TRI-STATE ENGINEERS AND LAND SURVEYORS, INC.
Civil Engineers ▪ Sanitary Engineers ▪ Municipal Engineers ▪ Land Surveyors ▪ Land Planners
801 W. Street Road Feasterville, Pennsylvania 19053
Telephone: 215-357-5950 Fax: 215-357-2836 Website: www.tse-ls.com

April 4, 2024

Project No: 22-04019

Mr. Kenneth Farrall, PLS, Planning and Zoning Director
Bensalem Township
2400 Byberry Road
Bensalem, PA 19020

RE: Land Development Plan Review
Galloway & Richlieu Road
TMP # 02-046-001
Bensalem Township, Bucks County, PA
Project No. BTSO.10001

Dear Mr. Farrall:

On behalf of our client, Madurham Farms LP, enclosed please find a resubmission packet consisting of the following documents for the above referenced project:

1. *3 hard copies* & 1 *digital copy* – Land Development dated July 5, 2022 last revised March 17th, 2024 (17 sheets)
2. *3 hard copies* & 1 *digital copy* – Vehicle Turning Plan dated July 5, 2022 last revised March 1st, 2024 (3 sheets)
3. *2 Hard copies – 1 digital copy* – Traffic Impact Assessment dated November 10th, 2023 last revised march 29th, 2024 prepared by Horner 7 Canter Associates

The following is a point-by-point response (shown in Bold) to TPD's review letter dated January 11, 2024.

ZONING ORDINANCE COMMENTS

The following are comments related to the Township's zoning ordinances:

1. Sec. 232-57. – Performance standards.

    a. Woodlands shall be preserved in at least and 50 percent natural open space state where such area contains neither wetlands nor significant natural features. The applicant was granted a variance to disturb 100% disturbance of the woodlands during the ZHB meeting held on August 2, 2018.

    Response: No comment

2. Sec. 232-59. – Steep slope overlay.

a. To minimize stormwater runoff, accelerated soil erosion and resultant stream siltation which may create a danger to life and/or property, all districts regulate the disturbance of steep slopes, the following standards shall apply for all uses:

i. No more than 40% disturbance for slopes of 8-15%

ii. No more than 30% disturbance for slopes of 15-25%

iii. No more than 15% disturbance for slopes of 25% or greater

The applicant was granted a variance for 100% disturbance for all three (3) categories during the ZHB meeting held on August 2, 2018.

Response: No comment

3. Sec. 232-152. – Use regulations.

a. On August 2, 2018, the applicant was granted a variance with conditions for use and keeping with the spirit of the ZHB decision, a revision to the facilities should be revisited due to the lack of parking.

Response: Through conversations with applicant and the township the convenience store use has been removed and a commercial retail store has been proposed instead. Additionally, with the change in facilities, the parking calculation is now compliant.

4. Sec. 232-153. – Area regulations.

a. Not more than 40% of the net lot area may be covered by impervious cover including the building area. The applicant was granted a variance to permit a maximum of 70% of the net lot area to be impervious cover.

b. One 35-foot-deep front yard is required. The applicant was granted a variance to permit a front yard with a depth of eight (8) feet.

Response: No comment

5. Sec. 232-434. – Use regulations.

a. Professional services limited to offices of persons that do not involve the actual storage, exchange, or delivery of merchandise on the premises.

i. Commercial facilities (UPS, convenience store and retail) do not meet these definitions for a BP usage.

Response: Through conversations with applicant and the township the convenience store use has been removed and commercial retail store has been proposed instead. Additionally is the zoning approval documents Under the section titled "THE ABOVE APPROVED RELIEF IS SUBJECT TO THE FOLLOWING CONDITIONS" subsection a "states "Permitted uses are limited to: Any use permitted in the BP Business and Professional zoning districts, retail store, restaurant (not including a drive-in restaurant); personal service shop or custom shop; office or studio, including medical office, or urgent care facility or similar medical use." Which allows retail stores.

6. Sec. 232-586. – Off street parking.

    a. The applicant identifies that the proposed uses for the 6,200 square foot building consists of three commercial facilities (batteries plus, convenience store, and UPS store).

        i. All uses, require one (1) parking stall per 100 square feet of gross leasable area plus one (1) space per employee; minimum required parking is 62 parking spaces, not including employees.

        ii. The applicant proposes 48 parking spaces, revise the plans.

Response: Through conversations with applicant and the township the convenience store use has been removed and a commercial retail store has been proposed instead. Per Sec. 232-586 "Five- and one-half spaces are required per 1,000 feet of gross leasable area" for Strip shopping center and including retail stores. 37 parking spaces (includes 2 Handicap spaces) are proposed bring the parking calculation into compliance.

    b. Four (4) ADA spaces are proposed, one shall be a Van accessible ADA parking stall with an eight-foot access aisle, not five-foot access.

Response: The proposed parking lot layout has been revised. Additionally, 2 van accessible spots are now proposed with each 8 foot in width with and 8 foot access and is shown on the plan.

7. Sec. 232-587. – Loading and unloading space.

    a. A dedicated loading and unloading space consisting of a minimum of 780 square feet of usable area (12 x 65 feet in size) shall be provided in a location that does not block or interfere with the use of automobile access or parking facilities or pedestrian ways. The applicant was granted a variance

but with the condition to provide a dedicated parking space for deliveries at is applicable for the proposed development.

Response: The proposed parking lot layout has been revised to show a singular load/parking space at the Southern corner of the parking lot.

SUBDIVISION AND LAND DEVELOPMENT ORDINANCE COMMENTS

The following are comments related to the Township's Subdivision and Land Development ordinances:

1. Sec. 201-41. – Preliminary plan requirements.

    a. The property boundary line shall be shown in a dark solid line with bearings and distances, which appears to be shown on the plans in a dashed, light gray line. The plans should be revised.

Response: The plans have been revised to show the boundary line as a dark solid line with bearing and distances.

    b. The area that is labeled as "PennDOT R.O.W. taking" should be shown also with the bearings and distances. Any restrictions to this easement should be identified on the plans.

Response: The plans have been revised to show the PennDOT taking on the existing features plan. The bearings and distances and plan reference has been added as well.

    c. The plans should be updated to include the owners name with a citation with the deed book and page number.

Response: The plans have been revised to state the owners name and instrument number and is shown on the plans.

    d. All existing sewer lines, water lines, fire hydrants, utility transmission lines, culverts, bridges, railroads, or other manmade features within the proposed subdivision and/or land development and within 100 feet of the boundaries of the proposed land development. The applicant requests a waiver and requests that an aerial be accepted in lieu of this requirement.

Response: No comment

    e. The location, width and purpose of existing easements and utility rights-of-way within 50 feet of the proposed land development should be provided.

Response: There are no easements within 50 feet of the proposed site. Additionally, all existing utilities are located within the public right of way.

f. Contours provided with elevations with reference to NAVD 88 are acceptable to this office.

Response: No comment

Provide dimensions from the ultimate ROW to the building set back lines.
Response: This distance has been shown, additionally the applicant was granted a variance to permit a front yard with a depth of eight (8) feet

g. All street monuments (existing and proposed) should be shown with elevations.

Response: The plans have been updated to show the proposed monumentation. The proposed monumentation elevation will be recorded once they have been installed and will shown on the Final As-built plan.

2. Sec. 201-43. – Preliminary plan review.

a. The applicant requests a waiver for the project to be reviewed concurrently as a preliminary/final plan; this office does not support this action.

Response: We recognize that this comment was based on the initial plan submission. Since the initial plan submission, we met with the township staff (township engineer, fire marshal and zoning officer) and made changes to the layout which addresses their respective comments. Many of the comments have been addressed in the revised plans, leaving a handful of administrative items that occur at the end of the land development process. The Applicant still wants to pursue this waiver request.

3. Sec. 201-62. – Submission.

a. The applicant is required to submit the final plan and make application to the following agencies:

i. Pennsylvania Department of Transportation – HOP

ii. Pennsylvania Department of Environmental Protection – Sewage Planning Module

iii. Bucks County Conservation District – Erosion and Sedimentation Control Plan.

Response: Understood.

b. The applicant shall provide a certification of notification of all adjacent property owners.

Response: Understood.

4. Sec. 201-106. – Environmental protection and open space preservation.

a. No proposed gradings shall be permitted within three feet of any site property line, and in no case shall cut and fills endanger adjoining property.

i. The applicant requests a waiver of this requirement stating that the grading is necessary to ensure the Stormwater Runoff is directed to the BMP.

Response: No comment.

b. Street trees shall be planted at intervals of no more than 20 feet or at a greater interval as determined by the Shade Tree Commission in an informal arrangement. Based on length of the future right of way line, 32 Street Trees are required and 26 are proposed.

i. The applicant is requesting a partial waiver to this requirement due to conflicts with proposed utilities and grading. This office does not support this request and asks that the trees be rearranged to meet the requirement. The current arrangement has one tree over the proposed storm sewer pipe.

Response: The landscaping has been revised to show 32 proposed street trees. Additionally the waiver is no longer needed and has been removed from the list of waivers requested.

c. Additionally, ten (10) trees per acre of gross site area plus one (1) tree per every five (5) parking spaces shall be planted. A total of 21 lot trees are required; 11 to satisfy the trees per acres and 10 for the parking lot requirement. The applicant proposes to plant 24 lot trees. However, the Plant Schedule identifies 21 trees and the total in the Landscape Compliance Calculation Table is “14”. Update the tables to coincide with each other.

Response: The landscaping charts have been revised to show the correct planting count.

5. Sec. 201-108. – Lot design standards.

    a. Access to and from the State Highway is requires an application for a permit, submitted to the Pennsylvania Department of Transportation. A copy of the permit must be produced prior to final plan approval.

Response: Understood.

6. Sec. 201-110. – Curbs.

    a. The developer must provide curbs along the street. The applicant is requesting a waiver to not provide curbs; this office does not support this waiver as curbing is located at the Southwest corner of the intersection.

Response: The Galloway Road frontage contains an existing roadside swale that carries the stormwater runoff from the road to the inlets at the intersection. This is the most efficient way to carry the stormwater runoff given that Galloway Road does not have much slope. Richlieu Road also has a roadside swale and steep slopes that carries the stormwater runoff from the road towards Bristol Road. If curbs are introduced, then inlets will be required. The nearest stormwater connection point is approximately 850 ft in the northeast direction heading towards Bristol Road. For these reasons, the Applicant is requesting a waiver from installing curbing.

7. Sec. 201-111. – Sidewalks.

    a. Sidewalks are required to be installed on the site where necessary. The applicant is requesting a waiver for the sidewalk to not be installed with this development; this office supports this request as there are no sidewalks.

        i. However, the applicant should provide an ADA compliant refuge area, due to the presence of an existing crosswalk, encouraging pedestrian mobility.

Response: The applicant has eliminated the convenience store use which tends to generate high pedestrian foot traffic. The applicant is proposing a Batteries Plus and UPS store which tends to have less foot traffic given that packages are dropped off and picked up mostly by people driving a vehicle. The Applicant is requesting a waiver from installing sidewalk partly due to less pedestrian traffic generated by the proposed uses and partly since there are existing roadside swales which carry the stormwater runoff and slopes that would prohibit the installation of sidewalk.

8. Sec. 201-112. – Motor vehicle parking facilities.

    a. A planting strip (including sidewalk) with an average of ten (10) feet and a minimum width of seven (7) feet shall be provided between the parking area and the outside wall of the nearest building. (Parking area consist of parking spaces, aisles, and driveways).

        i. The proposed design does not meet this standard as the spaces are approximately 5.5 feet from the face of the building, the plans should be revised.

Response: The design has been revised to show a 9 foot sidewalk between the parking lot and the outside wall of the building.

    b. All parking spaces except for the stalls at the entrance/exit shall be set back at least fifteen (15) feet from the ultimate right-of-way and all property lines.

        i. Two (2) spaces do not meet this requirement, the dedicated loading parking space, and the southeastern most parking space. The plans should be revised.

Response: The design has been revised to move the parking lot to a minimum of 15 foot from the ultimate right of way and is shown on the plans.

9. Sec. 201-115. – Water and sewage.

    a. Fire Hydrants. When water service is proposed to be furnished to any land development, the developer shall, at his own expense and without any cost to the Township, install fire hydrants according to the technical regulations and specifications of the Township. This office defers to the Fire Marshal for the location of any required fire hydrants.

Response: The project layout has been revised to address the Fire Marshall comments.

    b. Applicant shall provide to the township a letter of acceptance from BCWSA for water and sewer services.

Response: Understood, Additionally the will serve letter from Aqua has been attached.

STORMWATER MANAGEMENT ORDINANCE COMMENTS

The following are general comments related to the stormwater report and the post construction storm water management plans:

- Applicant should not propose to connect to the State Highway drainage system without approval from PennDOT.

Response: Understood

The following are comments related to the Township's Stormwater Management ordinances:

1. Sec. 196-31. – General requirements.

    a. Various BMPs and their design standards are listed in the Pennsylvania Stormwater Best Management Practices Manual (PA BMP Manual). The applicant shall follow all the design standards for MRC design.

Response: The proposed stormwater management system has been designed to the MRCC design standards.

2. Sec. 196-33. – Erosion and sedimentation control during regulated earth disturbance activities.

    a. DEP requires an erosion and sediment control plan for any earth disturbance activity of 5,000 square feet or more. The applicant shall provide adequacy letters before final approval is given.

    b. Bucks County Conservation District requires their approval of an erosion and sedimentation control plan for any earth disturbance activity of 1,000 square feet or more. The applicant shall provide adequacy letters before final approval is given.

Response: An NPDES will be submitted for this project and all correspondence will be forwarded to the township.

3. Sec. 196-61. – Design criteria.

    a. Storm sewers (pipes or other structures) shall be reinforced concrete pipe have a minimum grade of ½ 0/0 and a minimum inside diameter of 18 inches. The applicant will need to request a waiver, due to the proposed use of 18-inch HDPE.

Response: This waiver has been requested.

b. Minimum and maximum cover. A minimum of two feet of cover shall be maintained over all storm drain pipes. The top of storm drain pipes shall be at least one-half foot below subgrade evaluation. The maximum cover over storm drainpipes shall be ten feet unless special structural design calculations are submitted or approved. Applicant should adjust any spots along pipe runs that do not have two feet of cover from top of grade. This is critical for any spot that are under pavement.

Response: Pipe inverts have been revised to ensure a minimum of two feet of cover over the proposed pipes.

c. Cuts. No excavation shall be made with a cut face steeper than three-to-one horizontal to vertical, except under the condition in which the material in which the excavation is made is sufficiently stable to sustain a slope of steeper than three horizontal to one vertical. Applicant shall provide details of ponds and any grading that is greater than 3:1 H:V slopes. Any grading shall be adjusted in the design.

Response: The project is not proposing any ponds. All grading is less than a 3:1 slope.

d. The top of such retaining wall shall be four inches above the finished grade line. The detail shows a matching grade. The applicant shall adjust the retaining wall.

Response: The top of wall and detail has been revised to show the top of wall being a minimum of four (4) inches above finished grade

GENERAL COMMENTS:

- Applicant should review the Bucks County Planning Commission Comments letter dated January 10, 2024.

  Response: Understood

- Applicant shall update the zoning table to match the area regulations requirements Sec. 232-357.

  Response: The zoning section cited in the comment is for the IN Institutional District. The property currently is located in the R-1 zoning district. The zoning table reflects the area regulations of the R-1 zoning district.

- The Applicant is required to submit any plans for business signage as per the approved use.

Response: Understood

- The Applicant is required to enter into a Stormwater Facilities Maintenance and Monitoring Agreement with the Township, which Agreement shall be satisfactory in form and content to the Township Engineer and the Township Solicitor, in their sole discretion.

Response: Understood

- Applicants shall obtain all necessary approvals from the Pennsylvania Department of Transportation, including, but not limited to, an approved Highway Occupancy permit for the Plan. Submit copies of the PennDOT permits for access and utilities and cross reference them on the record plan.

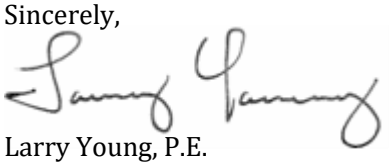
Response: Understood

- The applicant shall obtain all necessary approval from the Pennsylvania Department of Environmental Protection, including approval of the Township's Amendment to its 537 Plan.

Response: Understood

If you have any questions or require additional information, please do not hesitate to contact Cody Spadaccino at 215-357-5950 ext. 102.

Sincerely,



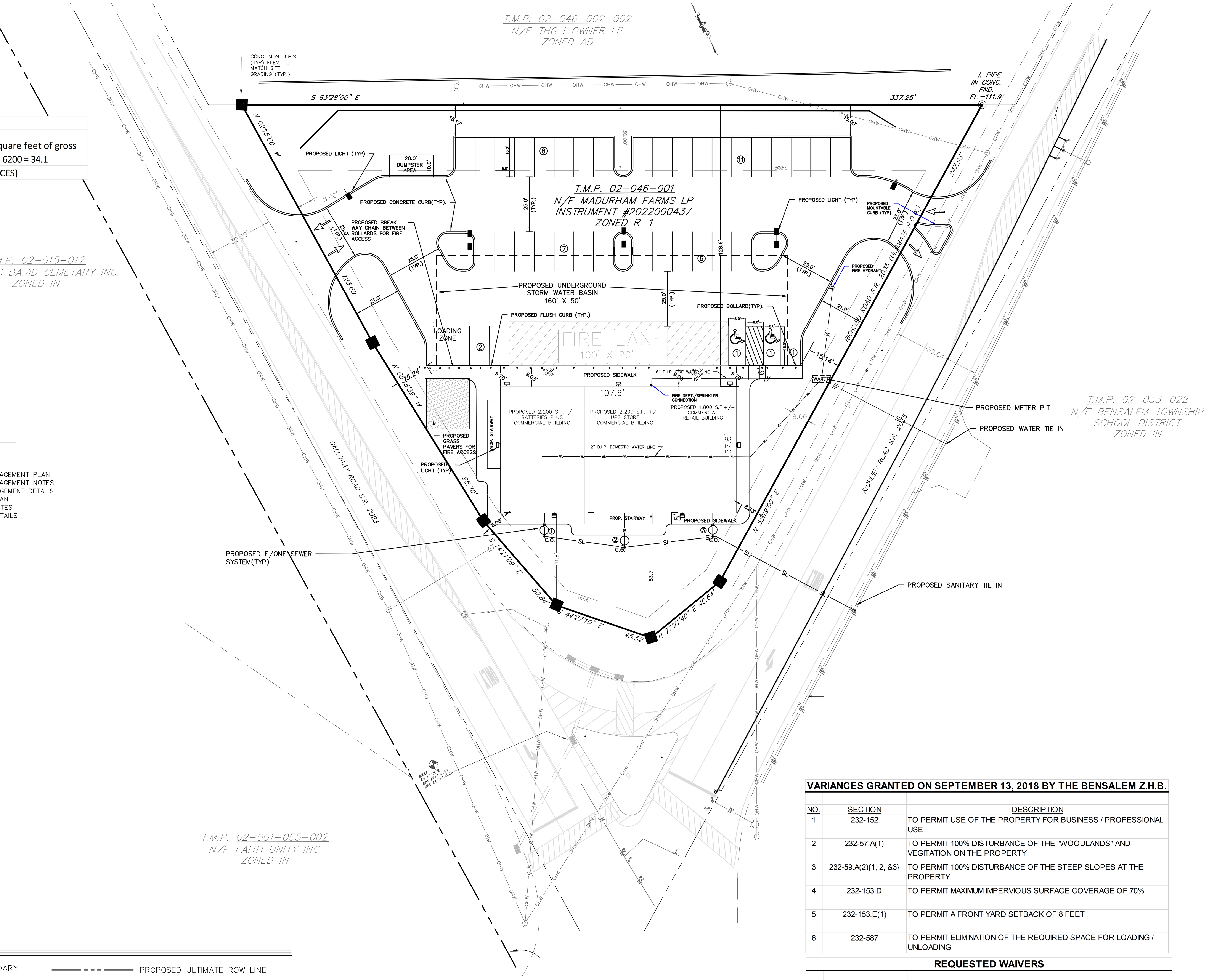
Larry Young, P.E.
Tri-State Engineers & Land Surveyors, Inc.
lyoung@tse-ls.com

Encl: Referenced Documents
cc: Kiran Patel

PARKING CHART

REQUIREMENT: Five and one-half per 1,000 square feet of gross leasable area. 5.5 SPACES / 1000 SF X 6200 = 34.1

PROPOSED: 37 SPACES (INCLUDES 2 HC SPACES)



LIST OF PLANS:

LEGEND

EXISTING PROPERTY BOUNDARY
EXISTING EDGE OF PAVEMENT
EXISTING CONTOURS
PROPOSED CONTOURS
EXISTING STORM SEWER
SOIL BOUNDARY LINE
EXISTING SANITARY MAIN
EXISTING WATER MAIN
EXISTING OVERHEAD ELECTRIC
EXISTING ADJOINING PROPERTY LINE
EXISTING UTILITY POLES
EXISTING SPOT ELEVATION
EXISTING T.G. INLET
EXISTING SANITARY MH
EXISTING WATER VALVE
EXISTING IRON PIN
EXISTING TRAFFIC SIGN
UmB EXISTING BOUNDARY SOILS TYPE
PROPOSED ULTIMATE ROW LINE
PROPOSED BSBL
F.F.E. PROPOSED FIRST FLOOR ELEVATION
MONUMENT TO BE SET
WL PROPOSED WATER LATERAL
SL PROPOSED SANITARY LATERAL
FH EXISTING FIRE HYDRANT
UP EXISTING UTILITY POLE
SITE BENCHMARK

PA ONE CALL UTILITY LIST:

VERIZON
ONE VERIZON WAY,
BASKING RIDGE, NEW JERSEY 07920
1-800-837-4966

AQUA PENNSYLVANIA, INC.
762 WEST LANCASTER AVENUE
BRYN MAWR, PA 19010
877-987-2782

BUCKS COUNTY WATER AND SEWER AUTHORITY
1275 ALMSHOUSE ROAD
WARRINGTON, PA 18976
215-343-2538

COMCAST
1701 JFK BLVD.
PHILADELPHIA, PA 19103
215-583-8078

PECO ENERGY
2301 MARKET ST.
PHILADELPHIA, PA 19103
800-494-4000

BENSALEM TOWNSHIP
2400 BYBERRY ROAD
BENSALEM, PA 19020
215-633-3600

PROJECT NARRATIVE:

THIS PROJECT PROPOSES TO DEVELOP THE EXISTING TAX PARCEL NO. 02-046-001 BY ADDING A COMMERCIAL BUILDING, PARKING LOT, AND ASSOCIATED IMPROVEMENTS. THE SITE IS IN BENSALEM TOWNSHIP, BUCKS COUNTY, PA.

VARIANCES GRANTED ON SEPTEMBER 13, 2018 BY THE BENSALEM Z.H.B.

NO.	SECTION	DESCRIPTION
1	232-152	TO PERMIT USE OF THE PROPERTY FOR BUSINESS / PROFESSIONAL USE
2	232-57.A(1)	TO PERMIT 100% DISTURBANCE OF THE "WOODLANDS" AND VEGITATION ON THE PROPERTY
3	232-59.A(2){1, 2, &3}	TO PERMIT 100% DISTURBANCE OF THE STEEP SLOPES AT THE PROPERTY
4	232-153.D	TO PERMIT MAXIMUM IMPERVIOUS SURFACE COVERAGE OF 70%
5	232-153.E(1)	TO PERMIT A FRONT YARD SETBACK OF 8 FEET
6	232-587	TO PERMIT ELIMINATION OF THE REQUIRED SPACE FOR LOADING / UNLOADING

REQUESTED WAIVERS

NO.	SECTION	DESCRIPTION
1	201-43.C.5	TO PERMIT THE SIMULTANEOUS SUBMISSION OF A PRELIMINARY AND FINAL LAND DEVELOPMENT PLAN
2	§201-104.B.(1)	FROM PROVIDING SIDEWALK ALONG ALL ABUTTING STREETS EXCEPT WHEN IN THE OPINION OF THE COUNCIL WITH ADVICE FROM THE TOWNSHIP ENGINEER AND PLANNING COMMISSION, THEY ARE UNNECESSARY FOR PUBLIC SAFETY AND CONVENIENCE. THERE ARE CURRENTLY NO SIDEWALKS IN THE IMMEDIATE VICINITY OF THE SITE ALONG RICHLIEU ROAD AND GALLOWAY ROAD
3	§201-104.B.(1)	FROM PROVIDING CURB ALONG ONE SIDE OF ALL ABUTTING STREETS (BOUNDARY STREETS), AND BOTH SIDES OF OTHER STREETS WITHIN THE SUBDIVISION OR LAND DEVELOPMENT. THERE ARE CURRENTLY NO OTHER CURBS IN THE IMMEDIATE VICINITY OF THE SITE ALONG RICHLIEU ROAD AND GALLOWAY ROAD
4	§201-82.B	FROM SHOWING ALL EXISTING SEWER LINES, WATER LINES, FIRE HYDRANTS, UTILITY TRANSMISSION LINES, CULVERTS, BRIDGES, RAILROADS, OR OTHER MANMADE FEATURES WITHIN THE PROPOSED SUBDIVISION AND/OR LAND DEVELOPMENT AND WITHIN 400 FEET OF THE BOUNDARIES OF THE PROPOSED SUBDIVISION AND/OR LAND DEVELOPMENT OR A LESSER DISTANCE WITHIN WHICH THE TOWNSHIP ENGINEER DETERMINES THAT ALL NECESSARY INFORMATION CAN BE PROVIDED; LOCATION, WIDTH AND PURPOSE OF EXISTING EASEMENTS AND UTILITY RIGHTS-OF-WAY WITHIN 50 FEET OF THE PROPOSED SUBDIVISION AND/OR LAND DEVELOPMENT. AN AERIAL PLAN IS PROVIDED IN LIEU OF THIS REQUIREMENT.
5	§201-106.(a).(2)(6)	TO PERMIT GRADING WITHIN 3 FEET OF THE PROPERTY LINE. TO ENSURE STORMWATER RUNOFF IS DIRECTED TO BMP.
6	§196-61.a	TO PERMIT THE USE OF HDPE PIPE IN LIEU OF THE REQUIRED REINFORCED CONCRETE PIPE DUE TO THE HDPE BEING AN INDUSTRY STANDARD AND THE COST SAVES OF USING HDPE PIPE.

SITE DATA

SITE ADDRESS:	Corner Of Richlieu Road And Galloway Road, Bensalem, PA 19020			
TAX MAP NO.: 02-046-001 (BENSALEM TOWNSHIP)				
ZONE	R-1 (Single Family District)			
PROPOSED USED	MULTI-USE COMMERCIAL*			
SITE AREA	02-046-001	74,903.60	SQ. FT.	To the Deed Line
	02-046-001	48,065.01	SQ. FT.	To ULT. R.O.W. & Penndot Taking

ZONING DATA

	REQUIRED	EXISTING	PROPOSED	
MIN. LOT AREA (SF)	12,000	48,065.01	48,065.01	
MIN. LOT WIDTH (FT.)	80	>80	>80	
MAX. IMPERVIOUS SURFACE (%)	40	0.00	61.99	*
MINIMUM FRONT YARD (FT.)	35.00	35.00	8.08	*
MINIMUM SIDE YARD (FT.)	12/30	N/A	N/A	
MINIMUM REAR YARD (FT.)	30.00	30.00	128.60	
MAXIMUM BUILDING HEIGHT (FT.) (STORIES)	35.00	<35	<35	
MAXIMUM BUILDING COVERAGE (%)	30.00	0.00	12.90	

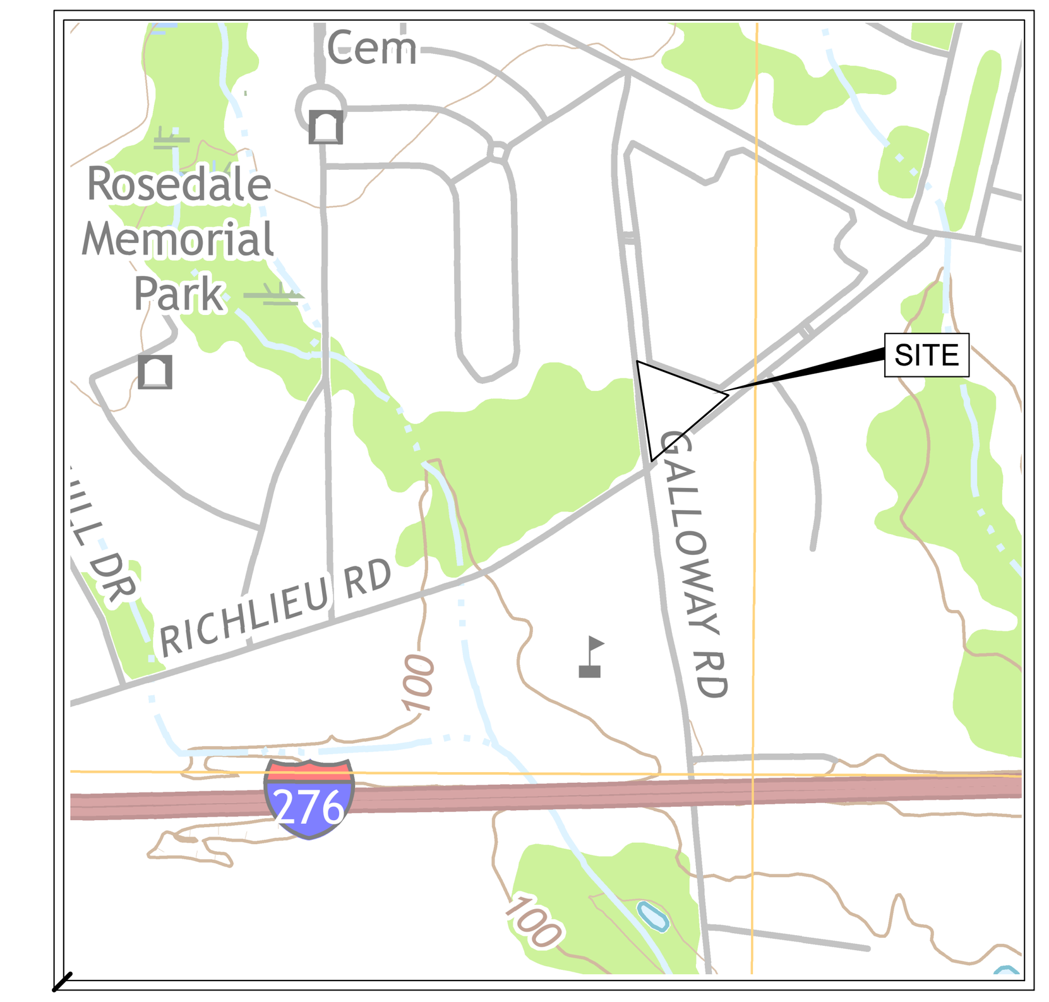
*- DENOTES VARIANCE GRANTED

IMPERVIOUS SURFACE BREAKDOWN

DESCRIPTION	EXISTING	PROPOSED
BUILDINGS	0.00	6,200.00
PARKING AREAS	0.00	21,293.97
DUMPSTER AREAS	0.00	200.00
SIDEWALKS, STEPS, ETC.	0.00	2,101.58
PATIOS/PADS	0.00	0.00
MISC.	0.00	0.00
TOTAL	0.00	29,795.55

GENERAL NOTES:

1. SITE ADDRESS: CORNER OF RICHLIEU ROAD & GALLOWAY ROAD, BENSALEM PA, 19020.
2. TAX MAP PARCEL: 02-046-001; AREA TO THE TITLE LINE=74,903.61 S.F./1.72 ACRES. AREA TO THE ULTIMATE R.O.W. LINE (INCLUDING PENNDOT TAKING) = 48,065.01 S.F./1.10 ACRES. INSTRUMENT NUMBER FOR T.M.P. 05-071-326 IS 2017035526.
3. REFERENCE MATERIAL:
   3.1 ZONING PLAN OF "T.M.P 02-046-001", DATED JUNE 12, 2018, AS JOB NUMBER 20180020, PREPARED BY PICKERING, CORTS, AND SUMMERSON, CONSULTING ENGINEERS AND LAND SURVEYORS.
   3.2 DEEDS AND TAX MAPS.
4. THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT.
5. A BOUNDARY AND TOPOGRAPHIC SURVEY WAS PERFORMED BY TRI-STATE ENGINEERS AND LAND SURVEYORS, INC. IN APRIL 2022.
6. THE HORIZONTAL DATUM FOR THIS PLAN IS PREPARED THE ON THE STATE PLANE COORDINATE SYSTEM.
7. THE ELEVATIONS SHOWN ON THIS PLAN ARE BASED ON NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
8. SURVEY BENCHMARK = INVERT OUT STORM INLET LOCATED ON CORNER OF CURB ISLAND ALONG GALLOWAY ROAD NEAR INTERSECTION WITH RICHLIEU ROAD (SHOWN), INV. ELEV. = 103.28.
9. THE PROPERTY IS DESIGNATED AS ZONE X (AREAS TO BE DETERMINED TO BE OUTSIDE THE 500 YEAR FLOODPLAIN AS SHOWN ON THE F.E.M.A. FLOOD INSURANCE RATE MAP OF BUCKS COUNTY, MAP NUMBER 42017C0439J, EFFECTIVE DATE MAY 18, 1999, LAST REVISED MARCH 16, 2015.
10. THE FUTURE PROPOSED COMMERCIAL BUILDING WILL BE SERVICED BY AQUA FOR PUBLIC WATER AND AQUA FOR PUBLIC SEWER. APPLICANT TO OBTAIN WILL-SERVE LETTERS FROM EACH UTILITY COMPANY PRIOR TO CONSTRUCTION.
11. TRI-STATE ENGINEERS AND LAND SURVEYORS, INC. IS NOT RESPONSIBLE AS TO THE ACCURACY OF THE INFORMATION OBTAINED FROM VARIOUS SOURCES. WHERE PROPOSED UTILITIES CROSS OR CONNECT TO EXISTING UTILITIES, PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE SPECIFIC DEPTHS, INVERTS, CLEARANCES, MATERIAL, AND SIZES OF THE UTILITIES INVOLVED. IF THE CONTRACTOR DETERMINES THAT DISCREPANCIES OR CONFLICTS EXIST, THE FIELD INFORMATION SHALL BE FORWARDED TO THIS OFFICE FOR REVIEW AND FIELD CHANGES MUST BE APPROVED BY THIS OFFICE. TEST PITS SHALL BE INCLUDED IN THE CONTRACTORS BID. NO IMPROVEMENTS SHALL BE INSTALLED UNTIL SUCH TIME THIS OFFICE APPROVES OF A FIELD CHANGE.
12. CONTRACTOR IS RESPONSIBLE TO ANY DAMAGE SUSTAINED TO ADJACENT PROPERTIES AS A RESULT OF CONSTRUCTION ON THIS SITE.
13. NATURAL STEEP SLOPES EXISTS ON THIS PROPERTY.
14. NO FLOODPLAINS EXIST ON THIS PROPERTY.
15. WOODLANDS EXIST ON THIS PROPERTY.
16. ALL FUTURE PROPOSED UTILITIES TO BE PLACED UNDERGROUND.
17. A PENNSYLVANIA ONE-CALL WAS MADE IN APRIL, 2022 FOR THE REFERENCED SITE AND SERIAL # 2022-1160890 WAS ASSIGNED.
18. THERE ARE NO CURRENT DEED RESTRICTIONS OR EXISTING EASEMENTS IMPOSED ON THIS PROPERTY.
19. CONTRACTOR TO VERIFY INVERTS BEFORE ANY CONSTRUCTION TAKES PLACE.
20. THE AREA BETWEEN THE EXISTING RIGHTS OF WAY AND THE ULTIMATE RIGHTS OF WAY OF RICHLIEU RD. & GALLOWAY RD. TO BE OFFERED FOR DEDICATION TO BENSALEM TOWNSHIP.
21. ALL NEW ROOF DRAINS TO BE PIPED INTO THE UNDERGROUND STORMWATER FACILITY.
22. ALL CONTRACTORS WORKING ON THIS PROJECT SHALL BE RESPONSIBLE FOR INSURING THAT ALL CONSTRUCTION ACTIVITIES RELATED TO THIS PROJECT ARE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION) STANDARDS.
23. BURYING OF CONSTRUCTION DEBRIS AND STUMPS ON THE SITE IS PROHIBITED.
24. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT SATISFACTORY COMPACTION.
25. A MINIMUM OF SIX INCHES OF TOPSOIL SHALL BE REDISTRIBUTED OVER ALL DISTURBED AREAS OF THE SITE, WITH THE EXCEPTION OF PAVED AND PROPOSED BUILDING AREAS. SURFACE SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 5-12" PRIOR TO SPREADING OF TOPSOIL.
26. THE APPLICANT SHALL NOTIFY THE TOWNSHIP ENGINEER'S OFFICE A MINIMUM OF THREE (3) BUSINESS DAYS PRIOR TO THE START OF CONSTRUCTION AND THREE (3) DAYS PRIOR TO THE CONSTRUCTION OF THE PROPOSED INFILTRATION BMP STORMWATER MANAGEMENT FACILITY.
27. THE OWNER(S) OF THE LOT SHALL SIGN AN OPERATIONS AND MAINTENANCE AGREEMENT WITH BENSALEM TOWNSHIP FOR THE PROPOSED STORMWATER FACILITY AND BMP'S. THIS AGREEMENT SHALL BE IN A FORM ACCEPTABLE TO THE TOWNSHIP SOLICITOR AND EXECUTED BY THE OWNER AND BENSALEM TOWNSHIP AND BE RECORDED AT THE BUCKS COUNTY COURTHOUSE AS A RESTRICTIVE DEED COVENANT THAT RUNS WITH THE LAND AND SHALL BE TRANSFERRED WITH TRANSFER OF OWNERSHIP.
28. NO PERSON SHALL PLACE ANY STRUCTURE, FILL, LANDSCAPING, OR VEGETATION INTO A STORMWATER FACILITY OR BMP OR WITHIN A DRAINAGE EASEMENT WHICH WOULD LIMIT OR ALTER THE FUNCTIONING OF THE STORMWATER FACILITY OR BMP WITHOUT WRITTEN APPROVAL OF THE TOWNSHIP.
29. NO PERSON SHALL MODIFY, REMOVE, FILL, LANDSCAPE, OR ALTER A STORMWATER MANAGEMENT (SWM) BEST MANAGEMENT PRACTICES (BMP'S), FACILITIES, AREA, OR STRUCTURES UNLESS IT IS PART OF AN APPROVED MAINTENANCE PROGRAM AND WRITTEN APPROVAL OF THE TOWNSHIP HAS BEEN OBTAINED.
30. THE TOWNSHIP SHALL HAVE THE RIGHT TO ENTER PRIVATE PROPERTY TO INSPECT AND REPAIR, IF NECESSARY, ANY STORM WATER MANAGEMENT FACILITY.
31. THE OWNER HEREBY GRANTS THE TOWNSHIP A BLANKET EASEMENT TO ENTER THE PROPERTY TO PERFORM THE NECESSARY INSPECTIONS REQUIRED UNDER THE TOWNSHIP'S MS4 PROGRAM.
32. THE STORMWATER MANAGEMENT FACILITIES ARE A PERMANENT PART OF THE DEVELOPMENT AND SHALL NOT BE REMOVED, ALTERED, OR MODIFIED.
33. THE OWNER OF T.M.P. 02-046-001 SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE STORMWATER BASIN.
34. THE STORMWATER SYSTEM IS DESIGNED FOR THE IMPERVIOUS SURFACES SHOWN ON THE LAND DEVELOPMENT PLANS. SHOULD FUTURE LOT OWNERS INTRODUCE ADDITIONAL IMPERVIOUS SURFACES BEYOND WHAT IS SHOWN ON THIS PLAN, ADDITIONAL STORMWATER FACILITIES WILL BE REQUIRED AT THAT TIME.
35. A LAND ALTERATION PERMIT WILL BE NEEDED PRIOR TO THE START OF ANY GRADING, EXCAVATION, REMOVAL OF TOPSOIL, REMOVAL OF TREES OR REMOVAL OF ANY OTHER VEGETATIVE COVER.
36. AN AS-BUILT LOT PLAN OF ALL STORMWATER BMP'S ARE REQUIRED UPON THE COMPLETION OF CONSTRUCTION OF THE LOT.
37. THE PROPOSED LAYOUT OF THE LOT IS BASED UPON AN APPROVED VARIANCE PLAN TITLED “ZONING VARIANCE PLAN” FOR TMP 02-046-001 DATED JUNE 12, 2018 PREPARED BY PICKERING CORTS & SUMMERSON, APPROVED BY THE BENSALEM ZHB ON 9/13/18
38. CLEAR SIGHT TRIANGLE SHALL BE PROVIDED AT ALL STREET INTERSECTIONS. WITHIN SUCH TRIANGLES NO STRUCTURE, WALL, FENCE, PLANTING OR OTHER VISUAL OBSTRUCTION BETWEEN THE HEIGHT OF TWO FEET AND SEVEN FEET ABOVE THE LEVEL OF THE INTERSECTING STREETS SHALL BE PERMITTED.



LOCATION MAP

SCALE: 1" = 800'

CERTIFICATION OF TRUE OWNERSHIP

WE, AS AUTHORIZED OFFICERS OF ________________________, DULY CERTIFY THAT THE TITLE OF THE PROPERTIES PRESENTED ARE IN THE NAME OF ________________________________ AS RECORDED IN THE OFFICE OF RECORDER OF DEEDS, BUCKS COUNTY, PENNSYLVANIA IN PLAN BOOK _____ PAGE ____.

PRESIDENT

SECRETARY

OWNER'S CERTIFICATION OF INTENT

TO ALL WHOM THESE PRESENTS MAY COME, I (WE) ______________________________ SEND GREETINGS. KNOW YE THAT I (WE) HAVE LAID OUT UPON MY (OUR) LANDS, SITUATE IN THE BENSALEM TOWNSHIP, COUNTY OF BUCKS AND COMMONWEALTH OF PENNSYLVANIA, INTENDED TO BE FORTHWITH RECORDED. WITNESS MY (OUR) HAND AND SEAL THIS ____ DAY OF ____________, 20___.

ATTEST:

(NAME OF CORPORATION)

(SECRETARY) (PRESIDENT)

COMMONWEALTH OF PENNSYLVANIA, COUNTY OF BUCKS, ON THE __________ DAY OF ______________________, ______, BEFORE ME, THE SUBSCRIBER, A NOTARY PUBLIC OF THE COMMONWEALTH OF PENNSYLVANIA, PERSONALLY APPEARED ________________________________, WHO ACKNOWLEDGED THIS PLAN TO BE THE OFFICIAL PLAN OF PROPERTY SHOWN HEREON, SITUATE IN THE BENSALEM TOWNSHIP, COUNTY OF BUCKS AND COMMONWEALTH OF PENNSYLVANIA AND DESIRED THAT THIS PLAN BE RECORDED ACCORDING TO LAW.

WITNESS MY HAND AND NOTARIAL SEAL THIS ___ DAY OF _____________ 20___.

(NOTARY PUBLIC)

MY COMMISSION EXPIRES THE ___ DAY OF ______________ _____.

PROFESSIONAL ENGINEER'S CERTIFICATION

I, ____________________, A REGISTERED PROFESSIONAL ENGINEER OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THIS PLAN CORRECTLY REPRESENTS THE METES AND BOUNDS, AS SHOWN, AND THE LOTS, LAND, STREETS, HIGHWAYS, EASEMENTS AND UTILITIES AS SURVEYED AND PLOTTED BY ME FOR THE OWNERS OR AGENTS.

I FURTHER CERTIFY THAT THIS PLAN MEETS THE REQUIREMENTS OF ALL ORDINANCES AFFECTING THIS SUBDIVISION AND LAND DEVELOPMENT PLAN, INCLUDING THE AMENDED ZONING ORDINANCE OF THE BENSALEM TOWNSHIP, IN WHICH THIS LAND DEVELOPMENT IS LOCATED.

[signature], P.E. — (REGISTERED PROFESSIONAL ENGINEER)

PE 053219 E — (REGISTRATION NUMBER)

PROFESSIONAL SURVEYOR'S CERTIFICATION

I, ____________________, A REGISTERED PROFESSIONAL SURVEYOR OF THE COMMONWEALTH OF PENNSYLVANIA, DO HEREBY CERTIFY THAT THIS PLAN CORRECTLY REPRESENTS THE METES AND BOUNDS, AS SHOWN, AND THE LOTS, LAND, STREETS, HIGHWAYS, EASEMENTS AND UTILITIES AS SURVEYED AND PLOTTED BY ME FOR THE OWNERS OR AGENTS.

[signature] — (REGISTERED PROFESSIONAL SURVEYOR)

SU-075463 — (REGISTRATION NUMBER)

TOWNSHIP ENGINEER

THIS SUBDIVISION PLAN WAS REVIEWED BY THE TOWNSHIP ENGINEER, ____________________, P.E., FOR BENSALEM TOWNSHIP ON THIS ______ DAY OF ______________ 20___.

________________, P.E. (TOWNSHIP ENGINEER) (REGISTRATION NUMBER)

APPROVAL OF THE BUCKS COUNTY PLANNING COMMISSION

BCPC No. _________

PROCESSED AND REVIEWED. REPORT PREPARED BY THE BUCKS COUNTY PLANNING COMMISSION IN ACCORDANCE WITH THE MUNICIPALITIES PLANNING CODE. CERTIFIED THIS DATE __________.

CHAIRMAN, BUCKS COUNTY PLANNING COMMISSION

EXECUTIVE DIRECTOR, BUCKS COUNTY PLANNING COMMISSION

APPROVAL OF THE COUNCIL OF THE TOWNSHIP OF BENSALEM

THIS PLAN WAS APPROVED BY THE COUNCIL OF THE TOWNSHIP OF BENSALEM THIS ______ DAY OF ________, 20__.

WETLANDS CERTIFICATION

THERE ARE NO WETLANDS ON THE SITE.

(WETLANDS STUDY CONSULTANT) (DATE)

CERTIFICATION FOR RECORDING

RECORDED IN THE OFFICE OF RECORDER OF DEEDS AT DOYLESTOWN, PENNSYLVANIA IN PLAN BOOK __ PAGE __ ON THE __ DAY OF ______, 20__.

(RECORDER OF DEEDS) (DATE)

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig in Pennsylvania
1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	1"=30'
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

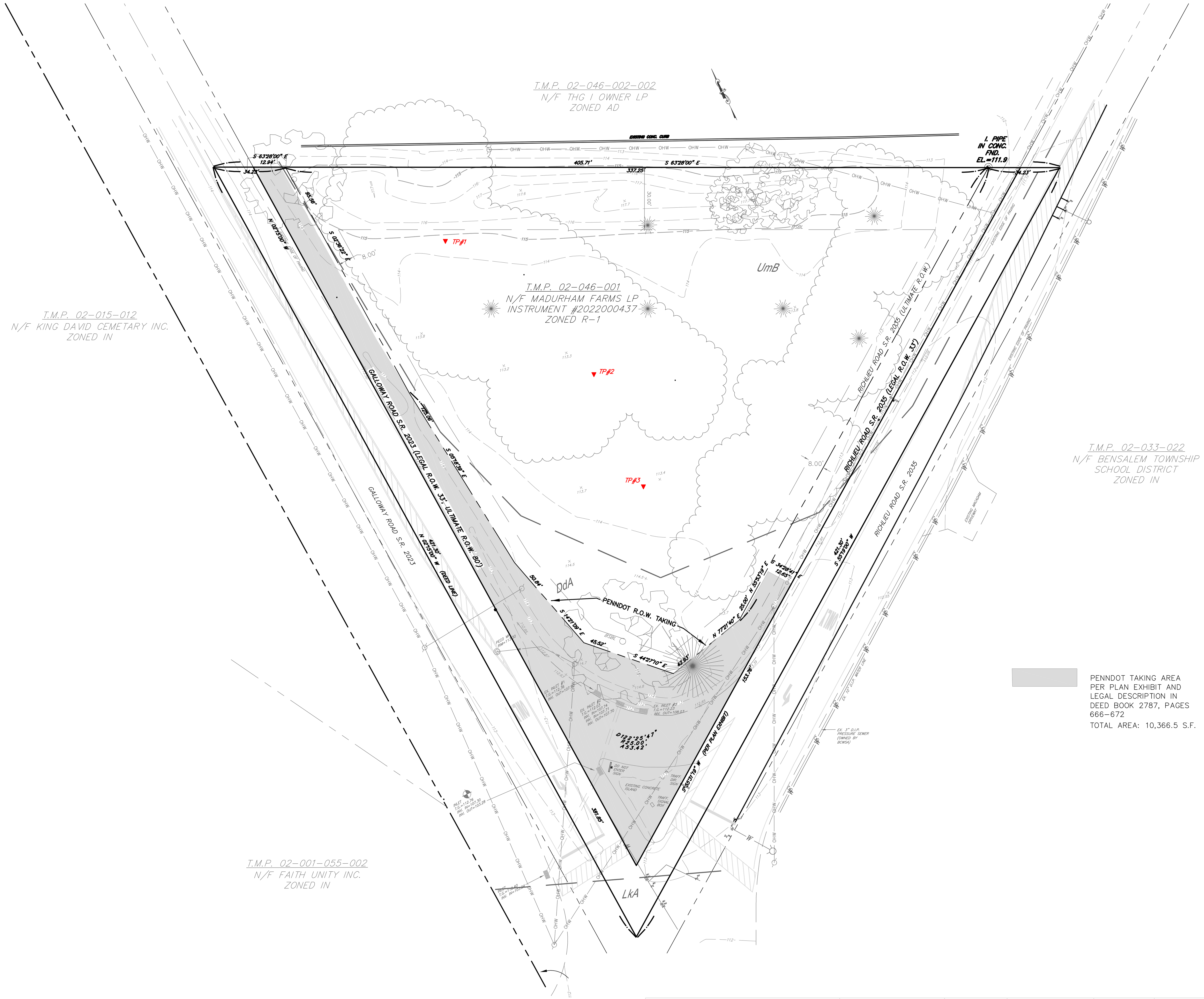
REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET: 30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — LARRY P. YOUNG — ENGINEER — PE053219-E

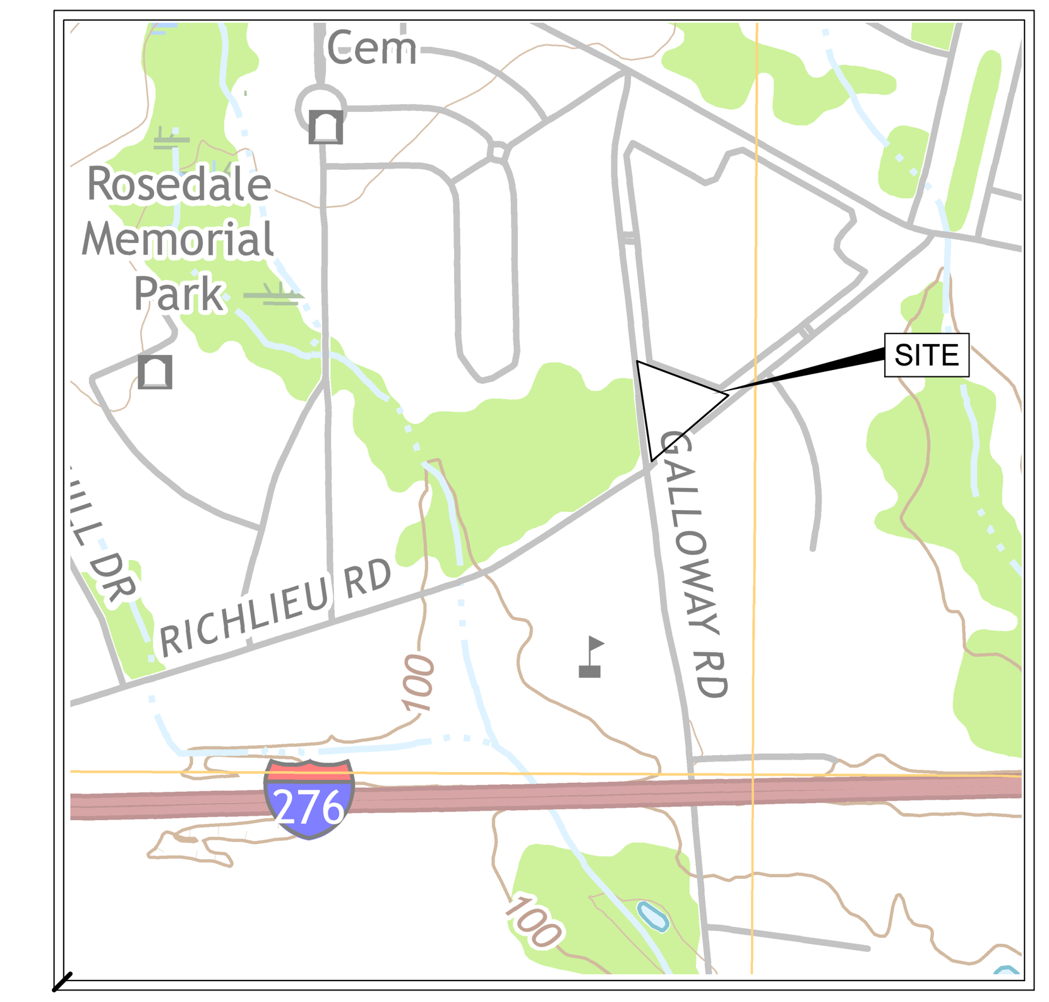
PRELIMINARY/FINAL
LAND DEVELOPMENT PLAN
FOR CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA



PENNDOT TAKING AREA PER PLAN EXHIBIT AND LEGAL DESCRIPTION IN DEED BOOK 2787, PAGES 666–672
TOTAL AREA: 10,366.5 S.F.

GENERAL NOTES:

1. SITE ADDRESS: CORNER OF RICHLIEU ROAD & GALLOWAY ROAD, BENSALEM PA, 19020.
2. TAX MAP PARCEL: 02-046-001; AREA TO THE TITLE LINE=74,903.61 S.F./1.72 ACRES. AREA TO THE ULTIMATE R.O.W. LINE (INCLUDING PENNDOT TAKING) = 48,064.88 S.F./1.10 ACRES. INSTRUMENT NUMBER FOR T.M.P. 05-071-326 IS 2017035526.
3. REFERENCE MATERIAL:
   3.1 ZONING PLAN OF "T.M.P 02-046-001", DATED JUNE 12, 2018, AS JOB NUMBER 20180020, PREPARED BY PICKERING, CORTS, AND SUMMERSON, CONSULTING ENGINEERS AND LAND SURVEYORS.
   3.2 DEEDS AND TAX MAPS.
4. THIS PLAN WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT.
5. A BOUNDARY AND TOPOGRAPHIC SURVEY WAS PERFORMED BY TRI-STATE ENGINEERS AND LAND SURVEYORS, INC. IN APRIL 2022.
6. THE HORIZONTAL DATUM FOR THIS PLAN IS PREPARED THE ON THE STATE PLANE COORDINATE SYSTEM.
7. THE ELEVATIONS SHOWN ON THIS PLAN ARE BASED ON NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
8. SURVEY BENCHMARK = INVERT OUT STORM INLET LOCATED ON CORNER OF CURB ISLAND ALONG GALLOWAY ROAD NEAR INTERSECTION WITH RICHLIEU ROAD (SHOWN), INV. ELEV. = 103.28.
9. THE PROPERTY IS DESIGNATED AS ZONE X (AREAS TO BE DETERMINED TO BE OUTSIDE THE 500 YEAR FLOODPLAIN AS SHOWN ON THE F.E.M.A. FLOOD INSURANCE RATE MAP OF BUCKS COUNTY, MAP NUMBER 42017C0439J, EFFECTIVE DATE MAY 18, 1999, LAST REVISED MARCH 16, 2015.
10. TRI-STATE ENGINEERS AND LAND SURVEYORS, INC. IS NOT RESPONSIBLE AS TO THE ACCURACY OF THE INFORMATION OBTAINED FROM VARIOUS SOURCES. WHERE PROPOSED UTILITIES CROSS OR CONNECT TO EXISTING UTILITIES, PRIOR TO CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE SPECIFIC DEPTHS, INVERTS, CLEARANCES, MATERIAL, AND SIZES OF THE UTILITIES INVOLVED. IF THE CONTRACTOR DETERMINES THAT DISCREPANCIES OR CONFLICTS EXIST, THE FIELD INFORMATION SHALL BE FORWARDED TO THIS OFFICE FOR REVIEW AND FIELD CHANGES MUST BE APPROVED BY THIS OFFICE. TEST PITS SHALL BE INCLUDED IN THE CONTRACTORS BID. NO IMPROVEMENTS SHALL BE INSTALLED UNTIL SUCH TIME THIS OFFICE APPROVES OF A FIELD CHANGE.
11. NATURAL STEEP SLOPES EXISTS ON THIS PROPERTY.
12. NO FLOODPLAINS EXIST ON THIS PROPERTY.
13. WOODLANDS EXIST ON THIS PROPERTY.
14. A PENNSYLVANIA ONE-CALL WAS MADE IN APRIL, 2022 FOR THE REFERENCED SITE AND SERIAL # 2022-1160890 WAS ASSIGNED.
15. THERE ARE NO CURRENT DEED RESTRICTIONS OR EXISTING EASEMENTS IMPOSED ON THIS PROPERTY.



LOCATION MAP
SCALE: 1" = 800'

SITE DATA				
SITE ADDRESS:	Corner Of Richlieu Road And Galloway Road, Bensalem, PA 19020			
TAX MAP NO.: 02-046-001 (BENSALEM TOWNSHIP)				
ZONE	R-1 (Single Family District)			
SITE AREA	02-046-001	74,903.60	SQ. FT.	To the Deed Line
ZONING DATA				
		REQUIRED	**EXISTING 02-046-001**	
MIN. LOT AREA (SF)		12,000	74,903.60	
MIN. LOT WIDTH (FT.)		80	>80	
MAX. IMPERVIOUS SURFACE (%)		35	0.00	
MINIMUM FRONT YARD (FT.)		35.00	35.00	
MINIMUM SIDE YARD (FT.)		12/30	N/A	
MINIMUM REAR YARD (FT.)		30.00	30.00	
MAXIMUM BUILDING HEIGHT (FT.) (STORIES)		35.00	N/A	
MAXIMUM BUILDING COVERAGE (%)		30.00	0.00	
IMPERVIOUS SURFACE BREAKDOWN				
DESCRIPTION			**EXISTING 02-046-001**	
BUILDINGS			0.00	
PARKING AREAS			0.00	
DUMPSTER AREAS			0.00	
WALKS, STEPS, ETC.			0.00	
PATIOS/PADS			0.00	
MISC.			0.00	
	TOTAL		0.00	

LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING EDGE OF PAVEMENT
- -115- -114- EXISTING CONTOURS
- EXISTING STORM SEWER
- SOIL BOUNDARY LINE
- S EXISTING SANITARY MAIN
- W EXISTING WATER MAIN
- OHW EXISTING OVERHEAD ELECTRIC
- EXISTING ADJOINING PROPERTY LINE
- EXISTING UTILITY POLES
- 29.5 EXISTING SPOT ELEVATION
- EXISTING T.G. INLET
- EXISTING SANITARY MH
- EXISTING WATER VALVE
- EXISTING IRON PIN
- EXISTING TRAFFIC SIGN
- UmB EXISTING BOUNDARY SOILS TYPE
- TP#2 SOIL TEST PIT
- FH EXISTING FIRE HYDRANT
- UP EXISTING UTILITY POLE
- SITE BENCHMARK
- EXISTING TREES TO BE REMOVED

SITE CAPACITY CALCULATIONS

A.	BASE SITE AREA:	1.72	ACRES	To the Deed Line
		1.10	ACRES	To ULT. R.O.W.
B.	LAND WITH RESTRICTIONS AND RESOURCE PROTECTION LAND:			

RESOURCE PROTECTION

NATURAL RESOURCE	RESOURCE PROTECTION RATIO	ACRES IN RESOURCE TOTAL	ACRES IN RESOURCE APPLICABLE	REQUIRED AREA TO BE PROTECTED RATIO X APPL.	ALLOWABLE DISTURBANCE	AREA TO BE DISTURBED (AC.)	PERCENT DISTURBED (%)	PERCENT PROTECTED (100%)
FLOODPLAINS	100%	0	0	N/A	N/A	N/A	N/A	N/A
FLOODPLAIN SOILS	100%	0	0	N/A	N/A	N/A	N/A	N/A
WETLANDS	100%	0	0	N/A	N/A	N/A	N/A	N/A
STEEP SLOPES (25% OR MORE)	85%	1.72	0.036	0.0306	0.0054	0.018*	50	50
STEEP SLOPES (15% - 25%)	70%	1.72	0.083	0.0581	0.0249	0.064*	77.11	22.89
STEEP SLOPES (8% - 15%)	60%	1.72	0.142	0.0852	0.0568	0.095*	66.90	33.10
WOODLANDS	50%	1.72	0.73	0.365	0.365	0.73*	100.00	0.00

* - DENOTE ZONING VARIANCES HAVE BEEN APPROVED FOR 100% USE WOODLANDS AND STEEP SLOPES DISTURBANCE

SOILS LEGEND AND TABLE OF LIMITATIONS & RESOLUTIONS BASED ON USDA–NRCS WEB SOIL SURVEY OF BUCKS COUNTY **

SYMBOL	MAPPING UNITS	SLOPE	LAND CAPBLTY	HYDRIC SOIL	HYDRO. GROUP	DEPTH TO BEDROCK	DEPTH TO WATER TABLE	LIMITATIONS FOR CONSTRUCTION	RESOLUTION OF LIMITATIONS
UmB	URBAN LAND–DOYLESTOWN COMPLEX	0–8%	8s–6w	NO	B/D	60–99 IN	6–72 IN	NOT RATED	FOLLOW PLAN SPECIFICATIONS.
DdA	DOYLESTOWN SILT LOAM	0–3%	4w	YES	C/D	60–99 IN	6–72 IN	VERY LIMITED: DEPTH TO SATURATED ZONE	HAVE BYPASS PUMP(S) & FILTER BAG(S) AVAILABLE. SEE DETAIL.

** THE SOILS SHOWN HEREON ARE BASED ON THE WEB SOIL SURVEY PREPARED BY SOIL SURVEY STAFF, NATURAL RESOURCES CONSERVATION SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE.

Pennsylvania One Call System, Inc.
SERIAL NO. 2022–1160890
Call Before You Dig in Pennsylvania
1–800–242–1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	1"=30'
Acreage: SEE TABLES		No. of Lots: 1
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

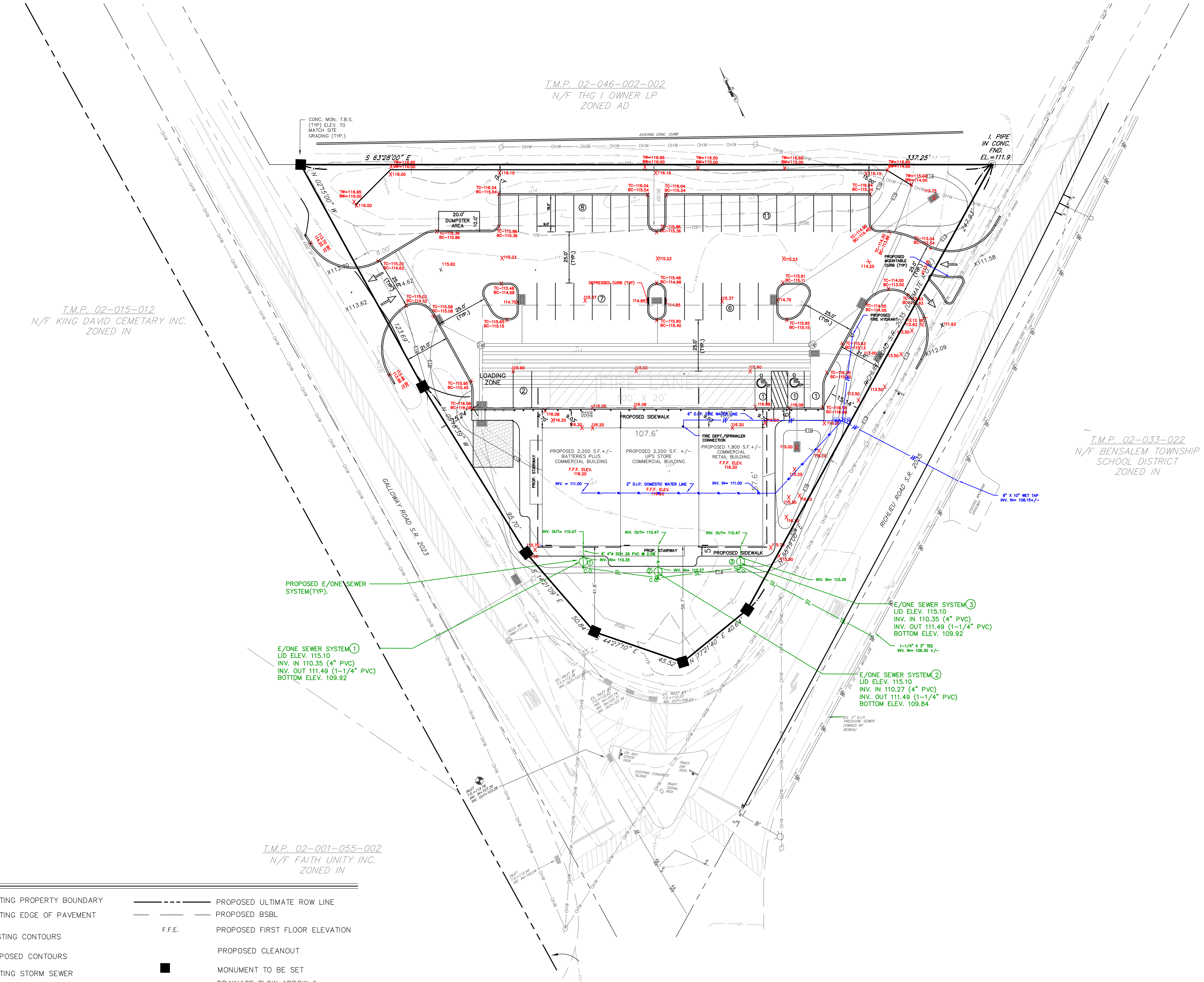
REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
TSE FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL JAMES ALAN OAKES LAND SURVEYOR

PRELIMINARY/FINAL
EXISTING FEATURES PLAN
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

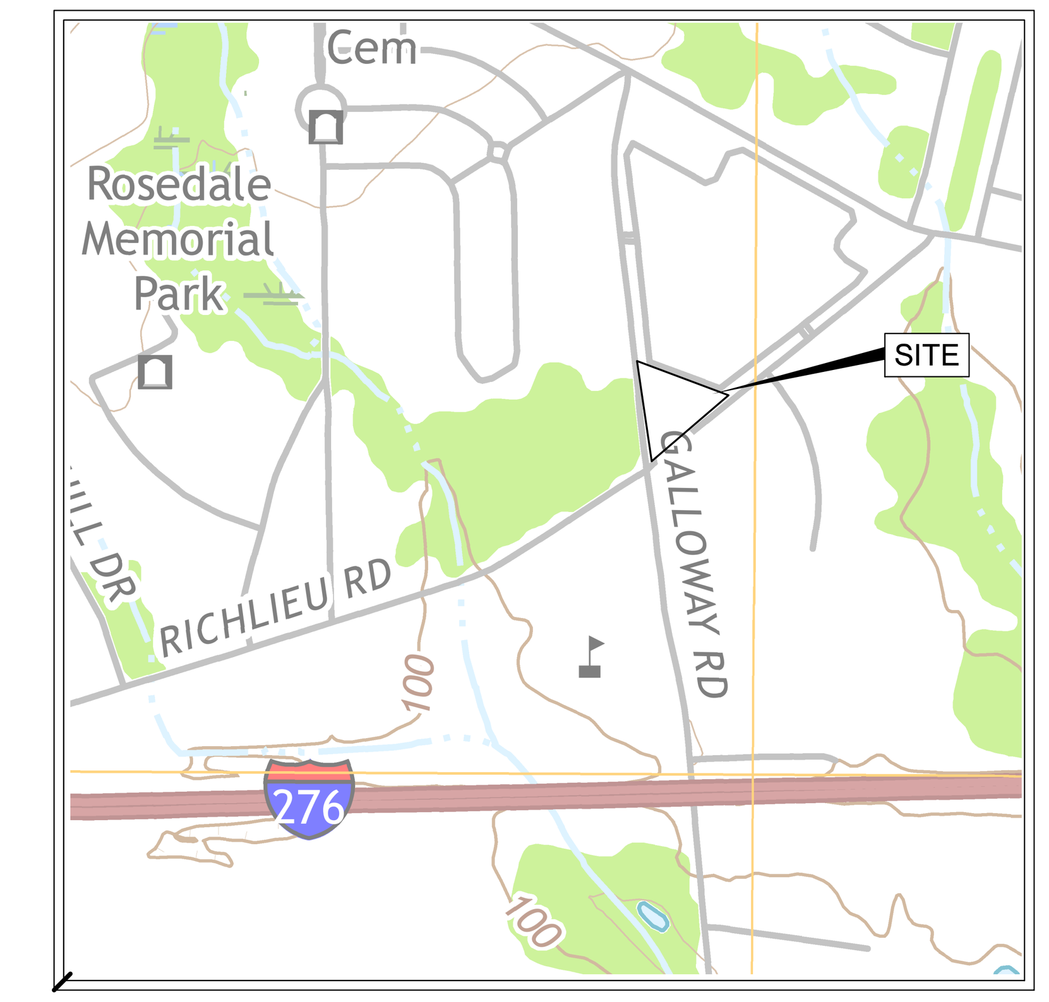


GRADING AND DRAINAGE NOTES:

1. THE GENERAL NOTES MUST BE INCLUDED AS PART OF THIS ENTIRE DOCUMENT PACKAGE AND ARE PART OF THE CONTRACT DOCUMENTS. THE GENERAL NOTES ARE REFERENCED HEREIN, AND THE CONTRACTOR MUST REFER TO THEM AND FULLY COMPLY WITH THESE NOTES, IN THEIR ENTIRETY, THE CONTRACTOR MUST BE FAMILIAR WITH AND ACKNOWLEDGE FAMILIARITY WITH ALL OF THE GENERAL NOTES AND ALL OF THE PLANS' SPECIFIC NOTES.
2. SITE GRADING MUST BE PERFORMED IS ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT AS REFERENCED IN THIS PLAN SET. IF NO GEOTECHNICAL REPORT HAS BEEN REFERENCED, THE CONTRACTOR NUST HAVE A GEOTECHNICAL ENGINEER PROVIDE WRITTEN SPECIFICATIONS AND RECOMMENDATIONS PRIOR TO THE CONTRACTOR COMMENCING THE FOOTINGS FOR THE DWELLINGS. THE CONTRACTOR MUST FOLLOW THE REQUIREMENTS OF ALL MUNICIPAL, COUNTY, STATE, AND FEDERAL LAWS, WHICH HAVE JURISDICTION OVER THIS PROJECT.
3. THE CONTRACTOR IS REQUIRED TO SECURE ALL NECESSARY AND/OR REQUIRED PERMITS AND APPROVALS FOR ALL OFF-SITE SOURCES AND DISPOSAL FACILITIES. THE CONTRACTOR MUST SUPPLY A COPY OF APPROVALS TO THE PROFESSIONAL OF RECORD AND THE OWNER PRIOR TO THE CONTRACTOR COMMENCING ANY WORK.
4. THE CONTRACTOR IS FULLY RESPONSIBLE FOR VERIFYING EXISTING TOPOGRAPHIC INFORMATION AND UTILITY INVERT ELEVATIONS PRIOR TO COMMENCING ANY CONSTRUCTION. SHOULD DISCREPANCIES BETWEEN THE PLANS AND INFORMATION OBTAINED THROUGH FIELD VERIFICATIONS BE IDENTIFIED OR EXIST, THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROFESSIONAL OF RECORD, IN WRITING.
5. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REPLACING ALL UNSUITABLE MATERIALS WITH SUITABLE MATERIALS AS SPECIFIED IN THE GEOTECHNICAL REPORT. THE CONTRACTOR MUST COMPACT ALL EXCAVATED OR FILLED AREAS IN STRICT ACCORDANCE WITH THE GEOTECHNICAL REPORT'S GUIDANCE. MOISTURE CONTENT AT TIME OF PLACEMENT MUST BE SUBMITTED IN A COMPACTION REPORT PREPARED BY A QUALIFIED GEOTECHNICAL ENGINEER, REGISTERED WITH THE STATE WHERE THE WORK IS PERFORMED. THIS REPORT MUST VERIFY THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN THE BUILDING PAD AREA AND AREAS TO BE PAVED HAVE BEEN COMPACTED IN ACCORDANCE WITH THESE PLANS, SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES WHICH ARE IN EFFECT AND WHICH ARE APPLICABLE TO THE PROJECT. SUBBASE MATERIAL FOR SIDEWALKS, CURB, OR ASPHALT MUST BE FREE OF ORGANICS AND OTHER UNSUITABLE MATERIALS. SHOULD SUBBASE BE DEEMED UNSUITABLE BY OWNER/DEVELOPER, OR OWNER/DEVELOPER'S REPRESENTATIVE, SUBBASE MUST BE REMOVED AND FILLED WITH APPROVED FILL MATERIAL, COMPACTED AS THE GEOTECHNICAL REPORT DIRECTS. EARTHWORK ACTIVITIES INCLUDING, BUT NOT LIMITED TO, EXCAVATION, BACKFILL, AND COMPACTING MUST COMPLY WITH THE RECOMMENDATIONS IN THE GEOTECHNICAL REPORT AND ALL APPLICABLE REQUIREMENTS, RULES, STATUTES, LAWS, ORDINANCES AND CODES. EARTHWORK ACTIVITIES MUST COMPLY WITH THE STANDARD STATE DOT SPECIFICATIONS FOR ROADWAY CONSTRUCTION (LATEST EDITION) AND ANY AMENDMENTS OR REVISIONS THERETO.
6. IN THE EVENT OF A DISCREPANCY(IES) AND/OR A CONFLICT(S) BETWEEN PLANS, OR RELATIVE TO OTHER PLANS, THE GRADING PLAN TAKES PRECEDENCE AND CONTROLS. THE CONTRACTOR MUST IMMEDIATELY NOTIFY THE PROFESSIONAL OF RECORD, IN WRITING, OF ANY DISCREPANCY(IES) AND/OR CONFLICT(S).
7. THE CONTRACTOR IS RESPONSIBLE TO IMPORT FILL OR EXPORT EXCESS MATERIAL AS NECESSARY TO CONFORM TO THE PROPOSED GRADING, AND TO BACKFILL EXCAVATIONS FOR THE INSTALLATION OF UNDERGROUND IMPROVEMENTS.

SITE SPECIFIC

8. PROPOSED TOP OF CURB ELEVATIONS ARE GENERALLY 6" ABOVE PAVEMENT GRADE.
9. THE CONTRACTOR MUST ENSURE THAT POSITIVE DRAINAGE IS PROVIDED IN BOTH PAVED AND LAWN AREAS AFTER CONSTRUCTION. THE MINIMUM SLOPES FOR IMPROVEMENTS ARE 1% ON ALL CONCRETE AND ASPHALT SURFACES, (EXCEPT WHERE ADA LIMITS SLOPE), AND 1.0% IN LAWN AREAS. ANY LOCALIZED DEPRESSIONS MUST BE ELIMINATED.
10. THE CONTRACTOR MUST ENSURE POSITIVE DRAINAGE AWAY FROM STRUCTURES. WHERE THE GRADING ALONG AND ADJACENT TO A BUILDING ARE SCHEMATIC DUE TO A GENERIC BUILDING FOOTPRINT, THE GRADES MUST BE ADJUSTED BASED ON FINAL ARCHITECTURAL PLANS.
11. WHERE SUBGRADE BUILDING AREAS(I.E. BASEMENT AND CRAWL SPACES) ARE PROVIDED, THE CONTRACTOR MUST DETERMINE THE DEPTH TO GROUNDWATER AT THE LOCATION OF THE PROPOSED SUBGRADE BUILDING AREA. WHERE GROUNDWATER IS ENCOUNTERED AT THE ELEVATION OF THE SUBGRADE BUILDING AREA, APPROPRIATE CONSTRUCTION METHODS SHALL BE EMPLOYED TO PREVENT GROUNDWATER FROM ENTERING THE STRUCTURE(S). IF AND WHERE SUMP PUMPS ARE PROVIDED, ALL DISCHARGES MUST BE CONNECTED TO THE STORM SEWER OR OTHERWISE PROTECTED FROM CAUSING SURFACE RUNOFF EROSION. THE BUILDING WILL NOT HAVE BASEMENTS/CRAWL SPACES.
12. ALL SLOPES 3:1 OR GREATER SHALL BE STABILIZED IN ACCORDANCE WITH THE PLANS OR GEOTECHNICAL SPECIFICATIONS.
13. THE TOP AND BOTTOM OF WALL ELEVATIONS (TW & BW) REPRESENT THE PROPOSED FINISHED GRADE AT THE FACE OF THE WALL AND DO NOT REPRESENT THE ELEVATION OF THE PROPOSED WALL, WHICH MAY INCLUDE CAP UNITS AND FOOTINGS. WALL FOOTINGS/FOUNDATION ELEVATIONS ARE NOT IDENTIFIED HEREIN AND ARE TO BE SET/DETERMINED BY THE CONTRACTOR BASED ON FINAL STRUCTURE DESIGN SHOP DRAWINGS PREPARED BY THE APPROPRIATE PROFESSIONAL LICENSED IN THE STATE WHERE THE CONSTRUCTION OCCURS. THE CONTRACTOR MUST ENSURE THAT THE WALLS SHOWN HEREON MUST BE DESIGNED BY A LICENSED STRUCTURAL ENGINEER AND THAT SIGNED AND SEALED SHOP DRAWINGS ARE APPROVED BY THE MUNICIPALITY PRIOR TO THEIR CONSTRUCTION. ADDITIONALLY, THE CONTRACTOR SHALL ENSURE THAT FENCING, GUIDERAIL, UTILITIES, AND OTHER SITE FEATURES IN THE VICINITY OF THE WALL(S), SHALL BE CONSIDERED AND INCORPORATED INTO THE RETAINING WALL DESIGNS (BY OTHERS).
14. ALL DISTURBED TOPSOIL ON THE SITE IS TO BE REDISTRIBUTED ON SITE IN AREAS NOT COVERED BY IMPERVIOUS SURFACES.
15. ALL CONSTRUCTION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH TOWNSHIP STANDARDS, PENNDOT FORM 408 SPECIFICATIONS AND RC STANDARDS, LATEST EDITION. MORE RESTRICTIVE SHALL CONTROL.
16. BURYING OF TREES, STUMPS, OR CONSTRUCTION MATERIAL IS PROHIBITED. TREES AND STUMPS MAY BE CHIPPED OR GROUND AND SPREAD ON THE SITE.
17. CONTRACTOR SHALL NOT ENCROACH ONTO ADJOINING PROPERTIES UNLESS A TEMPORARY CONSTRUCTION EASEMENT HAS BEEN GRANTED BY THE ADJOINING PROPERTY OWNER. CONTRACTOR SHALL HAVE PROPERTY LINES CLEARLY MARKED IN AREAS WHERE GRADING WILL ENCROACH WITHIN 5 FEET OF THE PROPERTY LINE BY A LICENSED SURVEYOR, AND SHALL CONSTRUCT SUCH BARRIERS WHICH ARE NECESSARY TO PREVENT ENCROACHMENT ONTO ADJACENT PROPERTIES.
18. NO EXCAVATION OR FILL SHALL BE MADE WITH A FACE DEEPER THAN THREE HORIZONTAL TO ONE VERTICAL (3:1).
19. TOPSOIL SHALL BE RETURNED TO A MINIMUM DEPTH OF 6 INCHES.
20. SIGHT DISTANCES INDICATED SHALL BE MAINTAINED BY CLEARING AND GRADING AS NECESSARY TO PROVIDE THE "REQUIRED" SIGHT DISTANCES. NO OBSTRUCTIONS TO VISIBILITY BETWEEN A VERTICAL PLANE OF 2 FEET TO 10 FEET ABOVE THE CENTERLINE OF THE STREET-LEVEL SO AS TO INTERFERE WITH TRAFFIC VISIBILITY ACROSS THE CORNER OF THE YARD WHICH IS IN THE SITE TRIANGLES INDICATED ON THE PLAN SHALL BE PERMITTED.
21. SURVEY BENCHMARK = INVERT OUT STORM INLET LOCATED ON CORNER OF CURB ISLAND ALONG GALLOWAY ROAD NEAR INTERSECTION WITH RICHLIEU ROAD (SHOWN), INV. ELEV. = 103.28.
22. NO PERSON SHALL MODIFY, REMOVE, FILL, LANDSCAPE, OR ALTER ANY EXISTING STORM WATER CONTROL OR BMP UNLESS IT IS PART OF AN APPROVED MAINTENANCE PROGRAM, WITHOUT THE WRITTEN APPROVAL OF THE MUNICIPALITY.
23. NO PERSON SHALL PLACE ANY STRUCTURE, FILL, LANDSCAPING, OR VEGETATION INTO A STORM WATER CONTROL OR BMP WITHIN A DRAINAGE EASEMENT, WHICH WOULD LIMIT OR ALTER THE FUNCTIONING OF THE STORM WATER CONTROL OR BMP, WITHOUT THE WRITTEN APPROVAL OF THE MUNICIPALITY.
24. THE STORMWATER FACILITIES AND FINAL GRADING SHOWN ON THESE PLANS AREA BASIC AND PERPETUAL PART OF THE STORMWATER MANAGEMENT SYSTEM OF THE PROPOSED SITE LOCATED IN BENSALEM TOWNSHIP, BUCKS COUNTY, COMMONWEALTH OF PENNSYLVANIA, AND SUCH ARE TO BE PROTECTED AND PRESERVED IN ACCORDANCE WITH THE APPROVED FINAL PLANS BY THE OWNERS, THEIR SUCCESSORS AND ASSIGNS OF THESE LANDS. BENSALEM TOWNSHIP AND/OR ITS AGENTS RESERVE THE RIGHT AND PRIVILEGE TO ENTER UPON THESE LANDS FROM TIME TO TIME FOR THE INSPECTION OF THESE FACILITIES IN ORDER TO DETERMINE THAT PROPER OPERATION AND MAINTENANCE AND THAT THE STRUCTURAL AND DESIGN INTEGRITY IS BEING MAINTAINED BY THE OWNER.
25. ANY SWALES OF SLOPES GREATER THAN 3:1 SHALL HAVE EROSION CONTROL MATTING INSTALLED ON THEM.
26. THERE SHALL BE A 10 FEET HORIZONTAL SEPARATION OF BETWEEN WATER AND SEWER LATERALS. IF THIS CAN NOT BE OBTAINED THAN THERE MUST BE A 1.5 FOOT VERTICAL SEPARATION BETWEEN THE WATER AND SEWER LATERALS.



LOCATION MAP

SCALE: 1" = 800'

LEGEND

EXISTING PROPERTY BOUNDARY
EXISTING EDGE OF PAVEMENT
EXISTING CONTOURS
PROPOSED CONTOURS
EXISTING STORM SEWER
SOIL BOUNDARY LINE
EXISTING SANITARY MAIN
EXISTING WATER MAIN
EXISTING OVERHEAD ELECTRIC
EXISTING ADJOINING PROPERTY LINE
EXISTING UTILITY POLES
EXISTING SPOT ELEVATION
EXISTING T.G. INLET
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PROPOSED ULTIMATE ROW LINE
PROPOSED BSBL
F.F.E. PROPOSED FIRST FLOOR ELEVATION
PROPOSED CLEANOUT
MONUMENT TO BE SET
2.75% DRAINAGE FLOW ARROW & SLOPE
× 115.10 PROPOSED SPOT ELEVATION
WL PROPOSED WATER LATERAL
SL PROPOSED SANITARY LATERAL
PROPOSED ROOF DRAIN
FH EXISTING FIRE HYDRANT
UP EXISTING UTILITY POLE
SITE BENCHMARK

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SERIAL NO. 2022-1160890
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State Law Requires
Construction Phase: Three working Days Notice
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Facility Owners: Member of One Call System

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MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

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Job No.	Date:	Scale:
22-04019	7/05/2022	1"=30'
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

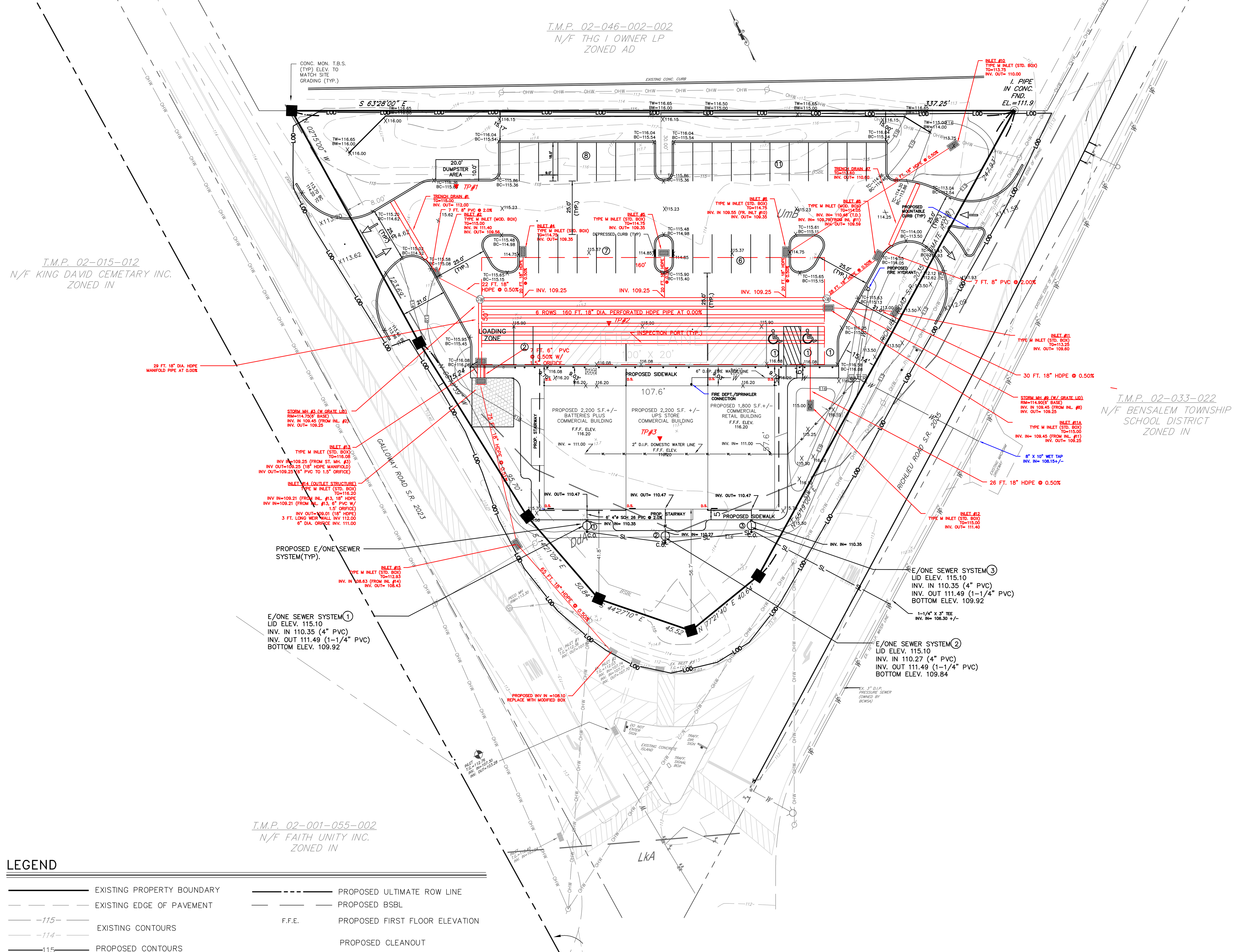
REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET: 30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL LARRY P. YOUNG ENGINEER PE053219-E

PRELIMINARY/FINAL
GRADING PLAN
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA



GENERAL NOTES:

1. SITE ADDRESS: CORNER OF RICHLIEU ROAD AND GALLOWAY ROAD, BENSALEM, PA 19020
2. TAX MAP PARCEL: 02-046-001;
3. AREA TO THE DEED LINE=74,903.60 S.F./1.7196 ACRES
3. AREA TO THE ULTIMATE RIGHT-OF-WAY LINE=75,918.7 S.F./1.1034 ACRES
4. TOTAL AMOUNT OF IMPERVIOUS SURFACE = 29,047.60 SF
5. TOTAL EARTH DISTURBANCE 1.30 ACRES
6. I, LARRY YOUNG, P.E., ON MARCH 29, 2021, HEREBY CERTIFY THAT THE SWM SITE PLAN MEETS ALL DESIGN STANDARDS AND CRITERIA OF THE NESHAMINY CREEK WATERSHED ACT 167 STORMWATER MANAGEMENT ORDINANCE OR PLAN.

