCDOT ROADWAY STANDARD DRAWINGS. CURB RAMPS THROUGH MEDIAN ISLANDS, SINGLE RAMPS AT DUAL CROSSWALKS OR LIMITED R/W SITUATIONS, WILL BE HANDLED BY SPECIAL DETAILS. CONTACT THE CONTRACT STANDARDS AND DEVELOPMENT UNIT FOR DETAILS OR A SPECIAL DESIGN.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

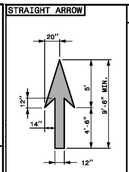
1:1.5B

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** PEDESTRIAN CROSSWALKS

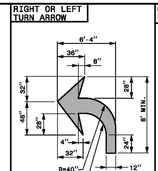
SHEET 1 OF 1

1205.07

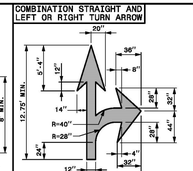
STRAIGHT ARROW



RIGHT OR LEFT TURN ARROW



COMBINATION STRAIGHT AND LEFT OR RIGHT TURN ARROW



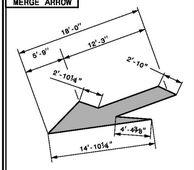
COMBINATION LEFT AND RIGHT TURN ARROW

SAME DIMENSIONS APPLY AS FOR THE LEFT/RIGHT TURN ARROW

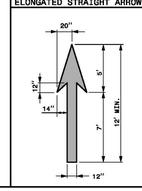
COMBINATION LEFT AND STRAIGHT AND RIGHT TURN ARROW

SAME DIMENSIONS APPLY AS FOR THE COMBINATION STRAIGHT AND LEFT/RIGHT TURN ARROW

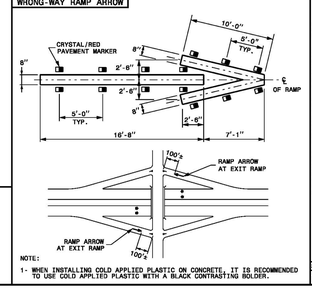
MERGE ARROW



ELONGATED STRAIGHT ARROW



WRONG-WAY RAMP ARROW



GENERAL NOTES:

1- USE THE COLOR WHITE FOR ALL PAVEMENT MARKING SYMBOLS.

2- DO NOT LOCATE PAVEMENT MARKING SYMBOLS AS TO ENCROACH INTO INTERSECTION AREAS.

3- DO NOT PLACE SYMBOLS ACROSS TRANSVERSE EXPANSION JOINTS ON PORTLAND CEMENT CONCRETE PAVEMENTS, UNLESS APPROVED BY THE ENGINEER.

4- CONFORM ALL SYMBOLS TO THE FHWA "STANDARD HIGHWAY SIGNS" MANUAL WHICH INCLUDES PAVEMENT MARKINGS AND STANDARD ALPHABETS (REFER TO SHEETS 8 THRU 9). DIMENSIONS CAN VARY AMONG MANUFACTURERS, THEREFORE SLIGHT VARIANCES ARE ACCEPTABLE. HOWEVER, ALL SYMBOLS ARE REQUIRED TO BE APPROVED BY THE DEPARTMENT.

NOTE:

1- WHEN INSTALLING COLD APPLIED PLASTIC ON CONCRETE, IT IS RECOMMENDED TO USE COLD APPLIED PLASTIC WITH A BLACK CONTRASTING BOLDER.

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

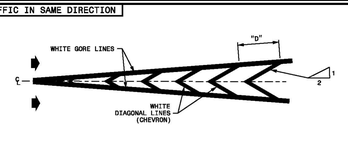
1:1.5B

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** SYMBOLS AND WORD MESSAGES

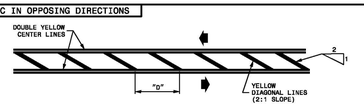
SHEET 1 OF 9

1205.08

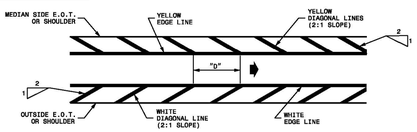
CHANNELIZING ISLAND SEPARATING TRAFFIC IN SAME DIRECTION



MEDIAN ISLAND SEPARATING TRAFFIC IN OPPOSING DIRECTIONS



EDGE OF PAVEMENT OR SHOULDER ISLAND



GENERAL NOTES:

1- "D" = SPACING OF DIAGONAL LINES (TYPICALLY EQUAL IN FEET TO THE POSTED SPEED LIMIT).

2- INCREASE SPACING OF DIAGONALS TO 200' OR MORE ON INTERSTATE ROADWAYS.

3- ADJUST SPACING OF DIAGONALS DEPENDING ON THE LENGTH OF THE ISLAND. SPACING MAY BE ADJUSTED AS DETERMINED BY THE ENGINEER.

LEGEND
E.O.T.= EDGE OF TRAVEL
DIRECTION OF TRAFFIC FLOW

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1:1.5B

ROADWAY STANDARD DRAWING FOR **PAVEMENT MARKINGS** PAINTED ISLANDS

SHEET 1 OF 1

1205.09

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Consulting Civil Engineers
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919-435-6395
NCBELS License P-0751

CLIENT:

PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
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919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT

2022-08-31

PROJECT NO: ---

DESIGN BY: JJB

DRAWN BY: JJB

SCALE: AS SHOWN

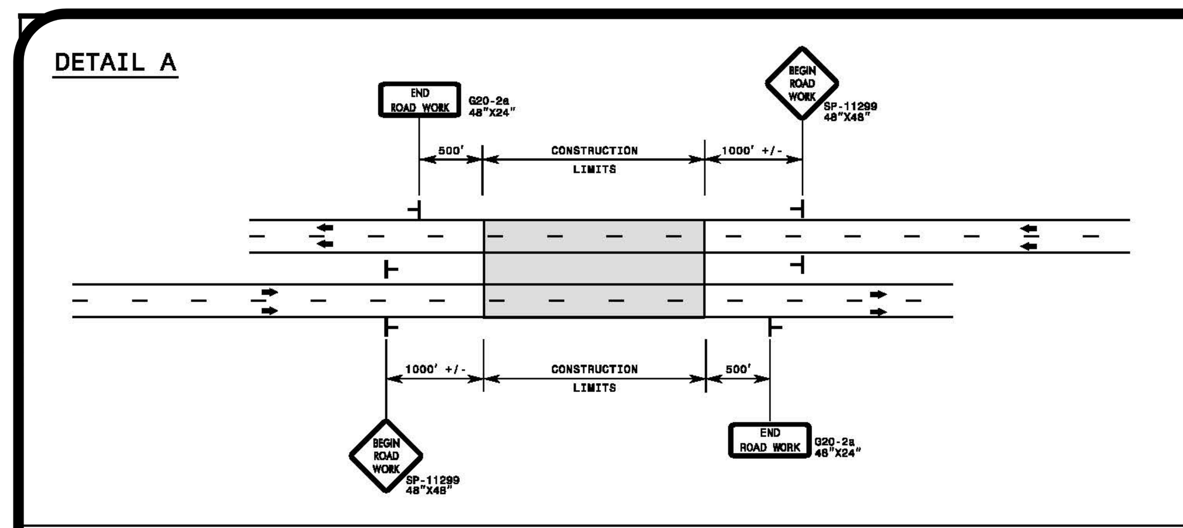
DATE: 2022-08-31

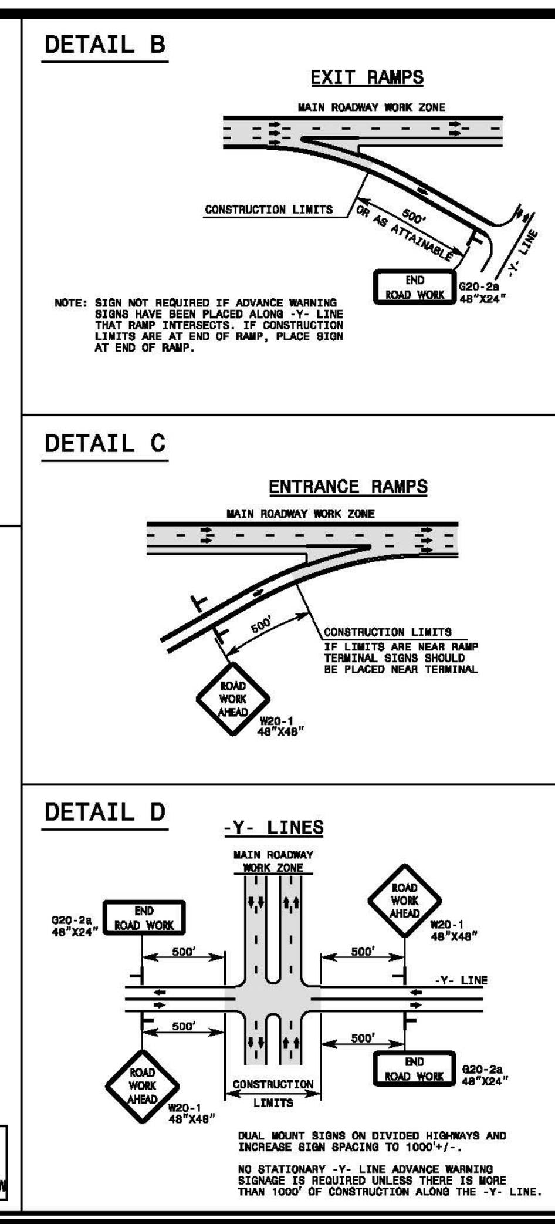
SHEET NO: **D1.6**

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

ROADWAY STANDARD DRAWING FOR WORK ZONE ADVANCE WARNING SIGNS FOR FACILITIES ≤ 55 MPH

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 3 — 1101.01





GENERAL NOTES

1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.

2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 3 CONSECUTIVE DAYS.

3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.

4- ERECT SIGNS PER RSD. 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.

5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.

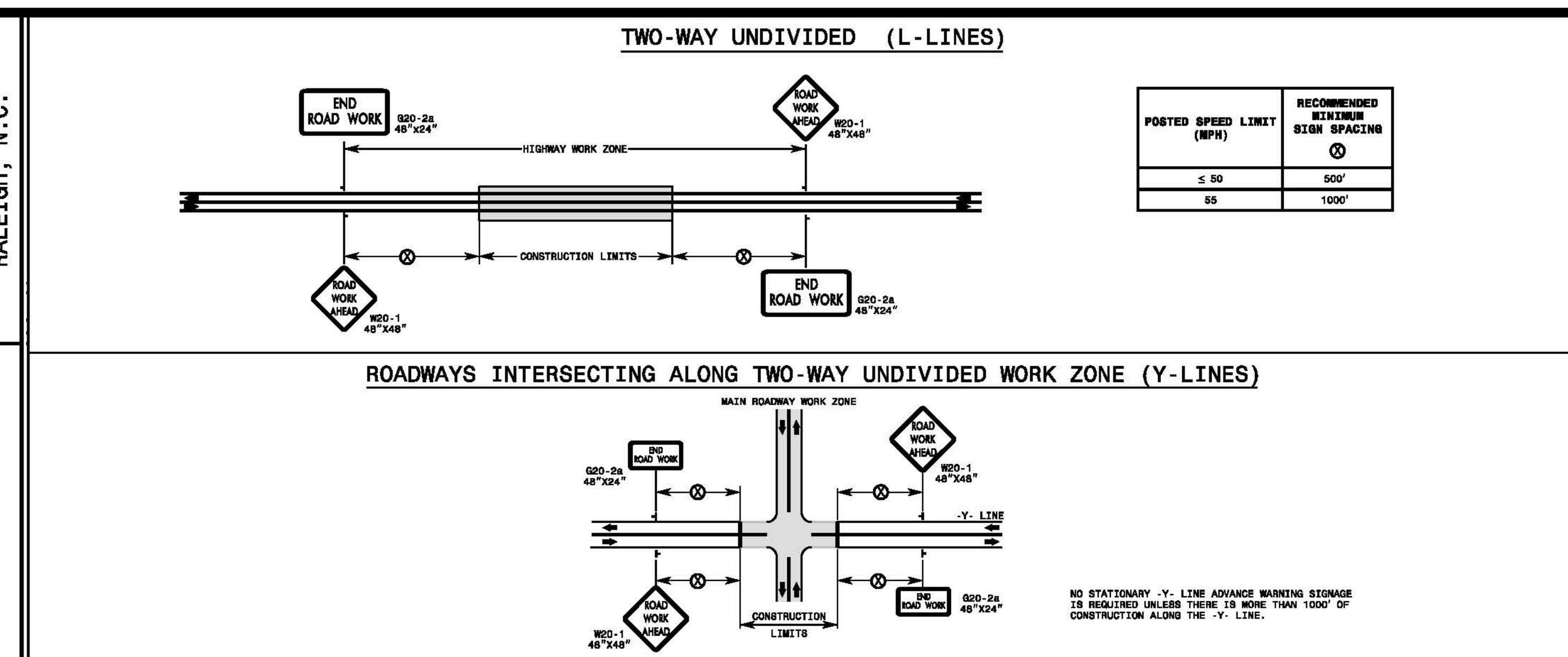
6- DO NOT BACK BRACE SIGN SUPPORTS.

7- TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

LEGEND
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW

ROADWAY STANDARD DRAWING FOR WORK ZONE ADVANCE WARNING SIGNS FOR TWO-WAY UNDIVIDED FACILITIES

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 3 OF 3 — 1101.01



POSTED SPEED LIMIT (MPH)	RECOMMENDED MINIMUM SIGN SPACING (X)
≤ 50	500'
55	1000'

GENERAL NOTES

1- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.

2- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 3 CONSECUTIVE DAYS.

3- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.

4- ERECT SIGNS PER RSD 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.

