

Operations and Maintenance Manual

Lion Trans Inc.

**4005 N County Road 1000 E
Brownsburg, Indiana 46112**

**Best Management Practices
For
Storm Water Quality**

February 4th, 2026

Owner:

**Malhi Kulwinder & Jigna Shah Jtsur
7631 E US Hwy 36
Avon, Indiana 46123**

Owner Information:

Name: Malhi Kulwinder & Jigna Shah Jtsur
Address: 7631 E US Hwy 36
Avon, Indiana 46123
Telephone: (317) 989-1580
Contact Person: Jigna Shah Jtsur
Contact Email: janh505969@gmail.com

BMP Site Drawings:

See Appendix

Responsible Party Required Periodic Inspections: See Appendix B for Tabular Inspection Schedule

It is the responsibility of the Responsible Party to inspect the installed infrastructure to determine if it is functioning as designed quarterly and after each major rainfall event.

Town Performed Periodic Inspections:

Town officials shall inspect the storm water improvement system installed annually. Inspections shall be based on the Town of Brownsburg Ordinances. The Responsible Party shall be responsible for the annual inspection fees and subsequent money spent in maintaining the best management practices as determined by the Town’s review official.

Required Perform Maintenance:

If determined by the Town’s inspection, the Responsible Party must complete any maintenance of the best management practices within the given specified timeframe. If maintenance activities are not completed, then the reserves the right to complete the maintenance activity and back charge the Responsible Party accordingly.

Routine Maintenance:

It is the responsibility of the Responsible Party to maintain the on-site and adjacent offsite drainage infrastructure. The routine maintenance includes mowing the grassy areas to a height between 4 to 6 inches. It is also the responsibility of the Responsible Party to keep all shrubbery and trees from growing in the right-of-way. The area must be kept clean of all litter and debris as well. Regarding soil within the yard area, if standing water is witnessed in excess for 48 hours after a storm event, the soil must be inspected for reasons of preventing absorption and/or decreasing permeability (i.e. compaction, debris, etc.) The soil needs to be tilled and/or inspected if immediate attention doesn’t rectify the situation. During tilling of the soil, mindfulness needs to be kept of the sub-surface drains to prevent damage (i.e. removal or crushing). The soil must maintain a minimum permeability value of $f_c > 0.50$ inches per hour. The sufficient proposed replacement soil such as Urban Land Fox Complex, 0 to 2% slope has sufficient permeability qualities to meet standards, if required. If re-seeding is required, stabilize existing soil and re-seed as necessary using erosion control methods such as straw mats until proper germination takes place. The hydrodynamic separator should be periodically inspected to determine the need for and frequency of maintenance, inspected as soon as construction is complete and then on an annual basis. When maintenance is required, remove all water, debris, oil and sediment using a vacuum truck. Then clean the manhole and fill with water to the invert of the outlet pipe. Volume Control Facilities and BMPs shall be inspected semi-annually and after major storm events exceeding one-half (1.5) inches.

Remedial Maintenance:

The responsibility of maintaining the installed infrastructure is the responsibility of the Responsibility Party. This includes replacing any damaged pipe, concrete structure, curb/gutters, etc. to maintain the function of the infrastructure as originally designed.

Sediment Removal:

Sediment removal from gutter of adjacent curbs.

Statement of Town’s Right of Access:

With the location of the access easement, Town officials have the right to enter the property and check the best management practices at their discretion.

Responsible Party for BMP Maintenance:

It is the sole responsibility of the Owner to maintain the best management practices after initial installation. This includes all costs and scheduling associated with the maintenance of BMP. The Owner is required to keep records of all inspection and maintenance activities and will self-certify that inspection and maintenance have been performed according to the Operations and Maintenance Manual, when requested by the city.