DESIGN ENGINEER — DATE: JULY 5, 2022

7. I, MADHURAM FARMS, LP, ACKNOWLEDGE THAT ANY REVISION TO THE APPROVED SWM SITE PLAN MUST BE APPROVED BY THE TOWNSHIP AND THAT A REVISED E&S PLAN MAY BE REQUIRED TO BE SUBMITTED TO THE BUCKS COUNTY CONSERVATION DISTRICT.

APPLICANT OR OWNER — DATE

8. NO CHANGES IN FINISH GRADE TO FINISH GRADING CAN OCCUR AT ANY TIME IN THE FUTURE WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE TOWNSHIP.
9. BICYCLE SAFE GRATES SHALL BE USED FOR ALL INLETS WITHIN THE PROJECT LIMITS.

LOCATION MAP

SCALE: 1" = 800'

SEQUENCE OF CONSTRUCTION

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. EACH STAGE SHALL BE COMPLETED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING AND GRUBBING SHALL BE LIMITED TO ONLY THOSE AREAS DESCRIBED IN EACH STAGE.

1. AT LEAST 7 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PLAN PREPARER, AND THE BUCKS COUNTY CONSERVATION DISTRICT TO AN ON-SITE MEETING. ALSO, AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE PENNSYLVANIA ONE CALL SYSTEM INCORPORATED AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.
2. INSTALL COMPOSITE FILTER SOCK, ORANGE CONSTRUCTION FENCING AROUND BMP'S, AND TREE PROTECTION FENCE THROUGHOUT THE SITE AS INDICATED ON THE E&S PLAN.
3. INSTALL ROCK CONSTRUCTION ENTRANCES AT EACH DRIVEWAY. THE CONSTRUCTION ENTRANCES SHALL BE MAINTAINED THROUGHOUT THE PROJECT. ROADWAYS SHALL BE KEPT FREE OF SEDIMENT, SOIL, AND MUD AT ALL TIMES.
4. REMOVE TREES FROM DISTURBED AREAS. CLEAR AND GRUB THE SITE AREA.
5. STOCKPILE TOPSOIL IN THE DESIGNATED AREA, INSTALL COMPOSITE FILTER SOCK, AND TEMPORARY SEED.
6. ROUGH GRADE THE SITE AREA AND PREP BUILDING PAD.
7. INSTALL CONCRETE WASHOUT AREA.
8. CONSTRUCT SUBSURFACE MRC BASIN, ALL INLETS AND STORM STRUCTURES. SEAL OFF ALL INLETS AND STORM MANHOLES UNTIL SITE HAS BEEN COMPLETED STABILIZED.
9. INSTALL ALL CURB AND SIDEWALK THROUGHOUT THE SITE.
10. INSTALL BASE COURSE PAVING THROUGH THE SITE. SITE AND ROADWAY ARE TO BE SWEPT AS NEEDED TO NOT ALLOW DIRT OR DEBRIS TO ENTER ROADWAY.
11. POUR FOOTING AND CONSTRUCT BUILDING.
12. INSTALL WATER AND SEWER SERVICE LINES FOR EACH BUILDING.
13. INSTALL REMAINING UNDERGROUND UTILITIES INCLUDING ELECTRIC, TELEPHONE, GAS, ETC.
14. FINAL GRADE THE SITE AREA. UPON COMPLETION OF THE FINAL GRADING, INSTALL LANDSCAPING AND APPLY PERMANENT SEEDING AND MULCH UNTIL PROPER VEGETATIVE COVER IS ESTABLISHED. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS. ALL SWALES SHALL EITHER BE SODDED OR EROSION CONTROL MATTING (SC150) SHALL BE USED.
15. ONCE ALL GRADING AND LANDSCAPING ACTIVITIES HAVE BEEN COMPLETED AND ALL CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED, INSTALL FINAL WEARING COURSE AND LINE STRIPING.
16. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED AND WITH THE RECOMMENDATION OF THE BUCKS COUNTY CONSERVATION DISTRICT, REMOVE COMPOSITE FILTER SOCK, INLET PROTECTION, TREE PROTECTION FENCE, AND ORANGE CONSTRUCTION FENCE. AREAS DISTURBED DURING REMOVAL OF THE ES CONTROLS MUST BE STABILIZED IMMEDIATELY. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.
17. CONSTRUCTION ACTIVITIES ARE EXPECTED TO COMMENCE IN SPRING OF 2024 AND BE COMPLETED WITHIN ONE (1) YEAR.

BMP CONSTRUCTION SEQUENCE

1. PROTECT SUBSURFACE INFILTRATION SYSTEM AREAS FROM COMPACTION PRIOR TO INSTALLATION. STOCKPILES SHALL NOT BE PLACED OVER SUBSURFACE INFILTRATION SYSTEMS.
2. INSTALL INFILTRATION SYSTEM AS NOTED IN THE CONSTRUCTION SEQUENCE. AFTER INSTALLATION, PREVENT SEDIMENT LADEN WATER FROM ENTERING INLETS AND PIPES.
3. COMPACTION OF THE SOIL AT THE SUBSURFACE INFILTRATION SYSTEMS SHALL NOT OCCUR. THE FOLLOWING METHODS ARE EXAMPLES OF HOW COMPACTION COULD BE AVOIDED.
   - 3.1 EXCAVATION AND GRADING OF THE PROPOSED INFILTRATION BMP. SHALL BE COMPLETED FROM THE PERIMETER OF THE PROPOSED BMP WHERE POSSIBLE. WHERE THE EXCAVATION CANNOT BE COMPLETED FROM THE PERIMETER OF THE BMP, BULK EARTHWORK CAN BE COMPLETED TO AN ELEVATION THAT IS 1 FOOT ABOVE THE INFILTRATION SURFACE. THE FINAL 1 FOOT OF MATERIAL SHOULD BE EXCAVATED WITH A HOE OR SIMILAR EQUIPMENT. EXCAVATION FROM THIS POINT ON SHOULD BE COMPLETED WITH THE MACHINE PLACED ON THE AREAS CONTAINING 1 FOOT OF MATERIAL. AS EXCAVATION OF THE 1 FOOT OF MATERIAL PROCEEDS, THE INFILTRATION SURFACE SHOULD BE SCARIFIED. AGGREGATE BACKFILL SHOULD NOT BE DUMPED ON TO THE PREPARED INFILTRATION SURFACE BY TRUCK BUT SHOULD BE SPREAD WITH THE MACHINE PLACING/SPREADING THE STONE ON THE PERIMETER OF THE INFILTRATION SURFACE OR TRACKING OVER A MINIMUM OF 1 FOOT OF AGGREGATE.
   - 3.2 THE USE OF LOW GROUND PRESSURE (LGP) MACHINES IS ALLOWED AS LONG AS THE SPECIFICATIONS OF THE MACHINE TO BE USED ARE PROVIDED AT THE PRE-CONSTRUCTION MEETING AND IT IS VERIFIED PRIOR TO EXCAVATION THAT THE PROPOSED MACHINE IS A LGP MACHINE.
4. INSTALL AND MAINTAIN PROPER EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION
5. THE EXISTING SUBGRADE UNDER THE BED AREAS SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO GEOTEXTILE AND STONE BED PLACEMENT. IF POSSIBLE, EXCAVATE INFILTRATION BASIN BOTTOM TO AN UNCOMPACTED SUBGRADE FREE FROM ROCKS AND DEBRIS. DO NOT SUBGRADE.
6. WHERE EROSION OF SUBGRADE HAS CAUSED ACCUMULATION OF FINE MATERIALS AND/OR SURFACE PONDING, THIS MATERIAL SHOULD BE REMOVED WITH LIGHT EQUIPMENT AND THE UNDERLYING SOILS SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES WITH A YORK RAKE (OR EQUIVALENT) AND LIGHT TRACTOR. ALL FINE GRADING SHALL BE DONE BY HAND. ALL BED BOTTOMS SHOULD BE AT A LEVEL GRADE.
7. INSTALL UPSTREAM AND DOWNSTREAM INLET AND OUTLET CONTROL STRUCTURES, CLEANOUTS PERFORATED PIPING AND ALL OTHER NECESSARY STORMWATER STRUCTURES.
8. GEOTEXTILE AND BED AGGREGATE SHOULD BE PLACED IMMEDIATELY AFTER APPROVAL OF SUBGRADE PREPARATION AND INSTALLATION OF STRUCTURES. GEOTEXTILE SHOULD BE PLACED IN ACCORDANCE WITH MANUFACTURERS STANDARDS AND RECOMMENDATIONS. ADJACENT STRIPS OF GEOTEXTILE SHOULD OVERLAP A MINIMUM OF 16 INCHES. IT SHOULD ALSO BE SECURED AT LEAST 4 FEET OUTSIDE OF THE BED IN ORDER TO PREVENT ANY RUNOFF OR SEDIMENT FROM ENTERING THE STORAGE BED. THIS EDGE STRIP SHOULD REMAIN IN PLACE UNTIL ALL BARE SOILS CONTIGUOUS TO BEDS ARE STABILIZED AND VEGETATED. AS THE SITE IS FULLY STABILIZED, EXCESS GEOTEXTILE ALONG BED EDGES CAN BE CUT BACK TO THE EDGE OF THE BED.
9. CLEAN-WASHED, UNIFORMLY GRADED AGGREGATE SHOULD BE PLACED IN THE BED IN MAXIMUM 8-INCH LIFTS. EACH LAYER SHOULD BE LIGHTLY COMPACTED, WITH CONSTRUCTION EQUIPMENT KEPT OFF THE BED BOTTOM AS MUCH AS POSSIBLE.
10. APPROVED SOIL MEDIA, IF APPLICABLE, SHOULD BE PLACED OVER THE INFILTRATION BED IN MAXIMUM 6-INCH LIFTS.
11. SEED AND STABILIZE WITH TOPSOIL. (VEGETATE IF APPROPRIATE WITH NATIVE PLANTINGS), STONE, OR PAVEMENT, AS NOTED ON THE PLAN.
12. DO NOT REMOVE INLET PROTECTION OR OTHER EROSION AND SEDIMENT CONTROL MEASURES UNTIL SITE IS FULLY STABILIZED.

STORMWATER MGMT. OPERATION AND MAINTENANCE NOTES

1. STORMWATER MANAGEMENT FACILITIES PROPOSED FOR THE PROJECT INCLUDE ONE SUBSURFACE MRC BASIN, INLET BOXES AND STORM PIPE TO CONVEY STORMWATER RUNOFF TO THE STORMWATER SYSTEM.
2. THE MUNICIPALITY SHALL PROVIDE CONSTRUCTION OBSERVATION FOR THE STORMWATER MANAGEMENT FACILITY AS DEEMED NECESSARY BY THE MUNICIPAL REPRESENTATIVES.
3. THE TOWNSHIP SHALL HAVE THE RIGHT TO ACCESS THE PROPERTY TO PERFORM INSPECTIONS AND EMERGENCY MAINTENANCE FOR THE PRESERVATION AND FUNCTION OF THE STORMWATER MANAGEMENT FACILITIES.
4. NO PERSON SHALL MODIFY, REMOVE, FILL, LANDSCAPE, OR ALTER ANY STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (BMPS), THE FACILITY AREAS OR STRUCTURES UNLESS IT IS PART OF AN APPROVED MAINTENANCE PROGRAM AND WRITTEN APPROVAL FROM THE MUNICIPALITY HAS BEEN OBTAINED.
5. NO PERSON SHALL PLACE ANY STRUCTURE, FILL, LANDSCAPING, OR VEGETATION OTHER THAN WHAT IS SHOWN ON THE PLAN, IN OR ABOVE A STORMWATER MANAGEMENT FACILITIES OR BMP THAT WOULD LIMIT OR ALTER THE FUNCTIONING OF THE STORMWATER MANAGEMENT FACILITY WITHOUT WRITTEN APPROVAL FROM THE MUNICIPALITY.
6. DURING CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE TOWNSHIP ENGINEER' S OFFICE THREE DAYS PRIOR TO THE CONSTRUCTION OF THE PROPOSED INFILTRATION STORMWATER MANAGEMENT FACILITY.

STORMWATER MANAGEMENT GENERAL NOTES

1. OPERATION AND MAINTENANCE FOR THE STORMWATER MANAGEMENT FACILITIES IS THE RESPONSIBILITY OF THE PROPERTY OWNER.
2. ON A MONTHLY BASIS, THE FOLLOWING MAINTENANCE SHALL BE PERFORMED:
   a. SUBSURFACE MRC BASIN SHALL BE OBSERVED THROUGH THE INSPECTION PORT'S AND SUMPED INLETS TO IDENTIFY CONTINUED FUNCTION AND SEDIMENT ACCUMULATION, IF ANY. IF SIGNIFICANT SEDIMENT ACCUMULATION IS IDENTIFIED, THE SYSTEM SHALL BE VACUUMED OR FLUSHED.
3. ON AN ANNUAL BASIS, THE FOLLOWING MAINTENANCE SHALL BE PERFORMED:
   a. IF SEDIMENT IS ACCUMULATING IN THE BOTTOM OF THE INLET BOXES, THE SEDIMENT SHALL BE REMOVED BY A VACUUM OR SIMILAR APPARATUS.
   b. GENERAL REVIEW TO IDENTIFY DAMAGED TO ALL COMPONENTS OF THE UNDERGROUND INFILTRATION BASIN AND STORMWATER CONVEYANCE SYSTEMS. IF DAMAGE IS FOUND, SHALL BE REPAIRED IMMEDIATELY.
4. IF TRASH AND DEBRIS ARE PRESENT, OWNER SHALL REMOVE THE TRASH AND DEBRIS IMMEDIATELY. ALSO THE INLETS SHALL BE CHECKED FOR OBSTRUCTIONS.

LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING EDGE OF PAVEMENT
- EXISTING CONTOURS (-115-, -114-)
- PROPOSED CONTOURS (115)
- EXISTING STORM SEWER
- SOIL BOUNDARY LINE
- EXISTING SANITARY MAIN (S)
- EXISTING WATER MAIN (W)
- EXISTING OVERHEAD ELECTRIC (OHW)
- EXISTING ADJOINING PROPERTY LINE
- EXISTING UTILITY POLES
- EXISTING SPOT ELEVATION (29.5)
- EXISTING T.G. INLET
- EXISTING SANITARY MH
- EXISTING WATER VALVE
- EXISTING IRON PIN
- EXISTING TRAFFIC SIGN
- UmB — EXISTING BOUNDARY SOILS TYPE
- #2 — SOIL TEST PIT
- PROPOSED ULTIMATE ROW LINE
- PROPOSED BSBL
- F.F.E. — PROPOSED FIRST FLOOR ELEVATION
- PROPOSED CLEANOUT
- MONUMENT TO BE SET
- 2.75% — DRAINAGE FLOW ARROW & SLOPE
- × 115.10 — PROPOSED SPOT ELEVATION
- WL — PROPOSED WATER LATERAL
- SL — PROPOSED SANITARY LATERAL
- PROPOSED ROOF DRAIN
- FH — EXISTING FIRE HYDRANT
- UP — EXISTING UTILITY POLE
- SITE BENCHMARK

SOILS LEGEND AND TABLE OF LIMITATIONS & RESOLUTIONS BASED ON USDA-NRCS WEB SOIL SURVEY OF BUCKS COUNTY **

SYMBOL	MAPPING UNITS	SLOPE	LAND CAPBLTY	HYDRIC SOIL	HYDRO. GROUP	DEPTH TO BEDROCK	DEPTH TO WATER TABLE	LIMITATIONS FOR CONSTRUCTION	RESOLUTION OF LIMITATIONS
UmB	URBAN LAND-DOYLESTOWN COMPLEX	0-8%	8s-6w	NO	B/D	60-99 IN	6-72 IN	NOT RATED	FOLLOW PLAN SPECIFICATIONS.
DdA	DOYLESTOWN SILT LOAM	0-3%	4w	YES	C/D	60-99 IN	6-72 IN	VERY LIMITED: DEPTH TO SATURATED ZONE	HAVE BYPASS PUMP(S) & FILTER BAG(S) AVAILABLE. SEE DETAIL.

** THE SOILS SHOWN HEREON ARE BASED ON THE WEB SOIL SURVEY PREPARED BY SOIL SURVEY STAFF, NATURAL RESOURCES CONSERVATION SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE.

Stormwater Testing Summary

Test Location	Depth of Test Pit (Inches)	Depth to Water (Inches)	Depth to Rock (Inches)	Depth of Testing (Inches)	Infiltration Rate (Inches per hour)
1001A	102	---	---	60	0.05
1001B	102	---	---	12	0.05
1002A	91	---	---	48	0.01
1002B	91	---	---	12	0.02
1003A*	80	---	---	54	0.01
1003B*	80	---	---	12	0.01

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Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
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3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET: 30 15 0 30 60 120

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PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — LARRY P. YOUNG — PE053219-E

PRELIMINARY/FINAL
PCSM PLAN
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

\\SERVER2\Public1\2022\22-04019 - Bensalem Twp_ Kiran Patel_ Galloway Road and Richlieu Road L.D\dwg\land development\2ND SUB\Richlieu Road and Galloway Road-2nd Sub.dwg

GRADING AND DRAINAGE NOTES:

1. ALL CONSTRUCTION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH TOWNSHIP STARDARDS, PENNDOT FORM 408 SPECIFICATIONS AND RC STANDARDS, LATEST EDITION. MORE RESTRICTIVE SHALL CONTROL.
2. BURYING OF TREES, STUMPS, OR CONSTRUCTION MATERIAL IS PROHIBITED. TREES AND STUMPS MAY BE CHIPPED OR GROUND AND SPREAD ON THE SITE.
3. CONTRACTOR SHALL NOT ENCROACH ONTO ADJOINING PROPERTIES UNLESS A TEMPORARY CONSTRUCTION EASEMENT HAS BEEN GRANTED BY THE ADJOINING PROPERTY OWNER. CONTRACTOR SHALL HAVE PROPERTY LINES CLEARLY MARKED IN AREAS WHERE GRADING WILL ENCROACH WITHIN 5 FEET OF THE PROPERTY LINE BY A LICENSED SURVEYOR, AND SHALL CONSTRUCT SUCH BARRIERS WHICH ARE NECESSARY TO PREVENT ENCROACHMENT ONTO ADJACENT PROPERTIES.
4. NO EXCAVATION OR FILL SHALL BE MADE WITH A FACE DEEPER THAN THREE HORIZONTAL TO ONE VERTICAL (3:1).
5. TOPSOIL SHALL BE RETURNED TO A MINIMUM DEPTH OF 6 INCHES.
6. SIGHT DISTANCES INDICATED SHALL BE MAINTAINED BY CLEARING AND GRADING AS NECESSARY TO PROVIDE THE "REQUIRED" SIGHT DISTANCES. NO OBSTRUCTIONS TO VISIBILITY BETWEEN A VERTICAL PLANE OF 2 FEET TO 10 FEET ABOVE THE CENTERLINE OF THE STREET-LEVEL SO AS TO INTERFERE WITH TRAFFIC VISIBILITY ACROSS THE CORNER OF THE YARD WHICH IS IN THE SITE TRIANGLES INDICATED ON THE PLAN SHALL BE PERMITTED.
7. SURVEY BENCHMARK = INVERT OUT STORM INLET LOCATED ON CORNER OF CURB ISLAND ALONG GALLOWAY ROAD NEAR INTERSECTION WITH RICHLIEU ROAD (SHOWN), INV. ELEV. = 103.28.
8. NO PERSON SHALL MODIFY, REMOVE, FILL, LANDSCAPE, OR ALTER ANY EXISTING STORM WATER CONTROL OR BMP UNLESS IT IS PART OF AN APPROVED MAINTENANCE PROGRAM, WITHOUT THE WRITTEN APPROVAL OF THE MUNICIPALITY.
9. NO PERSON SHALL PLACE ANY STRUCTURE, FILL, LANDSCAPING, OR VEGETATION INTO A STORM WATER CONTROL OR BMP WITHIN A DRAINAGE EASEMENT, WHICH WOULD LIMIT OR ALTER THE FUNCTIONING OF THE STORM WATER CONTROL OR BMP, WITHOUT THE WRITTEN APPROVAL OF THE MUNICIPALITY.
10. THE STORMWATER FACILITIES AND FINAL GRADING SHOWN ON THESE PLANS AREA BASIC AND PERPETUAL PART OF THE STORMWATER MANAGEMENT SYSTEM OF THE PROPOSED SITE LOCATED IN BENSALEM TOWNSHIP, BUCKS COUNTY, COMMONWEALTH OF PENNSYLVANIA, AND SUCH ARE TO BE PROTECTED AND PRESERVED IN ACCORDANCE WITH THE APPROVED FINAL PLANS BY THE OWNERS, THEIR SUCCESSORS AND ASSIGNS OF THESE LANDS. BENSALEM TOWNSHIP AND/OR ITS AGENTS RESERVE THE RIGHT AND PRIVILEGE TO ENTER UPON THESE LANDS FROM TIME TO TIME FOR THE INSPECTION OF THESE FACILITIES IN ORDER TO DETERMINE THAT PROPER OPERATION AND MAINTENANCE AND THAT THE STRUCTURAL AND DESIGN INTEGRITY IS BEING MAINTAINED BY THE OWNER.
11. AREAS WHERE THE SUBSURFACE MRC BASIN BMP IS PROPOSED SHALL BE PROTECTED FROM SEDIMENTATION AND COMPACTION DURING THE CONSTRUCTION, SO AS TO MAINTAIN THEIR MAXIMUM INFILTRATION CAPACITY.
12. SUBSURFACE MRC BASIN BMP'S SHALL NOT BE CONSTRUCTED NOR RECEIVE RUNOFF UNTIL THE ENTIRE CONTRIBUTORY DRAINAGE AREA TO THE INFILTRATION BMP HAS RECEIVED FINAL STABILIZATION.
13. THE PROPERTY OWNER IS RESPONSIBLE FOR THE MAINTENANCE OF THE STORM SEWER AND STORMWATER BMP. PROPERTY OWNER SHALL CHECK THE INSPECTION PORTS AND DRAIN BASIN SUMP AFTER EVERY LARGE STORM AND AT LEAST TWICE A YEAR.
14. NO CHANGES TO FINISHED GRADING CAN OCCUR AT ANY TIME IN THE FUTURE WITHOUT FIRST OBTAINING WRITTEN APPROVAL FROM THE TOWNSHIP.
15. ANY SWALE OF SLOPE GREATER THAN 3:1 SHALL HAVE EROSION CONTROL MATTING INSTALLED ON IT.

POST-CONSTRUCTION BMPs OPERATIONS & MAINTENANCE PROCEDURES

1. THE PROPOSED STORMWATER MANAGEMENT FACILITY OPERATES UNDER PASSIVE HYDRAULIC CONDITIONS. THE OWNER IS TO OWN AND MAINTAIN THE UNDERGROUND INFILTRATION BED. THE UNDERGROUND INFILTRATION BED SHOULD BE INSPECTED ON AN ANNUAL BASIS AND AFTER VERY LARGE RAINFALL EVENTS. THE PERIODIC INFILTRATION BED INSPECTIONS SHOULD INCLUDE INSPECTION OF THE UNDERGROUND PIPING SYSTEM THROUGH THE CLEANOUTS TO IDENTIFY ANY REQUIRED STRUCTURAL REPAIRS. MAINTENANCE INCLUDES TRASH REMOVAL.
2. THE OWNER(S) OF THE LOT SHALL SIGN AN OPERATIONS AND MAINTENANCE AGREEMENT WITH BENSALEM TOWNSHIP FOR THE PROPOSED STORMWATER FACILITIES AND BMP'S. THIS AGREEMENT SHALL BE IN A FORM ACCEPTABLE TO THE TOWNSHIP SOLICITOR AND EXECUTED BY THE OWNER AND BENSALEM TOWNSHIP AND BE RECORDED AT THE BUCKS COUNTY COURTHOUSE AS A RESTRICTIVE DEED COVENANT THAT RUNS WITH THE LAND AND SHALL BE TRANSFERRED WITH TRANSFER OF OWNERSHIP.
3. THE MUNICIPALITY SHALL PROVIDE CONSTRUCTION OBSERVATION FOR THE STORMWATER MANAGEMENT FACILITIES, AS DEEMED NECESSARY BY THE MUNICIPAL REPRESENTATIVES.
4. NO PERSON SHALL MODIFY, REMOVE, FILL, LANDSCAPE, OR ALTER ANY STORMWATER MANAGEMENT BMP/FACILITIES, AREA, OR STRUCTURES UNLESS IT IS PART OF AN APPROVED MAINTENANCE PROGRAM AND WRITTEN APPROVAL FROM THE MUNICIPALITY MUST BE OBTAINED.
5. THE TOWNSHIP SHALL HAVE THE RIGHT TO ACCESS THE PROPERTY TO PERFORM INSPECTIONS. THE TOWNSHIP ALSO HAS THE RIGHT TO PERFORM MAINTENANCE FOR THE PRESERVATION AND FUNCTION OF THE STORMWATER FACILITIES IN THE EVENT THE OWNER DOES NOT PERFORM THE REQUIRED MAINTENANCE. THE TOWNSHIP ALSO HAS THE RIGHT TO INVOICE THE HOMEOWNER FOR ANYWHERE THE TOWNSHIP PERFORMS.
6. THE OWNER HEREBY GRANTS THE TOWNSHIP A BLANKET EASEMENT TO ENTER THE PROPERTY TO PERFORM THE NECESSARY INSPECTIONS REQUIRED UNDER THE TOWNSHIP'S MS4 PROGRAM.
7. NO PERSON SHALL PLACE ANY STRUCTURE, FILL, LANDSCAPING, OR VEGETATION INTO A STORMWATER FACILITY OR BMP WHICH WOULD LIMIT OR ALTER THE FUNCTIONING OF SUCH STORMWATER FACILITY OR BMP WITHOUT THE WRITTEN APPROVAL OF THE MUNICIPALITY.
8. DURING CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE TOWNSHIP ENGINEER'S OFFICE THREE DAYS PRIOR TO THE CONSTRUCTION OF THE PROPOSED INFILTRATION BMP STORMWATER MANAGEMENT FACILITY.
9. AN AS-BUILT LOT PLAN OF ALL STORMWATER BMP'S ARE REQUIRED UPON THE COMPLETION OF CONSTRUCTION OF EACH LOT.

CRITICAL STAGES OF IMPLEMENTATION OF PCSM PLAN

1. CONSTRUCTION OF THE SUBSURFACE MRC BASIN.

EARTH MOVING DURING WINTER CONDITIONS

IN ORDER TO MINIMIZE THE POTENTIONAL FOR SOIL EROSION AND RESULTING POLLUTION DURING THE WINTER MONTHS, THE FOLLOWING EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE TAKEN FOR ALL SOILS LOCATED ON THE SITE:

- WHEN FROZEN SOILS ARE ENCOUNTERED, THEY MUST BE STABILIZED IMMEDIATELY WITH THE MEASURES CALLED OUT IN THE CONSTRUCTION SEQUENCE AND SHOWN ON THE PLAN. AREAS THAT ARE NOT TO BE PERMANENTLY STABILIZED WITH STONE SHALL BE STABILIZED WITH MULCH AND JUTE NETTING UNTIL TEMPORARY OR FINAL SEEDING CAN BE ACCOMPLISHED.
-
- ADDITIONAL STONE SHALL BE PLACED ON THE CONSTRUCTION ENTRANCE IF REQUIRED TO MAINTAIN ITS EFFECTIVENESS.
- EROSION AND SEDIMENT CONTROLS SHALL BE IN PLACE BY WINTER.
- DISTURBED AREAS SHALL BE MULCHED DURING WINTER MONTHS AND SEEDED AND STABILIZED AS SOON AS CONDITIONS ALLOW IN THE SPRING.

THERMAL IMPACT ANALYSIS

THE CONSTRUCTION PHASE OF THIS PROJECT INCLUDES THE REMOVAL OF TOPSOIL AND EARTHWORK GRADING. THE SITE WILL USE COMPOST FILTER SOCKS TO PROMOTE SHEET FLOW OF STORMWATER DURING CONSTRUCTION, WHICH WILL DISPERSE WARM WATER TO THE GROUND SURFACE LIMITING POINT SOURCES OF THERMAL POLLUTION. THE POST CONSTRUCTION PHASE OF THE PROJECT PROPOSES IMPERVIOUS COVER FROM THE DRIVEWAY AND DWELLING TO THE RESIDENTIAL ESTATE WHICH DISCHARGES TO PROPOSED SUBSURFACE INFILTRATION BEDS. THE PROPOSED BMP'S WILL HELP TO PROTECT FROM THERMAL POLLUTION.

DISPOSAL/RECYCLING OF CONSTRUCTION MATERIAL

ALL CONSTRUCTION WASTES ARE TO BE RECYCLED TO THE GREATEST EXTENT PRACTICAL AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL MUNICIPALITY REQUIREMENTS AND GUIDELINES.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON-WATER SOLUBLE, NON-DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE-USE).

CLEAN FILL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE: FILL MATERIALS AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE STILL QUALIFIES AS CLEAN FILL PROVIDED THE TESTING REVEALS THAT THE FILL MATERIAL CONTAINS CONCENTRATIONS OF REGULATED SUBSTANCES THAT ARE BELOW THE RESIDENTIAL LIMITS IN TABLES FP-1A AND FP-1B FOUND IN THE DEP'S POLICY "MANAGEMENT OF FILL".

ANY PERSON PLACING CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP-001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL.

ENVIRONMENTAL DUE DILIGENCE: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANDORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEP'S POLICY "MANAGEMENT OF FILL"
FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEP'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA. CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE.

DISPOSAL/RECYCLING

INDIVIDUALS RESPONSIBLE FOR EARTH DISTURBANCE ACTIVITIES MUST ENSURE THAT PROPER MECHANISMS ARE IN PLACE TO CONTROL WASTE MATERIALS. CONSTRUCTION WASTE INCLUDE THINGS SUCH AS, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, DAMAGED NETTINGS OR MATTING, SANITARY WASTES, GENERAL TRASH, ETC. THAT COULD ADVERSELY EFFECT OR IMPACT WATER QUALITY. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING OF THE SITE, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHEREVER POSSIBLE, RECYCLING OF EXCESS MATERIALS IS PREFERRED, RATHER THAN DISPOSAL.

SEDIMENT REMOVED FROM EROSION CONTROL MEASURES OR FACILITIES AND OTHER SOILS DEEMED UNSUITABLE FOR USE AS FILL SHALL BE STABILIZED AND DISPOSED OF OFF SITE AT AN APPROVED FACILITY. OFF SITE DISPOSAL MUST COMPLY WITH ALL LOCAL, COUNTY, STATE AND FEDERAL RULES, REGULATIONS AND LAWS.

GEOLOGIC FORMATIONS

THERE ARE NO KNOWN EXISTING GEOLOGIC FORMATIONS THAT HAVE THE POTENTIAL TO CAUSE POLLUTION AND THAT WOULD NEED MITIGATION.

CRITICAL STAGES OF CONSTRUCTION

THE STORMWATER MANAGEMENT SYSTEM SHALL BE INSPECTED DURING CRITICAL STAGES OF CONSTRUCTION BY A REPRESENTATIVE OF TRI-STATE ENGINEERS & LAND SURVEYORS, INC. AS FOLLOWS:

1. PRIOR TO COMMENCEMENT OF CONSTRUCTION.
2. DURING THE INSTALLATION OF THE SUBSURFACE MRC BASIN
3. FOLLOWING THE COMPLETION OF ALL SITE IMPROVEMENTS.

GEOLOGIC FORMATIONS

THERE ARE NO KNOWN EXISTING GEOLOGIC FORMATIONS THAT HAVE THE POTENTIAL TO CAUSE POLLUTION AND THAT WOULD NEED MITIGATION.

PCSM BMP'S

THE SITE'S STORMWATER BMP'S WERE DEVELOPED TO PREVENT AN INCREASE IN THE RATE OF STORMWATER RUNOFF, PRESERVE THE INTEGRITY OF STREAM CHANNELS AND MAINTAIN AND PROTECT THE PHYSICAL, BIOLOGICAL, AND CHEMICAL QUALITIES OF THE RECEIVING STREAM, AND MINIMIZE ANY INCREASE IN STORMWATER VOLUME, IN ACCORDANCE WITH THE TOWNSHIP'S AND PA DEP STORMWATER REQUIREMENTS. THE PROJECT PROPOSES TO USE STRUCTURAL AND NON-STRUCTURAL BMP'S THAT PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF.

SUBSURFACE MRC BASIN (MANAGED RELEASE CONCEPT)

ONE SUBSURFACE MRC BASIN IS PROPOSED AS PART OF THIS PROJECT.

- SUBSURFACE MRC BASIN 1 IS LOCATED IN THE PARKING LOT AT THE FRONT OF THE PROPOSED BUILDING TO HANDLE THE RUNOFF FROM THE PROPOSED DEVELOPMENT. THIS SYSTEM IS A 160' BY 50' WITH A BOTTOM ELEVATION OF 108.25 AND A TOP ELEVATION OF 113.75. SIX (6) 18" PERFORATED HDPE PIPES ARE PROPOSED THROUGHOUT THE SYSTEM TO PROVIDE ADDITIONAL STORAGE. THE PROPOSED OUTLET STRUCTURE WILL HAVE WEIR WALL AT ELEVATION 112.00 WITH A 6" ORIFICE AT ELEVATION 111.00 AND A 1.5" ORIFICE AT ELEVATION 109.2. THE STORMWATER WILL DISCHARGE INTO THE EXISTING STORM SEWER SYSTEM.

PCSM BMP'S

THE SITE'S STORMWATER BMP'S WERE DEVELOPED TO PREVENT AN INCREASE IN THE RATE OF STORMWATER RUNOFF, PRESERVE THE INTEGRITY OF STREAM CHANNELS AND MAINTAIN AND PROTECT THE PHYSICAL, BIOLOGICAL, AND CHEMICAL QUALITIES OF THE RECEIVING STREAM, AND MINIMIZE ANY INCREASE IN STORMWATER VOLUME, IN ACCORDANCE WITH THE TOWNSHIP'S AND PA DEP STORMWATER REQUIREMENTS. THE PROJECT PROPOSES TO USE STRUCTURAL AND NON-STRUCTURAL BMP'S THAT PREVENT OR MINIMIZE CHANGES IN STORMWATER RUNOFF.

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BCCD PCSM CHECKLIST

LIMITED AREA OF DISTURBANCE

NO SITE CLEARING OR GRADE IS PROPOSED WHICH IS NOT ESSENTIAL TO THE CONSTRUCTION OF THE PROJECT. THE LIMITS OF EARTH DISTURBANCE ARE SHOWN ON THE PLANS.

MAXIMIZE PROTECTION OF DRAINAGE FEATURES AND VEGETATION

THIS PROJECT PROPOSES THE CONSTRUCTION OF NEW SINGLE FAMILY RESIDENTIAL ESTATE AND DRIVEWAY. EXISTING VEGETATION WILL BE PROTECTED DURING CONSTRUCTION BY COMPOST FILTER SOCKS AND OTHER EROSION AND SEDIMENT CONTROL MEASURES AND POST CONSTRUCTION BY THE PROPOSED STORMWATER BMP'S. EXISTING VEGETATION AND TREES WILL BE PROTECTED TO THE MAXIMUM EXTENT PRACTICAL.

MINIMIZE SOIL COMPACTION

THE AREA OF SOIL DISTURBANCE HAS BEEN LIMITED TO THE CONSTRUCTION AREA. THE PROPOSED STORMWATER FACILITIES WILL BE PROTECTED FROM SOIL COMPACTION TO THE MAXIMUM EXTENT PRACTICAL DURING CONSTRUCTION. AREAS NOT SUBJECT TO IMPERVIOUS COVER WILL BE TOPPED WITH TOPSOIL, SEED AND MULCH.

MINIMIZE IMPERVIOUS AREAS

THIS PROJECT PROPOSES TO MINIMIZE IMPERVIOUS COVER BY MINIMIZING THE WIDTH OF THE PROPOSED DRIVE, AND KEEPING THE BUILDING ENVELOPE WITHIN THE ALLOWABLE AREA PROVIDED BY THE TOWNSHIP.

MINIMIZE LAND CLEARING AND GRADING

THE DISTURBANCE FOR THE SITE IS LIMITED TO THAT NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. EXISTING VEGETATION WILL BE MAINTAINED TO THE MAXIMUM EXTENT PRACTICAL.
PRESERVE THE INTEGRITY OF STREAM CHANNELS AND MAINTAIN AND PROTECT THE PHYSICAL, BIOLOGICAL AND CHEMICAL QUALITIES OF THE RECEIVING STREAM.
THE PROJECT IS PROPOSING SEVERAL BMP'S TO PRESERVE THE INTEGRITY OF NESHAMINY CREEK AND MAINTAIN AND PROTECT THE PHYSICAL, BIOLOGICAL AND CHEMICAL QUALITIES OF THE RECEIVING STREAM. THESE BMP'S INCLUDE A INFILTRATION TRENCH ALONG THE PROPOSED DRIVEWAY. WATER QUALITY FILTERS AND LANDSCAPE RESTORATION. THE COMBINATION OF THESE MEASURES TO ADDRESS STORMWATER VOLUMES, WATER QUALITY AND PEAK RATES ARE PROPOSED TO PRESERVE THE INTEGRITY OF THE DOWNSTREAM WATER COURSE.

MINIMIZE TOTAL DISTURBED AREA

THE DISTURBANCE FOR THE SITE IS LIMITED TO THAT NECESSARY TO CONSTRUCT THE PROPOSED IMPROVEMENTS. THE LOCATION OF THE DRIVE FOLLOWS THE EXISTING TEMPORARY DRIVEWAY TO LIMIT THE EXTENT OF DISTURBED AREAS. ADDITIONALLY, THE PROPOSED DRIVEWAY MATCHES EXISTING GRADE OF TEMPORARY DRIVEWAY TO THE MAXIMUM EXTENT POSSIBLE TO MINIMIZE AREAS OF EARTH DISTURBANCE.

RIPARIAN FOREST BUFFER MANAGEMENT PLAN

- EXISTING AND/OR PROPOSED RIPARIAN FOREST BUFFERS SHOWN ON PLAN MAP(S)
- RIPARIAN BUFFER OFFSET AREAS SHOWN, IF NECESSARY.
- RIPARIAN BUFFER OR RIPARIAN FOREST BUFFER EQUIVALENCY DEMONSTRATION INCLUDED, IF NECESSARY.
- CHECKLIST FOR FUNCTIONAL EQUIVALENCY OF RIPARIAN BUFFERS AND RIPARIAN BUFFERS INCLUDED.

THE PROJECT SITE IS NOT LOCATED IN AN EV OR HQ WATERSHED, THEREFORE, RIPARIAN FOREST BUFFERS ARE NOT PROPOSED.

INSPECTION AND MAINTENANCE SCHEDULE

SOIL RESOLUTIONS

A. SOILS EXHIBITING LOW STRENGTH AND ARE SUSCEPTIBLE TO CAVING OF CUT BANKS AS WELL AS LANDSLIDES – APPROPRIATE PRECAUTIONS SHOULD BE TAKEN TO SAFEGUARD WORKERS DURING ALL TRENCHING AND EXCAVATION OPERATIONS. ALL APPLICABLE OSHA STANDARDS AND REGULATIONS MUST BE IMPLEMENTED AT ALL TIMES. SOILS ARE PRONE TO SLOPE FAILURES, AND SITE SHALL BE GRADED TO PROVIDE MANAGEABLE SLOPES AS SHOWN ON THE PLANS.

B. SOILS EXHIBITING LOW SHEAR STRENGTH AND POOR COHESION SHALL BE BLENDED WITH OTHER ON-SITE SOILS OR OTHERWISE TREATED UNTIL THEY MEET THE CONTRACT SPECIFICATIONS. ALTERNATIVELY LOW SHEAR STRENGTH SOILS MAY BE DISPOSED OF OFF-SITE.

C. SOILS CORROSIVE TO CONCRETE AND STEEL – SUITABLE PRECAUTIONS SHALL BE TAKEN TO PROTECT ALL UNDERGROUND PIPES, CONDUITS AND STORAGE TANKS.

D. SOILS PRONE TO WETNESS, SLOW PERCOLATION AND SEASONALLY HIGH WATER TABLES/SHALLOW DEPTH TO SATURATED ZONE – EXCAVATION IN THESE SOILS MAY ENCOUNTER WHEN AND HAVE THE PRESENCE OF HYDRIC SOILS OR HYDRIC INCLUSIONS. WHEN NECESSARY, TEMPORARY DEWATERING FACILITIES SHALL BE PROVIDED TO MINIMIZE THE IMPACT OF HIGH OR SEASONAL WATER.

E. SOILS DEEMED UNSUITABLE FOR CONSTRUCTION (E.G. ORGANIC SOILS, OVERLY WET SOILS, BOULDERS, ETC.) SHALL BE TREATED, BLENDED OR MODIFIED UNTIL SUITABLE, OR DISPOSED OF OFF-SITE.

F. SOILS THAT ARE MOISTURE SENSITIVE AND PRONE TO FROST ACTION – WINTER GRADING IS A CONCERN DUE TO THE FINE GRAIN/COHESIVE NATURE OF THE SITE SOILS. FROZEN SOIL SHALL NOT BE USED AS FILL MATERIAL, UNLESS THAWED AND PROVEN ACCEPTABLE FOR USE AS FILL IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. PRECAUTIONS SHOULD BE TAKEN TO PREVENT ALL CONSTRUCTION FROM DAMAGE DUE TO FROST CYCLE ACTION.

G. ERODIBLE SOILS EXIST AT THE SITE – SOILS PRONE TO EROSION SHALL BE CONTROLLED BY THE MEASURES AND FACILITIES PRESENTED HEREIN.

H. SOILS ARE PRONE TO PIPING. CULVERTS PASSING THROUGH EMBANKMENTS SHALL BE PROVIDED WITH ANTI-SEEP PROTECTION TO PROTECT AGAINST PIPING.

I. SOILS THAT ARE POOR SOURCES OF TOPSOIL, SUCH AS BEING TOO DROUGHTY OR TOO WET – SOIL TESTS ARE RECOMMENDED TO DETERMINE THE PROPER APPLICATION OF SOIL AMENDMENTS TO PROMOTE THE GROWTH OF THE DESIRED VEGETATION. WHEREVER SOILS THAT ARE FAIR OR GOOD SOURCES OF TOPSOIL MAY EXIST ON A SITE, THEY SHOULD BE CAREFULLY PRESERVED AND STORED FOR LATER USE IN RESTORATION.

OVERALL PCSM NOTES:

1. THE OWNER SHALL BE RESPONSIBLE FOR MAINTENANCE OF ALL ONSITE STORMWATER FACILITIES AS FOLLOWS:

1.1 ALL STORMWATER FACILITIES SHALL BE VISUALLY INSPECTED FOLLOWING A RAINFALL EVENT OF 1/2" IN ANY 24 HOUR PERIOD.

1.2 ALL STORMWATER FACILITIES SHALL BE VISUALLY INSPECTED MONTHLY OR MORE FREQUENTLY DEPENDANT ON THE NEEDS OF THE SITE.

1.3 THE DESIGN ENGINEER OF RECORD SHALL INSPECT THE SITE AFTER THE FIRST YEAR OF SERVICE, THEN EVERY OTHER YEAR IN THE EVENT OF FAILURES NOTICED DURING THE INITIAL INSPECTION.

1.4 ALL LAWN ARES SHALL BE MAINTAINED WITH A MOWABLE TURF WITH A GRASS HEIGHT THAT DOES NOT EXCEED 6".

1.5 ALL INLETS SNOUTS SHALL HAVE ACCUMULATED SEDIMENT REMOVED MONTHLY OR MORE FREQUENTLY DEPENDANT ON SITE NEEDS.

1.6 ALL MEADOW AREAS SHALL BE MAINTAINED TO A NATURAL GROWTH CONDITION AND SHALL HAVE WOODY AND EVASIVE SPECIES REMOVED YEARLY. THE MEADOW AREAS SHALL BE MOWED TO A 6" STAND AT THE BEGINNING OF EACH GROWING SEASON.

2. THE STORMWATER MANAGEMENT SYSTEM SHALL BE INSPECTED DURING CONSTRUCTION BY A REPRESENTATIVE OF TRI-STATE ENGINEERS & LAND SURVEYORS, INC. IN ACCORDANCE WITH THE CRITICAL STAGES OF CONSTRUCTION.

3. TRI-STATE ENGINEERS & LAND SURVEYORS, INC. SHALL PROVIDE A COMPLETE SET OF AS-BUILT PLANS INCLUDING THE FOLLOWING:

3.1 TOPOGRAPHY FOR THE SITE WITHIN DEVELOPMENT AREA INCLUDING SUBSURFACE INFILTRATION BASINS.

3.2 AS-BUILT SURVEY OF ALL PIPES, OUTLET CONTROL STRUCTURES AND INLETS.

3.3 ANY CHANGES FROM DESIGN TO AS-BUILT CONDITIONS MUST BE APPROVED BY THE ENGINEER AND THE TOWNSHIP.

4. THE CONTRACTOR SHALL PROVIDE TRI-STATE ENGINEERS & LAND SURVEYORS, INC., BCCD AND THE TOWNSHIP ENGINEER 3 WORKING DAYS PRIOR NOTICE PRIOR TO CONSTRUCTION.

5. THE ANTICIPATED START DATE FOR THIS PROJECT IS FALL OF 2021.

6. A WRITTEN REPORT SHALL BE PREPARED AND KEPT, DOCUMENTING EACH INSPECTION AND ALL BMP REPAIR AND MAINTENANCE ACTIVITIES, INCLUDING DATES OF INSPECTION, DEFICIENCIES FOUND, AND DATES THEY WERE CORRECTED.

CHAPTER 93 RECEIVING WATER CLASSIFICATION

RUNOFF FROM THIS SITE DRAINS TO AN UNNAMED TRIBUTARY OF THE NESHAMINY CREEK (NESHAMINY CREEK WATERSHED), WHICH HAS A PA CHAPTER 93 RECEIVING WATER CLASSIFICATION OF WWF, MF (WARM WATER FISHES, MIGRATORY FISHES).

SEEDING AND MULCHING SCHEDULE

1. SITE PREPARATION, STABILIZATION AND MAINTENANCE SHALL BE PERFORMED IN ACCORDANCE WITH PENN STATE UNIVERSITY'S "THE AGRONOMY GUIDE" AND PENNDOT FORM 408 SPECIFICATIONS' MOST RECENT ADDITION.

TEMPORARY SEEDING SPECIFICATION FORMULA E – ANNUAL RYE GRASS

PERMANENT SEEDING SPECIFICATION FORMULA B –
50% KENTUCKY BLUEGRASS MIXTURE
30% PENNLAWN RED FESCUE
20% PERENNIAL RYEGRASS MIXTURE

STEEP SLOPE SEEDING SPECIFICATION FORMULA W –
70% TALL FESCUE
20% BIRDSFOOT TREFOIL MIXTURE
10% REDTOP

TEMPORARY:
SPECIES: ANNUAL RYEGRASS
% PURE LIVE SEED: 81%
APPLICATION RATE: 40 LB./ACRE
FERTILIZER TYPE: 10-20-20
FERTILIZER APPLICATION RATE: 1000 LB./ACRE
LIMING RATE: 1 TON/ACRE
MULCH TYPE: HAY/STRAW
MULCHING RATE: 3 TON/ACRE

SEEDING RATE FOR THE ABOVE MIXTURES:
10 LBS/1,000 SY FOR TEMPORARY SEEDING
21 LBS/1,000 SY FOR PERMANENT SEEDING
11 LBS/1,000 SY FOR STEEP SLOPE SEEDING (SEE NOTE 5)

2. HAY OR STRAW MULCH SHALL BE APPLIED AT THE RATES OF AT LEAST 3.0 TONS PER ACRE. STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN. SLOPES OF 3:1 SHALL BE ANCHORED WITH MULCH CONTROL NETTING.

3. PULVERIZED AGRICULTURAL LIMESTONE AND COMMERCIAL FERTILIZER SHALL BE APPLIED TO ALL DISTURBED AREAS WHICH ARE TO BE SEEDED EXCEPT FOR TEMPORARY SEED AREAS ARE THE FOLLOWING RATES:

PULVERIZED AGRICULTURAL LIMESTONE – 90 LBS/1,000 SF
10-20-20 ANALYSIS COMMERCIAL FERTILIZER – 20 LBS/1,000 SF

NOTE: APPLICATION OF LIME AND FERTILIZER FOR TEMPORARY SEEDING IS UNNECESSARY AND ONLY SERVES TO CONTRIBUTE TO AN OVERABUNDANCE OF NUTRIENT POLLUTION IN THE WATERSHED.

4. PERMANENT SEEDING SHALL TAKE PLACE FROM MARCH 15 TO JUNE 1 OR FROM AUGUST 1 TO OCTOBER 15. IF COMPLETED AT IN OTHER SEASONS, AREAS SHALL RECEIVE TEMPORARY SEEDING AND 3.0 TONS PER ACRE MULCH.

5. STEEP SLOPE AREAS, CONSIDERED SLOPES GREATER THAN 3:1, SHALL BE PROTECTED FROM EROSION BY ONE OF THE FOLLOWING METHODS. MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED FOR PARTICULAR METHOD AND SPECIFIC SITE CONDITIONS.

FLEXIBLE GROWTH MEDIUM: SHALL BE HYDRAULICALLY APPLIED COMBINATION OF SEED, MULCH, AND EROSION PROTECTION MATERIAL SIMILAR TO "FLEXTERRA" BY ACF OR EQUAL BY OTHER MANUFACTURER.

EROSION CONTROL MATTING: SHALL BE TEMPORARY MATTING SIMILAR TO SC350 BY NORTH AMERICAN GREEN OR EQUAL BY OTHER MANUFACTURER.

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig in Pennsylvania
1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:		Scale:
22-04019	7/05/2022		
Acreage		No. of Lots	
SEE TABLES		1	
Designed By:	Drawn By:		Checked By:
STAFF	STAFF		L.Y.

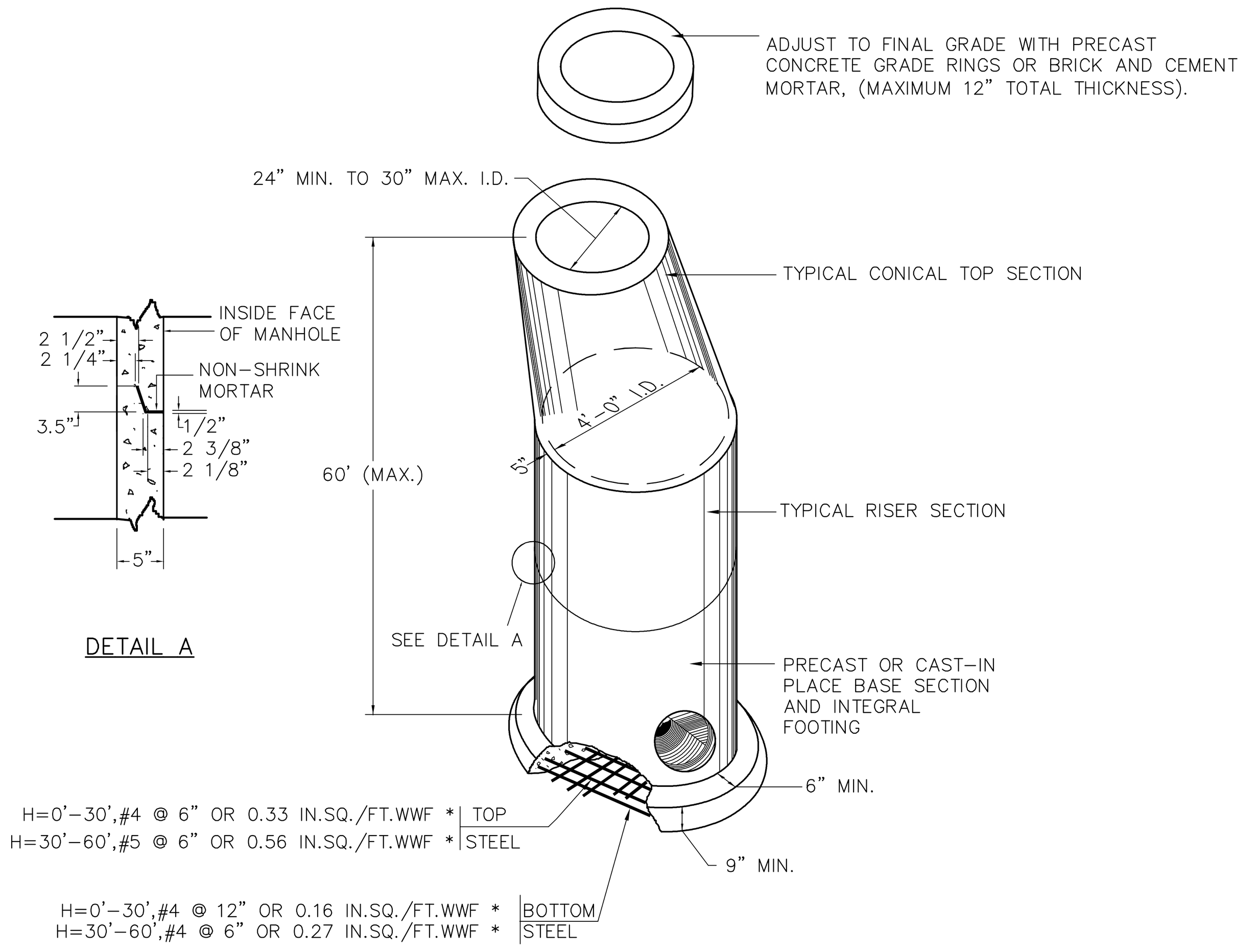
REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
T S E FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL LARRY P. YOUNG ENGINEER PE053219-E

PRELIMINARY/FINAL
PCSM NOTES AND DETAILS
FOR CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA



NOTES:

PRECAST MANHOLES, MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 714, MAY BE SUBSTITUTED FOR STANDARD CAST-IN-PLACE MANHOLE.

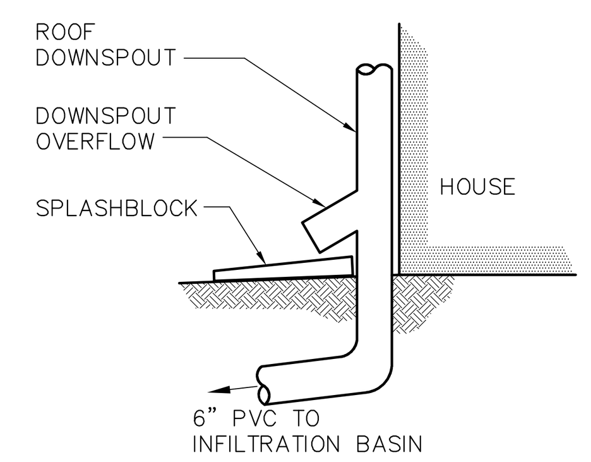
REFER TO "COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, BUREAU OF HIGHWAY DESIGN, STANDARDS FOR ROADWAY CONSTRUCTION", PAGE RC-39, SHEET 3 of 5, LATEST ISSUE, FOR NOTES AND SPECIFICATIONS REGARDING PRECAST MANHOLE CONSTRUCTION.

* PROVIDE WELDED WIRE FABRIC MEETING THE REQUIREMENTS OF PUBLICATION 408, SECTION 709.3.

MANHOLE STEPS SHALL BE PROVIDED IN ANY CASE WHERE THE STRUCTURE IS 5 FEET OR GREATER IN DEPTH.

PRECAST STORMWATER MANHOLE

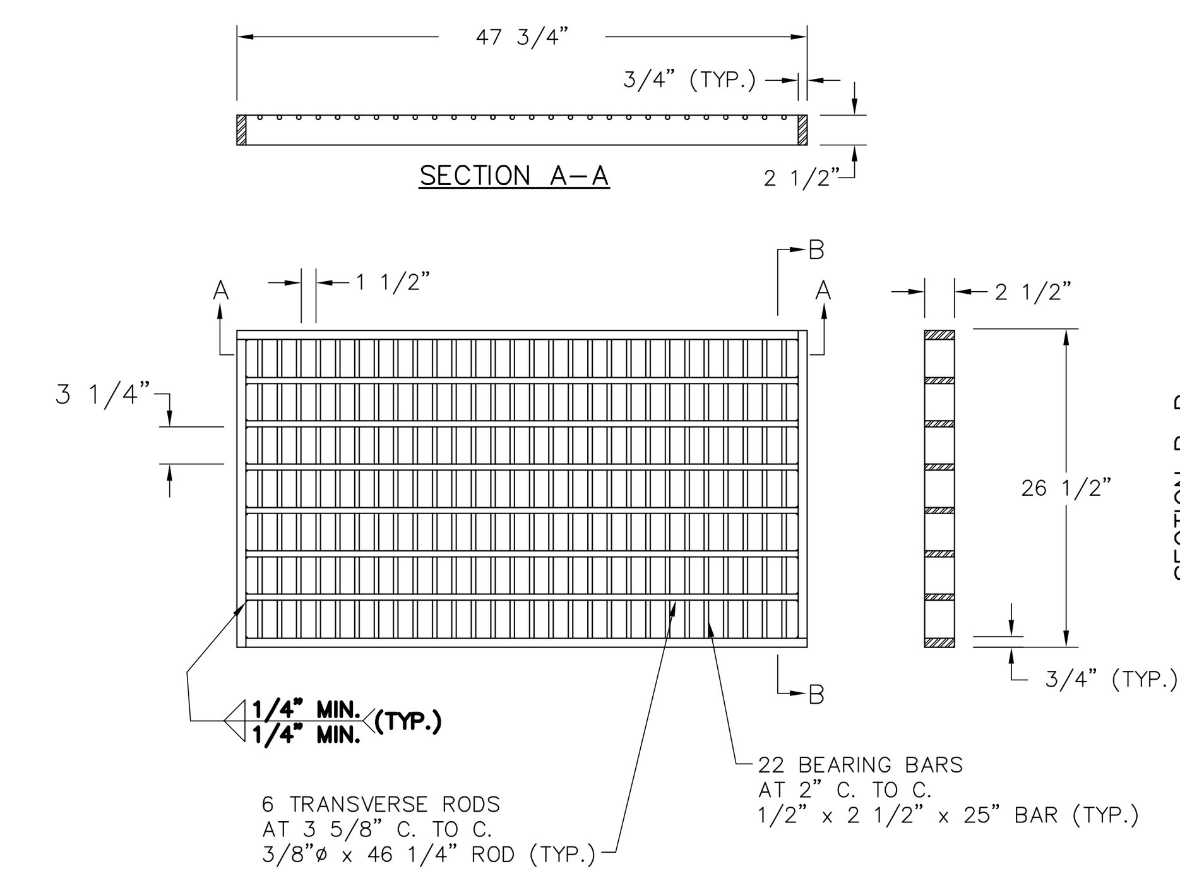
NOT TO SCALE



NOTES:
1. ALL ROOF DOWNSPOUTS ARE TO DRAIN INTO THE INFILTRATION BED.

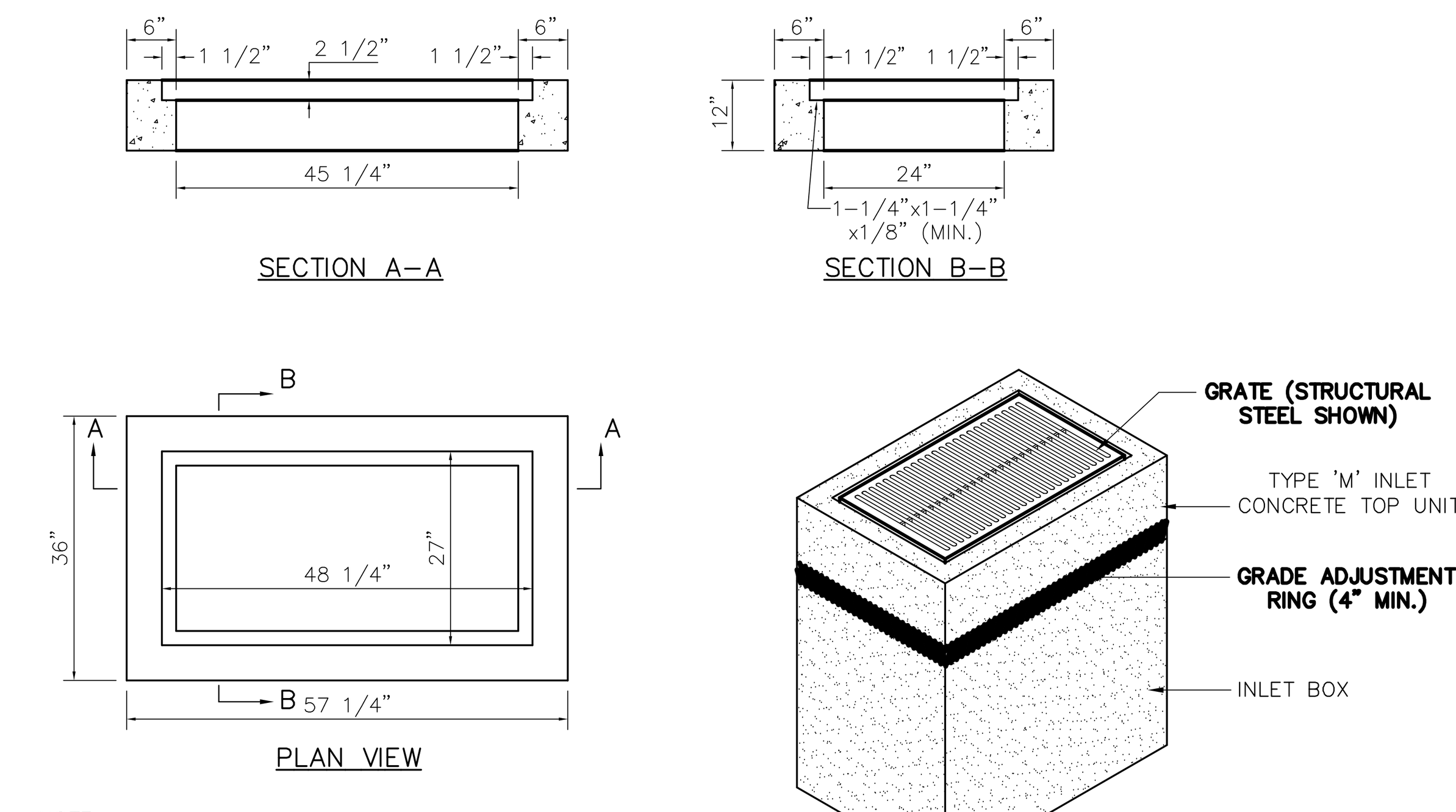
DOWNSPOUT OVERFLOW DETAIL

NOT TO SCALE



STRUCTURAL STEEL GRATE
BICYCLE SAFE

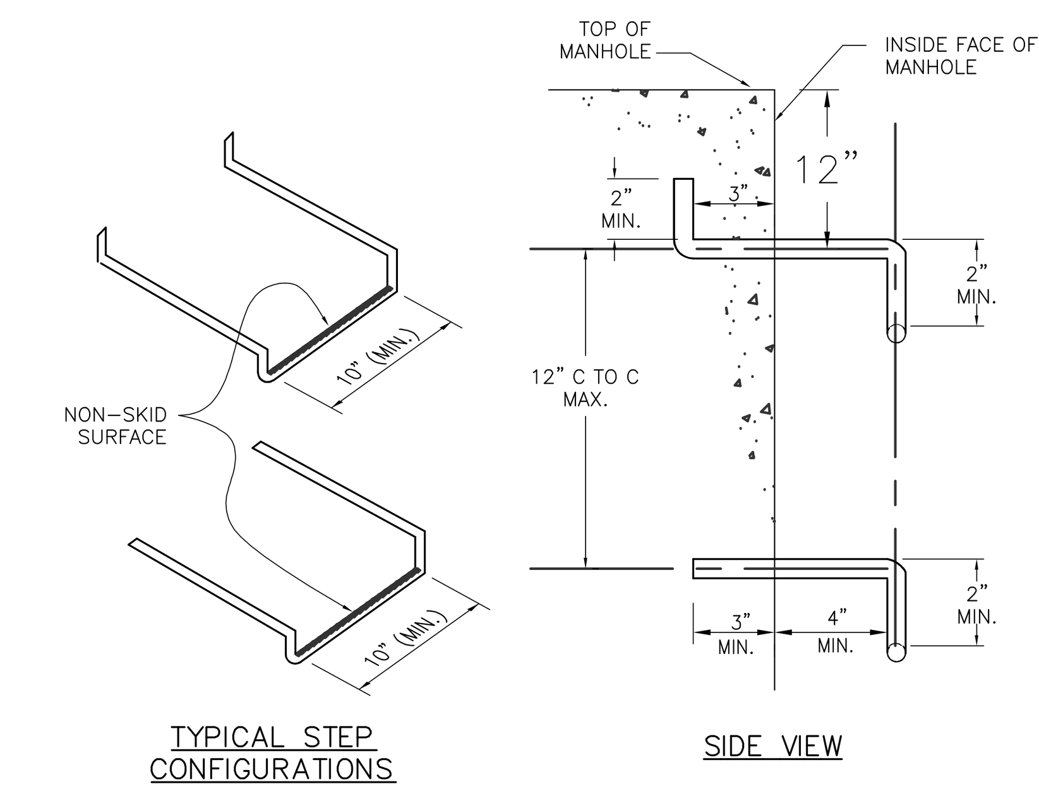
NOT TO SCALE



NOTE:
REFER TO "COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, BUREAU OF DESIGN, STANDARDS FOR ROADWAY CONSTRUCTION", PAGE RC-46M, LATEST ISSUE, FOR NOTES AND SPECIFICATIONS REGARDING PRECAST INLET CONSTRUCTION.

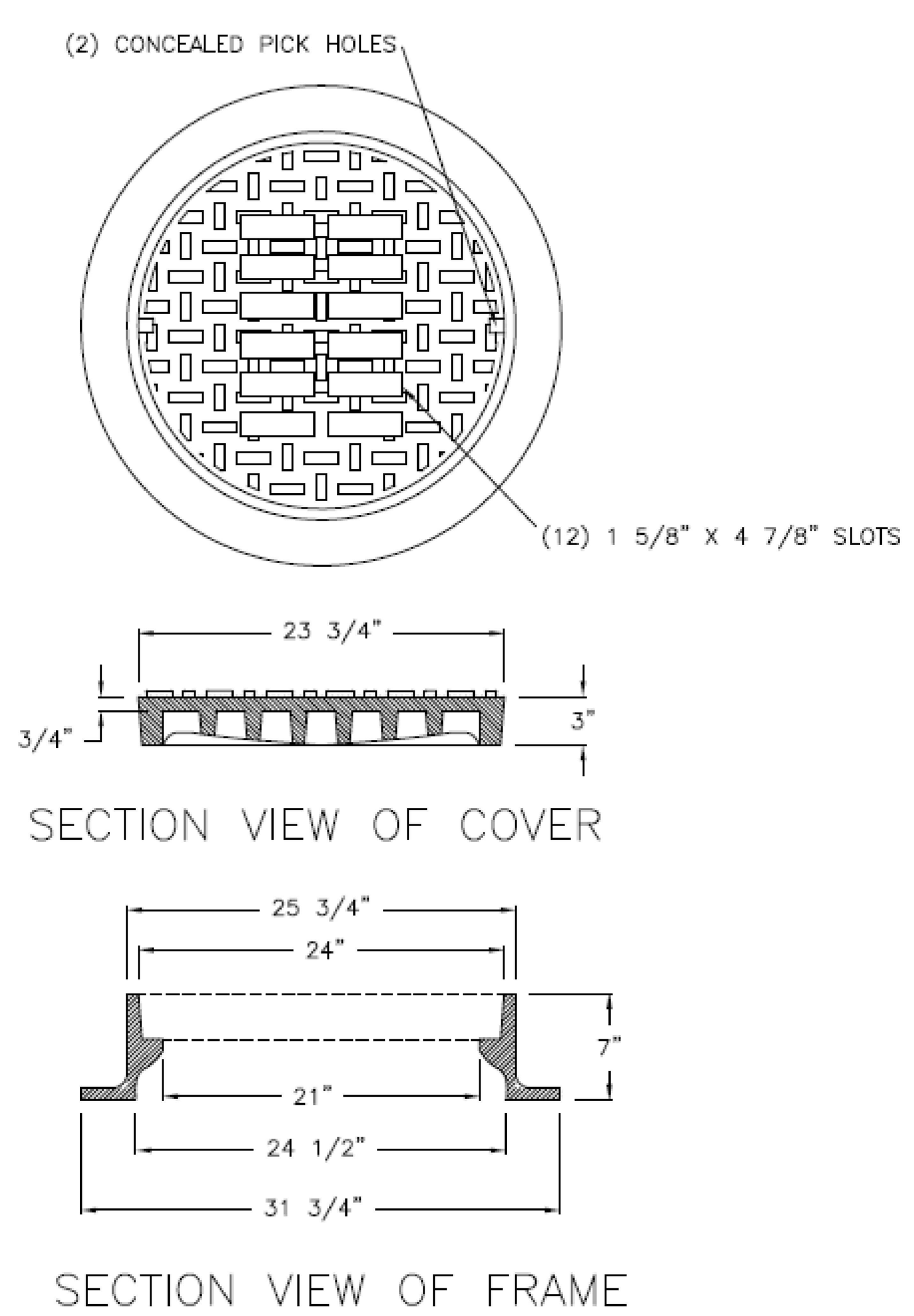
TYPE 'M' INLET DETAIL

NOT TO SCALE



MANHOLE AND INLET STEPS

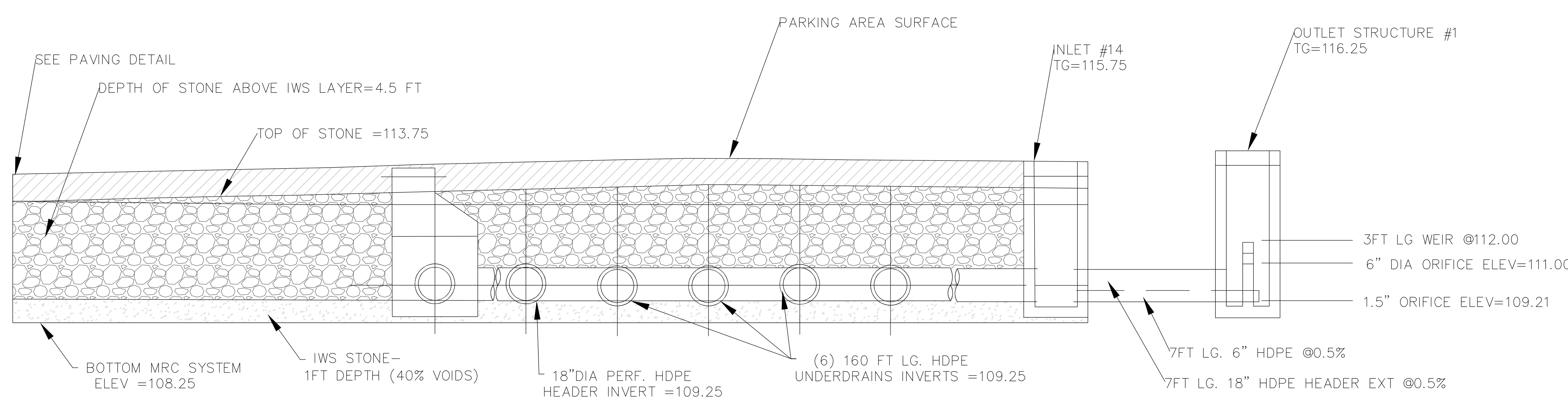
NOT TO SCALE



SPECIFICATIONS:
ALL MATERIAL IS ASTM A48 CLASS 35B GRAY IRON.
SUITABLE FOR H25 LOAD DESIGN.

STORM MANHOLE SLOTTED CAST IRON FRAME

(ALL ROUNDS AND FILLETS TO BE 1/4" R.
UNLESS OTHERWISE NOTED.)



DETAIL: SECTION THRU MRC 160' X 50 BMP

SCALE: NTS

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
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Job No.	Date:	Scale:
22-04019	7/05/2022	
Acreage SEE TABLES	No. of Lots 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
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3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET: 30 15 0 30 60 120

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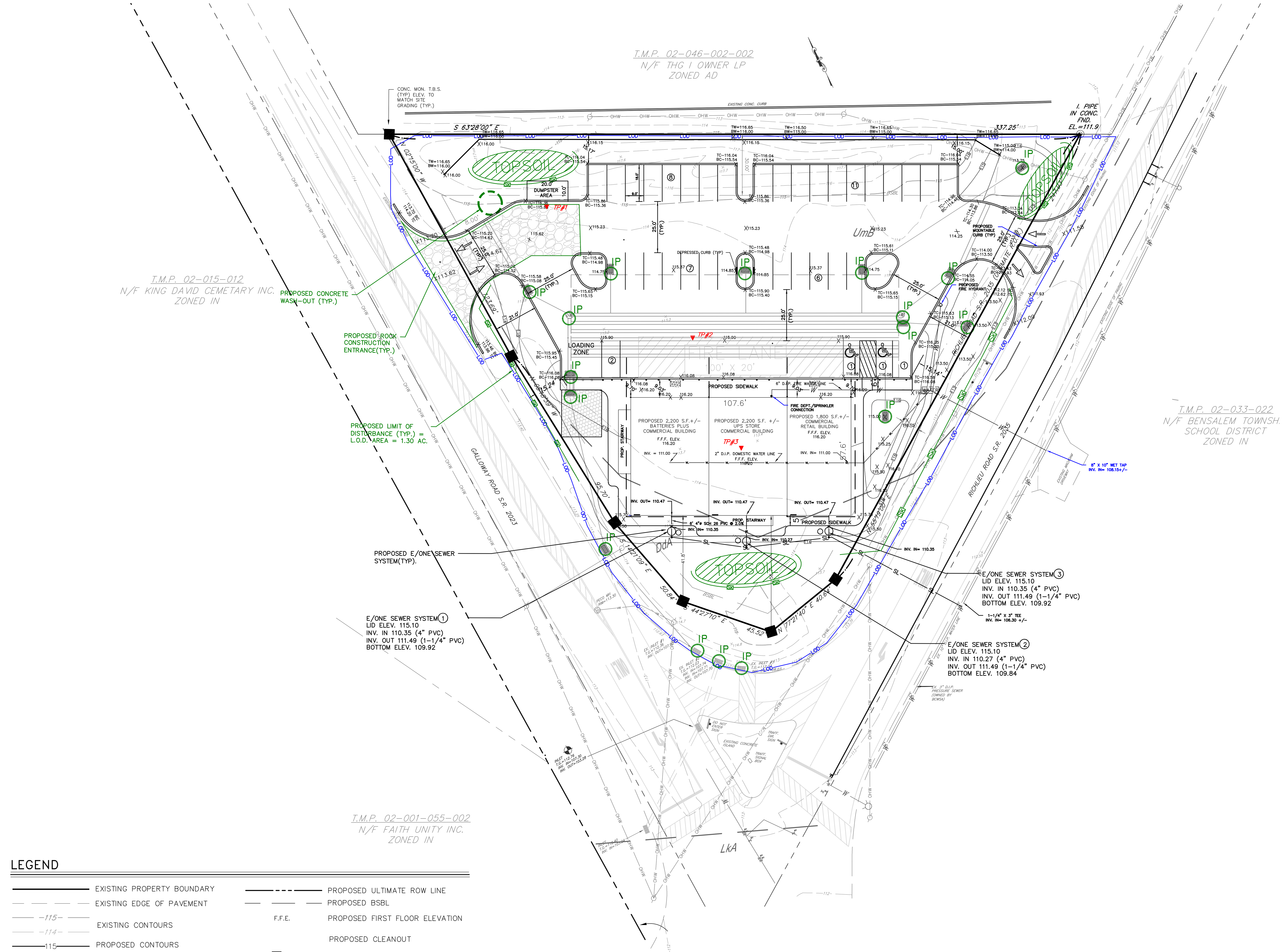
PRELIMINARY/FINAL

PCSM NOTES AND DETAILS

FOR CORNER OF RICHLIEU ROAD & GALLOWAY ROAD TMP 02-046-001 BENSALEM TOWNSHIP BUCKS COUNTY PENNSYLVANIA

SHEET 6 OF 17



LEGEND

EXISTING PROPERTY BOUNDARY	PROPOSED ULTIMATE ROW LINE
EXISTING EDGE OF PAVEMENT	PROPOSED BSBL
EXISTING CONTOURS	F.F.E. PROPOSED FIRST FLOOR ELEVATION
PROPOSED CONTOURS	PROPOSED CLEANOUT
EXISTING STORM SEWER	MONUMENT TO BE SET
SOIL BOUNDARY LINE	2.75% DRAINAGE FLOW ARROW & SLOPE
EXISTING SANITARY MAIN	× 115.10 PROPOSED SPOT ELEVATION
EXISTING WATER MAIN	
EXISTING OVERHEAD ELECTRIC	WL PROPOSED WATER LATERAL
EXISTING ADJOINING PROPERTY LINE	SL PROPOSED SANITARY LATERAL
EXISTING UTILITY POLES	PROPOSED ROOF DRAIN
29.5 EXISTING SPOT ELEVATION	TP TREE PROTECTION FENCING
	SK PROPOSED 12" SILT SOCK
EXISTING T.G. INLET	LOD LIMIT OF DISTURBANCE
EXISTING SANITARY MH	X PROPOSED ORANGE CONSTRUCTION FENCE
EXISTING WATER VALVE	FH EXISTING FIRE HYDRANT
EXISTING IRON PIN	UP EXISTING UTILITY POLE
EXISTING TRAFFIC SIGN	SITE BENCHMARK
UmB EXISTING BOUNDARY SOILS TYPE	TOPSOIL TEMPORARY TOPSOIL STOCKPILE
#2 SOIL TEST PIT	
IP INLET PROTECTION	TEMPORARY ROCK CONSTRUCTION ENTRANCE

NOTE: ALL E&S CONTROLS MEASURES SHALL BE ABACT APPROVED

SOILS LEGEND AND TABLE OF LIMITATIONS & RESOLUTIONS BASED ON USDA-NRCS WEB SOIL SURVEY OF BUCKS COUNTY **

SYMBOL	MAPPING UNITS	SLOPE	LAND CAPBLTY	HYDRIC SOIL	HYDRO. GROUP	DEPTH TO		LIMITATIONS FOR CONSTRUCTION	RESOLUTION OF LIMITATIONS
						BEDROCK	WATER TABLE		
UmB	URBAN LAND-DOYLESTOWN COMPLEX	0-8%	8s-6w	NO	B/D	60-99 IN	6-72 IN	NOT RATED	FOLLOW PLAN SPECIFICATIONS.
DdA	DOYLESTOWN SILT LOAM	0-3%	4w	YES	C/D	60-99 IN	6-72 IN	VERY LIMITED: DEPTH TO SATURATED ZONE	HAVE BYPASS PUMP(S) & FILTER BAG(S) AVAILABLE. SEE DETAIL.

** THE SOILS SHOWN HEREON ARE BASED ON THE WEB SOIL SURVEY PREPARED BY SOIL SURVEY STAFF, NATURAL RESOURCES CONSERVATION SERVICE, UNITED STATES DEPARTMENT OF AGRICULTURE.

SEQUENCE OF CONSTRUCTION

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE FOLLOWING SEQUENCE. EACH STAGE SHALL BE COMPLETED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING AND GRUBBING SHALL BE LIMITED TO ONLY THOSE AREAS DESCRIBED IN EACH STAGE.

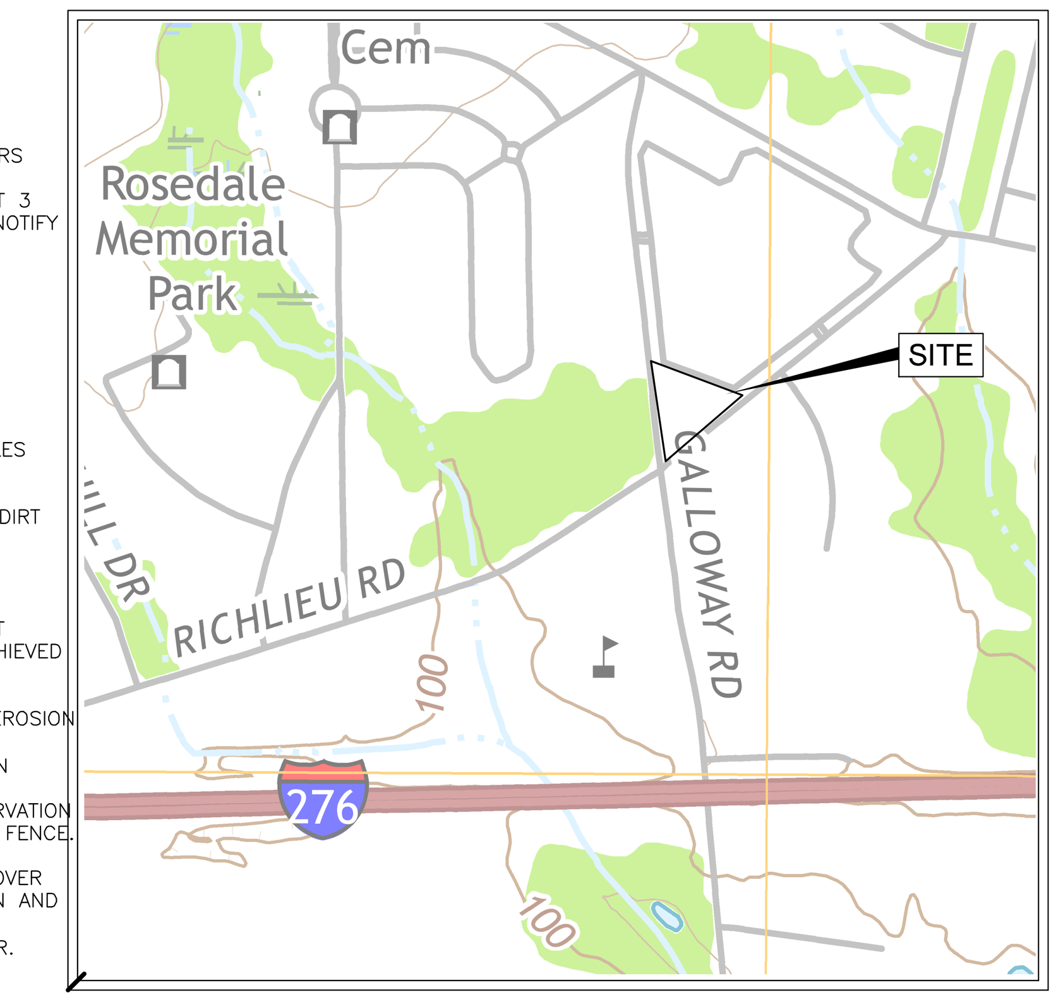
1. AT LEAST 7 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PLAN PREPARER, AND THE BUCKS COUNTY CONSERVATION DISTRICT TO AN ON-SITE MEETING. ALSO, AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE PENNSYLVANIA ONE CALL SYSTEM INCORPORATED AT 1-800-242-1776 FOR BURIED UTILITIES LOCATIONS.
2. INSTALL COMPOSITE FILTER SOCK, ORANGE CONSTRUCTION FENCING AROUND BMP'S, AND TREE PROTECTION FENCE THROUGHOUT THE SITE AS INDICATED ON THE E&S PLAN.
3. INSTALL ROCK CONSTRUCTION ENTRANCES AT EACH DRIVEWAY. THE CONSTRUCTION ENTRANCES SHALL BE MAINTAINED THROUGHOUT THE PROJECT. ROADWAYS SHALL BE KEPT FREE OF SEDIMENT, SOIL, AND MUD AT ALL TIMES.
4. REMOVE TREES FROM DISTURBED AREAS. CLEAR AND GRUB THE SITE AREA.
5. STOCKPILE TOPSOIL IN THE DESIGNATED AREA, INSTALL COMPOSITE FILTER SOCK, AND TEMPORARY SEED.
6. ROUGH GRADE THE SITE AREA AND PREP BUILDING PAD.
7. INSTALL CONCRETE WASHOUT AREA.
8. CONSTRUCT SUBSURFACE MRC BASIN, ALL INLETS AND STORM STRUCTURES. SEAL OFF ALL INLETS AND STORM MANHOLES UNTIL SITE HAS BEEN COMPLETED STABILIZED.
9. INSTALL ALL CURB AND SIDEWALK THROUGHOUT THE SITE.
10. INSTALL BASE COURSE PAVING THROUGH THE SITE. SITE AND ROADWAY ARE TO BE SWEPT AS NEEDED TO NOT ALLOW DIRT OR DEBRIS TO ENTER ROADWAY.
11. POUR FOOTING AND CONSTRUCT BUILDING.
12. INSTALL WATER AND SEWER SERVICE LINES FOR EACH BUILDING.
13. INSTALL REMAINING UNDERGROUND UTILITIES INCLUDING ELECTRIC, TELEPHONE, GAS, ETC.
14. FINAL GRADE THE SITE AREA. UPON COMPLETION OF THE FINAL GRADING, INSTALL LANDSCAPING AND APPLY PERMANENT SEEDING AND MULCH UNTIL PROPER VEGETATIVE COVER IS ESTABLISHED. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS. ALL SWALES SHALL EITHER BE SODDED OR EROSION CONTROL MATTING (SC150) SHALL BE USED.
15. ONCE ALL GRADING AND LANDSCAPING ACTIVITIES HAVE BEEN COMPLETED AND ALL CONSTRUCTION ACTIVITIES HAVE BEEN COMPLETED, INSTALL FINAL WEARING COURSE AND LINE STRIPING.
16. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED AND WITH THE RECOMMENDATION OF THE BUCKS COUNTY CONSERVATION DISTRICT, REMOVE COMPOSITE FILTER SOCK, INLET PROTECTION, TREE PROTECTION FENCE, AND ORANGE CONSTRUCTION FENCE. AREAS DISTURBED DURING REMOVAL OF THE ES CONTROLS MUST BE STABILIZED IMMEDIATELY. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.
17. CONSTRUCTION ACTIVITIES ARE EXPECTED TO COMMENCE IN SPRING OF 2024 AND BE COMPLETED WITHIN ONE (1) YEAR.