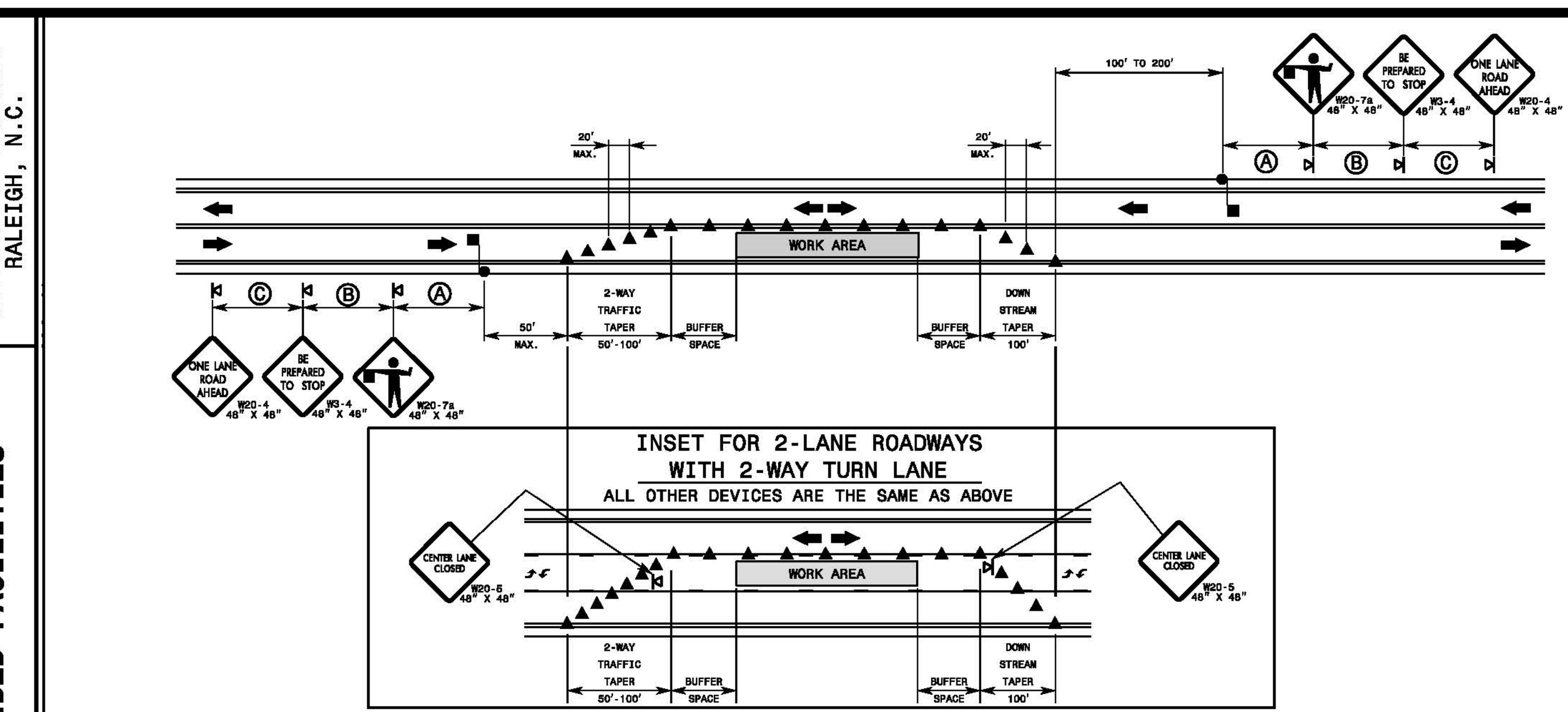
5- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD. 1110.01.

6- DO NOT BACK BRACE SIGN SUPPORTS.

LEGEND
- STATIONARY SIGN
- DIRECTION OF TRAFFIC FLOW

ROADWAY STANDARD DRAWING FOR TEMPORARY LANE CLOSURES 2-LANE, 2-WAY ROADWAY-1 LANE CLOSED

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 14 — 1101.02



GENERAL NOTES FOR FLAGGING OPERATIONS

1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.

3- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

4- PLACE CONES THRU THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.

5- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD. 1101.11, SHEET 2).

6- DO NOT STOP TRAFFIC IN ANY ONE DIRECTION FOR MORE THAN 5 MINUTES AT A TIME.

7- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.

9- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.

10- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

11- IF VEHICLE QUEUES WILL REACH WITHIN 15' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE GRADE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.

GENERAL NOTES FOR PILOT CAR OPERATIONS

1- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.

2- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA, AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.

3- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.

4- MOUNT SIGN G20-4 "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.

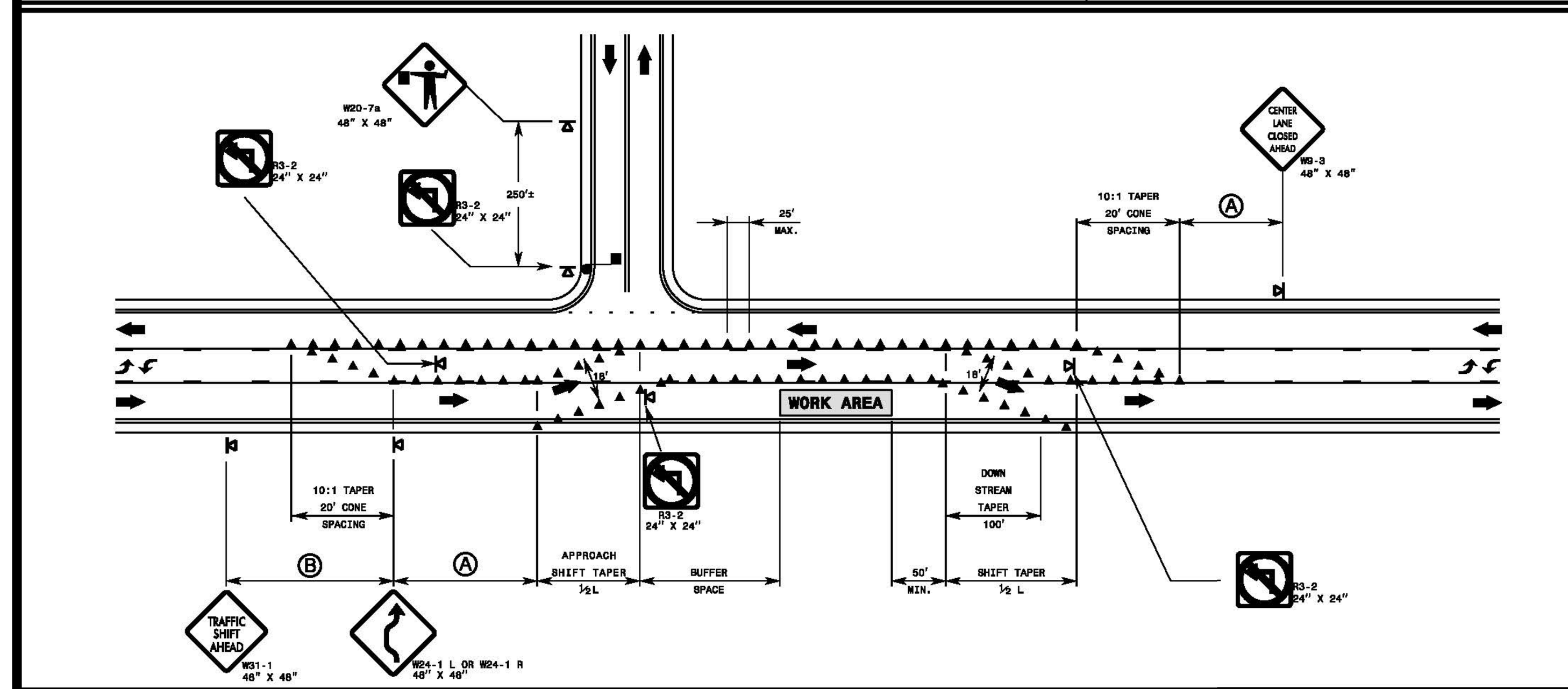
5- DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.

6- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.

LEGEND
- FLAGGER
- CONE
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

ROADWAY STANDARD DRAWING FOR TEMPORARY LANE CLOSURES 2-LANE, 2-WAY ROADWAY WITH 2-WAY TURN LANE 1 THRU LANE CLOSED

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 14 — 1101.02



GENERAL NOTES

1- REFER TO RSD. 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.

2- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC. REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.

3- PLACE CONES ADJACENT TO THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT. PLACE CONES SEPARATING OPPOSING TRAFFIC AT THE MAXIMUM SPACING OF 25 FEET.

4- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE BEGINNING OF THE APPROACH SHIFT TAPER (REFER TO RSD. 1101.11, SHEET 2).

5- TMAs ARE REQUIRED WHEN ADEQUATE BUFFER SPACE CANNOT BE ATTAINED. POSITION TMAs TO MAINTAIN A ROLL-AHEAD DISTANCE AS RECOMMENDED BY THE MANUFACTURER.

6- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD. 1180.01 FOR SKINNY DRUM REQUIREMENTS.

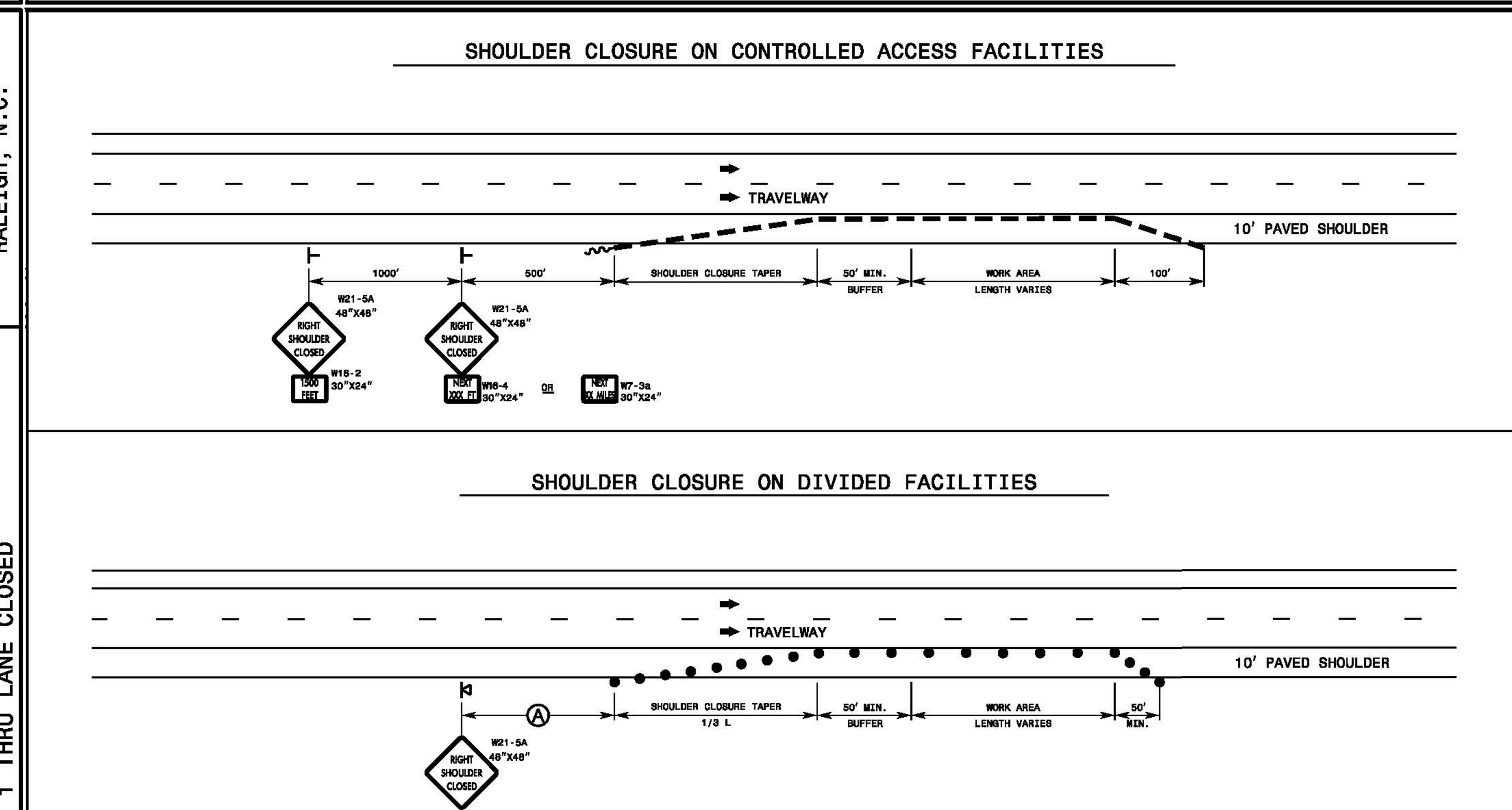
7- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.

8- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W20-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS, PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.

LEGEND
- FLAGGER
- CONE
- PORTABLE SIGN
- DIRECTION OF TRAFFIC FLOW

ROADWAY STANDARD DRAWING FOR TEMPORARY SHOULDER CLOSURES

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 1 — 1101.04



GENERAL NOTES

1- PLACE SHOULDER CLOSURE SIGNS ON THE SAME SIDE AS THE SHOULDER THAT IS CLOSED.

2- PLACE DRUMS IN THE SHOULDER TAPER AT THE MAXIMUM SPACING EQUAL IN FEET TO THE POSTED SPEED LIMIT. THE MAXIMUM SPACING OF DRUMS ALONG THE WORK AREA IS EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.

3- USE STATIONARY SIGNS FOR OPERATIONS IN EFFECT LONGER THAN 3 DAYS.

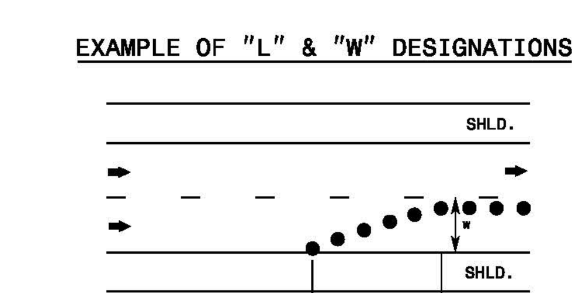
4- REFER TO RSD. 1101.11, SHEETS 1, 3 & 4, FOR "L" DISTANCE, BARRIER FLARE RATES, AND SIGN SPACING.