Responsible Party: _____

Printed Name of Responsible Party: _____

Date: _____

APPENDICES

**APPENDIX A
BMP DRAWINGS**

National Flood Hazard Layer FIRMette



Legend

SEE FIR REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE) Zone A, X, B, B1
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

- 0.2% Annual Chance Flood Hazard, Areas of 1% Annual Chance Flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levees, See Notes, Zone D
- Area with Flood Risk due to Levees Zone D

OTHER AREAS

- Area of Minimal Flood Hazard Zone X
- Effective LOMs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

Cross Sections with 1% Annual Chance

- Water Surface Elevation
- Coastal Transact
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transact Baseline
- Profile Baseline
- Hydrographic Feature

OTHER FEATURES

- Digital Data Available
- No Digital Data Available
- Unmapped

MAP PANELS

- The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/20/2022 at 4:21 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRMet panel number, and FIRMet effective date. Map images for unmapped and unmapped areas cannot be used for regulatory purposes.



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Ybva	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	1.8	53.2%
Yc1a	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	1.5	46.8%
Totals for Area of Interest		3.3	100.0%

FLOOD ZONE DESIGNATION:

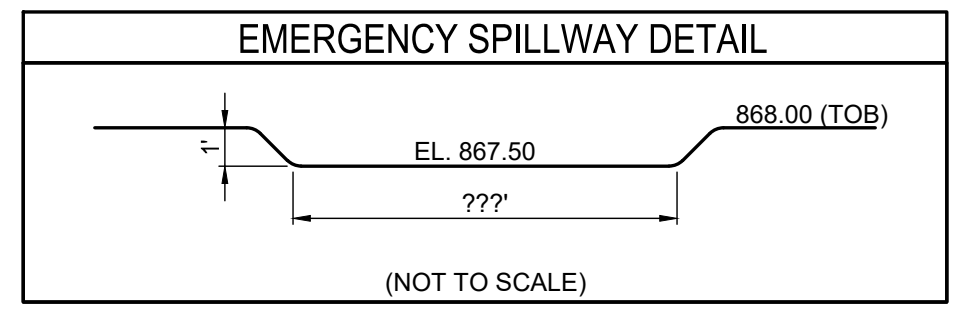
THIS LOT LIES ENTIRELY IN FLOOD HAZARD ZONE "X" AS SCALES FROM THE FLOOD INSURANCE RATE MAP (FIRM) FOR:

HENDRICKS COUNTY, INDIANA
 COMMUNITY NAME: TOWN OF BROWNSBURG
 COMMUNITY NUMBER: 180087
 PANEL NUMBER: C0179E
 DATED: JUNE 15, 2022