BMP CONSTRUCTION SEQUENCE

1. PROTECT SUBSURFACE INFILTRATION SYSTEM AREAS FROM COMPACTION PRIOR TO INSTALLATION. STOCKPILES SHALL NOT BE PLACED OVER SUBSURFACE INFILTRATION SYSTEMS.
2. INSTALL INFILTRATION SYSTEM AS NOTED IN THE CONSTRUCTION SEQUENCE. AFTER INSTALLATION, PREVENT SEDIMENT LADEN WATER FROM ENTERING INLETS AND PIPES.
3. COMPACTION OF THE SOIL AT THE SUBSURFACE INFILTRATION SYSTEMS SHALL NOT OCCUR. THE FOLLOWING METHODS ARE EXAMPLES OF HOW COMPACTION COULD BE AVOIDED.
   3.1 EXCAVATION AND GRADING OF THE PROPOSED INFILTRATION BMP. SHALL BE COMPLETED FROM THE PERIMETER OF THE PROPOSED BMP WHERE POSSIBLE. WHERE THE EXCAVATION CANNOT BE COMPLETED FROM THE PERIMETER OF THE BMP, BULK EARTHWORK CAN BE COMPLETED TO AN ELEVATION THAT IS 1 FOOT ABOVE THE INFILTRATION SURFACE. THE FINAL 1 FOOT OF MATERIAL SHOULD BE EXCAVATED WITH A HOE OR SIMILAR EQUIPMENT. EXCAVATION FROM THIS POINT ON SHOULD BE COMPLETED WITH THE MACHINE PLACED ON THE AREAS CONTAINING 1 FOOT OF MATERIAL. AS EXCAVATION OF THE 1 FOOT OF MATERIAL PROCEEDS, THE INFILTRATION SURFACE SHOULD BE SCARIFIED. AGGREGATE BACKFILL SHOULD NOT BE DUMPED ON TO THE PREPARED INFILTRATION SURFACE BY TRUCK BUT SHOULD BE SPREAD WITH THE MACHINE PLACING/SPREADING THE STONE ON THE PERIMETER OF THE INFILTRATION SURFACE OR TRACKING OVER A MINIMUM OF 1 FOOT OF AGGREGATE.
   3.2 THE USE OF LOW GROUND PRESSURE (LGP) MACHINES IS ALLOWED AS LONG AS THE SPECIFICATIONS OF THE MACHINE TO BE USED ARE PROVIDED AT THE PRE-CONSTRUCTION MEETING AND IT IS VERIFIED PRIOR TO EXCAVATION THAT THE PROPOSED MACHINE IS A LGP MACHINE.
4. INSTALL AND MAINTAIN PROPER EROSION AND SEDIMENT CONTROL MEASURES DURING CONSTRUCTION
5. THE EXISTING SUBGRADE UNDER THE BED AREAS SHALL NOT BE COMPACTED OR SUBJECT TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO GEOTEXTILE AND STONE BED PLACEMENT. IF POSSIBLE, EXCAVATE INFILTRATION BASIN BOTTOM TO AN UNCOMPACTED SUBGRADE FREE FROM ROCKS AND DEBRIS. DO NOT SUBGRADE.
6. WHERE EROSION OF SUBGRADE HAS CAUSED ACCUMULATION OF FINE MATERIALS AND/OR SURFACE PONDING, THIS MATERIAL SHOULD BE REMOVED WITH LIGHT EQUIPMENT AND THE UNDERLYING SOILS SCARIFIED TO A MINIMUM DEPTH OF 6 INCHES WITH A YORK RAKE (OR EQUIVALENT) AND LIGHT TRACTOR. ALL FINE GRADING SHALL BE DONE BY HAND. ALL BED BOTTOMS SHOULD BE AT A LEVEL GRADE.
7. INSTALL UPSTREAM AND DOWNSTREAM INLET AND OUTLET CONTROL STRUCTURES, CLEANOUTS PERFORATED PIPING AND ALL OTHER NECESSARY STORMWATER STRUCTURES.
8. GEOTEXTILE AND BED AGGREGATE SHOULD BE PLACED IMMEDIATELY AFTER APPROVAL OF SUBGRADE PREPARATION AND INSTALLATION OF STRUCTURES. GEOTEXTILE SHOULD BE PLACED IN ACCORDANCE WITH MANUFACTURERS STANDARDS AND RECOMMENDATIONS. ADJACENT STRIPS OF GEOTEXTILE SHOULD OVERLAP A MINIMUM OF 16 INCHES. IT SHOULD ALSO BE SECURED AT LEAST 4 FEET OUTSIDE OF THE BED IN ORDER TO PREVENT ANY RUNOFF OR SEDIMENT FROM ENTERING THE STORAGE BED. THIS EDGE STRIP SHOULD REMAIN IN PLACE UNTIL ALL BARE SOILS CONTIGUOUS TO BEDS ARE STABILIZED AND VEGETATED. AS THE SITE IS FULLY STABILIZED, EXCESS GEOTEXTILE ALONG BED EDGES CAN BE CUT BACK TO THE EDGE OF THE BED.
9. CLEAN-WASHED, UNIFORMLY GRADED AGGREGATE SHOULD BE PLACED IN THE BED IN MAXIMUM 8-INCH LIFTS. EACH LAYER SHOULD BE LIGHTLY COMPACTED, WITH CONSTRUCTION EQUIPMENT KEPT OFF THE BED BOTTOM AS MUCH AS POSSIBLE.
10. APPROVED SOIL MEDIA, IF APPLICABLE, SHOULD BE PLACED OVER THE INFILTRATION BED IN MAXIMUM 6-INCH LIFTS.
11. SEED AND STABILIZE WITH TOPSOIL. (VEGETATE IF APPROPRIATE WITH NATIVE PLANTINGS), STONE, OR PAVEMENT, AS NOTED ON THE PLAN.
12. DO NOT REMOVE INLET PROTECTION OR OTHER EROSION AND SEDIMENT CONTROL MEASURES UNTIL SITE IS FULLY STABILIZED.

PROTECTION OF BMPs DURING CONSTRUCTION:

1. INSTALL AND MAINTAIN ADEQUATE EROSION AND SEDIMENT CONTROL MEASURES AT THE PERIMETER OF THE BED AREA DURING CONSTRUCTION.
2. EXCAVATE THE BASIN TO SUBGRADE TAKING CARE TO AVOID COMPACTION AND TO NOT SUBJECT THE AREA TO EXCESSIVE CONSTRUCTION EQUIPMENT TRAFFIC PRIOR TO AMENDED SOIL PLACEMENT.
3. IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF THE INFILTRATION AREA. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF THE BASIN IS EXCAVATED USING A LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE TIRES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.
4. COMPACTION AND/OR SEDIMENTATION AFFECTS CAN BE ALLEVIATED BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER, OR SUBSOILER. THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.



LOCATION MAP
SCALE: 1" = 800'

PROJECT NARRATIVE:

THIS PROJECT PROPOSES TO DEVELOP THE EXISTING TAX PARCEL NO. 02-046-001 BY ADDING A COMMERCIAL BUILDING, PARKING LOT, AND ASSOCIATED IMPROVEMENTS. A PROPOSED SUBSURFACE MRC BASIN IS PROPOSED TO CONTROL THE STORMWATER RUNOFF.

EROSION CONTROL METHODS CONSIST OF TEMPORARY SEEDING, PLACING BASE MATERIAL ON PAVED AREAS, APPLYING GRASS SEED, MULCH, OR PROTECTIVE MATTING AT FINAL GRADING STAGE.

SEDIMENT CONTROL METHODS CONSIST OF INSTALLING SILT SOCK AT STRATEGIC LOCATIONS ON EACH LOT THE TRACT AND A ROCK CONSTRUCTION ENTRANCE FOR THE PROJECT.

CHAPTER 93 RECEIVING WATER CLASSIFICATION

RUNOFF FROM THIS SITE DRAINS TO AN UNNAMED TRIBUTARY OF THE NESHAMINY CREEK (DELAWARE RIVER WATERSHED), WHICH HAS A PA CHAPTER 93 RECEIVING WATER CLASSIFICATION OF WWF, MF (WARM WATER FISHES, MIGRATORY FISHES).

LIMIT OF DISTURBANCE = 1.30 Ac

THE BUCKS COUNTY CONSERVATION DISTRICT SHALL BE NOTIFIED AT LEAST THREE (3) DAYS PRIOR TO THE DATE OF THE PRE-CONSTRUCTION MEETING

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig in Pennsylvania 1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
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BENSALEM, PA 19020

APPLICANT:
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Job No.	Date:	Scale:
22-04019	7/05/2022	1"=30'
Acreage SEE TABLES	No. of Lots 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
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801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
T S E FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL LARRY P. YOUNG ENGINEER PE053219-E

PRELIMINARY/FINAL
E&S CONTROL PLAN
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 7 OF 17

TOPSOIL APPLICATION

1. GRADED AREAS SHOULD BE SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES TO PERMIT BONDING OF THE TOPSOIL TO THE SURFACE AREAS AND TO PROVIDE A ROUGHENED SURFACE TO PREVENT TOPSOIL FROM SLIDING DOWN SLOPE.
2. TOPSOIL SHOULD BE UNIFORMLY DISTRIBUTED ACROSS THE DISTURBED AREA TO A DEPTH OF 4 TO 8 INCHES MINIMUM – 2 INCHES ON FILL OUTSLOPES. SPREADING SHOULD BE DONE IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL PREPARATION OR TILLAGE. IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOIL PLACEMENT SHOULD BE CORRECTED IN ORDER TO PREVENT FORMATION OF DEPRESSIONS UNLESS SUCH DEPRESSIONS ARE PART OF THE PCSM PLAN.
3. TOPSOIL SHOULD NOT BE PLACED WHILE THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET, OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION. COMPACTED SOILS SHOULD BE SCARIFIED TO 6 TO 12 INCHES ALONG CONTOUR WHEREVER POSSIBLE PRIOR TO SEEDING.

TABLE 11.1
"Cubic yards of topsoil required for application to various depths"

Depth (in)	Per 1,000 Square Feet	Per Acre
1.00	3.10	134.00
2.00	6.20	268.00
3.00	9.30	402.00
4.00	12.40	536.00
5.00	15.50	670.00
6.00	18.60	804.00
7.00	21.70	938.00
8.00	24.80	1072.00

Soil amendment application rate equivilants

Soil Amendment	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.
	Permanent seeding application rate		
Agricultural lime	6 tons	240 lb.	2,480 lb.
10–10–20 fertilizer	1,000 lb.	25 lb.	210 lb.
	Temporary seeding application rate		
Agricultural lime	1 ton	40 lb.	410 lb.
10–10–20 fertilizer	500 lb.	12.5 lb.	100 lb.

NOTE: A compost blanket which meets the standards of the PA DEP ESPC Program Manual of March 2012 may be substituted for the soil amendments show above.

EARTH MOVING DURING WINTER CONDITIONS

IN ORDER TO MINIMIZE THE POTENTIAL FOR SOIL EROSION AND RESULTING POLLUTION DURING THE WINTER MONTHS, THE FOLLOWING MEASURES SHALL BE TAKEN FOR ALL SOILS LOCATED ON THE SITE:

- WHEN FROZEN SOILS ARE ENCOUNTERED, THEY MUST BE STABILIZED IMMEDIATELY WITH THE MEASURES CALLED OUT IN THE CONSTRUCTION SEQUENCE AND SHOWN ON THE PLAN. AREAS THAT ARE NOT TO BE PERMANENTLY STABILIZED WITH STONE SHALL BE STABILIZED WITH MULCH AND JUTE NETTING UNTIL TEMPORARY OR FINAL SEEDING CAN BE ACCOMPLISHED.
- ADDITIONAL STONE SHALL BE PLACED ON THE CONSTRUCTION ENTRANCE IF REQUIRED TO MAINTAIN ITS EFFECTIVENESS.
- EROSION AND SEDIMENT CONTROLS SHALL BE IN PLACE BY WINTER.
- DISTURBED AREAS SHALL BE MULCHED DURING WINTER MONTHS AND SEEDED AND STABILIZED AS SOON AS CONDITIONS ALLOW IN THE SPRING.

INSPECTION AND MAINTENANCE PROGRAM

PROPER IMPLEMENTATION OF THIS PLAN REQUIRES MAINTENANCE OF THE PROPOSED ESC MEASURES, AS FOLLOWS, UNLESS MORE STRINGENT REQUIREMENTS ARE DISCUSSED ON THE LAND DEVELOPMENT PLANS. REFER TO E&S NARRATIVE.

ROCK CONSTRUCTION ENTRANCE WITH WASHRACK
ROCK CONSTRUCTION ENTRANCE WITH WASHRACK THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF PENNDOT NO. 1 STONE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. AT THE END OF EACH CONSTRUCTION DAY, ALL SEDIMENT DEPOSITED ON PAVED AREAS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IN A MANNER SATISFACTORY TO THE MUNICIPALITY AND TO THE LOCAL COUNTY CONSERVATION DISTRICT. WASHING OF THE ROADWAY WITH WATER WILL NOT BE PERMITTED. DAMAGED WASH RACKS SHOULD BE REPAIRED AS NECESSARY TO MAINTAIN THEIR EFFECTIVENESS. ALL DISTURBED AREAS SHALL BE STABILIZED IMMEDIATELY.

COMPOST FILTER SOCK
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED OF PROPERLY. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR.

TEMPORARY STABILIZATION
ANY DISTURBED AREA ON WHICH ACTIVITY HAS CEASED AND WHICH WILL REMAIN EXPOSED SHALL BE STABILIZED IMMEDIATELY. DURING NON–GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE RECOMMENDED RATES.

PUMPED WATER FILTER BAGS
PUMPED WATER FILTER BAGS SHALL BE USED ON THE PROJECT SITE TO ASSIST WITH TRENCH DEWATERING DURING UNDERGROUND UTILITY INSTALLATION. ALL PUMPED WATER SHALL BE DIRECTED THROUGH A FILTER BAG PRIOR TO DISCHARGE TO AN EROSION RESISTANT AREA. THE FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.

INLET PROTECTION
INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. STONE FILTER BERMS SHALL BE REQUIRED FOR SOME INSTALLATIONS; SEE PLAN DETAILS. ROLLED EARTHEN BERMS SHALL BE MAINTAINED UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. SIX–INCH MINIMUM HEIGHT ASPHALT BERM SHALL BE MAINTAINED UNTIL ROADWAY SURFACE RECEIVES FINAL COAT WHEN APPLICABLE. AT A MINIMUM, THE FABRIC SHALL HAVE A MINIMUM GRAB TENSILE STRENGTH OF 120 LBS, A MINIMUM BURST STRENGTH OF 200 PSI, AND A MINIMUM TRAPEZOIDAL TEAR STRENGTH OF 50 LBS. FILTER BAGS SHALL BE CAPABLE OF TRAPPING ALL PARTICLES NOT PASSING A NO. 40 SIEVE. INLET FILTER BAGS SHALL BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT. BAGS SHALL BE EMPTIED AND RINSED OR REPLACED WHEN HALF FULL OR WHEN FLOW CAPACITY HAS BEEN REDUCED SO AS TO CAUSE FLOODING OR BYPASSING OF THE INLET. DAMAGED OR CLOGGED BAGS SHALL BE REPLACED. A SUPPLY SHALL BE MAINTAINED ON SITE FOR REPLACEMENT OF BAGS. ALL NEEDED REPAIRS SHALL BE INITIATED IMMEDIATELY AFTER THE INSPECTION. DISPOSE OF ACCUMULATED SEDIMENT AS WELL AS ALL USED BAGS ACCORDING TO THE PLAN NOTES.

UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENTATION CONTROLS MUST BE MAINTAINED. MAINTENANCE MUST INCLUDE INSPECTION OF ALL ESC MEASURES AFTER EACH RUNOFF EVENT AND ON A MINIMUM OF A WEEKLY BASIS. ALL PREVENTION AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, RE–GRADING, RESEEDING, AND RE–MULCHING, MUST BE PERFORMED WITHIN 24 HOURS OF OBSERVANCE. SHOULD ANY MEASURES CONTAINED WITHIN THIS PLAN PROVE INCAPABLE OF ADEQUATELY REMOVING SEDIMENT FROM ON–SITE FLOWS PRIOR TO DISCHARGE, OR OF STABILIZING THE SURFACES INVOLVED, ADDITIONAL MEASURES MUST BE IMPLEMENTED TO ELIMINATE ALL SUCH PROBLEMS.

PROPOSED E&S AND PCSM BEST MANAGEMENT PRACTICES

ESPC MEASURES:

STABILIZED CONSTRUCTION ENTRANCE: A TEMPORARY CONSTRUCTION ENTRANCE WILL BE PROVIDED AT THE DRIVEWAY/ACCESS ROAD TO ALLOW ACCESS TO THE SITE FOR CONSTRUCTION VEHICLES PRIOR TO THE ESTABLISHMENT OF THE PAVEMENT BASE COURSE. THE ENTRANCE WILL ALSO AID IN CLEANING MUD FROM VEHICLE TIRES BEFORE EXITING THE SITE. THE CLEANING PROVISIONS WILL REMAIN UNTIL THE SITE IS STABILIZED.

COMPOST FILTER SOCKS: COMPOST FILTER SOCKS WILL BE USED TO FILTER SEDIMENT FROM OVERLAND (SHEET FLOW) AREAS.

TEMPORARY SEEDING AND MULCHING: DISTURBED AREAS WILL BE IMMEDIATELY STABILIZED WITH A TEMPORARY SEED MIXTURE AND MULCH AS SHOWN ON THE PLANS. IN ADDITION, SOIL STOCKPILE AREAS ARE TO BE IMMEDIATELY SEEDED AND MULCHED WITH A TEMPORARY SEED MIXTURE TO PROMOTE RAPID VEGETATED STABILIZATION.
PERMANENT SEEDING AND MULCHING: DISTURBED AREAS AT FINAL GRADE ARE TO RECEIVE A PERMANENT SEED MIXTURE AND MULCH TO PROMOTE PERMANENT STABILIZATION.

SLOPE STABILIZATION: SLOPE STABILIZATION IS PROVIDED FOR ALL TEMPORARY AND PERMANENT SLOPES EQUAL TO OR GREATER THAN 3:1.

COMPOST FILTER SOCK CONCRETE WASHOUT: A COMPOST SOCK WASHOUT FACILITY SHALL BE PROVIDED FOR THE CLEANING OF CHUTES, MIXERS, AND HOPPERS OF THE DELIVERY VEHICLES UNLESS SUCH A FACILITY WILL BE USED AT THE SOURCE OF THE CONCRETE. UNDER NO CIRCUMSTANCES MAY WASH WATER FROM THESE VEHICLES BE ALLOWED TO ENTER ANY SURFACE WATERS. WASHOUT FACILITIES SHALL NOT BE PLACED WITHIN 50 FEET OF STORM DRAINS, OPEN DITCHES OR SURFACE WATERS, AND BE PLACED IN A LOCATION CONVENIENT FOR THE TRUCKS.

PUMPED WATER FILTER BAGS: PUMPED WATER FILTER BAGS SHALL BE USED ON THE PROJECT SITE TO ASSIST WITH TRENCH DEWATERING DURING UNDERGROUND UTILITY INSTALLATION. ALL PUMPED WATER SHALL BE DIRECTED THROUGH A FILTER BAG PRIOR TO DISCHARGE TO AN EROSION RESISTANT AREA. THE FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED.

ROCK FILTER: SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTERS. IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL, REMOVE ACCUMULATED SEDIMENT, REMOVE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

STONE INLET PROTECTION AND BERM: SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE STONE. DAMANGED OR CLOGGED INSTALLTIONS SHALL BE REPAIRED OR REPLACED IMMEDIATEDLY

E&S COMPLETENESS REVIEW CHECKLIST

LIMIT AREA OF DISTURBANCE: NO SITE CLEARING, OR GRADING IS PROPOSED WHICH IS NOT ESSENTIAL TO THE CONSTRUCTION OF THE PROJECT. THE LIMIT OF EARTH DISTURBANCE IS SHOWN ON THE PLANS.

MINIMIZE EXTENT AND DURATION OF EARTH DISTURBANCE: THE ESC PLAN WAS PREPARED TO ALLOW FOR SUFFICIENT ROOM TO ALLOW FOR CONSTRUCTION OF THE SITE WHILE LIMITING THE EXTENT OF THE DISTURBED AREAS. THE CONSTRUCTION SEQUENCE REQUIRES DOWNSTREAM FACILITIES BE INSTALLED AND STABILIZED PRIOR TO UPSLOPE CONSTRUCTION.

MAXIMIZE PROTECTION OF DRAINAGE FEATURES AND VEGETATION; THIS PROJECT PROPOSES CONSTRUCTION OF NEW FACILITIES. THE SITE WAS CONFIGURED TO KEEP THE PROPOSED IMPERVIOUS AREA AS FAR AWAY FROM ANY EXISTING SURFACE WATERS AS POSSIBLE.

MINIMIZE SOIL COMPACTION: THE AREA OF SOIL DISTURBANCE HAS BEEN LIMITED TO THE CONSTRUCTION AREA. THE PROPOSED INFILTRATION AREAS WILL BE PROTECTED FROM SOIL COMPACTION. AREAS NOT SUBJECT TO IMPERVIOUS SURFACE COVER WILL BE TOPPED WITH TOP SOIL, SEED, AND MULCH.

PROVIDE BMPS DURING CONSTRUCTION TO MINIMUM GENERATION OF INCREASED STORMWATER: THE CONSTRUCTION HAS BEEN SEQUENCED TO INSTALL DOWN SLOPE FACILITIES TO CAPTURE AND MITIGATE STORMWATER PEAK FLOWS.

OTHER MEASURES OR CONTROLS THAT PREVENT OR MINIMIZE GENERATION OF INCREASED STORMWATER RUNOFF: THE PLAN PROPOSES SEVERAL MEASURES AND CONTROLS TO MINIMIZE GENERATION OF INCREASED STORMWATER RUNOFF. THE CONSTRUCTION HAS BEEN SEQUENCED TO INSTALL DOWNSLOPE FACILITIES TO CAPTURE AND MITIGATE STORMWATER RUNOFF.

UTILITY LINE INSTALLATION CONSTRUCTION NOTES & SEQUENCE

THIS SEQUENCE IS A SUBSEQUENCE OF THE GENERAL CONSTRUCTION SEQUENCE AND SHOULD BE FOLLOWED FOR THE INSTALLATION OF THE UTILITY LINES OF THE PROJECT. THE INTENT OF THIS SEQUENCE IS TO PROVIDE THE SEQUENCING FOR THE UTILITY LINE INSTALLATION.

ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE CONSTRUCTION SEQUENCE. EACH STAGE SHALL BE COMPLETED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING AND GRUBBING SHALL BE LIMITED ONLY TO THOSE AREAS DESCRIBED IN EACH STAGE.

1. THE FOLLOWING TASKS SHALL BE COMPLETED EACH DAY, IN FULL, FOR UTILITY LINE INSTALLATION. THE PROCESS HALL BE REPEATED EACH DAY DURING PIPE INSTALLATION.
   - 1.1 EXCAVATE THE PIPE TRENCH FOR INSTALLATION. EXCAVATED MATERIAL FOR INSTALLATION SHALL BE PACED ON THE UPSLOPE SIDE OF THE TRENCH. ALL EXCAVATED MATERIAL SHALL BE STOCKPILED A MINIMUM OF 3 FEET AWAY FROM THE EXCAVATED TRENCH. LIMIT DAILY TRENCH EXCAVATION TO THAT LENGTH OF PIPE INSTALLATION, BACKFILLING, AND STABILIZING THAT CAN BE COMPLETED THE SAME DAY OR TRENCH PLUGS INSTALLED PER DETAIL.
   - 1.2 PLACE PIPE–BEDDING MATERIAL. WATER THAT ACCUMULATES IN THE TRENCH SHALL BE COMPLETELY REMOVED BY PUMPING BEFORE PIPE PLACEMENT AND/OR BACKFILLING, IN ACCORDANCE WITH THE FACILITY FOR REMOVING SEDIMENT FROM PUMPED WATER DETAIL IN THE DRAWINGS.
   - 1.3 PLACE PIPE AS INDICATED.
   - 1.4 BACKFILL PIPE TRENCH IMMEDIATELY UPON COMPLETION OF TESTING AND INSPECTION.
   - 1.5 GRADE DISTURBED AREAS TO FINAL CONTOURS. FOLLOW APPROPRIATE EROSION AND SEDIMENTATION POLLUTION CONTROL MEASURES. IMMEDIATELY SEED AND MULCH ALL DISTURBED AREAS. AREAS IN PROPOSED PAVED AREAS SHALL BE BACKFILLED WITH STONE TO PROVIDE STABILIZATION. AREAS NOTED TO BE STABILIZED WITH EROSION CONTROL MATTING SHALL BE IMMEDIATELY STABILIZED AS NOTED.

GEOLOGIC FORMATIONS

THERE ARE NO KNOWN EXISTING GEOLOGIC FORMATIONS THAT HAVE THE POTENTIAL TO CAUSE POLLUTION AND THAT WOULD NEED MITIGATION.

THERMAL IMPACT ANALYSIS

THE CONSTRUCTION PHASE OF THIS PROJECT INCLUDES THE REMOVAL OF TOPSOIL AND EARTHWORK GRADING. THE SITE WILL USE COMPOST FILTER SOCKS TO PROMOTE SHEET FLOW OF STORMWATER DURING CONSTRUCTION, WHICH WILL DISPERSE WARM WATER TO THE GROUND SURFACE LIMITING POINT SOURCES OF THERMAL POLLUTION. THE POST CONSTRUCTION PHASE OF THE PROJECT PROPOSES IMPERVIOUS COVER FROM THE DRIVEWAY AND THE RESIDENTIAL ESTATE WHICH DISCHARGES TO PROPOSED INFILTRATION BEDS. THE PROPOSED BMP'S WILL HELP TO PROTECT AGAINST THERMAL POLLUTION

PERMANENT EROSION & SEDIMENT CONTROL NOTES

1. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED, STABILIZED AND FUNCTIONAL PRIOR TO EARTH DISTURBANCE WITHIN THE TRIBUTARY AREA TO SAID E&S MEASURE.
2. LOCAL ROADS ARE TO REMAIN FREE OF SEDIMENT AND CONSTRUCTION VEHICLES AND EQUIPMENT.
3. CONSTRUCTION VEHICLES AND THEIR TIRES SHALL BE CLEANED DAILY PRIOR TO LEAVING THE SITE TO PREVENT ANY TRACKINGS OR TRAILINGS ONTO THE ROAD.
4. UPON COMPLETION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY, THE SITE SHALL BE IMMEDIATELY SEEDED, MULCHED OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION AS PER SEEDING AND MULCHING SCHEDULE.
5. SILT FENCING MAY BE REMOVED WHEN THE SITE IS PERMANENTLY STABILIZED. ACCUMULATED SEDIMENT MAY BE SPREAD AT THE SITE IN AREAS NOT SUBJECT TO EROSION.
6. THE TREE PROTECTION FENCING SHALL NOT BE REMOVED UNTIL ALL DEVELOPMENT AREAS ARE STABILIZED AND WRITTEN CONFIRMATION AND APPROVAL IS RECEIVED FROM THE LANDSCAPE REVIEW CONSULTANTS.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE IMPLEMENTATION OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
8. BEFORE INITIATING ANY REVISIONS TO THE APPROVED EROSION AND SEDIMENT CONTROL PLAN, OR REVISIONS TO OTHER PLANS WHICH MAY AFFECT THE EFFECTIVENESS OF THE APPROVED E&S CONTROL PLAN, THE CONTRACTOR SHALL RECEIVE APPROVAL OF THE REVISIONS FROM THE BUCKS COUNTY CONSERVATION DISTRICT.
9. THE CONTRACTOR IS ADVISED TO BECOME FAMILIAR WITH THE PROVISIONS OF APPENDIX 64, 'EROSION CONTROL RULES AND REGULATIONS,' TITLE 25, PART 1, DEPT. OF ENVIRONMENTAL PROTECTION, SUBPART C–PROTECTION OF NATURAL RESOURCES, ARTICLE III–WATER RESOURCES, CHAPTER 102–EROSION CONTROL AND WITH THE "EROSION AND SEDIMENT POLLUTION CONTROL PROGRAM MANUAL" BY THE COMMONWEALTH OF PA., DEPARTMENT OF ENVIRONMENTAL PROTECTION, MARCH 2000 OR LATEST EDITION.
10. TECHNICAL ADVICE FOR THE IMPLEMENTATION OF THIS PROGRAM MAY BE OBTAINED BY CONTACTING THE BUCKS COUNTY CONSERVATION DISTRICT AT (215)345–7577.
11. COPIES OF THESE PLANS MUST BE AVAILABLE ON SITE THROUGHOUT CONSTRUCTION.
12. CONTRACTOR SHALL FOLLOW THE PROCEDURES OUTLINED BY THE APPROVED EROSION & SEDIMENT CONTROL PLAN AND THE SEQUENCE OF CONSTRUCTION UNLESS OTHERWISE APPROVED BY THE TOWNSHIP ENGINEER AND THE BUCKS COUNTY CONSERVATION DISTRICT.

TEMPORARY EROSION & SEDIMENT CONTROL NOTES

1. EXISTING TREES AND OTHER EXISTING VEGETATION SHALL NOT BE DISRUPTED AND ALL CONSTRUCTION ACTIVITIES SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE.
2. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITY HAS CEASED, ALL AREAS SHALL BE STABILIZED. DURING NON–GERMINATING PERIODS, MULCH SHALL BE APPLIED AT SPECIFIED RATES. DISTURBED AREAS THAT ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN ONE YEAR SHALL BE STABILIZED WITH TEMPORARY VEGETATION. AREAS WHICH ARE AT FINISHED GRADE OR WHICH WILL NOT BE REDISTURBED WITHIN ONE YEAR SHALL RECEIVE PERMANENT STABILIZATION. (SEE SEEDING AND MULCHING TABLE FOR DETAILS)
3. ALL TOPSOIL FROM THE OVERALL SITE PREPARATIONS WILL BE STOCKPILED AND REDISTRIBUTED UNIFORMLY AT THE TIME OF FINAL GRADING. ALL STOCKPILES SHALL HAVE PERIMETER SILT FENCE INSTALLED AND BE SEEDED AND MULCHED IMMEDIATELY. STOCKPILE(S) SHALL HAVE A SIDE SLOPE OF 2:1 OR FLATTER AND SHALL HAVE A HEIGHT NOT GREATER THAN 35 FEET. SEE PLAN FOR LOCATION OF TOPSOIL STOCKPILES.
4. GRADE ALL CUT AND FILL SLOPES TO 3 FOOT HORIZONTAL FOR EVERY 1 FOOT VERTICAL OR FLATTER, AND APPLY SEEDING AND MULCH. AREAS WITH GRADES GREATER THAN OR EQUAL TO 3:1 SHALL RECEIVE STEEP SLOPE SEED MIX AND PERMANENT TURF REINFORCEMENT MAT: NORTH AMERICAN GREEN #C350 OR EQUAL
5. SIGNIFICANT STANDS OF TREES, DESIGNATED TO REMAIN, WILL BE PROTECTED WITH FENCING, SEE DETAIL. INSTALL ALONG THE DRIP LINE OF THE TREE BRANCHES.
6. EROSION CONTROL FACILITIES MUST DISCHARGE INTO ADEQUATE STORM SEWERS, NATURAL WATERWAYS, OR STABLE EROSION RESISTANT AREAS.
7. ANY SEDIMENT OR MUD THAT IS TRACKED ONTO THE PUBLIC ROADWAY MUST BE CLEANED OFF IMMEDIATELY BY BROOMING AND/OR SHOVELING TO THE SATISFACTION OF THE TOWNSHIP AT THE EXPENSE OF THE DEVELOPER AND/OR RESPONSIBLE CONTRACTOR. USE OF A BACKHOE BUCKET TO SCRAPE ROADWAY SURFACE IS PROHIBITED. WHERE SAND AND/OR SEDIMENT IS CAUSING SLICK OR HAZARDOUS CONDITIONS, ROADWAY SURFACE SHALL BE PRESSURE WASHED TO REMOVE THE CONDITION. ALL SEDIMENT LADEN WATER MUST BE FILTERED IN A MANNER SATISFACTORY TO THE BUCKS COUNTY CONSERVATION DISTRICT BEFORE ENTERING STORM SEWERS AND/OR DRAINAGE CHANNELS.
8. NO SEDIMENT OR SEDIMENT LADEN WATER MUST BE ALLOWED TO LEAVE THE SITE/PROPERTY WITHOUT FIRST BEING FILTERED TO THE SATISFACTION OF BUCKS COUNTY CONSERVATION DISTRICT. ANY INLETS WHICH DO NOT DIRECT FLOW TO A SEDIMENT BASIN MUST BE SEALED OFF TO NOT RECEIVE RUNOFF.
9. ALL PUMPING OF SEDIMENT–LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A FILTER BAG, DISCHARGING OVER UNDISTURBED AREAS.
10. ABSOLUTELY NO EARTHMOVING, PLACEMENT OF FILL MATERIAL OR THE ENTRY OF SEDIMENT LADEN WATER MUST TAKE PLACE IN WETLANDS. ALL WETLANDS SHALL BE PROTECTED FROM ENCROACHMENT WITH FENCING.
11. ROCK FILTER OUTLETS MUST BE PROVIDED IMMEDIATELY WHERE SILT SOCK HAS BEEN COMPROMISED.
12. THE SEDIMENTATION AND EROSION CONTROL MEASURES SHOWN ON THIS PLAN HAVE BEEN PREPARED IN ACCORDANCE WITH REQUIREMENTS OF THE BUCKS COUNTY CONSERVATION DISTRICT. TRI–STATE ENGINEERS DOES NOT TAKE ANY RESPONSIBILITY IN OBSERVING AND CERTIFYING THE CONSTRUCTION OF THESE FACILITIES UNLESS REQUESTED SPECIFICALLY BY THE OWNER AND/OR CONTRACTOR. THEREFORE, TRI–STATE ENGINEERS DOES NOT ACCEPT ANY RESPONSIBILITY FOR DAMAGES AS A RESULT OF IMPROPER CONSTRUCTION AND/OR MAINTENANCE OF FACILITIES DURING CONSTRUCTION.
13. ACCUMULATED SEDIMENTS REMOVED FROM ANY AND ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE DISPOSED OF IN LANDSCAPED AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES. IMMEDIATELY STABILIZE REPLACED SOILS WITH SEED & MULCH OR DEPOSIT IN SOIL STOCKPILES AND STABILIZE.
14. THE CONTRACTOR SHALL REMOVE FROM THE SITE, RECYCLE OR DISPOSE OF ALL BUILDING MATERIAL AND WASTES IN ACCORDANCE WITH DEP'S SOLID WASTE MANAGEMENT REGULATIONS, AND/OR ANY ADDITIONAL LOCAL, STATE OR FEDERAL REGULATIONS. NO BUILDING MATERIALS (USED OR UNUSED) OR WASTE MATERIALS SHALL BE BURNED, BURIED, DUMPED OR DISCHARGED AT THE SITE.
15. ANY TREES WITHIN THE TREE PROTECTION ZONE THAT DIE DURING THE CONSTRUCTION OF A LAND DEVELOPMENT OR DURING THE 18–MONTH MAINTENANCE PERIOD, WHERE APPLICABLE, SHALL BE REMOVED BY THE DEVELOPER AND REPLACED WITH AN APPROVED SHADE TREE IN A LOCATION DESIGNATED BY THE TOWNSHIP.

SEEDING AND MULCHING SCHEDULE

1. SITE PREPARATION, STABILIZATION AND MAINTENANCE SHALL BE PERFORMED IN ACCORDANCE WITH PENN STATE UNIVERSITY'S "THE AGRONOMY GUIDE" AND PENNDOT FORM 408 SPECIFICATIONS' MOST RECENT ADDITION.

TEMPORARY SEEDING SPECIFICATION FORMULA E – ANNUAL RYE GRASS

PERMANENT SEEDING SPECIFICATION FORMULA B –
50% KENTUCKY BLUEGRASS MIXTURE
30% PENNLAWN RED FESCUE
20% PERENNIAL RYEGRASS MIXTURE

STEEP SLOPE SEEDING SPECIFICATION FORMULA W –
70% TALL FESCUE
20% BIRDSFOOT TREFOIL MIXTURE
10% REDTOP

TEMPORARY:
SPECIES: ANNUAL RYEGRASS
% PURE LIVE SEED: 81%
APPLICATION RATE: 40 LB./ACRE
FERTILIZER TYPE: 10–20–20
FERTILIZER APPLICATION RATE: 1000 LB./ACRE
LIMING RATE: 1 TON/ACRE
MULCH TYPE: HAY/STRAW
MULCHING RATE: 3 TON/ACRE

SEEDING RATE FOR THE ABOVE MIXTURES:
10 LBS/1,000 SY FOR TEMPORARY SEEDING
21 LBS/1,000 SY FOR PERMANENT SEEDING
11 LBS/1,000 SY FOR STEEP SLOPE SEEDING (SEE NOTE 5)

2. HAY OR STRAW MULCH SHALL BE APPLIED AT THE RATES OF AT LEAST 3.0 TONS PER ACRE. STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN. SLOPES OF 3:1 SHALL BE ANCHORED WITH MULCH CONTROL NETTING.
3. PULVERIZED AGRICULTURAL LIMESTONE AND COMMERCIAL FERTILIZER SHALL BE APPLIED TO ALL DISTURBED AREAS WHICH ARE TO BE SEEDED EXCEPT FOR TEMPORARY SEED AREAS ARE THE FOLLOWING RATES:

PULVERIZED AGRICULTURAL LIMESTONE – 90 LBS/1,000 SF
10–20–20 ANALYSIS COMMERCIAL FERTILIZER – 20 LBS/1,000 SF

NOTE: APPLICATION OF LIME AND FERTILIZER FOR TEMPORARY SEEDING IS UNNECESSARY AND ONLY SERVES TO CONTRIBUTE TO AN OVERABUNDANCE OF NUTRIENT POLLUTION IN THE WATERSHED.

4. PERMANENT SEEDING SHALL TAKE PLACE FROM MARCH 15 TO JUNE 1 OR FROM AUGUST 1 TO OCTOBER 15. IF COMPLETED AT IN OTHER SEASONS, AREAS SHALL RECEIVE TEMPORARY SEEDING AND 3.0 TONS PER ACRE MULCH.
5. STEEP SLOPE AREAS, CONSIDERED SLOPES GREATER THAN 3:1, SHALL BE PROTECTED FROM EROSION BY ONE OF THE FOLLOWING METHODS. MANUFACTURER'S RECOMMENDATIONS SHALL BE FOLLOWED FOR PARTICULAR METHOD AND SPECIFIC SITE CONDITIONS.

FLEXIBLE GROWTH MEDIUM: SHALL BE HYDRAULICALLY APPLIED COMBINATION OF SEED, MULCH, AND EROSION PROTECTION MATERIAL SIMILAR TO "FLEXTERRA" BY ACF OR EQUAL BY OTHER MANUFACTURER.

EROSION CONTROL MATTING: SHALL BE TEMPORARY MATTING SIMILAR TO SC350 BY NORTH AMERICAN GREEN OR EQUAL BY OTHER MANUFACTURER.

BCCD E&S CONTROL PLAN STANDARD NOTES

STANDARD EROSION AND SEDIMENT CONTROL PLAN NOTES

1. STOCKPILE HEIGHTS MUST NOT EXCEED 35 FEET. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.
2. THE OPERATOR/RESPONSIBLE PERSON (O/RP) ON–SITE SHALL ASSURE THAT THE APPROVED EROSION AND SEDIMENT CONTROL PLAN IS PROPERLY AND COMPLETELY IMPLEMENTED.
3. UNTIL THE SITE ACHIEVES FINAL STABILIZATION, THE PERMITTEE AND COMMITEE SHALL ASSURE THAT THE BEST MANAGEMENT PRACTICES ARE IMPLEMENTED, OPERATED, AND MAINTAINED PROPERLY AND COMPLETELY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL BEST MANAGEMENT PRACTICE FACILITIES AND MAINTAIN AND MAKE AVAILABLE TO THE BUCKS COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF ALL THOSE INSPECTIONS. ALL MAINTENANCE WORK, INCLUDING CLEANING, REPAIR, REPLACEMENT, REGRADING, RESEEDING, AND RESTABILIZATION SHALL BE PERFORMED IMMEDIATELY.
4. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO ELIMINATE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION.
5. BEFORE INITIATING ANY REVISIONS TO THE APPROVED EROSION AND SEDIMENT CONTROL PLAN OR REVISIONS TO OTHER PLANS WHICH MAY AFFECT THE EFFECTIVENESS OF THE APPROVED E&S CONTROL PLAN, THE OPERATOR MUST RECEIVE APPROVAL OF THE REVISIONS FROM THE BUCKS COUNTY CONSERVATION DISTRICT.
6. THE OPERATOR SHALL ASSURE THAT AN EROSION AND SEDIMENT CONTROL PLAN HAS BEEN PREPARED, APPROVED BY THE BUCKS COUNTY CONSERVATION DISTRICT, AND IS BEING IMPLEMENTED AND MAINTAINED FOR ALL SOIL AND/OR ROCK SPOIL AND BORROW AREAS, REGARDLESS OF THEIR LOCATIONS.
7. ALL PUMPING OF SEDIMENT LADEN WATER SHALL BE THROUGH A SEDIMENT CONTROL BMP, SUCH AS A PUMPED WATER FILTER BAG DISCHARGING OVER NON–DISTURBED AREAS.
8. THE CONTRACTOR IS ADVISED TO BECOME THOROUGHLY FAMILIAR WITH THE PROVISIONS OF THE APPENDIX 64, EROSION CONTROL RULES AND REGULATIONS, TITLE 25, PART 1, DEPARTMENT OF ENVIRONMENTAL PROTECTION, SUBPART C, PROTECTION OF NATURAL RESOURCES, ARTICLE III, WATER RESOURCES, CHAPTER 102, EROSION CONTROL.
9. A COPY OF THE APPROVED EROSION AND SEDIMENT POLLUTION CONTROL PLAN MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES.
10. EROSION AND SEDIMENT BMP'S MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THE TRIBUTARY AREAS OF THOSE BMP'S.
11. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMP CONTROLS MUST BE REMOVED. AREAS DISTURBED DURING REMOVAL OF THE BMP'S MUST BE STABILIZED IMMEDIATELY.
12. AT LEAST 7 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, THE OPERATOR SHALL INVITE ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES, THE LANDOWNER, ALL APPROPRIATE MUNICIPAL OFFICIALS, THE EROSION AND SEDIMENT CONTROL PLAN PREPARER, AND THE BUCKS COUNTY CONSERVATION DISTRICT TO AN ON–SITE MEETING. ALSO, AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE PENNSYLVANIA ONE CALL SYSTEM INCORPORATED AT 1–800–242–1776 FOR BURIED UTILITIES LOCATIONS.
13. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE OF CONSTRUCTION. EACH STAGE SHALL BE COMPLETED BEFORE ANY FOLLOWING STAGE IS INITIATED. CLEARING AND GRUBBING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE.

14. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE, THE OPERATOR SHALL STABILIZE ANY AREAS DISTURBED BY THE ACTIVITIES. DURING NON–GERMINATING PERIODS, MULCH MUST BE APPLIED AT THE SPECIFIED RATES. DISTURBED AREAS WHICH ARE NOT AT FINISHED GRADE AND WHICH WILL BE REDISTURBED WITHIN ONE YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY VEGETATIVE STABILIZATION SPECIFICATIONS. DISTURBED AREAS WHICH ARE AT FINISH GRADE OR WHICH WILL NOT BE REDISTURBED WITHIN ONE YEAR MUST BE STABILIZED IN ACCORDANCE WITH THE PERMANENT VEGETATIVE STABILIZATION SPECIFICATIONS.
15. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS.

TEMPORARY STABILIZATION AND PERMANENT STABILIZATION

16. HAY OR STRAW MULCH MUST BE APPLIED AT 3.0 TONS PER ACRE.
17. MULCH WITH MULCH CONTROL NETTING OR EROSION CONTROL BLANKETS MUST BE INSTALLED ON ALL SLOPES 3:1 OR STEEPER.OM.
18. STRAW MULCH SHALL BE APPLIED IN LONG STRANDS, NOT CHOPPED OR FINELY BROKEN.
19. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMP'S MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL BMP'S AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING, AND RENETTING, MUST BE DONE IMMEDIATELY. IF EROSION AND SEDIMENT CONTROL BMP'S FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMP'S, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
20. SEDIMENT REMOVED FROM BMP'S SHALL BE DISPOSED OF IN LANDSCAPE AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS, OR DRAINAGE SWALES, AND IMMEDIATELY STABILIZED, OR PLACED IN TOPSOIL STOCKPILES.
21. THE OPERATOR SHALL REMOVE FROM THE SITE, RECYCLE, OR DISPOSE OF ALL BUILDING MATERIALS AND WASTES IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1 ET SEQ., AND 287.1 ET SEQ. THE CONTRACTOR SHALL NOT ILLEGALLY BURY, DUMP, OR DISCHARGE ANY BUILDING MATERIAL OR WASTES AT THE SITE.

OTHER ISSUES

22. THE HOMEOWNER IS RESPONSIBLE FOR THE LONG TERM "OPERATION AND MAINTENANCE" OF THE BMP'S.
23. IF THE SITE WILL NEED TO IMPORT OR EXPORT MATERIAL FROM THE SITE, THE RESPONSIBILITY FOR PERFORMING 'ENVIRONMENTAL DUE DILIGENCE' AND DETERMINATION OF 'CLEAN FILL' WILL REST WITH THE CONTRACTOR.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON–WATER SOLUBLE, NON–DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE 'WATERS OF THE COMMONWEALTH' UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE–USE).

CLEAN FILL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE: FILL MATERIALS AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE STILL QUALIFIES AS CLEAN FILL PROVIDED THE TESTING REVEALS THAT THE FILL MATERIAL CONTAINS CONCENTRATIONS OF REGULATED SUBSTANCES THAT ARE BELOW THE RESIDENTIAL LIMITS IN TABLES FP–1A AND FP–1B FOUND IN THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".

ANY PERSON PLACING CLEAN FILL THAT HAS BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE MUST USE FORM FP–001 TO CERTIFY THE ORIGIN OF THE FILL MATERIAL AND THE RESULTS OF THE ANALYTICAL TESTING TO QUALIFY THE MATERIAL AS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE OWNER OF THE PROPERTY RECEIVING THE FILL. A COPY OF FORM FP–001 CAN BE FOUND AT THE END OF THESE INSTRUCTIONS.

ENVIRONMENTAL DUE DILIGENCE: THE APPLICANT MUST PERFORM ENVIRONMENTAL DUE DILIGENCE TO DETERMINE IF THE FILL MATERIALS ASSOCIATED WITH THE PROJECT QUALIFY AS CLEAN FILL. ENVIRONMENTAL DUE DILIGENCE IS DEFINED AS: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL".

FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA. CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE. THESE REGULATIONS ARE AVAILABLE ON–LINE AT WWW.PACODE.COM.

MAINTENANCE OF FACILITIES

1. COMPOST SILT SOCK SHOULD BE INSPECTED AND MAINTAINED ON A DAILY BASIS.
2. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT CONTROL DEVICES MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROLS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING, AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF E&S CONTROL BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS OR MODIFICATIONS OF INSTALLED MEASURES WILL BE REQUIRED.
3. CONTRACTOR SHALL MAINTAIN AND MAKE AVAILABLE TO THE BUCKS COUNTY CONSERVATION DISTRICT COMPLETE, WRITTEN INSPECTION LOGS OF THE ABOVE NOTED INSPECTION AND MAINTENANCE.
4. SEEDING, MULCHING AND FERTILIZING SHALL BE IN ACCORDANCE WITH THE SEEDING AND MULCHING SCHEDULE.
5. SHOULD THE TREE PROTECTION FENCING BE DISTURBED AT ANY POINT, IT SHALL BE REPLACED IMMEDIATELY.
6. THE CONTRACTOR SHALL HAVE AVAILABLE WATER TRUCKS OR OTHER MEANS OF CONTROLLING EXCESSIVE DUST AND AIRBORNE DEBRIS.
7. ALL DRAINAGE SWALES SHALL BE SEEDED AND MULCHED, AND PROTECTED WITH TURF REINFORCEMENT MAT: NORTH AMERICAN GREEN #SC150 (OR EQUAL). IF SWALES ARE TO BE SODDED, TURF REINFORCEMENT IS NOT REQUIRED.
8. ALL AREAS OF CONCENTRATED SURFACE DRAINAGE SHALL BE SEEDED AND MULCHED, AND PROTECTED WITH TEMPORARY TURF REINFORCEMENT MAT: NORTH AMERICAN GREEN #SC150 (OR EQUAL). IF AREAS ARE TO BE SODDED, TURF REINFORCEMENT IS NOT REQUIRED.
9. AFTER THE STORM CONVEYANCE SYSTEM IS CONSTRUCTED, MONTHLY INSPECTIONS FOR EACH DEVICE WILL BE MADE. AN INSPECTION OF ALL FACILITIES WILL BE MADE AFTER EVERY STORM TO DETERMINE THEIR RESISTANCE TO DRIVING RAINS AND ACCUMULATED RUNOFF.
10. SEEDED AREAS THAT HAVE WASHED AWAY SHALL BE FILLED AND GRADED AS NECESSARY AND THEN RESEEDED. A BURLAP OR STRAW COVER WILL BE APPLIED TO RETAIN THE SEED UNTIL IT HAS A CHANCE TO ROOT PROPERLY.
11. THE ABOVE PROCEDURE SHALL BE REPEATED AFTER EACH SIZABLE STORM UNTIL NO MORE SIGNS OF EROSION ARE EVIDENT. AT MONTHLY INTERVALS THEREAFTER, INSPECTIONS AND NECESSARY CLEANING WILL BE DONE. TRASH THAT IS REMOVED FROM ANY OF THE CONTROL DEVICES SHALL BE DISPOSED OF AT AN APPROVED DISPOSAL AREA. SILT THAT HAS ACCUMULATED SHALL BE REMOVED AND ALLOWED TO DRY AND USED AS FILL WHEREVER REQUIRED ON THE SITE.
12. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE MEASURES TO ADDRESS SAID CIRCUMSTANCES.

CHAPTER 93 RECEIVING WATER CLASSIFICATION

RUNOFF FROM THIS SITE DRAINS TO AN UNNAMED TRIBUTARY OF THE NESHAMINY CREEK WHICH IS PART OF THE NESHAMINY CREEK WATERSHED, WHICH HAS A PA CHAPTER 93 RECEIVING WATER CLASSIFICATION OF WWF, MF (WARM WATER FISHES, MIGRATORY FISHES).

SOILS RESOLUTIONS

A. SOILS EXHIBITING LOW STRENGTH AND AREA SUSCEPTIBLE TO CAVING OF OUT BANKS AS WELL AS LANDSLIDES – APPROPRIATE PRECAUTIONS SHOULD BE TAKEN TO SAFEGUARD WORKERS DURING ALL TRENCHING AND EXCAVATION OPERATIONS. ALL APPLICABLE OSHA STANDARDS AND REGULATIONS MUST BE IMPLEMENTED AT ALL TIMES. SOILS ARE PRONE TO SLOPE FAILURES, AND SITE SHALL BE GRADED TO PROVIDE MANAGEABLE SLOPES AS SHOWN ON THE PLANS.

B. SOILS EXHIBITING LOW SHEAR STRENGTH AND POOR COHESION SHALL BE BLENDED WITH OTHER ON–SITE SOILS OR OTHERWISE TREATED UNTIL THEY MEET THE CONTRACT SPECIFICATIONS. ALTERNATIVELY LOW SHEAR STRENGTH SOILS MAY BE DISPOSED OF OFF–SITE.

C. SOILS CORROSIVE TO CONCRETE AND STEEL – SUITABLE PRECAUTIONS SHALL BE TAKEN TO PROTECT ALL UNDERGROUND PIPES, CONDUITS AND STORAGE TANKS.

D. SOILS PRONE TO WETNESS, SLOW PERCOLATION, AND SEASONALLY HIGH WATER TABLES/SHALLOW DEPTH TO SATURATED ZONE – EXCAVATION IN THESE SOILS MAY ENCOUNTER WARE AND HAVE THE PRESENCE OF HYDRIC INCLUSIONS. WHEN NECESSARY, TEMPORARY DEWATERING FACILITIES SHALL BE PROVIDED TO MINIMIZE THE IMPACT OF HIGH OR SEASONAL WATER.

E. SOILS DEEMED UNSUITABLE FOR CONSTRUCTION (E.G., ORGANIC SOILS, OVERLY WET SOILS, BOULDERS, ETC.), SHALL BE TREATED, BLENDED OR MODIFIED UNTIL SUITABLE, OR DISPOSED OF OFF–SITE.

F. SOILS THAT ARE MOISTURE SENSITIVE AND PRONE TO FROST ACTION – WINTER GRADING IS A CONCERN DUE TO THE FINE GERAIN/COHESIVE NATURE OF THE SITE SOILS. FROZEN SOIL SHALL NOT BE USED AS FILL MATERIAL, UNLESS THAWED AND PROVEN ACCEPTABLE FOR USE AS FILL IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. PRECAUTIONS SHOULD BE TAKEN TO PREVENT ALL CONSTRUCTION FROM DAMAGE DUE TO FROST CYCLE ACTION.

G. ERODIBLE SOILS EXIST AT THE SITE – SOILS PRONE TO EROSION SHALL BE CONTROLLED BY THE MEASURES AND FACILITIES PRESENTED HEREIN.

H. SOILS ARE PRONE TO PIPING. CULVERTS PASSING THROUGH EMBANKMENTS SHALL BE PROVIDED WITH ANTI–SEEP PROTECTION TO PROTECT AGAINST PIPING

I. SOILS THAT ARE POOR SOURCES OF TOPSOIL, SUCH AS BEING TOO DROUGHTY OR TOO WET – SOIL TESTS ARE RECOMMENDED TO DETERMINE THE PROPER APPLICATION OF SHOULD AMENDMENTS TO PROMOTE THE GROWTH OF THE DESIRED VEGETATION. WHEREVER SOILS THAT ARE FAIR OR GOOD SOURCES OF TOPSOIL MAY EXIST ON A SITE, THE SHOULD BE CAREFULLY PRESERVED AND STORED FOR LATER USED IN RESTORATION.

NON–STRUCTURAL BMP MEASURES:

THE FOLLOWING NON–STRUCTURAL BMP MEASURES WERE IMPLEMENTED AS PART OF THIS LAND DEVELOPMENT:

1. CONSERVATION OF EXISTING NATURAL RESOURCE AREAS..
2. SITE CLUSTERING.
3. MINIMIZE DISTURBANCE AND MAINTENANCE.
4. REDUCE IMPERVIOUS COVER.
5. DISCONNECTION OF RUNOFF.
6. MINIMIZE SOIL COMPACTION.

Pennsylvania One Call System, Inc.
SERIAL NO. 2022–1160890
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1–800–242–1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22–04019	7/05/2022	
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

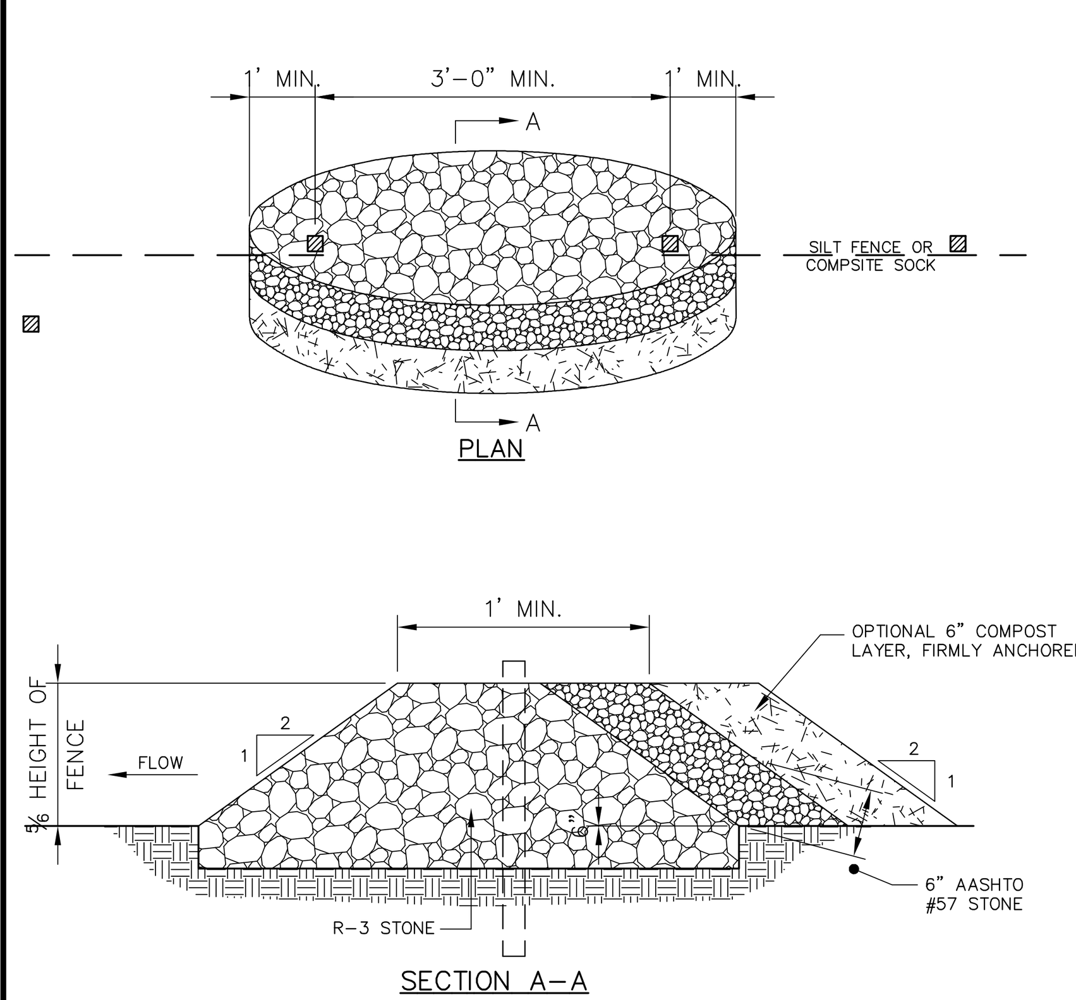
SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
T S E FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER LARRY P. YOUNG PE053219–E

PRELIMINARY/FINAL
E&S CONTROL NOTES
FOR CORNER OF RICHLIEU ROAD & GALLOWAY ROAD TMP 02-046-001 BENSALEM TOWNSHIP BUCKS COUNTY PENNSYLVANIA

\\SERVER2\Public1\2022\22-04019 - Bensalem Twp_ Kiran Patel_ Galloway Road and Richlieu Road L.D\dwg\land development\2ND SUB\Richlieu Road and Galloway Road-2nd Sub.dwg

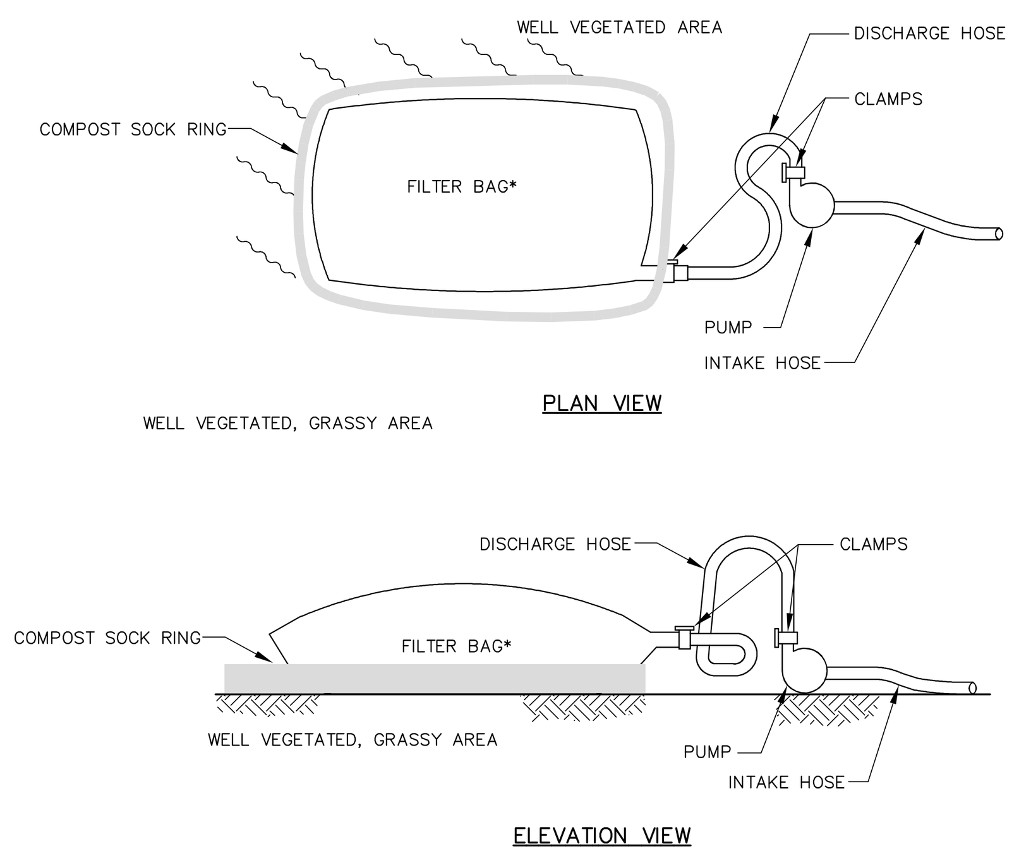


NOTES:

1. ROCK FILTER OUTLETS TO BE PROVIDED AT ALL EXISTING OR PROPOSED LOW POINTS AND ALL AREAS OF CONCENTRATED FLOWS.
2. SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLETS.
3. COMPOST LAYER IS REQUIRED IN ALL HQ AND EV WATERSHEDS.

ROCK FILTER OUTLET DETAIL

NOT TO SCALE

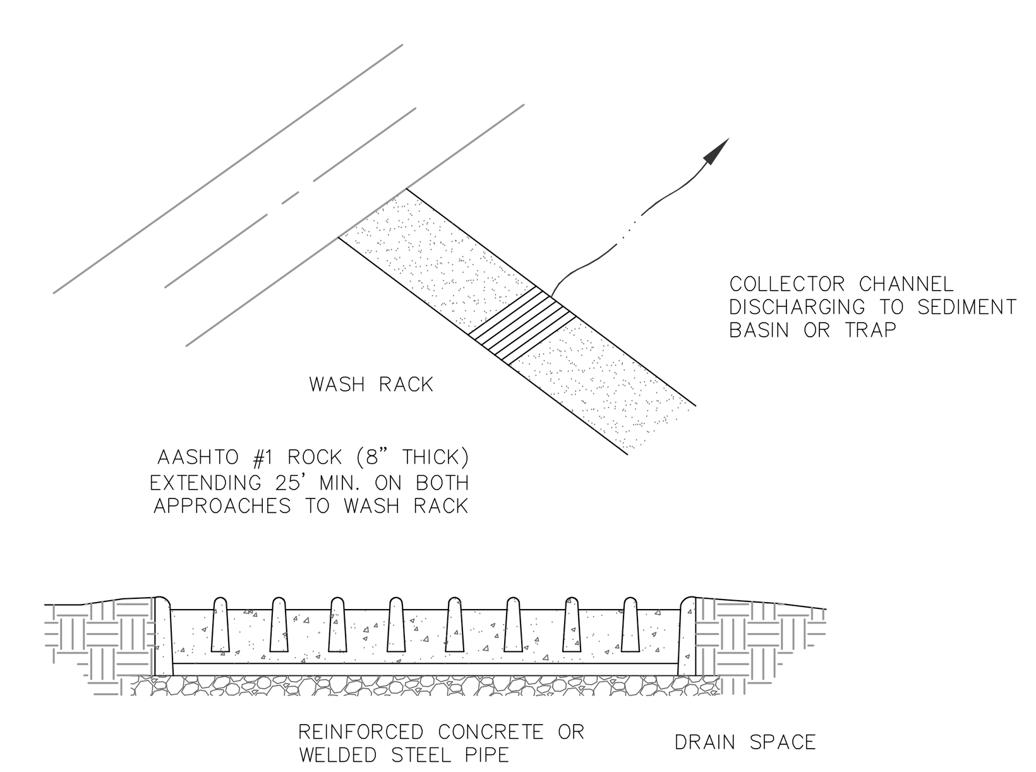


NOTES:

1. FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED 'J' TYPE SEAMS. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS.
2. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME HALF 1/2 FULL. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FULL.
3. BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREAS, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE FLOW PATH SHALL BE PROVIDED. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%.
4. THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED.
5. THE PUMP RATE SHALL BE NO GREATER THAN 750 GPM OR 1/2 THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHOULD BE FLOATING AND SCREENED.
6. FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.

PUMPED WATER FILTER BAG

NOT TO SCALE



NOTES:

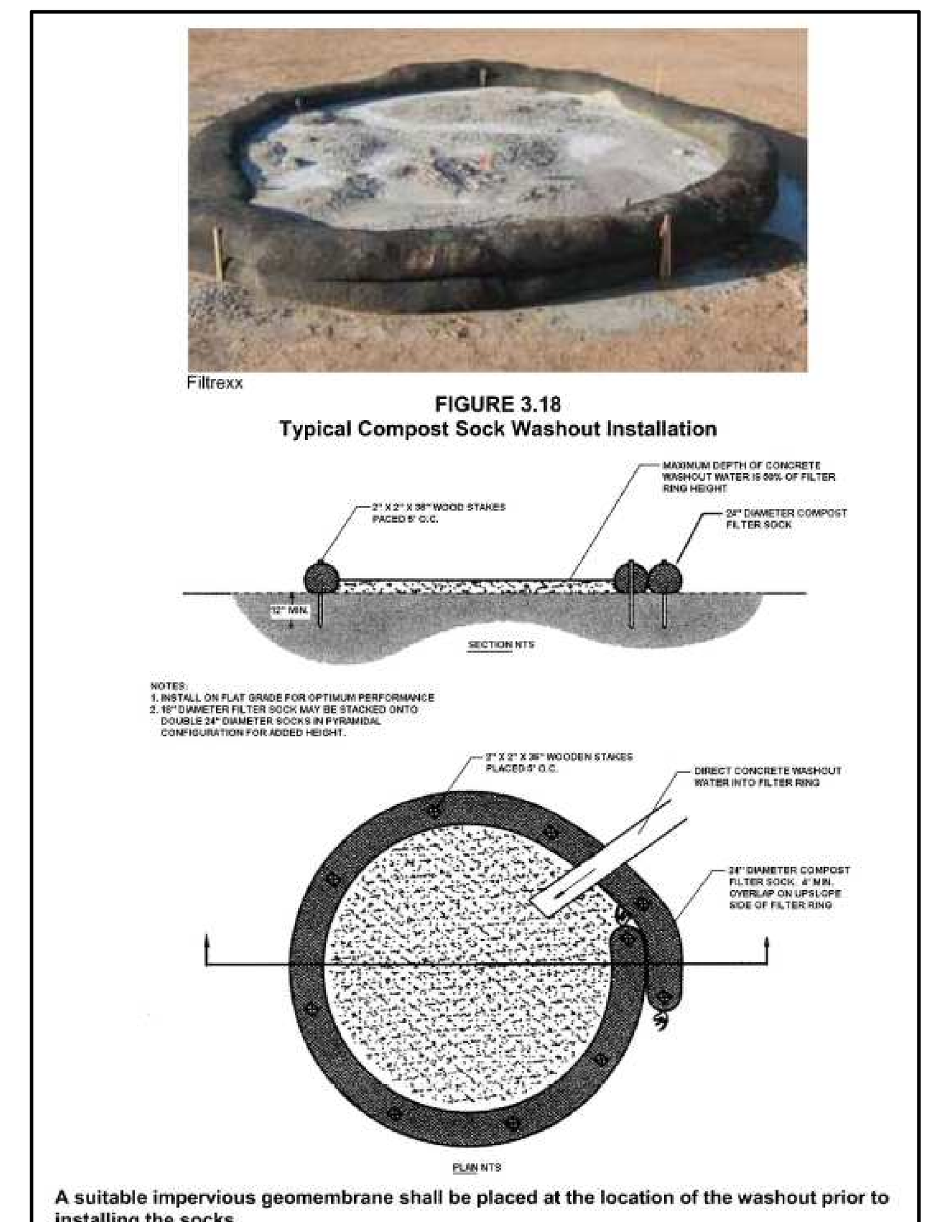
WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS.

WASH RACK SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.

A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.

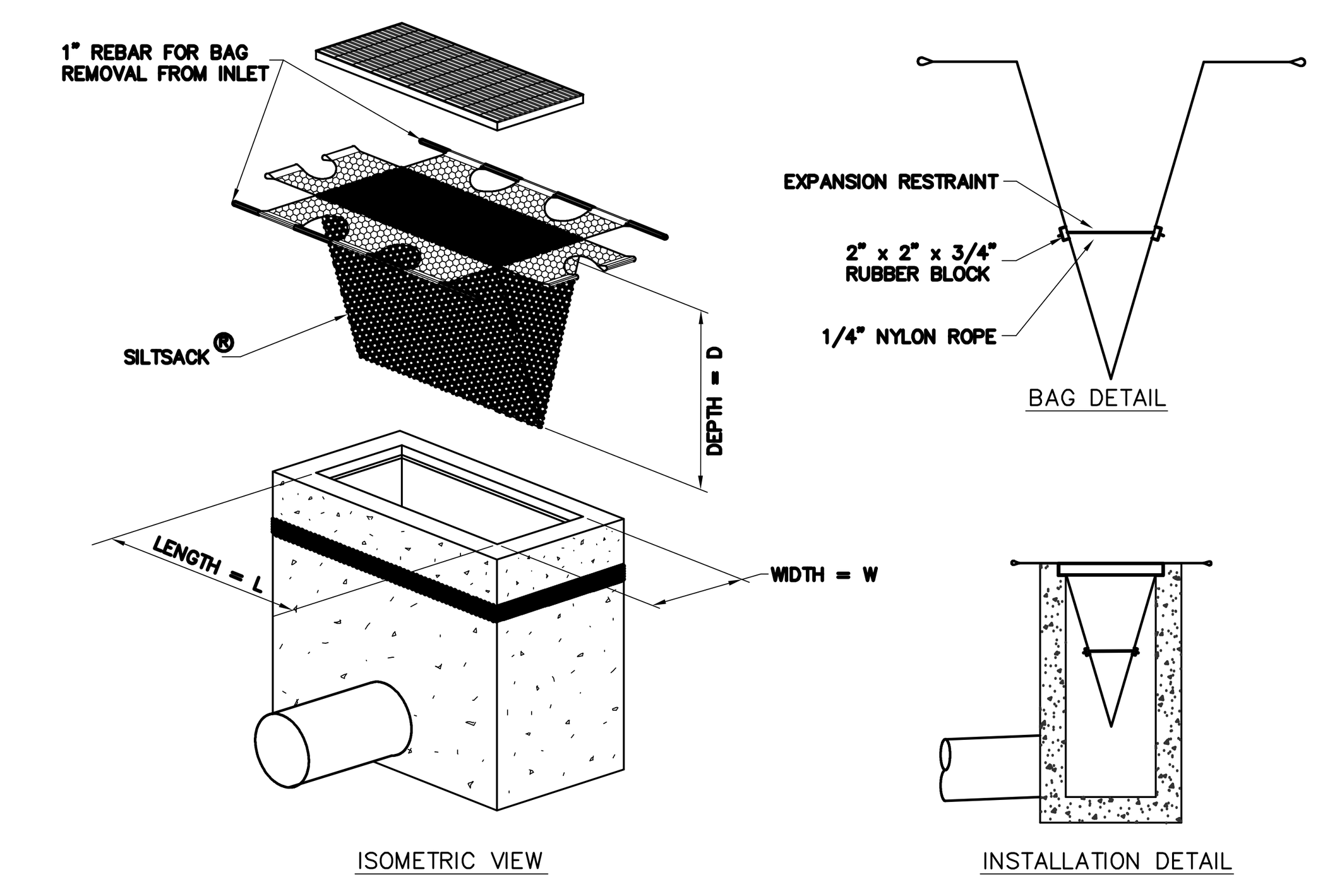
MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

STANDARD CONSTRUCTION DETAIL #3-2
ROCK CONSTRUCTION ACCESS WITH WASH RACK



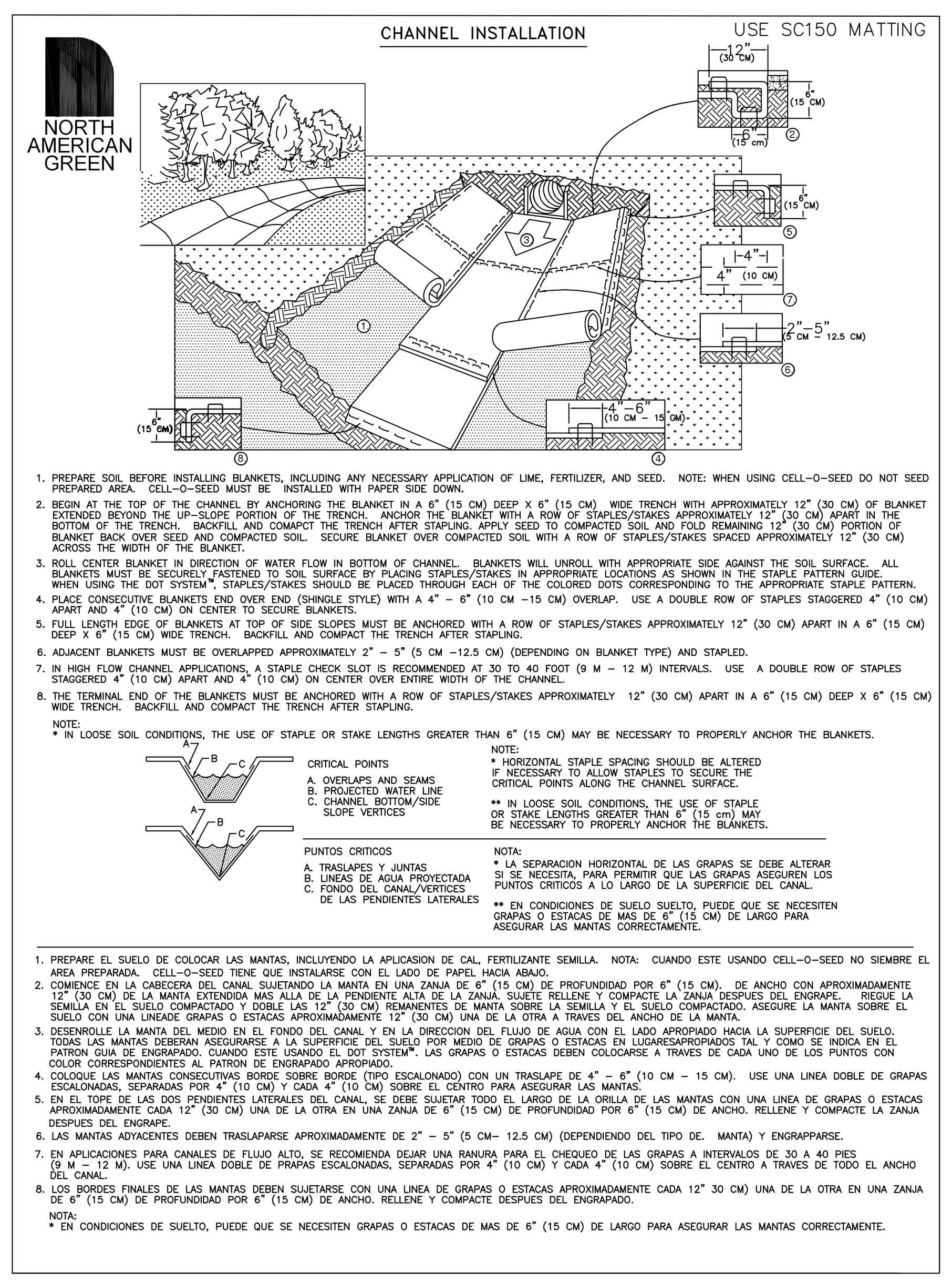
COMPOST FILTER SOCK CONCRETE WASHOUT DETAIL

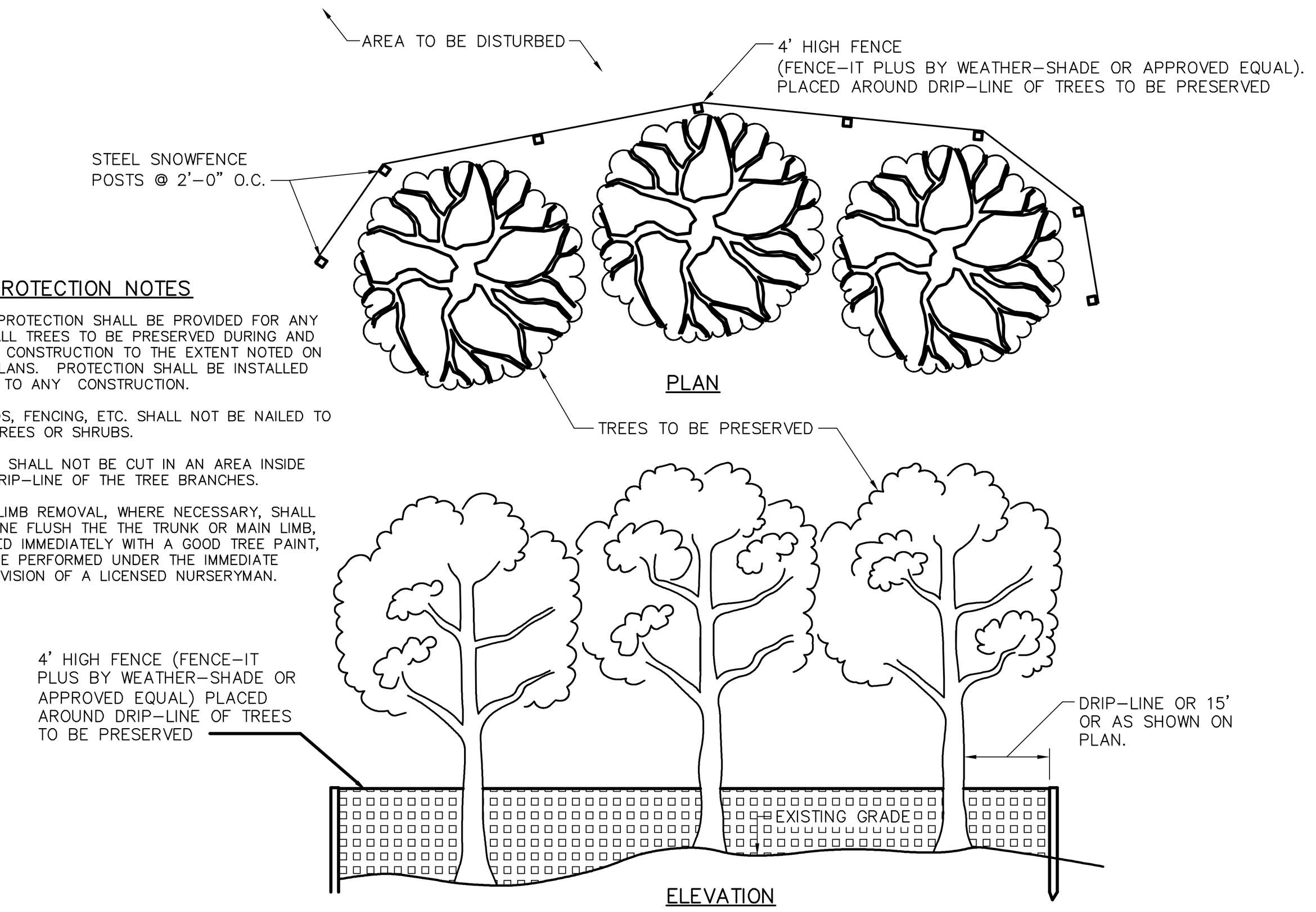
NOT TO SCALE



SILTSACK DETAIL – INLET PROTECTION

NOT TO SCALE

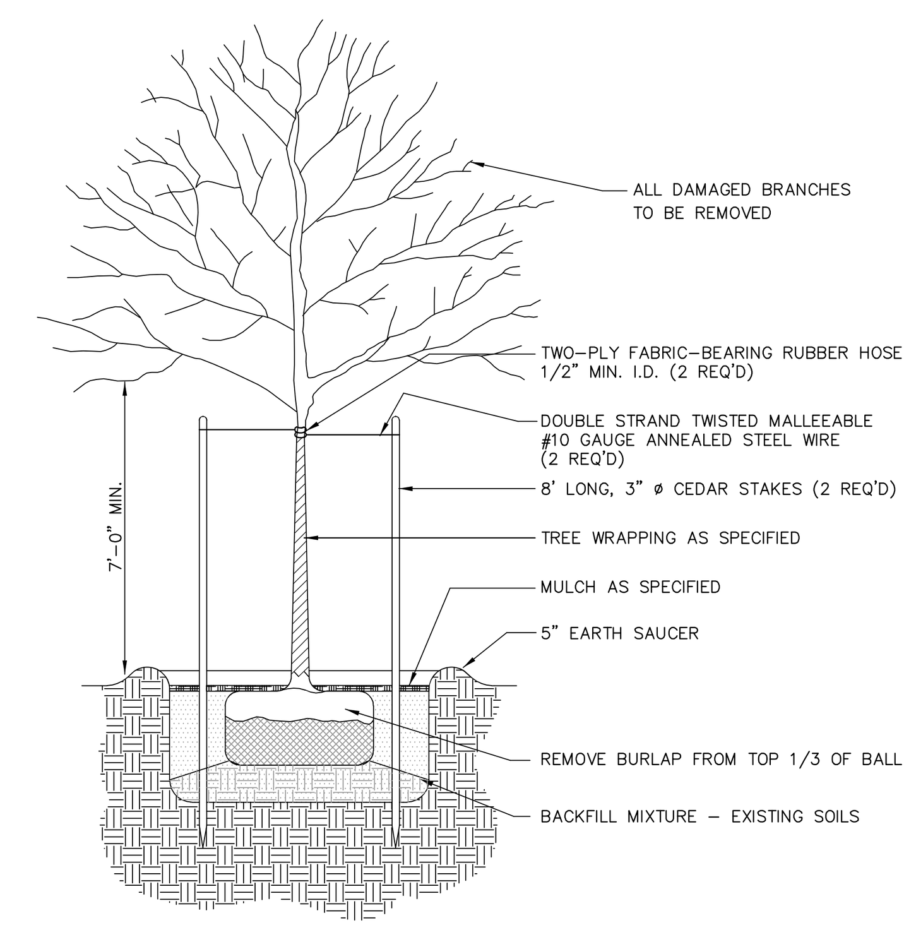




TREE PROTECTION NOTES

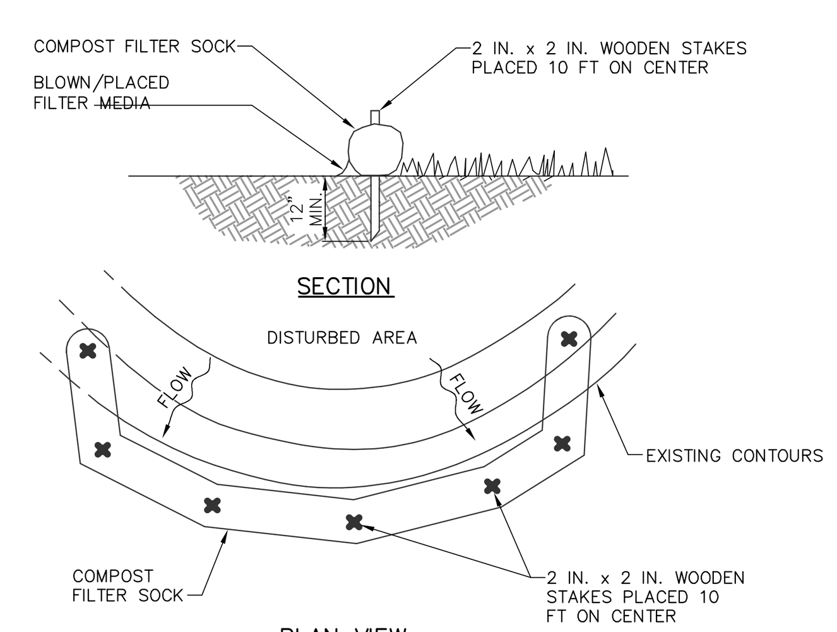
1. TREE PROTECTION SHALL BE PROVIDED FOR ANY AND ALL TREES TO BE PRESERVED DURING AND AFTER CONSTRUCTION TO THE EXTENT NOTED ON THE PLANS. PROTECTION SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION.
2. BOARDS, FENCING, ETC. SHALL NOT BE NAILED TO ANY TREES OR SHRUBS.
3. ROOTS SHALL NOT BE CUT IN AN AREA INSIDE THE DRIP-LINE OF THE TREE BRANCHES.
4. TREE LIMB REMOVAL, WHERE NECESSARY, SHALL BE DONE FLUSH THE THE TRUNK OR MAIN LIMB, PAINTED IMMEDIATELY WITH A GOOD TREE PAINT, AND BE PERFORMED UNDER THE IMMEDIATE SUPERVISION OF A LICENSED NURSERYMAN.

TREE PROTECTION DETAIL



TREE PLANTING AND STAKING

TREE SHALL BEAR SAME RELATION TO FINISHED GRADE AS IT BORE TO PREVIOUS EXISTING GRADE



NOTES:

SOCK FABRIC SHALL MEET STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST FILL MATERIALS SHALL BE KILN DRIED WOOD CHIPS (SILTWORM) OR AND ABACT APROVED EQUAL.

COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE BARRIER SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT. MAXIMUM SLOPE LENGTH ABOVE ANY BARRIER SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE OF THE SOCK AND THE SLOPE OF ITS TRIBUTARY AREA.

TRAFFIC SHALL NOT BE PERMITTED TO CROSS COMPOST FILTER SOCKS.

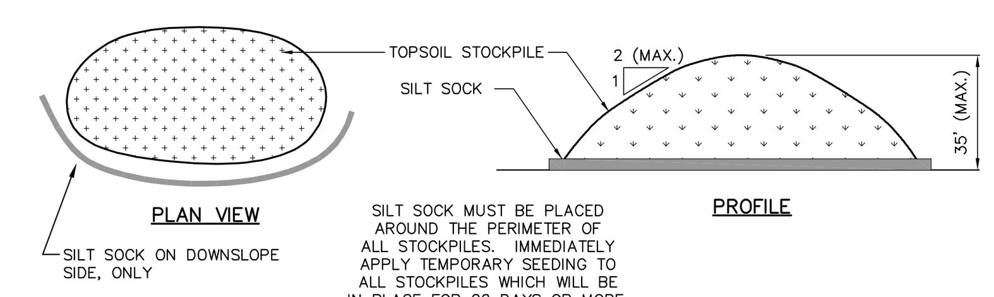
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE BARRIER AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.

COMPOST FILTER SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.

BIODEGRADABLE COMPOST FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

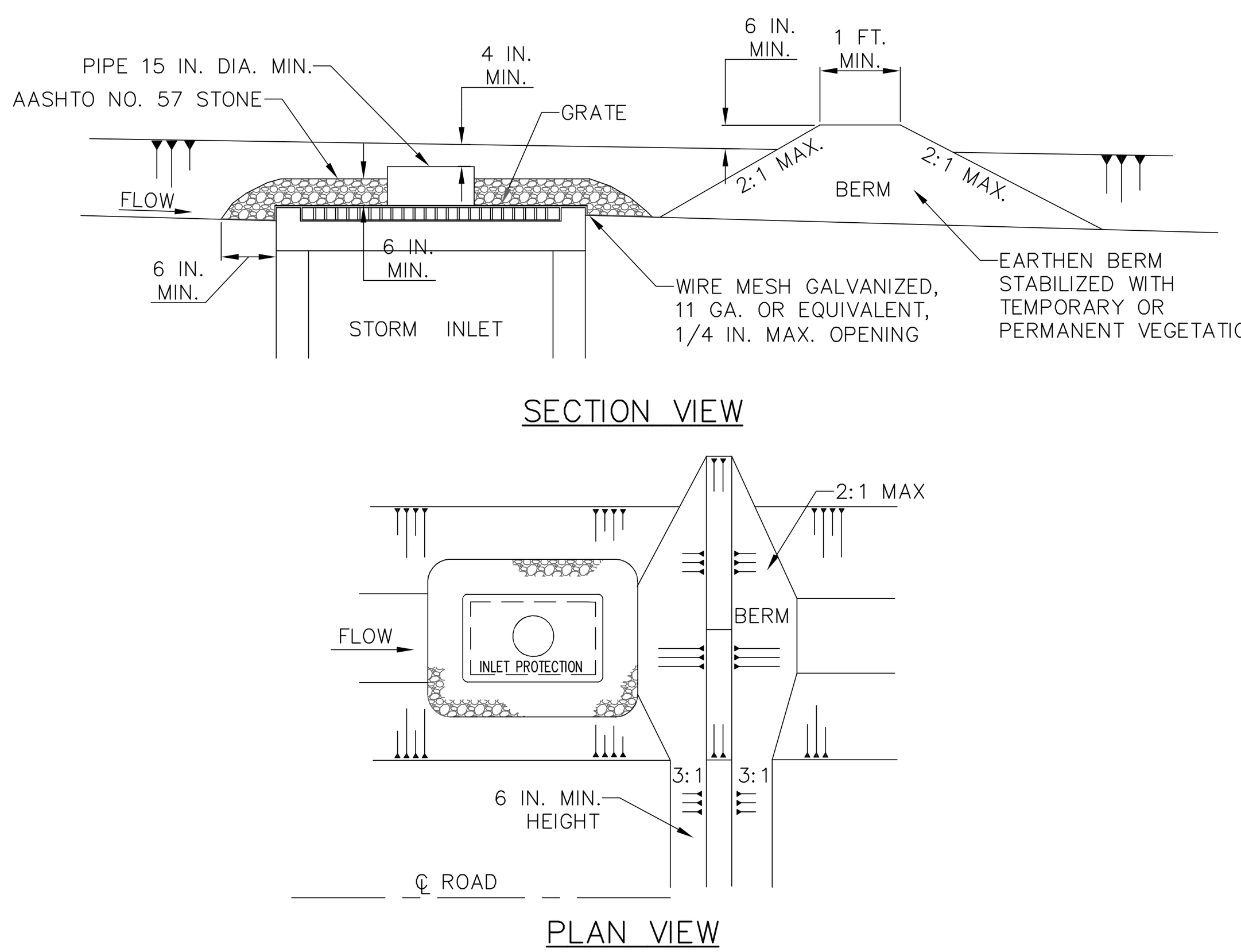
UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

STANDARD CONSTRUCTION DETAIL #4-1
COMPOST FILTER SOCK



TOPSOIL STOCKPILE AREA DETAIL

NOT TO SCALE



NOTES:

INLET PROTECTION SHALL NOT BE REQUIRED FOR INLET TRIBUTARY TO SEDIMENT BASIN OR TRAP. BERMS SHALL BE REQUIRED FOR ALL INSTALLATIONS NOT LOCATED AT A LOW POINT.