LEGEND
- DRUM
- STATIONARY SIGN
- PORTABLE SIGN
- PORTABLE CONCRETE BARRIER
- DIRECTION OF TRAFFIC FLOW
- TEMPORARY CRASH CUSHION

ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES "L" DISTANCE AND CHANNELIZING DEVICE TAPER CRITERIA

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 4 — 1101.11

EXAMPLE OF "L" & "W" DESIGNATIONS



TAPER LENGTH CRITERIA FOR CHANNELIZING DEVICES IN WORK ZONES

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPER	
MERGING TAPER	L MINIMUM
SHIFTING TAPER	½ L MINIMUM
SHOULDER TAPER	⅓ L MINIMUM
TWO-WAY TRAFFIC TAPER	50 - 100 FEET MAXIMUM
DOWNSTREAM TAPER	100 FEET MAXIMUM

DO NOT INTRODUCE A MERGING OR SHIFTING TAPER WITHIN A CURVE OF THE ROADWAY

QUICK REFERENCE - "L" DISTANCE TABLE
MINIMUM LONGITUDINAL DISTANCE "L" (FEET) (ROUNDED VALUES)

POSTED SPEED "S" (MPH)	LATERAL WIDTH "W" (FEET) 1	2	3	4	5	6	7	8	9	10	11	12
20	10	15	20	30	35	40	50	55	60	70	75	80
25	15	25	35	45	55	65	75	85	95	105	115	125
30	15	30	45	60	75	90	105	120	135	150	165	180
35	25	45	65	85	105	125	145	165	185	205	225	245
40	30	55	80	110	135	160	190	215	240	270	295	320
45	45	90	135	180	225	270	315	360	405	450	495	540
50	50	100	150	200	250	300	350	400	450	500	550	600
55	55	110	165	220	275	330	385	440	495	550	605	660
60	60	120	180	240	300	360	420	480	540	600	660	720
65	65	130	195	260	325	390	455	520	585	650	715	780
70	70	140	210	280	350	420	490	560	630	700	770	840

GENERAL NOTES

1- TABLE FOR "L" DISTANCE IS BASED ON CHANNELIZATION TAPER FORMULA FROM THE MUTCD. WHERE:

SPEED LIMIT	FORMULA
40 MPH OR LESS	$L_{MIN} = \frac{W \times S^2}{60}$
45 MPH OR GREATER	$L_{MIN} = W \times S$

L = MINIMUM TAPER LENGTH IN FEET (LONGITUDINAL DISTANCE)
W = WIDTH OF OFFSET IN FEET (LATERAL DISTANCE)
S = POSTED SPEED LIMIT, OR OFF-PEAK 85 PERCENTILE SPEED IN MPH PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED IN MPH

2- "L" DISTANCE IS FOR APPLICATION WITH CHANNELIZING DEVICE AND PAVEMENT MARKING TAPERS AND TRANSITIONS. CHANNELIZING DEVICES INCLUDE DRUMS, CONES, TUBULAR MARKERS, BARRICADES, RAISED ASPHALT ISLANDS, AND VERTICAL PANELS.

ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES BUFFER SPACE & SIGHT DISTANCE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 2 OF 4 — 1101.11

DESIGN SPEED (MPH)	MINIMUM SIGHT DISTANCE: STOPPING SIGHT DISTANCE (FEET)	MINIMUM SIGHT DISTANCE: PASSING SIGHT DISTANCE (FEET)	MINIMUM LONGITUDINAL BUFFER SPACE (FEET)
30	200	1090	85
35	250	1280	120
40	305	1470	155
45	360	1625	195
50	425	1835	240
55	495	1985	290
60	570	2135	345
65	645	2285	405
70	730	2480	470
75	820	2580	540
80	910	2680	615

GENERAL NOTES

1- TABLES ARE BASED ON THE AASHTO GREEN BOOK "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". MINIMUM SIGHT DISTANCE VALUES ARE FOR PASSENGER CAR VEHICLES ON WET AND LEVEL ROADWAYS. CONSULT THE AASHTO GREEN BOOK TO MAKE FINAL DETERMINATION OF STOPPING SIGHT DISTANCE REQUIREMENTS.

2- BUFFER SPACE TABLE IS BASED ON THE BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS.

3- USE OF STOPPING SIGHT DISTANCE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE FOR TRAFFIC APPROACHING A LANE CLOSURE. PROVIDE 2-LANE, 2-WAY ROADWAYS STOPPING SIGHT DISTANCE TO THE FLAGGER. FOR LANE CLOSURES ON MULTILANE ROADWAYS PROVIDE STOPPING SIGHT DISTANCE TO THE BEGINNING OF THE LANE CLOSURE MERGE TAPER, OR FLASHING ARROW BOARD. EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED.

4- USE OF MINIMUM PASSING SIGHT DISTANCE TABLE IN TRAFFIC CONTROL PLAN APPLICATIONS INCLUDES PROVIDING SIGHT DISTANCE REQUIREMENTS FOR PLACEMENT OF PAVEMENT MARKING PASSING/NO-PASSING ZONES FOR 2-LANE, 2-WAY ROADWAYS.

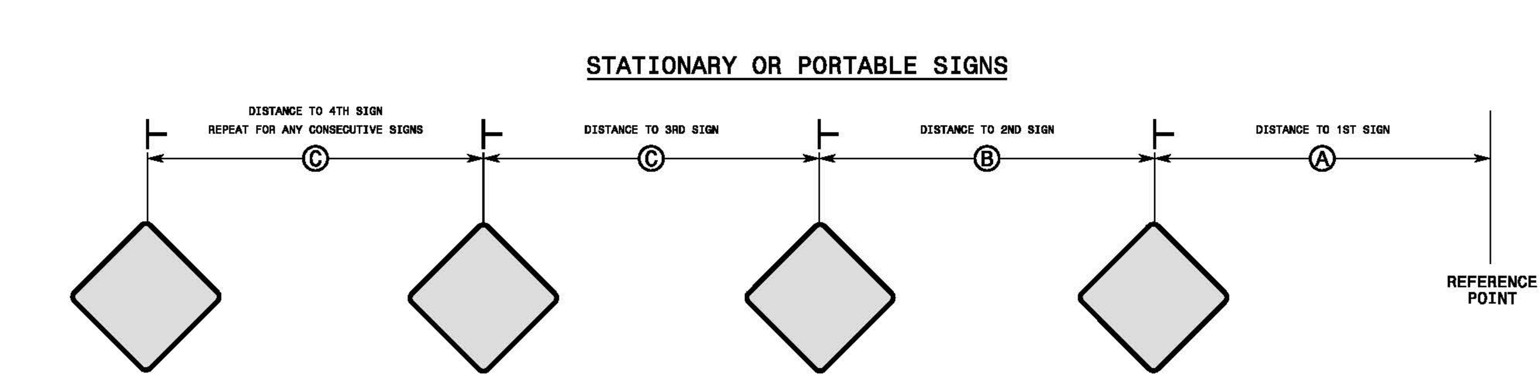
ROADWAY STANDARD DRAWING FOR TRAFFIC CONTROL DESIGN TABLES SPACING OF TEMPORARY SIGNS IN SERIES

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 4 OF 4 — 1101.11

ADVANCE WARNING SIGN SPACING CHART

POSTED SPEED LIMIT (MPH)	RECOMMENDED DISTANCE BETWEEN SIGNS (FEET)± (A)	(B)	(C)
≤ 35	200	200	200
40-50	350	350	350
55	500	500	500
CONTROLLED ACCESS ROADS (≥ 55)	1000	1500	2700

STATIONARY OR PORTABLE SIGNS



GENERAL NOTES

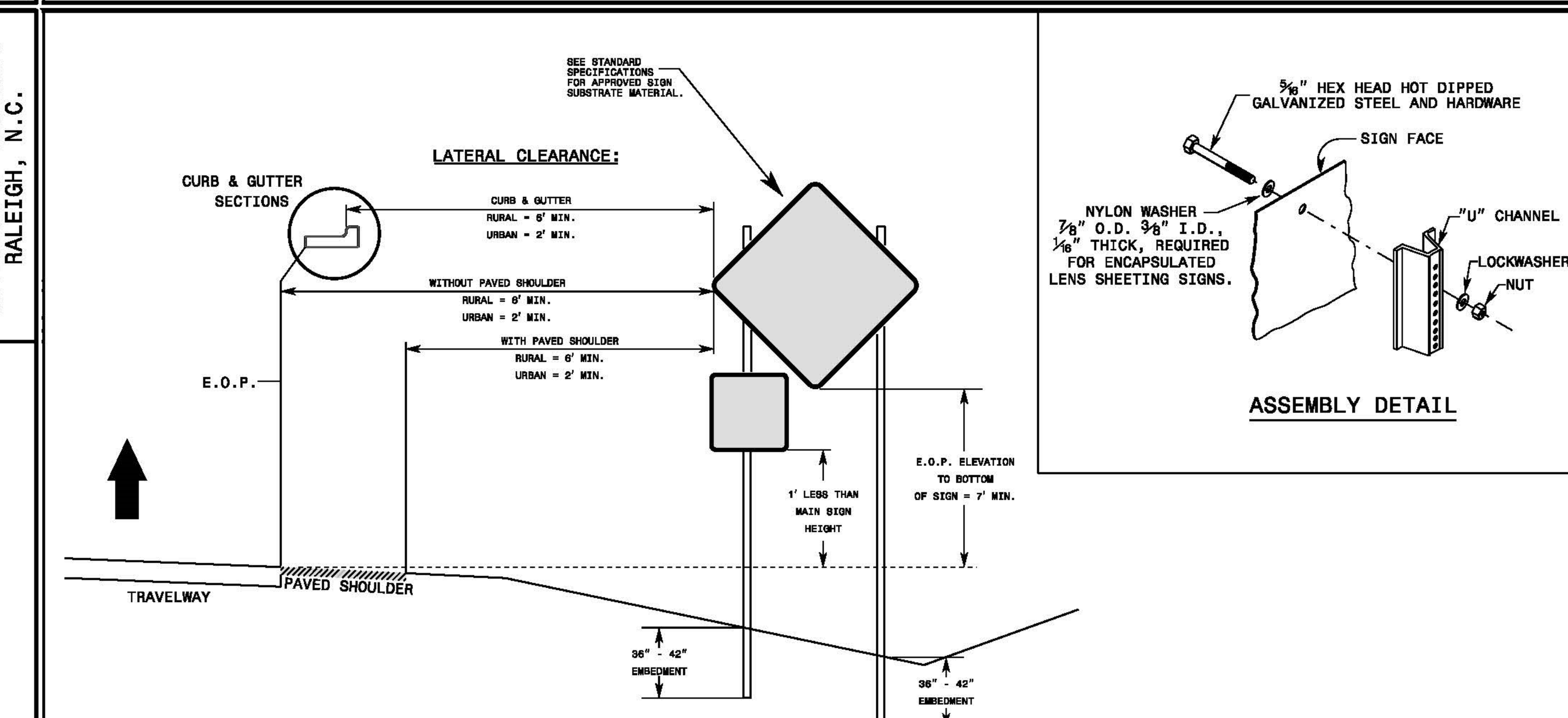
1- REFER TO 2009 MUTCD OR THE LATEST EDITION.

2- USE THIS STANDARD DRAWING IN CONJUNCTION WITH OTHER TRAFFIC CONTROL ROADWAY STANDARD DRAWINGS WHERE SIGN SPACING DISTANCES A, B, C, ARE SPECIFIED.

3- APPLY THE ADVANCE WARNING SIGN SPACING CHART WHERE A SERIES OF 2 OR MORE SIGNS ARE USED. ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE. FIELD ADJUST AS VARIOUS CONDITIONS OCCUR, SUCH AS LIMITED SIGHT DISTANCE, OBSTRUCTION INTERFERENCE, ETC.

ROADWAY STANDARD DRAWING FOR STATIONARY WORK ZONE SIGNS MOUNTING HEIGHT & LATERAL CLEARANCE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C. — 1-18 — SHEET 1 OF 3 — 1110.01



GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS THAT DETRACT FROM THEIR VISIBILITY, MOUNT THE SIGNS AT AN APPROPRIATE HEIGHT SUCH THAT THEY ARE CLEARLY VISIBLE TO APPROACHING TRAFFIC.

2- MOUNT SIGNS THAT ARE LARGER THAN 10 SQUARE FEET IN AREA ON TWO OR MORE WOOD OR U-CHANNEL SUPPORTS. PERFORATED SQUARE TUBING SUPPORT SYSTEMS MAY SUPPORT LARGER AREAS ON A SINGLE SUPPORT. FOLLOW MANUFACTURER'S RECOMMENDATIONS. THESE SYSTEMS SHALL BE NCHRP 350 COMPLIANT AND NCDOT APPROVED.

3- REFER TO STANDARD SPECIFICATION 1089-1 FOR WORK ZONE SIGNS.

4- REFER TO STANDARD SPECIFICATION 1089-2 FOR WORK ZONE SIGN SUPPORTS.

5- REFER TO RSD. 903.20 FOR WOOD POSTS.

6- REFER TO STANDARD SPECIFICATION 903-1 FOR WOOD SUPPORTS.