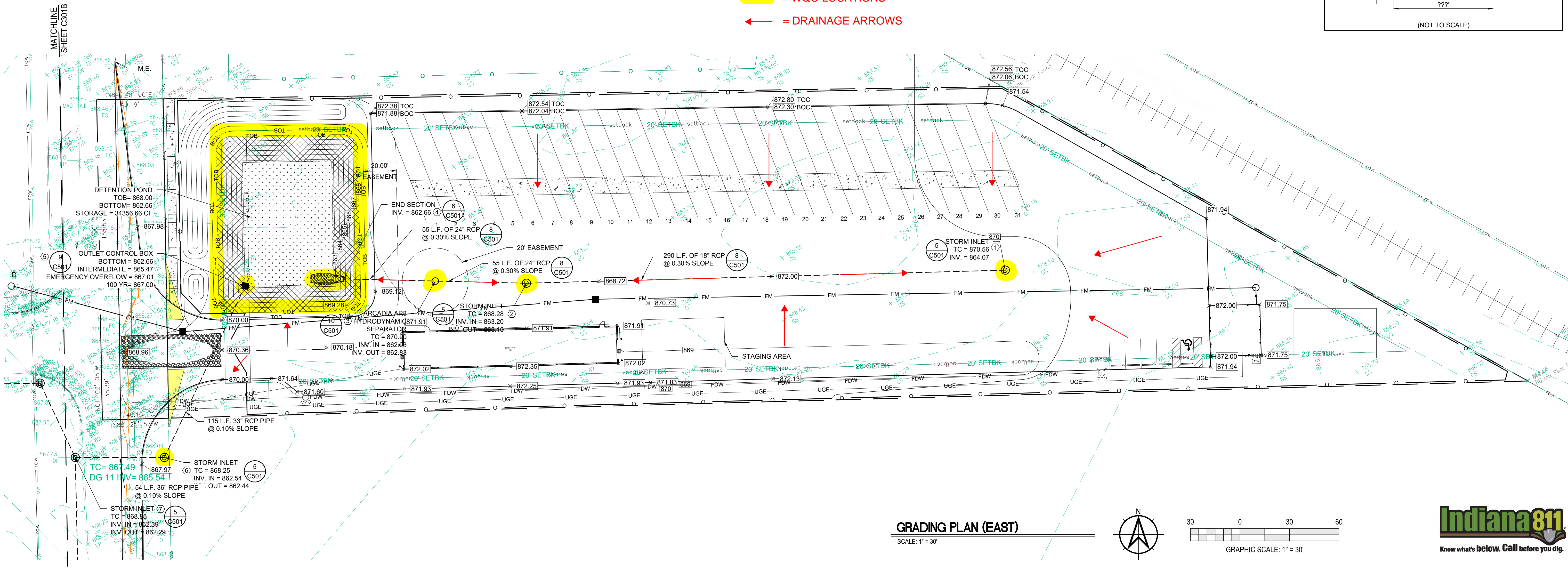
STAGE STORAGE TABLE

ELEV	AREA (sq. ft.)	DEPTH (ft)	AVG END INC. VOL. (cu. ft.)	AVG END TOTAL VOL. (cu. ft.)	CONIC INC. VOL. (cu. ft.)	CONIC TOTAL VOL. (cu. ft.)
862.660	4,044.91	N/A	N/A	0.00	N/A	0.00
863,000	4,312.07	0.340	1420.69	1420.69	1420.44	1420.44
864,000	5,146.08	1,000	4729.07	6149.76	4722.93	6143.37
865,000	6,051.22	1,000	5598.65	11748.41	5592.54	11735.92
866,000	7,016.36	1,000	6533.79	18282.20	6527.84	18263.76
867,000	8,038.03	1,000	7527.19	25809.39	7521.41	25785.17
868,000	9,116.26	1,000	8571.15	34386.54	8571.50	34356.66