ROLLED EARTHEN BERM IN ROADWAY SHALL BE PROVIDED AND MAINTAINED IMMEDIATELY DOWN GRADIENT OF THE PROTECTED INLET UNTIL ROADWAY IS STONED. ROAD SUBBASE BERM ON ROADWAY SHALL BE MAINTAINED UNTIL ROADWAY IS PAVED. EARTHEN BERM IN CHANNEL SHALL BE MAINTAINED UNTIL PERMANENT STABILIZATION IS COMPLETED OR TO REMAIN PERMANENTLY.

STONE INLET PROTECTION AND BERM FOR A TYPE M INLET CAN BE USED IN ONE ACRE MAXIMUM DRAINAGE AREA WITH 15 IN. OVERFLOW PIPE AND 4 IN. HEAD. A PERFORATED PLATE WELDED TO A METAL RISER MAY NOT BE SUBSTITUTED FOR THE WIRE MESH. A SLOTTED PLATE WELDED TO THE RISER MAY BE USED IN CONJUNCTION WITH THE WIRE MESH IF CALCULATIONS ARE PROVIDED TO SHOW SUFFICIENT CAPACITY OF THE INLET TO ACCEPT THE PEAK RUNOFF FOR A 2-YEAR STORM EVENT FROM THE TRIBUTARY DRAINAGE AREA. TOP OF PIPE SHALL BE AT LEAST 6 INCHES BELOW ADJACENT ROADWAY IF PONDED WATER WOULD POSE A SAFETY HAZARD TO TRAFFIC. EARTHEN BERM SHALL BE ROLLED.

SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE HEIGHT OF THE STONE. DAMAGED OR CLOGGED INSTALLATIONS SHALL BE REPAIRED OR REPLACED IMMEDIATELY.

FOR SYSTEMS DISCHARGING TO HQ OR EV SURFACE WATER, A 6 IN. THICK COMPOST LAYER SHALL BE SECURELY ANCHORED ON OUTSIDE AND OVER TOP OF STONE. COMPOST SHALL MEET THE STANDARDS IN TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.

DO NOT USE ON MAJOR PAVED ROADWAYS WHERE PONDING MAY CAUSE TRAFFIC HAZARDS.

STANDARD CONSTRUCTION DETAIL #4-20
STONE INLET PROTECTION AND BERM - TYPE M INLET

NOT TO SCALE

Pennsylvania One Call System, Inc.
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State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

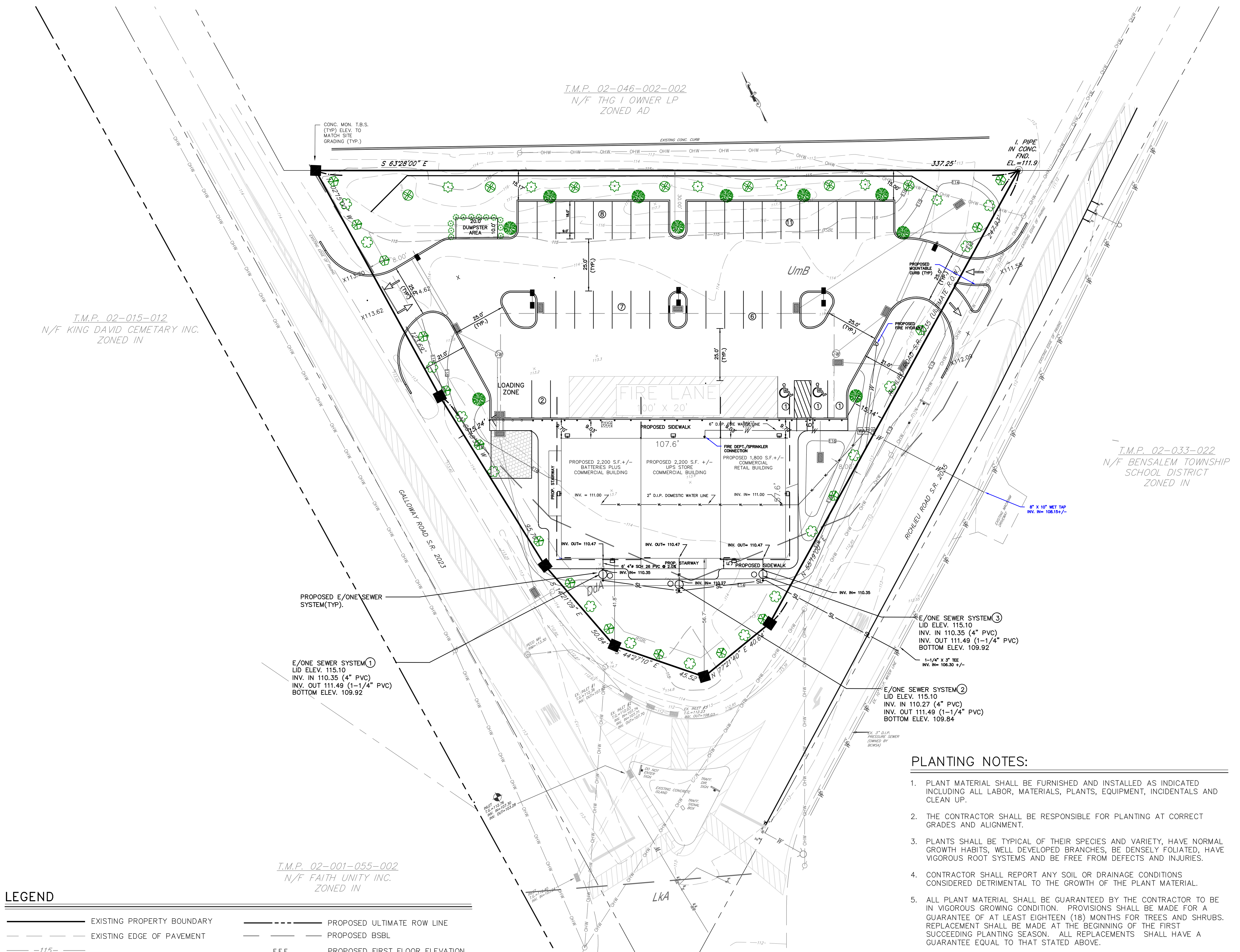
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053219-E

PRELIMINARY/FINAL

E&S CONTROL DETAILS

FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET
9 OF 17



LOCATION MAP

SCALE: 1" = 800'

LANDSCAPE COMPLIANCE CALCULATIONS

THE FOLLOWING CHART REPRESENTS THE MINIMUM QUANTITIES FOR LANDSCAPE MATERIAL BASED ON § 201-106 OF THE BENSALEM SUBDIVISION AND LAND DEVELOPMENT ORDINANCE.

REQUIREMENT

SHADE TREES:
TEN TREES PER ACRE OF GROSS SITE AREA PLUS ONE TREE FOR EVERY FIVE PARKING SPACES IN ALL OTHER SUBDIVISION AND LAND DEVELOPMENTS.

LOCATION	PARKING SPACES	REQUIRED	EXISTING	PROPOSED
PARKING LOT	48	10	0	10
GROSS SITE AREA	1.1 ACRE	10	0	14
TOTAL				24

REQUIREMENT

STREET TREES:
STREET TREES SHALL BE PLANTED AT INTERVALS OF NO MORE THAN 20 FEET OR AT A GREATER INTERVAL AS DETERMINED BY THE SHADE TREE COMMISSION DEPENDENT UPON SPECIES SELECTED OR AN EQUIVALENT NUMBER SHALL BE PLATED IN AN INFORMAL ARRANGEMENT, BUT IN NO CASE WILL ANY TREES BE PLANTED IN EXISTING OR PROPOSED STREET RIGHTS-OF-WAY.

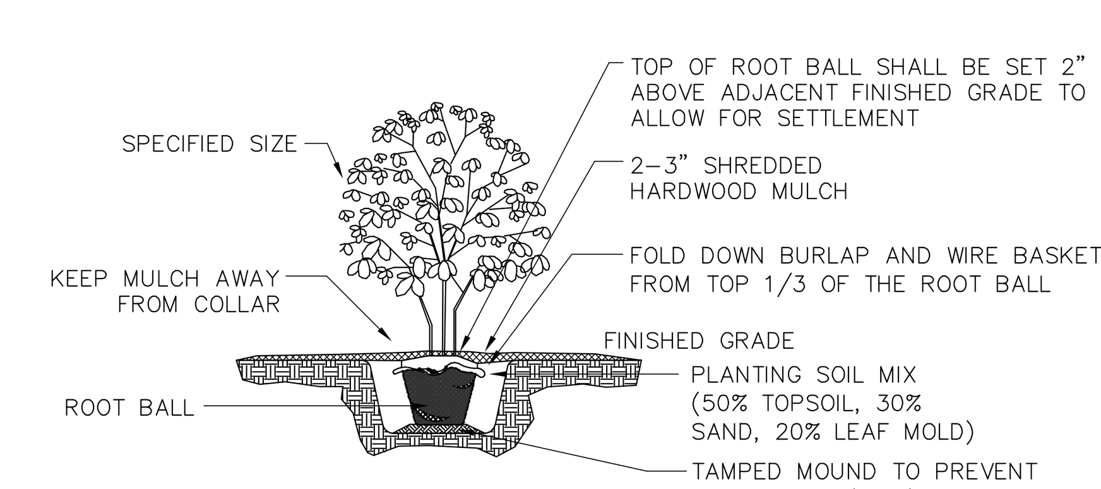
LOCATION	ROAD FRONTAGE	REQUIRED	EXISTING	PROPOSED
RICHLIEU & GALLOWAY ROAD	646	32	0	32

PLANT SCHEDULE

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	ROOT	SYMBOL
STREET TREES							
CG	15	CRATAEGUS CRUS-GALLI	"THORNLESS COCKSPUR" HAWTHORNE	2.5" CALIPER MIN.	AS SHOWN	B&B	
JV	17	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	2.5" CALIPER MIN.	AS SHOWN	B&B	
SHADE TREES							
QC	7	QUERCUS COCCINEA	SCARLET OAK	2.5" CALIPER MIN.	AS SHOWN	B&B	
PV	10	PRUNUS VIRGINIANA	CANADA RED CHERRY	2.5" CALIPER MIN.	AS SHOWN	B&B	
QC	7	CARPINUS CAROLINIANA	AMERICAN HORNBEAM	2.5" CALIPER MIN.	AS SHOWN	B&B	
SHRUBS							
TX	12	TAXUS X 'HICKSIL'	HICKS YEW	48" HT.	AS SHOWN	B&B	

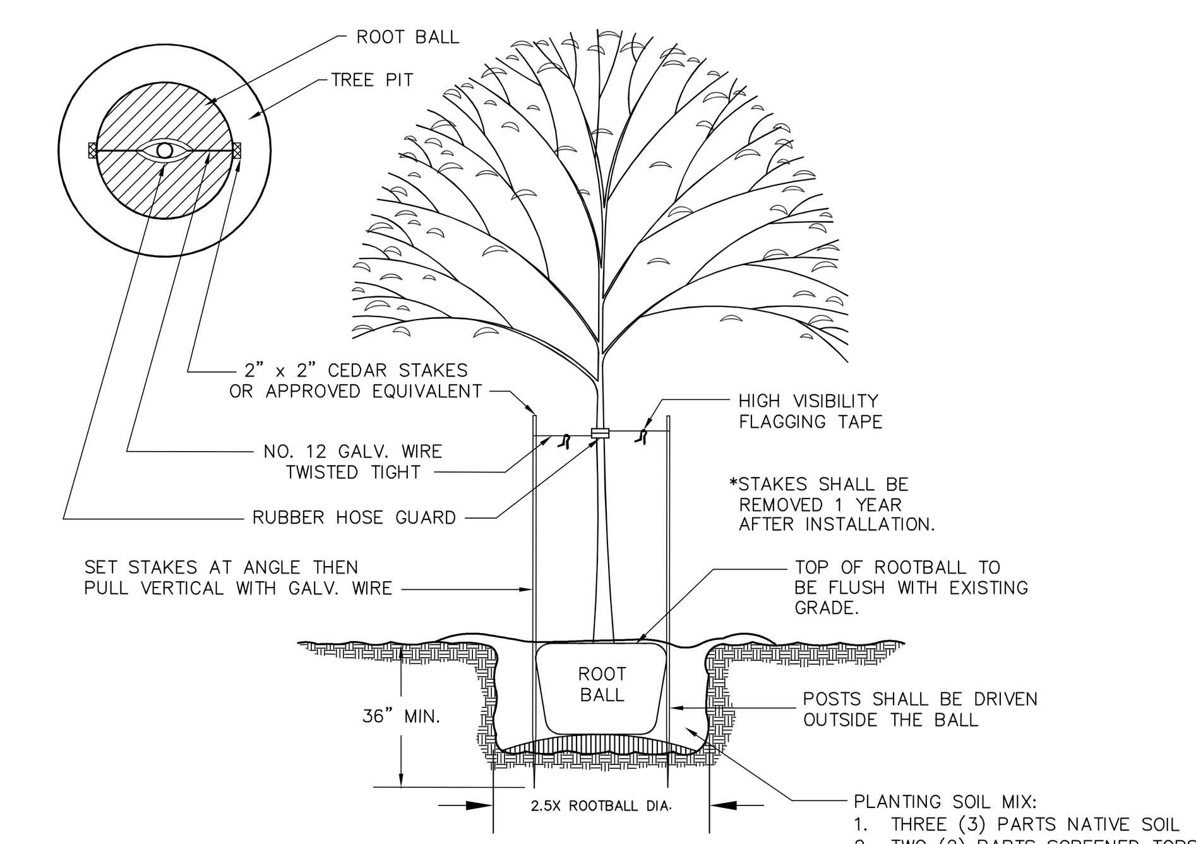
PLANTING NOTES:

1. PLANT MATERIAL SHALL BE FURNISHED AND INSTALLED AS INDICATED INCLUDING ALL LABOR, MATERIALS, PLANTS, EQUIPMENT, INCIDENTALS AND CLEAN UP.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PLANTING AT CORRECT GRADES AND ALIGNMENT.
3. PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY, HAVE NORMAL GROWTH HABITS, WELL DEVELOPED BRANCHES, BE DENSELY FOLIATED, HAVE VIGOROUS ROOT SYSTEMS AND BE FREE FROM DEFECTS AND INJURIES.
4. CONTRACTOR SHALL REPORT ANY SOIL OR DRAINAGE CONDITIONS CONSIDERED DETRIMENTAL TO THE GROWTH OF THE PLANT MATERIAL.
5. ALL PLANT MATERIAL SHALL BE GUARANTEED BY THE CONTRACTOR TO BE IN VIGOROUS GROWING CONDITION. PROVISIONS SHALL BE MADE FOR A GUARANTEE OF AT LEAST EIGHTEEN (18) MONTHS FOR TREES AND SHRUBS. REPLACEMENT SHALL BE MADE AT THE BEGINNING OF THE FIRST SUCCEEDING PLANTING SEASON. ALL REPLACEMENTS SHALL HAVE A GUARANTEE EQUAL TO THAT STATED ABOVE.
6. INSOFAR AS IT IS PRACTICABLE, PLANT MATERIALS SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THIS IS NOT POSSIBLE, THE CONTRACTOR SHALL PROTECT STOCK NOT PLANTED. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A THREE (3) DAY PERIOD AFTER DELIVERY.
7. QUALITY AND SIZE OF PLANTS, SPREAD OF ROOTS, AND SIZE OF BALLS SHALL BE IN ACCORDANCE WITH THE 1990 "AMERICAN STANDARD FOR NURSERY STOCK" AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMAN INC., LATEST EDITION.
8. ALL PLANTS SHALL BE PLANTED IN TOPSOIL THAT IS THOUROUGHLY WATERED AND TAMPED AS BACKFILLING PROGRESSES. NOTHING BUT SUITABLE TOPSOIL, FREE OF DRY SOD, STIFF CLAY, LITTER, ETC., SHALL BE USED FOR PLANTING.
9. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AND IN ACCORDANCE WITH ACCEPTED LOCAL PRACTICE.
10. SET ALL PLANTS PLUMB AND STRAIGHT. SET AT SUCH A LEVEL THAT AFTER SETTLEMENT, A NORMAL OR NATURAL RELATIONSHIP TO THE CROWN OF THE PLANT WITH THE GROUND SURFACE WILL BE ESTABLISHED. LOCATE PLANT IN THE CENTER OF THE PLANTING PIT.
11. EACH TREE AND SHRUB SHALL BE PRUNED IN ACCORDANCE WITH STANDARD HORTICULTURAL PRACTICE TO PRESERVE NATURAL CHARACTER OF THE PLANT. PRUNING SHALL BE DONE WITH CLEAN, SHARP TOOLS.
12. LANDSCAPING CONTRACTOR SHALL VERIFY LOCATION OF ALL UTILITIES PRIOR TO PLACEMENT OF LANDSCAPE MATERIAL. CONTRACTOR SHALL NOT PLACE LANDSCAPING MATERIAL ON TOP OF UTILITY PIPING.
13. CLEARANCE HEIGHT OF BRANCHING ON ALL SHADE TREES SHALL BE 6'-8".
14. PLAN QUANTITIES SHALL SUPERCEDE PLANT LIST.
15. THE CENTER OF ALL TREES SHALL BE PLANTED A MINIMUM OF 10 FEET FROM STORM SEWER, SANITARY SEWER AND DOMESTIC WATER LATERALS.



SHRUB PLANTING AND SHRUB BED PREPARATION

NOT TO SCALE



DECIDUOUS TREES 1-1/2" to 3-1/2" CALIPER
EVERGREEN TREES 4' to 8' HIGH

TREE STAKING & GUYING SHALL NOT BE IMPLEMENTED UNLESS SITE CONDITIONS SUCH AS WET/UNSTABLE SOILS, EXCESSIVE WIND, AND STEEP SLOPES (3:1 OR GREATER) EXIST. STAKING SHALL NOT BE INSTALLED WITHOUT THE APPROVAL OF THE LANDSCAPE ARCHITECT RESPONSIBLE FOR THE PREPARATION OF THESE PLANS. ALL STAKES SHALL BE PAINTED ORANGE, AND ALL WIRES SHALL BE FLAGGED WITH HIGH-VISIBILITY FLAGGING TAPE.

STAKES AND WIRING SHALL BE REMOVED AFTER ONE (1) FULL GROWING SEASON. WHEN REMOVED, STAKES SHALL BE DRIVEN BELOW GROUND LEVEL OR REMOVED FROM THE SITE ENTIRELY.

DECIDUOUS TREE PLANTING

NOT TO SCALE

LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	EXISTING PROPERTY BOUNDARY		PROPOSED ULTIMATE ROW LINE
	EXISTING EDGE OF PAVEMENT		PROPOSED BSBL
-115- -114-	EXISTING CONTOURS	F.F.E.	PROPOSED FIRST FLOOR ELEVATION
115	PROPOSED CONTOURS		PROPOSED CLEANOUT
	EXISTING STORM SEWER		MONUMENT TO BE SET
	SOIL BOUNDARY LINE	2.75%	DRAINAGE FLOW ARROW & SLOPE
S	EXISTING SANITARY MAIN	× 115.10	PROPOSED SPOT ELEVATION
W	EXISTING WATER MAIN	WL	PROPOSED WATER LATERAL
OHW	EXISTING OVERHEAD ELECTRIC	SL	PROPOSED SANITARY LATERAL
	EXISTING ADJOINING PROPERTY LINE		PROPOSED ROOF DRAIN
	EXISTING UTILITY POLES	X	PROPOSED ORANGE CONSTRUCTION FENCE
× 29.5	EXISTING SPOT ELEVATION	FH	EXISTING FIRE HYDRANT
	EXISTING T.G. INLET	UP	EXISTING UTILITY POLE
S	EXISTING SANITARY MH		SITE BENCHMARK
WV	EXISTING WATER VALVE		
	EXISTING IRON PIN		
	EXISTING TRAFFIC SIGN		
UmB	EXISTING BOUNDARY SOILS TYPE		
#2	SOIL TEST PIT		

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig
in Pennsylvania
1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

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Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

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SCALE IN FEET
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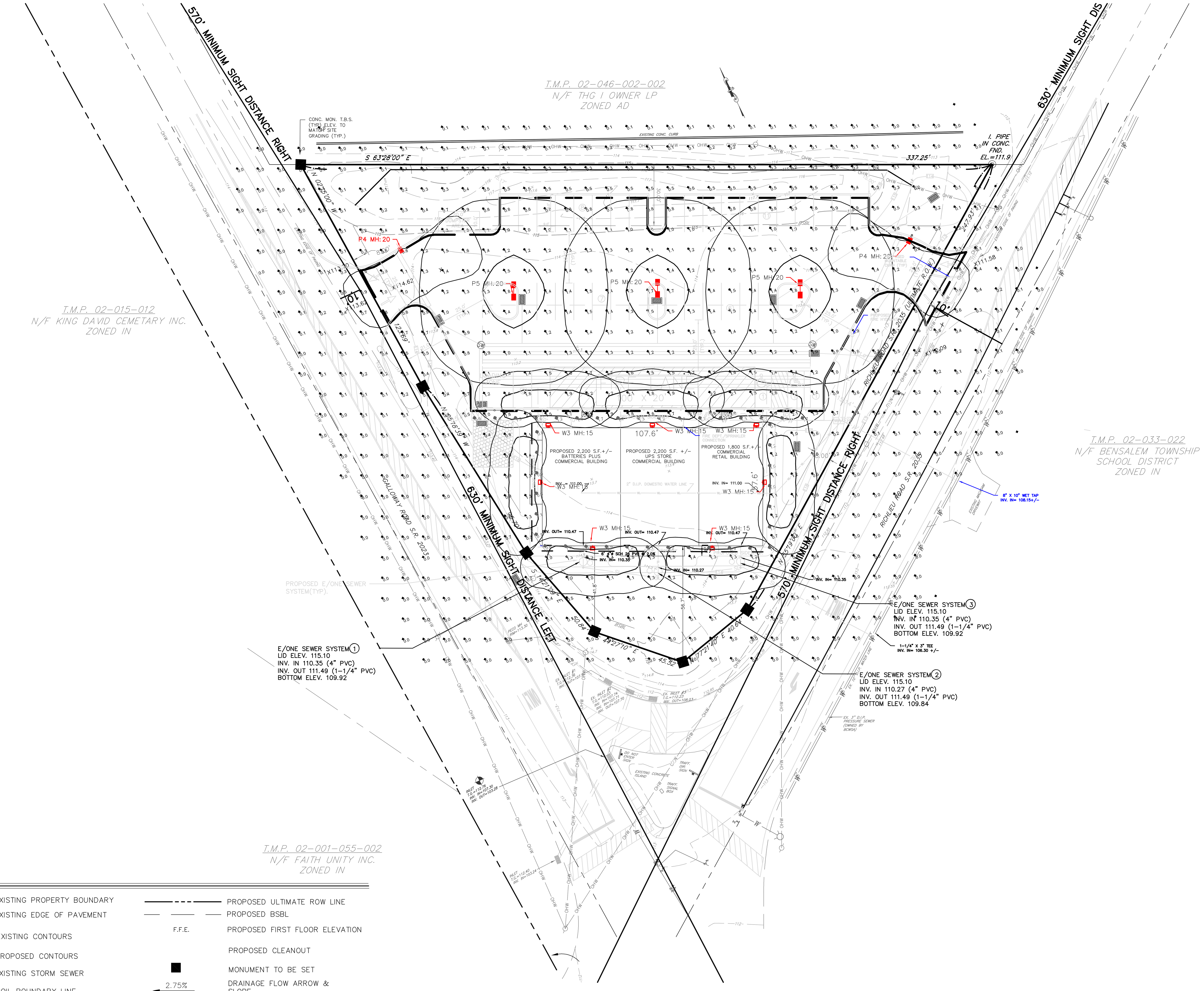
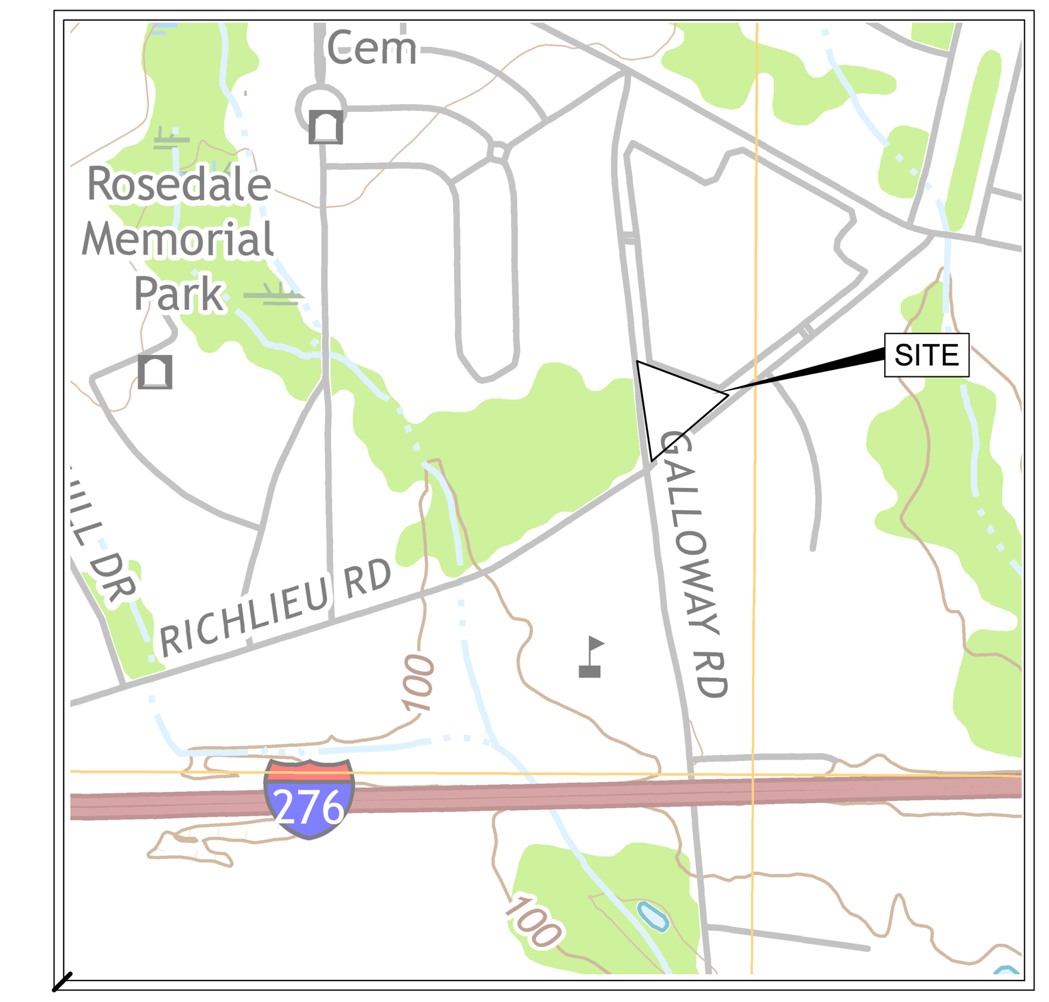
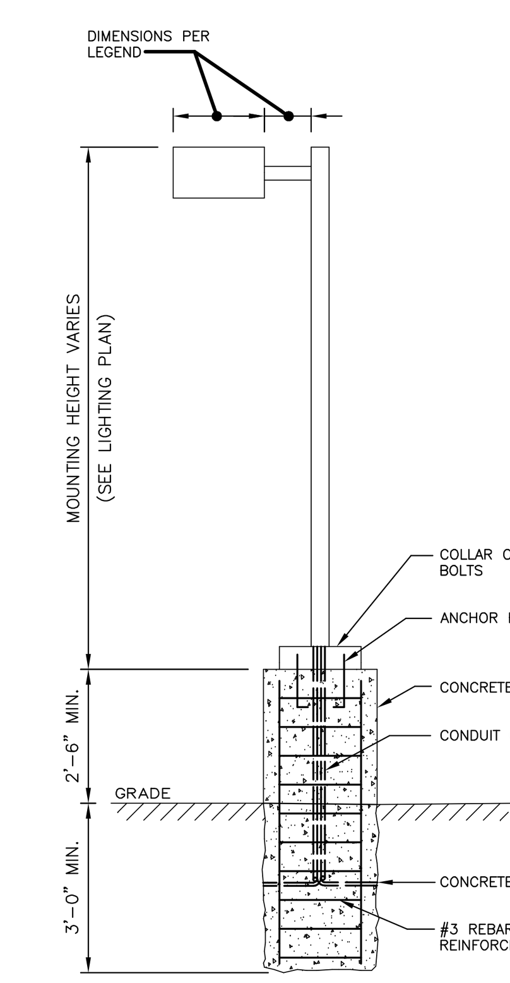
PRELIMINARY/FINAL
LANDSCAPING PLAN
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA





LOCATION MAP

SCALE: 1" = 800'



POLE LIGHTING (WITH 30" CONC. BASE)

N.T.S.

SITE LIGHTING

NOTES:

ALL SITE LIGHTING SHALL COMPLY WITH ALL TOWNSHIP ORDINANCES. NO GLARE SHALL EXTEND ON TO ADJOINING PROPERTIES.

LIGHTING PLAN NOTES

THE TOWNSHIP RESERVES THE RIGHT TO CONDUCT A POST INSTALLATION NIGHTTIME INSPECTION TO VERIFY COMPLIANCE WITH THE REQUIREMENTS OF THE MUNICIPAL CODE AND IF, APPROPRIATE, TO REQUIRE REMEDIAL ACTION AT NO EXPENSE TO THE TOWNSHIP.

LEGEND

- EXISTING PROPERTY BOUNDARY
- EXISTING EDGE OF PAVEMENT
- EXISTING CONTOURS
- PROPOSED CONTOURS
- EXISTING STORM SEWER
- SOIL BOUNDARY LINE
- EXISTING SANITARY MAIN
- EXISTING WATER MAIN
- EXISTING OVERHEAD ELECTRIC
- EXISTING ADJOINING PROPERTY LINE
- EXISTING UTILITY POLES
- EXISTING SPOT ELEVATION
- EXISTING T.G. INLET
- EXISTING SANITARY MH
- EXISTING WATER VALVE
- EXISTING IRON PIN
- EXISTING TRAFFIC SIGN
- UmB EXISTING BOUNDARY SOILS TYPE
- #2 SOIL TEST PIT
- PROPOSED ULTIMATE ROW LINE
- PROPOSED BSBL
- F.F.E. PROPOSED FIRST FLOOR ELEVATION
- PROPOSED CLEANOUT
- MONUMENT TO BE SET
- 2.75% DRAINAGE FLOW ARROW & SLOPE
- × 115.10 PROPOSED SPOT ELEVATION
- WL PROPOSED WATER LATERAL
- SL PROPOSED SANITARY LATERAL
- PROPOSED ROOF DRAIN
- X PROPOSED ORANGE CONSTRUCTION FENCE
- FH EXISTING FIRE HYDRANT
- EXISTING UTILITY POLE
- SITE BENCHMARK

LUMINAIRE SCHEDULE **REFER TO LIGHTING FIXTURE CUTSHEETS FOR COMPLETE CATALOG NUMBERS**

Symbol	Qty	Arrangement	Fixture Type	Description	Manufacturer	Catalog Number	CCT	LLF	Total Watts	Delivered Lumens	Mounting Height	Pole Spec	Filename
	2	Single	P4	POLE MOUNTED AREA LIGHT, TYPE 4W DISTRIBUTION	BEACON	RAR1-80L-25-3K7-4W-UNV-ASQ	3000K	0.900	25.4	3197	20	SSS-B-20-40-A-1-B3-VM1	RAR1-80L-25-3K7-4W.ies
	3	Back-Back	P5	POLE MOUNTED AREA LIGHTS, TYPE 5QW DISTRIBUTION	BEACON PRODUCTS	RAR1-80L-39-3K7-5QW-UNV-ASQ	3000K	0.900	75.96	10050	20	SSS-B-20-40-A-2-B3-VM1	RAR1-80L-39-3K7-5QW.ies
	7	Single	W3	WALL PACK, TYPE 3 DISTRIBUTION	BEACON	RWL1-48L-20-3K7-3-U	3000K	0.900	19.9	2605	15		RWL1-48L-20-3K7-3.ies

CALCULATION SUMMARY

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min	PtSpcLr	PtSpcTb
CALC PTS TO ZERO_Ground	Illuminance	Fc	0.2	2.2	0.0	N.A.	N.A.	10	N.A.
PROPERTY LINE_Ground	Illuminance	Fc	0.1	0.3	0.0	N.A.	N.A.	10	N.A.
SIDEWALK_Ground	Illuminance	Fc	1.2	1.9	0.6	2.0	3.2	10	N.A.
StatArea_PARKING LOT	Illuminance	Fc	1.3	2.2	0.7	1.8	3.1		

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig in Pennsylvania
1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

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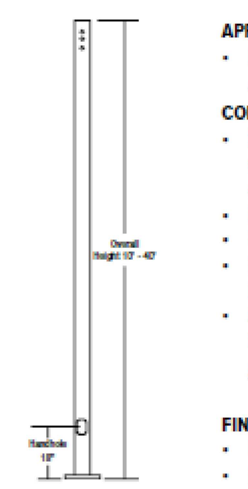
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL LARRY P. YOUNG ENGINEER PE053219-E

PRELIMINARY/FINAL
LIGHTING PLAN
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SSS-B Series Poles

SQUARE STRAIGHT STEEL

DATE: | LOCATION:
TYPE: | PROJECT:
CATALOG #:



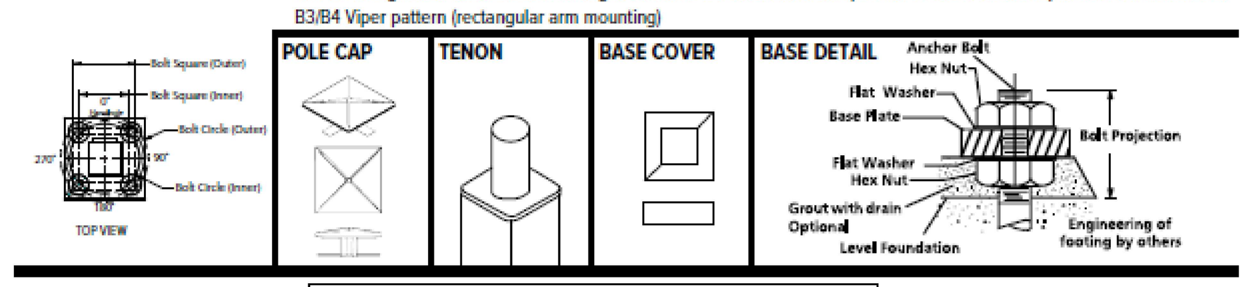
APPLICATIONS
- Lighting installations for side and top mounting of luminaires with effective projected area (EPA) not exceeding maximum allowable loading of the specified pole in its installed geographic location

CONSTRUCTION
- SHAFT: One-piece straight steel with square cross section, flat sides and minimum 0.23" radius on all corners; Minimum yield of 46,000 psi (ASTM-A500, Grade B); Longitudinal weld seam to appear flush with shaft side wall; Steel base plate with axial bolt circle slots welded flush to pole shaft having minimum yield of 36,000 psi (ASTM A36)
- BASE COVER: Two-piece square aluminum base cover included standard
- POLE CAP: Pole shaft supplied with removable cover when applicable; Tenon and post-top configurations also available
- HAND HOLE: Rectangular 3x5 steel hand hole frame (2.38" x 4.38" opening); Mounting provisions for grounding lug located behind gasketed cover
- ANCHOR BOLTS: Four galvanized anchor bolts provided per pole with minimum yield of 55,000 psi (ASTM F1554). Galvanized hardware with two washers and two nuts per bolt for leveling

Anchor bolt part numbers: 3/4 x 30 x 3 — TAB-30-M38
1 x 36 x 4 — TAB-36-M38

FINISH
- Durable thermoset polyester powder coat paint finish with nominal 3.0 mil thickness
- Powder paint prime applied over "white metal" steel substrate cleaned via mechanical shot blast method
- Decorative finish coat available in multiple standard colors; Custom colors available; RAL number preferable

WAREHOUSE 'STOCKED' POLES:
- SSSH20-40A-4-HV-DB-RDC, SSSH25-40A-4-HV-DB-RDC and SSSH30-50B-4-HV-DB-RDC
- The HV designation in the above catalog numbers is a combination drill pattern of the Current S2 pattern and the Beacon B3/B4 Viper pattern (rectangular arm mounting)



ORDERING INFORMATION

ORDERING EXAMPLE: Reference page 2 for available configurations

SSS-B – 25 – 40 – A/B/C – 2L – B3 – BLT – UL

SERIES	HEIGHT	SHAFT	THICKNESS
SSS-B Square Straight Steel Pole Beacon	Reference page 2 Ordering matrix	Reference page 2 Ordering matrix	Reference page 2 Ordering matrix

MOUNTING

1	Single arm mount
2	Two fixtures at 180°
2L	Two fixtures at 90°
3T	Three fixtures at 90°
4	Four fixtures at 90°
TA	Tenon (2.38" OD x 4" Tall)
TB	Tenon (2.88" OD x 4" Tall)
TC	Tenon (3.5" OD x 6" Tall)
TR[1]	Removable Tenon (2.375 x 4.25)
OT	Open Top (includes pole cap)

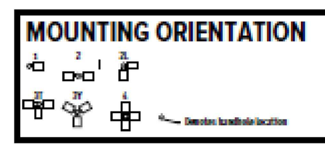
FINISH

BLT	Black Matte Textured
BLS	Black Gloss Smooth
DBT	Dark Bronze Matte Textured
DBS	Dark Bronze Gloss Smooth
GTT	Graphite Matte Textured
LGS	Light Grey Gloss Smooth
PSS	Platinum Silver Smooth
WHT	White Matte Textured
WHS	White Gloss Smooth
VGT	Verde Green Textured
Color Option	
CC	Custom Color

OPTIONS

GFI[2]	20 Amp GFCI Receptacle and Cover
EHH[2]	Extra Handhole
C05[2]	.5" Coupling
C07[2]	.75" Coupling
C20[2]	2" Coupling
MPB[2]	Mid-pole Luminaire Bracket
VM2	2nd mode vibration damper
LAB	Less Anchor Bolts
UL	UL Certified

MOUNTING ORIENTATION



1 Removable tenon used in conjunction with side arm mounting. First specify desired arm configuration followed by the "TR" notation. Example: SSS-B-25-40-A-1-B1-TR-BBT
2 Specify option location using logic found on page 2 (Option Orientation)
3 VM1 recommended on poles 20' and taller with EPA of less than 1.

DRILL PATTERN

B1	Cruzer "AM" arm
B3	2 bolt (2-½" spacing), Viper "A" arm
S2	2 bolt (3-½" spacing), Viper "AD" arm

ACCESSORIES - Order Separately

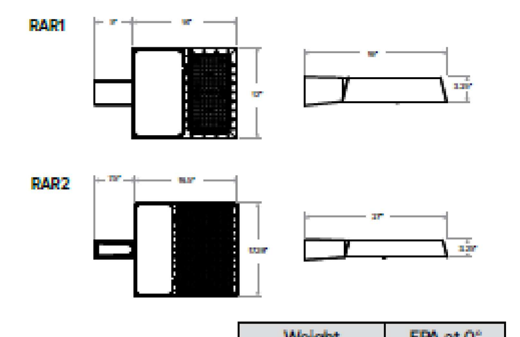
Catalog Number	Description
VM1[3]	1st mode vibration damper
VM2SXX	2nd mode vibration damper

RATIO Series

AREA/SITE LIGHTER

DATE: | LOCATION:
TYPE: | PROJECT:
CATALOG #:

FEATURES
- Low profile LED area/site luminaire with a variety of IES distributions for lighting applications such as retail, commercial and campus parking lots
- Featuring Micro Strike Optics which maximizes target zone illumination with minimal losses at the house-side, reducing light trespass issues
- Visual comfort standard
- Compact and lightweight design with low EPA
- 3G rated for high vibration applications including bridges and overpasses
- Control options including photo control, occupancy sensing, NX Distributed Intelligence™ and 7-Pin with networked controls
- Best in class surge protection available



	Weight	EPA at 0°
RAR1	13.5 lbs / 6.1 kg	.45ft² / .13m²
RAR2	24 lbs / 10.9 kg	.55ft² / .17m²

CONTROL TECHNOLOGY

SERVICE PROGRAMS

STOCK QS10

SPECIFICATIONS

CONSTRUCTION
- Rectilinear form mimics the traditional shoebox form factor keeping a similar but updated style and appearance, ideal for retrofit applications
- Die-cast housing with hidden vertical heat fins that are optimal for heat dissipation while keeping a clean smooth outer surface
- Corrosion resistant, die-cast aluminum housing with powder coat paint finish

OPTICS
- Entire optical aperture illuminates to create a larger luminous surface area resulting in a low glare appearance without sacrificing optical performance
- 80, 160, 320 or 480 midpower LEDs
- 3000K, 4000K or 5000K (70 CRI) CCT
- Zero uplight at 0 degrees of tilt
- Field rotatable optics

INSTALLATION
- Standard square arm mount, compatible with B3 drill pattern
- Optional universal mounting block for ease of installation during retrofit applications. Available as an option or accessory for square and round poles.
- Knuckle arm fitter option available for 2-3/8" OD tenon. Max tilt of 60 degrees with 4 degree adjustable increments. (Restrictions apply for 7-pin options)

ELECTRICAL
- Universal 120-277 VAC or 347-480 VAC input voltage, 50/60 Hz
- Ambient operating temperature -40°C to 40°C
- Drivers have greater than 90% power factor and less than 20% THD
- LED drivers have output power over-voltage, over-current protection and short circuit protection with auto recovery
- Field replaceable surge protection device provides 20kA protection meeting ANSI/IEEE C62.41.2 Category C High and Surge Location Category C3; Automatically takes fixture off-line for protection when device is compromised

CONTROLS
- Photo control, occupancy sensor and wireless available for complete on/off and dimming control
- 7-pin ANSI C136.41-2013 photocontrol receptacle option available for twist lock photocontrols or wireless control modules (control accessories sold separately)
- 0-10 V Dimming Drivers are standard and dimming leads are extended out of the luminaire unless control options require connection to the dimming leads. Must specify if wiring leads are to be greater than the 6" standard
- NX Distributed Intelligence™ available with in fixture wireless control module, features dimming and occupancy sensor

CERTIFICATIONS
- DLC® (DesignLights Consortium Qualified), with some Premium Qualified configurations. Not all product variations on this page are DLC Qualified. Refer to www.designlights.org for the most up-to-date list.
- Listed to UL1598 and CSA C22.2#250.0-24 for wet locations and 40°C ambient temperatures
- 3G rated for ANSI C136.31 high vibration applications
- Fixture is IP66 rated
- Meets IDA recommendations using 3K CCT configuration at 0 degrees of tilt
- This product meets federal procurement law requirements under the Buy American Act (FAR 52.225-9) and Trade Agreements Act (FAR 52.225-11). See Buy America(n) Solutions (link to https://www.currentlighting.com/resources/america-solutions)

WARRANTY
- 5 year limited warranty
- See HLI Standard Warranty for additional information

RATIO Series

AREA/SITE LIGHTER

DATE: | LOCATION:
TYPE: | PROJECT:
CATALOG #:

Grey Shading = Service Program Limit of 15 luminaires QS10

ORDERING GUIDE

Example: RAR1-80L-25-3K7-2-UNV-ASQ-BL-NXW-BC

CATALOG #

ORDERING INFORMATION

Series

RAR1	Ratio Area Size 1
RAR2	Ratio Area Size 2

 # LEDs - Wattage

80L-25	25W - 3,000 Lumens
80L-39	39W - 5,200 Lumens
80L-50	50W - 6,000 Lumens
160L-70	70W - 9,000 Lumens
160L-100	100W - 12,000 Lumens
160L-115	115W - 15,000 Lumens
160L-135	135W - 18,000 Lumens
320L-110	110W - 15,000 Lumens
320L-140	140W - 18,000 Lumens
320L-165	165W - 21,000 Lumens
480L-185	185W - 24,000 Lumens
480L-210	210W - 27,000 Lumens
480L-240	240W - 30,000 Lumens
480L-255	255W - 36,000 Lumens
480L-295	295W - 42,000 Lumens
480L-340	340W - 48,000 Lumens

CCT/CRI

3K7	3000K, 70 CRI
4K7	4000K, 70 CRI
5K7	5000K, 70 CRI

Distribution

2	IES TYPE II
3	IES TYPE III
4W	IES TYPE IV
4F	IES TYPE IV Forward
5QW	IES TYPE V

Optics Rotation

	Blank for no rotation
L	Optic rotation left
R	Optic rotation right

Voltage

UNV	Universal 120-277V
120	120V
208	208V
240	240V
277	277V
347	347V
480	480V

Mounting

ASQ	Arm mount for square pole/flat surface
ASQU	Universal arm mount for square pole/flat surface- Does not include round pole adapt or B3 drill pattern
Mounting Round Poles	
A_	Arm mount for round pole[1] B3 drill pattern
A_U	Universal arm mount for round pole[1]
Mounting Other	
WB	Wall bracket
MAF	Mast arm fitter for 2-3/8" OD horizontal arm
K	Knuckle

Color

BLT	Black Matte Textured
BLS	Black Gloss Smooth
DBT	Dark Bronze Matte Textured
DBS	Dark Brone Gloss Smooth
GTT	Graphite Matte Textured
LGS	Light Grey Gloss Smooth
PSS	Platinum Silver Smooth
WHT	White Matte Textured
WHS	White Gloss Smooth
VGT	Verde Green Textured
Color Option	
CC	Custom Color

Control Options Network

NXWS16F	NX Networked Wireless Enabled Integral NXSMP2-LMO PIR Occupancy Sensor with Automatic Dimming Photocell and Bluetooth Programming[6,7]
NXWS40F	NX Networked Wireless Enabled Integral NXSMP2-HMO PIR Occupancy Sensor with Automatic Dimming Photocell and Bluetooth Programming[6,7]
NXW	NX Networked Wireless Radio Module NXRM2 and Bluetooth Programming, without Sensor[6,7]
Control Options Other	
SCP_F	Programmable occupancy sensor[3,4]
7PR	7-Pin twist lock receptacle
7PR-SC	7-Pin receptacle with shorting cap
7PR-MD40F	Low voltage sensor for 7PR
7PR-TL	7-Pin PCR with photocontrol
ADD	AutoDim Timer Based Dimming
ADT	AutoDim Time of Day Dimming
BTS-14F	Bluetooth® Programmable, BTSMP-LMO PIR Occupancy Sensor with Automatic Dimming Photocell and 360° Lens[9]
BTS-40F	Bluetooth® Programmable, BTSMP-LMO PIR Occupancy Sensor with Automatic Dimming Photocell and 360° Lens[9]
BTSO-12F	Bluetooth® Programmable, BTSMP-OMNI-O PIR Occupancy Sensor with Automatic Dimming Photocell and 360° Lens[9]

Options

BC	Backlight control[8]
F	Fusing[5]
TB	Terminal block
2PF	2 power feed with 2 drivers[7]

Notes:
1 Replace "_" with "3" for 3.5"-4.13" OD pole, "4" for 4.18"-5.25" OD pole, "5" for 5.5"-6.5" OD pole
2 Not available with 25, 50, 255, 295 & 340W configurations
3 At least one SCPREMOTE required to program SCP motion sensor
4 Replace "_" with 8F or 40F lens
5 Must specify voltage
6 Networked Controls cannot be combined with other control options
7 Not available with 2PF option
8 BC not available on 4F distributions
9 BTS and BTSO available for 50 Watts or higher and only on 120-277 voltage

RATIO Wall

RWL1/RWL2 LED WALLPACK

DATE: | LOCATION:
TYPE: | PROJECT:
CATALOG #:

FEATURES
- Low profile LED wall luminaire with a variety of IES distributions for lighting applications such as retail, commercial and industrial building mount
- Featuring Micro Strike Optics which maximizes target zone illumination with minimal losses at the house-side, reducing light trespass issues
- Visual comfort standard
- Control options including photo control, occupancy sensing, NX Distributed Intelligence™, Wiscape and 7-Pin with networked controls
- Battery Backup options available for emergency code compliance
- Quick-mount adapter allows easy installation/maintenance
- 347V and 480V versions for industrial applications and Canada

	Weight
RWL1	6.5 lbs / 2.95 kg
RWL2	16.5 lbs / 7.48 kg

CONTROL TECHNOLOGY

LIGHTGRID+

SERVICE PROGRAM

QS10

SPECIFICATIONS

CONSTRUCTION
- Die-cast housing with hidden vertical heat fins that are optimal for heat dissipation while keeping a clean smooth outer surface
- Corrosion resistant, die-cast aluminum housing with powder coat paint finish
- Powder paint finish provides durability in outdoor environments. Tested to meet 1000 hour salt spray rating

OPTICS
- Entire optical aperture illuminates to create a larger luminous surface area resulting in a low glare appearance without sacrificing optical performance
- 48 or 160 midpower LEDs
- 3000K, 4000K or 5000K (70 CRI/80 CRI) CCT
- Zero uplight distributions
- LED optics provide IES type II, III and IV distributions. Type II only available in RWL2 configurations

INSTALLATION
- Quick-mount adapter provides easy installation to wall or to recessed junction boxes (4" square junction box)
- Designed for direct J-box mount.
- Integral back box contains 1/2" conduit hubs
- Integral back box standard with Dual Driver, Dual Power Feed, NX, Wiscape and battery versions (battery versions for RWL1 only)

ELECTRICAL
- 120V-277V universal voltage 50/60Hz 0-10V dimming drivers
- 347V and 480V dimmable driver option for all wattages above 35W
- Ambient operating temperature -40°C to 40°C
- Driver RoHS and IP66

ELECTRICAL (CONTINUED)
- 10kV Surge Protector optional
- Drivers have greater than .90 power factor and less than 20% Total Harmonic Distortion
- Dual Driver option provides 2 drivers within luminaire but only one set of leads exiting the luminaire, where Dual Power Feed provides two drivers which can be wired independently as two sets of leads are extended from the luminaire. Both options can not be included in one same fixture.
- Dimming drivers are standard and dimming leads are extended out of the luminaire unless control options require connection to the dimming leads. Must specify if wiring leads are to be greater than 6" standard.

CONTROLS
- Photo control, occupancy sensor and wireless available for complete on/off and dimming control
- Button photocontrol is suitable for 120-277V operation
- 7-pin ANSI C136.41-2013 photocontrol receptacle option available for twist lock photocontrols or wireless control modules (control accessories sold separately)
- NX Distributed Intelligence™ available with in fixture wireless control module, features dimming and occupancy sensor wiSCAPE® available with in fixture wireless control module, features dimming and occupancy sensor
- Integral Battery Backup provides emergency lighting for the required 90 minute path of egress
- Battery Backup suitable for operating temperatures -25°C to 40°C. RWL1 battery is 12.5W RWL2 battery is 18W

CONTROLS (CONTINUED)
- Dual Driver and Dual Power Feed options creates product configuration with 2 internal drivers for code compliance
- Please consult brand or sales representative when combining control and electrical options as some combinations may not operate as anticipated depending on your application.
- LightGRID+ available with in fixture wireless control module, features dimming and occupancy sensor. Also available in 7-pin configuration

CERTIFICATIONS
- Listed to UL1598 and CSAC22.2#250.0-24 for wet locations
- IP65 rated housing
- Not all product variations listed in this document are DLC™ ((DesignLights Consortium Qualified). Refer to designlights.org for most up-to-date list.
- Emergency battery backup options are California Energy Commission (CEC) Title 20 Compliant

WARRANTY
- 5 year limited warranty

RATIO Wall

RWL1/RWL2 LED WALLPACK

DATE: | LOCATION:
TYPE: | PROJECT:
CATALOG #:

Grey Shading = Service Program Limit of 15 luminaires QS10

ORDERING GUIDE

Example: RWL1–48L-10–3K7–2–UNV–BLS–E

CATALOG #

Series

RWL1	Ratio Wall 1
RWL2	Ratio Wall 2

 # LEDs - Wattage

48L-10	1,000 Lumens[4]
48L-15	2,000 Lumens[4]
48L-20	2,500 Lumens[4]
48L-25	3,500 Lumens
48L-35	4,500 Lumens
48L-45	5,500 Lumens[4]
160L-45	6,500 Lumens
160L-50	7,500 Lumens
160L-65	9,500 Lumens
160L-80	11,000 Lumens
160L-95	13,000 Lumens
160L-115	15,000 Lumens
160L-135	17,500 Lumens
160L-155	19,500 Lumens

CCT/CRI

3K7	3000K, 70 CRI
4K7	4000K, 70 CRI
5K7	5000K, 70 CRI

Distribution

2	IES TYPE II[1]
3	IES TYPE III
4F	IES TYPE IV Forward[1]
4W	IES TYPE IV

Voltage

UNV	120-277V
120	120V
208	208V
240	240V
277	277V
347	347V
480	480V

Color

BLT	Black Matte Textured
BLS	Black Gloss Smooth
DBT	Dark Bronze Matte Textured
DBS	Dark Bronze Gloss Smooth
GTT	Graphite Matte Textured
LGS	Light Grey Gloss Smooth
LGT	Light Grey Matte Textured
PSS	Platinum Silver Smooth
WHT	White Matte Textured
WHS	White Gloss Smooth
VGT	Verde Green Textured
Color Option	
CC	Custom Color

Control Options Network

NXW	NX Networked Wireless Radio Module NXRM2 and Bluetooth Programming, without Sensor
NXWS16F	NX Networked Wireless Enabled Integral NXSMP2-LMO PIR Occupancy Sensor with Automatic Dimming Photocell and Bluetooth Programming
NXWS40F	NX Networked Wireless Enabled Integral NXSMP2-HMO PIR Occupancy Sensor with Automatic Dimming Photocell and Bluetooth Programming
WIR	LightGRID+ In-Fixture Module[2,6]
Stand Alone Sensors	
SCP-8F	Remote control programmable line voltage sensor[3,4]
SCP-20F	Remote control programmable line voltage sensor[3,4]
BTS-14F	Bluetooth® Programmable, PIR Occupancy/Daylight Sensor[10]
BTS-40F	Bluetooth® Programmable, PIR Occupancy/Daylight Sensor[10]
BTSO-12F	Bluetooth® Programmable, PIR Occupancy/Daylight Sensor, up to 12' mounting height[10]
Control Options	
7PR_	7-Pin Receptacle[5]

Options*

F	Fusing[3]
E	Emergency Battery Backup[7,8,9]
EH	Emergency Battery w/ Heater Option[7,8]
2DR	Dual Driver[4,6,11]
2PF	Dual Power Feed[4,6,11]
PC	Button Photocontrol[8,12]
SP	10kA Surge Protector[12]

Notes:
1 Only available with RWL2
2 Networked Controls cannot be combined with other control options
3 Must specify voltage, 120V or 277V only
4 Not available with 347/480V
5 Replace "_" with "14" for up to 14' mounting height, "40" for up to 40' mounting height
6 This item is located in the integral backbox which will be automatically added onto the fixture if chosen.
7 For E and EH, an integral backbox is added to the RWL1 configuration
8 Option only available at 120 or 277V
9 2DR and 2PF can't be combined with E and EH due to space limitations
10 Not available in RWL1 or 2 PF
11 Available only in UNV in 25, 35 and 45 Watt in RWL1; Not available in RWL1 10, 15 and 20 Watt.
12 SP and PC cannot be in the same fixture due to space constraints
* Based on space limitations, some options may not be able to be combined

CONTROLS

Control Options

Standalone

SCPREMOTE Order at least one per project location to program and control

ACCESSORIES AND REPLACEMENT PATS - MADE TO ORDER

	Catalog Number	Description
☐	WP-BB-XXX	Accessory for conduit entry[1]

Notes:
1 replace "xxx" with color option

NOTE:

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Pennsylvania One Call System, Inc.
SERIAL NO. 2022–1160890
Call Before You Dig in Pennsylvania 1–800–242–1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	
Acreage: SEE TABLES		No. of Lots: 1
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

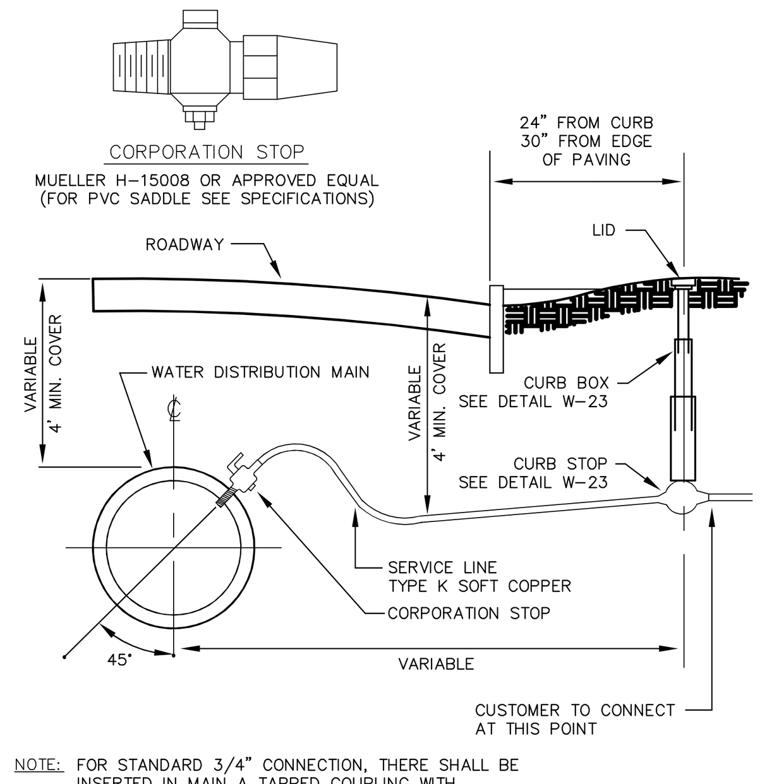
SCALE IN FEET: 30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA – REGISTERED PROFESSIONAL ENGINEER – LARRY P. YOUNG – PE053219-E

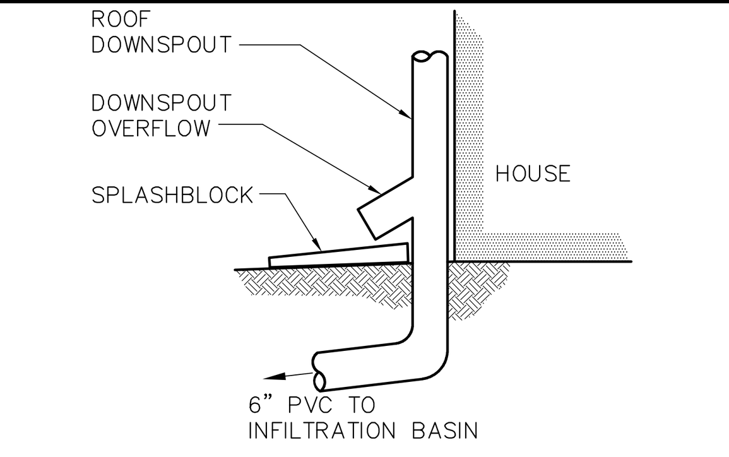
PRELIMINARY/FINAL
LIGHTING & LANDSCAPING NOTES & DETAILS
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 12 OF 17



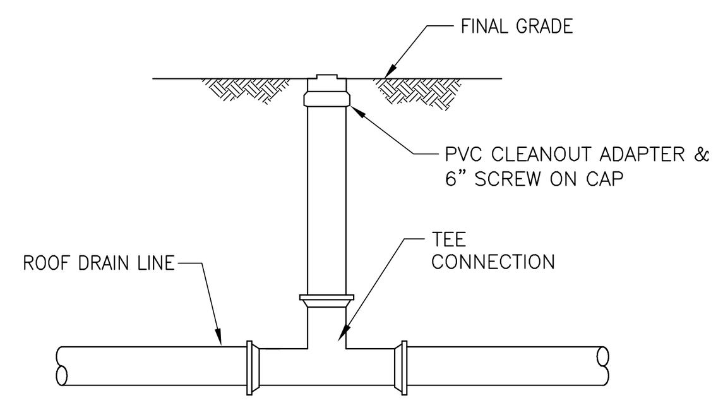
NOTE: FOR STANDARD 3/4" CONNECTION, THERE SHALL BE INSERTED IN MAIN A TAPPED COUPLING WITH THREADED INSERT OR DOUBLE-STRAPPED SADDLE CLAMP.

TYPICAL WATER SERVICE DETAIL
NOT TO SCALE



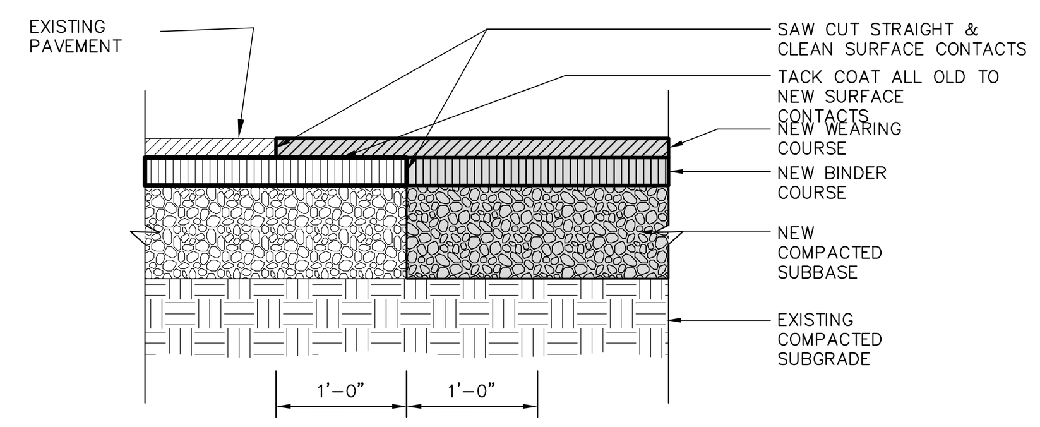
NOTES:
1. ALL ROOF DOWNSPOUTS ARE TO DRAIN INTO THE INFILTRATION BED.

DOWNSPOUT OVERFLOW DETAIL
NOT TO SCALE



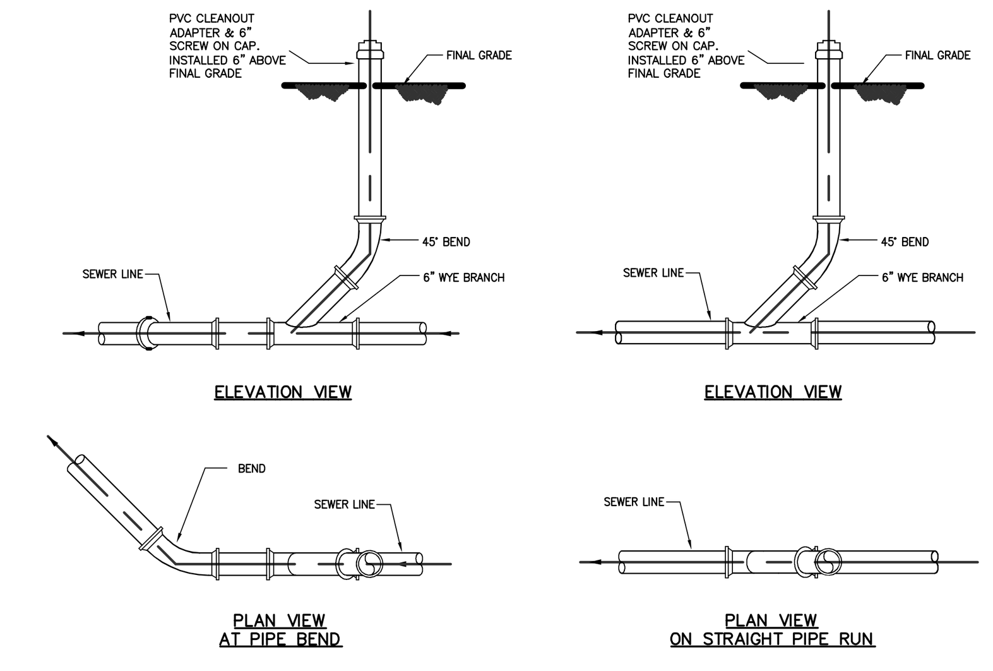
ELEVATION VIEW

CLEANOUT DETAIL
NOT TO SCALE

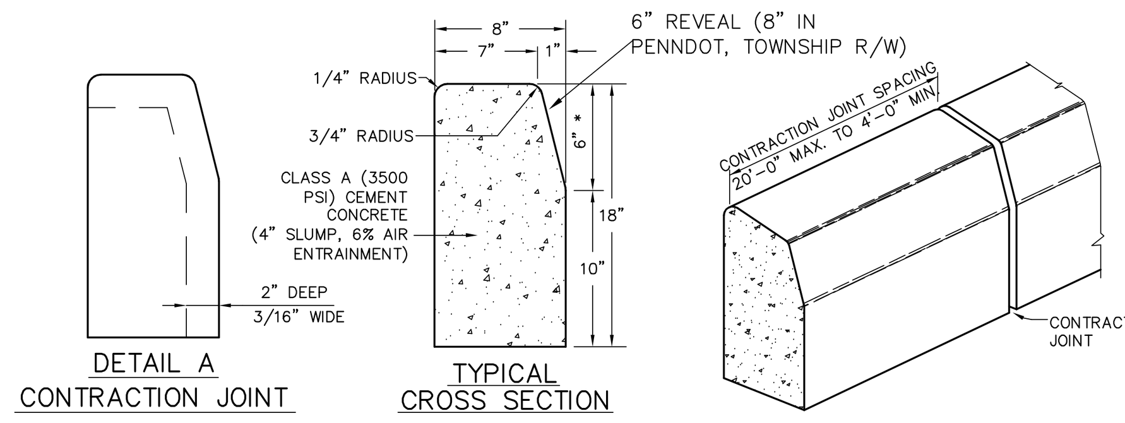


NOTE:
1. CONTRACTOR SHALL INSTALL 2'-0" WIDE GEOTEXTILE FABRIC FULL LENGTH OF JOINT.
2. SEE ASPHALT PAVING SECTION DETAIL FOR LAYER DEPTHS

NEW/EXISTING ASPHALT INTERFACE
NOT TO SCALE



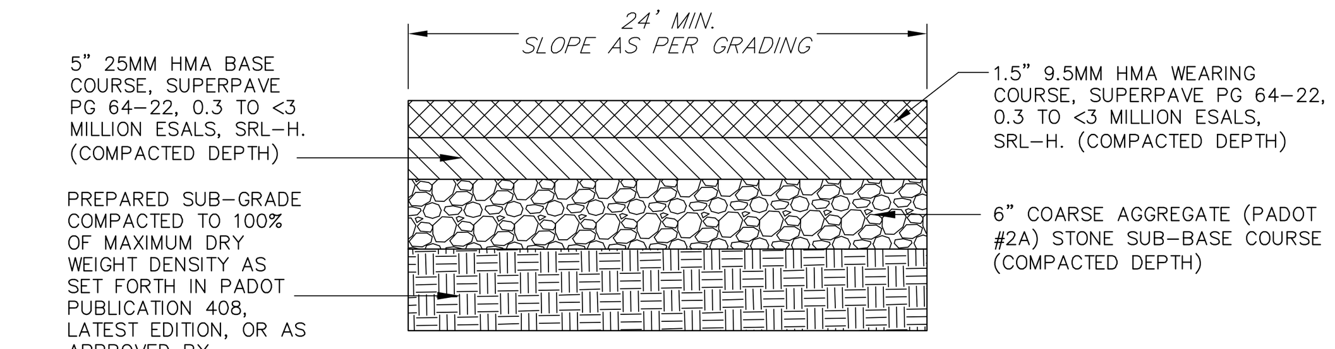
SANITARY CLEAN-OUT DETAILS
NOT TO SCALE



DETAIL A CONTRACTION JOINT

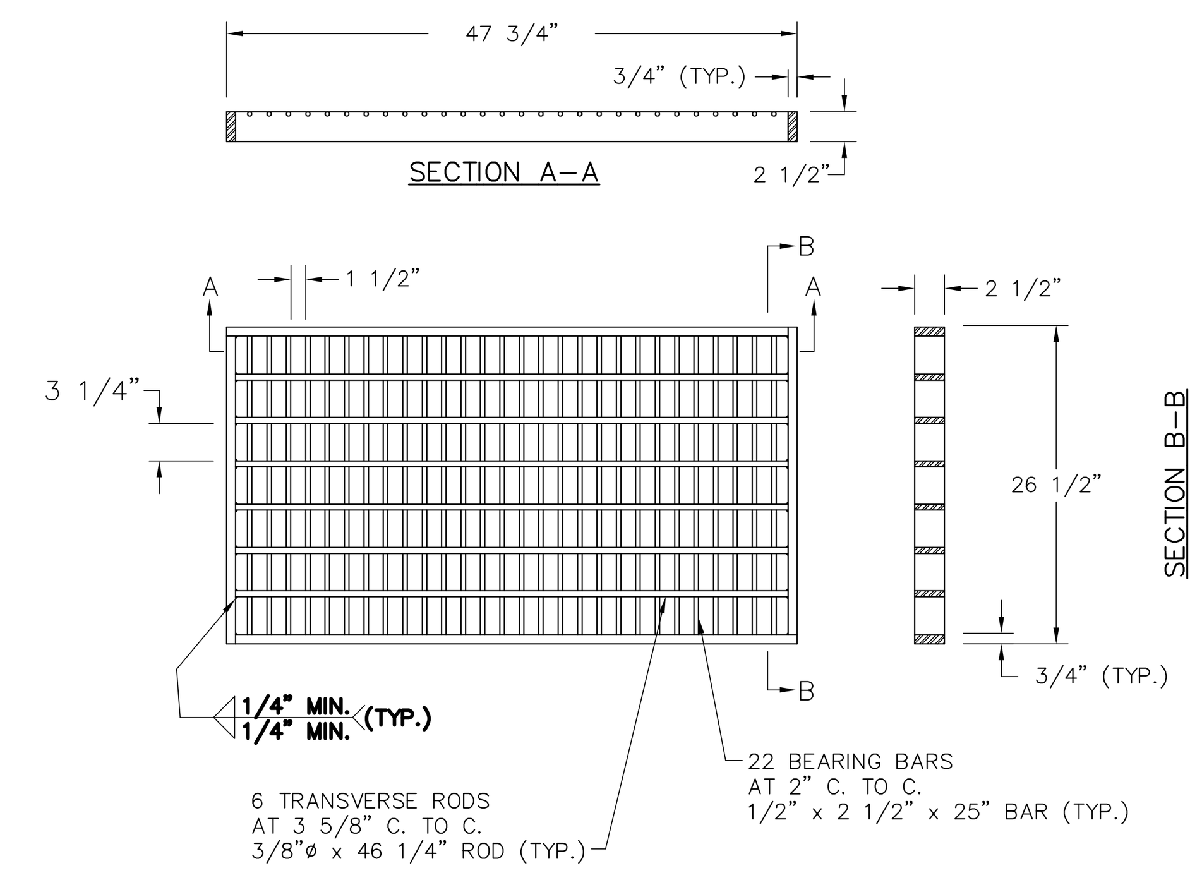
TYPICAL CROSS SECTION

PLAIN CEMENT CONCRETE CURB
NOT TO SCALE



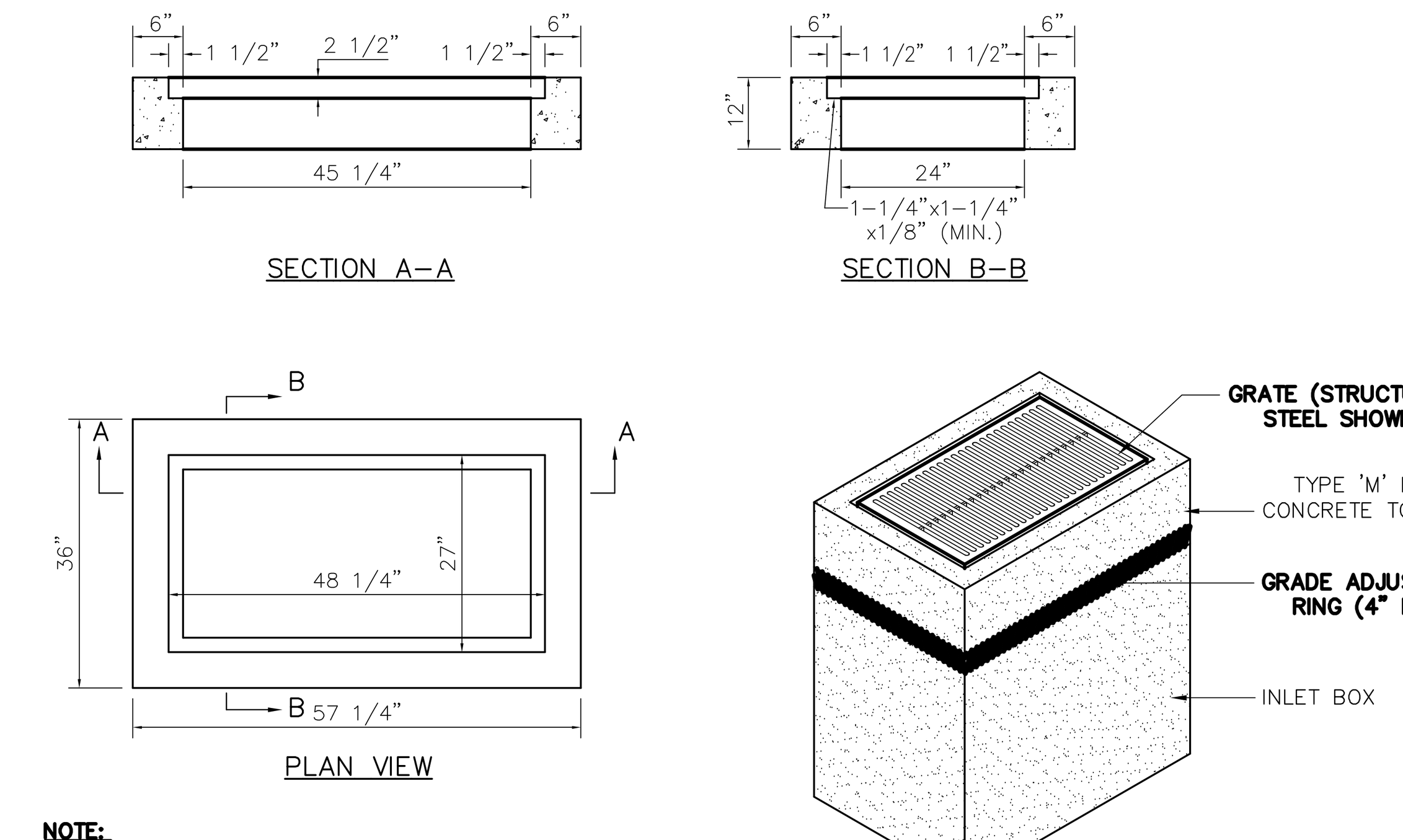
NOTE:
1. USE PG 64-22 JOINT SEALANT WHERE NEW ASPHALT MEETS EXISTING ASPHALT (TYP.).
2. SUBGRADE SHALL BE COMPACTED IN ACCORDANCE WITH SPECIFICATIONS OF PADOT PUBLICATION 408, LATEST EDITION, WHERE PARKING AREA(S) ARE TO BE USED FOR INFILTRATION PRACTICES, SUBGRADE SHALL NOT BE COMPACTED AND IT SHALL BE PROTECTED FROM COMPACTION FROM CONSTRUCTION EQUIPMENT, TRAFFIC, STORAGE OF MATERIALS, ETC. TO PRESERVE INFILTRATION CAPACITY OF SUBGRADE SOILS.

PARKING LOT PAVING DETAIL
NOT TO SCALE



SECTION A-A

STRUCTURAL STEEL GRATE BICYCLE SAFE
NOT TO SCALE



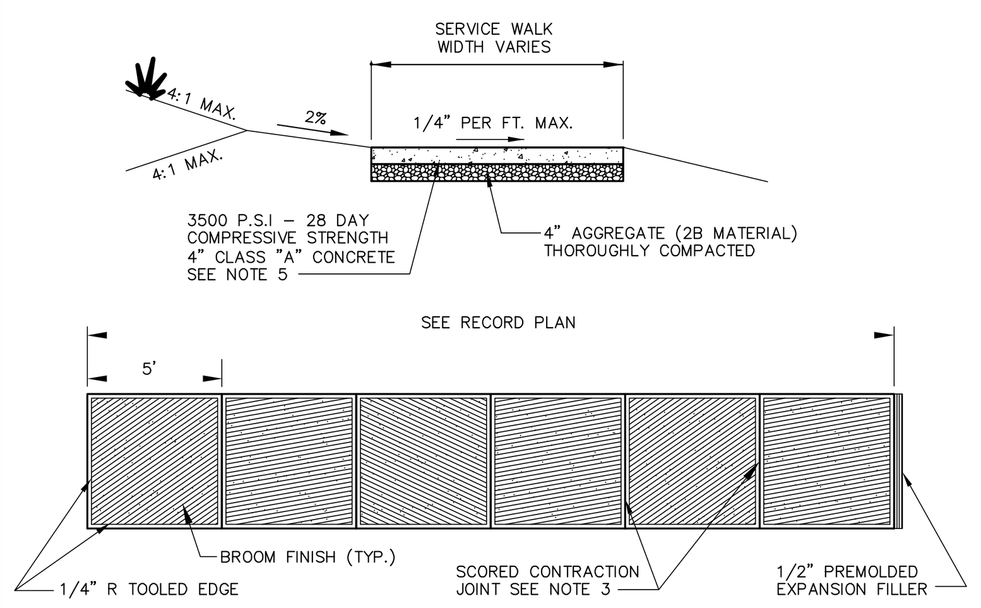
SECTION A-A

SECTION B-B

PLAN VIEW

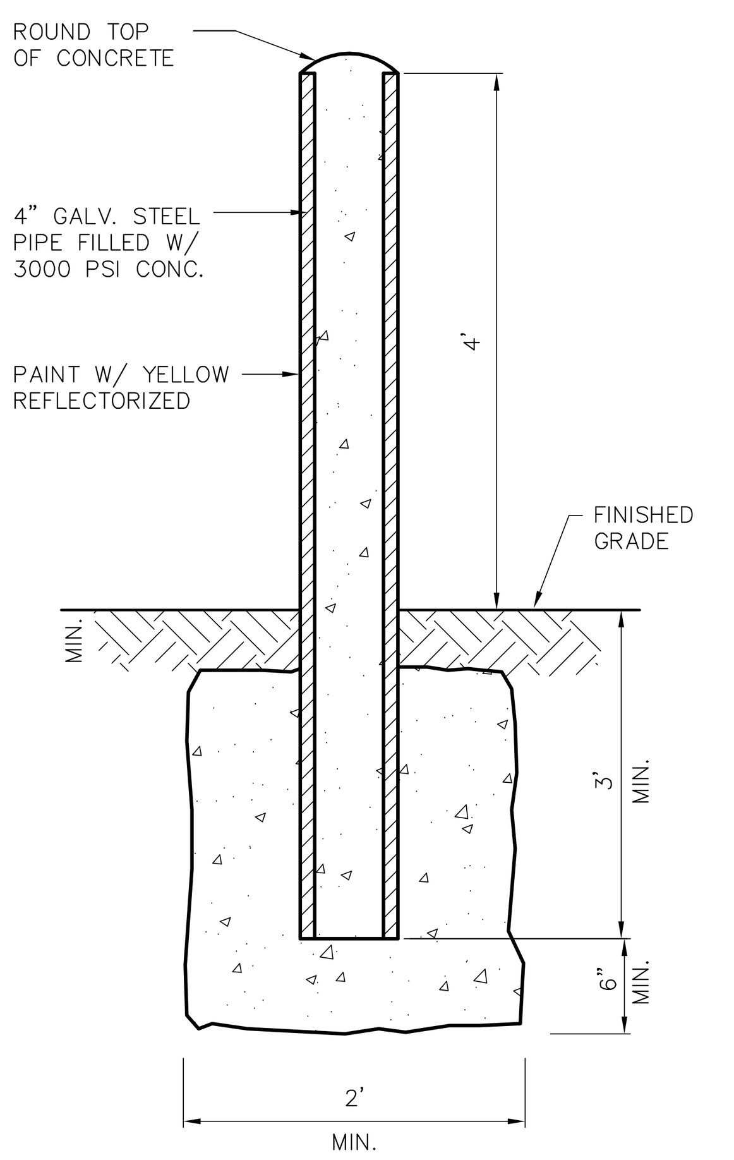
NOTE:
REFER TO "COMMONWEALTH OF PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, BUREAU OF DESIGN, STANDARDS FOR ROADWAY CONSTRUCTION", PAGE RC-46M, LATEST ISSUE, FOR NOTES AND SPECIFICATIONS REGARDING PRECAST INLET CONSTRUCTION.

TYPE 'M' INLET DETAIL
NOT TO SCALE

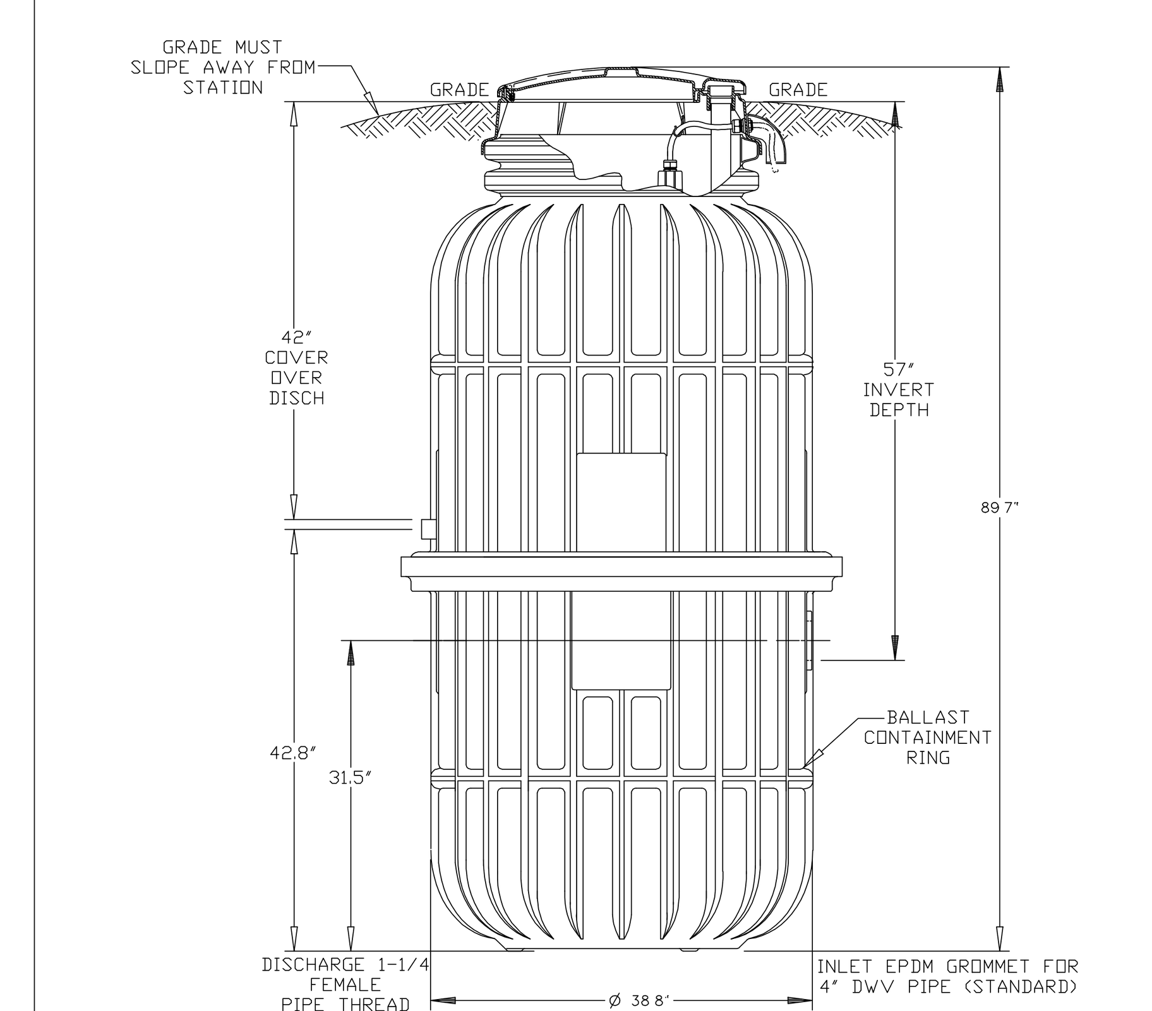


NOTES:
1. PROVIDE MATERIAL AND CONSTRUCTION METHODS MEETING THE REQUIREMENTS OF PENNDOT SPECIFICATIONS, PUBLICATION 408.
2. PLACE 1/2" PREMOLDED EXPANSION MATERIAL FOR THE FULL DEPTH OF THE SIDEWALK AT 30' INTERVALS, OPPOSITE EXPANSION JOINTS, IN ADJACENT CURB, BETWEEN THE SIDEWALK AND THE CURB AND BETWEEN THE SIDEWALK AND RIGID STRUCTURES.
3. FORM TRANSVERSE DUMMY JOINTS AT 5 FOOT INTERVALS, APPROXIMATELY 1/8" WIDE AND AT LEAST 1" DEEP.
4. BROOM FINISH TO PROVIDE A NON-SLIP SURFACE TEXTURE.
5. WHERE SIDEWALK IS ADJACENT TO A DRIVEWAY APRON, THE CONCRETE SHALL MATCH THE APRON DEPTH.