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919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY OFFSITE ROADWAY IMPROVEMENTS

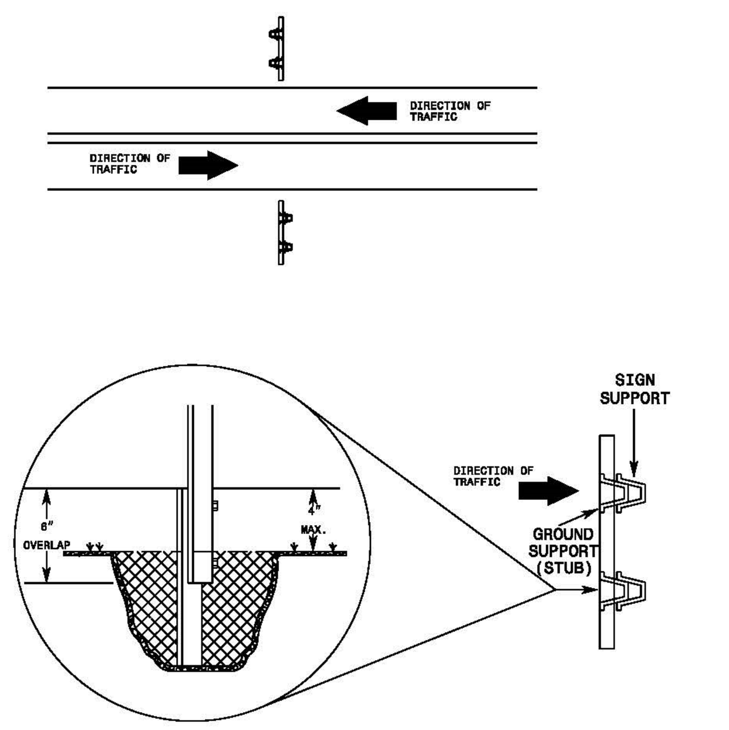
ROLESVILLE, NC

DETAILS

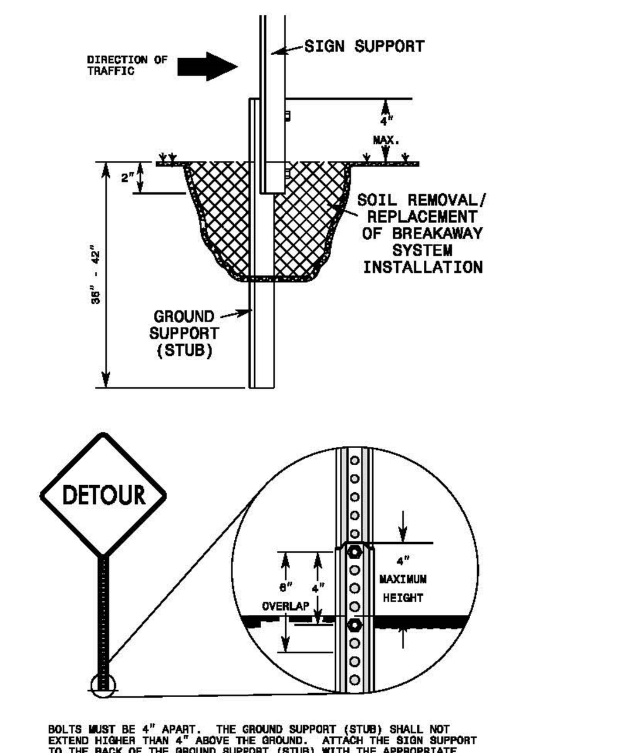
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT 2022-08-31

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: AS SHOWN
DATE: 2022-08-31
SHEET NO: D1.7

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION



INSTALL THE GROUND SUPPORT (STUB) BETWEEN THE SIGN SUPPORT AND THE APPROACHING TRAFFIC IN THE ADJACENT TRAVEL LANE.



BOLTS MUST BE 4" APART. THE GROUND SUPPORT (STUB) SHALL NOT EXTEND HIGHER THAN 4" ABOVE THE GROUND. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE PROVIDED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM. OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6".

GENERAL NOTES

1- ALL TRAFFIC CONTROL DEVICES, INCLUDING BREAKAWAY SYSTEMS FOR GROUND MOUNTED SIGN SUPPORTS, COMPLY WITH ALL NCHRP REPORT 350 REQUIREMENTS AND SHALL BE APPROVED BY THE DEPARTMENT.

2- INSTALL THE BREAKAWAY SYSTEM TO FUNCTION PROPERLY IN ACCORDANCE WITH THE DIRECTION OF TRAFFIC ADJACENT TO THE SIGN.

3- FOR PERFORATED SQUARE TUBING BREAKAWAY SYSTEMS, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR ANCHOR EMBEDMENT DEPTHS AND POST ATTACHMENT REQUIREMENTS.

3 LB. U-CHANNEL SPLICING REQUIREMENTS

1- WHEN SIGN IS REMOVED AT THE END OF PROJECT, REMOVE THE GROUND SUPPORT (STUB).

2- WHEN SPLICING A U-CHANNEL SUPPORT, INSTALL THE GROUND SUPPORT (STUB) APPROXIMATELY 36" TO 42" INTO THE GROUND WHILE LEAVING NO MORE THAN 4" ABOVE THE EXISTING GROUND ELEVATION. REMOVE ENOUGH SOIL FROM AROUND THE GROUND SUPPORT (STUB) TO PERMIT ACCESS TO THE HOLES FOR THE BREAKAWAY SYSTEM. ONCE THE BREAKAWAY SYSTEM IS TIGHTENED, REPLACE THE SOIL AND TAMP.

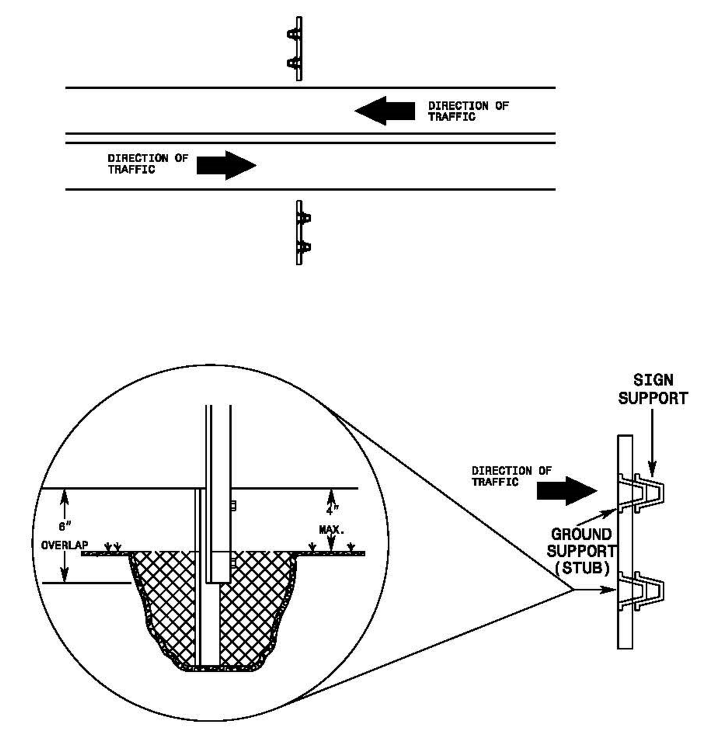
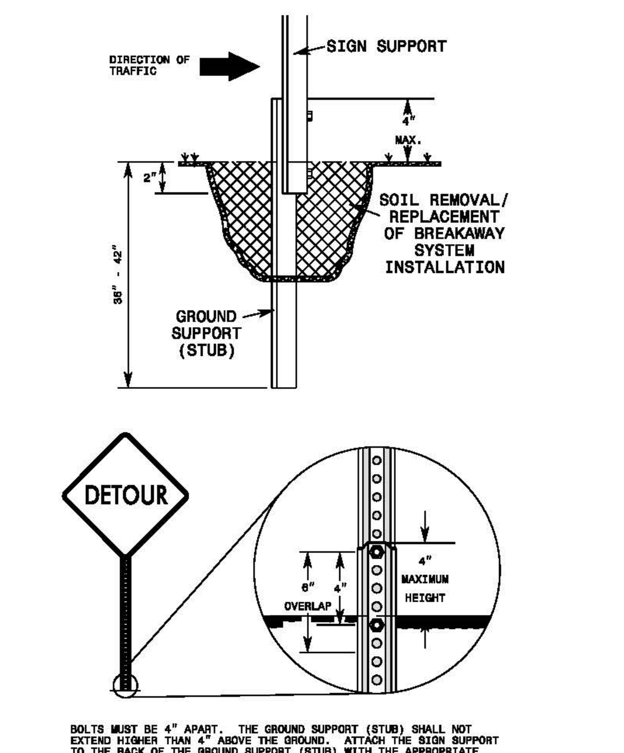
3- OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6". BOLTS MUST BE 4" APART. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE SUPPLIED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM.

4- INSTALL U-CHANNEL BREAKAWAY SYSTEMS SO THE GROUND SUPPORT (STUB) IS INSTALLED ON THE APPROACH SIDE OF TRAFFIC WHILE THE SIGN SUPPORT IS ATTACHED/SPLICED BEHIND THE GROUND SUPPORT (STUB).

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **STATIONARY WORK ZONE SIGNS** SPLICING DETAIL

SHEET 2 OF 3 **1110.01**

INSTALL THE GROUND SUPPORT (STUB) BETWEEN THE SIGN SUPPORT AND THE APPROACHING TRAFFIC IN THE ADJACENT TRAVEL LANE.

BOLTS MUST BE 4" APART. THE GROUND SUPPORT (STUB) SHALL NOT EXTEND HIGHER THAN 4" ABOVE THE GROUND. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE PROVIDED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM. OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6".

GENERAL NOTES

1- ALL TRAFFIC CONTROL DEVICES, INCLUDING BREAKAWAY SYSTEMS FOR GROUND MOUNTED SIGN SUPPORTS, COMPLY WITH ALL NCHRP REPORT 350 REQUIREMENTS AND SHALL BE APPROVED BY THE DEPARTMENT.

2- INSTALL THE BREAKAWAY SYSTEM TO FUNCTION PROPERLY IN ACCORDANCE WITH THE DIRECTION OF TRAFFIC ADJACENT TO THE SIGN.

3- FOR PERFORATED SQUARE TUBING BREAKAWAY SYSTEMS, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR ANCHOR EMBEDMENT DEPTHS AND POST ATTACHMENT REQUIREMENTS.

3 LB. U-CHANNEL SPLICING REQUIREMENTS

1- WHEN SIGN IS REMOVED AT THE END OF PROJECT, REMOVE THE GROUND SUPPORT (STUB).

2- WHEN SPLICING A U-CHANNEL SUPPORT, INSTALL THE GROUND SUPPORT (STUB) APPROXIMATELY 36" TO 42" INTO THE GROUND WHILE LEAVING NO MORE THAN 4" ABOVE THE EXISTING GROUND ELEVATION. REMOVE ENOUGH SOIL FROM AROUND THE GROUND SUPPORT (STUB) TO PERMIT ACCESS TO THE HOLES FOR THE BREAKAWAY SYSTEM. ONCE THE BREAKAWAY SYSTEM IS TIGHTENED, REPLACE THE SOIL AND TAMP.

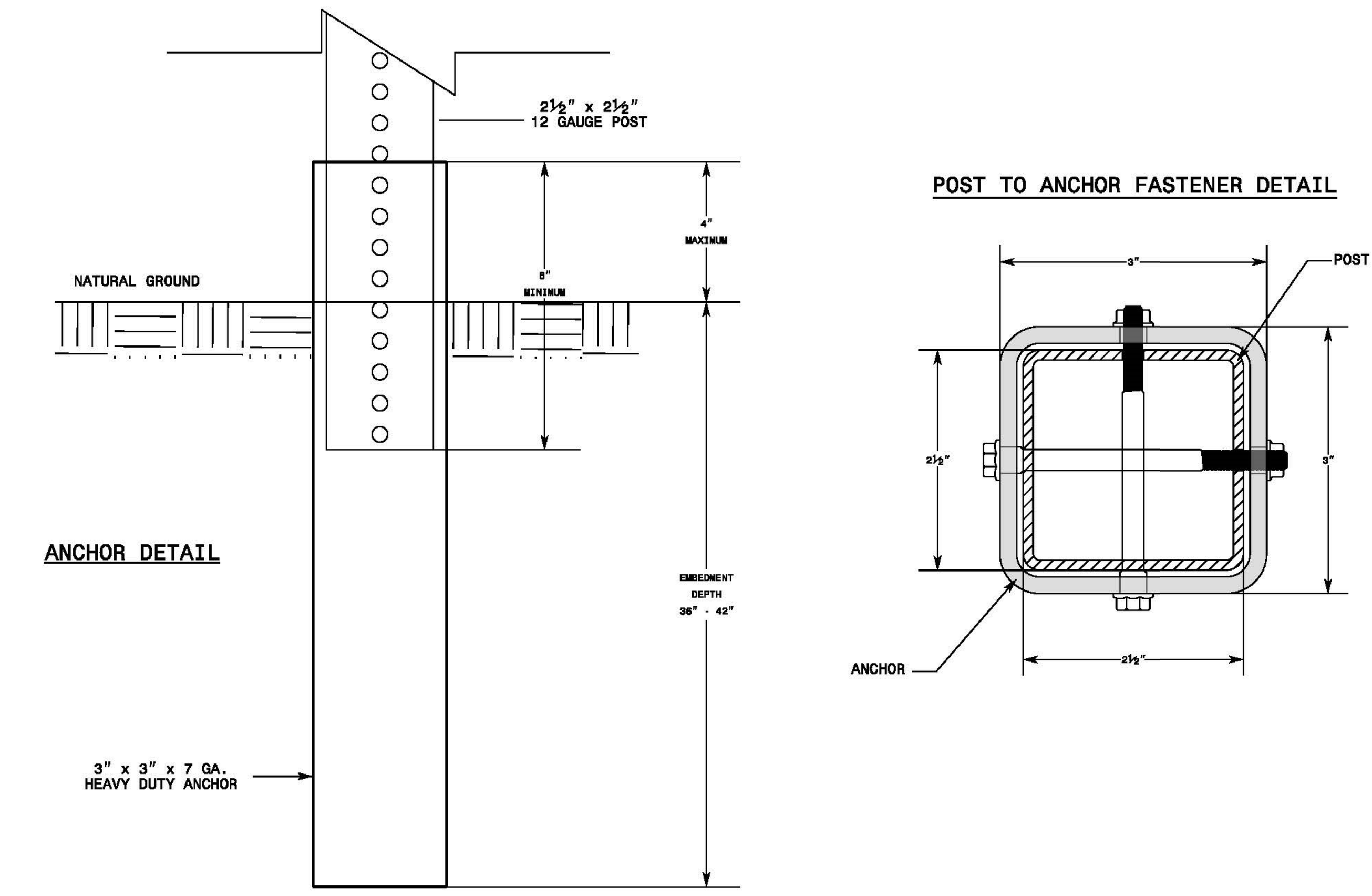
3- OVERALL LENGTH OF THE BREAKAWAY SYSTEM IS 6". BOLTS MUST BE 4" APART. ATTACH THE SIGN SUPPORT TO THE BACK OF THE GROUND SUPPORT (STUB) WITH THE APPROPRIATE HARDWARE SUPPLIED BY THE MANUFACTURER OF THE BREAKAWAY SYSTEM.