- GRADING NOTES:**
- GENERAL GRADE NOTES:**
- REFER TO THE INDIANA DEPARTMENT OF TRANSPORTATION (INDOT) STANDARD SPECIFICATIONS, LATEST EDITION, FOR BASIC MATERIALS AND CONSTRUCTION METHODS. THE SECTION BELOW FOR VARIOUS ITEMS ARE TO CLARIFY THE INTENT OF THE REQUIREMENTS FOR THIS PROJECT. PLEASE NOTE THAT OTHER SECTIONS OF THE INDOT STANDARD SPECIFICATIONS MAY ALSO BE APPLICABLE.
 - FILL MATERIAL SHALL CONSIST OF EARTH OBTAINED FROM CUT AREAS, BORROW PITS OR OTHER APPROVED SOURCES. EARTH SHALL BE FREE FROM ORGANIC MATTER AND OTHER DELETERIOUS SUBSTANCES AND LARGE ROCKS. THE FILL MATERIAL SHALL BE PLACED IN LAYERS NOT TO EXCEED SIX INCHES FOLLOWING COMPACTION. PROPER MOISTURE CONTENT OF FILL MATERIAL WILL BE SUCH TO ACHIEVE SPECIFIED COMPACTION DENSITY. ALL FILL BENEATH PAVED AREAS, FLOOR SLABS AND FUTURE BUILDINGS SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY PER ASTM D-1557. FIELD COMPACTION TEST SHALL BE RUN ON EACH LIFT. IN FILL SECTIONS, AND THE REQUIRED COMPACTION ON EACH LIFT SHALL BE IN ACCORDANCE WITH INDOT SECTION 211.
 - MAXIMUM LAWN SLOPE IS 3:1.
 - THE CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES TO LOCATE MAINS, CONDUITS, SERVICE LINES, ETC. IN THE AFFECTED CONSTRUCTION AREA EXISTING UTILITY STRUCTURES ARE SHOWN HERE IN ACCORDANCE WITH AVAILABLE INFORMATION. THE LOCATION AND PROTECTION OF UTILITY STRUCTURES, THEIR SUPPORT AND MAINTENANCE DURING CONSTRUCTION IN COOPERATION WITH APPLICABLE UTILITY COMPANY IS THE EXPRESSED RESPONSIBILITY OF THE CONTRACTOR.
 - ALL SPOT ELEVATIONS ARE TO FINISHED GRADE.
 - ALL EXISTING MANHOLE CASTINGS TO BE ADJUSTED TO FINISH GRADE.
 - COMPACT "B" BORROW BACK FILL REQ'D. OVER ALL UTILITIES IN PAVED AREAS.
 - DISTURBED AREAS TO BE GRADED TO FINAL GRADE AND RECEIVE A MIN OF 4" TOPSOIL.
 - STABILIZATION MUST BE INITIATED BY END OF THE 7TH DAY THE AREA IS LEFT IDLE AND STABILIZATION SHALL BE COMPLETED WITHIN 14 DAYS AFTER INITIATION.
 - FINAL STABILIZATION IS ACHIEVED WHEN ALL LAND DISTURBING ACTIVITIES HAVE BEEN COMPLETED AND A UNIFORM PERENNIAL VEGETATIVE COVER WITH DENSITY OF 70% ON ALL UNPAVED SURFACES.
 - WATER SHOULD BE PUMPED THROUGH BMP AND INTO THE DETENTION POND.
- REINFORCED CONCRETE PIPE:**
- REINFORCED CONCRETE PIPE SHALL BE CLASS III, IV OR V AS SPECIFIED IN ASTM C-76.
 - REINFORCED ELLIPTICAL CONCRETE PIPE SHALL BE CLASS HE-III OR HE-IV AS SPECIFIED IN ASTM C-507.
 - LIFT HOLES ARE NOT ALLOWED FOR PIPE LESS THAN 24 INCHES IN DIAMETER. A MAXIMUM OF TWO LIFT HOLES ARE ALLOWED FOR PIPE 24 INCH IN DIAMETER OR LARGER. LIFT HOLES SHALL BE REPAIRED ACCORDING TO MOST RECENT INDOT STANDARD SPECIFICATIONS.
 - FITTINGS AND SPECIALTIES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS FOR THE TYPE OF PIPE BEING USED.
 - EACH PIPE SECTION SHALL BE MARKED WITH DATE OF MANUFACTURE, SIZE AND CLASS OF PIPE, SPECIFICATION DESIGNATION, MANUFACTURER AND PLANT IDENTIFICATION.
 - PIPE SHALL BE FURNISHED WITH A BELL OR GROOVE ON ONE END OF A UNIT OF PIPE AND A SPIGOT OR TONGUE ON THE ADJACENT END OF THE ADJOINING PIPE. ALL JOINTS SHALL HAVE A GROOVE ON THE SPIGOT FOR PLACEMENT OF A RUBBER "O-RING" OR PROFILE GASKET IN ACCORDANCE WITH ASTM C-443. THE GASKET SHALL BE A CONTINUOUS RING WHICH FITS SNUGLY INTO THE ANNULAR SPACE BETWEEN THE OVERLAPPING SURFACES OF THE ASSEMBLED PIPE JOINT.