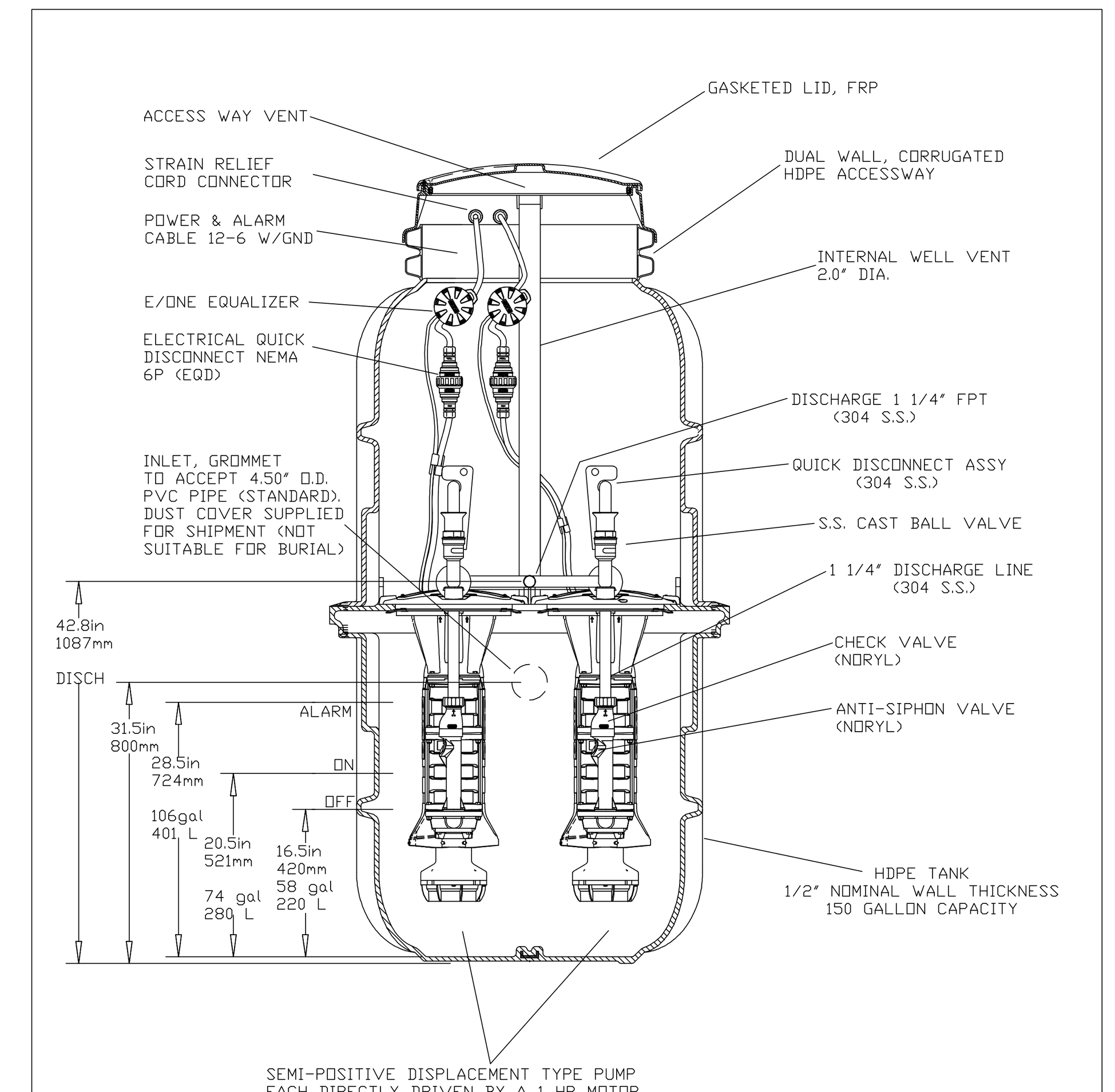
TYPICAL CONCRETE SIDEWALK DETAIL
NOT TO SCALE



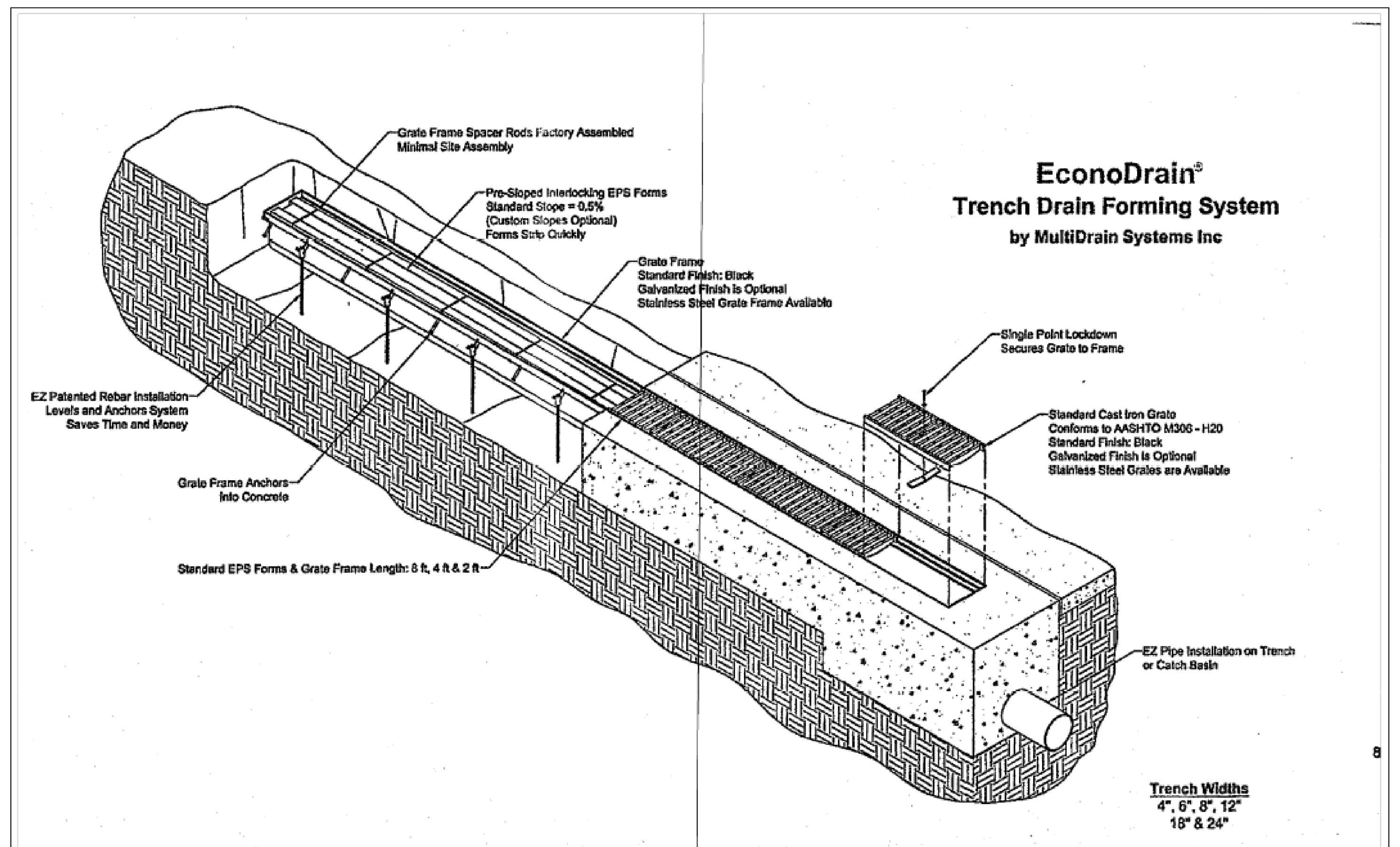
BOLLARD DETAIL
NOT TO SCALE



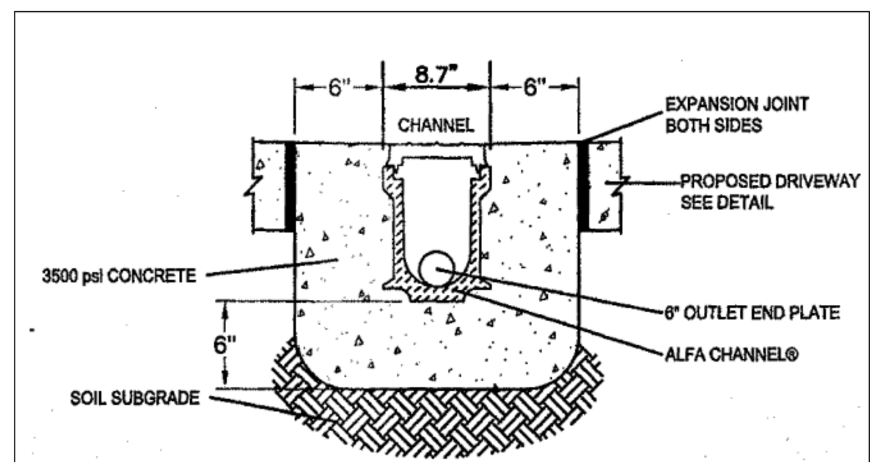
CONCRETE BALLAST MAY BE REQUIRED
SEE INSTALLATION INSTRUCTIONS FOR DETAILS



CONCRETE BALLAST MAY BE REQUIRED
SEE INSTALLATION INSTRUCTIONS FOR DETAILS

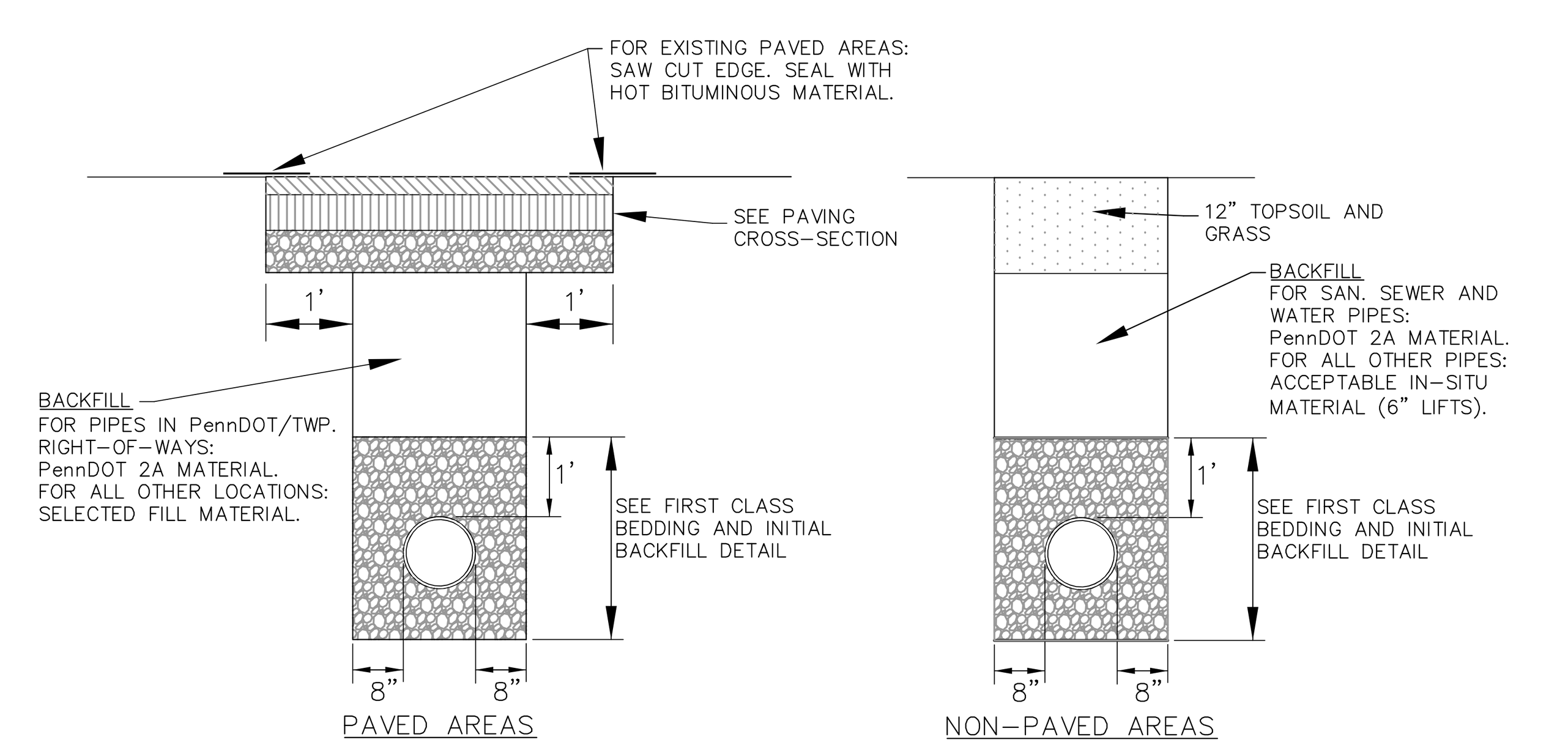


PARKING LOT TRENCH DRAIN GRATE DETAIL
NOT TO SCALE



CROSS SECTIONAL VIEW

ECONO DRAIN® TRENCH DRAIN



PAVED AREAS

NON-PAVED AREAS

FINAL BACKFILL SPECIFICATION:
1. TRENCHES IN EXISTING PAVEMENT MUST BE OVERCUT TWELVE (12) INCHES ON BOTH SIDES OF TRENCH.
2. PAVEMENT AND JOINT SEAL TO BE PROVIDED AS SHOWN.
3. FOR PIPES IN PennDOT RIGHT-OF-WAY, BACKFILL TRENCHES WITH PennDOT 2A MATERIAL, MECHANICALLY TAMPED IN FOUR (4) INCH LIFTS.
4. FOR ALL OTHER PAVED LOCATIONS, BACKFILL TRENCHES WITH PennDOT No. 2A AGGREGATE, MECHANICALLY TAMPED IN SIX (6) INCH LIFTS.
5. FOR SAN. SEWER AND WATER PIPES IN NON-PAVED AREAS, BACKFILL TRENCHES WITH SELECTED FILL, MECHANICALLY TAMPED IN SIX (6) INCH LIFTS.
6. FOR ALL OTHER PIPES IN NON-PAVED AREAS, BACKFILL TRENCHES WITH ACCEPTABLE IN-SITU MATERIAL (6" LIFTS).

NOTES:
1. WORK ZONE TRAFFIC CONTROL MUST CONFORM WITH STATE PUBLICATION 203 (67 PA CODE, CHAPTER 203).
2. TEMPORARY COLD PATCH TO BE PLACED LAST FIVE (5) INCHES FROM TOP OF TRENCH PRIOR TO FINAL RESTORATION.
3. APPLICANT WILL BE RESPONSIBLE FOR MAINTENANCE OF TEMPORARY RESTORATION.

TRENCH RESTORATION AND BACKFILL DETAIL
NOT TO SCALE

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig in Pennsylvania
1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET: 30 15 0 30 60 120

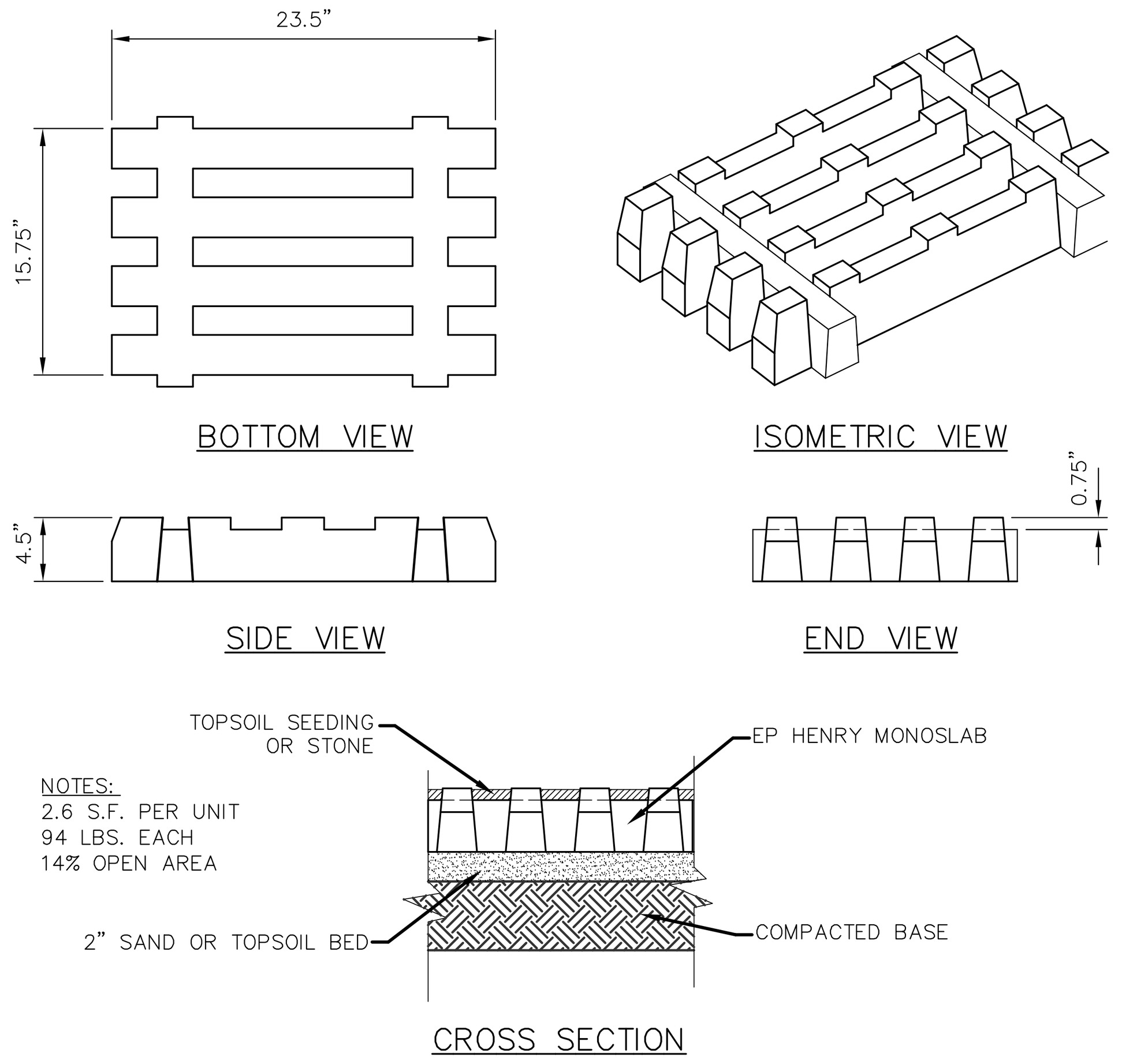
TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA, REGISTERED PROFESSIONAL ENGINEER, LARRY P. YOUNG, PE053210-E

PRELIMINARY/FINAL

CONSTRUCTION DETAILS

FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

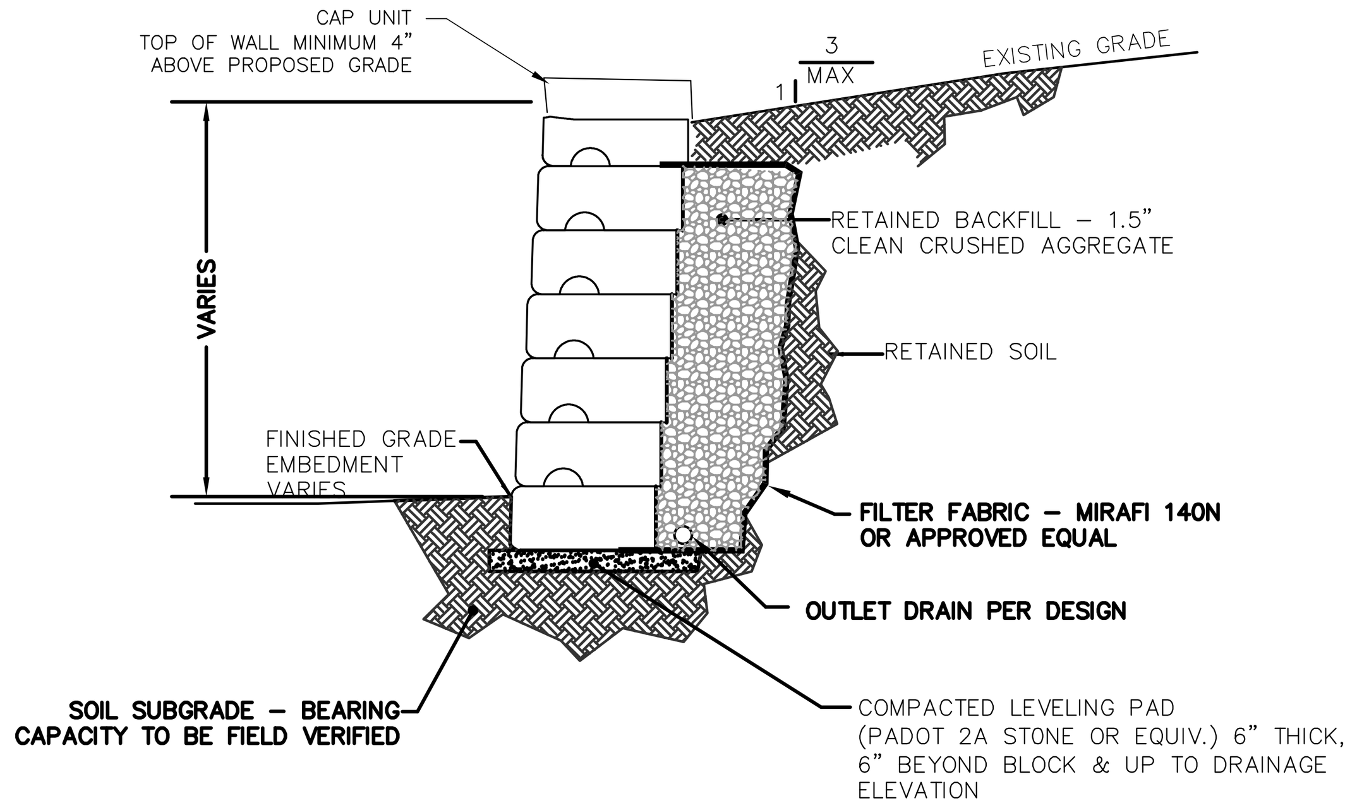


EMERGENCY ACCESS GRASS PAVING BLOCKS

NOT TO SCALE

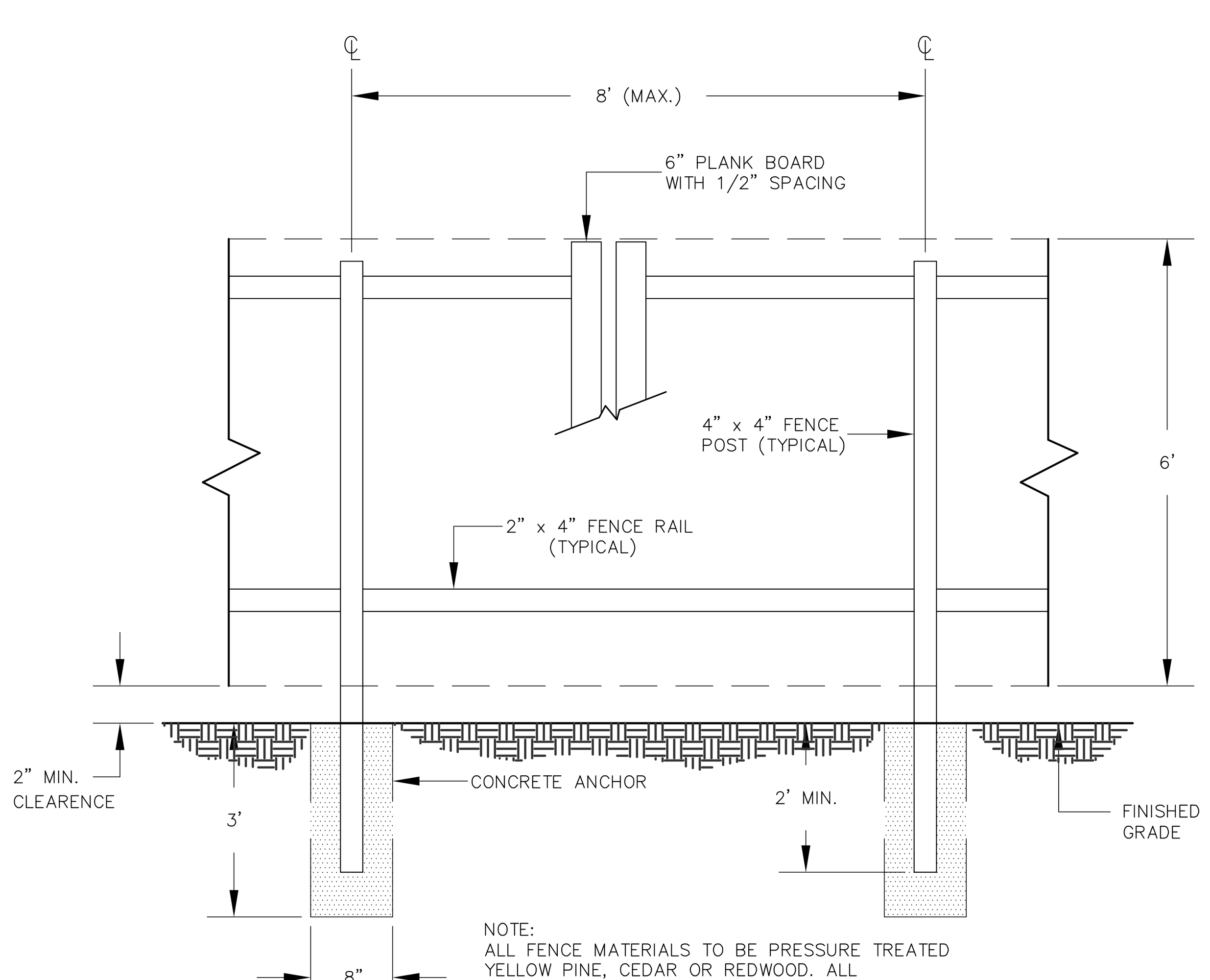
NOTE:

THIS SECTION REPRESENTS A TYPICAL CONFIGURATION AND THE SYSTEM COMPONENTS OF A GRAVITY SEGMENTAL RETAINING WALL. IT IS NOT INTENDED FOR CONSTRUCTION. SEALED SHOP DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED FOR A SPECIFIC WALL SYSTEM FOR APPROVAL BY ENGINEER PRIOR TO CONSTRUCTION.



GRAVITY RETAINING WALL – TYPICAL CROSS SECTION

NOT TO SCALE

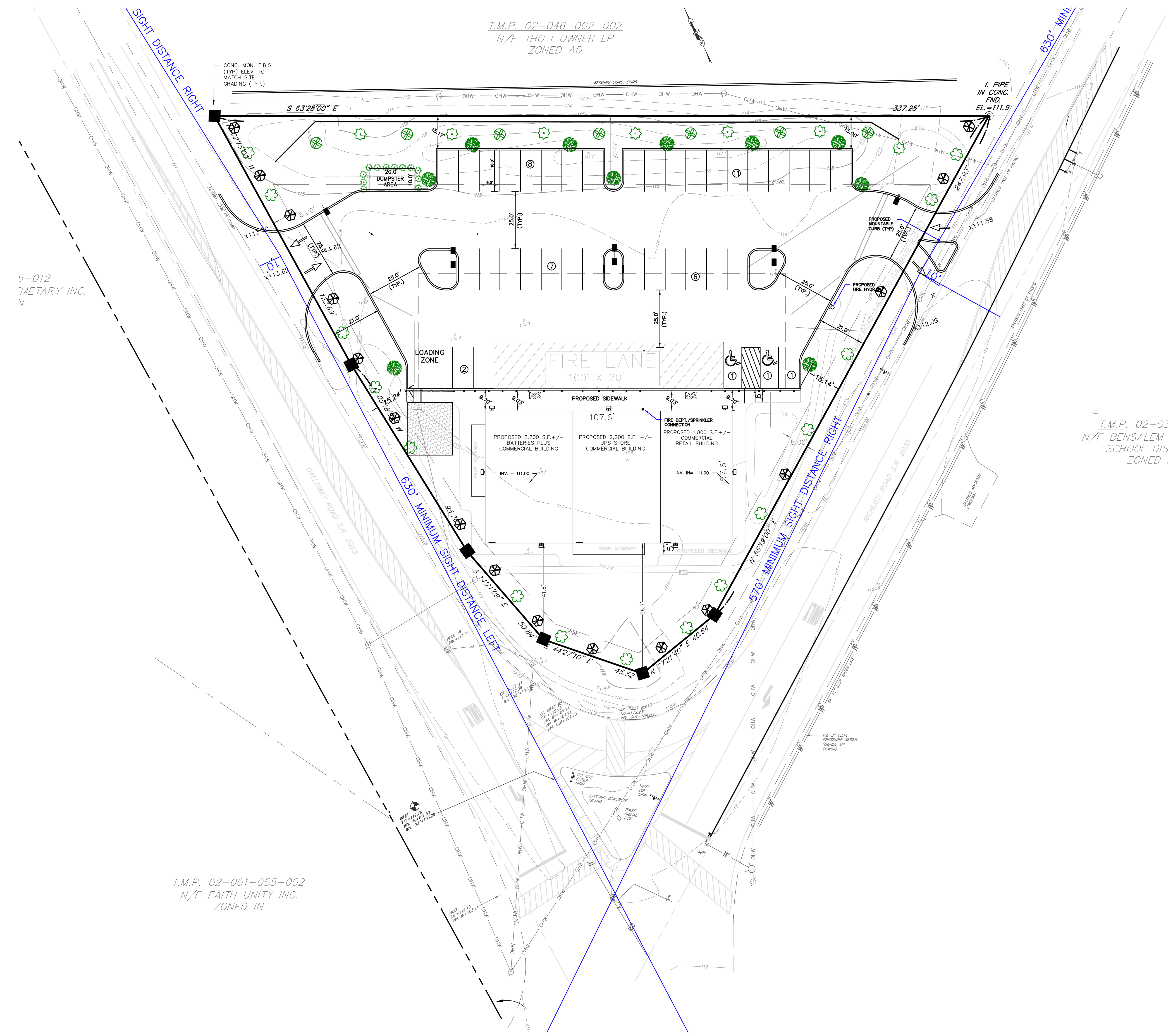


NOTE:

ALL FENCE MATERIALS TO BE PRESSURE TREATED YELLOW PINE, CEDAR OR REDWOOD. ALL HARDWARE AND ATTACHMENT DEVICES TO BE HOT-DIPPED GALVANIZED.

TRASH ENCLOSURE FENCE DETAIL

NOT TO SCALE



SIGHT DISTANCE TRIANGLE DETAIL

CLEAR SIGHT TRIANGLE SHALL BE PROVIDED AT ALL STREET INTERSECTIONS. WITHIN SUCH TRIANGLES NO STRUCTURE, WALL, FENCE, PLANTING OR OTHER VISUAL OBSTRUCTION BETWEEN THE HEIGHT OF TWO FEET AND SEVEN FEET ABOVE THE LEVEL OF THE INTERSECTING STREETS SHALL BE PERMITTED.

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	
Acreage	No. of Lots	
SEE TABLES	1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET
30 15 0 30 60 120

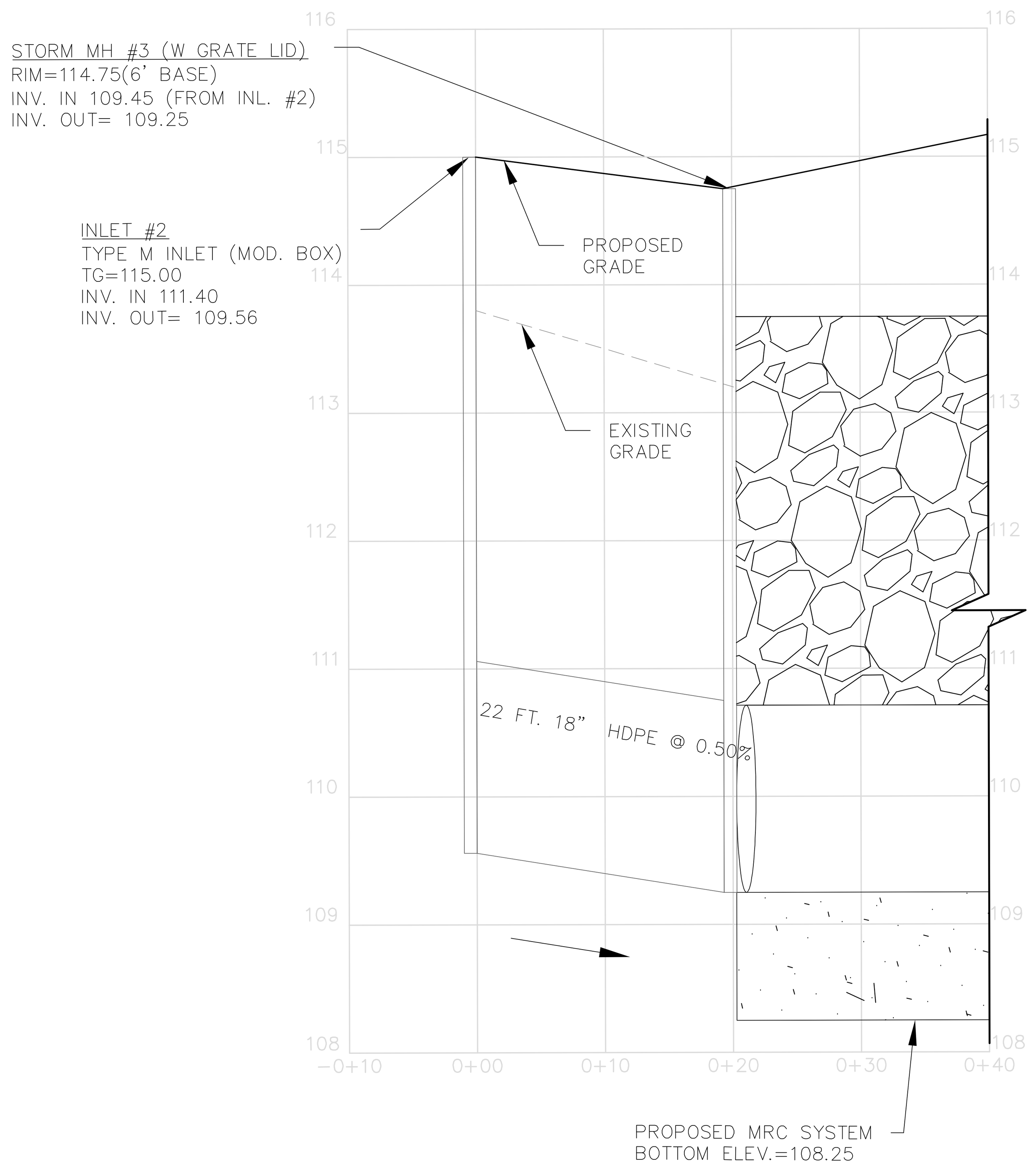
TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
LARRY P. YOUNG
PE053219-E

PRELIMINARY/FINAL

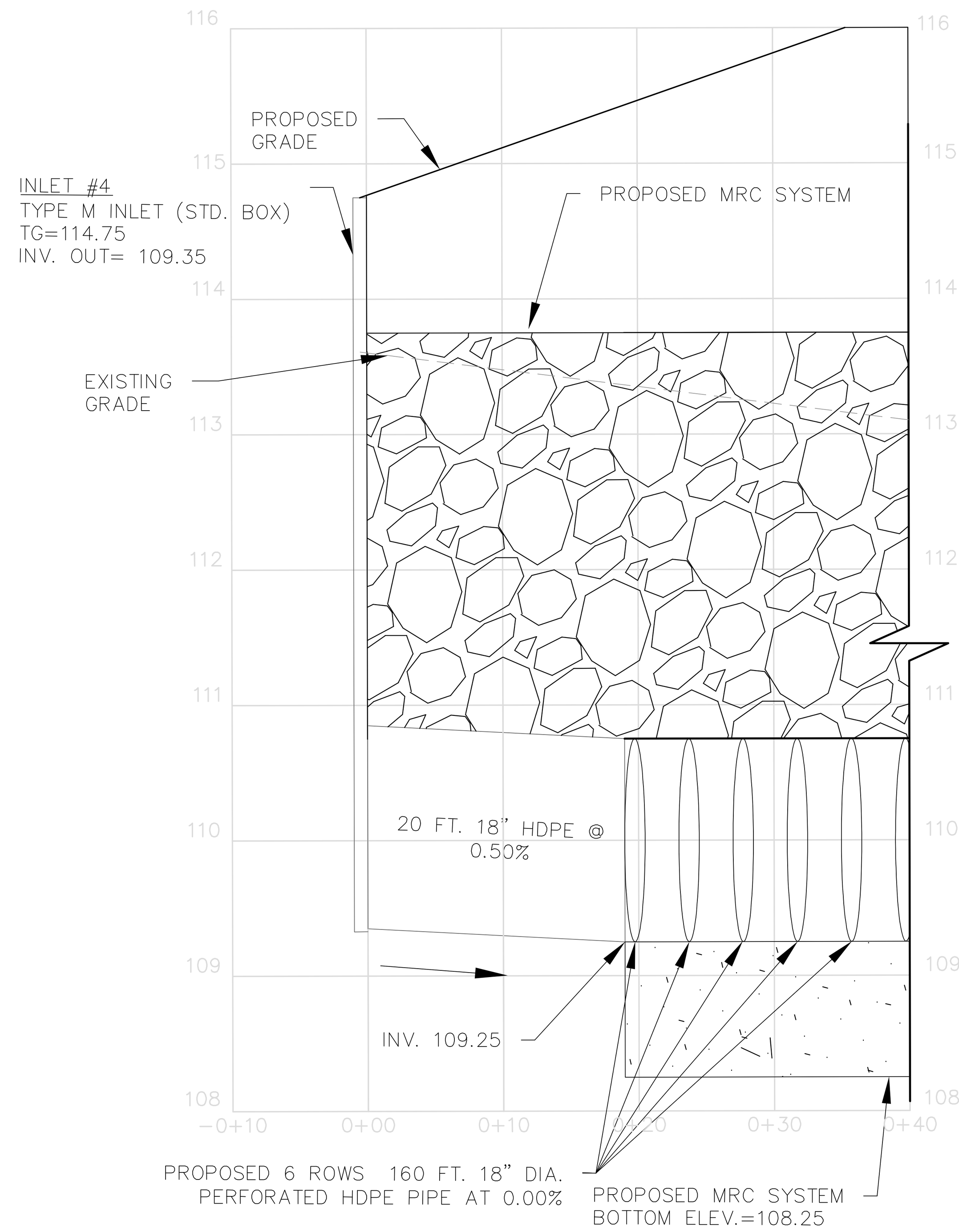
CONSTRUCTION DETAILS

FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA



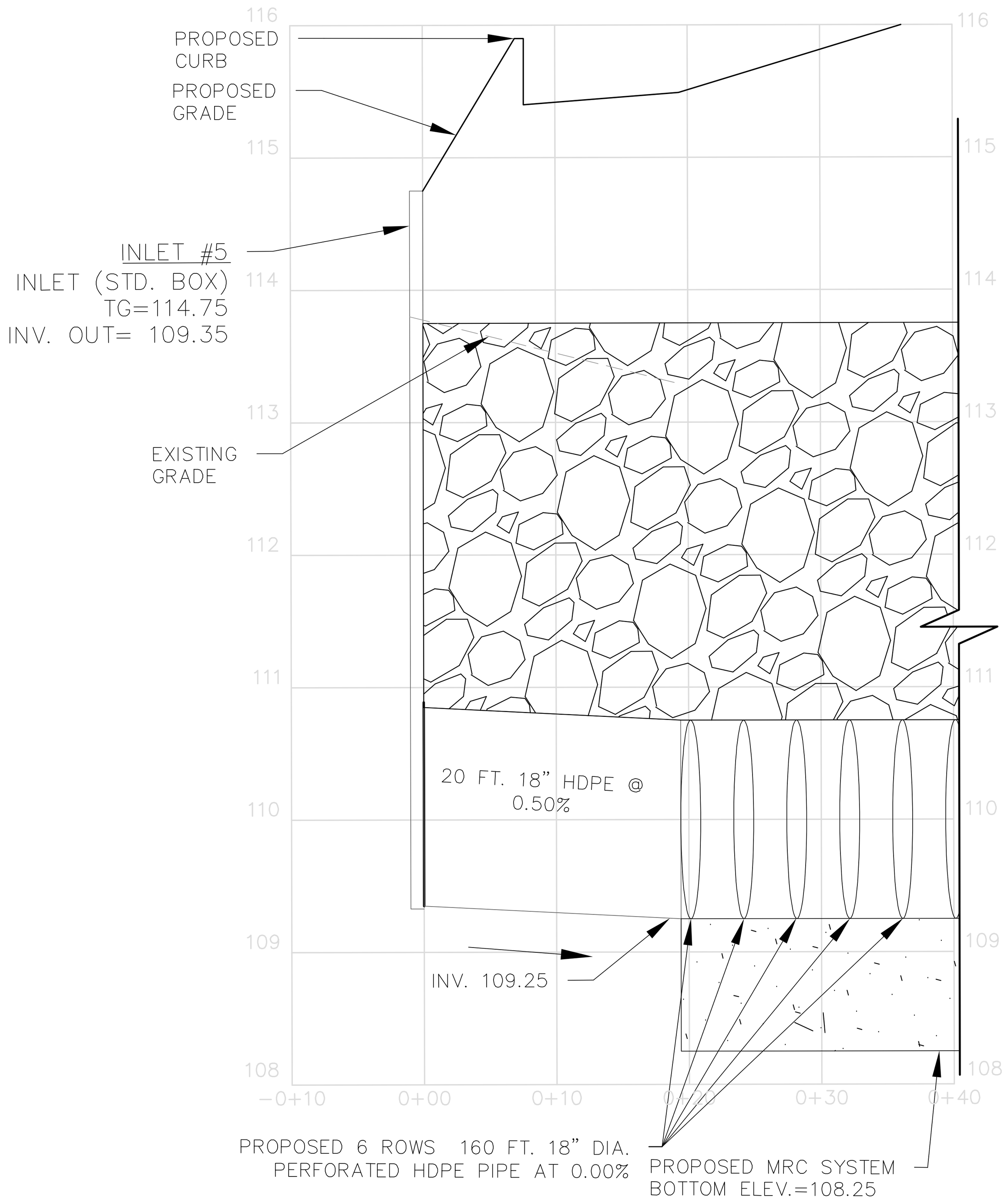
PROFILE 1

INLET #2-STORM MH#3



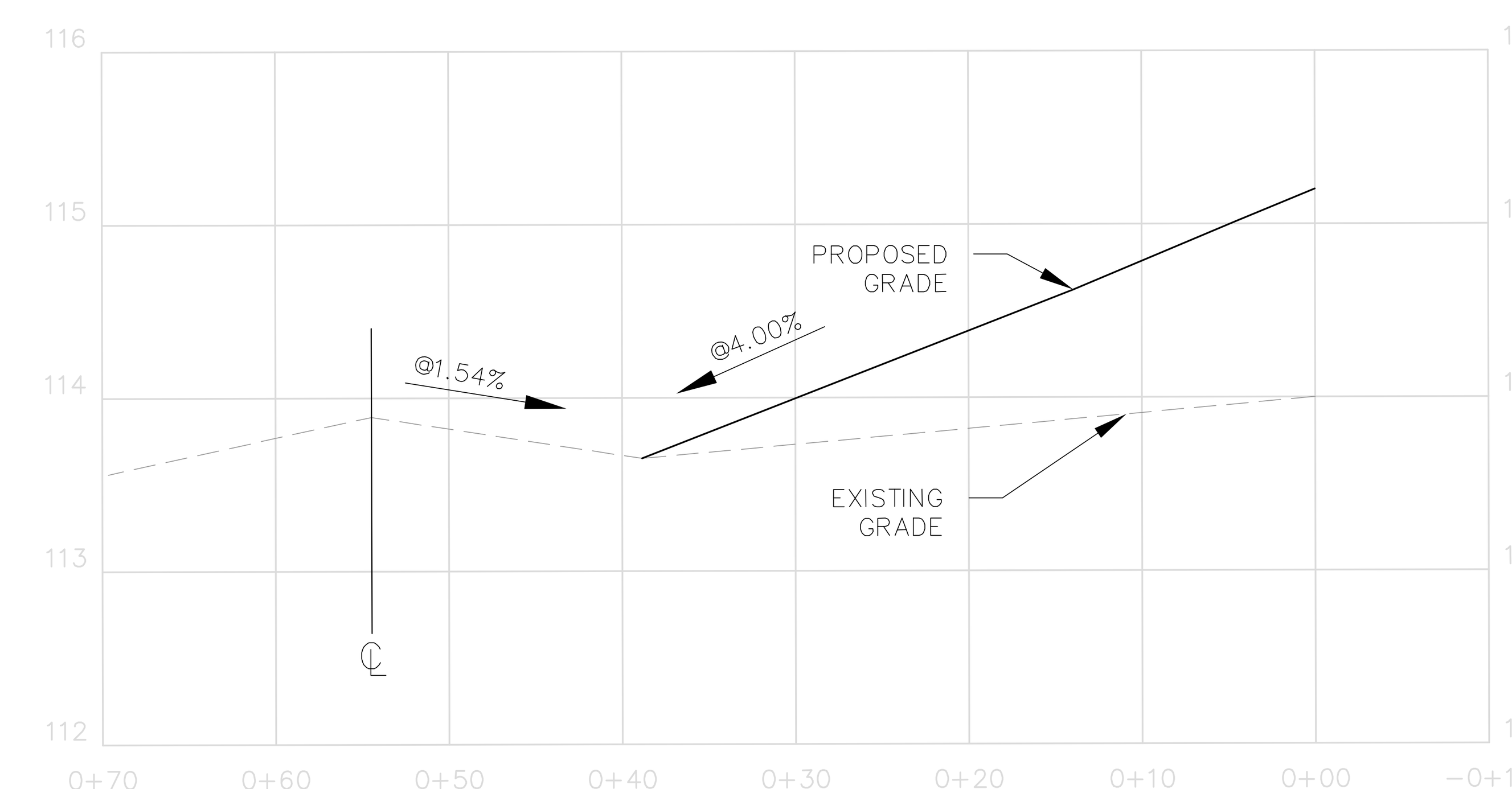
PROFILE 2

INLET #4-MRC SYSTEM



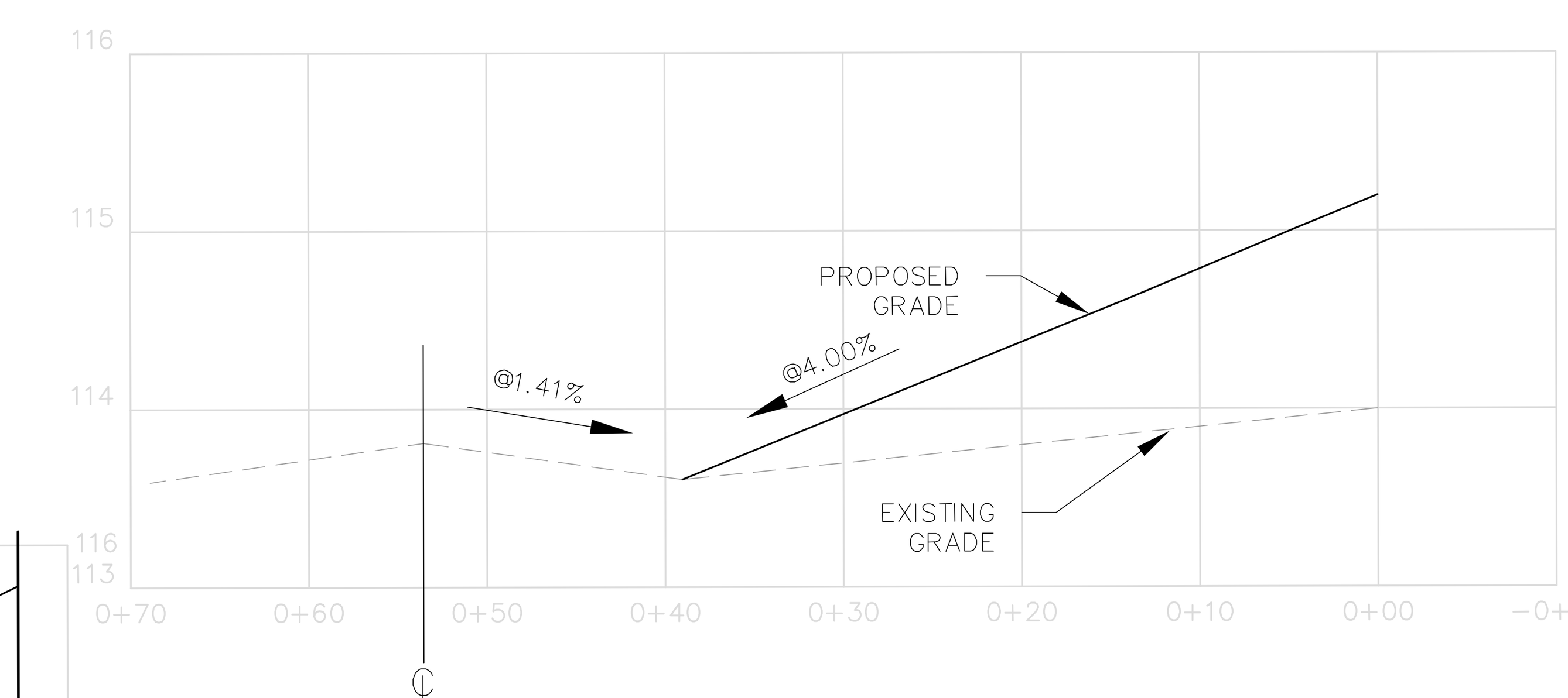
PROFILE 3

INLET #5-MRC SYSTEM



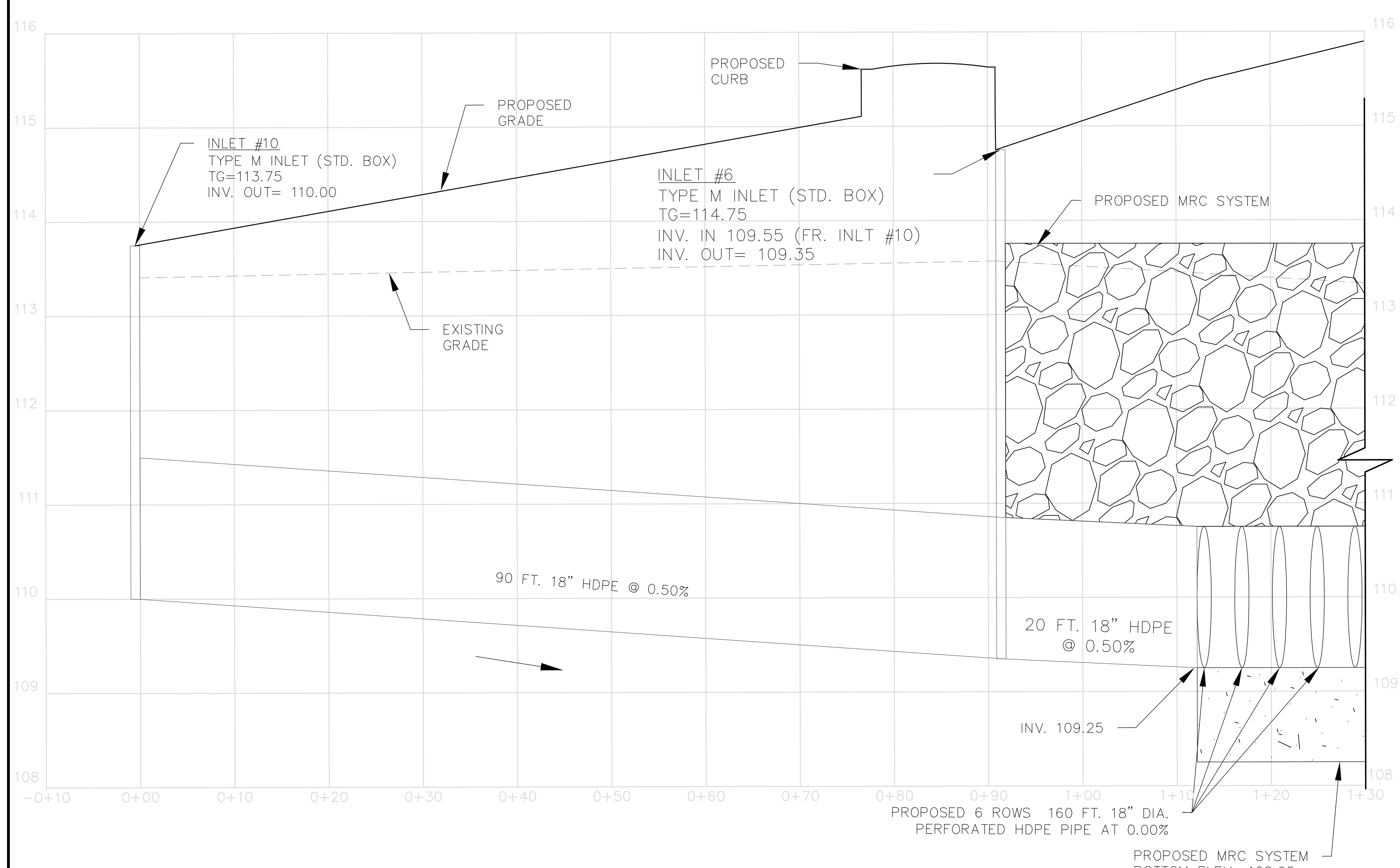
PROFILE 9

ENTRANCE TO THE SITE FROM GALLOWAY ROAD



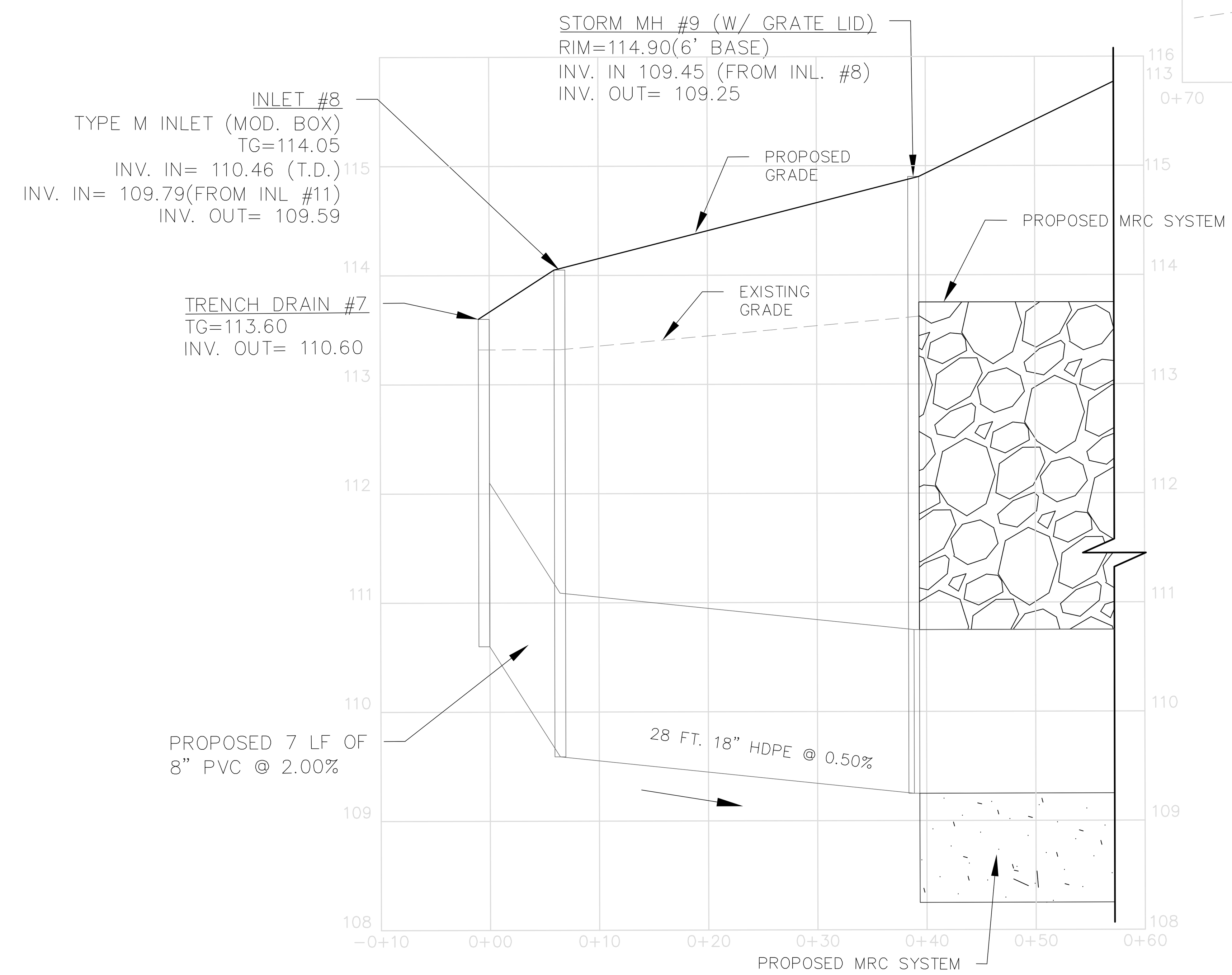
PROFILE 10

EXIT FROM THE SITE TO GALLOWAY ROAD



PROFILE 4

INLET #10-INLET #6-MRC SYSTEM



PROFILE 5

INLET #7-INLET #8-INLET #9

Pennsylvania One Call System, Inc.
SERIAL NO. 2022-1160890
Call Before You Dig in Pennsylvania
1-800-242-1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
MR. KIRAN PATEL
415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	1" = 10'
Acreage SEE TABLES		No. of Lots 1
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

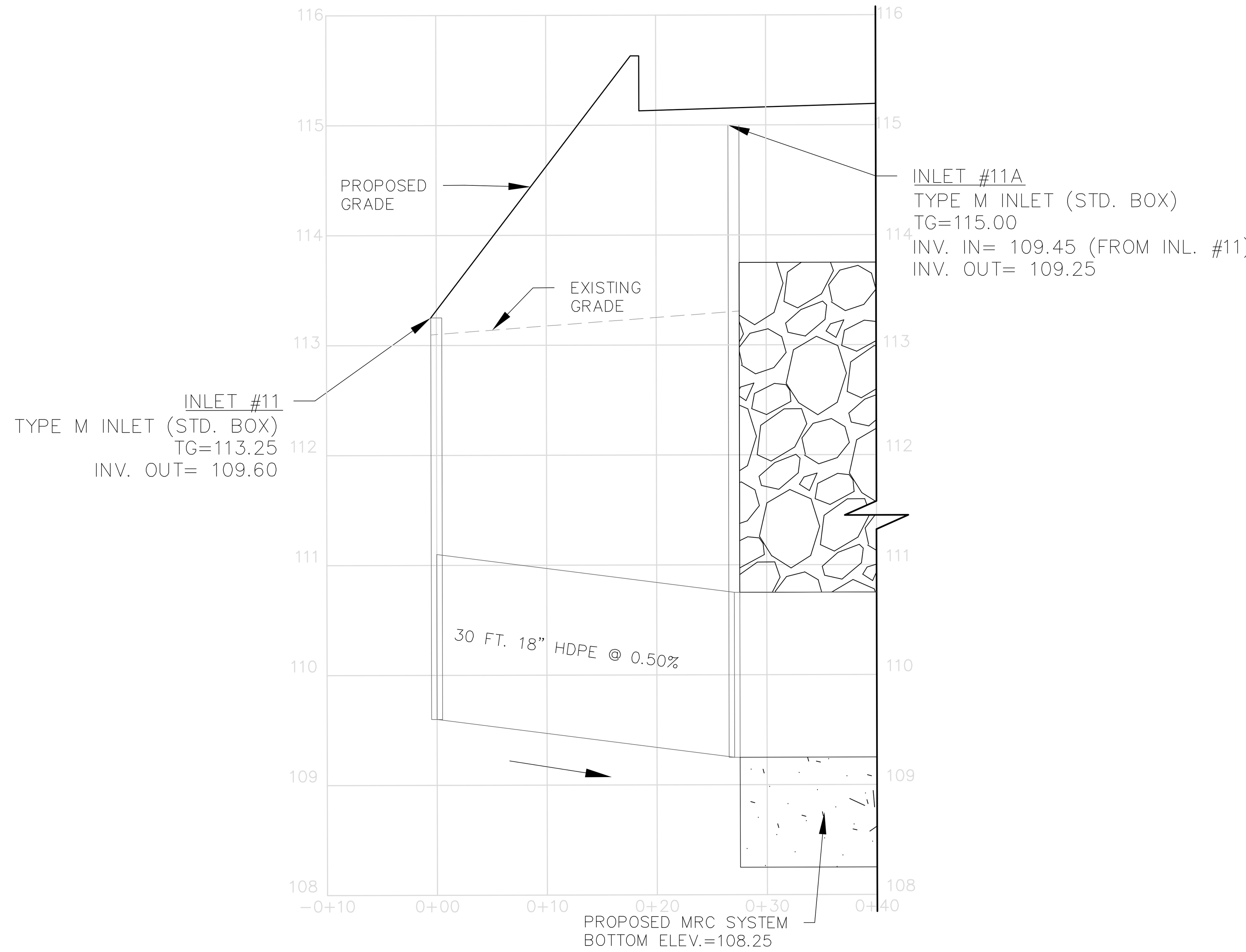
SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950
FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053219-E

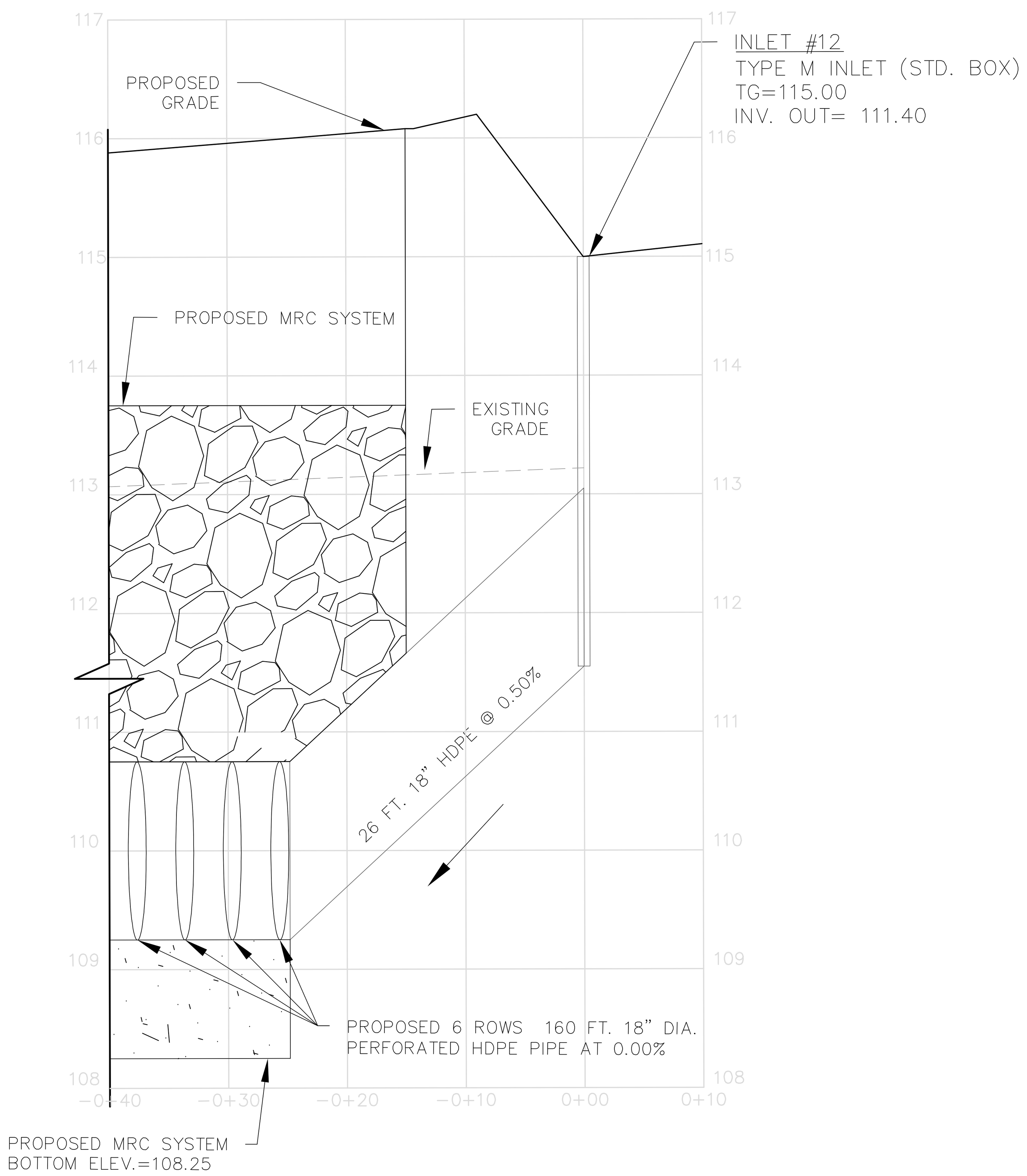
PRELIMINARY/FINAL
PROFILES
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 15 OF 17



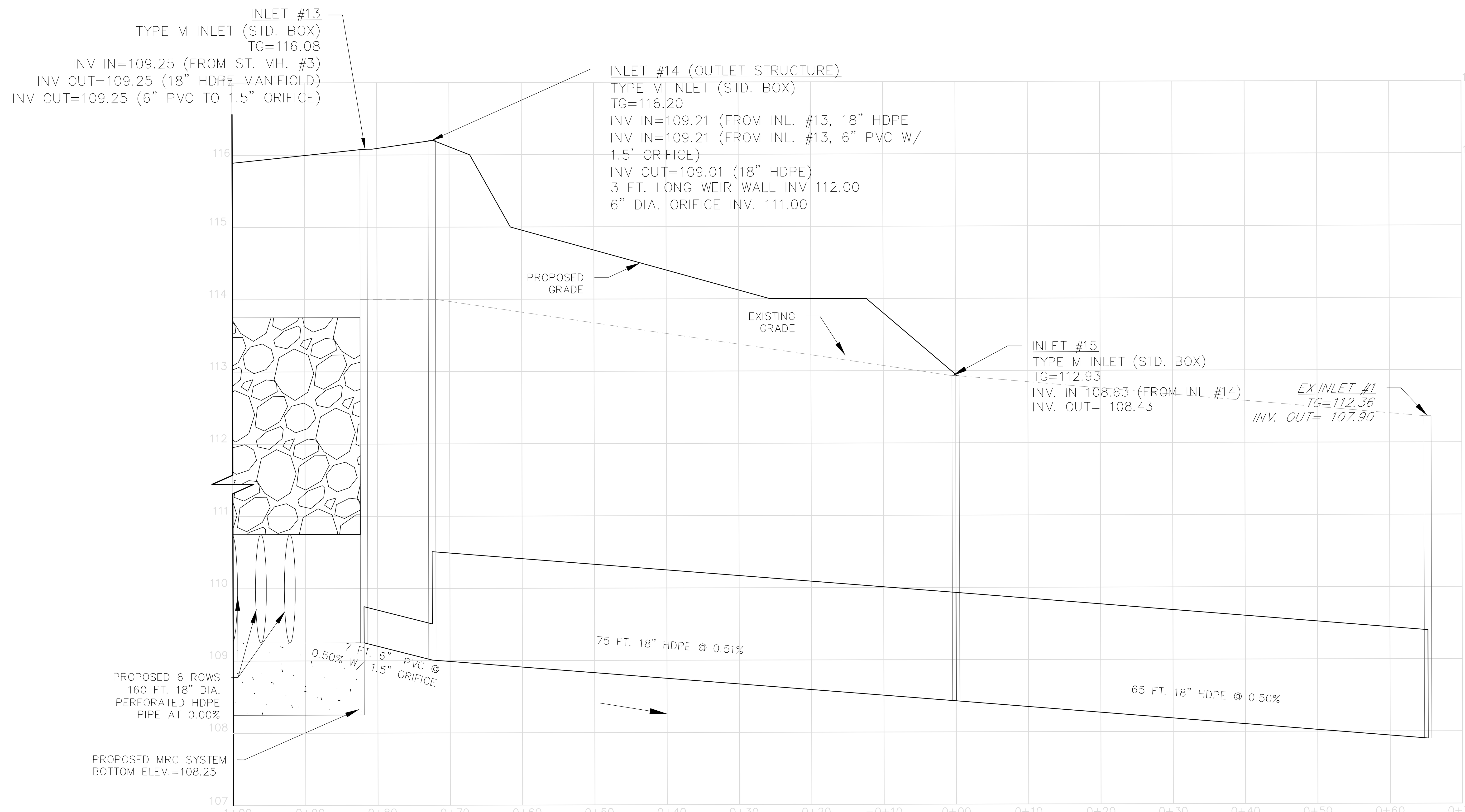
PROFILE 6

INLET #11–INLET #11A



PROFILE 7

INLET #12–MRC SYSTEM



PROFILE 8

NOTE:

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SERIAL NO. 2022–1160890
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in Pennsylvania
1–800–242–1776
State Law Requires
Construction Phase: Three working Days Notice
Design Phase: Ten working Days Notice
Facility Owners: Member of One Call System

OWNER OF RECORD:
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415 WEST BRISTER ROAD
BENSALEM, PA 19020

APPLICANT:
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BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	1" = 10'
Acreage SEE TABLES		No. of Lots 1
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/17/24	CLS

SCALE IN FEET
30 15 0 30 60 120

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
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COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053219-E

PRELIMINARY/FINAL
PROFILES
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 16 OF 17

NOTE:

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415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22–04019	7/05/2022	1" = 50'
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1			

SCALE IN FEET
50 25 0 50 100 200

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
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PHONE: 215-357-5950 FAX: 215-357-2836
T S E
FOUNDED 1959

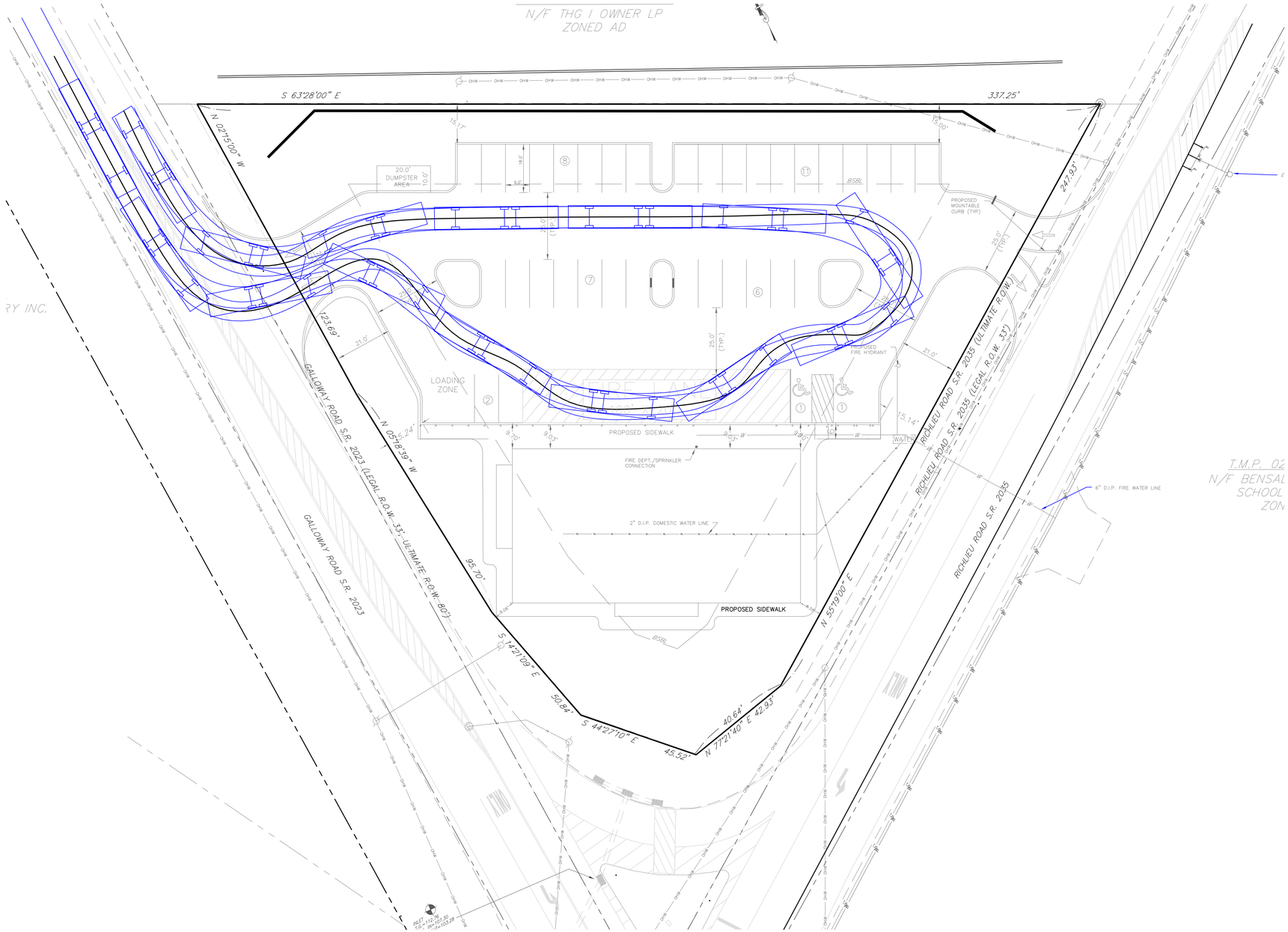
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053219–E

PRELIMINARY/FINAL

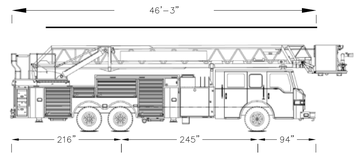
ARIAL PLAN

FOR
CORNER OF RICHLIEU ROAD &
GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET
17 OF 17



FIRE APPARATUS LEGEND



DESCRIPTION	DIMENSION
OVERALL LENGTH	46' 3"
FRONT OF TRUCK TO FIRST AXLE	94"
WHEEL BASE	245"
WHEEL WIDTH	102"
OVERALL WIDTH (WITH MIRRORS)	126"
HEIGHT	11'-11"

NOTE:

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APPLICANT:
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415 WEST BRISTER ROAD
BENSALEM, PA 19020

Job No.	Date:	Scale:
22-04019	7/05/2022	1"=20'
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/1/24	CLS

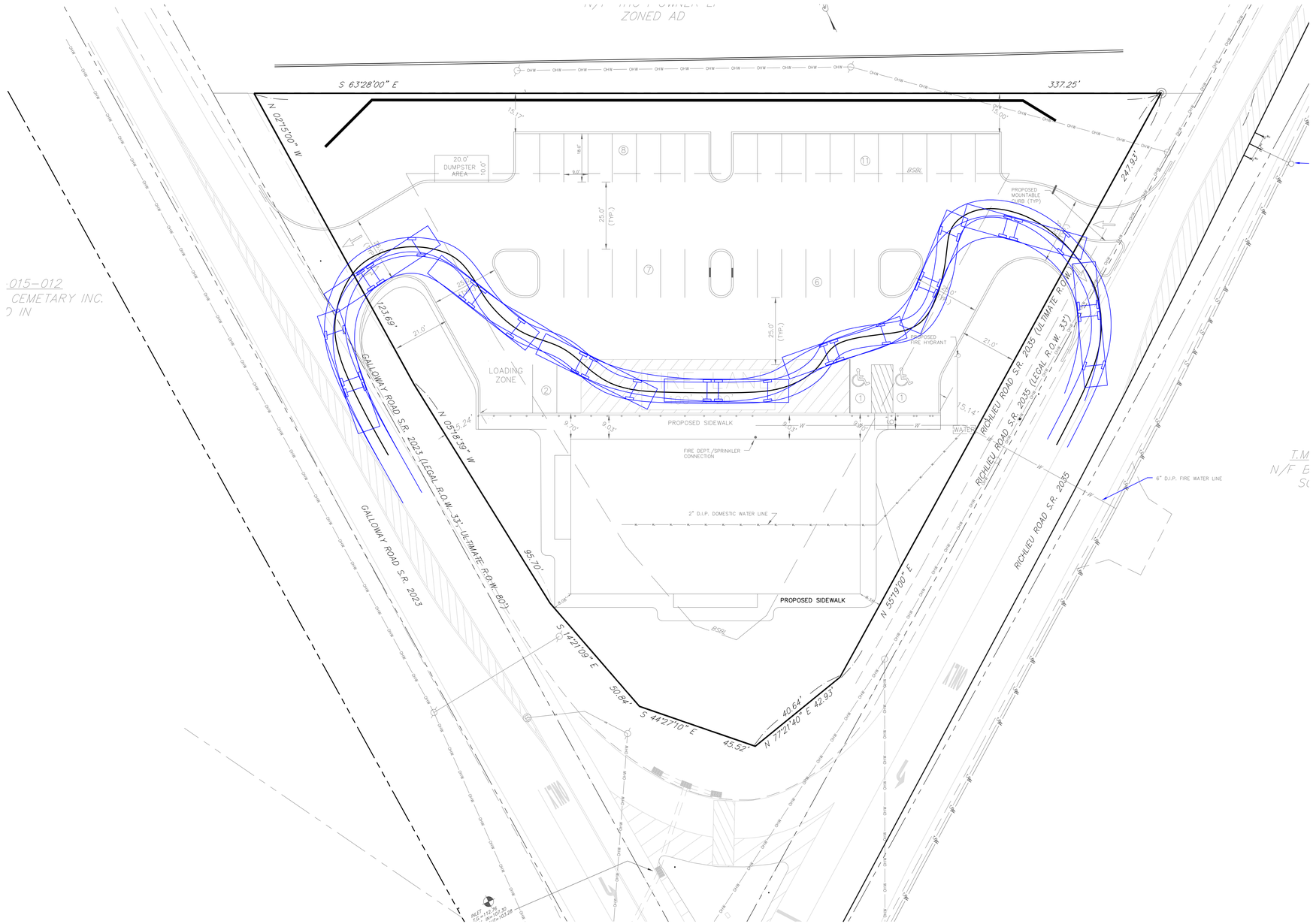
SCALE IN FEET
20 10 0 20 40 120 80

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
CIVIL ENGINEER • MUNICIPAL ENGINEERS • LAND SURVEYORS • LAND PLANNERS • LANDSCAPE ARCHITECT
801 WEST STREET ROAD, FEASTERVILLE, PENNSYLVANIA 19053
PHONE: 215-357-5950 FAX: 215-357-2836
FOUNDED 1959

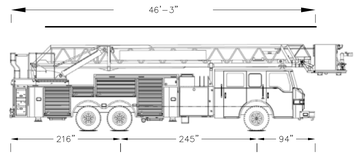
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053219-E

TRUCK TURNING PLAN
ENTRANCE FROM GALLOWAY 1
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 1 OF 3



FIRE APPARATUS LEGEND



DESCRIPTION	DIMENSION
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WHEEL WIDTH	102"
OVERALL WIDTH (WITH MIRRORS)	126"
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Job No.	Date:	Scale:
22-04019	7/05/2022	1"=20'
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/1/24	CLS

SCALE IN FEET
20 10 0 20 40 60

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
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FOUNDED 1959

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053219-E

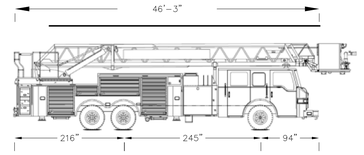
TRUCK TURNING PLAN

ENTRANCE FROM GALLOWAY 2

FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 2 OF 3

FIRE APPARATUS LEGEND



DESCRIPTION	DIMENSION
OVERALL LENGTH	46'-3"
FRONT OF TRUCK TO FIRST AXLE	94"
WHEEL BASE	245"
WHEEL WIDTH	102"
OVERALL WIDTH (WITH MIRRORS)	126"
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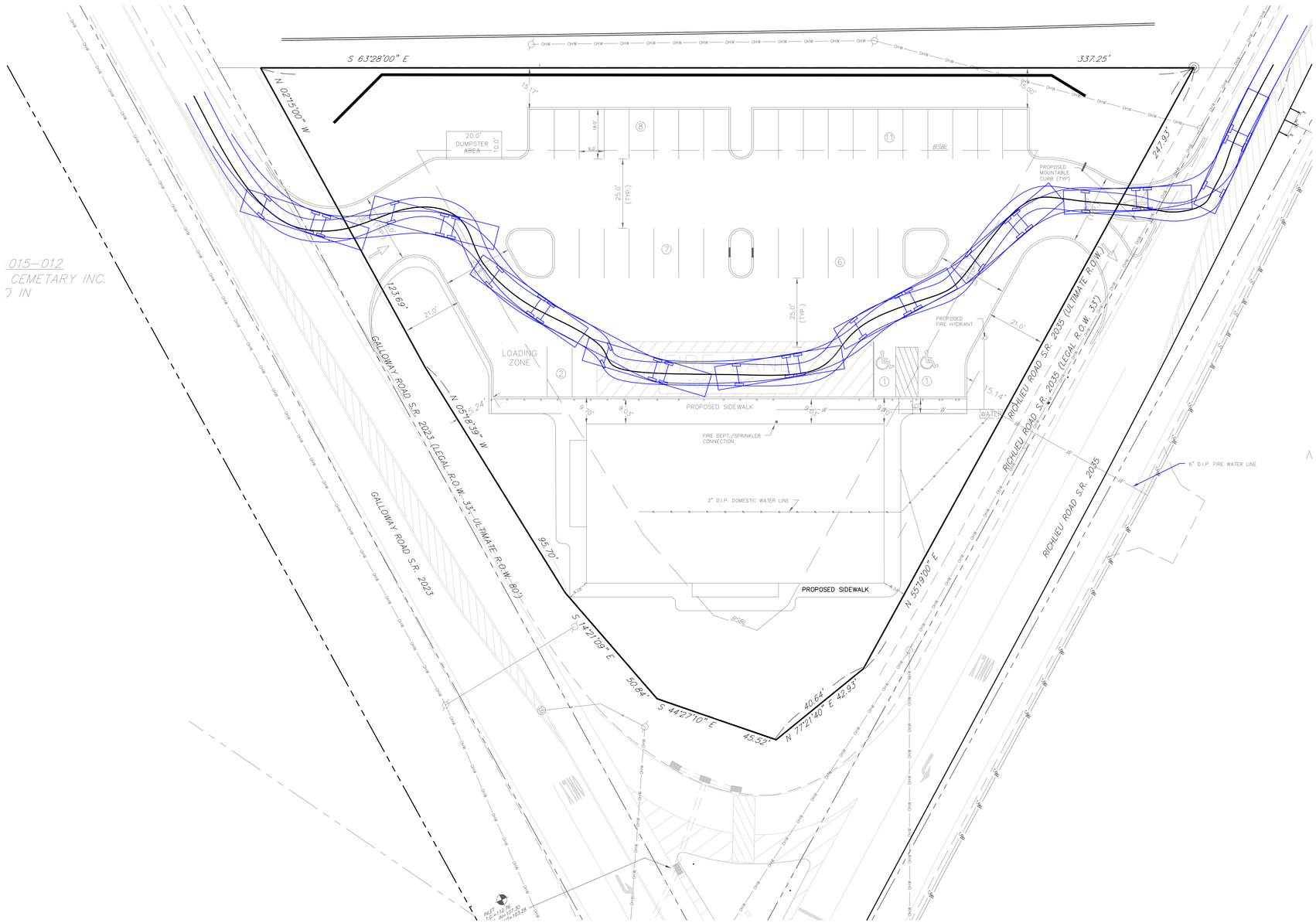

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Facility Owners: Member of One Call System

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APPLICANT:
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Job No.	Date:	Scale:
22-04019	7/05/2022	1"=20'
Acreage: SEE TABLES	No. of Lots: 1	
Designed By: STAFF	Drawn By: STAFF	Checked By: L.Y.

REVISION	DESCRIPTION	DATE	DRAWN BY
4			
3			
2			
1	TOWNSHIP ENGINEERS REVIEW LETTER	3/1/24	CLS

SCALE IN FEET
20 10 0 20 40 80

TRI-STATE ENGINEERS & LAND SURVEYORS, INC.
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PHONE: 215-357-5950 FAX: 215-357-2836
FOUNDED 1969

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
LARRY P. YOUNG
ENGINEER
PE053216-E

TRUCK TURNING PLAN
ENTRANCE FROM RICHLIEU
FOR
CORNER OF RICHLIEU ROAD & GALLOWAY ROAD
TMP 02-046-001
BENSALEM TOWNSHIP
BUCKS COUNTY PENNSYLVANIA

SHEET 3 OF 3

HCA Horner & Canter Associates A PROFESSIONAL CORPORATION
TRANSPORTATION AND TRAFFIC ENGINEERING

DAVID H. HORNER, P.E., PTOE, President
HASSON A. KEENE, Associate

April 3, 2024

Mr. Kenneth Farrall, PLS
Planning and Zoning Board Director
Bensalem Township
2400 Byberry Road
Bensalem, PA 19020

Re: Galloway & Richlieu Road Retail Development
TMP #02-046-001
Bensalem Township, Bucks County, Pennsylvania
HCA File No. 22-062

Dear Mr. Farrall:

Horner & Canter is submitting an updated Traffic Impact Assessment, dated March 29, 2024, for the above-referenced application. The updated study was prepared to address the traffic study comments contained in the January 2024 review by Traffic, Planning & Design, Inc. (TPD).

Our responses to TPD's traffic study comments are provided for your consideration below. We understand that the remaining comments are being addressed by Tri-State Engineers & Land Surveyors under separate cover.

General Comments

2. a. The HCS files have been provided.

   b. Updated traffic count data sheets are provided in Appendix B of the updated traffic study.

   c. The intersection of Richlieu Road/Galloway Road (AM, PM and SAT) and Bristol Road/Richlieu Road (PM only) have been recounted in late March 2024 on days unaffected by school closures.

   d. Figure 12 has been revised to correct the entering site volumes.

e. The intersection of Bristol Road/Richlieu Road has been analyzed as a signalized intersection in the No-Build and Build scenarios.

f. Based on the new counts and the re-analysis, the WB left-turn queues on Richlieu Road at Galloway Road will be fully contained within the left-turn lane and will not spill back into the through lanes.

If you have any questions, please do not hesitate to call me.

Very truly yours,

David H. Horner, P.E., PTOE

DHH/mac

cc: Tri-State Engineers & Surveyors

TRAFFIC IMPACT ASSESSMENT

PROPOSED RETAIL CENTER
(TMP 02-046-001)

Bensalem Township, Bucks County

Pennsylvania

November 10, 2023
Updated March 29, 2024

Horner & Canter Associates A Professional Corporation
TRANSPORTATION AND TRAFFIC ENGINEERING

TRAFFIC IMPACT ASSESSMENT

PROPOSED RETAIL CENTER
(TMP 02-046-001)

Richlieu Road (SR 2035)
Galloway Road (SR 2023)

Bensalem Township
Bucks County
Pennsylvania

Prepared by:

HORNER & CANTER ASSOCIATES
A Professional Corporation
Transportation and Traffic Engineering
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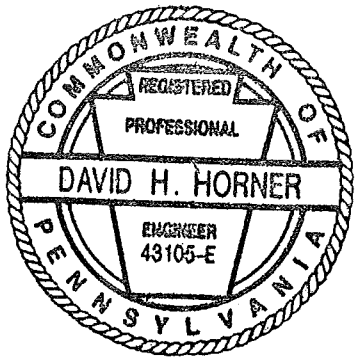

March 29, 2024

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File No. 22-062

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INTRODUCTION

Horner & Canter Associates has prepared this updated Traffic Impact Assessment for the proposed 6,200 square feet retail center situated on TMP 02-046-001 in Bensalem Township, Bucks County, Pennsylvania (Figure 1). The site is located on the northeast corner of Richlieu Road (SR 2035) and Galloway Road (SR 2023). Access to the proposed retail center will be provided via a full access driveway intersecting Galloway Road (SR 2023) and a right-turn-in/right-turn-out only access driveway intersecting Richlieu Road (SR 2035).

This report is an update to our November 10, 2023 Traffic Impact Assessment. The update addresses comments contained in the Traffic, Planning & Design (TPD) traffic engineering review prepared on behalf of Bensalem Township.

For the purpose of this Traffic Impact Assessment, the completion and occupancy date of the proposed retail center is assumed to be 2025.

Scope of Study

The purpose of this Traffic Impact Assessment is to determine the traffic impact the proposed development will have with respect to the conditions on the adjacent roadways and intersections. The study scope includes the following:

- A site inspection and inventory of existing roadway features such as geometric layout, lane configurations, traffic control devices, and other pertinent physical characteristics.

- Conduct of Manual Turning Movement (MTM) counts for the weekday AM (7:00 AM - 9:00 AM), weekday PM (4:00 PM - 6:00 PM), and Saturday midday (11:00 AM – 1:00 PM) peak periods at the following intersections which constitute the study area:

    - Richlieu Road (SR 2035)/Galloway Road (SR 2023)
    - Galloway Road (SR 2023)/Bristol Road (SR 2025)
    - Richlieu Road (SR 2035)/Bristol Road (SR 2025)

- Projection of development-generated traffic volumes and distribution of this traffic to the study area roadway network.

- Establishment of future traffic volumes for the study horizon year (2025) including background traffic growth projections and the site-generated traffic.

- Analysis of existing, future No-Build and future Build traffic conditions at the study area intersections and the proposed site access intersections.

- Formulation of conclusions with regard to the traffic impact of the proposed development.

EXISTING CONDITIONS

The study area roadway network was inventoried with regard to the existing physical and operating characteristics as they affect traffic flow. The study area roadway network is described in further detail below.

The site fronts on **Richlieu Road**, a State highway carrying the SR 2035 designation in a general east-west direction. Richlieu Road generally provides one travel lane in each direction with the westbound lane transitioning to two lanes along the site frontage approaching the signalized intersection with Galloway Road. The posted speed limit on Richlieu Road is 40 miles per hour.

The site also fronts on **Galloway Road**, a State highway carrying the SR 2023 designation in a general north-south direction. Galloway Road along the site frontage provides one travel lane in each direction. The posted speed limit on Galloway Road is 40 miles per hour.

The nearest signalized intersection to the site is Richlieu Road (SR 2035)/Galloway Road (SR 2023). The study area intersection of Galloway Road (SR 2023)/Bristol Road (SR 2025) is also signalized, while the study area intersection of Richlieu Road (SR 2035)/Bristol Road (SR 2025) is proposed to be signalized within the future horizon year of this study. The Traffic Signal Permit plans for all three intersections and the System Permit Plan #I-0022 are provided for reference in Appendix A.

Existing Traffic Volumes

Since the peak hour traffic conditions reflect the critical periods for evaluation of operating conditions and traffic impact, existing traffic volumes were acquired at the study area intersections through the conduct of peak hour Manual Turning Movement (MTM) traffic counts conducted by our firm. The counts were conducted during the weekday AM (7:00 – 9:00 AM), weekday PM (4:00 – 6:00 PM) and Saturday midday (11:00 AM – 1:00 PM) peak periods in September 2023 while school was in session. Supplemental counts were completed in March 2024 to address TPD concerns about some of the prior counts being conducted when school was closed for a three-day holiday weekend. These count periods were selected to capture both

the peak hours of adjacent street traffic and the peak periods of the proposed development. The summarized MTM counts are provided for reference in Appendix B.