4- INSTALL U-CHANNEL BREAKAWAY SYSTEMS SO THE GROUND SUPPORT (STUB) IS INSTALLED ON THE APPROACH SIDE OF TRAFFIC WHILE THE SIGN SUPPORT IS ATTACHED/SPLICED BEHIND THE GROUND SUPPORT (STUB).

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR STATIONARY WORK ZONE SIGNS SPLICING DETAIL

SHEET 2 OF 3 1110.01



GENERAL NOTES

1- POSTS SHALL BE 2½" X 2½" 12 GAUGE STEEL.

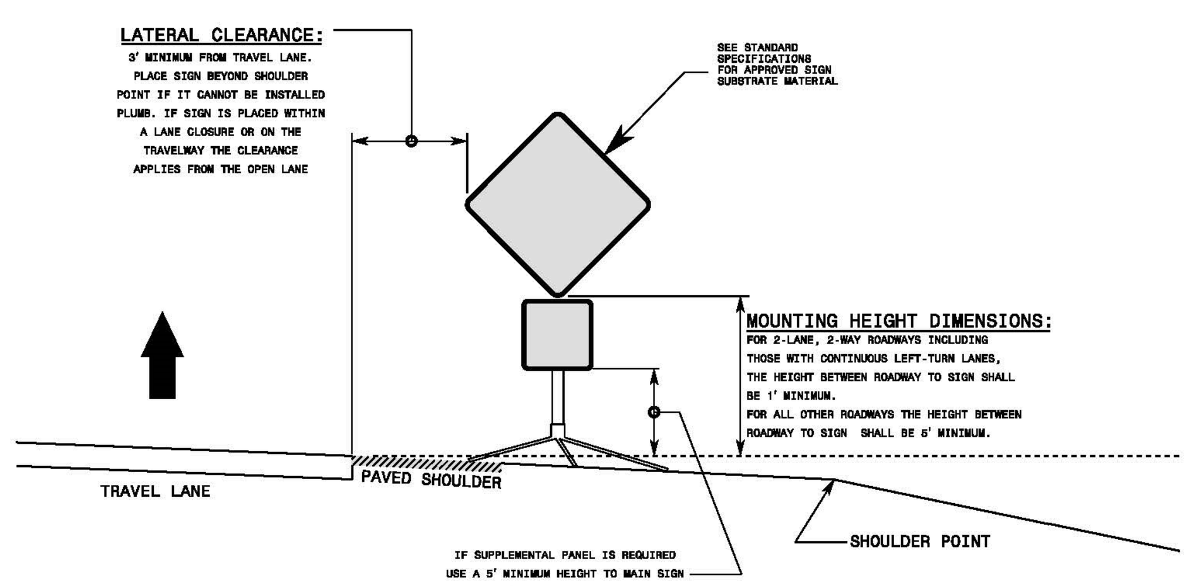
2- ANCHORS SHALL BE 3" X 3" 7 GAUGE STEEL.

3- CONNECTIONS SHALL BE AS RECOMMENDED BY THE MANUFACTURER.

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **STATIONARY WORK ZONE SIGNS** PERFORATED SQUARE STEEL TUBING

SHEET 3 OF 3 **1110.01**



GENERAL NOTES

1- DIMENSIONS SHOWN ARE MINIMUM VALUES. MOUNT SIGNS SO THEY WILL BE CLEARLY VISIBLE TO APPROACHING TRAFFIC EVEN WHEN SIGNS ARE MOUNTED BEHIND TRAFFIC CONTROL DEVICES SUCH AS DRUMS, BARRIER, OR OTHER OBJECTS.

2- ALL PORTABLE SIGNS AND STANDS MUST MEET OR EXCEED THE REQUIREMENTS OF NCHRP 350 FOR CATEGORY II DEVICES. USE PORTABLE WORK ZONE SIGNS AND STANDS SPECIFICALLY DESIGNED FOR ONE ANOTHER.

3- ALL PORTABLE WORK ZONE SIGNS AND STANDS MUST BE LISTED ON THE DEPARTMENT'S APPROVED PRODUCTS LIST.

1-18 STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR **PORTABLE WORK ZONE SIGNS** MOUNTING HEIGHT & LATERAL CLEARANCE

SHEET 1 OF 1 **1110.02**

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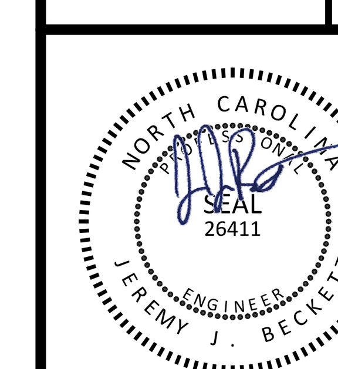
PRESERVE AT JONES DAIRY OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS



2022-08-31

PROJECT NO: ---

DESIGN BY: JJB

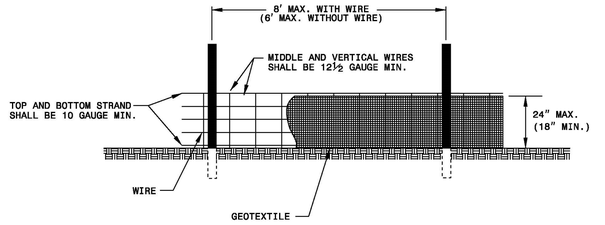
DRAWN BY: JJB

SCALE: AS SHOWN

DATE: 2022-08-31

SHEET NO: D1.8

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION



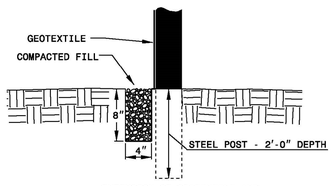
NOTES

USE GEOTEXTILE A MINIMUM OF 36" IN WIDTH AND FASTEN ADEQUATELY TO THE POSTS AND WIRE AS DIRECTED.

USE WIRE A MINIMUM OF 32" IN WIDTH AND WITH A MINIMUM OF 5 LINE WIRES WITH 12" VERTICAL SPACING.

PROVIDE 5'-0" STEEL POST OF THE SELF-FASTENER ANGLE STEEL TYPE.

FOR MECHANICAL SLICING METHOD INSTALLATION, GEOTEXTILE SHALL BE A MAXIMUM OF 18" ABOVE GROUND SURFACE.



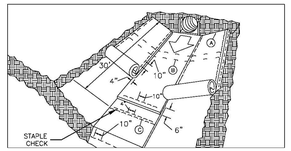
EXTENSION OF GEOTEXTILE AND WIRE INTO TRENCH

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

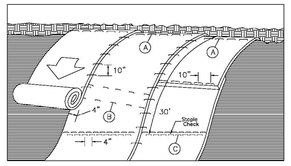
1:1B

ROADWAY STANDARD DRAWING FOR
TEMPORARY SILT FENCE

SHEET 1 OF 1
1605.01



MATTING IN DITCHES



MATTING ON SLOPES

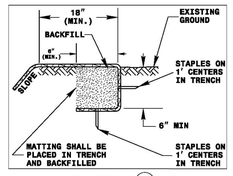


DIAGRAM (A)

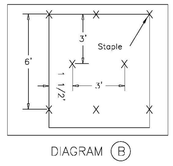


DIAGRAM (B)

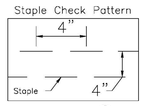


DIAGRAM (C)

NOTES

THIS DETAIL APPLIES TO STRAW, EXCELSIOR, COIR FIBER MAT AND PERMANENT SOIL REINFORCEMENT MAT (PSRM) INSTALLATION AND AS DIRECTED.

STAPLES SHALL BE NO. 11 GAUGE STEEL WIRE FORMED INTO A "U" SHAPE WITH A MINIMUM THROAT WIDTH OF 1 INCH AND NOT LESS THAN 6 INCHES IN LENGTH.

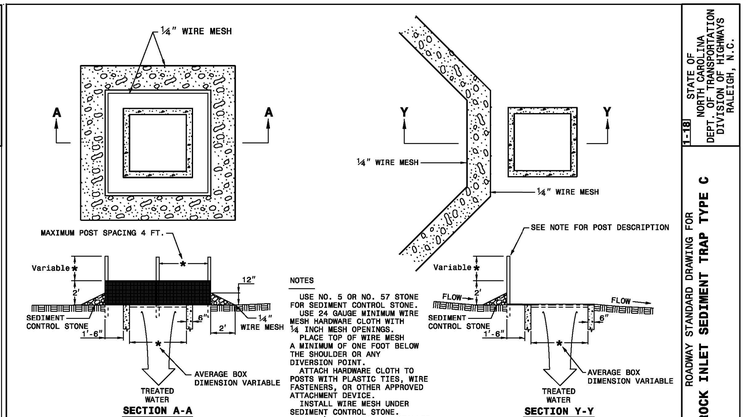
NOT TO SCALE

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1:1B

ROADWAY STANDARD DRAWING FOR
MATTING INSTALLATION

SHEET 1 OF 1
1631.01



SECTION A-A

MULTI-DIRECTIONAL FLOW

NOTES

USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE.

USE 24 GAUGE MINIMUM WIRE MESH HARDWARE CLOTH WITH ¼ INCH MESH OPENINGS.

PLACE TOP OF WIRE MESH A MINIMUM OF ONE FOOT BELOW THE SHOULDER OR ANY DIVERSION POINT.

ATTACH HARDWARE CLOTH TO POSTS WITH PLASTIC TIES, WIRE FASTENERS, OR OTHER APPROVED ATTACHMENT DEVICE.

INSTALL WIRE MESH UNDER SEDIMENT CONTROL STONE.

USE 5' STEEL POST, INSTALLED 2' DEEP MINIMUM, AND OF THE SELF-FASTENER ANGLE STEEL TYPE.

SPACE POST A MAXIMUM OF 4'.

SECTION Y-Y

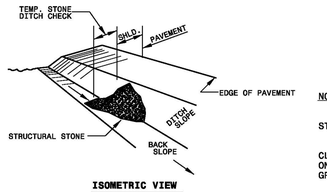
SINGLE-DIRECTIONAL FLOW

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1:1B

ROADWAY STANDARD DRAWING FOR
ROCK INLET SEDIMENT TRAP TYPE C

SHEET 1 OF 1
1632.03

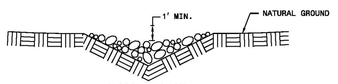


ISOMETRIC VIEW

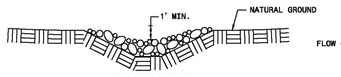
NOTES

USE CLASS B EROSION CONTROL STONE FOR STRUCTURAL STONE.

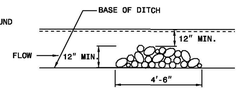
THE ENGINEER MAY DIRECT THE OPTION OF CLASS A STONE FOR SITES HAVING LESS THAN ONE (1) ACRE DRAINAGE AREA AND A DITCH GRADE LESS THAN 3%.



CROSS SECTION
VEE DITCH



CROSS SECTION
TRAPEZOIDAL DITCH



ELEVATION VIEW

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1:1B

ROADWAY STANDARD DRAWING FOR
TEMPORARY ROCK SILT CHECK TYPE B

SHEET 1 OF 1
1633.02

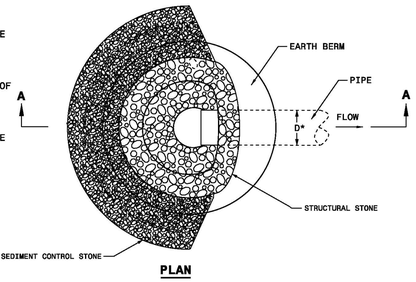
NOTES

USE CLASS A EROSION CONTROL STONE FOR STRUCTURAL STONE.

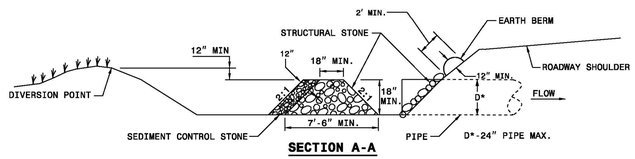
USE NO. 5 OR NO. 57 STONE FOR SEDIMENT CONTROL STONE.

CONSTRUCT TOP OF BERM A MINIMUM OF ONE FOOT BELOW THE SHOULDER OR DIVERSION POINT.

PROVIDE A TOTAL SEDIMENT TRAP VOLUME OF 3600± CUBIC FEET PER ACRE OF DISTURBED AREA. SOME OF THE REQUIRED VOLUME MAY BE PROVIDED BY UP OR DOWNSTREAM CONTROLS.



PLAN



SECTION A-A

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

1:1B

ROADWAY STANDARD DRAWING FOR
ROCK PIPE INLET SEDIMENT TRAP TYPE B

SHEET 1 OF 1
1635.02

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RALEIGH, NC 27617
919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT

2022-08-31

PROJECT NO: ---

DESIGN BY: JJB

DRAWN BY: JJB

SCALE: AS SHOWN

DATE: 2022-08-31

SHEET NO: **D1.9**

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION A: SELF-INSPECTION

Self-inspections are required during normal business hours in accordance with the table below. When adverse weather or site conditions would cause the safety of the inspection personnel to be in jeopardy, the inspection may be delayed until the next business day on which it is safe to perform the inspection. In addition, when a storm event of equal to or greater than 1.0 inch occurs outside of normal business hours, the self-inspection shall be performed upon the commencement of the next business day. Any time when inspections were delayed shall be noted in the Inspection Record.