Yellow circle = WQO LOCATIONS
 Red arrow = DRAINAGE ARROWS



Moench Engineering
 4000 Clarks Creek Road
 Plainfield, Indiana 46168
 (317) 837-2767
 (317) 837-7266 (Fax)

THESE DRAWINGS ARE GIVEN IN CONFIDENCE AND SHALL BE USED ONLY IN PURSUANCE TO THE AGREEMENT WITH

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LIONS TRANS INC. (BROWNSBURG)
 4005 N CR 1000 E
 BROWNSBURG, IN 46122

GRADING PLAN (EAST)

REVISIONS:

NO	DESCRIPTION	DATE
0	SUBMITTED FOR REVIEW	11/5/21
1	REVISED PER ISDH COMMENTS	12/3/21
2	REVISED TO ABOVE GROUND STORAGE	11/22/22
3	REVISED PER TOWN COMMENTS	9/09/24
4	REVISED PER TOWN COMMENTS	12/11/24
5	Revised Storm Outlet	9/26/25

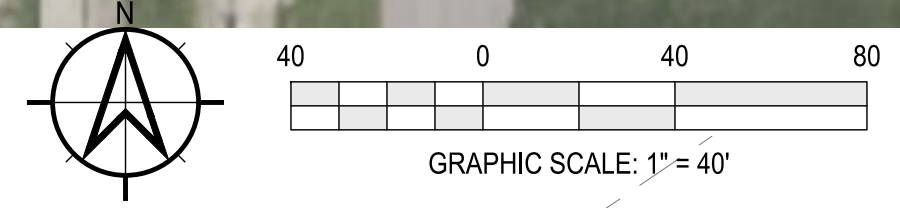
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 CHECKED BY: BEM
 PROJECT NUMBER: 21346
 DATE: 11/3/22
 SHEET NUMBER: C301A



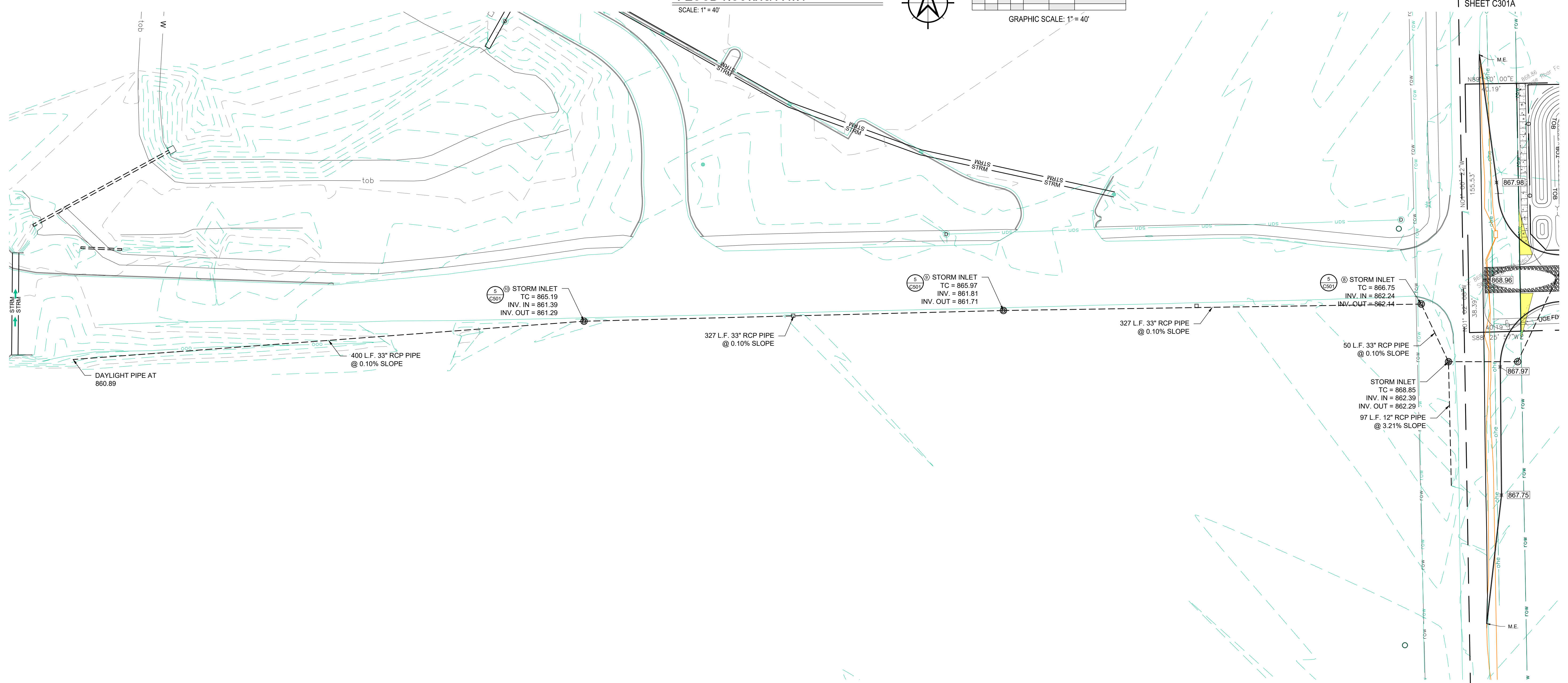
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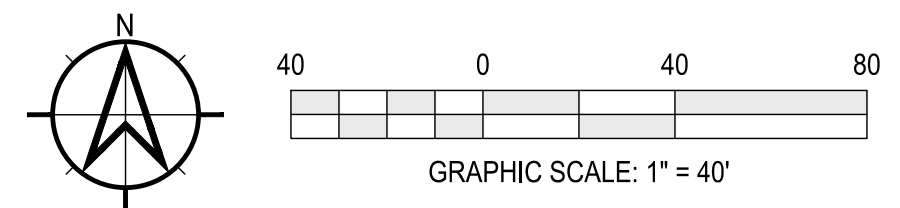
FLOOD ROUTING PATH
 SCALE: 1" = 40'