The resultant existing peak hour traffic volumes are presented in Figures 2, 3, and 4 for the respective peak periods.

Bicycle and Pedestrian Facilities

There are no existing sidewalks or designated bicycle paths along the site frontage roadways within the study area.

Public Transportation

The study area is served by SEPTA bus routes 128 and 130, both of which traverse Galloway Road in the vicinity of the site.

Scheduled Roadway Improvements

Per review of the PennDOT Transportation Improvement Program (TIP), there are no scheduled roadway improvements within the study area. It is noted that improvements by others to the off-site signalized intersection of Bristol Road (SR 2025)/Galloway Road (SR 2023) have been approved but not yet implemented. The intersection of Richlieu Road (SR 2035)/Bristol Road (2025) is proposed to be signalized within the horizon year of this study. This signalization is assumed in place for the No-Build and Build conditions analysis.

Existing Levels of Service

The operating conditions of the study area intersections was determined through the conduct of a capacity/Level of Service (LOS) analysis using the Highway Capacity Software which applies the methodologies contained in the Highway Capacity Manual (HCM 7th Edition). Level of Service (LOS) is a measure of the quality of the traffic flow and generally is expressed as follows:

Level of Service A - Excellent - Free flow
B - Very Good - Minor adjustments in traffic flows
C - Good - Stable flow of traffic
D - Satisfactory flow - Occasional short periods with minor delays
E – Approaching Capacity - Regular delays
F - Forced Flow - Significant delays

At signalized intersections, LOS is based on the average delay for all movements at the intersection. At unsignalized intersections, LOS is based on the average delay to controlled and yielding movements, such as exiting movements from a stop sign or the left-turn from a through street into a side street. The delay thresholds for various Levels of Service are contained in Appendix C.

The existing LOS findings for the study area intersections are presented in Figure 5. The detailed existing capacity/LOS analysis worksheets are provided in Appendix D.

SITE TRAFFIC

The determination of the amount of traffic that a proposed development will generate can best be made by comparison with similar sites. The Institute of Transportation Engineers (ITE) publication *Trip Generation Manual, 11th Edition* is a compilation of trip generation studies for a variety of land uses and is considered the primary data source for trip generation projections. For the proposed retail center, Land Use Code 822 – Strip Retail Plaza (<40k) was selected as the most appropriate.

Table 1 presents the projected development-generated traffic for the site based on the ITE database. The trip generation worksheets are provided for reference in Appendix E.

Table 1
Site Trips

		AM Peak Hour			*PM Peak Hour*			*SAT Peak Hour*		
	Daily	***In***	***Out***	***Total***	***In***	***Out***	***Total***	***In***	***Out***	***Total***
Retail Center (6,200 s.f.)	491	13	8	21	28	27	55	21	20	41
-Pass-by Trips[1]	n/a	-0	-0	-0	-10	-9	-19	-6	-5	-11
"New" Trips	**n/a**	**13**	**8**	**21**	**18**	**18**	**36**	**15**	**15**	**30**

[1] ITE Trip Generation Handbook, 3rd Edition: AM Pass-By 0%; PM Pass-By 34%; SAT Pass-By 26%

As noted in Table 1, not all trips associated with the proposed use are new trips to the roadway network. Retail uses have a component of traffic identified as "pass-by" traffic, defined as traffic that is already on the adjacent roadway network as part of an existing trip (i.e. home-to-work trip) and stops at the site as part of a dual-purpose trip.

The "new" site trips at the bottom of Table 1 were distributed to the proposed site accesses and to the study area roadway network based on the location of residential and business uses within the local service radius of the proposed retail center as reflected by the existing traffic patterns. The "new" site traffic distribution percentages are summarized below:

Richlieu Road (SR 2035)	
to/from the west	20%
Galloway Road (SR 2023)	
to/from the south	25%
Bristol Road (SR 2025)	
to/from the east	30%
to/from the west	25%
	100%

The pass-by traffic distribution is based specifically on the existing traffic flows that approach the site along Galloway Road and Richlieu Road with an assumed redistribution of these trips to ingress and egress the site. Because of the redistribution associated with "pass-by" trips there are some traffic movements that realize a reduction in trips associated with the proposed development.

The resultant distributed site trips are depicted in Figures 6A, 6B, and 6C for the new trips, pass-by trips, and total site trips, respectively.

FUTURE CONDITIONS

To assess the impact of the development-generated traffic volumes on the study area roadway network, the future traffic volumes in the anticipated build-out year of the site (2025) were determined. To account for regional growth that is expected to occur during the intervening period, a background traffic growth rate was applied to the existing traffic volumes. Based on PennDOT's growth rates for the area, a 0.16 percent per year background growth was applied (total 0.32 percent over two years) to the existing 2023 traffic volumes. The resultant 2025 No-Build traffic volumes are presented on Figures 7, 8 and 9 for the respective peak periods.

Future Build Traffic Volumes

The total Build 2025 traffic volumes, which include the site-generated traffic volumes distributed to the proposed site accesses and to the study area roadway network, are presented in Figures 10, 11 and 12 for the three study peak periods, respectively.

Proposed Site Access

The retail center is proposed to provide two access driveways as identified below:

1) Full movement access driveway via Galloway Road (SR 2023)
2) Right-turn-in/right-turn-out only access driveway via Richlieu Road (SR 2035)

The driveways are appropriately positioned in order to maximize the distance to the signalized intersection of Richlieu Road/Galloway Road.

Level of Service (LOS) Assessment

An assessment of the future 2025 No-Build and Build operating conditions within the study area was completed. The assessment included a Level of Service (LOS) analysis of the study area intersections and the proposed site accesses in order to determine if the projected traffic volumes can be acceptably accommodated within the study area and whether any roadway or intersection improvements would be required. The future No-Build LOS results are presented in Figure 13. The future Build LOS results are presented in Figure 14. The detailed capacity

analysis worksheets for the No-Build and Build conditions analyses are contained in Appendices F and G, respectively.

The Level of Service (LOS) results for each of the study locations are detailed below and summarized in Table 2 at the end of this section:

Richlieu Road (SR 2035)/Galloway Road (SR 2023) – This signalized intersection currently operates at acceptable overall LOS C/D during all three peak periods. All of the individual movements are operating at acceptable LOS D or better with the exception of two LOS F movements in the PM peak hour. Under 2025 No-Build and Build conditions the intersection will continue to operate as under existing conditions.

In accordance with PennDOT's *Highway Occupancy Permit Operations Manual (Pub 282)*, a "10-Second Variance" standard was applied to assess whether the site-generated traffic impact would require mitigation improvements at this intersection. Mitigation is not required if there is either no drop in the overall intersection LOS when comparing the Build conditions to the No-Build conditions or there is a drop but the overall intersection delay increase is less than 10 seconds. The "10-Second Variance" chart for this intersection is below:

	No-Build LOS (Delay)	Build LOS (Delay)	Delay Variance	Requirements Met?
AM Peak Hour	C (23.5)	C (23.5)	n/a	Yes
PM Peak Hour	D (48.6)	D (48.7)	n/a	Yes
SAT Peak Hour	C (21.6)	C (21.6)	n/a	Yes

n/a – With no LOS drop, the delay variance is not applicable to the compliance determination

The site-generated traffic can be accommodated at this intersection with no mitigation required.

Galloway Road (SR 2023)/Bristol Road (SR 2025) – This signalized intersection currently operates at acceptable overall LOS B during all three peak periods, with all individual movements operating at acceptable LOS D or better. Under 2025 No-Build and Build conditions the intersection will operate similar to the existing conditions.

In accordance with PennDOT's *Highway Occupancy Permit Operations Manual (Pub 282)*, we applied the "10-Second Variance" standard to assess whether the site-generated traffic impact would require mitigation improvements at this intersection. Mitigation is not required if there is either no drop in the overall intersection LOS when comparing the Build conditions to the No-Build conditions or there is a drop but the overall intersection delay increase is less than 10 seconds. The "10-Second Variance" chart for this intersection is below:

	No-Build LOS (Delay)	Build LOS (Delay)	Delay Variance	Requirements Met?
AM Peak Hour	B (13.2)	B (13.2)	n/a	Yes
PM Peak Hour	B (19.2)	B (19.5)	n/a	Yes
SAT Peak Hour	B (14.8)	B (15.0)	n/a	Yes

n/a – With no LOS drop, the delay variance is not applicable to the compliance determination

The site-generated traffic can be accommodated at this intersection with no mitigation required.

Richlieu Road (SR 2035)/Bristol Road (SR 2025) – This unsignalized intersection currently operates at acceptable LOS C or better for all movements during all three peak periods. Under 2025 No-Build and Build conditions the intersection will be signalized by others. This signalization was assumed in place for the No-Build and Build analyses. Under 2025 No-Build and Build conditions with signalization the intersection will operate at acceptable overall LOS B during all three peak periods, with all individual movements operating at acceptable LOS D or better.

In accordance with PennDOT's *Highway Occupancy Permit Operations Manual (Pub 282)*, we applied the "10-Second Variance" standard to assess whether the site-generated traffic impact would require mitigation improvements at this intersection. Mitigation is not required if there is either no drop in the overall intersection LOS when comparing the Build conditions to the No-Build conditions or there is a drop but the overall intersection delay increase is less than 10 seconds. The "10-Second Variance" chart for this intersection is below:

	No-Build LOS (Delay)	Build LOS (Delay)	Delay Variance	Requirements Met?
AM Peak Hour	B (19.0)	B (17.3)	n/a	Yes
PM Peak Hour	C (24.0)	C (23.8)	n/a	Yes
SAT Peak Hour	B (17.8)	B (17.7)	n/a	Yes

n/a – With no LOS drop, the delay variance is not applicable to the compliance determination

It should be noted that the Third Avenue approach to Bristol Road will be incorporated into the intersection once it is signalized. Since peak hour traffic volumes for the Third Avenue approach were not available, we made assumptions in order to account for this approach in the analyses. This has no affect in the analysis results or the site-generated traffic impact at this intersection.

The site-generated traffic can be accommodated at this intersection with no mitigation required.

Galloway Road (SR 2023)/Site Access – The full access driveway proposed to intersect Galloway Road will provide one ingress lane and one egress lane with stop-sign control. The access intersection will operate with all movements at acceptable LOS A/B during all three peak periods.

Richlieu Road (SR 2035)/Site Access – The right-turn-in/right-turn-out access driveway proposed to intersect Richlieu Road will provide one ingress lane and one egress lane with stop-sign control. The access intersection will operate with the stop-controlled right-turn-out movement at acceptable LOS A during all three peak periods.

Queue Conditions

The 95th percentile queues for all study area intersections and site access driveways were calculated as part of the Synchro analysis. Table 3 at the end of this section provides a summary of the 95th percentile queues for the existing, No-Build, and Build conditions at all locations. It is noted that the site-generated traffic has very little effect on the maximum queue conditions at the various signalized intersections and at the site access intersections.

Included in the queue evaluation was a review of the queue conditions along Galloway Road along the site frontage. The full movement site access is located approximately 280 feet from the stop bar on the southbound Galloway Road approach to the signalized intersection with Richlieu Road. The maximum (95th percentile) queues in this segment will be less than 230' during all three peak hours. At no time will the queues obstruct safe sight distance for vehicles entering or exiting the driveway.

Sight Distance

Sight distances for exiting vehicles from the proposed site access intersections was reviewed and compared to the desirable sight distance values contained in the Pennsylvania Code, Title 67, *Chapter 441 - Access To and Occupancy Of Highways By Driveways and Local Roads.* The desirable sight distance values for exiting vehicles from the driveways are 540 feet looking to the left and 460 feet looking to the right. There are no sight distance restrictions in either direction; thus, the desirable sight distance criteria are met.

Table 2
Intersection Level of Service Summary

		Weekday AM Peak			Weekday PM Peak			Saturday Midday Peak		
Intersections	**Movement**	**Existing**	**No-Build**	**Build**	**Existing**	**No-Build**	**Build**	**Existing**	**No-Build**	**Build**
Richlieu Road (SR 2035)/Galloway Road (SR 2023)	EB L	C (32.8)	C (32.8)	C (33.0)	D (38.3)	D (38.4)	D (38.7)	C (28.2)	C (28.2)	C (28.3)
	EB TR	C (28.6)	C (28.6)	C (28.6)	F (88.2)	F (89.4)	F (88.3)	C (28.8)	C (28.8)	C (28.8)
	WB L	D (38.3)	D (38.3)	D (38.4)	F (207.2)	F (207.2)	F (218.5)	D (36.2)	D (36.2)	D (36.2)
	WB TR	C (28.4)	C (28.4)	C (28.4)	C (32.9)	C (32.9)	C (33.0)	C (25.8)	C (25.8)	C (25.9)
	NB L	B (14.6)	B (14.7)	B (14.7)	B (13.1)	B (13.1)	B (13.1)	B (12.8)	B (12.8)	B (12.8)
	NB T	B (11.1)	B (11.1)	B (11.1)	B (11.7)	B (11.7)	B (11.8)	B (11.0)	B (11.0)	B (11.1)
	NB R	A (9.9)	A (9.9)	A (9.9)	A (9.8)	A (9.8)	A (9.8)	A (10.0)	A (10.0)	A (10.0)
	SB L	B (18.3)	B (18.3)	B (18.3)	B (18.6)	B (18.6)	B (18.6)	B (18.3)	B (18.3)	B (18.3)
	SB TR	C (23.9)	C (23.9)	C (24.0)	C (22.6)	C (22.6)	C (22.7)	C (21.4)	C (21.4)	C (21.5)
	Overall	**C (23.5)**	**C (23.5)**	**C (23.5)**	**D (48.2)**	**D (48.6)**	**D (48.7)**	**C (21.6)**	**C (21.6)**	**C (21.6)**
Galloway Road (SR 2023)/Bristol Road (SR 2025)	EB TR	B (12.3)	B (12.3)	B (12.4)	B (13.3)	B (13.3)	B (13.5)	B (14.6)	B (14.7)	B (14.8)
	WB LT	A (9.7)	A (9.7)	A (9.7)	A (8.2)	A (8.2)	A (8.2)	B (10.1)	B (10.1)	B (10.1)
	NB L	C (20.8)	C (20.8)	C (20.9)	D (42.4)	D (42.5)	D (42.9)	C (21.6)	C (21.6)	C (21.7)
	NB R	B (18.4)	B (18.4)	B (18.5)	C (33.5)	C (33.5)	C (33.7)	B (18.5)	B (18.5)	B (18.5)
	Overall	**B (13.1)**	**B (13.2)**	**B (13.2)**	**B (19.1)**	**B (19.2)**	**B (19.5)**	**B (14.8)**	**B (14.8)**	**B (15.0)**
Bristol Road (SR 2025)/Richlieu Road (SR 2035)	EB L	-	B (18.8)	B (15.2)	-	B (17.1)	B (17.1)	-	B (13.5)	B (13.5)
	EB TR	-	C (21.0)	B (17.0)	-	C (20.1)	C (20.2)	-	B (15.4)	B (15.4)
	WB L	B (10.9)	B (12.5)	A (9.9)	B (10.8)	B (12.4)	B (12.4)	B (10.4)	A (9.4)	A (9.4)
	WB TR	-	B (11.3)	A (8.6)	-	B (10.7)	B (10.6)	-	A (8.8)	A (8.8)
	NB LR/L	B (11.7)	D (36.8)	D (40.4)	C (19.8)	D (35.2)	D (35.4)	B (12.8)	D (39.7)	D (39.9)
	NB R	-	D (42.3)	D (48.3)	-	D (52.4)	D (52.1)	-	D (49.5)	D (49.2)
	SB LR	-	D (49.6)	D (51.4)	-	D (51.3)	D (51.3)	-	D (51.3)	D (51.3)
	Overall	**A (5.2)**	**B (19.0)**	**B (17.3)**	**A (8.4)**	**C (24.0)**	**C (23.8)**	**A (5.1)**	**B (17.8)**	**B (17.7)**
Galloway Road (SR 2023)/Site Access	SB L	-	-	A (8.6)	-	-	A (9.4)	-	-	A (8.7)
	WB LR	-	-	A (10.0)	-	-	B (11.9)	-	-	A (9.9)
	Overall	-	-	**A (0.2)**	-	-	**A (0.5)**	-	-	**A (0.5)**
Richlieu Road (SR 2035)/Site Access	EB R	-	-	B (10.4)	-	-	A (9.6)	-	-	A (9.3)
	Overall	-	-	**A (0.0)**	-	-	**A (0.1)**	-	-	**A (0.1)**

Table 3
95th Percentile Queue Summary (in feet)

			Weekday AM Peak			Weekday PM Peak			Saturday Midday Peak		
Intersections	**Movement**	**Storage Length[1]**	**Existing**	**No-Build**	**Build**	**Existing**	**No-Build**	**Build**	**Existing**	**No-Build**	**Build**
Richlieu Road (SR 2035)/Galloway Road (SR 2023)	EB L	**185'**	14	14	18	70	71	78	26	26	30
	EB TR	n/a	204	204	204	716	723	716	215	215	214
	WB L	**225'**	144	144	146	195	195	204	81	81	82
	WB TR	n/a	210	211	212	173	174	176	91	91	93
	NB L	**210'**	122	123	123	116	117	117	74	74	74
	NB T	n/a	83	83	84	168	168	171	79	80	82
	NB R	**210'**	19	19	19	45	45	44	24	24	24
	SB L	**75'**	2	2	2	1	1	1	1	1	1
	SB TR	n/a	226	227	229	195	195	199	138	139	141
Galloway Road (SR 2023)/Bristol Road (SR 2025)	EB TR	n/a	212	212	214	379	380	385	284	286	288
	WB LT	n/a	127	127	127	136	137	137	146	146	146
	NB L	n/a	125	126	128	321	322	327	163	165	167
	NB R	**85'**	9	9	10	24	24	33	11	11	14
Bristol Road (SR 2025)/Richlieu Road (SR 2035)	EB L	**70'**	-	8	7	-	7	7	-	6	6
	EB TR	n/a	-	115	102	-	156	159	-	109	111
	WB L	**155'**	40	181	155	30	123	126	28	103	105
	WB TR	n/a	-	201	169	-	145	144	-	168	167
	NB LR/L	n/a/**45'**	30	13	14	130	24	24	50	13	14
	NB R	n/a	-	175	188	-	296	292	-	202	200
	SB LR	n/a	-	28	29	-	25	25	-	25	25
Galloway Road (SR 2023)/Site Access	SB L	n/a	-	-	0	-	-	0	-	-	0
	WB LR	n/a	-	-	0	-	-	5	-	-	3
Richlieu Road (SR 2035)/Site Access	EB R	n/a	-	-	0	-	-	0	-	-	0

[1]n/a = not applicable; no designated storage lane

CONCLUSIONS

The conduct of this updated Traffic Impact Assessment for the proposed retail center on TMP 02-046-001 at the northeast corner of Richlieu Road (SR 2035)/Galloway Road (SR 2023) in Bensalem Township, Bucks County, has led to the following conclusions:

1. The proposed retail center will be provided access via a full movement driveway intersecting Galloway Road and a right-turn-in/right-turn-out only driveway intersecting Richlieu Road.

2. The site is expected to generate approximately 21 new trips in the weekday AM peak hour, 36 new trips in the weekday PM peak hour, and 30 new trips in the Saturday midday peak hour.

3. The site-generated traffic can be accommodated at all study area intersections in accordance with the LOS requirements of PennDOT's *Highway Occupancy Permit Operations Manual (Pub 282)*. There are no off-site intersection mitigation improvements required.

4. The proposed access driveways will operate at acceptable LOS A/B during all three peak periods. The driveways will meet the desirable sight distance standards of 540 feet looking to the left and 460 feet looking to the right.

5. The driveways are subject to the review and approval of PennDOT through the Highway Occupancy Permit (HOP) process.

6. As a result of the conduct of this Traffic Impact Assessment it is demonstrated that the site-generated traffic can be safely and acceptably accommodated within the study area roadway network.

HCA *Horner & Canter Associates*

TRANSPORTATION AND TRAFFIC ENGINEERING

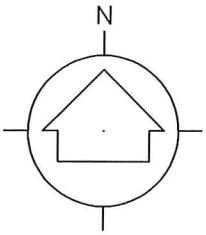


FIGURE 1
SITE LOCATION MAP

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

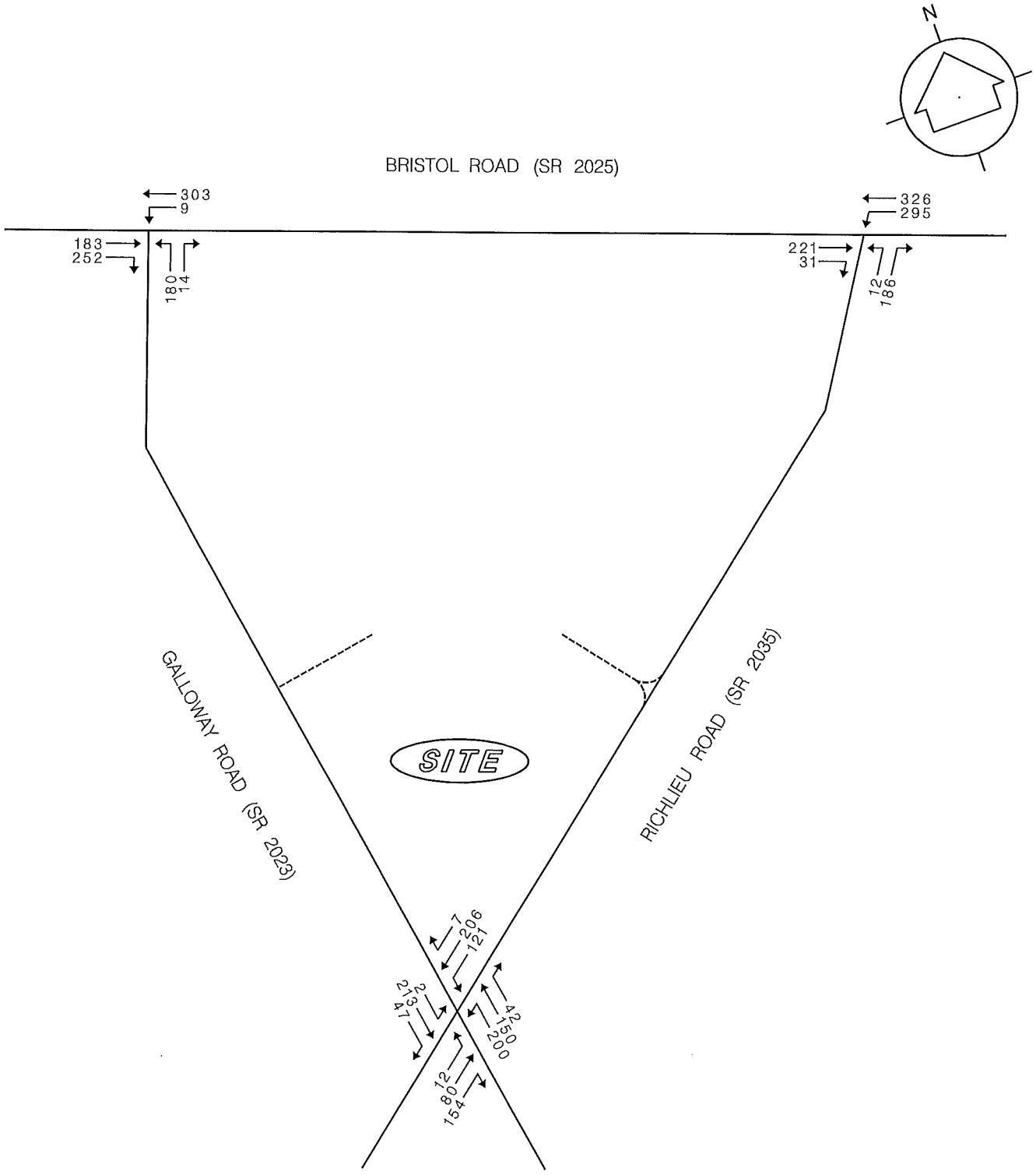


FIGURE 2
EXISTING WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

HCA Horner & Canter Associates

TRANSPORTATION AND TRAFFIC ENGINEERING

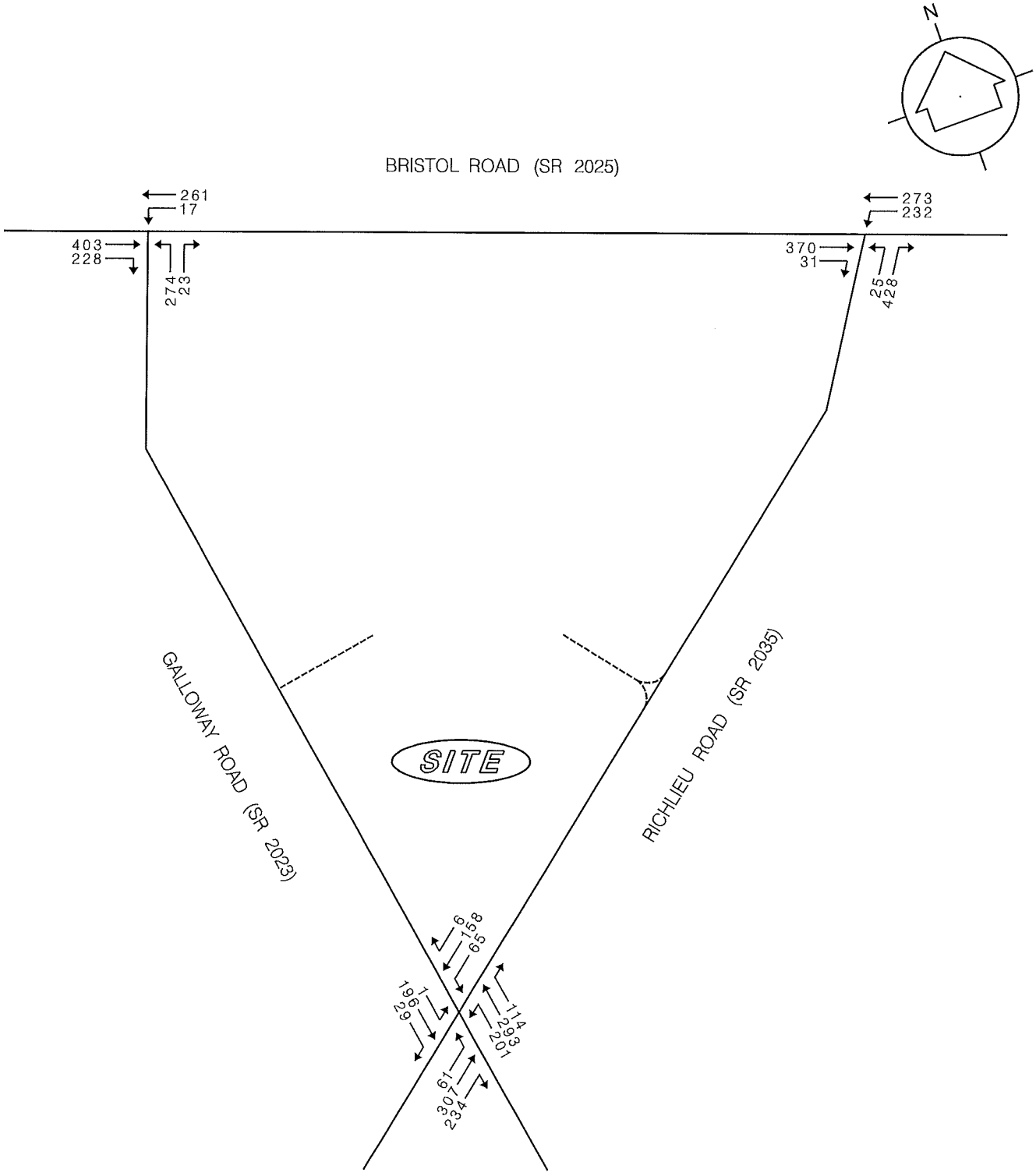


FIGURE 3
EXISTING WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY,PA

22-062
MARCH 2024

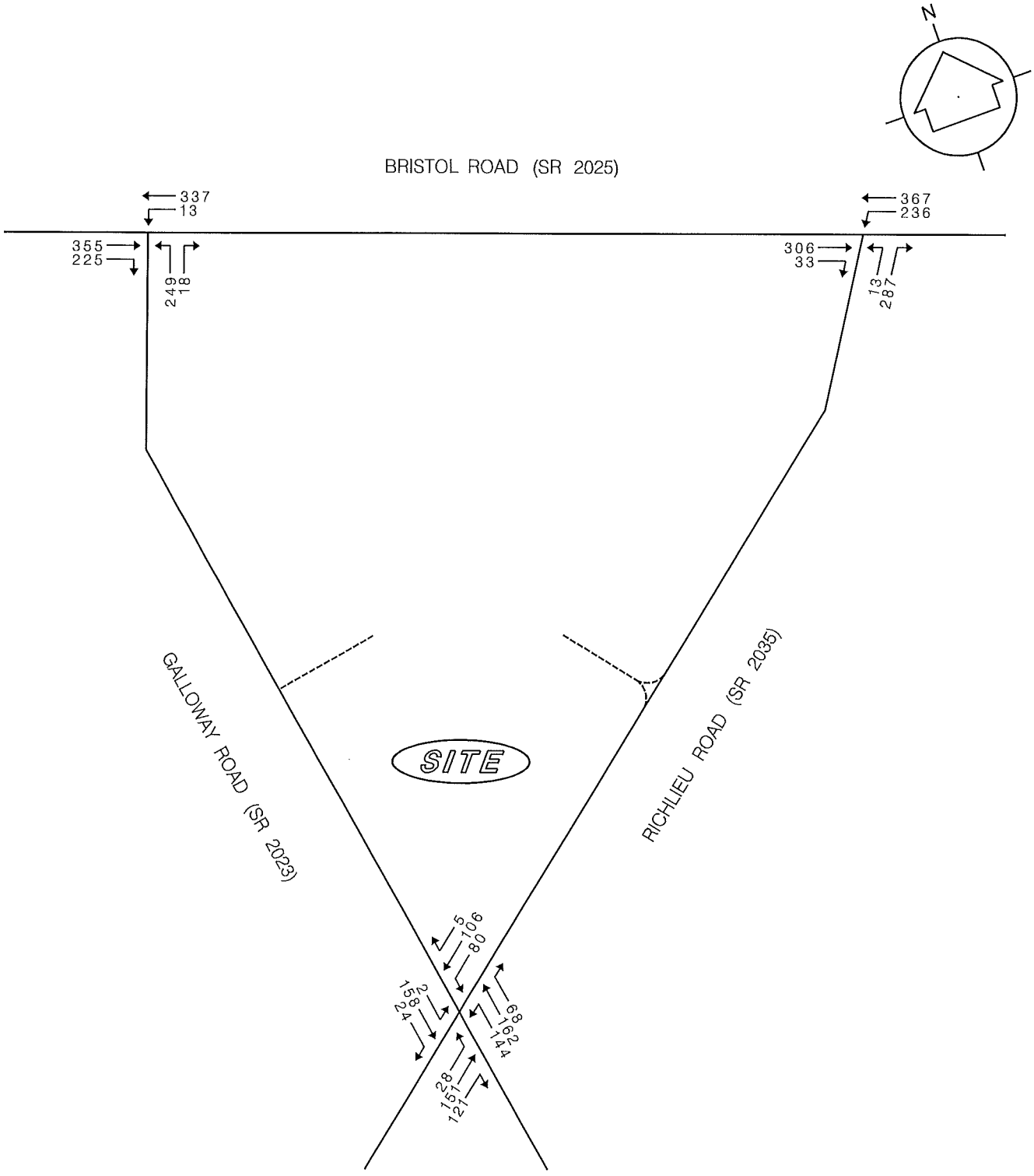


FIGURE 4
EXISTING SATURDAY MIDDAY PEAK HOUR TRAFFIC VOLUMES

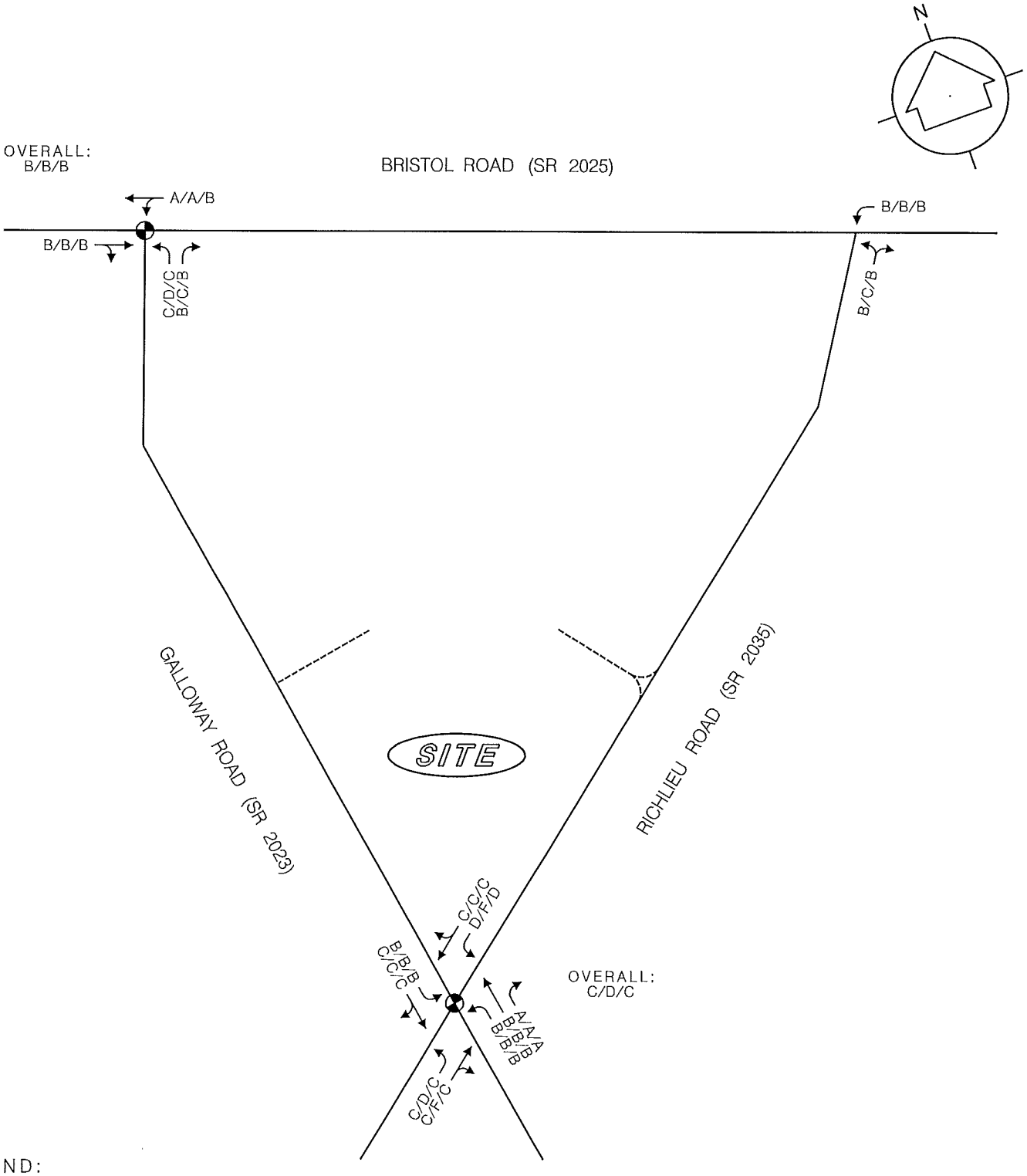
PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

HCA *Horner & Canter Associates*

TRANSPORTATION AND TRAFFIC ENGINEERING



LEGEND:

AM/PM/SATURDAY PEAK HOUR

TRAFFIC SIGNAL

FIGURE 5
EXISTING LEVELS OF SERVICE

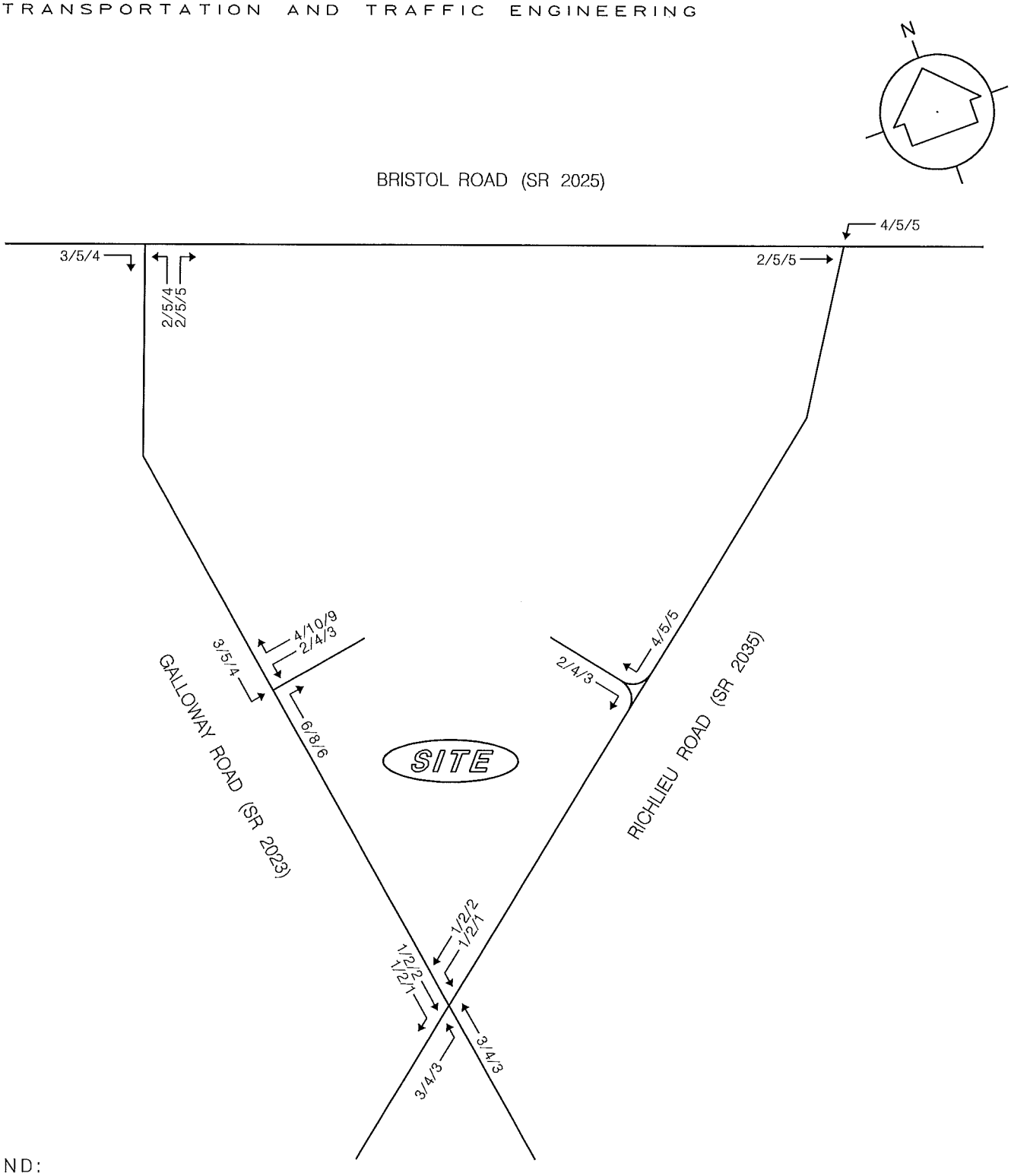
PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

HCA *Horner & Canter Associates*

TRANSPORTATION AND TRAFFIC ENGINEERING



LEGEND:

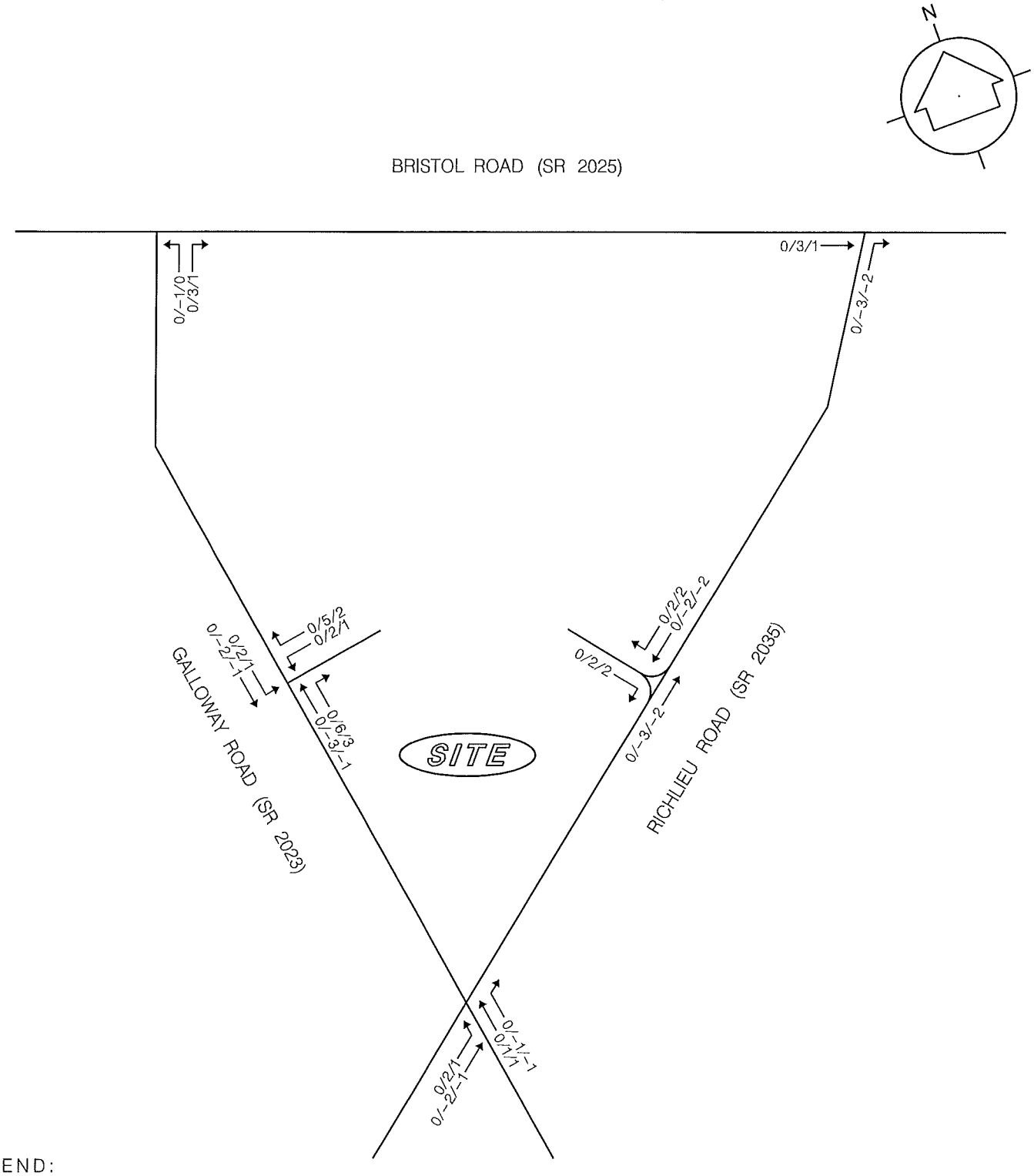
← AM/PM/SATURDAY PEAK HOUR

FIGURE 6A
NEW SITE TRIPS

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY,PA

22-062
MARCH 2024



LEGEND:

← AM/PM/SATURDAY PEAK HOUR

FIGURE 6B
PASS-BY SITE TRIPS

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

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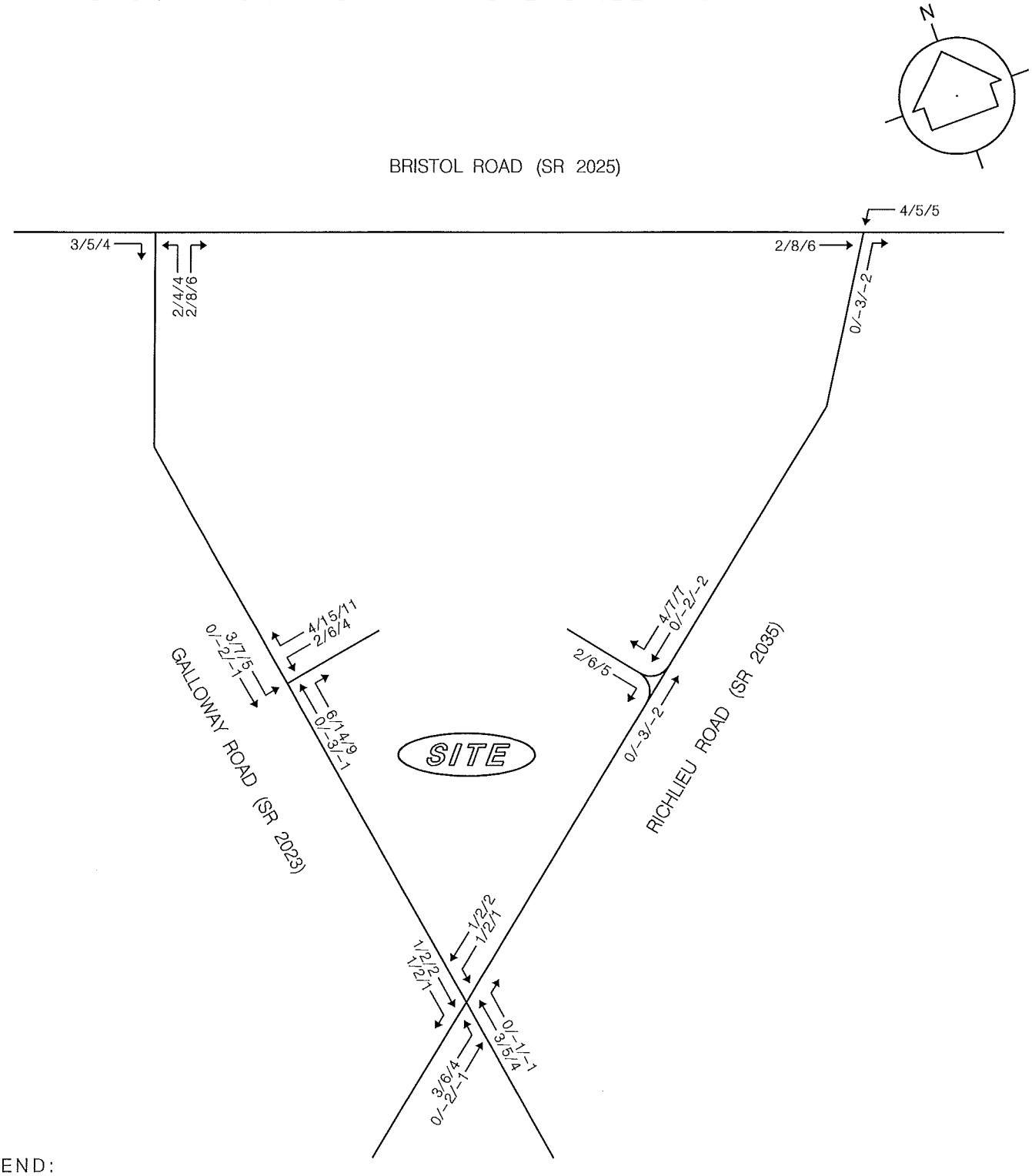

LEGEND:

← AM/PM/SATURDAY PEAK HOUR

FIGURE 6C
TOTAL SITE TRIPS

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

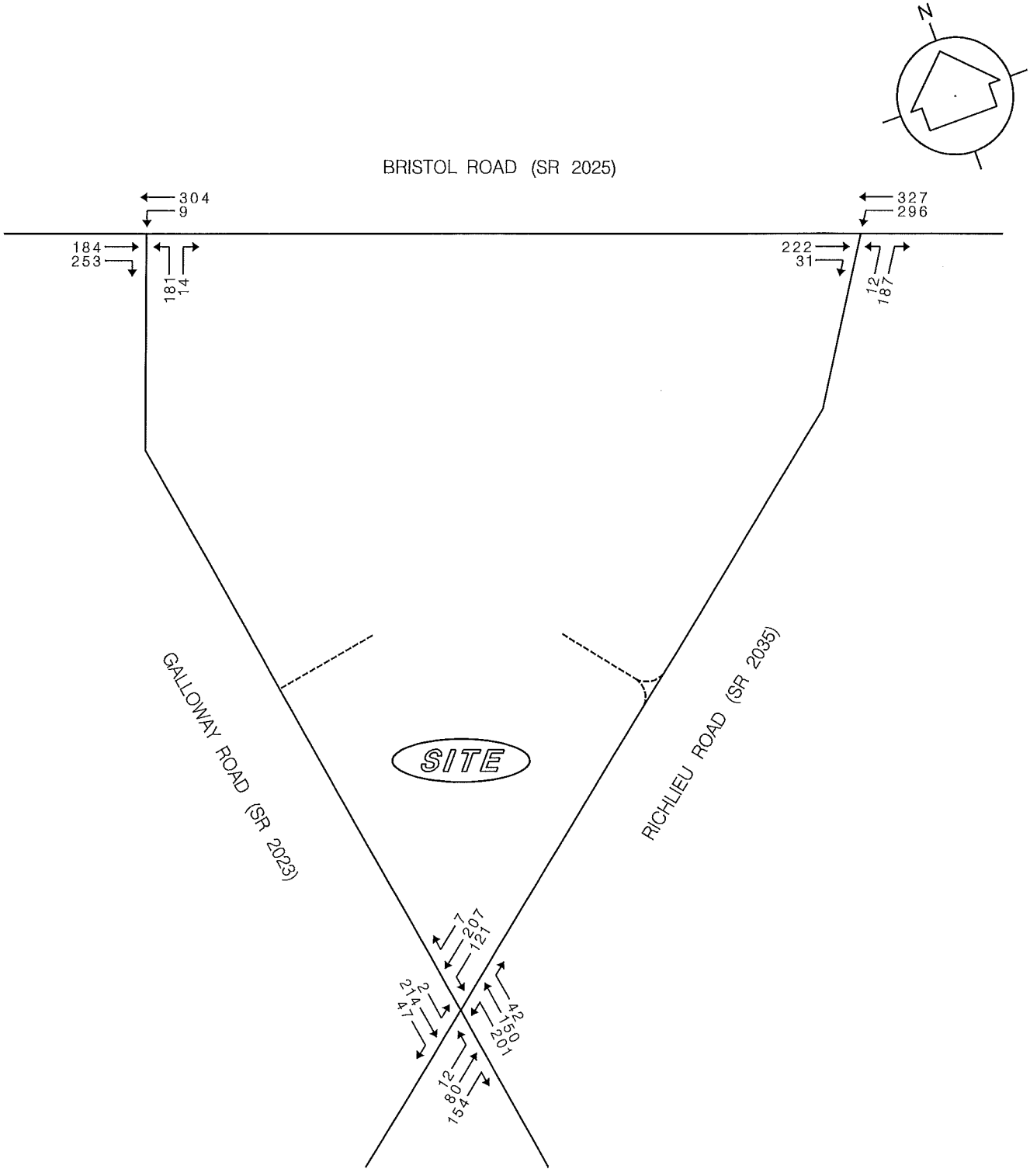

FIGURE 7
NO-BUILD WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

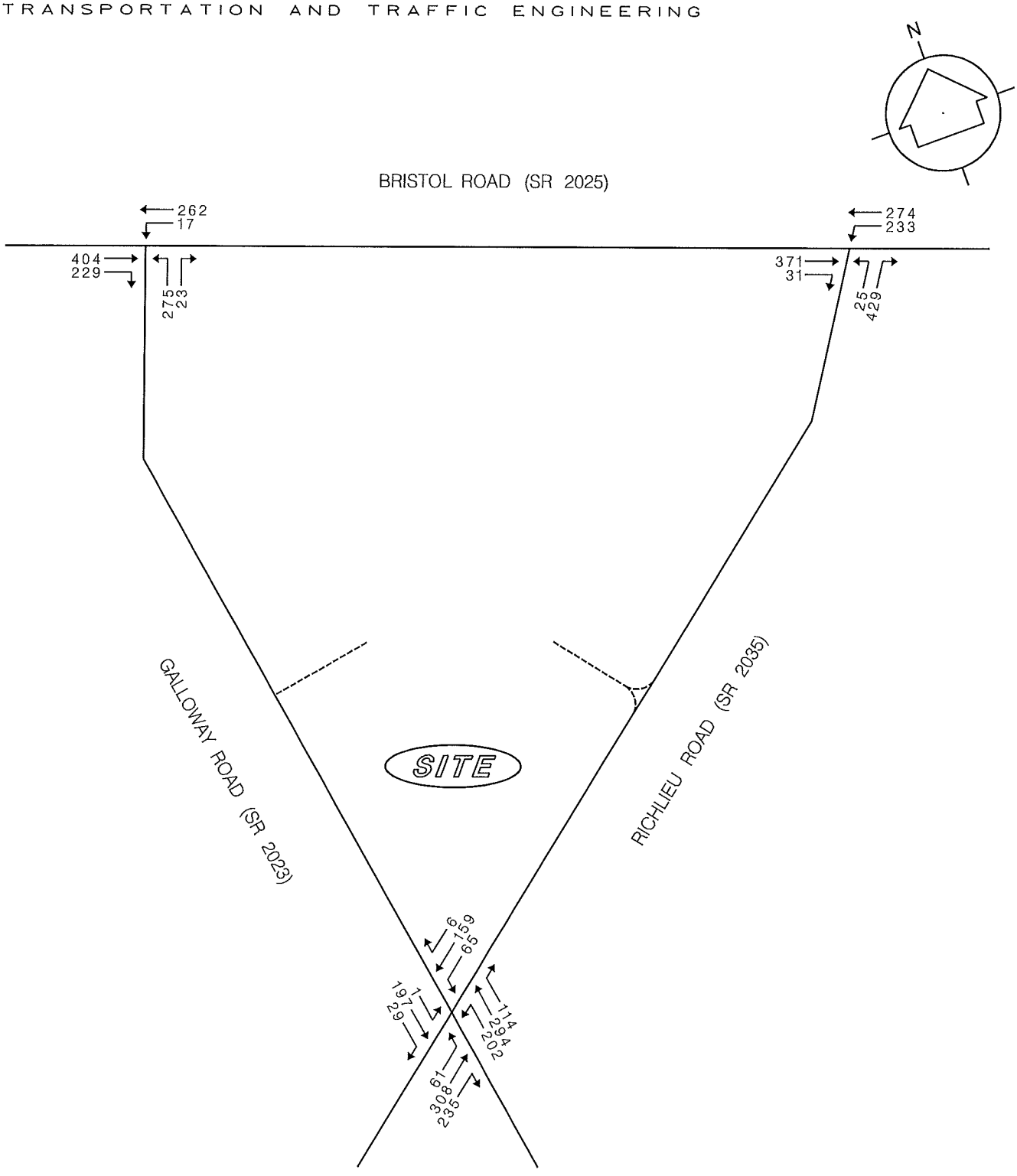

FIGURE 8
NO-BUILD WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

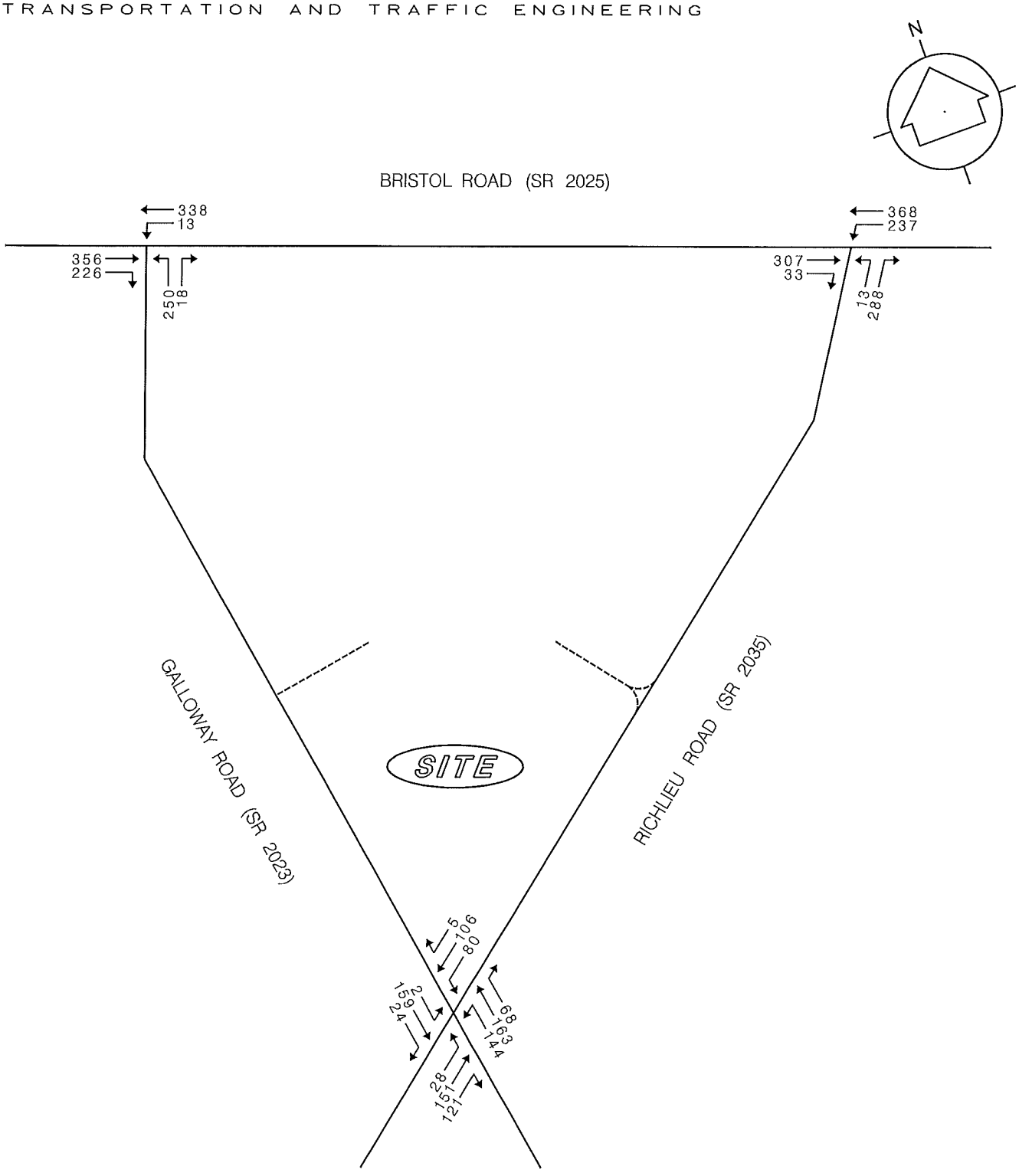

FIGURE 9
NO-BUILD SATURDAY MIDDAY PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

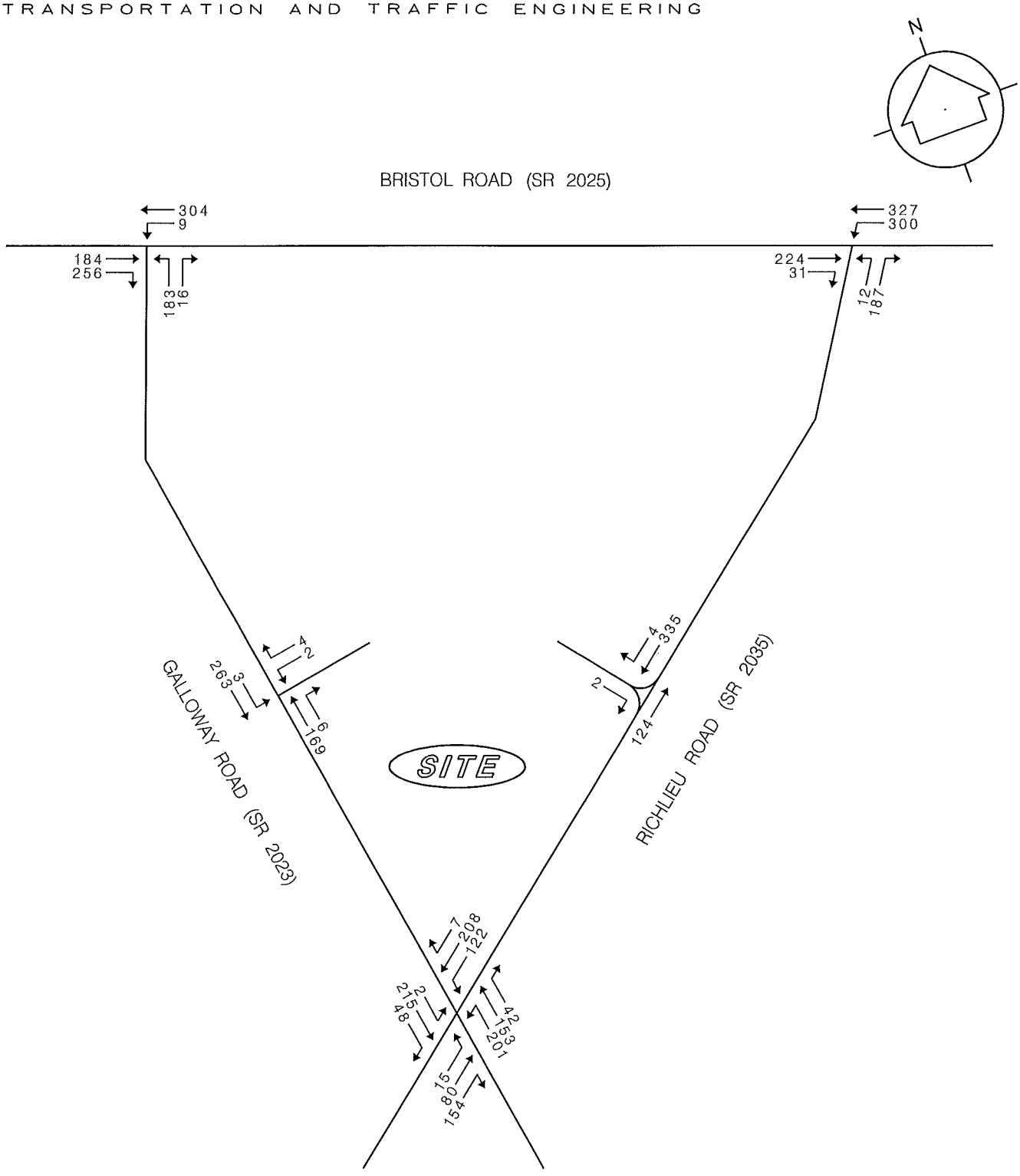

FIGURE 10
BUILD WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

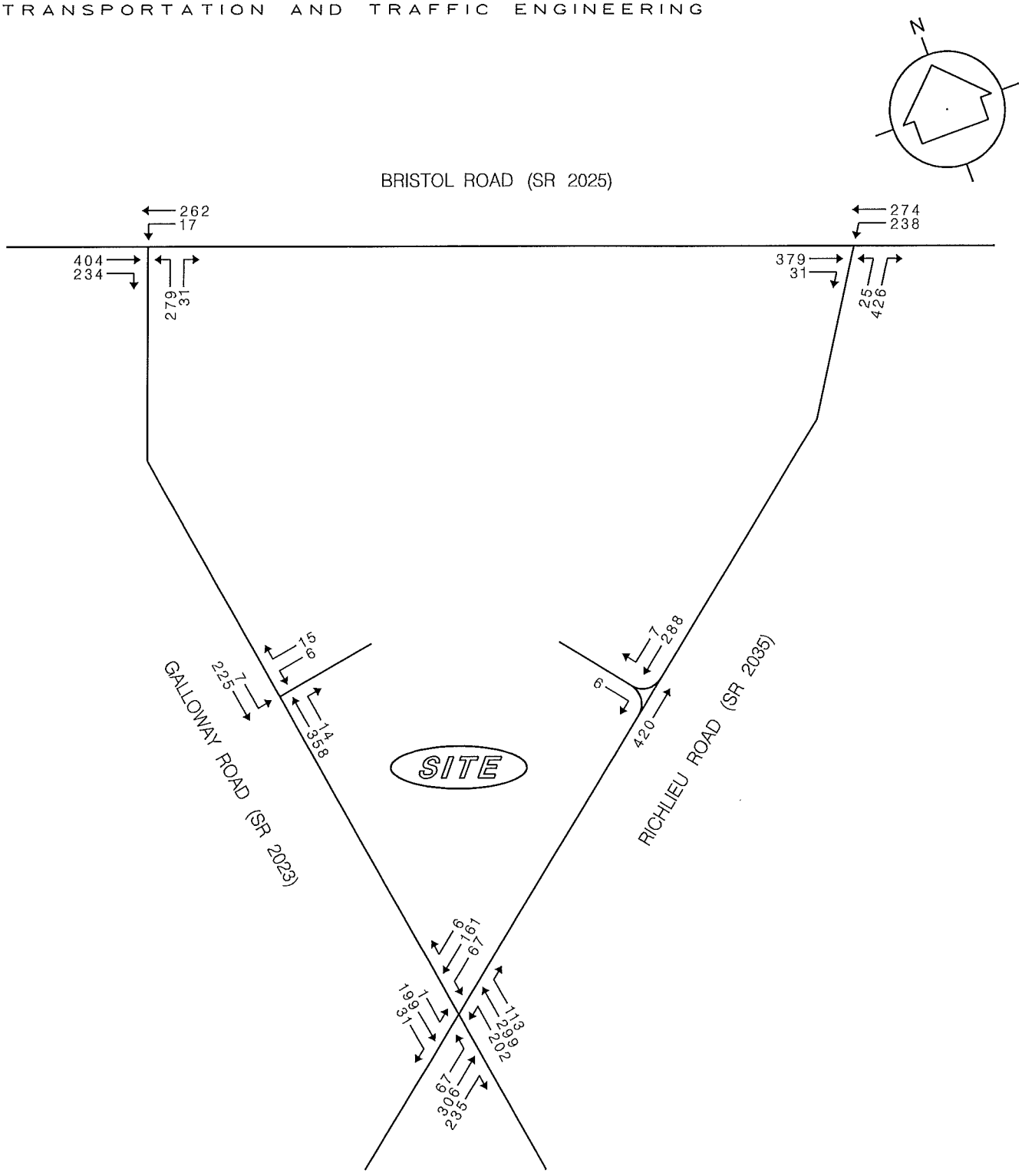

FIGURE 11
BUILD WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

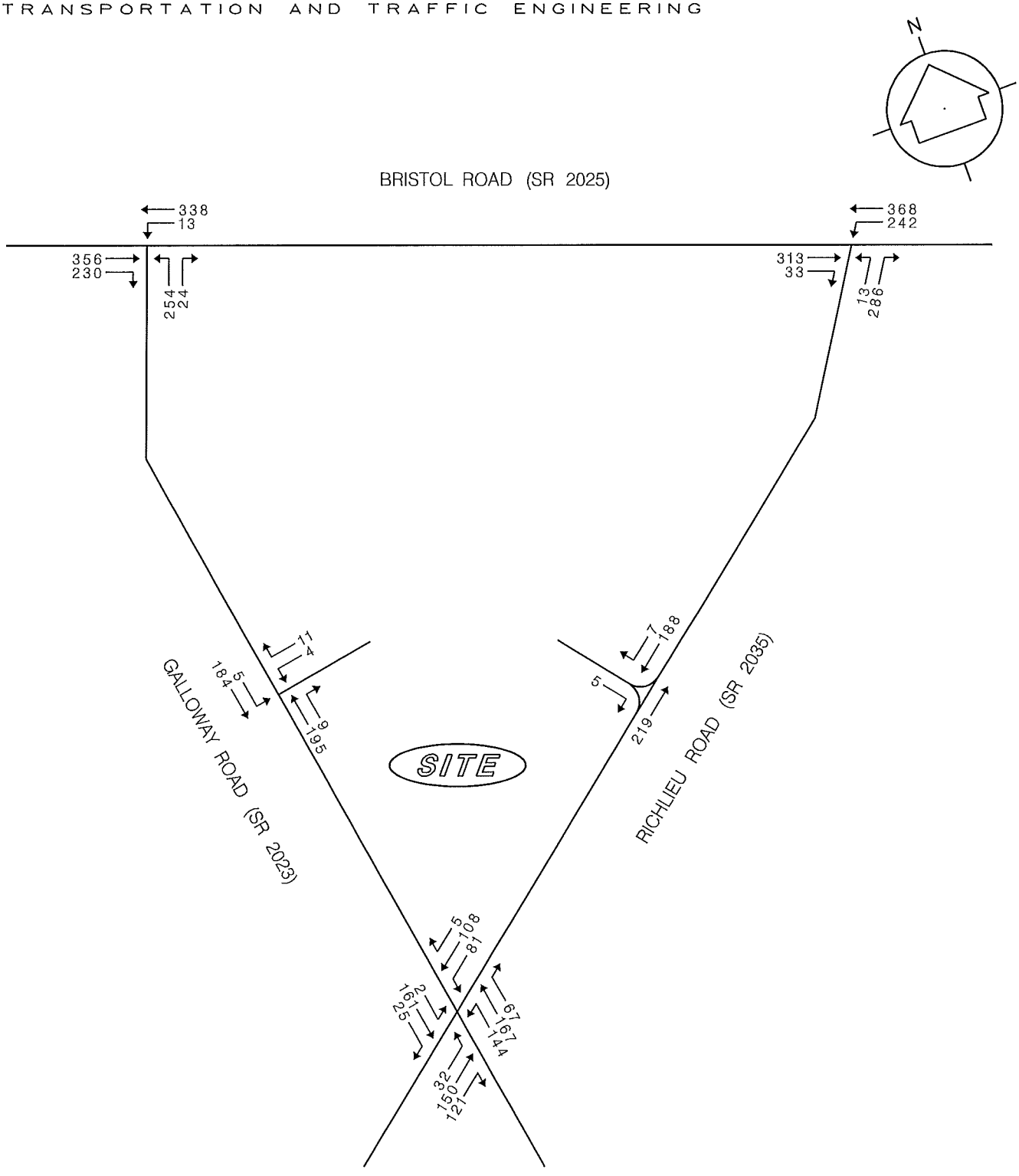

FIGURE 12
BUILD SATURDAY MIDDAY PEAK HOUR TRAFFIC VOLUMES

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY,PA

22-062
MARCH 2024

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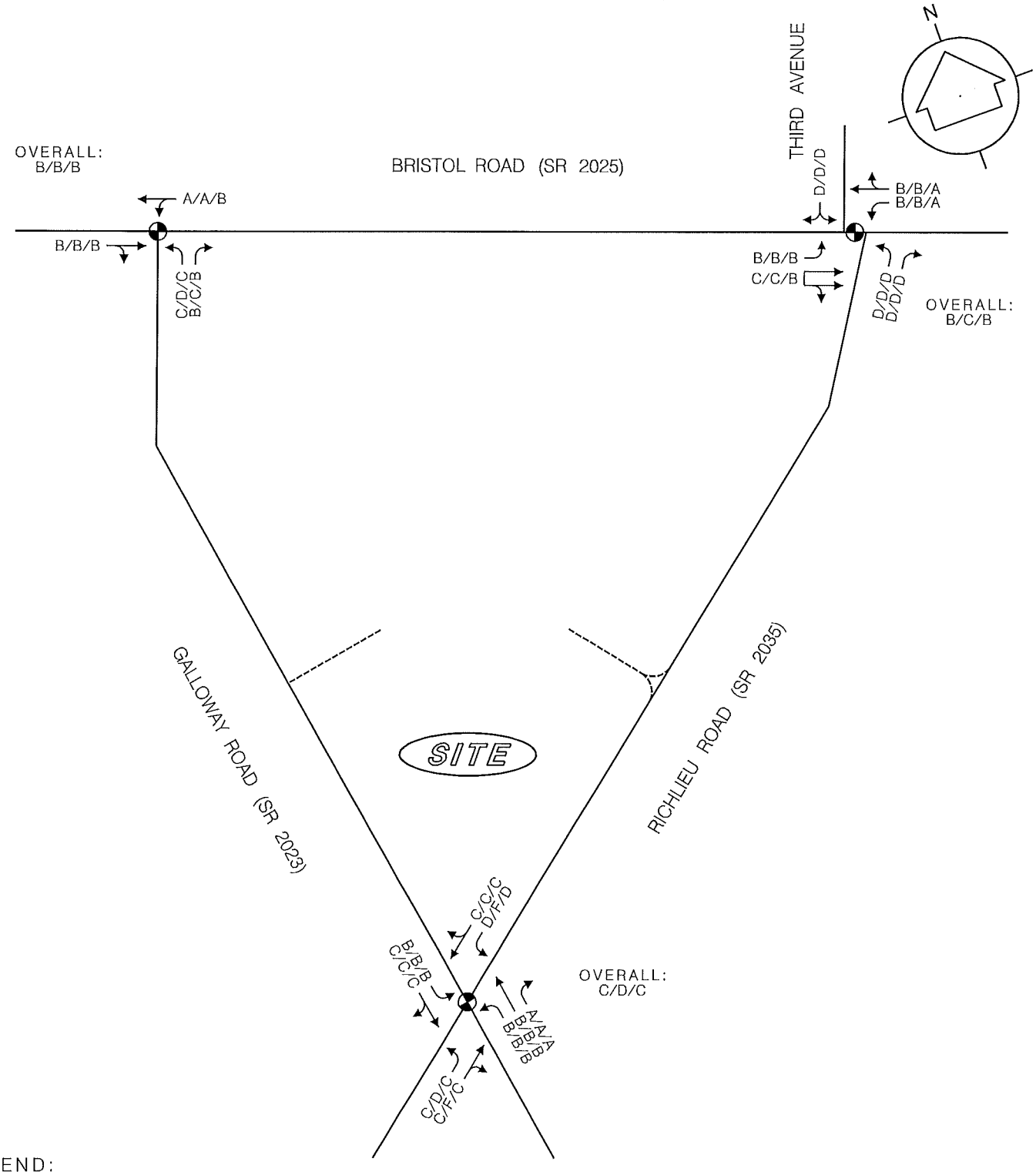
TRANSPORTATION AND TRAFFIC ENGINEERING



LEGEND:

AM/PM/SATURDAY PEAK HOUR

TRAFFIC SIGNAL

FIGURE 13
NO-BUILD LEVELS OF SERVICE

PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

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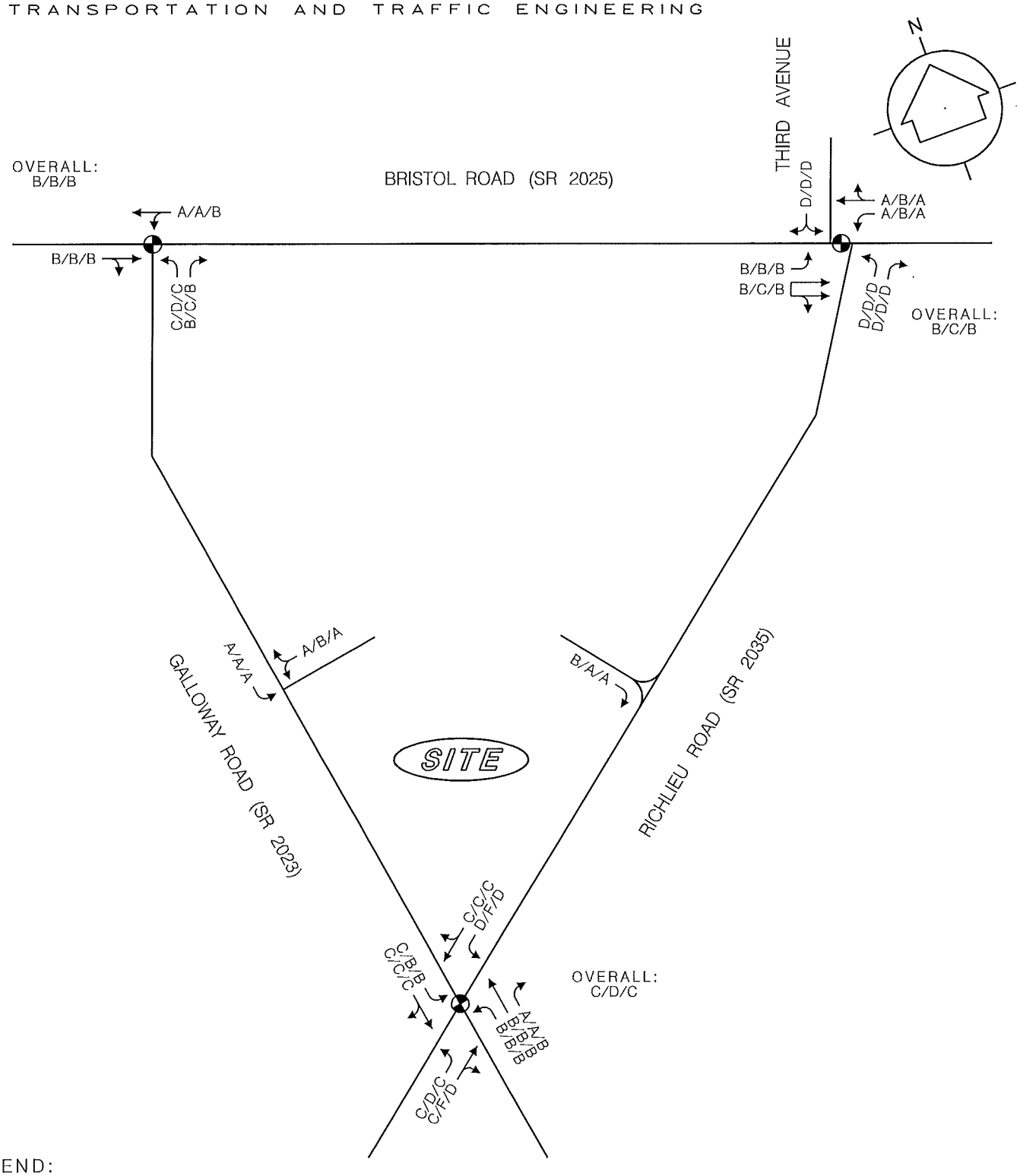


LEGEND:

AM/PM/SATURDAY PEAK HOUR

TRAFFIC SIGNAL

FIGURE 14
BUILD LEVELS OF SERVICE

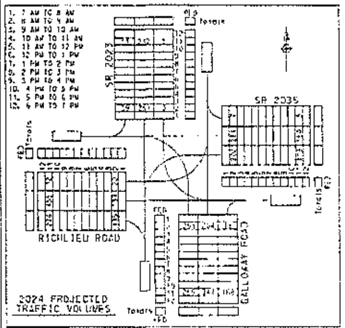
PROPOSED RETAIL CENTER (TMP 02-046-001)

BENSALEM TOWNSHIP, BUCKS COUNTY, PA

22-062
MARCH 2024

APPENDIX A

Traffic Signal Plans



SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R5-1	30"X30"	DO NOT ENTER
B	R3-8LSP	30"x48"	LANE USE CONTROL
C	R3-7L	30"x30"	LEFT LANE MUST TURN LEFT
E	R1-2	36"X36"	YIELD
J	R9-3	18"x18"	NO PEDESTRIAN CROSSING
K	D3-4	96"x16"	SINGLE LINE OVERHEAD STREET NAME
L	D3-4	96"x16"	SINGLE LINE OVERHEAD STREET NAME
N	R10-3E(L)	9"x15"	EDUCATIONAL PUSHBUTTON FOR WALK SYMBOL WITH COUNTDOWN TIMER SIGN ←
P	R10-3E(R)	9"x15"	EDUCATIONAL PUSHBUTTON FOR WALK SYMBOL WITH COUNTDOWN TIMER SIGN →
R	W11-2	30"X30"	PEDESTRIAN CROSSING SIGN
S	W16-7P	24"X12"	DIAGONAL DOWNWARD POINTING ARROW
T	R10-12	30"X36"	LEFT TURN YIELD ON GREEN ●

DETAIL SIGN "K"

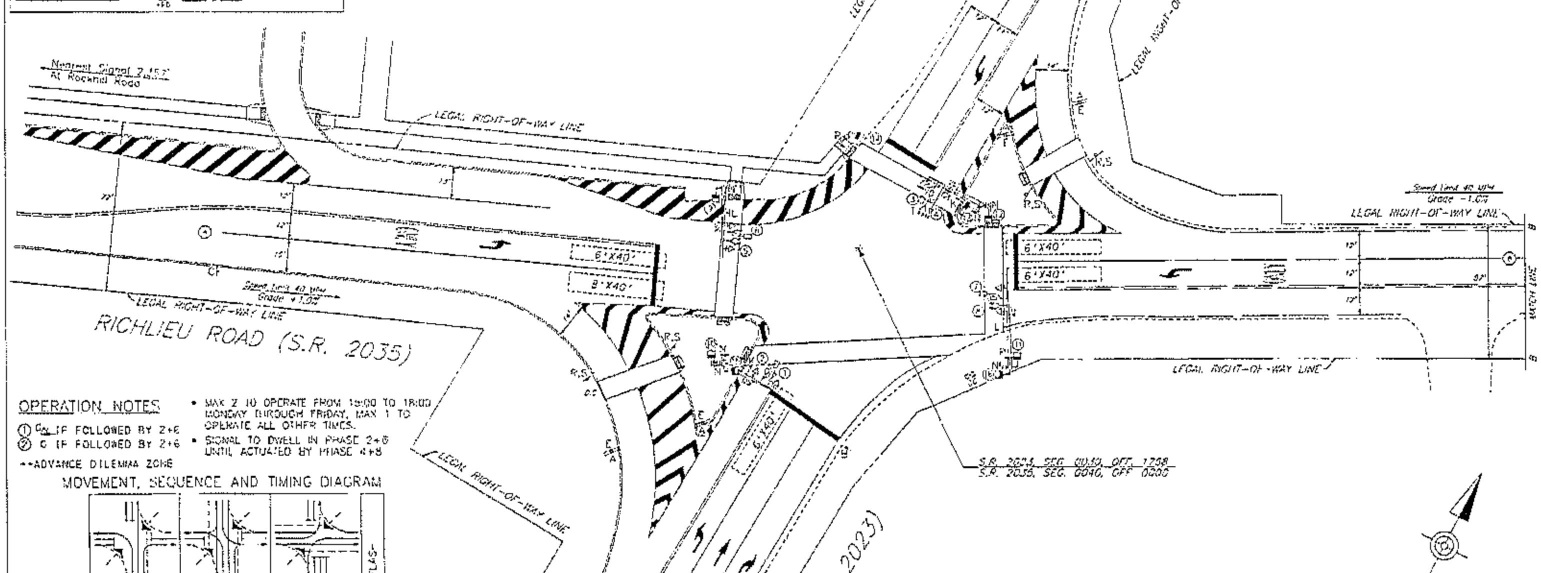
96" — Richlieu Rd — 16"

CLEARVIEW 1-W (5% REDUCTION)
10.6" U.C.
8" L.C.

DETAIL SIGN "L"

96" — Galloway Rd — 16"

CLEARVIEW 1-W (15% REDUCTION)
10.6" U.C.
8" L.C.



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ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 10, 1974

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT FOR REVIEW PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

OPERATION NOTES

① G/← IF FOLLOWED BY 2+6
② G IF FOLLOWED BY 2+6

**ADVANCE DILEMMA ZONE

- MAX 2 TO OPERATE FROM 15:00 TO 18:00 MONDAY THROUGH FRIDAY, MAX 1 TO OPERATE ALL OTHER TIMES.
- SIGNAL TO DWELL IN PHASE 2+6 UNTIL ACTUATED BY PHASE 4+8

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	2+5				2+6				4+8				FLASH
SIGNAL \ INTERVAL	1	2	3	4	5	6	7	8	9	10	11	12	
1,2	G	G	Y	R	G	G	Y	R	R	R	R	R	Y
3	[illegible]	[illegible]	Y	R	G	G	Y	R	R	R	R	R	Y
4	C	G	Y	R	C	C	Y	R	R	R	R	R	Y
5,6	R	R	R	R	R	R	R	R	G	G	Y	R	R
7,8	R	R	R	R	R	R	R	R	G	G	Y	R	R
9,10	M*	FH*	H	H	M*	FH*	H	H	H	H	H	H	OUT
11,12	M*	FH*	H	H	M*	FH*	H	H	H	H	H	H	OUT
13,14	H	H	H	H	H	H	H	H	M*	FH*	H	H	OUT
15,16	H	H	H	H	H	H	H	H	M*	FH*	H	H	OUT

	1	2	3	4	5	6	7	8	9	10	11	12
FIXED			4	3			4	3			4	3
MINIMUM	←3→				←15→				←3→			
SEC./ACT.					←2→							
MAX. INIT					←30→							
PASSAGE	←3→				←3+→				←3→			
MAXIMUM 1	←10→				←40→				←31→			
MAXIMUM 2	←13→				←50→				←33→			
PEDESTRIAN*	7	14			7	14			7	24		
MEMORY	←NL→				←MN→				←NL→			

* UPON PEDESTRIAN ACTUATION ONLY, OTHERWISE HAND AT ALL OTHER TIMES.
MR DENOTES MINIMUM RECALL
NL DENOTES NON LOCKING

**RADAR DILEMMA DETECTOR NOTES (ESTIMATED TIME OF ARRIVAL METHOD)

DENSITY:
RANGE OF DETECTION: STOP BAR TO 100 FEET
SPEED BOUNDARY: 5 MPH TO 30 MPH

DILEMMA ZONE:
ESTIMATED TIME OF ARRIVAL: MIN 2.5 SEC - MAX 5.5 SEC
RANGE OF DETECTION: STOP BAR TO 450 FEET
SPEED BOUNDARY: 27 MPH TO 100 MPH

25 0 25

SIGNAL INDICATIONS

12" LENS	12" LENS	18"X18" COUNTDOWN
1,2,4, 5,6,7,8	3	9,10,11,12, 13,14,15,16

SIGNALS TO BE EQUIPPED WITH TUNNEL VISORS 3,4

LEGEND

MAST ARM/ IDENTIFYING LENGTH	ADVANCE RADAR DETECTOR
VEHICULAR SIGNAL HEAD/ BACKPLATE/VISORS/ DIRECTIONAL ARROW/ IDENTIFYING NUMBER	EMERGENCY PREEMPTION BEACON
PEDESTRIAN SIGNAL HEAD/ IDENTIFYING NUMBER	EMERGENCY PREEMPTION DETECTOR
PEDESTRIAN PUSHBUTTON/ SIGN	VIDEO DETECTOR
SIGN/IDENTIFYING LETTER	CURB CUT RAMP
LOOP SENSOR/SIZE	UTILITY POLE
AREA OF DETECTION	PHASE NUMBER
	INLET
	CONTROLLER

PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: BUCKS
MUNICIPALITY: BENSALEM TOWNSHIP
INTERSECTION: RICHLIEU ROAD (S.R. 2035) AND GALLOWAY ROAD (S.R. 2023)

REVIEWED:
[signature] - DIR. OF [illegible] 7/24/19
MUNICIPAL OFFICIAL DATE

RECOMMENDED:
MARK L. KRAY 9/13/91
DOUGLAS MAY 9/13/91
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DES./REVW.	DATE	RECOM.	DATE	RECOM.	DATE
1	NEW DRAWING, ADDED INTERSECTION	PAI KEA	4/8/02	MK	4/15/02	LRO	4/15/02
2	MODIFIED PAVEMENT MARKINGS	PAI BFW	10/4/02	MK	10/13/02	LRO	10/21/02
3	REDRAWN, ADDED PED COUNTDOWN TIMERS, REVISED PRE-EMPTION NOTES	H&K	5/27/11				
4	ADDED NB LEFT-TURN PHASE, VIDEO DETECTION, ADVANCE RADAR DETECTION	TPD	7/16/19	[signature]	[illegible]	DLA	[illegible]
5							
6							
7							
8							

SHEET 2 OF 3 | PERMIT # 61-2740 | FILE # 2740

EMERGENCY PRE-EMPTION PHASING

PHASE		7				6				4				8		
SIGNAL / INTERVAL	SELECTIVE CLEARANCES	13	14	15	SELECTIVE CLEARANCES	16	17	18	SELECTIVE CLEARANCES	19	20	21	SELECTIVE CLEARANCES	22	23	24
1,2		R	R	R		G	Y(b)	R(a)		R	R	R		R	R	R
3		[illegible]	Y(b)	R(a)		R	R	R		R	R	R		R	R	R
4		G	Y(b)	R(a)		R	R	R		R	R	R		R	R	R
5,6		R	R	R		R	R	R		R	R	R		G	Y	R
7,8		R	R	R		R	R	R		G	Y	R		R	R	R
9,10		H	H	H		H	H	H		H	H	H		H	H	R
11,12		H	H	H		H	H	H		H	H	H		H	H	H
13,14		H	H	H		H	H	H		H	H	H		H	H	H
15,16		H	H	H		H	H	H		H	H	H		H	H	H
FIXED TIME		*	4	3		*	4	3		*	4	3		*	4	3

* FOR DURATION OF PRE-EMPTION

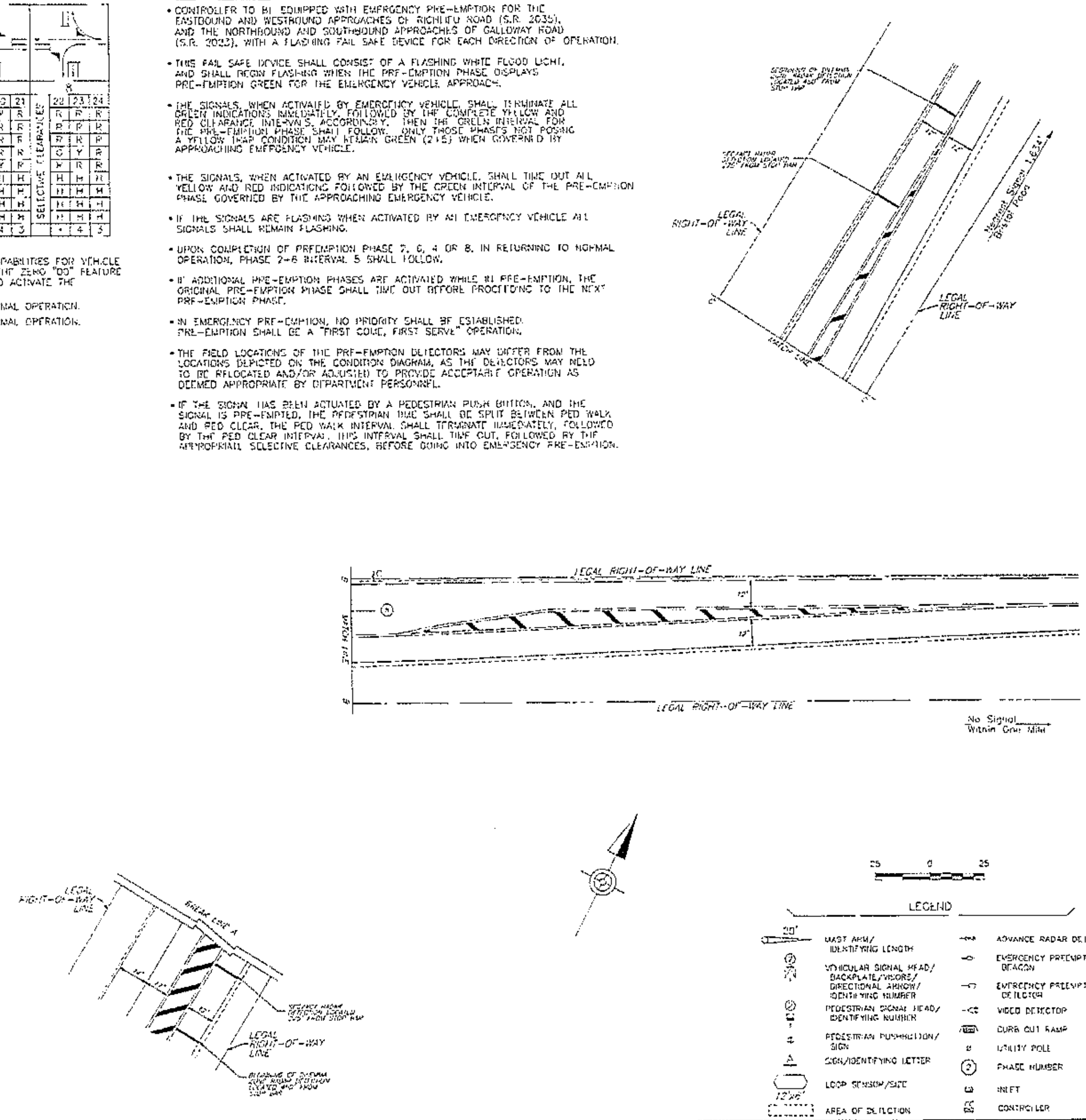
NOTE: IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "00" FEATURE ON TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

(a) SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION.