Inspect	Frequency (during normal business hours)	Inspection records must include:
(1) Rain gauge maintained in good working order	Daily	Daily rainfall amounts. If no daily rain gauge observations are made during weekend or holiday periods, and no individual-day rainfall information is available, record the cumulative rain measurement for those un-attended days (and this will determine if a site inspection is needed). Days on which no rainfall occurred shall be recorded as "zero." The permittee may use another rain-monitoring device approved by the Division.
(2) E&SC Measures	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the measures inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Indication of whether the measures were operating properly, 5. Description of maintenance needs for the measure, 6. Description, evidence, and date of corrective actions taken.
(3) Stormwater discharge outfalls (SDOs)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	1. Identification of the discharge outfalls inspected, 2. Date and time of the inspection, 3. Name of the person performing the inspection, 4. Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration, 5. Indication of visible sediment leaving the site, 6. Description, evidence, and date of corrective actions taken.
(4) Perimeter of site	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If visible sedimentation is found outside site limits, then a record of the following shall be made: 1. Actions taken to clean up or stabilize the sediment that has left the site limits, 2. Description, evidence, and date of corrective actions taken, and 3. An explanation as to the actions taken to control future releases.
(5) Streams or wetlands onsite or offsite (where accessible)	At least once per 7 calendar days and within 24 hours of a rain event ≥ 1.0 inch in 24 hours	If the stream or wetland has increased visible sedimentation or a stream has visible increased turbidity from the construction activity, then a record of the following shall be made: 1. Description, evidence and date of corrective actions taken, and 2. Records of the required reports to the appropriate Division Regional Office per Part III, Section C, Item (2)(a) of this permit of this permit.
(6) Ground stabilization measures	After each phase of grading	1. The phase of grading (installation of perimeter E&SC measures, clearing and grubbing, installation of storm drainage facilities, completion of all land-disturbing activity, construction or redevelopment, permanent ground cover). 2. Documentation that the required ground stabilization measures have been provided within the required timeframe or an assurance that they will be provided as soon as possible.

NOTE: The rain inspection resets the required 7 calendar day inspection requirement.

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION B: RECORDKEEPING

1. E&SC Plan Documentation

The approved E&SC plan as well as any approved deviation shall be kept on the site. The approved E&SC plan must be kept up-to-date throughout the coverage under this permit. The following items pertaining to the E&SC plan shall be documented in the manner described:

Item to Document	Documentation Requirements
(a) Each E&SC Measure has been installed and does not significantly deviate from the locations, dimensions and relative elevations shown on the approved E&SC Plan.	Initial and date each E&SC Measure on a copy of the approved E&SC Plan or complete, date and sign an inspection report that lists each E&SC Measure shown on the approved E&SC Plan. This documentation is required upon the initial installation of the E&SC Measures or if the E&SC Measures are modified after initial installation.
(b) A phase of grading has been completed.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate completion of the construction phase.
(c) Ground cover is located and installed in accordance with the approved E&SC Plan.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate compliance with approved ground cover specifications.
(d) The maintenance and repair requirements for all E&SC Measures have been performed.	Complete, date and sign an inspection report.
(e) Corrective actions have been taken to E&SC Measures.	Initial and date a copy of the approved E&SC Plan or complete, date and sign an inspection report to indicate the completion of the corrective action.

2. Additional Documentation

In addition to the E&SC Plan documents above, the following items shall be kept on the site and available for agency inspectors at al times during normal business hours, unless the Division provides a site-specific exemption based on unique site conditions that make this requirement not practical:

(a) This general permit as well as the certificate of coverage, after it is received.

(b) Records of inspections made during the previous 30 days. The permittee shall record the required observations on the Inspection Record Form provided by the Division or a similar inspection form that includes all the required elements. Use of electronically-available records in lieu of the required paper copies will be allowed if shown to provide equal access and utility as the hard-copy records.

(c) All data used to complete the Notice of Intent and older inspection records shall be maintained for a period of three years after project completion and made available upon request. [40 CFR 122.41]

PART III
SELF-INSPECTION, RECORDKEEPING AND REPORTING

SECTION C: REPORTING

1. Occurrences that must be reported

Permittees shall report the following occurrences:

(a) Visible sediment deposition in a stream or wetland.

(b) Oil spills if:
- They are 25 gallons or more,
- They are less than 25 gallons but cannot be cleaned up within 24 hours,
- They cause sheen on surface waters (regardless of volume), or
- They are within 100 feet of surface waters (regardless of volume).

(a) Releases of hazardous substances in excess of reportable quantities under Section 311 of the Clean Water Act (Ref: 40 CFR 110.3 and 40 CFR 117.3) or Section 102 of CERCLA (Ref: 40 CFR 302.4) or G.S. 143-215.85.

(b) Anticipated bypasses and unanticipated bypasses.

(c) Noncompliance with the conditions of this permit that may endanger health or the environment.

2. Reporting Timeframes and Other Requirements

After a permittee becomes aware of an occurrence that must be reported, he shall contact the appropriate Division regional office within the timeframes and in accordance with the other requirements listed below. Occurrences outside normal business hours may also be reported to the Division's Emergency Response personnel at (800) 662-7956, (800) 858-0368 or (919) 733-3300.

Occurrence	Reporting Timeframes (After Discovery) and Other Requirements
(a) Visible sediment deposition in a stream or wetland	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the sediment and actions taken to address the cause of the deposition. Division staff may waive the requirement for a written report on a case-by-case basis. • If the stream is named on the NC 303(d) list as impaired for sediment-related causes, the permittee may be required to perform additional monitoring, inspections or apply more stringent practices if staff determine that additional requirements are needed to assure compliance with the federal or state impaired-waters conditions.
(b) Oil spills and release of hazardous substances per Item 1(b)-(c) above	• ***Within 24 hours***, an oral or electronic notification. The notification shall include information about the date, time, nature, volume and location of the spill or release.
(c) Anticipated bypasses [40 CFR 122.41(m)(3)]	• ***A report at least ten days before the date of the bypass, if possible***. The report shall include an evaluation of the anticipated quality and effect of the bypass.
(d) Unanticipated bypasses [40 CFR 122.41(m)(3)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days,*** a report that includes an evaluation of the quality and effect of the bypass.
(e) Noncompliance with the conditions of this permit that may endanger health or the environment[40 CFR 122.41(l)(7)]	• ***Within 24 hours***, an oral or electronic notification. • ***Within 7 calendar days***, a report that contains a description of the noncompliance, and its causes; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time noncompliance is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. [40 CFR 122.41(l)(6). • Division staff may waive the requirement for a written report on a case-by case basis.

NORTH CAROLINA *Environmental Quality*

NCG01 SELF-INSPECTION, RECORDKEEPING AND REPORTING

EFFECTIVE: 04/01/19

GROUND STABILIZATION AND MATERIALS HANDLING PRACTICES FOR COMPLIANCE WITH THE NCG01 CONSTRUCTION GENERAL PERMIT

Implementing the details and specifications on this plan sheet will result in the construction activity being considered compliant with the Ground Stabilization and Materials Handling sections of the NCG01 Construction General Permit (Sections E and F, respectively). The permittee shall comply with the Erosion and Sediment Control plan approved by the delegated authority having jurisdiction. All details and specifications shown on this sheet may not apply depending on site conditions and the delegated authority having jurisdiction.

SECTION E: GROUND STABILIZATION

Required Ground Stabilization Timeframes		
Site Area Description	**Stabilize within this many calendar days after ceasing land disturbance**	**Timeframe variations**
(a) Perimeter dikes, swales, ditches, and perimeter slopes	7	None
(b) High Quality Water (HQW) Zones	7	None
(c) Slopes steeper than 3:1	7	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed
(d) Slopes 3:1 to 4:1	14	-7 days for slopes greater than 50' in length and with slopes steeper than 4:1 -7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed
(e) Areas with slopes flatter than 4:1	14	-7 days for perimeter dikes, swales, ditches, perimeter slopes and HQW Zones -10 days for Falls Lake Watershed unless there is zero slope

Note: After the permanent cessation of construction activities, any areas with temporary ground stabilization shall be converted to permanent ground stabilization as soon as practicable but in no case longer than 90 calendar days after the last land disturbing activity. Temporary ground stabilization shall be maintained in a manner to render the surface stable against accelerated erosion until permanent ground stabilization is achieved.

GROUND STABILIZATION SPECIFICATION

Stabilize the ground sufficiently so that rain will not dislodge the soil. Use one of the techniques in the table below:

Temporary Stabilization	Permanent Stabilization
• Temporary grass seed covered with straw or other mulches and tackifiers • Hydroseeding • Rolled erosion control products with or without temporary grass seed • Appropriately applied straw or other mulch • Plastic sheeting	• Permanent grass seed covered with straw or other mulches and tackifiers • Geotextile fabrics such as permanent soil reinforcement matting • Hydroseeding • Shrubs or other permanent plantings covered with mulch • Uniform and evenly distributed ground cover sufficient to restrain erosion • Structural methods such as concrete, asphalt or retaining walls • Rolled erosion control products with grass seed

POLYACRYLAMIDES (PAMS) AND FLOCCULANTS

1. Select flocculants that are appropriate for the soils being exposed during construction, selecting from the *NC DWR List of Approved PAMS/Flocculants*.
2. Apply flocculants at or before the inlets to Erosion and Sediment Control Measures.
3. Apply flocculants at the concentrations specified in the *NC DWR List of Approved PAMS/Flocculants* and in accordance with the manufacturer's instructions.
4. Provide ponding area for containment of treated Stormwater before discharging offsite.
5. Store flocculants in leak-proof containers that are kept under storm-resistant cover or surrounded by secondary containment structures.

EQUIPMENT AND VEHICLE MAINTENANCE

1. Maintain vehicles and equipment to prevent discharge of fluids.
2. Provide drip pans under any stored equipment.
3. Identify leaks and repair as soon as feasible, or remove leaking equipment from the project.
4. Collect all spent fluids, store in separate containers and properly dispose as hazardous waste (recycle when possible).
5. Remove leaking vehicles and construction equipment from service until the problem has been corrected.
6. Bring used fuels, lubricants, coolants, hydraulic fluids and other petroleum products to a recycling or disposal center that handles these materials.

LITTER, BUILDING MATERIAL AND LAND CLEARING WASTE

1. Never bury or burn waste. Place litter and debris in approved waste containers.
2. Provide a sufficient number and size of waste containers (e.g dumpster, trash receptacle) on site to contain construction and domestic wastes.
3. Locate waste containers at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
4. Locate waste containers on areas that do not receive substantial amounts of runoff from upland areas and does not drain directly to a storm drain, stream or wetland.
5. Cover waste containers at the end of each workday and before storm events or provide secondary containment. Repair or replace damaged waste containers.
6. Anchor all lightweight items in waste containers during times of high winds.
7. Empty waste containers as needed to prevent overflow. Clean up immediately if containers overflow.
8. Dispose waste off-site at an approved disposal facility.
9. On business days, clean up and dispose of waste in designated waste containers.

PAINT AND OTHER LIQUID WASTE

1. Do not dump paint and other liquid waste into storm drains, streams or wetlands.
2. Locate paint washouts at least 50 feet away from storm drain inlets and surface waters unless no other alternatives are reasonably available.
3. Contain liquid wastes in a controled area.
4. Containment must be labeled, sized and placed appropriately for the needs of site.
5. Prevent the discharge of soaps, solvents, detergents and other liquid wastes from construction sites.

PORTABLE TOILETS

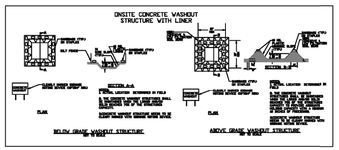
1. Install portable toilets on level ground, at least 50 feet away from storm drains, streams or wetlands unless there is no alternative reasonably available. If 50 foot offset is not attainable, provide relocation of portable toilet behind silt fence or place on a gravel pad and surround with sand bags.
2. Provide staking or anchoring of portable toilets during periods of high winds or in high foot traffic areas.
3. Monitor portable toilets for leaking and properly dispose of any leaked material. Utilize a licensed sanitary waste hauler to remove leaking portable toilets and replace with properly operating unit.

EARTHEN STOCKPILE MANAGEMENT

1. Show stockpile locations on plans. Locate earthen-material stockpile areas at least 50 feet away from storm drain inets, sediment basins, perimeter sediment controls and surface waters unless it can be shown no other alternatives are reasonably available.
2. Protect stockpile with silt fence installed along toe of slope with a minimum offset of five feet from the toe of stockpile.
3. Provide stable stone access point when feasible.
4. Stabilize stockpile within the timeframes provided on this sheet and in accordance with the approved plan and any additional requirements. Soil stabilization is defined as vegetative, physical or chemical coverage techniques that will restrain accelerated erosion on disturbed soils for temporary or permanent control needs.

NORTH CAROLINA *Environmental Quality*

ONSITE CONCRETE WASHOUT STRUCTURE WITH LINER



BELOW GRADE WASHOUT STRUCTURE — ABOVE GRADE WASHOUT STRUCTURE

CONCRETE WASHOUTS

1. Do not discharge concrete or cement slurry from the site.
2. Dispose of, or recycle settled, hardened concrete residue in accordance with local and state solid waste regulations and at an approved facility.
3. Manage washout from mortar mixers in accordance with the above item and in addition place the mixer and associated materials on impervious barrier and within lot perimeter silt fence.
4. Install temporary concrete washouts per local requirements, where applicable. If an alternate method or product is to be used, contact your approval authority for review and approval. If local standard details are not available, use one of the two types of temporary concrete washouts provided on this detail.
5. Do not use concrete washouts for dewatering or storing defective curb or sidewalk sections. Stormwater accumulated within the washout may not be pumped into or discharged to the storm drain system or receiving surface waters. Liquid waste must be pumped out and removed from project.
6. Locate washouts at least 50 feet from storm drain inlets and surface waters unless it can be shown that no other alternatives are reasonably available. At a minimum, install protection of storm drain inlet(s) closest to the washout which could receive spills or overflow.
7. Locate washouts in an easily accessible area, on level ground and install a stone entrance pad in front of the washout. Additional controls may be required by the approving authority.
8. Install at least one sign directing concrete trucks to the washout within the project limits. Post signage on the washout itself to identify this location.
9. Remove leavings from the washout when at approximately 75% capacity to limit overflow events. Replace the tarp, sand bags or other temporary structural components when no longer functional. When utilizing alternative or proprietary products, follow manufacturer's instructions.
10. At the completion of the concrete work, remove remaining leavings and dispose of in an approved disposal facility. Fill pit, if applicable, and stabilize any disturbance caused by removal of washout.