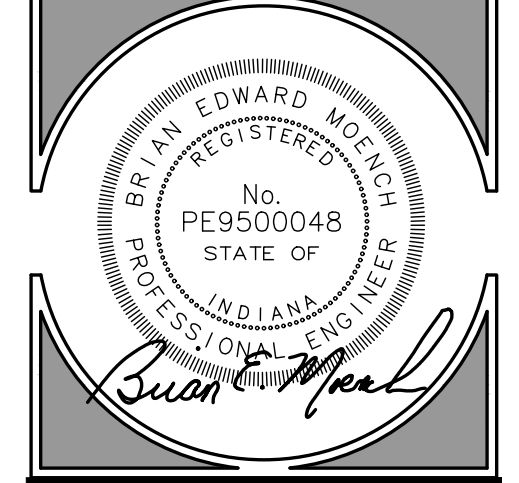
MATCHLINE SHEET C301A



GRADING PLAN (WEST)
 SCALE: 1" = 40'



LIONS TRANS INC. (BROWNSBURG)
 4005 N CR 1000 E
 BROWNSBURG, IN 46122
 GRADING PLAN (WEST)



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 CHECKED BY: BEM
 PROJECT NUMBER: 21346
 DATE: 1/13/22
 SHEET NUMBER:

C301B

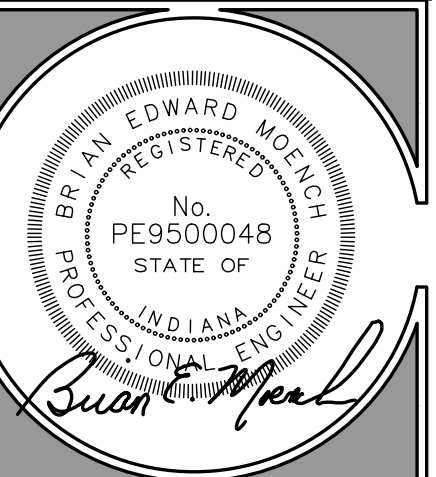


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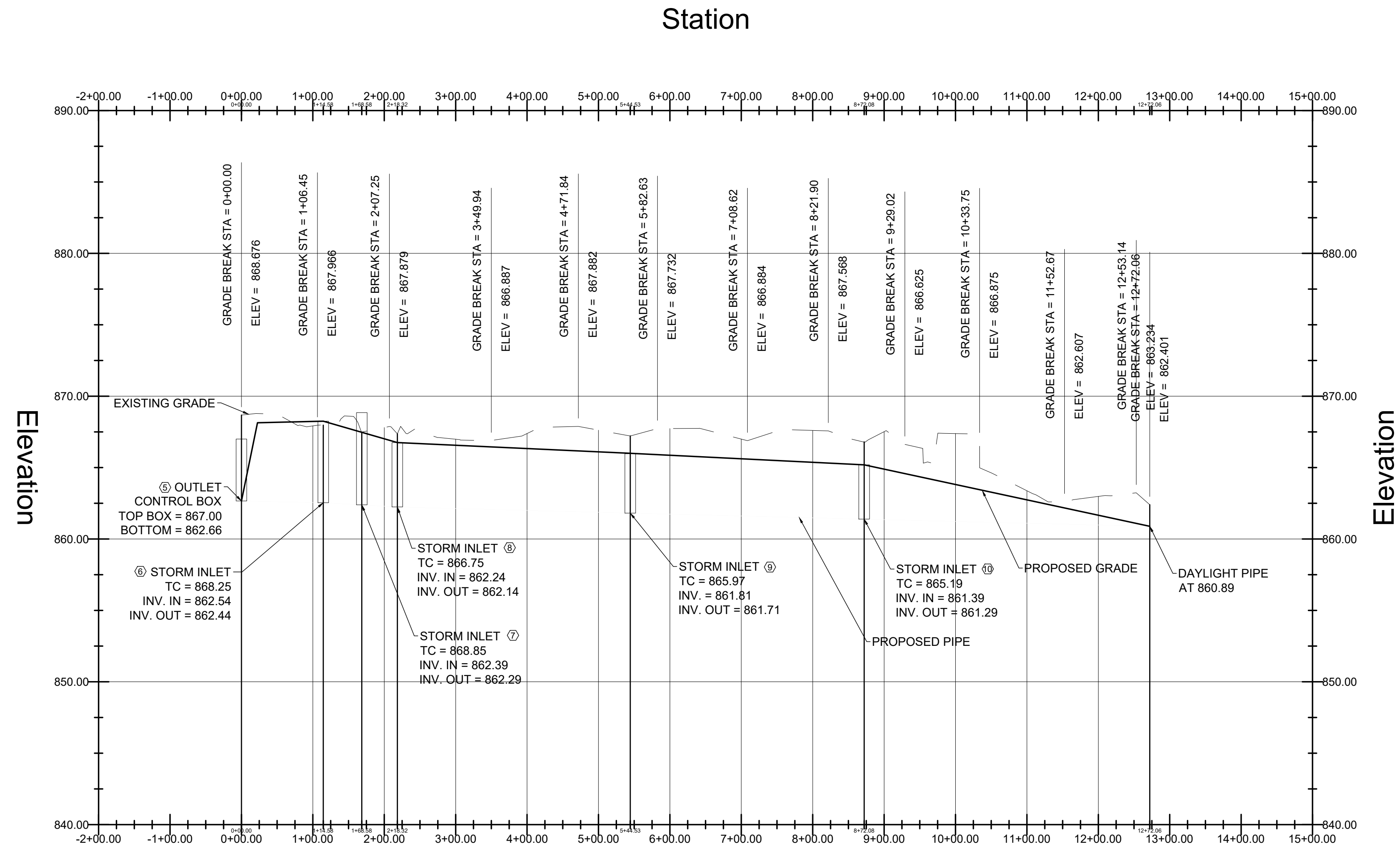
PIPE PROFILE PLAN (WEST)