(b) SIGNAL TO INDICATE G WHEN RETURNING TO NORMAL OPERATION.

EMERGENCY PRE-EMPTION NOTES

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE EASTBOUND AND WESTBOUND APPROACHES OF RICHLIEU ROAD (S.R. 2035), AND THE NORTHBOUND AND SOUTHBOUND APPROACHES OF GALLOWAY ROAD (S.R. 2023), WITH A FLASHING FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION.
- THIS FAIL SAFE DEVICE SHALL CONSIST OF A FLASHING WHITE FLOOD LIGHT, AND SHALL BEGIN FLASHING WHEN THE PRE-EMPTION PHASE DISPLAYS PRE-EMPTION GREEN FOR THE EMERGENCY VEHICLE APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (2+5) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF THE SIGNALS ARE FLASHING WHEN ACTIVATED BY AN EMERGENCY VEHICLE ALL SIGNALS SHALL REMAIN FLASHING.
- UPON COMPLETION OF PREEMPTION PHASE 7, 6, 4 OR 8, IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 5 SHALL FOLLOW.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED. PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- THE FIELD LOCATIONS OF THE PRE-EMPTION DETECTORS MAY DIFFER FROM THE LOCATIONS DEPICTED ON THE CONDITION DIAGRAM, AS THE DETECTORS MAY NEED TO BE RELOCATED AND/OR ADJUSTED TO PROVIDE ACCEPTABLE OPERATION AS DEEMED APPROPRIATE BY DEPARTMENT PERSONNEL.
- IF THE SIGNAL HAS BEEN ACTUATED BY A PEDESTRIAN PUSH BUTTON, AND THE SIGNAL IS PRE-EMPTED, THE PEDESTRIAN TIME SHALL BE SPLIT BETWEEN PED WALK AND PED CLEAR. THE PED WALK INTERVAL SHALL TERMINATE IMMEDIATELY, FOLLOWED BY THE PED CLEAR INTERVAL. THIS INTERVAL SHALL TIME OUT, FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES, BEFORE GOING INTO EMERGENCY PRE-EMPTION.



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INTERSECTION: RICHLIEU ROAD (S.R. 2035) AND GALLOWAY ROAD (S.R. 2023)

REVIEWED:

[signature] - DIR. OF ADMIN 7/22/19
MUNICIPAL OFFICIAL DATE

RECOMMENDED:

MARK L. KRAY 9/13/91

DOUGLAS MAY 9/13/91
DISTRICT TRAFFIC ENGINEER DATE

NO.	REVISION	DSN./REVW.	DATE	REVW.	DATE	RECOM.	DATE
1	NEW DRAWING, WITH NEW INTERSECTION	PAI RFW	3/15/02	MK	4/10/02	LRH	4/19/02
2	MODIFIED PAVEMENT MARKINGS	PAI RFW	10/4/02	MLK	10/12/02	LRD	10/21/02
3	REDRAWN, ADDED PED COUNTDOWN TIMERS, REVISED PRE-EMPTION NOTES	HAK	5/24/19				
4	ADDED LEFT-TURN PHASE, VIDEO DETECTION, ADVANCE RADAR DETECTION	TPD	7/15/19	[illegible]	6/21/19	DcA	7/5/19
5							
6							
7							
8							

SHEET 3 OF 3 | PERMIT # 61-2740 | FILE # 2740

PERMIT NO. 61-2555 | SHEET 2 OF 2
DATE ISSUED: 3/20/90 | FILE 2555

GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS THE RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 68.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF THE SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT GRADE.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB OR GRANITE CURB, INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

IN ADDITION TO THIS SIGNAL PERMIT THE PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT PRIOR TO ANY OPENINGS BEING MADE IN OR UNDER ANY PORTION OF A STATE HIGHWAY.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF ACT 172, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, EFFECTIVE DATE DECEMBER 12, 1986.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

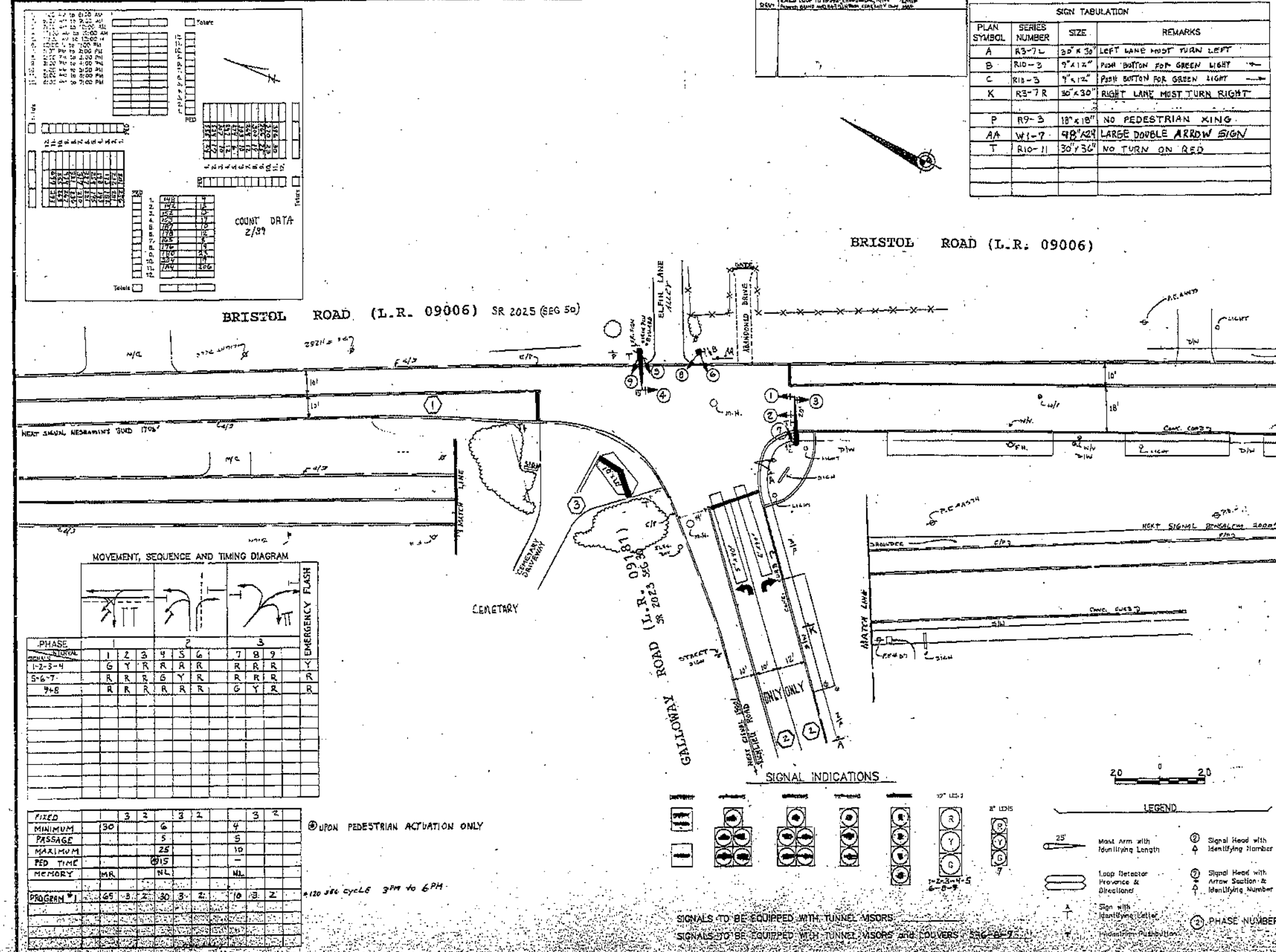
PENNSYLVANIA DEPARTMENT OF TRANSPORTATION
ENGINEERING DISTRICT 6-0

COUNTY: BUCKS COUNTY,
MUNICIPALITY: BENSALEM TOWNSHIP
INTERSECTION: BRISTOL RD (SR 2025) and GALLOWAY RD (SR 2023) and ELFIN LANE

REVIEWED:
MUNICIPAL OFFICAL — DATE
RECOMMENDED: C. BRAUN T.C.S. 3/7/90
DISTRICT TRAFFIC ENGINEER — DATE 3/20/90
Revised: 4-25-90 T.C.S. REVISIONS
Revised: 5/30/90 REMOVED ...
Revised: 1/91 ADDED NO TURN ON RED ...
Revised: 8/91 ADDED PROGRAM #1 ...
Revised:
Revised:

SIGN TABULATION

PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	R3-7L	30" x 30"	LEFT LANE MUST TURN LEFT
B	R10-3	9" x 12"	PUSH BUTTON FOR GREEN LIGHT
C	R10-3	9" x 12"	PUSH BUTTON FOR GREEN LIGHT
K	R3-7R	30" x 30"	RIGHT LANE MUST TURN RIGHT
P	R9-3	18" x 18"	NO PEDESTRIAN XING
AA	W1-7	48" x 24"	LARGE DOUBLE ARROW SIGN
T	R10-11	30" x 36"	NO TURN ON RED



MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1			2			3			EMERGENCY FLASH
SIGNALS \ INTERVAL	1	2	3	4	5	6	7	8	9	
1-2-3-4	G	Y	R	R	R	R	R	R	R	Y
5-6-7	R	R	R	G	Y	R	R	R	R	R
9+8	R	R	R	R	R	R	G	Y	R	R

	1	2	3	4	5	6	7	8	9
FIXED		3	2		3	2		3	2
MINIMUM	30			6			4		
PASSAGE				5			5		
MAXIMUM				25			10		
PED TIME				(*)15			—		
MEMORY	MR			NL			NL		
PROGRAM *1	65	3	2	30	3	2	10	3	2

(*) UPON PEDESTRIAN ACTUATION ONLY

*120 SEC CYCLE 3PM to 6PM

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	2025	001	16 OF 30
BENSALEM TOWNSHIP				

REVISION NUMBER	REVISIONS	DATE	BY

MOVEMENT, SEQUENCE AND TIMING DIAGRAM

PHASE	1+6				2+6				4				8				EMERGENCY FLASHING
SIGNALS \ INTERVAL	1	2	3		4	5	6	7	8	9	10	11	12	13	14		
1	G←	Y←	R←		FY	FY	Y←	R←	R←	R←	R←	R←	R←	R←	R←		R←
2,3	G	Y[1]	R[1]		G	G	Y	R	R	R	R	R	R	R	R		Y
4,5	R	R	R		G	G	Y	R	R	R	R	R	R	R	R		Y
6	R	R	R		R	R	R	R	R	R	R	R	G	Y	R		R
7	R	R	R		R	R	R	R	R	R	R	R	Y/G	Y	R		R
8	R	R	R		R	R	R	R	Y/G	Y/G	Y	R	R	R	R		R
9	R	R	R		R	R	R	R	G	G	Y	R	R	R	R		R
10,11	H	H	H		H	H	H	H	M	FH	H	H	H	H	H		OFF
12,13	H[2]	H[2]	H[2]		M	FH	H	H	H	H	H	H	H	H	H		OFF
FIXED		4	3				4	3			4	4		3	4		
MINIMUM	5				15				5				5				
PASSAGE	++				++				++				++				
MAXIMUM 1	25				31				10				10				
MAXIMUM 2	30				25				10				10				
PEDESTRIAN*					7	9			7	15							
MEMORY	NL				SVR				NL				NL				

* UPON PEDESTRIAN ACTUATION ONLY. OTHERWISE HAND AT ALL TIMES

SYSTEM NOTES:

REFER TO SYSTEM PLAN #1-0022 FOR ADAPTIVE OPERATION.

++ PASSAGE TIME AND PHASE SEQUENCE TO BE DETERMINED BY ADAPTIVE PROCESSOR.

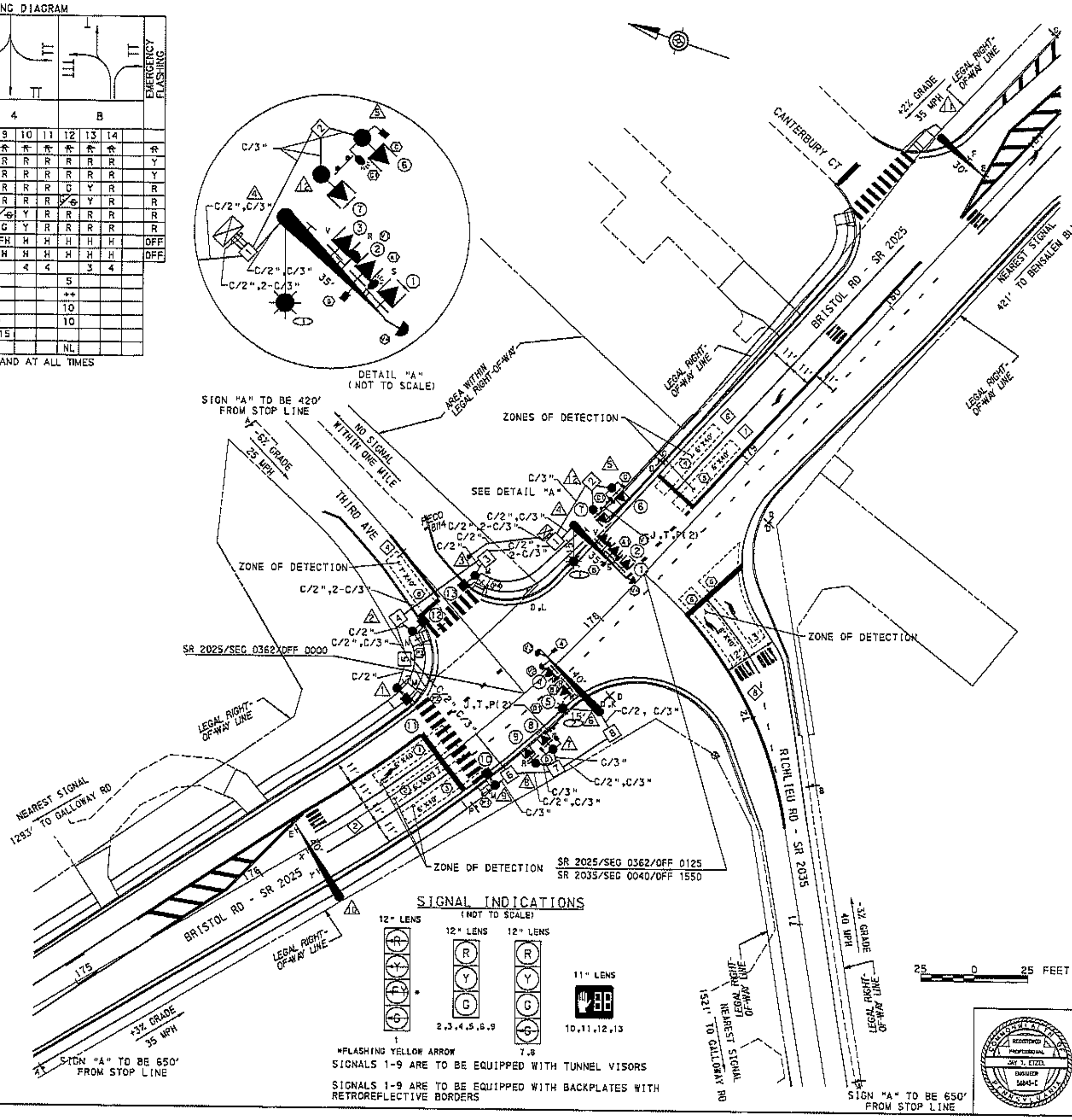
OPERATION NOTES:

① G IF FOLLOWED BY 2+6

② M IF FOLLOWED BY 2+6, PED CLEARANCES COMPLETED IN PHASE 2+6

LEGEND

- 20' — NEW MAST ARM/LENGTH
- NEW PEDESTAL POLE
- NEW SIGNAL HEAD/BACKPLATE/VISOR/ NUMBER & DIRECTIONAL ARROW
- EXISTING SIGN/IDENTIFYING LETTER
- NEW SIGN/IDENTIFYING LETTER
- NEW PREEMPTION DEVICE & IDENTIFYING LETTER
- NEW PREEMPTION CONFIRMATION BEACON & IDENTIFYING NUMBER
- LUMINAIRE & NUMBER
- NEW PEDESTRIAN PUSH BUTTON POLE
- NEW VIDEO DETECTOR & IDENTIFYING NUMBER
- TRAFFIC SIGNAL SUPPORT IDENTIFYING NUMBER
- NEW PEDESTRIAN SIGNAL HEAD & IDENTIFYING NUMBER
- PUSH BUTTON SYMBOL/ SIGN & IDENTIFYING NUMBER
- C/1" — NEW CONDUIT /SIZE
- CONTROLLER
- NEW JUNCTION BOX/NUMBER
- PHASE NUMBER
- DETECTION ZONE/ IDENTIFYING NUMBER



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POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

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WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
3 WORKING DAYS NOTICE FOR
CONSTRUCTION PHASE AND 10 WORKING
DAYS IN DESIGN STAGE - BEFORE YOU DIG CALL
PENNSYLVANIA ONE CALL SYSTEM, INC.

1-800-242-1776

SYSTEM PERMIT #1-0022

COUNTY : BUCKS

MUNICIPALITY : BENSALEM TOWNSHIP

INTERSECTION : BRISTOL ROAD (S.R. 2025) & RICHLIEU ROAD (S.R. 2035) / THIRD AVENUE

REVIEWED :

MUNICIPAL OFFICIAL ______ DATE

RECOMMENDED :

DISTRICT TRAFFIC ENGINEER ______ DATE

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	2025	001	17 OF 30

BENSALEM TOWNSHIP

REVISION NUMBER	REVISIONS	DATE	BY

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1-800-242-1776

SYSTEM PERMIT #1-0022

COUNTY : BUCKS

MUNICIPALITY : BENSALEM TOWNSHIP

INTERSECTION : BRISTOL ROAD (S.R. 2025) & RICHLIEU ROAD (S.R. 2035)/ THIRD AVENUE

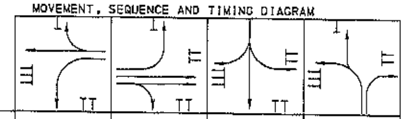
REVIEWED :

MUNICIPAL OFFICIAL DATE

RECOMMENDED :

DISTRICT TRAFFIC ENGINEER DATE

MOVEMENT, SEQUENCE AND TIMING DIAGRAM



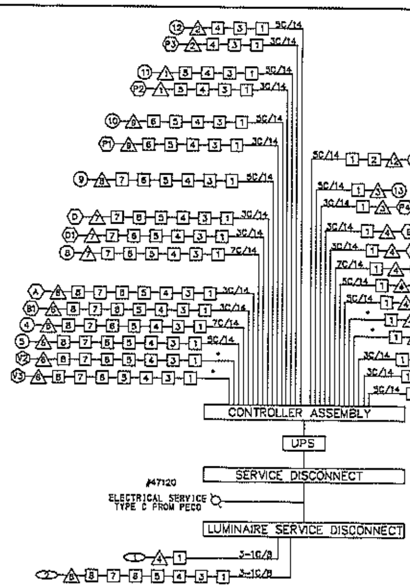
PHASE	6			2			4			8		
SIGNALS \ INTERVAL	15	16	17	18	19	20	21	22	23	24	25	26
1	←G	←Y	←R	FY	←Y	←R	←R	←R	←R	←R	←R	←R
2,3	G	Y Ⓐ	R Ⓐ	R	R	R	R	R	R	R	R	R
4,5	R	R	R	G	Y Ⓐ	R Ⓐ	R	R	R	R	R	R
6	R	R	R	R	R	R	R	R	R	G	Y	R
7	R	R	R	R	R	R	R	R	R	G/←G	Y	R
8	R	R	R	R	R	R	G/←G	Y	R	R	R	R
9	R	R	R	R	R	R	G	Y	R	R	R	R
10,11	H	H	H	H	H	H	H	H	H	H	H	H
12,13	H	H	H	H	H	H	H	H	H	H	H	H
FIXED TIME	Ⓑ	4	3	Ⓑ	4	3	Ⓑ	4	4	Ⓑ	3	4

IF PRE-EMPTION EQUIPMENT HAS ENCODING CAPABILITIES FOR VEHICLE IDENTIFICATION, IT IS RECOMMENDED TO HAVE THE ZERO "DO" FEATURE ON, TO GIVE UNCODED EMITTERS THE ABILITY TO ACTIVATE THE EMERGENCY PRE-EMPTION.

Ⓐ SIGNAL TO REMAIN GREEN WHEN RETURNING TO PHASE 2+6
Ⓑ FOR DURATION OF PRE-EMPTION

EMERGENCY PRE-EMPTION NOTES

- CONTROLLER TO BE EQUIPPED WITH EMERGENCY PRE-EMPTION FOR THE WESTBOUND AND EASTBOUND APPROACHES OF BRISTOL ROAD (SR 2025) AND THE NORTHBOUND AND SOUTHBOUND APPROACHES (RICHLIEU AND THIRD ST.) WITH A FAIL SAFE DEVICE FOR EACH DIRECTION OF OPERATION. THIS EMERGENCY BEACON SHALL CONSIST OF A FLASHING WHITE FLOODLIGHT, AND SHALL BEGIN FLASHING WHEN THE EMERGENCY VEHICLE HAS CONTROL OF THE INTERSECTION FOR THAT APPROACH.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TERMINATE ALL GREEN INDICATIONS IMMEDIATELY, FOLLOWED BY THE COMPLETE YELLOW AND RED CLEARANCE INTERVALS, ACCORDINGLY. THEN THE GREEN INTERVAL FOR THE PRE-EMPTION PHASE SHALL FOLLOW. ONLY THOSE PHASES NOT POSING A YELLOW TRAP CONDITION MAY REMAIN GREEN (4,8) WHEN GOVERNED BY APPROACHING EMERGENCY VEHICLE.
- THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, SHALL TIME OUT ALL YELLOW AND RED INDICATIONS, FOLLOWED BY THE GREEN INTERVAL OF THE PRE-EMPTION PHASE GOVERNED BY THE APPROACHING EMERGENCY VEHICLE.
- IF A SIGNAL IN THE DIRECTION OPPOSITE THE EMERGENCY VEHICLE PREEMPTION CALL IS IN FLASHING YELLOW ARROW MODE IT SHALL REMAIN IN FLASHING YELLOW ARROW WHILE THE ADJACENT THROUGH MOVEMENTS TIME OUT THE YELLOW AND RED CLEARANCE INTERVALS.
- IF THE SIGNALS HAVE BEEN ACTUATED BY A PEDESTRIAN PUSHBUTTON WHEN THE SIGNAL IS PREEMPTED, THE PEDESTRIAN WALK INTERVALL SHALL TERMINATE IMMEDIATELY, FOLLOWED BY THE COMPLETE PEDESTRIAN CLEARANCE INTERVAL. THIS INTERVAL SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE ENTERING EMERGENCY PREEMPTION. IF THE SIGNAL IS PREEMPTED DURING THE PEDESTRIAN CLEARANCE INTERVAL IT SHALL TIME OUT FOLLOWED BY THE APPROPRIATE SELECTIVE CLEARANCES BEFORE ENTERING EMERGENCY PREEMPTION.
- IF THE SIGNALS, WHEN ACTIVATED BY AN EMERGENCY VEHICLE, ARE FLASHING, ALL SIGNALS SHALL REMAIN FLASHING.
- IF ADDITIONAL PRE-EMPTION PHASES ARE ACTIVATED WHILE IN PRE-EMPTION, THE ORIGINAL PRE-EMPTION PHASE SHALL TIME OUT BEFORE PROCEEDING TO THE NEXT PRE-EMPTION PHASE.
- UPON COMPLETION OF PRE-EMPTION PHASE, IN RETURNING TO NORMAL OPERATION, PHASE 2+6 INTERVAL 4 SHALL FOLLOW.
- IN EMERGENCY PRE-EMPTION, NO PRIORITY SHALL BE ESTABLISHED, PRE-EMPTION SHALL BE A "FIRST COME, FIRST SERVE" OPERATION.
- LOCATION OF EMERGENCY VEHICLE DETECTORS ARE TO BE FIELD ADJUSTED TO ACHIEVE MAXIMUM OPERATION.



WIRING DIAGRAM LEGEND

- ○ – SIGNAL HEAD
- △ – TRAFFIC SIGNAL SUPPORT
- □ – JUNCTION BOX
- Ⓐ – PREEMPTION DEVICE
- ⬭ – LUMINAIRE
- Ⓟ – PEDESTRIAN PUSH BUTTON
- Ⓥ – VIDEO DETECTOR
- Ⓑ – PREEMPTION CONFIRMATION BEACON
- 5C/14 – CABLE (NO. OF COND./SIZE AWG)
- * – AS SPECIFIED BY MANUFACTURER

WIRING DIAGRAM

SIGN TABULATION			
PLAN SYMBOL	SERIES NUMBER	SIZE	REMARKS
A	W3-3	36" X 36"	SIGNAL AHEAD
B	R3-8a(L-R)	30" X 30"	LANE USE CONTROL (LEFT - RIGHT)
C	W12-1	36" X 36"	DOUBLE ARROW
D	R9-3	24" X 24"	NO PEDESTRIAN CROSSING (SYMBOL)
E	R3-5L	30" X 36"	LEFT TURN ONLY
F	R3-6SR	30" X 36"	OPTIONAL RIGHT TURN
G	R3-8a (L-S/R)	30" X 30"	LANE USE CONTROL (LEFT - STRAIGHT/RIGHT)
J	W1-7	36" X 36"	LARGE DOUBLE ARROW
K	R9-3bP(R)	18" X 12"	USE CROSSWALK (W/ RIGHT ARROW)
L	R9-3bP(L)	18" X 12"	USE CROSSWALK (W/ LEFT ARROW)
M	R10-3a(L)	9" X 15"	EDUCATIONAL PUSH BUTTON SIGN WITH COUNTDOWN TIMER <-
N	R10-3a(R)	9" X 15"	EDUCATIONAL PUSH BUTTON SIGN WITH COUNTDOWN TIMER ->
P	OM1-3	18" X 18"	OBJECT MARKER
R	R10-11	36" X 36"	NO TURN ON RED ●
S	R10-12A	30" X 36"	LEFT TURN YIELD ON FLASHING YELLOW ARROW
T	D3-4	78" x 16"	"Bristol Rd"
V	D3-4	96" x 32"	← "Richlieu Rd" "Third Ave" →
W	D3-4	96" x 32"	← "Third Ave" "Richlieu Rd" →
X	SPECIAL	36" X 48"	BENSALEM BLVD- DOWN ARROW - 600'
Y	SPECIAL	36" X 48"	BRISTOL ROAD - DOWN ARROW

D3-4

CLEARVIEW 3W
12" UC/9" LC
(NOT TO SCALE)

	7.0
B	11.0
r	7.4
i	5.0
s	8.8
t	7.7
o	11.5
l	3.4
	9.0
R	10.4
d	7.8
	7.0

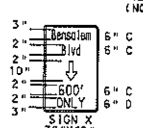
	96.0

D3-5

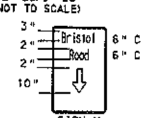
CLEARVIEW 2W
12" UC/9" LC
(NOT TO SCALE)

D3-5

CLEARVIEW 2W
12" UC/9" LC
(NOT TO SCALE)



SIGN X
36"X48"
WHITE ON GREEN
(NOT TO SCALE)



SIGN Y
36"X48"
WHITE ON GREEN
(NOT TO SCALE)

	3.8
<-	10.2
	7.8
R	8.0
i	4.4
c	7.4
h	8.4
l	4.7
i	4.4
e	8.3
u	5.3
	6.0
R	7.9
d	5.5
	3.9

	96.0

	3.0
T	7.2
h	8.2
i	4.8
r	5.5
d	5.5
	6.0
A	8.5
v	7.7
e	5.5
	8.0
->	10.2
	15.9

	96.0

	PROGRAM 1 INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET 1	OFFSET 2	OFFSET 3
1	ROCKHILL DRIVE & OLD LINCOLN HIGHWAY	2479	26	48	–	42	–	22	–	–	90	0		
2	ROCKHILL DRIVE & OVERLOOK BLVD	2519	–	65	–	25	–	65	–	–	90	57		
3	ROCKHILL DRIVE & HORIZON BLVD	2480	13	42	16	19	29	26	–	35	90	52		
4	ROCKHILL DRIVE & NB OFF RAMP	0896	14(Ø9)	32(Ø10)	–	22	14(Ø1)	46	–	22	90	40		
5	ROCKHILL DRIVE & MARKET PLACE	3036	13	46	–	18	13	46	–	13	90	33		
6	ROCKHILL DRIVE & NESHAMINY BLVD	3037	–	69	–	21	29	40	–	21	90	0		
7	NESHAMINY BLVD & NESHAMINY MALL DRIVE	2653												
8	BRISTOL ROAD & NESHAMINY BOULEVARD	1490												
9	BRISTOL ROAD & OLD LINCOLN HIGHWAY	1301	FREE											
10	OLD LINCOLN HIGHWAY & HORIZON BLVD	3452												
11	OLD LINCOLN HIGHWAY & STREET ROAD	1297	SEE 1-0005 SYSTEM PLAN											
12	OLD LINCOLN HIGWAY & SOMERTON ROAD	2388												
13	OLD LINCOLN HIGHWAY & INTERPLEX DRIVE	2213	FREE											
14	OLD LINCOLN HIGHWAY & LINCOLN HIGHWAY	1299	13	61	–	46	18	56	13	33	120	98		
15	LINCOLN HIGHWAY AND NESHAMINY INTERPLEX NORTHGATE	2238	–	102	–	20	27	75	–	–	120	0		
16	BRISTOL ROAD & GRANDVIEW AVENUE	1935												
17	BRISTOL ROAD & GALLOWAY ROAD	2555	FREE											
18	BRISTOL ROAD & RICHLIEU ROAD–THIRD AVE	–												
19	BRISTOL ROAD & BENSALEM BLVD	2034	–	76	–	14	19	57	–	14	90	0		
20	BRISTOL ROAD & PASQUALONE AVENUE	2345	FREE											

	PROGRAM 2 INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET 1	OFFSET 2	OFFSET 3
1	ROCKHILL DRIVE & OLD LINCOLN HIGHWAY	2479	27	53	–	47	–	26	–	–	100	0		
2	ROCKHILL DRIVE & OVERLOOK BLVD	2519	–	58	–	42	–	58	–	–	100	31		
3	ROCKHILL DRIVE & HORIZON BLVD	2480	13	46	18	23	34	25	–	41	100	19		
4	ROCKHILL DRIVE & NB OFF RAMP	0896	21(Ø9)	35(Ø10)	–	22	21(Ø1)	56	–	22	100	38		
5	ROCKHILL DRIVE & MARKET PLACE	3036	22	33	–	25	13	42	–	20	100	32		
6	ROCKHILL DRIVE & NESHAMINY BLVD	3037	–	69	–	31	34	35	–	31	100	11		
7	NESHAMINY BLVD & NESHAMINY MALL DRIVE	2653												
8	BRISTOL ROAD & NESHAMINY BOULEVARD	1490												
9	BRISTOL ROAD & OLD LINCOLN HIGHWAY	1301	FREE											
10	OLD LINCOLN HIGHWAY & HORIZON BLVD	3452												
11	OLD LINCOLN HIGHWAY & STREET ROAD	1297	SEE 1-0005 SYSTEM PLAN											
12	OLD LINCOLN HIGWAY & SOMERTON ROAD	2388												
13	OLD LINCOLN HIGHWAY & INTERPLEX DRIVE	2213	FREE											
14	OLD LINCOLN HIGHWAY & LINCOLN HIGHWAY	1299	13	50	–	41	14	45	13	28	100	82		
15	LINCOLN HIGHWAY AND NESHAMINY INTERPLEX NORTHGATE	2238	–	77	–	23	18	59	–	–	100	0		
16	BRISTOL ROAD & GRANDVIEW AVENUE	1935												
17	BRISTOL ROAD & GALLOWAY ROAD	2555	FREE											
18	BRISTOL ROAD & RICHLIEU ROAD–THIRD AVE	–												
19	BRISTOL ROAD & BENSALEM BLVD	2034	–	85	–	15	23	62	–	15	100	0		
20	BRISTOL ROAD & PASQUALONE AVENUE	2345	FREE											

	PROGRAM 3 INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET 1	OFFSET 2	OFFSET 3
1	ROCKHILL DRIVE & OLD LINCOLN HIGHWAY	2479	31	60	–	50	–	29	–	–	110	61		
2	ROCKHILL DRIVE & OVERLOOK BLVD	2519	–	61	–	49	–	61	–	–	110	57		
3	ROCKHILL DRIVE & HORIZON BLVD	2480	19	47	24	20	27	39	–	44	110	37		
4	ROCKHILL DRIVE & NB OFF RAMP	0896	26(Ø9)	40(Ø10)	–	22	26(Ø1)	66	–	22	110	30		
5	ROCKHILL DRIVE & MARKET PLACE	3036	18	48	–	25	14	52	–	19	110	18		
6	ROCKHILL DRIVE & NESHAMINY BLVD	3037	–	86	–	24	44	42	–	24	110	0		
7	NESHAMINY BLVD & NESHAMINY MALL DRIVE	2653												
8	BRISTOL ROAD & NESHAMINY BOULEVARD	1490												
9	BRISTOL ROAD & OLD LINCOLN HIGHWAY	1301	FREE											
10	OLD LINCOLN HIGHWAY & HORIZON BLVD	3452												
11	OLD LINCOLN HIGHWAY & STREET ROAD	1297	SEE 1-0005 SYSTEM PLAN											
12	OLD LINCOLN HIGWAY & SOMERTON ROAD	2388												
13	OLD LINCOLN HIGHWAY & INTERPLEX DRIVE	2213	FREE											
14	OLD LINCOLN HIGHWAY & LINCOLN HIGHWAY	1299	13	56	–	51	18	51	13	38	120	93		
15	LINCOLN HIGHWAY AND NESHAMINY INTERPLEX NORTHGATE	2238	–	90	–	30	21	69	–	–	120	0		
16	BRISTOL ROAD & GRANDVIEW AVENUE	1935												
17	BRISTOL ROAD & GALLOWAY ROAD	2555	FREE											
18	BRISTOL ROAD & RICHLIEU ROAD–THIRD AVE	–												
19	BRISTOL ROAD & BENSALEM BLVD	2034	–	85	–	15	23	62	–	15	100	0		
20	BRISTOL ROAD & PASQUALONE AVENUE	2345	FREE											

	PROGRAM 4 INTERSECTIONS	FILE #	PHASE 1	2	3	4	5	6	7	8	CYCLE	OFFSET 1	OFFSET 2	OFFSET 3
1	ROCKHILL DRIVE & OLD LINCOLN HIGHWAY	2479	33	50	–	40	–	17	–	–	90	42		
2	ROCKHILL DRIVE & OVERLOOK BLVD	2519	–	65	–	25	–	65	–	–	90	24		
3	ROCKHILL DRIVE & HORIZON BLVD	2480	13	33	13	31	25	21	–	44	90	20		
4	ROCKHILL DRIVE & NB OFF RAMP	0896	14(Ø9)	32(Ø10)	–	22	14(Ø1)	46	–	22	90	61		
5	ROCKHILL DRIVE & MARKET PLACE	3036	19	32	–	23	13	38	–	16	90	3		
6	ROCKHILL DRIVE & NESHAMINY BLVD	3037	–	60	–	30	32	28	–	30	90	0		
7	NESHAMINY BLVD & NESHAMINY MALL DRIVE	2653												
8	BRISTOL ROAD & NESHAMINY BOULEVARD	1490												
9	BRISTOL ROAD & OLD LINCOLN HIGHWAY	1301	FREE											
10	OLD LINCOLN HIGHWAY & HORIZON BLVD	3452												
11	OLD LINCOLN HIGHWAY & STREET ROAD	1297	SEE 1-0005 SYSTEM PLAN											
12	OLD LINCOLN HIGWAY & SOMERTON ROAD	2388												
13	OLD LINCOLN HIGHWAY & INTERPLEX DRIVE	2213	FREE											
14	OLD LINCOLN HIGHWAY & LINCOLN HIGHWAY	1299												
15	LINCOLN HIGHWAY AND NESHAMINY INTERPLEX NORTHGATE	2238												
16	BRISTOL ROAD & GRANDVIEW AVENUE	1935												
17	BRISTOL ROAD & GALLOWAY ROAD	2555	FREE											
18	BRISTOL ROAD & RICHLIEU ROAD–THIRD AVE	–												
19	BRISTOL ROAD & BENSALEM BLVD	2034	–	85	–	15	23	62	–	15	100	0		
20	BRISTOL ROAD & PASQUALONE AVENUE	2345	FREE											

GENERAL NOTE:

- THRESHOLD PARAMETERS ARE IN VOLUME+OCCUPANCY (PERCENTAGE) OF THE CAPACITY.

NOTES

- ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
- REFER TO SIGNAL PERMIT PLANS FOR MAX 1 AND CLEARANCE TIMES.
- LEVELS COORESPOND TO THE TRAFFIC RESPONSIVE THRESHOLD CHARTS.
- DIALS CORRESPOND TO THE CONTROLLERS COODINATION PLANS.

CLOSED LOOP SYSTEM NOTES:

1. PROGRAMS TO BE SELECTED BY CLOSED LOOP SYSTEM OR TBC BACKUP.
2. OFFSET REFERENCED TO NEMA TS-2 - 1ST GREEN.
3. ACTUAL GREEN TIME DETERMINED BY CYCLE LENGTH.
4. SYSTEM: ROCKHILL DRIVE (6 INTERSECTIONS)
   SYSTEM LIMITS: OLD LINCOLN HIGHWAY-NESHAMINY BLVD
   ON STREET MASTER: ROCKHILL DRIVE AND NESHAMINY BLVD
   PRIMARY COORDINATION ALONG ROCKHILL DRIVE ONLY: FIBER OPTIC CABLE
   SECONDARY COORDINATION: TIME BASED COORDINATOR
   (DEFAULT TO BACKUP TBC PROGRAM CHART)

WEEKLY PROGRAM CHART				
	DAY	TIME	PROGRAM	REMARKS
	1–7	00:00	MAX 1	FREE
	1–5	06:00	1	COORD
	1–5	09:00	2	COORD
	1–5	15:00	3	COORD
	1–5	18:00	2	COORD
	6,7	10:00	4	COORD

* DAY 1 = MONDAY

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	2025	001	22 OF 30
BENSALEM TOWNSHIP				

REVISION NUMBER	REVISIONS	DATE	BY

SYSTEM GENERAL NOTES

NO MODIFICATIONS OF THIS INSTALLATION ARE PERMITTED UNLESS PRIOR APPROVAL IS GRANTED IN WRITING BY A REPRESENTATIVE OF THE DEPARTMENT OF TRANSPORTATION.

ALL MAINTENANCE WORK, INCLUDING TRIMMING OF TREES, NECESSARY FOR PROPER VISIBILITY OF THE SIGNALS IS RESPONSIBILITY OF THE PERMITTEE.

ALL SIGNS AND PAVEMENT MARKINGS INDICATED ON THIS DRAWING ARE CONSIDERED PART OF THE PERMIT AND SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH PUBLICATION NO. 212.

POST MOUNTED SIGNALS SHALL BE INSTALLED WITH THE SIGNAL HEADS A MINIMUM OF 2 FEET BEHIND THE FACE OF CURB OR THE EDGE OF SHOULDER. SUPPORT POLES FOR OVERHEAD SIGNALS SHALL ALSO HAVE A MINIMUM CLEARANCE HORIZONTALLY OF 2 FEET.

SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

THE MINIMUM HORIZONTAL DISTANCE BETWEEN SIGNALS MEASURED AT RIGHT ANGLES TO THE APPROACH SHALL BE 8 FEET.

EXACT LOCATION OF DETECTORS SHALL BE DETERMINED PRIOR TO INSTALLATION BY A REPRESENTATIVE OF PENNDOT.

CURBING TO BE INSTALLED BY MUNICIPALITY AND, WHERE NOTED, SHALL BE PLAIN CEMENT CONCRETE CURB INSTALLED IN ACCORDANCE WITH DEPARTMENT SPECIFICATIONS FORM 408.

PRIOR TO INSTALLATION, THE CONTRACTOR SHALL CONSULT WITH THE LOCAL OFFICIALS AND UTILITY COMPANIES TO RESOLVE ANY PROBLEMS WHICH MAY BE CREATED DUE TO THE LOCATION OF UTILITIES.

THIS DRAWING CANNOT BE USED AS A CONSTRUCTION DRAWING UNLESS THE PERMITTEE COMPLIES WITH THE PROVISIONS OF THE LATEST AMENDMENT TO ACT 287, PREVENTION OF DAMAGE TO UNDERGROUND UTILITIES, DATED DECEMBER 20, 1974.

WHEN LIQUID FUELS MONEY IS USED, SIGNAL INSTALLATION MUST CONFORM TO FORM 408 AND A COPY OF THE PROPOSED SPECIFICATIONS MUST BE SUBMITTED TO THE DISTRICT TRAFFIC UNIT, FOR REVIEW, PRIOR TO BIDDING.

PERMITTEE SHALL OBTAIN A HIGHWAY OCCUPANCY PERMIT FOR ANY CHANGES IN INTERSECTION GEOMETRY REGARDING EXCAVATION.

CONDUIT INSTALLED IN BITUMINOUS ROADWAY LESS THAN 5 YEARS OLD, OR CONCRETE ROADWAY REGARDLESS OF AGE, MUST BE BORED OR JACKED UNDER THE ROADWAY. INSTALL IN ACCORDANCE WITH TRAFFIC SIGNAL STANDARDS TC-8800 SERIES.

COUNTY: BUCKS

MUNICIPALITY: BENSALEM TOWNSHIP

INTERSECTION: OLD LINCOLN HWY (S.R. 2037), ROCKHILL DRIVE AND BRISTOL ROAD (S.R. 2025) ARTERIALS

REVIEWED:

John Chrzanowski (signature) — DATE 12/7/2021

MUNICIPAL OFFICIAL — DATE

RECOMMENDED: Michael J. Smith — Digitally signed by Michael J. Smith Date: 2021.12.09 12:02:20 -05'00'

David L. Adams, P.E. — Digitally signed by David L. Adams, P.E. Date: 2021.12.09 13:23:41 -05'00'

DISTRICT TRAFFIC ENGINEER — DATE

NO	REVISION	DES/REVW	DATE	REVW	DATE	RECOM	DATE
1							
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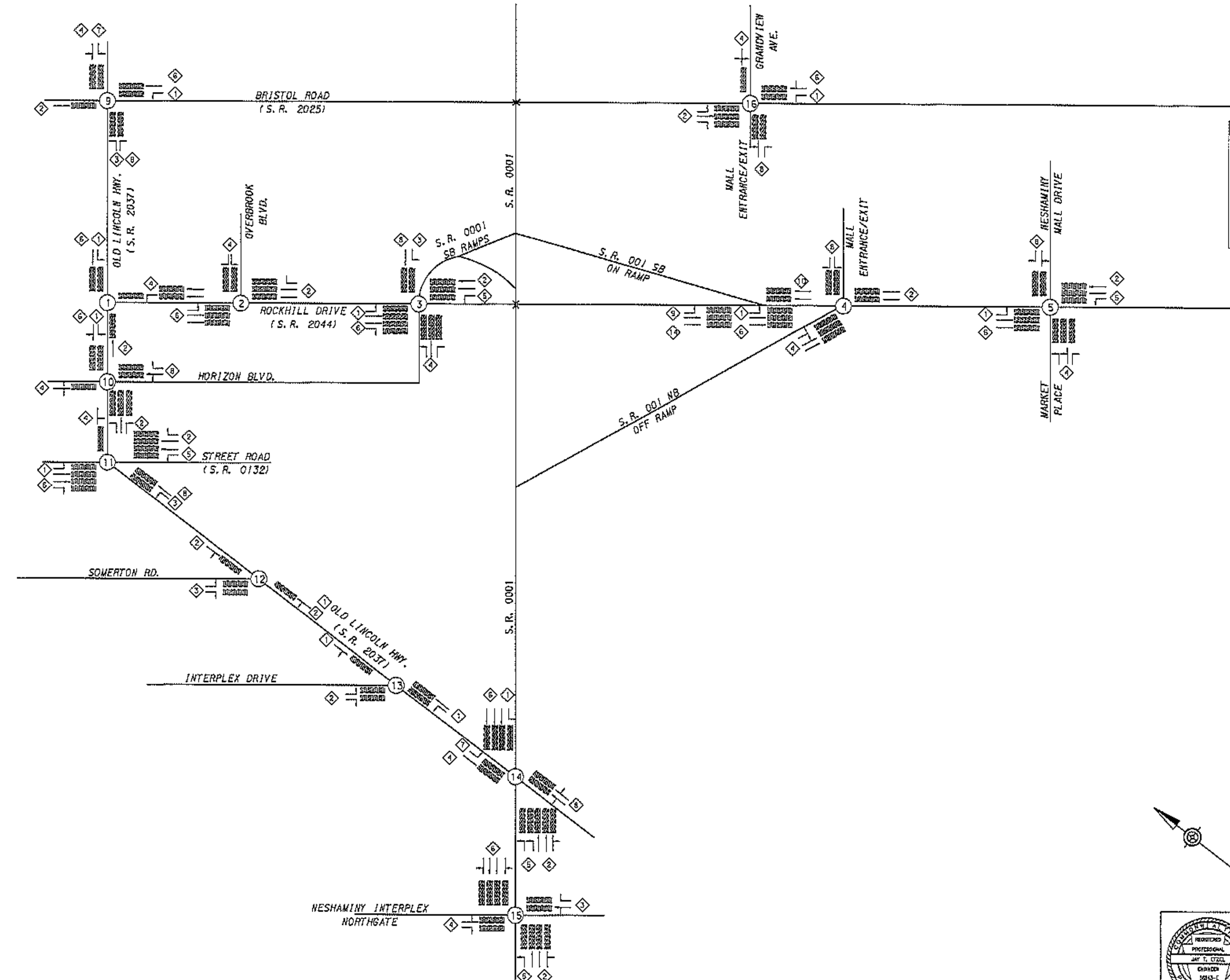
7							
8							

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — JAY T. ETZEL — ENGINEER — 34940-E

SYSTEM PERMIT # 1-0022

BENSALEM TOWNSHIP

REVISION NUMBER	REVISIONS	DATE	BY



SEE PLAN SHEET 24

SYSTEM GENERAL NOTES

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COUNTY: BUCKS

MUNICIPALITY: BENSALEM TOWNSHIP

INTERSECTION: OLD LINCOLN HWY (S.R. 2037), ROCKHILL DRIVE AND BRISTOL ROAD (S.R. 2025) ARTERIALS

REVIEWED:

MUNICIPAL OFFICIAL — DATE 12/7/2021

RECOMMENDED: Michael J. Smith — Digitally signed by Michael J. Smith Date: 2021.12.01 12:02:34 -05'00'

David L. Adams, P.E. — Digitally signed by David L. Adams, P.E. Date: 2021.12.09 13:25:57 -05'00'

DISTRICT TRAFFIC ENGINEER — DATE

NO	REVISION	DES/REVW	DATE	REVW	DATE	RECOM	DATE
1							
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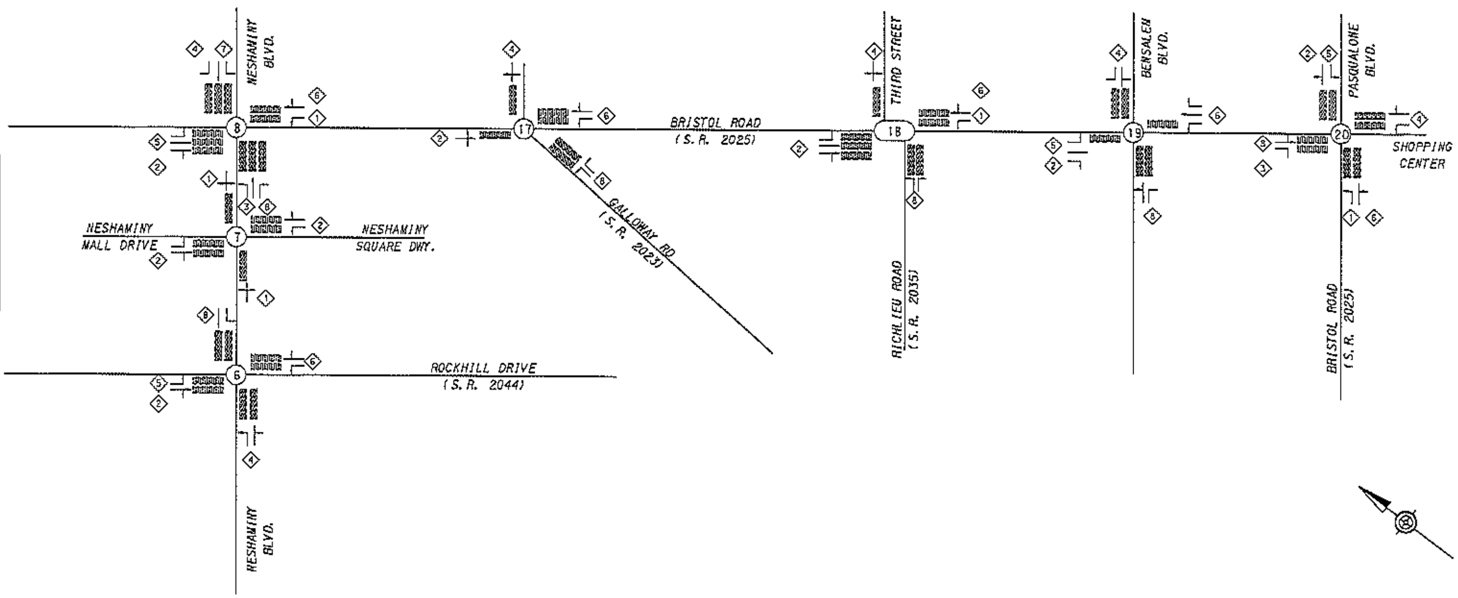
SYSTEM PERMIT # I-D022

PLOTTED: $$$$DATE$$$ $TIME$

OPERATOR: FILE NAME: $FILE$

D-9012 C400 (02-09) REVISED (10-04)



SEE PLAN SHEET 23

CYCLE/SPLIT/OFFSET

CONFIGURATION	INTERSECTIONS	FILE #	FACILITATOR #	PHASE 1	2	3	4	5	6	7	8	PERIOD	GLOBAL OFFSET (AT FACILITATOR)	LOCAL OFFSET	TRAVEL TIME TO NEXT INTERSECTION
1	ROCKHILL DRIVE & OLD LINCOLN HIGHWAY	2479													
2	ROCKHILL DRIVE & OVERLOOK BLVD	2519													
3	ROCKHILL DRIVE & HORIZON BLVD	2480													
4	ROCKHILL DRIVE & NB OFF RAMP	0896													
5	ROCKHILL DRIVE & MARKET PLACE	3036													
6	ROCKHILL DRIVE & NESHAMINY BLVD	3037													
7	NESHAMINY BLVD & NESHAMINY MALL DRIVE	2663													
8	BRISTOL ROAD & NESHAMINY BOULEVARD	1490													
9	BRISTOL ROAD & OLD LINCOLN HIGHWAY	1301													
10	OLD LINCOLN HIGHWAY & HORIZON BLVD	3452													
11	OLD LINCOLN HIGHWAY & STREET ROAD	1297		SEE I-0005 SYSTEM PLAN											
12	OLD LINCOLN HIGWAY & SOMERTON ROAD	2388													
13	OLD LINCOLN HIGHWAY & INTERPLEX DRIVE	2213													
14	OLD LINCOLN HIGHWAY & LINCOLN HIGHWAY	1299													
15	LINCOLN HIGHWAY AND NESHAMINY INTERPLEX NORTHGATE	2238													
16	BRISTOL ROAD & GRANDVIEW AVENUE	1935													
17	BRISTOL ROAD & GALLOWAY ROAD	2555													
18	BRISTOL ROAD & RICHLIEU ROAD–THIRD AVE	–													
19	BRISTOL ROAD & BENSALEM BLVD	2034													
20	BRISTOL ROAD & PASQUALONE AVENUE	2345													

NOTES:

1. ALL SPLIT TIMES INCLUDE YELLOW AND RED TIMES FOR A GIVEN PHASE.
2. REFER TO SIGNAL PERMIT PLANS FOR MAXIMUM, CLEARANCE AND PED TIMES.
3. GLOBAL OFFASET (AT FACILITATOR): VALUE IN SECONDS THAT OFFSETS A TUNNEL GLOBALLY AT THE FACILITATOR INTERSECTION AS ENTERED IN ControlSync.
4. LOCAL OFFSET: TUNNEL OFFSET AT INTERSECTION AS ENTERED IN ControlSync.
5. TRAVEL TIME TO NEXT INTERSECTION: VALUE FOR TRAVEL TIME OF THE CHOSEN TUNNEL TO THE CORRESPONDING TUNNEL AT THE NEXT INTERSECTION AS ENTERED IN ControlSync MAP VIEW.
6. PRIMARY COORDINATION: HARD-WIRE COMMUNICATION CABLE (FIBER OPTIC).
7. SECONDARY COORDINATION: TIME BASED COORDINATION (DEFAULT TO BACKUP T.B.C. PROGRAM CHART).
8. TRAFFIC ADAPATIVE SYSTEM IS DESIGNED FOR INSYNC SYSTEM SOFTWARE.
9. TRAFFIC ADAPTIVE SYSTEM TO UTILIZE THE RHYTHM ENGINEERING TRAVIS/INSYNC VIDEO DETECTION/TRAFFIC ADAPTIVE SIGNAL CONTROL SYSTEM.
10. TRAFFIC ADAPTIVE SYSTEM SETTING TO BE DETERMINED IN FIELD UPON ACTIVATION OF SYSTEM.

DISTRICT	COUNTY	ROUTE	SECTION	SHEET
6-0	BUCKS	2025	001	24 OF 30
BENSALEM TOWNSHIP				

REVISION NUMBER	REVISIONS	DATE	BY

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SIGNALS ERECTED OVER THE ROADWAY SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 16 FT. ABOVE THE ROADWAY. POST MOUNTED SIGNALS SHALL BE A MINIMUM OF 8 FT. ABOVE THE SIDEWALK OR PAVEMENT.

ALL OVERHEAD SIGNALS MUST BE RIGIDLY MOUNTED, TOP AND BOTTOM, AND EQUIPPED WITH BACKPLATES.

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COUNTY: BUCKS

MUNICIPALITY: BENSALEM TOWNSHIP

INTERSECTION: OLD LINCOLN HWY (S.R. 2037), ROCKHILL DRIVE AND BRISTOL ROAD (S.R. 2025) ARTERIALS

REVIEWED:

[signature] DATE 12/7/2021

MUNICIPAL OFFICIAL DATE

RECOMMENDED: Michael J. Smith Digitally signed by Michael J. Smith Date: 2021.12.09 12:02:25 -05'00'

David L. Adams, P.E. Digitally signed by David L. Adams, P.E. Date: 2021.12.09 13:27:07 -05'00'

DISTRICT TRAFFIC ENGINEER DATE

NO	REVISION	DES/REVW	DATE	REVW	DATE	RECOM	DATE
1							
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6							
7							
8							

SYSTEM PERMIT # I-0022

APPENDIX B

Traffic Counts

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB/SB: Richlieu Rd.
EB/WB: Galloway Rd.
Bensalem Twp./ Bucks Co./ PA
Wedsnesday/ Cloudy/ E-01/ GP

File Name : 22-062-001
Site Code : 22062001
Start Date : 3/20/2024

Groups Printed- Passenger and 2 Axle Vehicles - Buses and Heavy Vehicles

	Richlieu Rd. Southbound			Galloway Rd. Westbound			Richlieu Rd. Northbound			Galloway Rd. Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	41	38	3	41	22	5	1	16	42	11	66	7	293
07:15 AM	34	40	2	40	41	11	3	9	20	1	55	6	262
07:30 AM	35	61	2	41	32	8	3	19	26	0	58	10	295
07:45 AM	36	65	2	55	42	9	2	17	46	2	65	12	353
Total	146	204	9	177	137	33	9	61	134	14	244	35	1203
08:00 AM	26	44	1	52	42	15	2	19	52	0	50	10	313
08:15 AM	24	36	2	52	34	10	5	25	30	0	40	15	273
08:30 AM	24	48	3	38	42	15	1	13	38	0	33	9	264
08:45 AM	42	62	2	43	32	17	5	13	29	0	44	18	307
Total	116	190	8	185	150	57	13	70	149	0	167	52	1157
*** BREAK ***													
04:00 PM	19	38	2	58	76	26	13	64	45	0	44	7	392
04:15 PM	21	36	0	40	72	23	15	84	52	0	65	12	420
04:30 PM	23	32	1	61	84	25	16	65	60	0	44	4	415
04:45 PM	10	41	2	46	62	33	9	75	65	0	43	5	391
Total	73	147	5	205	294	107	53	288	222	0	196	28	1618
05:00 PM	11	49	3	54	75	33	21	83	57	1	44	8	439
05:15 PM	20	32	0	51	62	28	14	63	60	1	51	3	385
05:30 PM	27	31	4	45	53	27	8	86	50	1	49	12	393
05:45 PM	30	32	1	37	61	55	9	75	52	0	54	4	410
Total	88	144	8	187	251	143	52	307	219	3	198	27	1627
Grand Total	423	685	30	754	832	340	127	726	724	17	805	142	5605
Apprch %	37.2	60.2	2.6	39.1	43.2	17.7	8.1	46	45.9	1.8	83.5	14.7	
Total %	7.5	12.2	0.5	13.5	14.8	6.1	2.3	13	12.9	0.3	14.4	2.5	
Passenger and 2 Axle Vehicles	419	680	21	738	822	336	118	724	706	17	795	134	5510
% Passenger and 2 Axle Vehicles	99.1	99.3	70	97.9	98.8	98.8	92.9	99.7	97.5	100	98.8	94.4	98.3
Buses and Heavy Vehicles	4	5	9	16	10	4	9	2	18	0	10	8	95
% Buses and Heavy Vehicles	0.9	0.7	30	2.1	1.2	1.2	7.1	0.3	2.5	0	1.2	5.6	1.7

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB/SB: Richlieu Rd.
EB/WB: Galloway Rd.
Bensalem Twp./ Bucks Co./ PA
Wedsnesday/ Cloudy/ E-01/ GP

File Name : 22-062-001
Site Code : 22062001
Start Date : 3/20/2024

	Richlieu Rd. Southbound				Galloway Rd. Westbound				Richlieu Rd. Northbound				Galloway Rd. Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	35	61	**2**	98	**41**	32	8	81	3	19	26	48	0	58	10	68	295
07:45 AM	**36**	**65**	2	**103**	**55**	**42**	9	106	2	17	46	65	**2**	**65**	12	**79**	**353**
08:00 AM	26	44	1	71	52	42	**15**	**109**	2	19	**52**	**73**	0	50	10	60	313
08:15 AM	24	36	2	62	52	34	10	96	**5**	**25**	30	60	0	40	**15**	55	273
Total Volume	121	206	7	334	200	150	42	392	12	80	154	246	2	213	47	262	1234
% App. Total	36.2	61.7	2.1		51	38.3	10.7		4.9	32.5	62.6		0.8	81.3	17.9		
PHF	.840	.792	.875	.811	.909	.893	.700	.899	.600	.800	.740	.842	.250	.819	.783	.829	.874
Passenger and 2 Axle Vehicles	119	204	3	326	197	146	40	383	10	80	147	237	2	211	45	258	1204
% Passenger and 2 Axle Vehicles	98.3	99.0	42.9	97.6	98.5	97.3	95.2	97.7	83.3	100	95.5	96.3	100	99.1	95.7	98.5	97.6
Buses and Heavy Vehicles	2	2	4	8	3	4	2	9	2	0	7	9	0	2	2	4	30
% Buses and Heavy Vehicles	1.7	1.0	57.1	2.4	1.5	2.7	4.8	2.3	16.7	0	4.5	3.7	0	0.9	4.3	1.5	2.4
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:15 PM																	
04:15 PM	21	36	0	57	40	72	23	135	15	**84**	52	151	0	**65**	**12**	**77**	420
04:30 PM	**23**	32	1	56	**61**	**84**	25	**170**	16	65	60	141	0	44	4	48	415
04:45 PM	10	41	2	53	46	62	**33**	141	9	75	**65**	149	0	43	5	48	391
05:00 PM	11	**49**	**3**	**63**	54	75	33	162	**21**	83	57	**161**	**1**	44	8	53	**439**
Total Volume	65	158	6	229	201	293	114	608	61	307	234	602	1	196	29	226	1665
% App. Total	28.4	69	2.6		33.1	48.2	18.8		10.1	51	38.9		0.4	86.7	12.8		
PHF	.707	.806	.500	.909	.824	.872	.864	.894	.726	.914	.900	.935	.250	.754	.604	.734	.948
Passenger and 2 Axle Vehicles	65	157	5	227	198	289	114	601	59	306	227	592	1	191	27	219	1639
% Passenger and 2 Axle Vehicles	100	99.4	83.3	99.1	98.5	98.6	100	98.8	96.7	99.7	97.0	98.3	100	97.4	93.1	96.9	98.4
Buses and Heavy Vehicles	0	1	1	2	3	4	0	7	2	1	7	10	0	5	2	7	26
% Buses and Heavy Vehicles	0	0.6	16.7	0.9	1.5	1.4	0	1.2	3.3	0.3	3.0	1.7	0	2.6	6.9	3.1	1.6

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB/SB: Richlieu Rd.
EB/WB: Galloway Rd.
Bensalem Twp./ Bucks Co./ PA
Saturday/ Rain/ E-14/ GD

File Name : 22-062-011
Site Code : 22062011
Start Date : 3/23/2024
Page No : 1

Groups Printed- Passenger and 2 Axle Vehicles - Buses and Heavy Vehicles

	Richlieu Rd. Southbound			Galloway Rd. Westbound			Richlieu Rd. Northbound			Galloway Rd. Eastbound			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
11:00 AM	25	29	5	37	32	15	11	36	36	2	41	7	276
11:15 AM	24	22	0	32	33	20	2	27	32	0	27	3	222
11:30 AM	22	19	1	30	26	13	1	35	33	0	35	7	222
11:45 AM	22	31	2	31	41	19	8	42	24	1	46	6	273
Total	93	101	8	130	132	67	22	140	125	3	149	23	993
12:00 PM	17	27	1	37	37	17	3	32	35	1	49	9	265
12:15 PM	18	30	1	37	47	18	10	39	23	0	31	3	257
12:30 PM	23	18	1	39	37	14	7	38	39	0	32	6	254
12:45 PM	14	20	0	29	32	16	3	35	35	0	40	7	231
Total	72	95	3	142	153	65	23	144	132	1	152	25	1007
Grand Total	165	196	11	272	285	132	45	284	257	4	301	48	2000
Apprch %	44.4	52.7	3	39.5	41.4	19.2	7.7	48.5	43.9	1.1	85.3	13.6	
Total %	8.2	9.8	0.6	13.6	14.2	6.6	2.2	14.2	12.9	0.2	15.1	2.4	
Passenger and 2 Axle Vehicles	165	196	11	270	283	132	41	283	255	4	294	45	1979
% Passenger and 2 Axle Vehicles	100	100	100	99.3	99.3	100	91.1	99.6	99.2	100	97.7	93.8	98.9
Buses and Heavy Vehicles	0	0	0	2	2	0	4	1	2	0	7	3	21
% Buses and Heavy Vehicles	0	0	0	0.7	0.7	0	8.9	0.4	0.8	0	2.3	6.2	1

	Richlieu Rd. Southbound				Galloway Rd. Westbound				Richlieu Rd. Northbound				Galloway Rd. Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 11:45 AM																	
11:45 AM	22	**31**	**2**	**55**	31	41	**19**	91	8	**42**	24	74	**1**	46	6	53	**273**
12:00 PM	17	27	1	45	37	37	17	91	3	32	35	70	1	**49**	**9**	**59**	265
12:15 PM	18	30	1	49	37	**47**	18	**102**	**10**	39	23	72	0	31	3	34	257
12:30 PM	**23**	18	1	42	**39**	37	14	90	7	38	**39**	**84**	0	32	6	38	254
Total Volume	80	106	5	191	144	162	68	374	28	151	121	300	2	158	24	184	1049
% App. Total	41.9	55.5	2.6		38.5	43.3	18.2		9.3	50.3	40.3		1.1	85.9	13		
PHF	.870	.855	.625	.868	.923	.862	.895	.917	.700	.899	.776	.893	.500	.806	.667	.780	.961
Passenger and 2 Axle Vehicles	80	106	5	191	143	161	68	372	25	151	120	296	2	153	23	178	1037
% Passenger and 2 Axle Vehicles	100	100	100	100	99.3	99.4	100	99.5	89.3	100	99.2	98.7	100	96.8	95.8	96.7	98.9
Buses and Heavy Vehicles	0	0	0	0	1	1	0	2	3	0	1	4	0	5	1	6	12
% Buses and Heavy Vehicles	0	0	0	0	0.7	0.6	0	0.5	10.7	0	0.8	1.3	0	3.2	4.2	3.3	1.1

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB: Galloway Rd.
EB/WB: Bristol Rd.
Bensalem Twp./ Burlington Co./ PA
Thursday/ Clear & Cool/ E-14/ GD

File Name : 22-062-002
Site Code : 22062002
Start Date : 10/5/2023
Page No : 1

Groups Printed- Passenger and 2 Axle Vehicles - Buses and Heavy Vehicles

	Bristol Rd. Westbound		Galloway Rd. Northbound		Bristol Rd. Eastbound		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	3	84	35	1	34	85	242
07:15 AM	3	70	48	6	40	49	216
07:30 AM	2	81	43	2	53	61	242
07:45 AM	1	68	54	5	56	57	241
Total	9	303	180	14	183	252	941
08:00 AM	3	75	48	2	44	59	231
08:15 AM	1	68	50	1	60	33	213
08:30 AM	0	57	45	6	33	32	173
08:45 AM	3	65	46	2	40	56	212
Total	7	265	189	11	177	180	829
*** BREAK ***							
04:00 PM	2	69	72	10	87	41	281
04:15 PM	5	70	67	0	80	62	284
04:30 PM	3	58	72	4	81	65	283
04:45 PM	5	77	64	6	94	58	304
Total	15	274	275	20	342	226	1152
05:00 PM	1	61	70	4	114	45	295
05:15 PM	8	65	68	9	114	60	324
05:30 PM	4	59	69	5	85	53	275
05:45 PM	1	64	83	5	92	60	305
Total	14	249	290	23	405	218	1199
Grand Total	45	1091	934	68	1107	876	4121
Apprch %	4	96	93.2	6.8	55.8	44.2	
Total %	1.1	26.5	22.7	1.7	26.9	21.3	
Passenger and 2 Axle Vehicles	41	1060	868	62	1073	822	3926
% Passenger and 2 Axle Vehicles	91.1	97.2	92.9	91.2	96.9	93.8	95.3
Buses and Heavy Vehicles	4	31	66	6	34	54	195
% Buses and Heavy Vehicles	8.9	2.8	7.1	8.8	3.1	6.2	4.7

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB: Galloway Rd.
EB/WB: Bristol Rd.
Bensalem Twp./ Burlington Co./ PA
Thursday/ Clear & Cool/ E-14/ GD

File Name : 22-062-002
Site Code : 22062002
Start Date : 10/5/2023
Page No : 2

	Bristol Rd. Westbound			Galloway Rd. Northbound			Bristol Rd. Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	**3**	**84**	**87**	35	1	36	34	**85**	**119**	**242**
07:15 AM	3	70	73	48	**6**	54	40	49	89	216
07:30 AM	2	81	83	43	2	45	53	61	114	242
07:45 AM	1	68	69	**54**	5	**59**	**56**	57	113	241
Total Volume	9	303	312	180	14	194	183	252	435	941
% App. Total	2.9	97.1		92.8	7.2		42.1	57.9		
PHF	.750	.902	.897	.833	.583	.822	.817	.741	.914	.972
Passenger and 2 Axle Vehicles	7	292	299	151	12	163	171	235	406	868
% Passenger and 2 Axle Vehicles	77.8	96.4	95.8	83.9	85.7	84.0	93.4	93.3	93.3	92.2
Buses and Heavy Vehicles	2	11	13	29	2	31	12	17	29	73
% Buses and Heavy Vehicles	22.2	3.6	4.2	16.1	14.3	16.0	6.6	6.7	6.7	7.8
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:30 PM										
04:30 PM	3	58	61	**72**	4	76	81	**65**	146	283
04:45 PM	5	**77**	**82**	64	6	70	94	58	152	304
05:00 PM	1	61	62	70	4	74	**114**	45	159	295
05:15 PM	**8**	65	73	68	**9**	**77**	114	60	**174**	**324**
Total Volume	17	261	278	274	23	297	403	228	631	1206
% App. Total	6.1	93.9		92.3	7.7		63.9	36.1		
PHF	.531	.847	.848	.951	.639	.964	.884	.877	.907	.931
Passenger and 2 Axle Vehicles	17	254	271	265	23	288	396	216	612	1171
% Passenger and 2 Axle Vehicles	100	97.3	97.5	96.7	100	97.0	98.3	94.7	97.0	97.1
Buses and Heavy Vehicles	0	7	7	9	0	9	7	12	19	35
% Buses and Heavy Vehicles	0	2.7	2.5	3.3	0	3.0	1.7	5.3	3.0	2.9

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB: Galloway Rd.
EB/WB: Bristol Rd.
Bensalem Twp./ Bucks Co./ PA
Saturday / Clear & Cool/ E-14/ GD

File Name : 22-062-012
Site Code : 22062012
Start Date : 9/30/2023
Page No : 1

Groups Printed- Passenger and 2 Axle Vehicles - Buses and Heavy Vehicles

	Bristol Rd. Westbound		Galloway Rd. Northbound		Bristol Rd. Eastbound		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
11:00 AM	5	88	50	0	64	46	253
11:15 AM	2	85	51	8	90	52	288
11:30 AM	4	85	53	0	68	45	255
11:45 AM	2	84	58	6	107	56	313
Total	13	342	212	14	329	199	1109
12:00 PM	2	93	58	4	90	61	308
12:15 PM	3	83	71	5	88	55	305
12:30 PM	6	77	62	3	70	53	271
12:45 PM	6	80	59	7	85	59	296
Total	17	333	250	19	333	228	1180
Grand Total	30	675	462	33	662	427	2289
Apprch %	4.3	95.7	93.3	6.7	60.8	39.2	
Total %	1.3	29.5	20.2	1.4	28.9	18.7	
Passenger and 2 Axle Vehicles	27	669	455	31	648	421	2251
% Passenger and 2 Axle Vehicles	90	99.1	98.5	93.9	97.9	98.6	98.3
Buses and Heavy Vehicles	3	6	7	2	14	6	38
% Buses and Heavy Vehicles	10	0.9	1.5	6.1	2.1	1.4	1.7

	Bristol Rd. Westbound			Galloway Rd. Northbound			Bristol Rd. Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:45 AM										
11:45 AM	2	84	86	58	**6**	64	**107**	56	**163**	**313**
12:00 PM	2	**93**	**95**	58	4	62	90	**61**	151	308
12:15 PM	3	83	86	**71**	5	**76**	88	55	143	305
12:30 PM	**6**	77	83	62	3	65	70	53	123	271
Total Volume	13	337	350	249	18	267	355	225	580	1197
% App. Total	3.7	96.3		93.3	6.7		61.2	38.8		
PHF	.542	.906	.921	.877	.750	.878	.829	.922	.890	.956
Passenger and 2 Axle Vehicles	10	334	344	244	17	261	348	223	571	1176
% Passenger and 2 Axle Vehicles	76.9	99.1	98.3	98.0	94.4	97.8	98.0	99.1	98.4	98.2
Buses and Heavy Vehicles	3	3	6	5	1	6	7	2	9	21
% Buses and Heavy Vehicles	23.1	0.9	1.7	2.0	5.6	2.2	2.0	0.9	1.6	1.8

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB: Richlieu Rd.
EB/WB: Bristol Rd.
Bensalem Twp./ Bucks Co./ PA
Wednesday/ Clear & Cool/ E-14/ GD

File Name : 22-062-003 AM
Site Code : 22062003
Start Date : 10/4/2023
Page No : 1

Groups Printed- Passenger and 2 Axle Vehicles - Buses and Heavy Vehicles

	Bristol Rd. Westbound		Richlieu Rd. Northbound		Bristol Rd. Eastbound		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	62	78	1	22	40	7	210
07:15 AM	66	84	2	25	43	12	232
07:30 AM	77	89	1	31	63	9	270
07:45 AM	88	85	5	59	60	11	308
Total	293	336	9	137	206	39	1020
08:00 AM	57	69	4	55	49	4	238
08:15 AM	73	83	2	41	49	7	255
08:30 AM	62	78	3	41	50	11	245
08:45 AM	105	65	5	38	40	12	265
Total	297	295	14	175	188	34	1003
Grand Total	590	631	23	312	394	73	2023
Apprch %	48.3	51.7	6.9	93.1	84.4	15.6	
Total %	29.2	31.2	1.1	15.4	19.5	3.6	
Passenger and 2 Axle Vehicles	574	601	21	300	368	70	1934
% Passenger and 2 Axle Vehicles	97.3	95.2	91.3	96.2	93.4	95.9	95.6
Buses and Heavy Vehicles	16	30	2	12	26	3	89
% Buses and Heavy Vehicles	2.7	4.8	8.7	3.8	6.6	4.1	4.4

	Bristol Rd. Westbound			Richlieu Rd. Northbound			Bristol Rd. Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:30 AM										
07:30 AM	77	**89**	166	1	31	32	**63**	9	**72**	270
07:45 AM	**88**	85	**173**	**5**	**59**	**64**	60	**11**	71	**308**
08:00 AM	57	69	126	4	55	59	49	4	53	238
08:15 AM	73	83	156	2	41	43	49	7	56	255
Total Volume	295	326	621	12	186	198	221	31	252	1071
% App. Total	47.5	52.5		6.1	93.9		87.7	12.3		
PHF	.838	.916	.897	.600	.788	.773	.877	.705	.875	.869
Passenger and 2 Axle Vehicles	288	316	604	12	181	193	205	30	235	1032
% Passenger and 2 Axle Vehicles	97.6	96.9	97.3	100	97.3	97.5	92.8	96.8	93.3	96.4
Buses and Heavy Vehicles	7	10	17	0	5	5	16	1	17	39
% Buses and Heavy Vehicles	2.4	3.1	2.7	0	2.7	2.5	7.2	3.2	6.7	3.6

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB: Richlieu Rd.
EB/WB: Bristol Rd.
Bensalem Twp./ Bucks Co./ PA
Wednesday/ Clear/ E02-/ LE

File Name : 22-062-003 PM
Site Code : 22062003
Start Date : 3/20/2024
Page No : 1

Groups Printed- Passenger and 2 Axke Vehicles - Buses and Heavy Vehicles

	Bristol Rd. Westbound		Richlieu Rd. Northbound		Bristol Rd. Eastbound		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	61	67	8	90	75	5	306
04:15 PM	55	61	6	115	85	4	326
04:30 PM	56	61	4	85	94	7	307
04:45 PM	52	73	4	109	105	4	347
Total	224	262	22	399	359	20	1286
05:00 PM	62	72	8	103	85	7	337
05:15 PM	62	69	5	116	93	9	354
05:30 PM	56	59	8	100	87	11	321
05:45 PM	72	54	2	103	70	7	308
Total	252	254	23	422	335	34	1320
Grand Total	476	516	45	821	694	54	2606
Apprch %	48	52	5.2	94.8	92.8	7.2	
Total %	18.3	19.8	1.7	31.5	26.6	2.1	
Passenger and 2 Axke Vehicles	474	516	45	819	689	54	2597
% Passenger and 2 Axke Vehicles	99.6	100	100	99.8	99.3	100	99.7
Buses and Heavy Vehicles	2	0	0	2	5	0	9
% Buses and Heavy Vehicles	0.4	0	0	0.2	0.7	0	0.3

	Bristol Rd. Westbound			Richlieu Rd. Northbound			Bristol Rd. Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:45 PM										
04:45 PM	52	**73**	125	4	109	113	**105**	4	**109**	347
05:00 PM	**62**	72	**134**	**8**	103	111	85	7	92	337
05:15 PM	62	69	131	5	**116**	**121**	93	9	102	**354**
05:30 PM	56	59	115	8	100	108	87	**11**	98	321
Total Volume	232	273	505	25	428	453	370	31	401	1359
% App. Total	45.9	54.1		5.5	94.5		92.3	7.7		
PHF	.935	.935	.942	.781	.922	.936	.881	.705	.920	.960
Passenger and 2 Axke Vehicles	230	273	503	25	427	452	365	31	396	1351
% Passenger and 2 Axke Vehicles	99.1	100	99.6	100	99.8	99.8	98.6	100	98.8	99.4
Buses and Heavy Vehicles	2	0	2	0	1	1	5	0	5	8
% Buses and Heavy Vehicles	0.9	0	0.4	0	0.2	0.2	1.4	0	1.2	0.6

Horner & Canter Associates
Transportation and Traffic Engineering

4950 York Rd, Suite 2C, P.O. 301, Holicong, PA 18928-0301
105 Atsion Rd, Suite F, Medford, NJ 08055

NB: Richlieu Rd.
EB/WB: Bristol Rd.
Bensalem Twp./ Bucks Co./ PA
Saturday/ Cloudy/ E-02/ LE

File Name : 22-062-013
Site Code : 22062013
Start Date : 10/7/2023
Page No : 1

Groups Printed- Passenger and 2 Axle Vehicles - Buses and Heavy Vehicles

	Bristol Rd. Westbound		Richlieu Rd. Northbound		Bristol Rd. Eastbound		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
11:00 AM	57	63	2	73	74	7	276
11:15 AM	58	83	4	48	69	6	268
11:30 AM	52	85	3	53	79	7	279
11:45 AM	54	94	0	63	70	14	295
Total	221	325	9	237	292	34	1118
12:00 PM	75	75	4	72	85	7	318
12:15 PM	47	105	4	79	79	6	320
12:30 PM	60	93	5	73	72	6	309
12:45 PM	61	66	5	69	65	8	274
Total	243	339	18	293	301	27	1221
Grand Total	464	664	27	530	593	61	2339
Apprch %	41.1	58.9	4.8	95.2	90.7	9.3	
Total %	19.8	28.4	1.2	22.7	25.4	2.6	
Passenger and 2 Axle Vehicles	464	663	27	530	592	61	2337
% Passenger and 2 Axle Vehicles	100	99.8	100	100	99.8	100	99.9
Buses and Heavy Vehicles	0	1	0	0	1	0	2
% Buses and Heavy Vehicles	0	0.2	0	0	0.2	0	0.1

	Bristol Rd. Westbound			Richlieu Rd. Northbound			Bristol Rd. Eastbound			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 12:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 11:45 AM										
11:45 AM	54	94	148	0	63	63	70	**14**	84	295
12:00 PM	**75**	75	150	4	72	76	**85**	7	**92**	318
12:15 PM	47	**105**	152	4	**79**	**83**	79	6	85	**320**
12:30 PM	60	93	**153**	**5**	73	78	72	6	78	309
Total Volume	236	367	603	13	287	300	306	33	339	1242
% App. Total	39.1	60.9		4.3	95.7		90.3	9.7		
PHF	.787	.874	.985	.650	.908	.904	.900	.589	.921	.970
Passenger and 2 Axle Vehicles	236	367	603	13	287	300	305	33	338	1241
% Passenger and 2 Axle Vehicles	100	100	100	100	100	100	99.7	100	99.7	99.9
Buses and Heavy Vehicles	0	0	0	0	0	0	1	0	1	1
% Buses and Heavy Vehicles	0	0	0	0	0	0	0.3	0	0.3	0.1

APPENDIX C

Level of Service Delay Thresholds

Level of Service Criteria

Level of Service at intersections is defined in terms of DELAY. Delay is a measure of driver discomfort, frustration, and lost travel time, thus the rating of delay from highly acceptable LOS A to unacceptable LOS F.

At traffic signals, delay is a complex measure and is dependent on a number of variables including signal progression, the cycle length, the green-time ratio, clearance times, trucks, pedestrians, parking, and signal phasing.

At unsignalized intersections, delay is dependent on the available gaps in the two-way flow of the uninterrupted traffic movement, intersection width, and queuing.

Intersection LOS

	Signalized	Unsignalized
LOS A	Less than 10.0 sec/veh	Less than 10.0 sec/veh
B	10.0 to 20.0 sec/veh	10.0 to 15.0 sec/veh
C	20.0 to 35.0 sec/veh	15.0 to 25.0 sec/veh
D	35.0 to 55.0 sec/veh	25.0 to 35.0 sec/veh
E	55.0 to 80.0 sec/veh	35.0 to 50.0 sec/veh
F	Greater than 80.0 sec/veh	Greater than 50.0 sec/veh

LEVEL OF SERVICE FOR SIGNALIZED INTERSECTIONS

Level of service for signalized intersections is defined in terms of delay. Delay is a measure of driver discomfort, frustration, fuel consumption, and lost travel time.

- **LEVEL-OF-SERVICE A** describes operations with very low delay, i.e., less than 10.0 sec per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

- **LEVEL-OF-SERVICE B** describes operations with delay in the range of 10.0 to 20.0 sec per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.

- **LEVEL-OF-SERVICE C** describes operations with delay in the range of 20.0 to 35.0 sec per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear in this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.