HERBICIDES, PESTICIDES AND RODENTICIDES

1. Store and apply herbicides, pesticides and rodenticides in accordance with label restrictions.
2. Store herbicides, pesticides and rodenticides in their original containers with the label, which lists directions for use, ingredients and first aid steps in case of accidental poisoning.
3. Do not store herbicides, pesticides and rodenticides in areas where flooding is possible or where they may spill or leak into wells, stormwater drains, ground water or surface water. If a spill occurs, clean area immediately.
4. Do not stockpile these materials onsite.

HAZARDOUS AND TOXIC WASTE

1. Create designated hazardous waste collection areas on-site.
2. Place hazardous waste containers under cover or in secondary containment.
3. Do not store hazardous chemicals, drums or bagged materials directly on the ground.

NCG01 GROUND STABILIZATION AND MATERIALS HANDLING

EFFECTIVE: 04/01/19

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RALEIGH, NC 27617
919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS
ROLESVILLE, NC
DETAILS

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-08-31

PROJECT NO: ---
DESIGN BY: JJB
DRAWN BY: JJB
SCALE: AS SHOWN
DATE: 2022-08-31
SHEET NO: **D1.10**

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

SITE PERMITTING APPROVAL

Water and Sewer Permits (If Applicable)

The City of Raleigh consents to the connection and extension of the City's Public Sewer System as shown on this plan. The material and contruction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook. City of Raleigh Public Utilities Department Permit # **W-XXXX**

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CITY OF RALEIGH – PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: THis approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer Below. The City will retain a copy of the approvad plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval__________
Raleigh Water Review Officer

ATTENTION CONTRACTORS

THE CONSTRUCTION CONTRACTOR RESPONSIBLE FOR THE EXTENSION OF WATER, SEWER AND/OR REUSE, AS APPROVED IN THESE PLANS, IS RESPONSIBLE FOR CONTACTING THE PUBLIC UTILITIES DEPARTMENT AT 919-996-4540 AT LEAST 24 HOURS PRIOR TO BEGINNING ANY OF THEIR CONSTRUCTION.

FAILURE TO NOTIFY BOTH CITY DEPARTMENTS IN ADVANCE OF BEGINNING CONSTRUCTION WILL RESULT IN THE ISSUANCE OF MONETARY FINES, AND REQUIRE REINSTALLATION OF ANY WATER OR SEWER FACILITIES NOT INSPECTED AS A RESULT OF THIS NOTIFICATION FAILURE.

FAILURE TO CALL FOR INSPECTION, INSTALL A DOWNSTREAM PLUG, HAVE PERMITTED PLANS ON THE JOBSITE, OR ANY OTHER VIOLATION OF CITY OF RALEIGH STANDARDS WILL RESULT IN A FINE AND POSSIBLE EXCLUSION FROM FUTURE WORK IN THE CITY OF RALEIGH.

50 0 25 50 100
SCALE: 1"=50'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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NCBELS License P-0751

CLIENT:
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RALEIGH, NC 27617 919-491-0761

REVISIONS

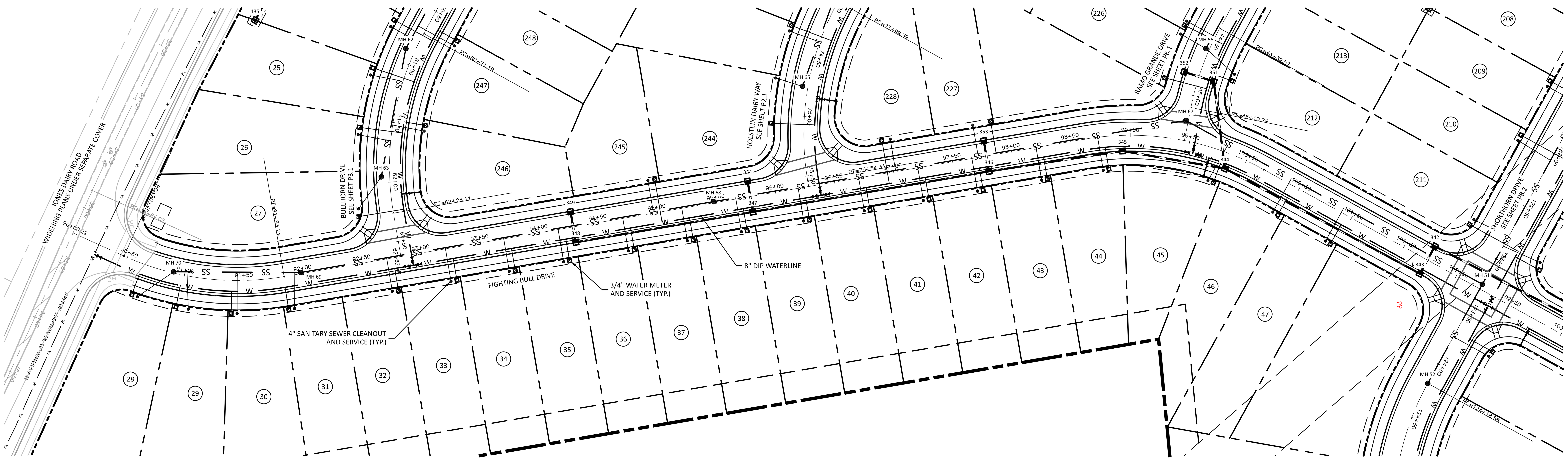
PRESERVE AT JONES DAIRY - CENTRAL CONSTRUCTION DRAWINGS

ROLESVILLE, NC

CATTLE DRIVE PLAN AND PROFILE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL — NATHAN P. EAKINS
09-16-2022

PROJECT NO:	---
DESIGN BY:	JPE
DRAWN BY:	RSF
SCALE:	1"=50'
DATE:	2022-09-16
SHEET NO:	**P1.1**



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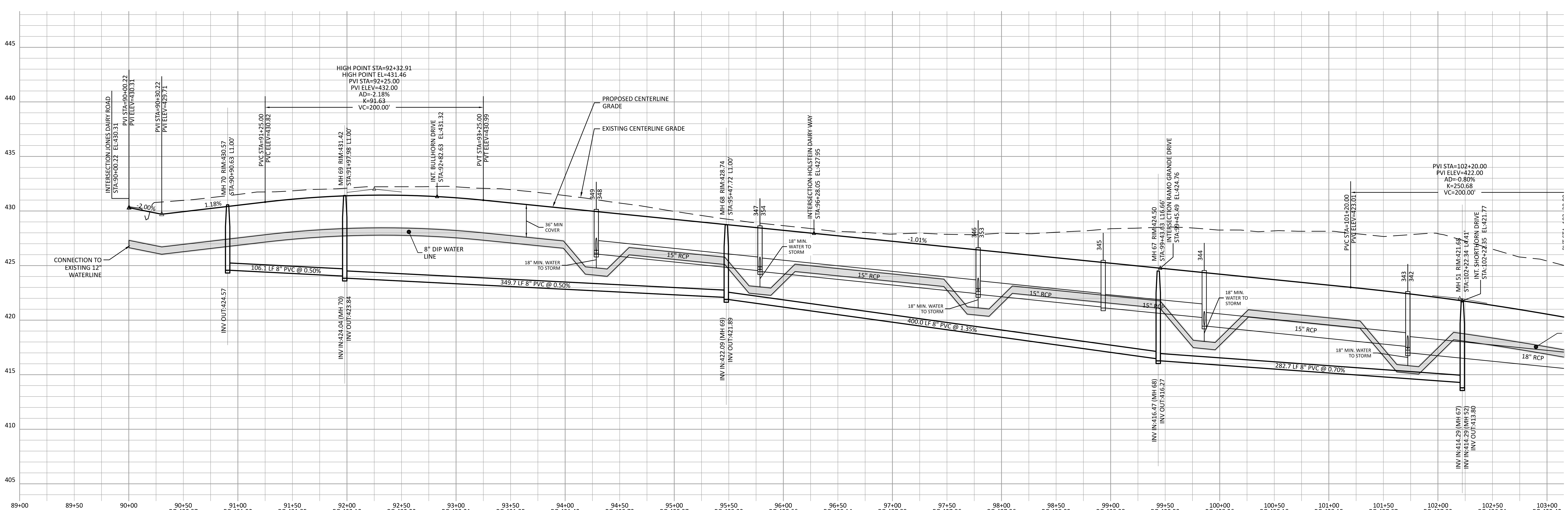
City of Raleigh Development Approval ____________
Raleigh Water Review Officer



SCALE: 1"=50'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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919-435-6395
NCBELS License P-0751

CLIENT:
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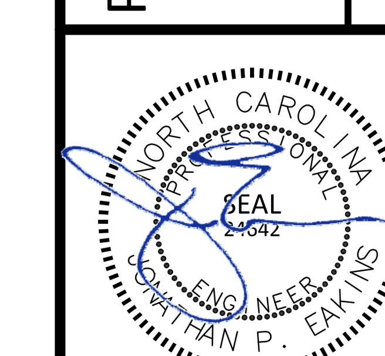
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617 919-491-0761

REVISIONS

PRESERVE AT JONES DAIRY - CENTRAL CONSTRUCTION DRAWINGS

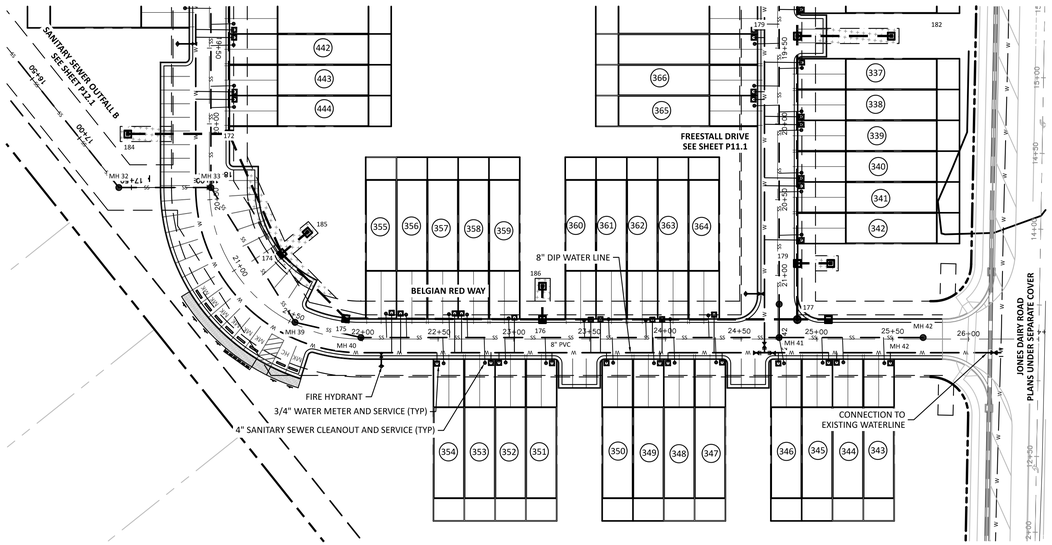
ROLESVILLE, NC

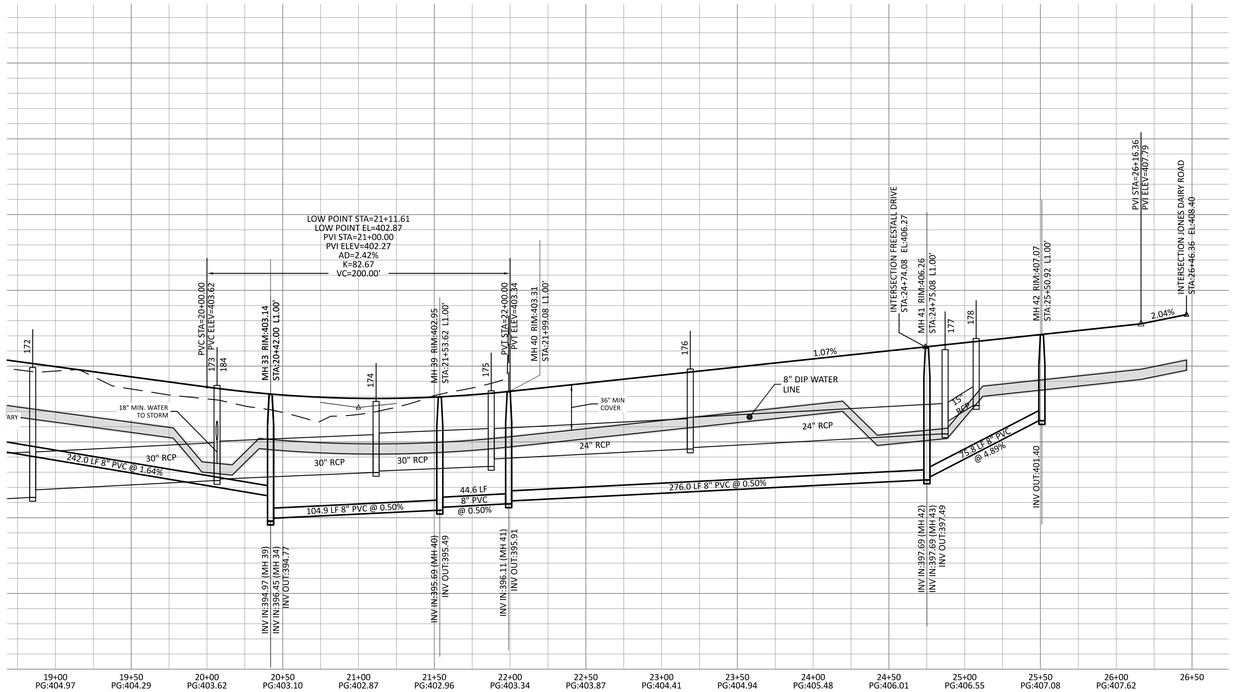
FIGHTING BULL DRIVE PLAN AND PROFILE



09-16-2022

PROJECT NO:	---
DESIGN BY:	JPE
DRAWN BY:	RSF
SCALE:	1"=50'
DATE:	2022-09-16
SHEET NO:	P4.1





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SITE PERMITTING APPROVAL

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City of Raleigh Development Approval