- **LEVEL-OF-SERVICE D** describes operations with delay in the range of 35.0 to 55.0 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

- **LEVEL-OF-SERVICE E** describes operations with delay in the range of 55.0 to 80.0 sec per vehicle. This is considered to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

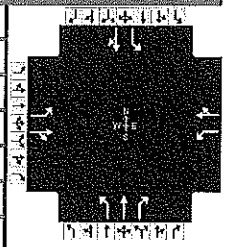
- **LEVEL-OF-SERVICE F** describes operations with delay in excess of 80.0 sec per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over saturation, i.e., when arrival flow rates exceed the capacity of the intersection. It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

APPENDIX D

Existing Capacity/LOS Analysis Worksheets

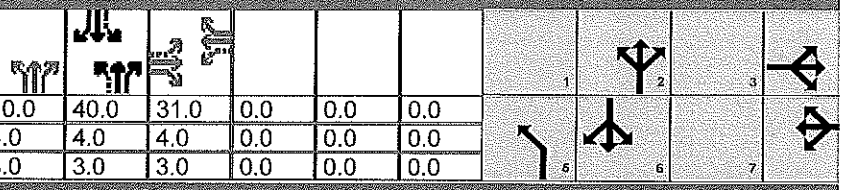
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.87
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_ea.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	12	80	154	121	206	7	200	150	42	2	213	47

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	10.0	40.0		31.0	0.0	0.0	0.0					
Yellow	4.0	4.0		4.0	0.0	0.0	0.0					
Red	3.0	3.0		3.0	0.0	0.0	0.0					

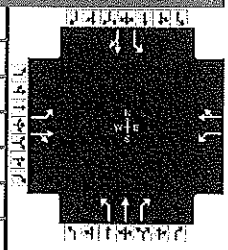
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		38.0		38.0	17.0	64.0		47.0
Change Period, (*Y*+*R c*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*g s*), s		14.8		25.4	9.8			
Green Extension Time (*g e*), s		2.2		1.3	0.0	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		0.02		0.66	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	14	234		139	245		230	172	43	2	293	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1000	1643		1146	1784		1723	1795	1497	1232	1715	
Queue Service Time (*g s*), s	1.1	11.7		11.3	11.1		7.3	4.7	1.3	0.1	12.6	
Cycle Queue Clearance Time (*g c*), s	12.3	11.7		22.9	11.1		7.3	4.7	1.3	0.1	12.6	
Green Ratio (*g/C*)	0.31	0.31		0.31	0.31		0.53	0.57	0.57	0.40	0.40	
Capacity (*c*), veh/h	275	515		299	560		565	1020	851	566	690	
Volume-to-Capacity Ratio (*X*)	0.050	0.455		0.465	0.437		0.407	0.169	0.050	0.004	0.425	
Back of Queue (*Q*), ft/ln (95 th percentile)	14	204		144.2	209.5		122.2	82.6	19.4	1.5	226.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.5	8.0		5.7	8.2		4.8	3.2	0.7	0.1	8.9	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.08	0.00		0.64	0.00		0.58	0.00	0.09	0.02	0.00	
Uniform Delay (*d 1*), s/veh	32.7	28.0		37.2	27.8		14.2	10.7	9.8	18.3	22.0	
Incremental Delay (*d 2*), s/veh	0.1	0.6		1.1	0.5		0.5	0.4	0.1	0.0	1.9	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	32.8	28.6		38.3	28.4		14.6	11.1	9.9	18.3	23.9	
Level of Service (LOS)	C	C		D	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	28.9	C		32.0	C		12.8	B		23.9	C	
Intersection Delay, s/veh / LOS	23.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.96	B
Bicycle LOS Score / LOS	0.90	A	1.12	A	1.22	A	0.98	A

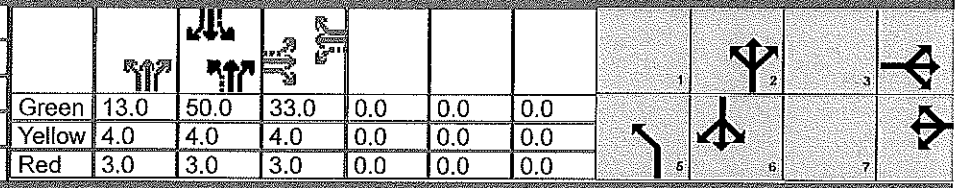
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_ep.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	61	307	234	65	158	6	201	293	114	1	196	29

Signal Information			
Cycle, s	117.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	13.0	50.0		33.0	0.0	0.0	0.0					
Yellow	4.0	4.0		4.0	0.0	0.0	0.0					
Red	3.0	3.0		3.0	0.0	0.0	0.0					

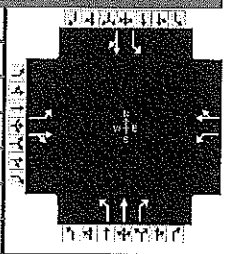
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		40.0		40.0	20.0	77.0		57.0
Change Period, (*Y*+*R c*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*g s*), s		36.5		36.5	9.4			
Green Extension Time (*g e*), s		0.0		0.0	0.2	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		1.00		1.00	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	64	517		68	173		212	308	94	1	232	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1203	1735		898	1811		1723	1823	1557	1088	1719	
Queue Service Time (*g s*), s	5.2	34.0		0.0	8.7		6.9	9.4	2.9	0.1	10.3	
Cycle Queue Clearance Time (*g c*), s	13.9	34.0		34.0	8.7		6.9	9.4	2.9	0.1	10.3	
Green Ratio (*g/C*)	0.29	0.29		0.29	0.29		0.58	0.61	0.61	0.44	0.44	
Capacity (*c*), veh/h	321	504		62	526		676	1106	945	536	749	
Volume-to-Capacity Ratio (*X*)	0.200	1.025		1.112	0.328		0.313	0.279	0.099	0.002	0.309	
Back of Queue (*Q*), ft/ln (95 th percentile)	70.5	716.4		195	172.9		116.4	167.7	44.8	0.8	194.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	28.4		7.8	6.9		4.6	6.7	1.8	0.0	7.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.38	0.00		0.87	0.00		0.55	0.00	0.21	0.01	0.00	
Uniform Delay (*d 1*), s/veh	38.0	41.5		58.5	32.5		12.8	11.1	9.6	18.6	21.5	
Incremental Delay (*d 2*), s/veh	0.3	46.7		148.7	0.4		0.3	0.6	0.2	0.0	1.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	38.3	88.2		207.2	32.9		13.1	11.7	9.8	18.6	22.6	
Level of Service (LOS)	D	F		F	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	82.7	F		82.4	F		11.9	B		22.6	C	
Intersection Delay, s/veh / LOS	48.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.16	B	1.94	B	1.89	B	1.99	B
Bicycle LOS Score / LOS	1.45	A	0.89	A	1.50	B	0.87	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.96
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_es.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	28	151	121	80	106	5	144	162	68	2	158	24

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3			
Green	10.0	40.0	31.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	3.0	3.0	3.0	0.0	0.0	0.0	5	6	7			

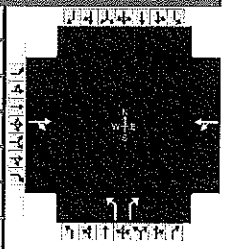
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		38.0		38.0	17.0	64.0		47.0
Change Period, (*Y+R c*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*g s*), s		14.6		21.1	7.0			
Green Extension Time (*g e*), s		1.6		1.3	0.1	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		0.01		0.11	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	29	257		83	116		150	169	55	2	184	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1186	1744		1140	1822		1736	1823	1557	1236	1719	
Queue Service Time (*g s*), s	1.9	12.1		6.5	4.7		4.5	4.5	1.6	0.1	7.3	
Cycle Queue Clearance Time (*g c*), s	6.6	12.1		18.6	4.7		4.5	4.5	1.6	0.1	7.3	
Green Ratio (*g/C*)	0.31	0.31		0.31	0.31		0.53	0.57	0.57	0.40	0.40	
Capacity (*c*), veh/h	387	547		293	572		665	1037	885	567	691	
Volume-to-Capacity Ratio (*X*)	0.075	0.470		0.285	0.202		0.226	0.163	0.062	0.004	0.267	
Back of Queue (*Q*), ft/ln (95 th percentile)	25.9	214.9		80.8	90.6		74.4	79.2	24.3	1.4	137.5	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	8.6		3.2	3.6		3.0	3.1	1.0	0.1	5.4	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.14	0.00		0.36	0.00		0.35	0.00	0.12	0.02	0.00	
Uniform Delay (*d 1*), s/veh	28.1	28.2		35.7	25.6		12.6	10.7	9.8	18.3	20.4	
Incremental Delay (*d 2*), s/veh	0.1	0.6		0.5	0.2		0.2	0.3	0.1	0.0	0.9	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	28.2	28.8		36.2	25.8		12.8	11.0	10.0	18.3	21.4	
Level of Service (LOS)	C	C		D	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	28.7	C		30.2	C		11.6	B		21.3	C	
Intersection Delay, s/veh / LOS	21.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.14	B	1.93	B	1.89	B	1.95	B
Bicycle LOS Score / LOS	0.96	A	0.82	A	1.10	A	0.80	A

HCS Signalized Intersection Results Summary

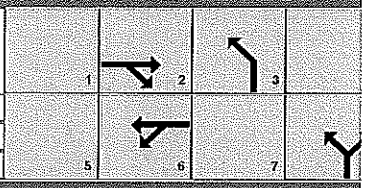
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.97
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_ea.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		183	252	9	303		180		14			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	45.0	25.0	0.0	0.0	0.0	0.0	
Yellow	3.0	3.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



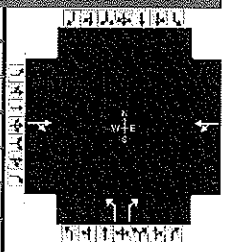
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		50.0		50.0		30.0		
Change Period, (*Y+R c*), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						9.7		
Green Extension Time (g_e), s		0.0		0.0		0.3		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		448			322		186		14			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1536			1707		1569		1420			
Queue Service Time (g_s), s		14.0			0.0		7.2		0.6			
Cycle Queue Clearance Time (g_c), s		14.0			7.8		7.2		0.6			
Green Ratio (*g/C*)		0.57			0.57		0.32		0.32			
Capacity (*c*), veh/h		883			1028		510		461			
Volume-to-Capacity Ratio (*X*)		0.508			0.313		0.364		0.031			
Back of Queue (*Q*), ft/ln (95 th percentile)		211.5			126.7		125.4		8.6			
Back of Queue (*Q*), veh/ln (95 th percentile)		8.0			4.9		4.4		0.3			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00			0.00		0.00		0.10			
Uniform Delay (d_1), s/veh		10.2			8.9		20.7		18.4			
Incremental Delay (d_2), s/veh		2.1			0.8		0.2		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (*d*), s/veh		12.3			9.7		20.8		18.4			
Level of Service (LOS)		B			A		C		B			
Approach Delay, s/veh / LOS	12.3	B		9.7	A		20.7	C		0.0		
Intersection Delay, s/veh / LOS	13.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.72	B	1.72	B
Bicycle LOS Score / LOS	1.23	A	1.02	A		F		

HCS Signalized Intersection Results Summary

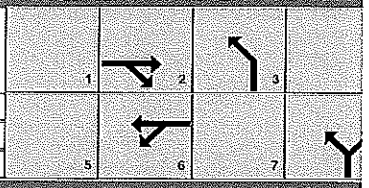
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.93
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_ep.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		403	228	17	261		274		23			

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	80.0	30.0	0.0	0.0	0.0	0.0	
Yellow	3.0	3.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



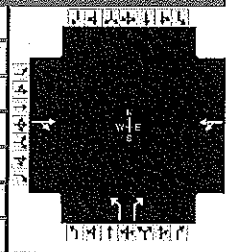
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		85.0		85.0		35.0		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (MAH), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						20.6		
Green Extension Time (g_e), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.01		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		678			299		295		25			
Adjusted Saturation Flow Rate (s), veh/h/ln		1645			1651		1745		1589			
Queue Service Time (g_s), s		27.4			0.0		18.1		1.4			
Cycle Queue Clearance Time (g_c), s		27.4			8.1		18.1		1.4			
Green Ratio (g/C)		0.68			0.68		0.26		0.26			
Capacity (c), veh/h		1111			1146		451		410			
Volume-to-Capacity Ratio (X)		0.611			0.261		0.654		0.060			
Back of Queue (Q), ft/ln (95 th percentile)		378.7			136.3		320.7		24.3			
Back of Queue (Q), veh/ln (95 th percentile)		14.8			5.3		12.5		1.0			
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.29			
Uniform Delay (d_1), s/veh		10.8			7.7		39.7		33.5			
Incremental Delay (d_2), s/veh		2.5			0.6		2.7		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (d), s/veh		13.3			8.2		42.4		33.5			
Level of Service (LOS)		B			A		D		C			
Approach Delay, s/veh / LOS	13.3	B		8.2	A		41.7	D		0.0		
Intersection Delay, s/veh / LOS	19.1						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.74	B	1.74	B
Bicycle LOS Score / LOS	1.61	B	0.98	A		F		

HCS Signalized Intersection Results Summary

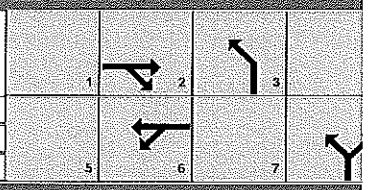
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.96
Urban Street		Analysis Year	Existing	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_es.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		355	225	13	337		249		18			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EB			WB			NB			SB		
Green	45.0	25.0		0.0	0.0		0.0	0.0				
Yellow	3.0	3.0		0.0	0.0		0.0	0.0				
Red	2.0	2.0		0.0	0.0		0.0	0.0				



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		50.0		50.0		30.0		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (MAH), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						11.8		
Green Extension Time (g_e), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		604			365		259		19			
Adjusted Saturation Flow Rate (s), veh/h/ln		1651			1720		1758		1516			
Queue Service Time (g_s), s		19.6			0.0		9.3		0.7			
Cycle Queue Clearance Time (g_c), s		19.6			8.9		9.3		0.7			
Green Ratio (g/C)		0.57			0.57		0.32		0.32			
Capacity (c), veh/h		949			1036		571		493			
Volume-to-Capacity Ratio (X)		0.636			0.352		0.454		0.038			
Back of Queue (Q), ft/ln (95 th percentile)		284.1			145.7		163.3		10.5			
Back of Queue (Q), veh/ln (95 th percentile)		11.2			5.7		6.4		0.4			
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.12			
Uniform Delay (d_1), s/veh		11.4			9.1		21.4		18.5			
Incremental Delay (d_2), s/veh		3.3			0.9		0.2		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (d), s/veh		14.6			10.1		21.6		18.5			
Level of Service (LOS)		B			B		C		B			
Approach Delay, s/veh / LOS	14.6	B		10.1	B		21.4	C		0.0		
Intersection Delay, s/veh / LOS	14.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.72	B	1.72	B
Bicycle LOS Score / LOS	1.48	A	1.09	A		F		

HCS Two-Way Stop-Control Report

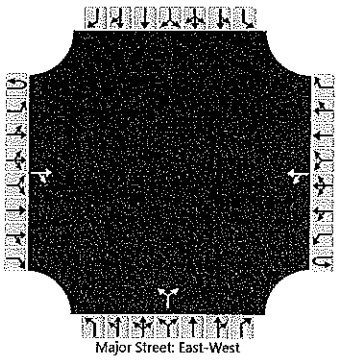
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	11/10/2023
Analysis Year	2023
Time Analyzed	AM Peak Hour
Intersection Orientation	East-West
Project Description	22-062 Proposed Retail Center

Site Information

Intersection	Bristol Rd/Richlieu Rd
Jurisdiction	Bensalem Twp
East/West Street	Bristol Road
North/South Street	Richlieu Road
Peak Hour Factor	0.87
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			221	31		295	326			12		186				
Percent Heavy Vehicles (%)						2				0		3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.3				7.1		6.2				
Critical Headway (sec)						4.32				6.40		6.23				
Base Follow-Up Headway (sec)						3.0				3.0		3.1				
Follow-Up Headway (sec)						3.02				3.00		3.13				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						339					228					
Capacity, c (veh/h)						949					767					
v/c Ratio						0.36					0.30					
95% Queue Length, Q_{95} (veh)						1.6					1.2					
Control Delay (s/veh)						10.9	4.9				11.7					
Level of Service (LOS)						B	A				B					
Approach Delay (s/veh)					7.8				11.7							
Approach LOS					A				B							

HCS Two-Way Stop-Control Report

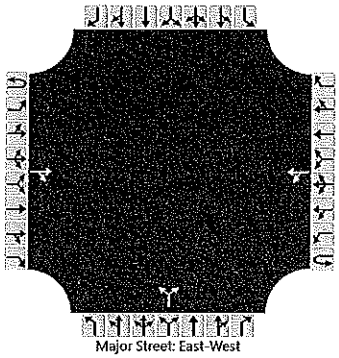
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2023
Time Analyzed	PM Peak Hour
Intersection Orientation	East-West
Project Description	22-062 Proposed Retail Center

Site Information

Intersection	Bristol Rd/Richlieu Rd
Jurisdiction	Bensalem Twp
East/West Street	Bristol Road
North/South Street	Richlieu Road
Peak Hour Factor	0.96
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			370	31		232	273			25		428				
Percent Heavy Vehicles (%)						1				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.3				7.1		6.2				
Critical Headway (sec)						4.31				6.40		6.20				
Base Follow-Up Headway (sec)						3.0				3.0		3.1				
Follow-Up Headway (sec)						3.01				3.00		3.10				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						242					472					
Capacity, c (veh/h)						860					705					
v/c Ratio						0.28					0.67					
95% Queue Length, Q_{95} (veh)						1.2					5.2					
Control Delay (s/veh)						10.8	3.6				19.8					
Level of Service (LOS)						B	A				C					
Approach Delay (s/veh)					6.9				19.8							
Approach LOS					A				C							

HCS Two-Way Stop-Control Report

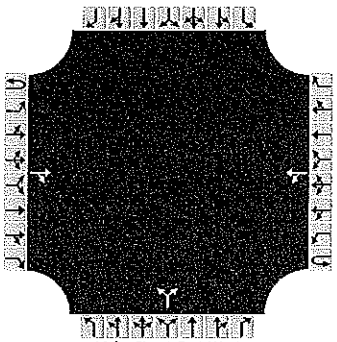
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	11/10/2023
Analysis Year	2023
Time Analyzed	SAT Peak Hour
Intersection Orientation	East-West
Project Description	22-062 Proposed Retail Center

Site Information

Intersection	Bristol Rd/Richlieu Rd
Jurisdiction	Bensalem Twp
East/West Street	Bristol Road
North/South Street	Richlieu Road
Peak Hour Factor	0.97
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			306	33		236	367			13		287				
Percent Heavy Vehicles (%)						0				0		0				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.3				7.1		6.2				
Critical Headway (sec)						4.30				6.40		6.20				
Base Follow-Up Headway (sec)						3.0				3.0		3.1				
Follow-Up Headway (sec)						3.00				3.00		3.10				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						243					309					
Capacity, c (veh/h)						911					768					
v/c Ratio						0.27					0.40					
95% Queue Length, Q_{95} (veh)						1.1					2.0					
Control Delay (s/veh)						10.4	3.5				12.8					
Level of Service (LOS)						B	A				B					
Approach Delay (s/veh)					6.2				12.8							
Approach LOS					A				B							

APPENDIX E

Trip Generation Worksheets

Strip Retail Plaza (<40k)
(822)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday**

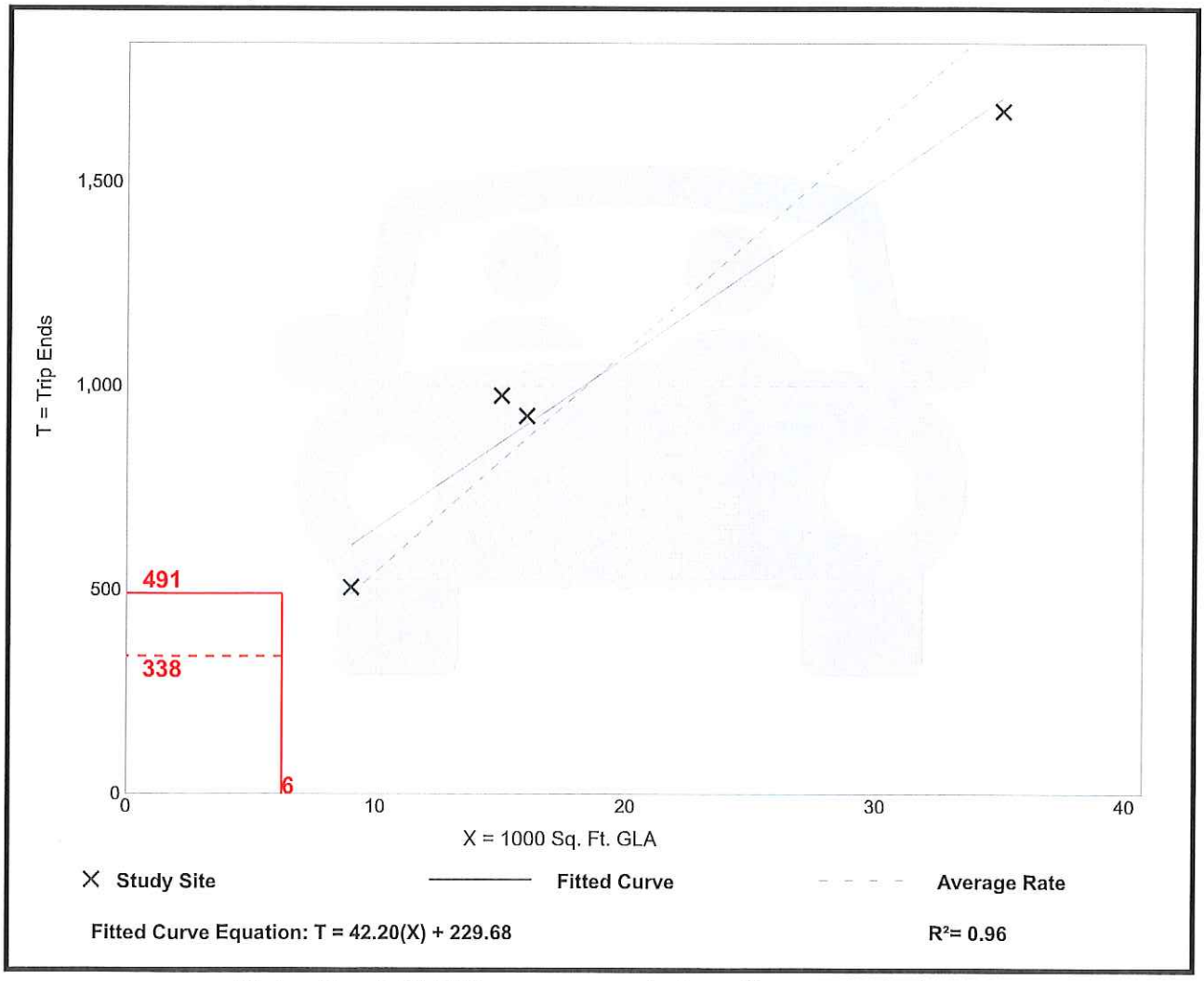
Setting/Location: **General Urban/Suburban**
Number of Studies: 4
Avg. 1000 Sq. Ft. GLA: 19
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
54.45	47.86 - 65.07	7.81

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: T = 42.20(X) + 229.68

R^2= 0.96

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Strip Retail Plaza (<40k)
(822)

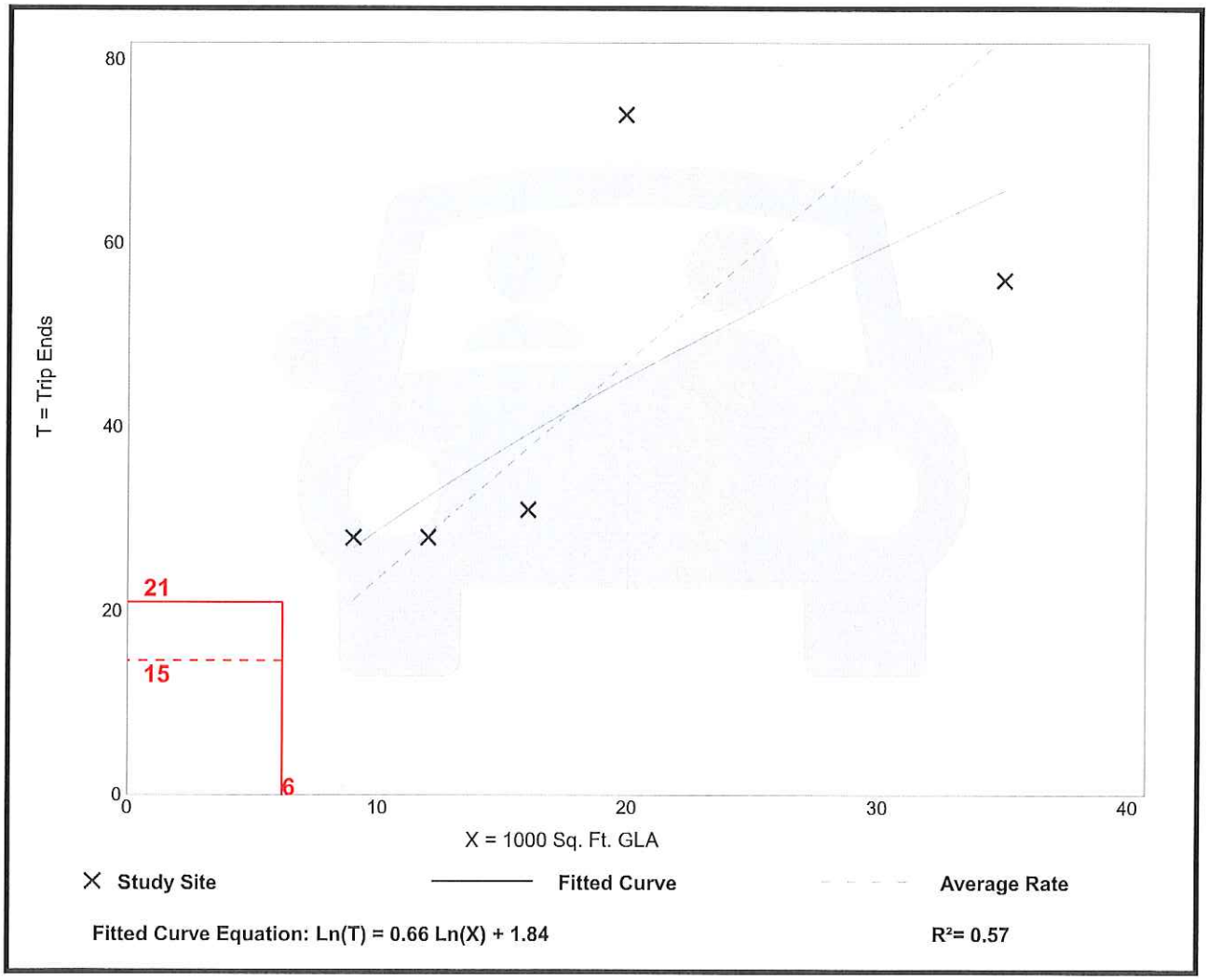
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 5
Avg. 1000 Sq. Ft. GLA: 18
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
2.36	1.60 - 3.73	0.94

Data Plot and Equation

Caution – Small Sample Size



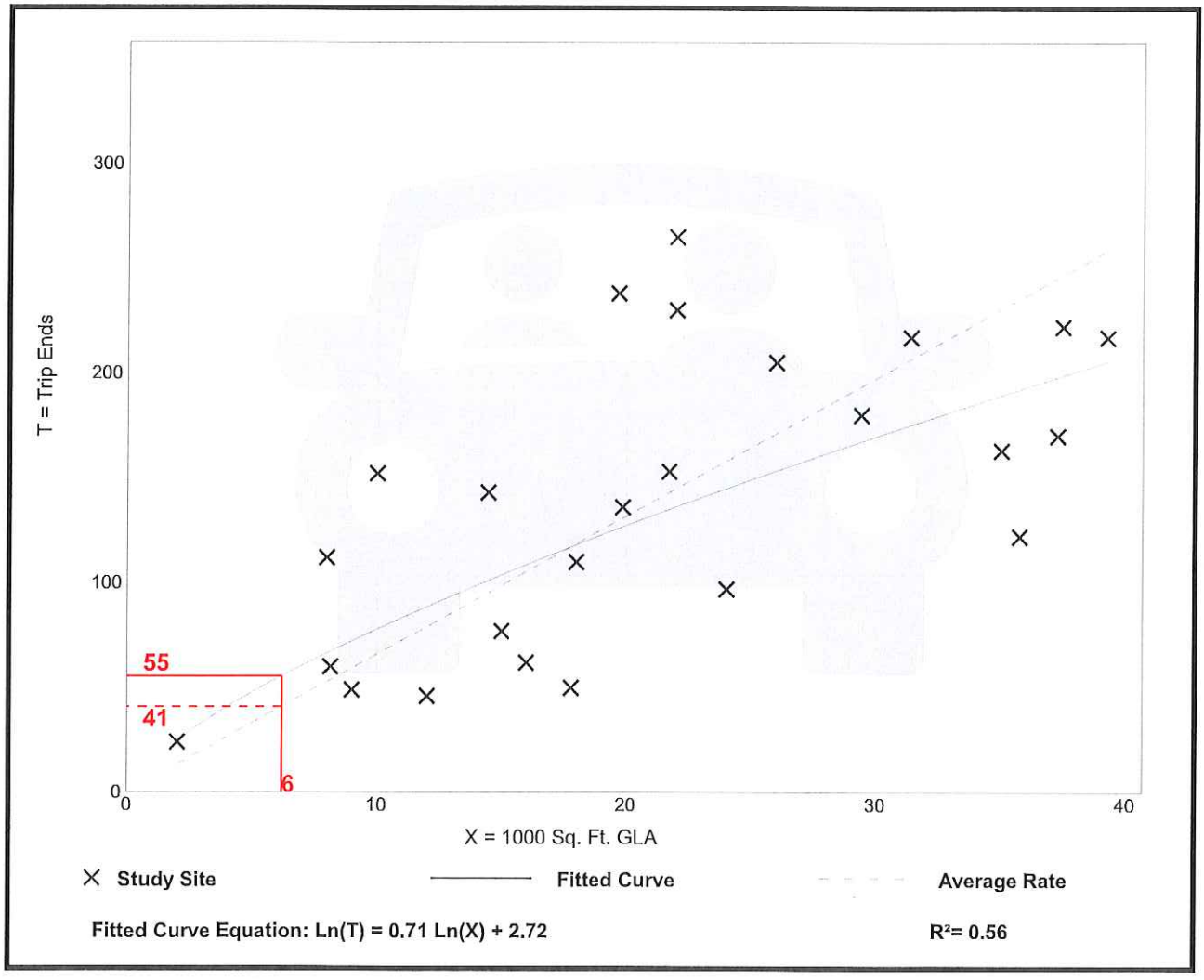
Strip Retail Plaza (<40k)
(822)

Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Weekday,**
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: **General Urban/Suburban**
Number of Studies: 25
Avg. 1000 Sq. Ft. GLA: 21
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.59	2.81 - 15.20	2.94

Data Plot and Equation



Strip Retail Plaza (<40k)
(822)

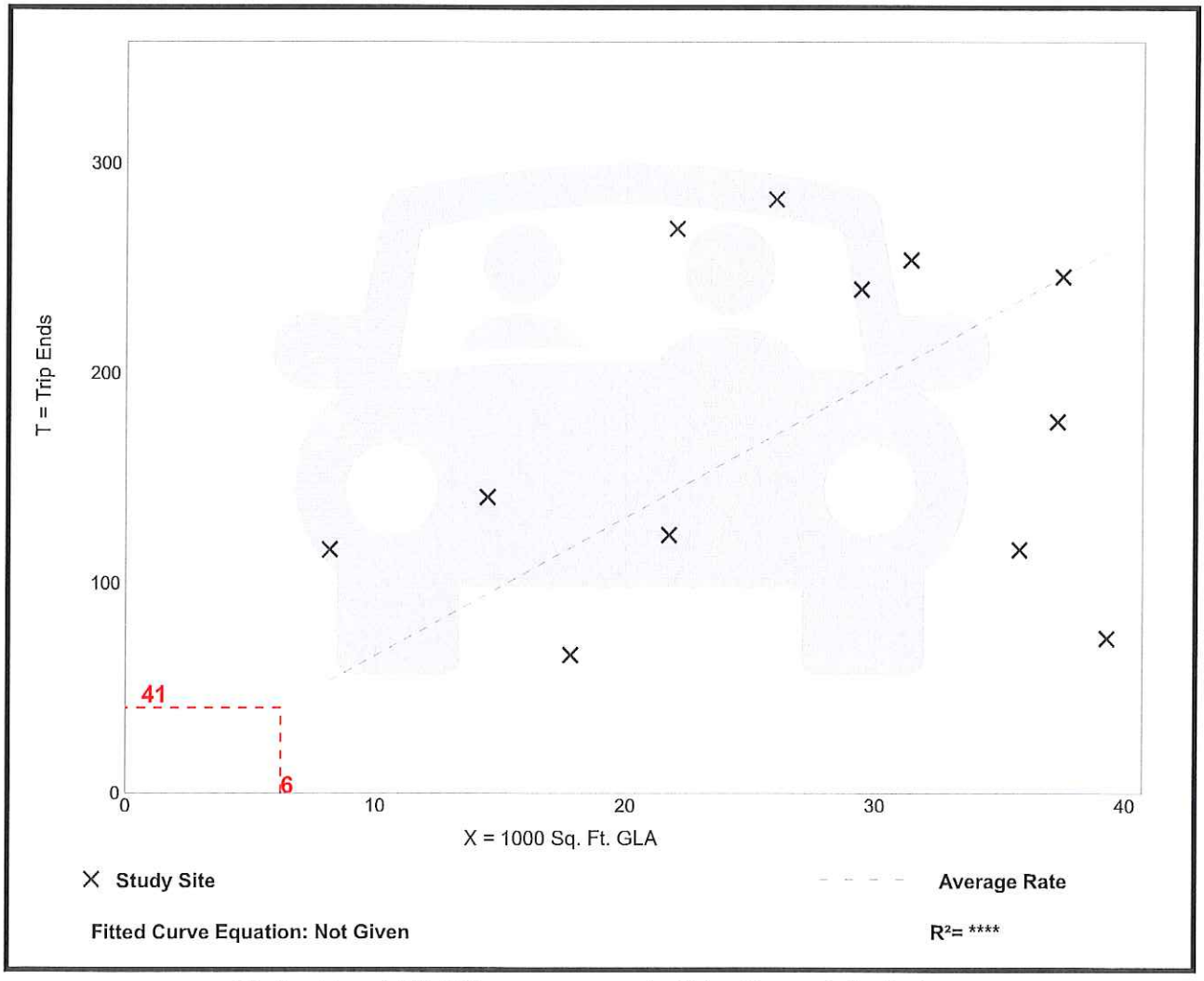
Vehicle Trip Ends vs: **1000 Sq. Ft. GLA**
On a: **Saturday, Peak Hour of Generator**

Setting/Location: **General Urban/Suburban**
Number of Studies: 12
Avg. 1000 Sq. Ft. GLA: 27
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
6.57	1.88 - 14.23	3.45

Data Plot and Equation



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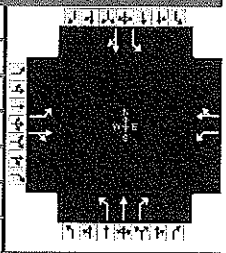
APPENDIX F

No-Build Capacity/LOS Analysis Worksheets

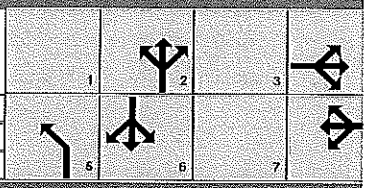
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.87
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_na.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	12	80	154	121	207	7	201	150	42	2	214	47

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	10.0	40.0		31.0	0.0		0.0	0.0		0.0		
Yellow	4.0	4.0		4.0	0.0		0.0	0.0		0.0		
Red	3.0	3.0		3.0	0.0		0.0	0.0		0.0		

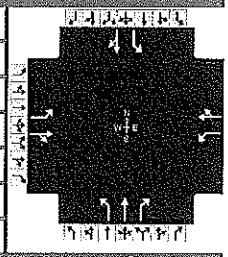
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		38.0		38.0	17.0	64.0		47.0
Change Period, ($Y+R_c$), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (MAH), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (g_s), s		14.8		25.4	9.9			
Green Extension Time (g_e), s		2.2		1.3	0.0	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		0.02		0.66	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	14	234		139	246		231	172	43	2	294	
Adjusted Saturation Flow Rate (s), veh/h/ln	999	1643		1146	1784		1723	1795	1497	1232	1716	
Queue Service Time (g_s), s	1.1	11.7		11.3	11.2		7.4	4.7	1.3	0.1	12.6	
Cycle Queue Clearance Time (g_c), s	12.3	11.7		22.9	11.2		7.4	4.7	1.3	0.1	12.6	
Green Ratio (g/C)	0.31	0.31		0.31	0.31		0.53	0.57	0.57	0.40	0.40	
Capacity (c), veh/h	274	515		299	560		564	1020	851	566	690	
Volume-to-Capacity Ratio (X)	0.050	0.455		0.465	0.439		0.409	0.169	0.050	0.004	0.427	
Back of Queue (Q), ft/ln (95 th percentile)	14	204		144.2	210.5		122.8	82.6	19.4	1.5	227.1	
Back of Queue (Q), veh/ln (95 th percentile)	0.5	8.0		5.7	8.2		4.8	3.2	0.7	0.1	8.9	
Queue Storage Ratio (RQ) (95 th percentile)	0.08	0.00		0.64	0.00		0.58	0.00	0.09	0.02	0.00	
Uniform Delay (d_1), s/veh	32.8	28.0		37.2	27.9		14.2	10.7	9.8	18.3	22.0	
Incremental Delay (d_2), s/veh	0.1	0.6		1.1	0.5		0.5	0.4	0.1	0.0	1.9	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	32.8	28.6		38.3	28.4		14.7	11.1	9.9	18.3	23.9	
Level of Service (LOS)	C	C		D	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	28.9	C		32.0	C		12.8	B		23.9	C	
Intersection Delay, s/veh / LOS	23.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.96	B
Bicycle LOS Score / LOS	0.90	A	1.12	A	1.22	A	0.98	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_np.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	61	308	235	65	159	6	202	294	114	1	197	29

Signal Information			
Cycle, s	117.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.0	50.0	33.0	0.0	0.0	0.0	1	2	3	4		
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8		
Red	3.0	3.0	3.0	0.0	0.0	0.0						

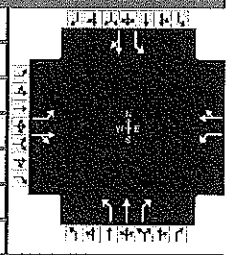
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		40.0		40.0	20.0	77.0		57.0
Change Period, (*Y+R c*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*g s*), s		36.5		36.5	9.5			
Green Extension Time (*g e*), s		0.0		0.0	0.2	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		1.00		1.00	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	64	519		68	174		213	309	94	1	233	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1201	1734		897	1811		1723	1823	1557	1087	1719	
Queue Service Time (*g s*), s	5.2	34.0		0.0	8.8		7.0	9.4	2.9	0.1	10.3	
Cycle Queue Clearance Time (*g c*), s	14.0	34.0		34.0	8.8		7.0	9.4	2.9	0.1	10.3	
Green Ratio (*g/C*)	0.29	0.29		0.29	0.29		0.58	0.61	0.61	0.44	0.44	
Capacity (*c*), veh/h	320	504		62	526		675	1106	945	535	749	
Volume-to-Capacity Ratio (*X*)	0.200	1.030		1.112	0.330		0.315	0.280	0.099	0.002	0.311	
Back of Queue (*Q*), ft/ln (95 th percentile)	70.6	723.3		195.1	174.2		117	168.3	44.8	0.8	195.4	
Back of Queue (*Q*), veh/ln (95 th percentile)	2.8	28.7		7.8	6.9		4.6	6.7	1.8	0.0	7.6	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.38	0.00		0.87	0.00		0.56	0.00	0.21	0.01	0.00	
Uniform Delay (*d 1*), s/veh	38.1	41.5		58.5	32.6		12.8	11.1	9.6	18.6	21.5	
Incremental Delay (*d 2*), s/veh	0.3	47.9		148.7	0.4		0.3	0.6	0.2	0.0	1.1	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	38.4	89.4		207.2	32.9		13.1	11.7	9.8	18.6	22.6	
Level of Service (LOS)	D	F		F	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	83.8	F		82.2	F		11.9	B		22.6	C	
Intersection Delay, s/veh / LOS	48.6						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.16	B	1.94	B	1.89	B	1.99	B
Bicycle LOS Score / LOS	1.45	A	0.89	A	1.50	B	0.87	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.96
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_ns.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	28	151	121	80	106	5	144	163	68	2	159	24

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	1	2	3	4	5	6	7	8				
Green	10.0	40.0	31.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	3.0	3.0	3.0	0.0	0.0	0.0						

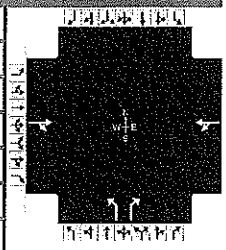
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		38.0		38.0	17.0	64.0		47.0
Change Period, (*Y+Rc*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*gs*), s		14.6		21.1	7.0			
Green Extension Time (*ge*), s		1.6		1.3	0.1	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		0.01		0.11	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	29	257		83	116		150	170	55	2	185	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1186	1744		1140	1822		1736	1823	1557	1235	1719	
Queue Service Time (*gs*), s	1.9	12.1		6.5	4.7		4.5	4.5	1.6	0.1	7.4	
Cycle Queue Clearance Time (*gc*), s	6.6	12.1		18.6	4.7		4.5	4.5	1.6	0.1	7.4	
Green Ratio (*g/C*)	0.31	0.31		0.31	0.31		0.53	0.57	0.57	0.40	0.40	
Capacity (*c*), veh/h	387	547		293	572		664	1037	885	567	691	
Volume-to-Capacity Ratio (*X*)	0.075	0.470		0.285	0.202		0.226	0.164	0.062	0.004	0.268	
Back of Queue (*Q*), ft/ln (95 th percentile)	25.9	214.9		80.8	90.6		74.4	79.7	24.3	1.4	138.7	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.0	8.6		3.2	3.6		3.0	3.2	1.0	0.1	5.4	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.14	0.00		0.36	0.00		0.35	0.00	0.12	0.02	0.00	
Uniform Delay (*d1*), s/veh	28.1	28.2		35.7	25.6		12.6	10.7	9.8	18.3	20.4	
Incremental Delay (*d2*), s/veh	0.1	0.6		0.5	0.2		0.2	0.3	0.1	0.0	1.0	
Initial Queue Delay (*d3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	28.2	28.8		36.2	25.8		12.8	11.0	10.0	18.3	21.4	
Level of Service (LOS)	C	C		D	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	28.7	C		30.2	C		11.6	B		21.4	C	
Intersection Delay, s/veh / LOS	21.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.14	B	1.93	B	1.89	B	1.95	B
Bicycle LOS Score / LOS	0.96	A	0.82	A	1.11	A	0.80	A

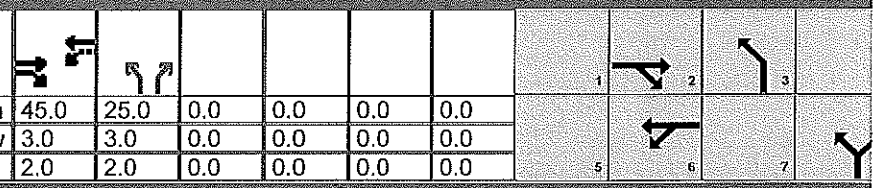
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.97
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_na.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		184	253	9	304		181		14			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	45.0	25.0	0.0	0.0	0.0	0.0
Yellow	3.0	3.0	0.0	0.0	0.0	0.0
Red	2.0	2.0	0.0	0.0	0.0	0.0

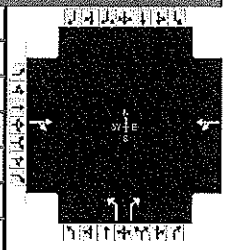
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		50.0		50.0		30.0		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (MAH), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						9.8		
Green Extension Time (g_e), s		0.0		0.0		0.3		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		451			323		187		14			
Adjusted Saturation Flow Rate (s), veh/h/ln		1536			1707		1569		1420			
Queue Service Time (g_s), s		14.1			0.0		7.3		0.6			
Cycle Queue Clearance Time (g_c), s		14.1			7.8		7.3		0.6			
Green Ratio (g/C)		0.57			0.57		0.32		0.32			
Capacity (c), veh/h		883			1028		510		461			
Volume-to-Capacity Ratio (X)		0.510			0.314		0.366		0.031			
Back of Queue (Q), ft/ln (95 th percentile)		212.3			127.2		126.1		8.6			
Back of Queue (Q), veh/ln (95 th percentile)		8.0			4.9		4.5		0.3			
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.10			
Uniform Delay (d_1), s/veh		10.2			8.9		20.7		18.4			
Incremental Delay (d_2), s/veh		2.1			0.8		0.2		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (d), s/veh		12.3			9.7		20.8		18.4			
Level of Service (LOS)		B			A		C		B			
Approach Delay, s/veh / LOS	12.3		B	9.7		A	20.7		C	0.0		
Intersection Delay, s/veh / LOS	13.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.72	B	1.72	B
Bicycle LOS Score / LOS	1.23	A	1.02	A		F		

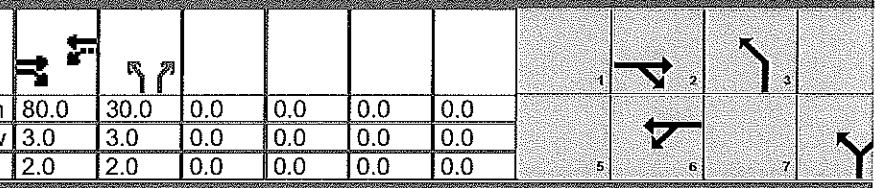
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.93
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_np.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		404	229	17	262		275		23			

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	80.0	30.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

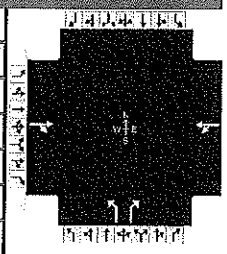
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		85.0		85.0		35.0		
Change Period, (*Y+R c*), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		0.0		0.0		3.1		
Queue Clearance Time (*g s*), s						20.7		
Green Extension Time (*g e*), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.01		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		681			300		296		25			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1645			1651		1745		1589			
Queue Service Time (*g s*), s		27.5			0.0		18.2		1.4			
Cycle Queue Clearance Time (*g c*), s		27.5			8.2		18.2		1.4			
Green Ratio (*g/C*)		0.68			0.68		0.26		0.26			
Capacity (*c*), veh/h		1110			1146		451		410			
Volume-to-Capacity Ratio (*X*)		0.613			0.262		0.656		0.060			
Back of Queue (*Q*), ft/ln (95 th percentile)		380.4			137.2		321.9		24.3			
Back of Queue (*Q*), veh/ln (95 th percentile)		14.9			5.4		12.6		1.0			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00			0.00		0.00		0.29			
Uniform Delay (*d 1*), s/veh		10.8			7.7		39.7		33.5			
Incremental Delay (*d 2*), s/veh		2.5			0.6		2.8		0.0			
Initial Queue Delay (*d 3*), s/veh		0.0			0.0		0.0		0.0			
Control Delay (*d*), s/veh		13.3			8.2		42.5		33.5			
Level of Service (LOS)		B			A		D		C			
Approach Delay, s/veh / LOS	13.3	B		8.2	A		41.8	D		0.0		
Intersection Delay, s/veh / LOS	19.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.74	B	1.74	B
Bicycle LOS Score / LOS	1.61	B	0.98	A		F		

HCS Signalized Intersection Results Summary

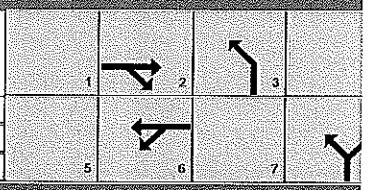
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.96
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_ns.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		356	226	13	338		250		18			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	45.0	25.0	0.0	0.0	0.0	0.0	
Yellow	3.0	3.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



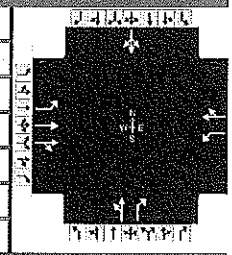
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		50.0		50.0		30.0		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (MAH), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						11.9		
Green Extension Time (g_e), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		606			366		260		19			
Adjusted Saturation Flow Rate (s), veh/h/ln		1651			1720		1758		1516			
Queue Service Time (g_s), s		19.7			0.0		9.4		0.7			
Cycle Queue Clearance Time (g_c), s		19.7			9.0		9.4		0.7			
Green Ratio (g/C)		0.57			0.57		0.32		0.32			
Capacity (c), veh/h		949			1036		571		493			
Volume-to-Capacity Ratio (X)		0.639			0.353		0.456		0.038			
Back of Queue (Q), ft/ln (95 th percentile)		285.6			146.2		164.6		10.5			
Back of Queue (Q), veh/ln (95 th percentile)		11.2			5.8		6.5		0.4			
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.12			
Uniform Delay (d_1), s/veh		11.4			9.1		21.4		18.5			
Incremental Delay (d_2), s/veh		3.3			0.9		0.2		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (d), s/veh		14.7			10.1		21.6		18.5			
Level of Service (LOS)		B			B		C		B			
Approach Delay, s/veh / LOS	14.7	B		10.1	B		21.4	C		0.0		
Intersection Delay, s/veh / LOS	14.8						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.72	B	1.72	B
Bicycle LOS Score / LOS	1.49	A	1.09	A		F		

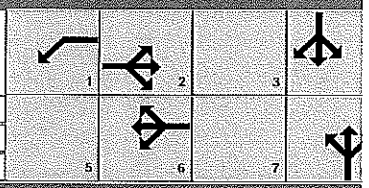
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.87
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Bristol Rd/Richlieu Rd	File Name	Bristol Rd_Richlieu Rd_na.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	222	31	296	327	10	12	0	187	10	0	10

Signal Information			
Cycle, s	105.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	14.4	41.7		3.4	16.5	0.0	0.0					
Yellow	4.0	4.0		4.0	3.0	0.0	0.0					
Red	3.0	3.0		4.0	4.0	0.0	0.0					

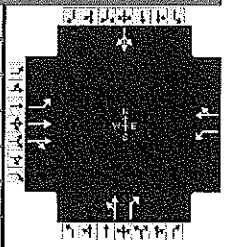
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		48.7	21.4	70.1		23.5		11.4
Change Period, (*Y*+*R c*), s		7.0	7.0	7.0		7.0		8.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.3		3.4
Queue Clearance Time (*g s*), s			13.9			19.9		7.0
Green Extension Time (*g e*), s		0.0	0.5	0.0		0.0		0.0
Phase Call Probability			1.00			0.99		0.49
Max Out Probability			0.00			1.00		1.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	11	147	144	340	387			14	157		23	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	988	1652	1581	1666	1726			1821	1647		1777	
Queue Service Time (*g s*), s	0.7	6.1	6.2	11.4	11.8			0.7	9.3		1.3	
Cycle Queue Clearance Time (*g c*), s	0.7	6.1	6.2	11.4	11.8			0.7	9.3		1.3	
Green Ratio (*g*/*C*)	0.41	0.41	0.41	0.58	0.61			0.17	0.17		0.04	
Capacity (*c*), veh/h	471	672	643	687	1054			302	274		75	
Volume-to-Capacity Ratio (*X*)	0.024	0.219	0.224	0.495	0.367			0.046	0.576		0.305	
Back of Queue (*Q*), ft/ln (95 th percentile)	8.2	115.3	107.5	181.1	200.7			13.2	174.9		27.9	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	4.4	4.3	7.1	7.8			0.5	6.8		1.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00			0.00	0.00		0.00	
Uniform Delay (*d 1*), s/veh	18.7	20.3	20.3	12.3	10.3			36.8	40.4		48.8	
Incremental Delay (*d 2*), s/veh	0.1	0.7	0.8	0.2	1.0			0.0	1.9		0.8	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	18.8	21.0	21.1	12.5	11.3			36.8	42.3		49.6	
Level of Service (LOS)	B	C	C	B	B			D	D		D	
Approach Delay, s/veh / LOS	21.0	C		11.8	B		41.8	D		49.6	D	
Intersection Delay, s/veh / LOS	19.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.99	B	1.66	B	2.15	B	2.13	B
Bicycle LOS Score / LOS	0.74	A	1.69	B	0.77	A	0.53	A

HCS Signalized Intersection Results Summary

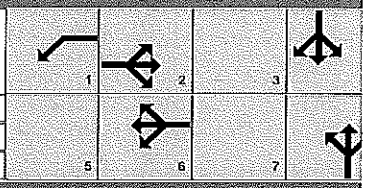
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.96
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Bristol Rd/Richlieu Rd	File Name	Bristol Rd_Richlieu Rd_np.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	10	371	31	233	274	10	25	0	429	10	0	10

Signal Information			
Cycle, s	105.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Green	10.6	44.5		2.3	18.7	0.0	0.0					
Yellow	4.0	4.0		4.0	3.0	0.0	0.0					
Red	3.0	3.0		4.0	4.0	0.0	0.0					



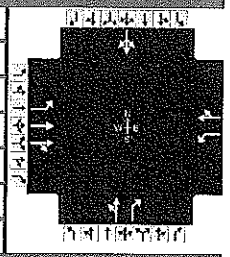
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.5	17.6	69.1		25.7		10.3
Change Period, ($Y+R_c$), s		7.0	7.0	7.0		7.0		8.0
Max Allow Headway (MAH), s		0.0	3.1	0.0		3.3		3.4
Queue Clearance Time (g_s), s			10.2			18.4		3.7
Green Extension Time (g_e), s		0.0	0.4	0.0		0.3		0.0
Phase Call Probability			1.00			1.00		0.46
Max Out Probability			0.00			0.46		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	10	211	207	243	296			26	265		21	
Adjusted Saturation Flow Rate (s), veh/h/ln	1101	1736	1688	1680	1766			1821	1685		1815	
Queue Service Time (g_s), s	0.6	8.3	8.3	7.7	8.4			1.2	15.9		1.2	
Cycle Queue Clearance Time (g_c), s	0.6	8.3	8.3	7.7	8.4			1.2	15.9		1.2	
Green Ratio (g/C)	0.43	0.43	0.43	0.57	0.60			0.19	0.19		0.03	
Capacity (c), veh/h	545	752	731	595	1061			341	316		57	
Volume-to-Capacity Ratio (X)	0.019	0.281	0.284	0.408	0.279			0.076	0.838		0.368	
Back of Queue (Q), ft/ln (95 th percentile)	6.8	155.6	151.7	123.3	145.1			24.4	295.8		25.3	
Back of Queue (Q), veh/ln (95 th percentile)	0.3	6.2	6.1	4.9	5.8			1.0	11.8		1.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	17.0	19.2	19.2	12.2	10.1			35.2	41.1		49.8	
Incremental Delay (d_2), s/veh	0.1	0.9	1.0	0.2	0.7			0.0	11.3		1.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (d), s/veh	17.1	20.1	20.2	12.4	10.7			35.2	52.4		51.3	
Level of Service (LOS)	B	C	C	B	B			D	D		D	
Approach Delay, s/veh / LOS	20.1	C		11.5	B		50.9	D		51.3	D	
Intersection Delay, s/veh / LOS	24.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.16	B	1.66	B	2.15	B	2.13	B
Bicycle LOS Score / LOS	0.84	A	1.38	A	0.97	A	0.52	A

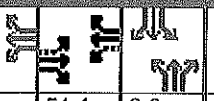
HCS Signalized Intersection Results Summary

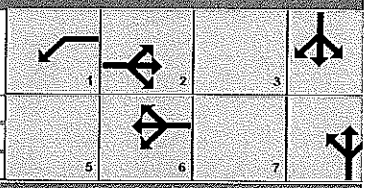
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.97
Urban Street		Analysis Year	2025 No-Build	Analysis Period	1> 7:00
Intersection	Bristol Rd/Richlieu Rd	File Name	Bristol Rd_Richlieu Rd_ns.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	10	307	33	237	368	10	13	0	288	10	0	10

Signal Information			
Cycle, s	105.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On





Green	9.6	51.1	2.3	13.0	0.0	0.0
Yellow	4.0	4.0	4.0	3.0	0.0	0.0
Red	3.0	3.0	4.0	4.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		58.1	16.6	74.7		20.0		10.3
Change Period, ($Y+R_c$), s		7.0	7.0	7.0		7.0		8.0
Max Allow Headway (MAH), s		0.0	3.1	0.0		3.3		3.4
Queue Clearance Time (g_s), s			9.2			12.9		3.7
Green Extension Time (g_e), s		0.0	0.4	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		0.45
Max Out Probability			0.00			0.24		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	10	177	173	244	390			13	173		21	
Adjusted Saturation Flow Rate (s), veh/h/ln	1010	1750	1690	1693	1769			1821	1685		1815	
Queue Service Time (g_s), s	0.5	6.0	6.1	6.7	10.2			0.7	10.4		1.2	
Cycle Queue Clearance Time (g_c), s	0.6	6.0	6.1	6.7	10.2			0.7	10.4		1.2	
Green Ratio (g/C)	0.50	0.50	0.50	0.62	0.65			0.13	0.13		0.03	
Capacity (c), veh/h	569	868	838	693	1158			243	225		56	
Volume-to-Capacity Ratio (X)	0.018	0.204	0.207	0.353	0.337			0.055	0.770		0.366	
Back of Queue (Q), ft/ln (95 th percentile)	5.9	108.7	106.7	102.7	167.7			13.4	202.3		25.1	
Back of Queue (Q), veh/ln (95 th percentile)	0.2	4.3	4.3	4.1	6.7			0.5	8.1		1.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	13.5	14.8	14.9	9.3	8.0			39.7	43.9		49.9	
Incremental Delay (d_2), s/veh	0.1	0.5	0.6	0.1	0.8			0.0	5.6		1.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (d), s/veh	13.5	15.4	15.4	9.4	8.8			39.7	49.5		51.3	
Level of Service (LOS)	B	B	B	A	A			D	D		D	
Approach Delay, s/veh / LOS	15.3	B		9.0	A		48.8	D		51.3	D	
Intersection Delay, s/veh / LOS	17.8						B					

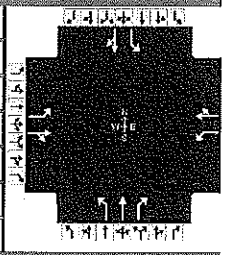
Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.07	B	1.65	B	2.15	B	2.14	B
Bicycle LOS Score / LOS	0.79	A	1.53	B	0.80	A	0.52	A

APPENDIX G

Build Capacity/LOS Analysis Worksheets

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.87
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_ba.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	15	80	154	122	208	7	201	153	42	2	215	48

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	40.0	31.0	0.0	0.0	0.0	1	2	3	4	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0								
Red	3.0	3.0	3.0	0.0	0.0	0.0								

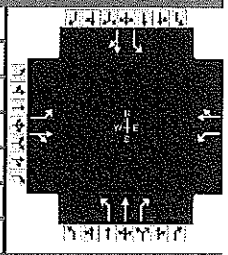
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		38.0		38.0	17.0	64.0		47.0
Change Period, (*Y+R c*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*g s*), s		15.2		25.5	9.9			
Green Extension Time (*g e*), s		2.2		1.3	0.0	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		0.03		0.69	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	17	234		140	247		231	176	43	2	297	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	998	1643		1146	1784		1723	1795	1497	1228	1715	
Queue Service Time (*g s*), s	1.4	11.7		11.4	11.3		7.4	4.8	1.3	0.1	12.8	
Cycle Queue Clearance Time (*g c*), s	12.7	11.7		23.0	11.3		7.4	4.8	1.3	0.1	12.8	
Green Ratio (*g/C*)	0.31	0.31		0.31	0.31		0.53	0.57	0.57	0.40	0.40	
Capacity (*c*), veh/h	274	515		299	560		562	1020	851	564	689	
Volume-to-Capacity Ratio (*X*)	0.063	0.455		0.469	0.442		0.411	0.172	0.050	0.004	0.430	
Back of Queue (*Q*), ft/ln (95 th percentile)	17.6	204		145.7	211.5		122.9	84.3	19.4	1.5	228.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.6	8.0		5.7	8.3		4.8	3.3	0.7	0.1	9.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.10	0.00		0.65	0.00		0.59	0.00	0.09	0.02	0.00	
Uniform Delay (*d 1*), s/veh	32.9	28.0		37.2	27.9		14.2	10.7	9.8	18.3	22.1	
Incremental Delay (*d 2*), s/veh	0.1	0.6		1.1	0.5		0.5	0.4	0.1	0.0	2.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	33.0	28.6		38.4	28.4		14.7	11.1	9.9	18.3	24.0	
Level of Service (LOS)	C	C		D	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	28.9	C		32.0	C		12.8	B		24.0	C	
Intersection Delay, s/veh / LOS	23.5						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.12	B	1.93	B	1.89	B	1.96	B
Bicycle LOS Score / LOS	0.90	A	1.13	A	1.23	A	0.98	A

HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.95
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_bp.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h	67	306	235	67	161	6	202	299	113	1	199	31

Signal Information			
Cycle, s	117.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	13.0	50.0	33.0	0.0	0.0	0.0	1	2	3	4		
Yellow	4.0	4.0	4.0	0.0	0.0	0.0	5	6	7	8		
Red	3.0	3.0	3.0	0.0	0.0	0.0						

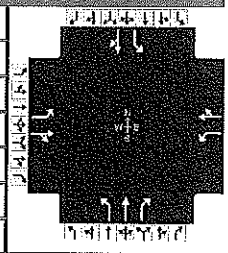
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		40.0		40.0	20.0	77.0		57.0
Change Period, ($Y+R_c$), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (MAH), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (g_s), s		36.5		36.5	9.5			
Green Extension Time (g_e), s		0.0		0.0	0.2	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		1.00		1.00	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (v), veh/h	71	517		71	176		213	315	93	1	237	
Adjusted Saturation Flow Rate (s), veh/h/ln	1199	1734		898	1811		1723	1823	1557	1082	1717	
Queue Service Time (g_s), s	5.7	34.0		0.0	8.9		7.0	9.6	2.9	0.1	10.6	
Cycle Queue Clearance Time (g_c), s	14.7	34.0		34.0	8.9		7.0	9.6	2.9	0.1	10.6	
Green Ratio (g/C)	0.29	0.29		0.29	0.29		0.58	0.61	0.61	0.44	0.44	
Capacity (c), veh/h	319	504		62	526		671	1106	945	533	748	
Volume-to-Capacity Ratio (X)	0.221	1.026		1.146	0.334		0.317	0.284	0.098	0.002	0.317	
Back of Queue (Q), ft/ln (95 th percentile)	78.1	716.3		203.8	176.3		117.1	171.2	44.2	0.8	198.7	
Back of Queue (Q), veh/ln (95 th percentile)	3.0	28.4		8.2	7.0		4.6	6.8	1.8	0.0	7.8	
Queue Storage Ratio (RQ) (95 th percentile)	0.42	0.00		0.91	0.00		0.56	0.00	0.21	0.01	0.00	
Uniform Delay (d_1), s/veh	38.4	41.5		58.5	32.6		12.8	11.1	9.6	18.6	21.6	
Incremental Delay (d_2), s/veh	0.3	46.8		160.0	0.4		0.3	0.6	0.2	0.0	1.1	
Initial Queue Delay (d_3), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (d), s/veh	38.7	88.3		218.5	33.0		13.1	11.8	9.8	18.6	22.7	
Level of Service (LOS)	D	F		F	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	82.3	F		86.1	F		11.9	B		22.7	C	
Intersection Delay, s/veh / LOS	48.7						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.16	B	1.94	B	1.89	B	1.99	B
Bicycle LOS Score / LOS	1.46	A	0.89	A	1.51	B	0.88	A

HCS Signalized Intersection Results Summary

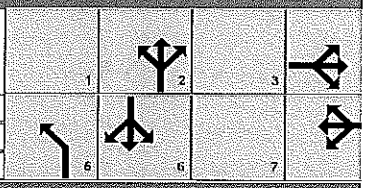
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.96
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Richlieu Rd	File Name	Galloway Rd_Richlieu Rd_bs.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	32	150	121	81	108	5	144	167	67	2	161	25

Signal Information			
Cycle, s	102.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.0	40.0	31.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	3.0	3.0	3.0	0.0	0.0	0.0						



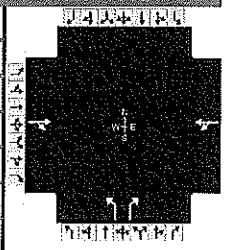
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		4		8	5	2		6
Case Number		6.0		6.0	1.0	3.0		6.3
Phase Duration, s		38.0		38.0	17.0	64.0		47.0
Change Period, (*Y+R c*), s		7.0		7.0	7.0	7.0		7.0
Max Allow Headway (*MAH*), s		4.2		4.2	4.1	0.0		0.0
Queue Clearance Time (*g s*), s		14.6		21.1	7.0			
Green Extension Time (*g e*), s		1.7		1.4	0.1	0.0		0.0
Phase Call Probability		1.00		1.00	1.00			
Max Out Probability		0.01		0.11	1.00			

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	7	4	14	3	8	18	5	2	12	1	6	16
Adjusted Flow Rate (*v*), veh/h	33	256		84	118		150	174	54	2	189	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1183	1744		1141	1823		1736	1823	1557	1230	1718	
Queue Service Time (*g s*), s	2.2	12.1		6.6	4.8		4.5	4.6	1.6	0.1	7.5	
Cycle Queue Clearance Time (*g c*), s	7.0	12.1		18.6	4.8		4.5	4.6	1.6	0.1	7.5	
Green Ratio (*g/C*)	0.31	0.31		0.31	0.31		0.53	0.57	0.57	0.40	0.40	
Capacity (*c*), veh/h	386	547		294	572		661	1037	885	565	691	
Volume-to-Capacity Ratio (*X*)	0.086	0.468		0.287	0.206		0.227	0.168	0.061	0.004	0.273	
Back of Queue (*Q*), ft/ln (95 th percentile)	29.8	214		81.7	92.5		74.4	81.7	23.9	1.4	141.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	1.1	8.6		3.3	3.7		3.0	3.2	1.0	0.1	5.5	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.16	0.00		0.36	0.00		0.35	0.00	0.11	0.02	0.00	
Uniform Delay (*d 1*), s/veh	28.2	28.2		35.6	25.7		12.7	10.7	9.8	18.3	20.5	
Incremental Delay (*d 2*), s/veh	0.1	0.6		0.5	0.2		0.2	0.3	0.1	0.0	1.0	
Initial Queue Delay (*d 3*), s/veh	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Control Delay (*d*), s/veh	28.3	28.8		36.2	25.9		12.8	11.1	10.0	18.3	21.5	
Level of Service (LOS)	C	C		D	C		B	B	A	B	C	
Approach Delay, s/veh / LOS	28.7	C		30.2	C		11.6	B		21.4	C	
Intersection Delay, s/veh / LOS	21.6						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.14	B	1.93	B	1.89	B	1.95	B
Bicycle LOS Score / LOS	0.97	A	0.82	A	1.11	A	0.80	A

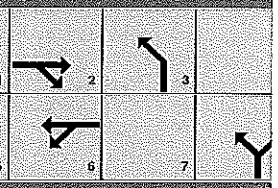
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.97
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_ba.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		184	256	9	304		183		16			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EB			WB			NB			SB		
Green	45.0	25.0		0.0	0.0		0.0	0.0				
Yellow	3.0	3.0		0.0	0.0		0.0	0.0				
Red	2.0	2.0		0.0	0.0		0.0	0.0				

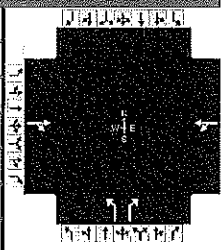
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		50.0		50.0		30.0		
Change Period, (*Y+R c*), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		0.0		0.0		3.1		
Queue Clearance Time (*g s*), s						9.9		
Green Extension Time (*g e*), s		0.0		0.0		0.3		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		454			323		189		16			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1535			1707		1569		1420			
Queue Service Time (*g s*), s		14.3			0.0		7.4		0.6			
Cycle Queue Clearance Time (*g c*), s		14.3			7.8		7.4		0.6			
Green Ratio (*g/C*)		0.57			0.57		0.32		0.32			
Capacity (*c*), veh/h		883			1028		510		461			
Volume-to-Capacity Ratio (*X*)		0.514			0.314		0.370		0.036			
Back of Queue (*Q*), ft/ln (95 th percentile)		214.1			127.2		128.1		9.8			
Back of Queue (*Q*), veh/ln (95 th percentile)		8.1			4.9		4.5		0.4			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00			0.00		0.00		0.11			
Uniform Delay (*d 1*), s/veh		10.3			8.9		20.7		18.4			
Incremental Delay (*d 2*), s/veh		2.1			0.8		0.2		0.0			
Initial Queue Delay (*d 3*), s/veh		0.0			0.0		0.0		0.0			
Control Delay (*d*), s/veh		12.4			9.7		20.9		18.5			
Level of Service (LOS)		B			A		C		B			
Approach Delay, s/veh / LOS	12.4	B		9.7	A		20.7	C		0.0		
Intersection Delay, s/veh / LOS	13.2						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.72	B	1.72	B
Bicycle LOS Score / LOS	1.24	A	1.02	A		F		

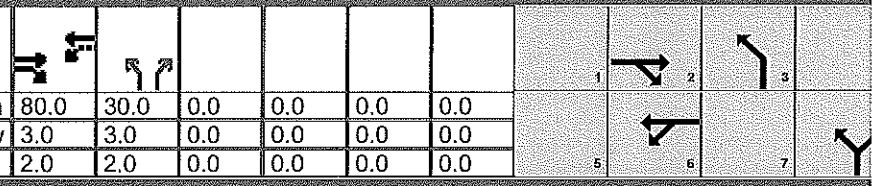
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.93
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_bp.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		404	234	17	262		279		31			

Signal Information			
Cycle, s	120.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	80.0	30.0	0.0	0.0	0.0	0.0						
Yellow	3.0	3.0	0.0	0.0	0.0	0.0						
Red	2.0	2.0	0.0	0.0	0.0	0.0						

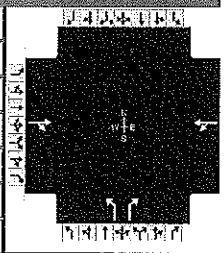
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		85.0		85.0		35.0		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (MAH), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						21.0		
Green Extension Time (g_e), s		0.0		0.0		0.5		
Phase Call Probability						1.00		
Max Out Probability						0.01		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		686			300		300		33			
Adjusted Saturation Flow Rate (s), veh/h/ln		1644			1650		1745		1589			
Queue Service Time (g_s), s		27.9			0.0		18.5		1.9			
Cycle Queue Clearance Time (g_c), s		27.9			8.2		18.5		1.9			
Green Ratio (g/C)		0.68			0.68		0.26		0.26			
Capacity (c), veh/h		1110			1146		451		410			
Volume-to-Capacity Ratio (X)		0.618			0.262		0.666		0.081			
Back of Queue (Q), ft/ln (95 th percentile)		385.1			137.2		327.4		32.9			
Back of Queue (Q), veh/ln (95 th percentile)		15.0			5.4		12.8		1.3			
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.39			
Uniform Delay (d_1), s/veh		10.9			7.7		39.9		33.7			
Incremental Delay (d_2), s/veh		2.6			0.6		3.0		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (d), s/veh		13.5			8.2		42.9		33.7			
Level of Service (LOS)		B			A		D		C			
Approach Delay, s/veh / LOS	13.5	B		8.2	A		41.9	D		0.0		
Intersection Delay, s/veh / LOS	19.5						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.74	B	1.74	B
Bicycle LOS Score / LOS	1.62	B	0.98	A		F		

HCS Signalized Intersection Results Summary

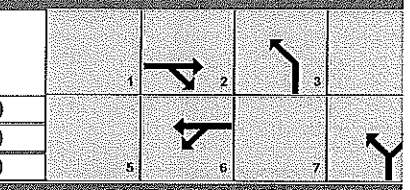
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Nov 10, 2023	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.96
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Galloway Rd/Bristol Rd	File Name	Galloway Rd_Bristol Rd_bs.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (v), veh/h		356	230	13	338		254		24			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	45.0	25.0	0.0	0.0	0.0	0.0	
Yellow	3.0	3.0	0.0	0.0	0.0	0.0	
Red	2.0	2.0	0.0	0.0	0.0	0.0	



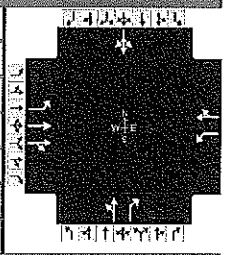
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		8.0		9.0		
Phase Duration, s		50.0		50.0		30.0		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (MAH), s		0.0		0.0		3.1		
Queue Clearance Time (g_s), s						12.1		
Green Extension Time (g_e), s		0.0		0.0		0.4		
Phase Call Probability						1.00		
Max Out Probability						0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (v), veh/h		610			366		265		25			
Adjusted Saturation Flow Rate (s), veh/h/ln		1650			1720		1758		1516			
Queue Service Time (g_s), s		20.0			0.0		9.6		0.9			
Cycle Queue Clearance Time (g_c), s		20.0			9.0		9.6		0.9			
Green Ratio (g/C)		0.57			0.57		0.32		0.32			
Capacity (c), veh/h		949			1036		571		493			
Volume-to-Capacity Ratio (X)		0.643			0.353		0.463		0.051			
Back of Queue (Q), ft/ln (95 th percentile)		288.2			146.2		167.2		14.1			
Back of Queue (Q), veh/ln (95 th percentile)		11.3			5.8		6.6		0.5			
Queue Storage Ratio (RQ) (95 th percentile)		0.00			0.00		0.00		0.17			
Uniform Delay (d_1), s/veh		11.5			9.1		21.5		18.5			
Incremental Delay (d_2), s/veh		3.4			0.9		0.2		0.0			
Initial Queue Delay (d_3), s/veh		0.0			0.0		0.0		0.0			
Control Delay (d), s/veh		14.8			10.1		21.7		18.5			
Level of Service (LOS)		B			B		C		B			
Approach Delay, s/veh / LOS	14.8	B		10.1	B		21.4	C		0.0		
Intersection Delay, s/veh / LOS	15.0						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.65	B	0.68	A	1.72	B	1.72	B
Bicycle LOS Score / LOS	1.49	A	1.09	A		F		

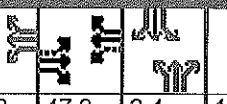
HCS Signalized Intersection Results Summary

General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	AM Peak Hour	PHF	0.87
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Bristol Rd/Richlieu Rd	File Name	Bristol Rd_Richlieu Rd_ba.xus		
Project Description	22-062 Proposed Retail Center				

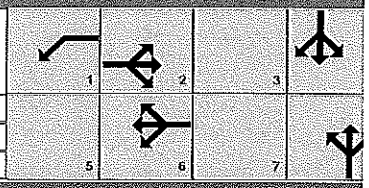


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	224	31	300	327	10	12	0	187	10	0	10

Signal Information			
Cycle, s	105.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Green	13.3	47.9	2.4	12.3	0.0	0.0		
Yellow	4.0	4.0	4.0	3.0	0.0	0.0		
Red	3.0	3.0	4.0	4.0	0.0	0.0		



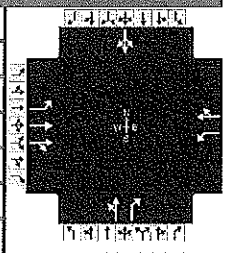
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		54.9	20.3	75.3		19.3		10.4
Change Period, ($Y+R_c$), s		7.0	7.0	7.0		7.0		8.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.3		3.4
Queue Clearance Time (g_s), s			12.7			12.2		3.8
Green Extension Time (g_e), s		0.0	0.6	0.0		0.2		0.0
Phase Call Probability			1.00			0.99		0.49
Max Out Probability			0.00			0.13		0.01

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	11	148	145	345	387			14	157		23	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	988	1652	1582	1666	1726			1821	1647		1777	
Queue Service Time (g_s), s	0.7	5.5	5.7	10.2	10.3			0.7	9.7		1.3	
Cycle Queue Clearance Time (g_c), s	0.7	5.5	5.7	10.2	10.3			0.7	9.7		1.3	
Green Ratio (*g/C*)	0.47	0.47	0.47	0.63	0.66			0.13	0.13		0.03	
Capacity (*c*), veh/h	529	770	737	738	1139			230	208		58	
Volume-to-Capacity Ratio (*X*)	0.022	0.193	0.197	0.467	0.340			0.060	0.757		0.395	
Back of Queue (*Q*), ft/ln (95 th percentile)	7.2	102.1	95	155.3	169			14	188.4		28.6	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.3	3.9	3.8	6.1	6.6			0.6	7.4		1.1	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	15.1	16.4	16.5	9.7	7.8			40.4	44.3		49.8	
Incremental Delay (d_2), s/veh	0.1	0.6	0.6	0.2	0.8			0.0	4.0		1.6	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	15.2	17.0	17.1	9.9	8.6			40.4	48.3		51.4	
Level of Service (LOS)	B	B	B	A	A			D	D		D	
Approach Delay, s/veh / LOS	17.0		B	9.2		A	47.7		D	51.4		D
Intersection Delay, s/veh / LOS	17.3						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	1.98	B	1.65	B	2.15	B	2.14	B
Bicycle LOS Score / LOS	0.74	A	1.70	B	0.77	A	0.53	A

HCS Signalized Intersection Results Summary

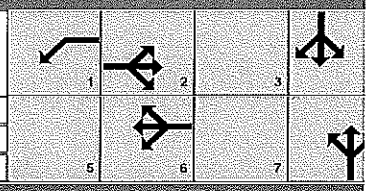
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	PM Peak Hour	PHF	0.96
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Bristol Rd/Richlieu Rd	File Name	Bristol Rd_Richlieu Rd_bp.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	379	31	238	274	10	25	0	426	10	0	10

Signal Information			
Cycle, s	105.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	10.8	44.5	2.3	18.5	0.0	0.0
Yellow	4.0	4.0	4.0	3.0	0.0	0.0
Red	3.0	3.0	4.0	4.0	0.0	0.0



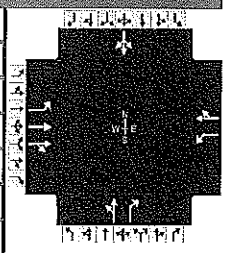
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		51.5	17.8	69.2		25.5		10.3
Change Period, ($Y+R_c$), s		7.0	7.0	7.0		7.0		8.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.3		3.4
Queue Clearance Time (g_s), s			10.3			18.2		3.7
Green Extension Time (g_e), s		0.0	0.4	0.0		0.3		0.0
Phase Call Probability			1.00			1.00		0.46
Max Out Probability			0.00			0.39		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	216	212	248	296			26	261		21	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1101	1736	1689	1680	1766			1821	1685		1815	
Queue Service Time (g_s), s	0.6	8.4	8.5	7.8	8.4			1.2	15.7		1.2	
Cycle Queue Clearance Time (g_c), s	0.6	8.4	8.5	7.8	8.4			1.2	15.7		1.2	
Green Ratio (*g/C*)	0.43	0.43	0.43	0.57	0.60			0.19	0.19		0.03	
Capacity (*c*), veh/h	545	752	732	593	1064			338	313		57	
Volume-to-Capacity Ratio (*X*)	0.019	0.287	0.289	0.418	0.278			0.077	0.836		0.368	
Back of Queue (Q), ft/ln (95 th percentile)	6.8	159	155.4	125.6	144.4			24.4	292.1		25.3	
Back of Queue (Q), veh/ln (95 th percentile)	0.3	6.3	6.2	5.0	5.8			1.0	11.7		1.0	
Queue Storage Ratio (RQ) (95 th percentile)	0.00	0.00	0.00	0.00	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	17.0	19.3	19.3	12.2	10.0			35.3	41.2		49.8	
Incremental Delay (d_2), s/veh	0.1	1.0	1.0	0.2	0.7			0.0	10.9		1.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	17.1	20.2	20.3	12.4	10.6			35.4	52.1		51.3	
Level of Service (LOS)	B	C	C	B	B			D	D		D	
Approach Delay, s/veh / LOS	20.2	C		11.4	B		50.6	D		51.3	D	
Intersection Delay, s/veh / LOS	23.8						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.16	B	1.66	B	2.15	B	2.13	B
Bicycle LOS Score / LOS	0.85	A	1.38	A	0.96	A	0.52	A

HCS Signalized Intersection Results Summary

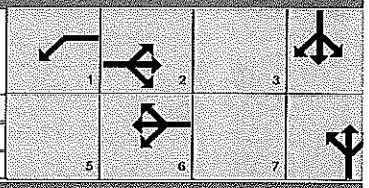
General Information				Intersection Information	
Agency	Horner & Canter Assoc			Duration, h	0.250
Analyst	DHH	Analysis Date	Mar 29, 2024	Area Type	Other
Jurisdiction	Bensalem Twp	Time Period	SAT Peak Hour	PHF	0.97
Urban Street		Analysis Year	2025 Build	Analysis Period	1> 7:00
Intersection	Bristol Rd/Richlieu Rd	File Name	Bristol Rd_Richlieu Rd_bs.xus		
Project Description	22-062 Proposed Retail Center				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	10	313	33	242	368	10	13	0	286	10	0	10

Signal Information			
Cycle, s	105.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	No	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

	EB			WB			NB			SB		
Green	9.8	51.1		2.3	12.9	0.0	0.0					
Yellow	4.0	4.0		4.0	3.0	0.0	0.0					
Red	3.0	3.0		4.0	4.0	0.0	0.0					



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		4
Case Number		6.3	1.0	4.0		11.0		12.0
Phase Duration, s		58.1	16.8	74.8		19.9		10.3
Change Period, ($Y+R_c$), s		7.0	7.0	7.0		7.0		8.0
Max Allow Headway (*MAH*), s		0.0	3.1	0.0		3.3		3.4
Queue Clearance Time (g_s), s			9.4			12.8		3.7
Green Extension Time (g_e), s		0.0	0.4	0.0		0.2		0.0
Phase Call Probability			1.00			1.00		0.45
Max Out Probability			0.00			0.21		0.00

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (*v*), veh/h	10	180	177	249	390			13	171		21	
Adjusted Saturation Flow Rate (*s*), veh/h/ln	1010	1750	1691	1693	1769			1821	1685		1815	
Queue Service Time (g_s), s	0.5	6.1	6.2	6.9	10.2			0.7	10.3		1.2	
Cycle Queue Clearance Time (g_c), s	0.6	6.1	6.2	6.9	10.2			0.7	10.3		1.2	
Green Ratio (*g/C*)	0.50	0.50	0.50	0.62	0.66			0.13	0.13		0.03	
Capacity (*c*), veh/h	569	868	838	692	1160			241	223		56	
Volume-to-Capacity Ratio (*X*)	0.018	0.208	0.211	0.361	0.336			0.056	0.767		0.366	
Back of Queue (*Q*), ft/ln (95 th percentile)	5.9	110.6	108.8	104.9	167.2			13.5	199.8		25.1	
Back of Queue (*Q*), veh/ln (95 th percentile)	0.2	4.4	4.4	4.2	6.7			0.5	8.0		1.0	
Queue Storage Ratio (*RQ*) (95 th percentile)	0.00	0.00	0.00	0.00	0.00			0.00	0.00		0.00	
Uniform Delay (d_1), s/veh	13.5	14.9	14.9	9.3	8.0			39.8	44.0		49.9	
Incremental Delay (d_2), s/veh	0.1	0.5	0.6	0.1	0.8			0.0	5.3		1.5	
Initial Queue Delay (d_3), s/veh	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Control Delay (*d*), s/veh	13.5	15.4	15.5	9.4	8.8			39.9	49.2		51.3	
Level of Service (LOS)	B	B	B	A	A			D	D		D	
Approach Delay, s/veh / LOS	15.4	B		9.0	A		48.6	D		51.3	D	
Intersection Delay, s/veh / LOS	17.7						B					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.07	B	1.65	B	2.15	B	2.14	B
Bicycle LOS Score / LOS	0.79	A	1.54	B	0.79	A	0.52	A

HCS Two-Way Stop-Control Report

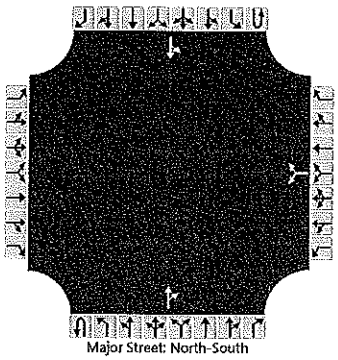
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2025
Time Analyzed	AM Peak Hour - Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Galloway Rd/Site Access
Jurisdiction	Bensalem Twp
East/West Street	Site Access
North/South Street	Galloway Road
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						2		4			169	6		3	263	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.3		
Critical Headway (sec)						6.43		6.23						4.33		
Base Follow-Up Headway (sec)						3.0		3.1						3.0		
Follow-Up Headway (sec)						3.03		3.13						3.03		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							8							4		
Capacity, c (veh/h)							730							1001		
v/c Ratio							0.01							0.00		
95% Queue Length, Q_{95} (veh)							0.0							0.0		
Control Delay (s/veh)							10.0							8.6	0.0	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)					10.0								0.1			
Approach LOS					A								A			

HCS Two-Way Stop-Control Report

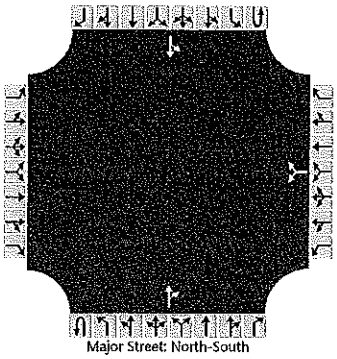
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2025
Time Analyzed	PM Peak Hour - Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Galloway Rd/Site Access
Jurisdiction	Bensalem Twp
East/West Street	Site Access
North/South Street	Galloway Road
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						6		15			358	14		7	225	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.3		
Critical Headway (sec)						6.43		6.23						4.33		
Base Follow-Up Headway (sec)						3.0		3.1						3.0		
Follow-Up Headway (sec)						3.03		3.13						3.03		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							26							9		
Capacity, c (veh/h)							549							821		
v/c Ratio							0.05							0.01		
95% Queue Length, Q_{95} (veh)							0.2							0.0		
Control Delay (s/veh)							11.9							9.4	0.1	
Level of Service (LOS)							B							A	A	
Approach Delay (s/veh)					11.9								0.4			
Approach LOS					B								A			

HCS Two-Way Stop-Control Report

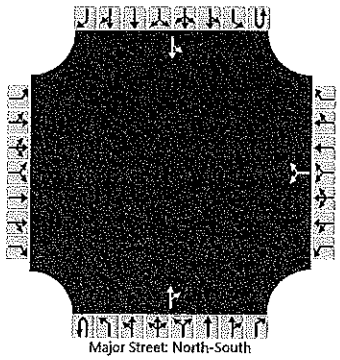
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2025
Time Analyzed	SAT Peak Hour - Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Galloway Rd/Site Access
Jurisdiction	Bensalem Twp
East/West Street	Site Access
North/South Street	Galloway Road
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		0	1	0	0	0	1	0	0	0	1	0
Configuration							LR					TR		LT		
Volume (veh/h)						4		11			195	9		5	184	
Percent Heavy Vehicles (%)						3		3						3		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.3		
Critical Headway (sec)						6.43		6.23						4.33		
Base Follow-Up Headway (sec)						3.0		3.1						3.0		
Follow-Up Headway (sec)						3.03		3.13						3.03		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)							19							6		
Capacity, c (veh/h)							753							972		
v/c Ratio							0.02							0.01		
95% Queue Length, Q_{95} (veh)							0.1							0.0		
Control Delay (s/veh)							9.9							8.7	0.1	
Level of Service (LOS)							A							A	A	
Approach Delay (s/veh)					9.9								0.3			
Approach LOS					A								A			

HCS Two-Way Stop-Control Report

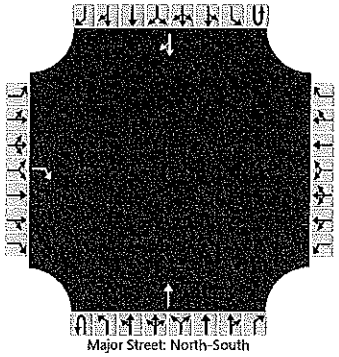
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2025
Time Analyzed	AM Peak Hour - Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Richlieu Rd/Site Access
Jurisdiction	Bensalem Twp
East/West Street	Site Access
North/South Street	Richlieu Road
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T					TR
Volume (veh/h)				2							124				335	4
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)				6.2												
Critical Headway (sec)				6.23												
Base Follow-Up Headway (sec)				3.1												
Follow-Up Headway (sec)				3.13												

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				3												
Capacity, c (veh/h)				663												
v/c Ratio				0.00												
95% Queue Length, Q_{95} (veh)				0.0												
Control Delay (s/veh)				10.4												
Level of Service (LOS)				B												
Approach Delay (s/veh)		10.4														
Approach LOS		B														

HCS Two-Way Stop-Control Report

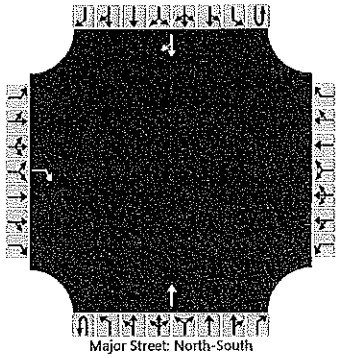
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2025
Time Analyzed	PM Peak Hour - Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Richlieu Rd/Site Access
Jurisdiction	Bensalem Twp
East/West Street	Site Access
North/South Street	Richlieu Road
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T					TR
Volume (veh/h)				6							420				228	7
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No														
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)				6.2												
Critical Headway (sec)				6.23												
Base Follow-Up Headway (sec)				3.1												
Follow-Up Headway (sec)				3.13												

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				8												
Capacity, c (veh/h)				789												
v/c Ratio				0.01												
95% Queue Length, Q_{95} (veh)				0.0												
Control Delay (s/veh)				9.6												
Level of Service (LOS)				A												
Approach Delay (s/veh)		9.6														
Approach LOS		A														

HCS Two-Way Stop-Control Report

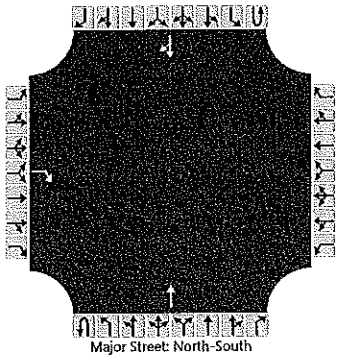
General Information

Analyst	DHH
Agency/Co.	Horner & Canter Assoc
Date Performed	3/29/2024
Analysis Year	2025
Time Analyzed	SAT Peak Hour - Build
Intersection Orientation	North-South
Project Description	

Site Information

Intersection	Richlieu Rd/Site Access
Jurisdiction	Bensalem Twp
East/West Street	Site Access
North/South Street	Richlieu Road
Peak Hour Factor	0.80
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T					TR
Volume (veh/h)				5							219				188	7
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No															
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)				6.2												
Critical Headway (sec)				6.23												
Base Follow-Up Headway (sec)				3.1												
Follow-Up Headway (sec)				3.13												

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				6												
Capacity, c (veh/h)				843												
v/c Ratio				0.01												
95% Queue Length, Q_{95} (veh)				0.0												
Control Delay (s/veh)				9.3												
Level of Service (LOS)				A												
Approach Delay (s/veh)	9.3															
Approach LOS	A															