Raleigh Water Review Officer

50 0 25 50 100

SCALE: 1"=50'

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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NCBELS License P-0751

CLIENT:
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RALEIGH, NC 27617 919-491-0761

REVISIONS

1	2022-12-01	TOWN OF ROLESVILLE COMMENTS

PRESERVE AT JONES DAIRY - CENTRAL
CONSTRUCTION DRAWINGS
ROLESVILLE, NC

BELGIAN RED WAY PLAN AND PROFILE

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 54042 JONATHAN P. EAKINS

12-01-2022

PROJECT NO: ---

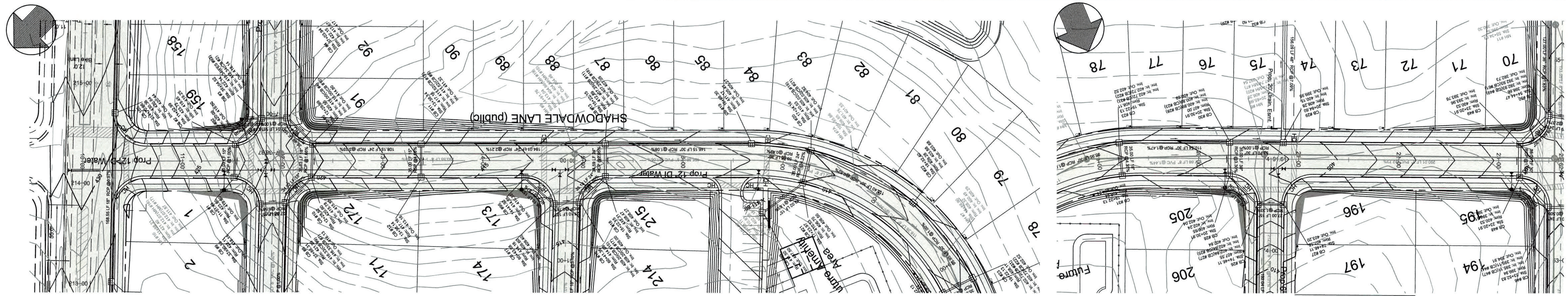
DESIGN BY: JPE

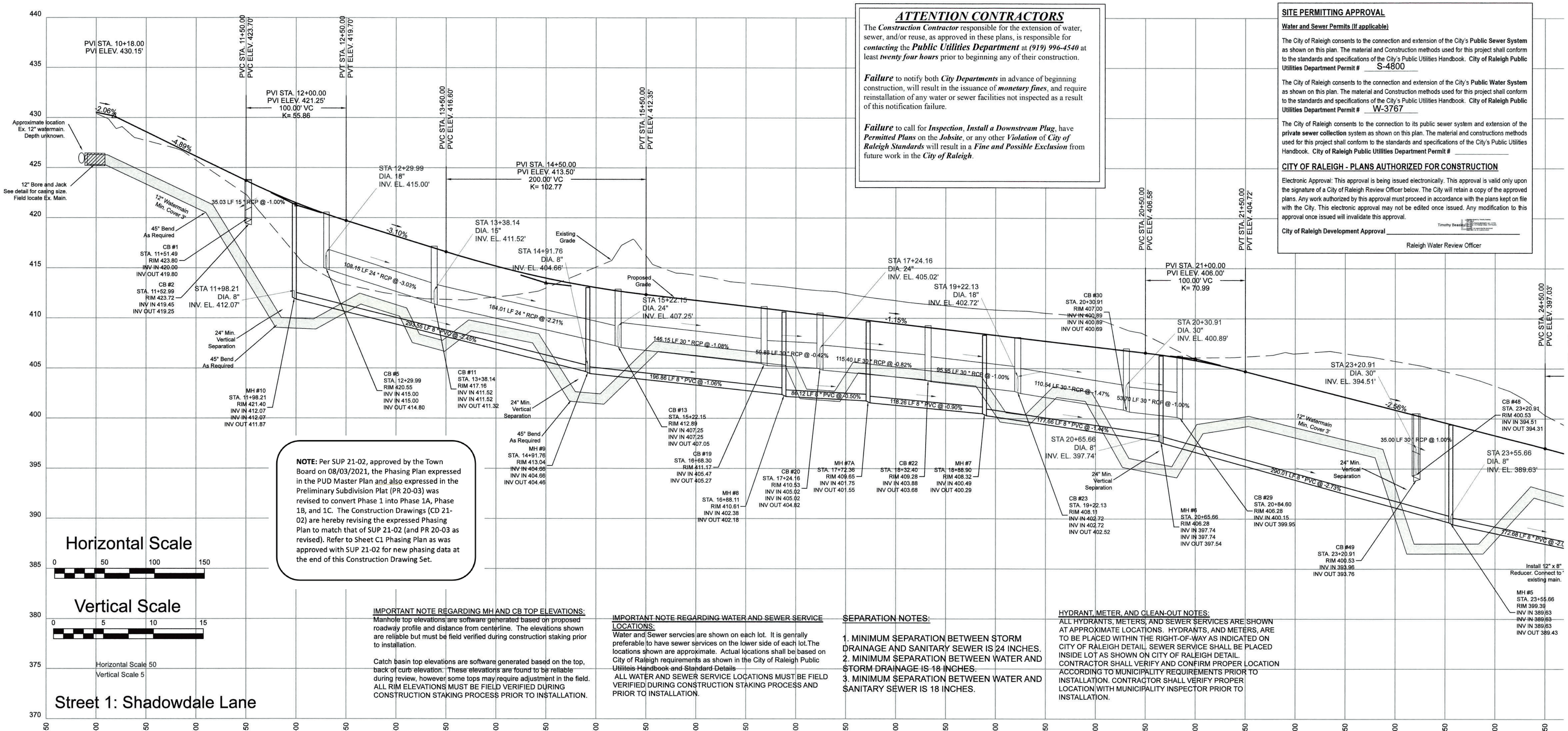
DRAWN BY: RSF

SCALE: 1"=50'

DATE: 2022-09-16

SHEET NO: **P10.2**





NOTE: Per SUP 21-02, approved by the Town Board on 08/03/2021, the Phasing Plan expressed in the PUD Master Plan and also expressed in the Preliminary Subdivision Plat (PR 20-03) was revised to convert Phase 1 into Phase 1A, Phase 1B, and 1C. The Construction Drawings (CD 21-02) are hereby revising the expressed Phasing Plan to match that of SUP 21-02 (and PR 20-03 as revised). Refer to Sheet C1 Phasing Plan as was approved with SUP 21-02 for new phasing data at the end of this Construction Drawing Set.

ATTENTION CONTRACTORS

The ***Construction Contractor*** responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for ***contacting*** the ***Public Utilities Department*** at ***(919) 996-4540*** at least ***twenty four hours*** prior to beginning any of their construction.

Failure to notify both ***City Departments*** in advance of beginning construction, will result in the issuance of ***monetary fines***, and require reinstallation of any water or sewer facilities not inspected as a result of this notification failure.

Failure to call for ***Inspection***, ***Install a Downstream Plug***, have ***Permitted Plans*** on the ***Jobsite***, or any other ***Violation*** of ***City of Raleigh Standards*** will result in a ***Fine and Possible Exclusion*** from future work in the ***City of Raleigh***.

SITE PERMITTING APPROVAL

Water and Sewer Permits (If applicable)

The City of Raleigh consents to the connection and extension of the City's **Public Sewer System** as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook. **City of Raleigh Public Utilities Department Permit #** S-4800

The City of Raleigh consents to the connection and extension of the City's **Public Water System** as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook. **City of Raleigh Public Utilities Department Permit #** W-3767

The City of Raleigh consents to the connection to its public sewer system and extension of the **private sewer collection** system as shown on this plan. The material and constructions methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook. **City of Raleigh Public Utilities Department Permit #** ____________

CITY OF RALEIGH - PLANS AUTHORIZED FOR CONSTRUCTION

Electronic Approval: This approval is being issued electronically. This approval is valid only upon the signature of a City of Raleigh Review Officer below. The City will retain a copy of the approved plans. Any work authorized by this approval must proceed in accordance with the plans kept on file with the City. This electronic approval may not be edited once issued. Any modification to this approval once issued will invalidate this approval.

City of Raleigh Development Approval Timothy Beasley

Raleigh Water Review Officer

IMPORTANT NOTE REGARDING MH AND CB TOP ELEVATIONS:
Manhole top elevations are software generated based on proposed roadway profile and distance from centerline. The elevations shown are reliable but must be field verified during construction staking prior to installation.

Catch basin top elevations are software generated based on the top, back of curb elevation. These elevations are found to be reliable during review, however some tops may require adjustment in the field. ALL RIM ELEVATIONS MUST BE FIELD VERIFIED DURING CONSTRUCTION STAKING PROCESS PRIOR TO INSTALLATION.

IMPORTANT NOTE REGARDING WATER AND SEWER SERVICE LOCATIONS:
Water and Sewer servcies are shown on each lot. It is genrally preferable to have sewer services on the lower side of each lot.The locations shown are approximate. Actual locations shall be based on City of Raleigh requirements as shown in the City of Raleigh Public Utiliteis Handbook and Standard Details
ALL WATER AND SEWER SERVICE LOCATIONS MUST BE FIELD VERIFIED DURING CONSTRUCTION STAKING PROCESS AND PRIOR TO INSTALLATION.

SEPARATION NOTES:

1. MINIMUM SEPARATION BETWEEN STORM DRAINAGE AND SANITARY SEWER IS 24 INCHES.
2. MINIMUM SEPARATION BETWEEN WATER AND STORM DRAINAGE IS 18 INCHES.
3. MINIMUM SEPARATION BETWEEN WATER AND SANITARY SEWER IS 18 INCHES.

HYDRANT, METER, AND CLEAN-OUT NOTES:
ALL HYDRANTS, METERS, AND SEWER SERVICES ARE SHOWN AT APPROXIMATE LOCATIONS. HYDRANTS, AND METERS, ARE TO BE PLACED WITHIN THE RIGHT-OF-WAY AS INDICATED ON CITY OF RALEIGH DETAIL. SEWER SERVICE SHALL BE PLACED INSIDE LOT AS SHOWN ON CITY OF RALEIGH DETAIL. CONTRACTOR SHALL VERIFY AND CONFIRM PROPER LOCATION ACCORDING TO MUNICIPALITY REQUIREMENTS PRIOR TO INSTALLATION. CONTRACTOR SHALL VERIFY PROPER LOCATION WITH MUNICIPALITY INSPECTOR PRIOR TO INSTALLATION.

caaENGINEERS, Inc.
McIntyre, Gettle, Crowley
PROFESSIONAL ENGINEERS
1233 Heritage Links Drive, Wake Forest, North Carolina 27587
4932B Windy Hill Drive, Raleigh, North Carolina 27609
(919)556-6755
C-2151

NO.	DATE	REVISION DESCRIPTION	BY
1	05/08/2020	Preliminary Construction Plans	MAC
2	10/23/2020	Revised per 1st review comments	MAC
3	11/25/2020	Town, Raleigh Comments	MAC
4	01/11/2021	Town Comments	MAC
5	02/12/2021	Issued for signature approval	MAC
6	Date	Comment	By
7	Date	Comment	By
8	Date	Comment	BY

Michael Crowley — Digitally signed by Michael Crowley Date: 2021.02.12

Shadowdale Lane

Preserve at Jones Dairy, South
Preserve at Jones Dairy, LLC
Rolesville, Wake County, North Carolina

Job No. JDF
Dwg No. C25

STATION 12+00

STATION 14+00

STATION 16+00

STATION 18+00

STATION 20+00

STATION 11+50

STATION 13+50

STATION 15+50

STATION 17+50

STATION 19+50

STATION 11+00

STATION 13+00

STATION 15+00

STATION 17+00

STATION 19+00

STATION 10+50

STATION 12+50

STATION 14+50

STATION 16+50

STATION 18+50

50 0 25 50 100

SCALE: 1"=5' VERTICAL

50 0 25 50 100

SCALE: 1"=50' HORIZONTAL

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

The Nau Company
Consulting Civil Engineers
PO Box 810 Rolesville, NC 27571
919-435-6395
NCBELS License P-0751

CLIENT:
PRESERVE AT JONES DAIRY, LLC
10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

CROSS SECTIONS - JONES DAIRY ROAD

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT

2022-12-05

PROJECT NO: ---

DESIGN BY: JJB

DRAWN BY: JJB

SCALE: AS SHOWN

DATE: 2022-08-31

SHEET NO: **XS1.1**

50 0 25 50 100

SCALE: 1"=5' VERTICAL

50 0 25 50 100

SCALE: 1"=50' HORIZONTAL

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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919-491-0761

REVISIONS

1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

CROSS SECTIONS - JONES DAIRY ROAD

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT

2022-12-05

PROJECT NO: ---

DESIGN BY: JJB

DRAWN BY: JJB

SCALE: AS SHOWN

DATE: 2022-08-31

SHEET NO: **XS1.2**

PRELIMINARY DRAWING - NOT RELEASED FOR CONSTRUCTION

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CLIENT:
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10534 ARNOLD PALMER DRIVE
RALEIGH, NC 27617
919-491-0761

REVISIONS

1	2022-10-11	NCDOT COMMENTS #1
2	2022-12-05	NCDOT COMMENTS #2

PRESERVE AT JONES DAIRY
OFFSITE ROADWAY IMPROVEMENTS

ROLESVILLE, NC

CROSS SECTIONS - JONES DAIRY ROAD

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 26411 JEREMY J. BECKETT
2022-12-05

PROJECT NO: ---

DESIGN BY: JJB

DRAWN BY: JJB

SCALE: AS SHOWN

DATE: 2022-08-31

SHEET NO: **XS1.3**