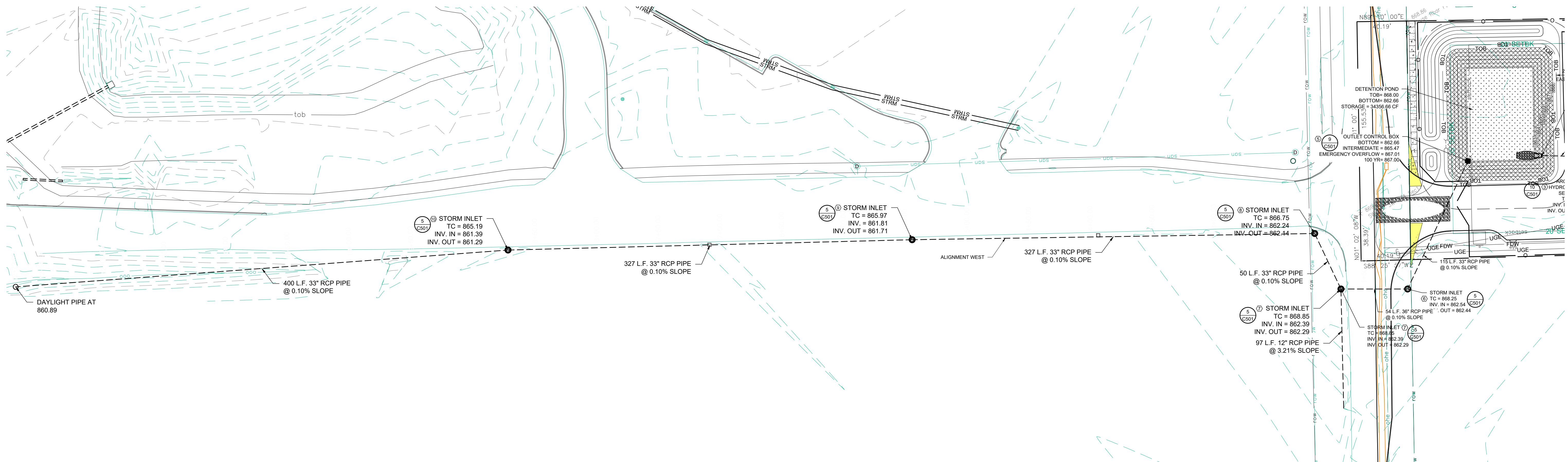
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DRAWN BY: JBF
 CHECKED BY: BEM
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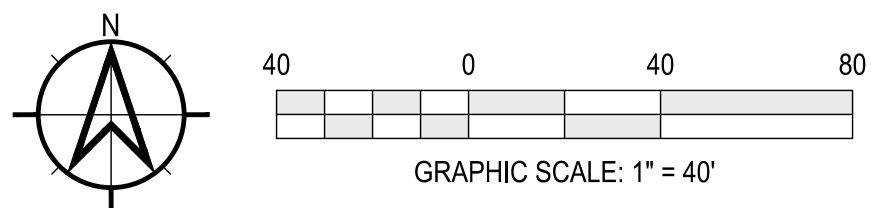
SHEET NUMBER:
C301C



PIPE PROFILE VIEW ALIGNMENT WEST
 NOT TO SCALE



ALIGNMENT WEST
 SCALE: 1" = 40'



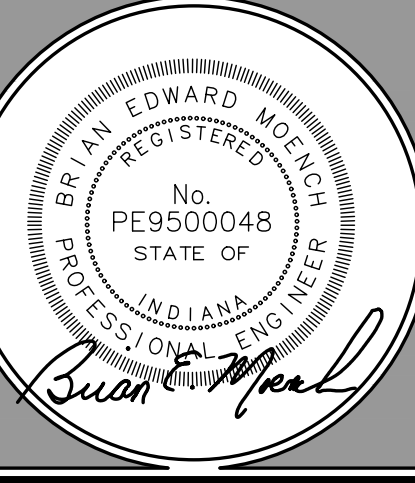


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PIPE PROFILE PLAN (EAST)

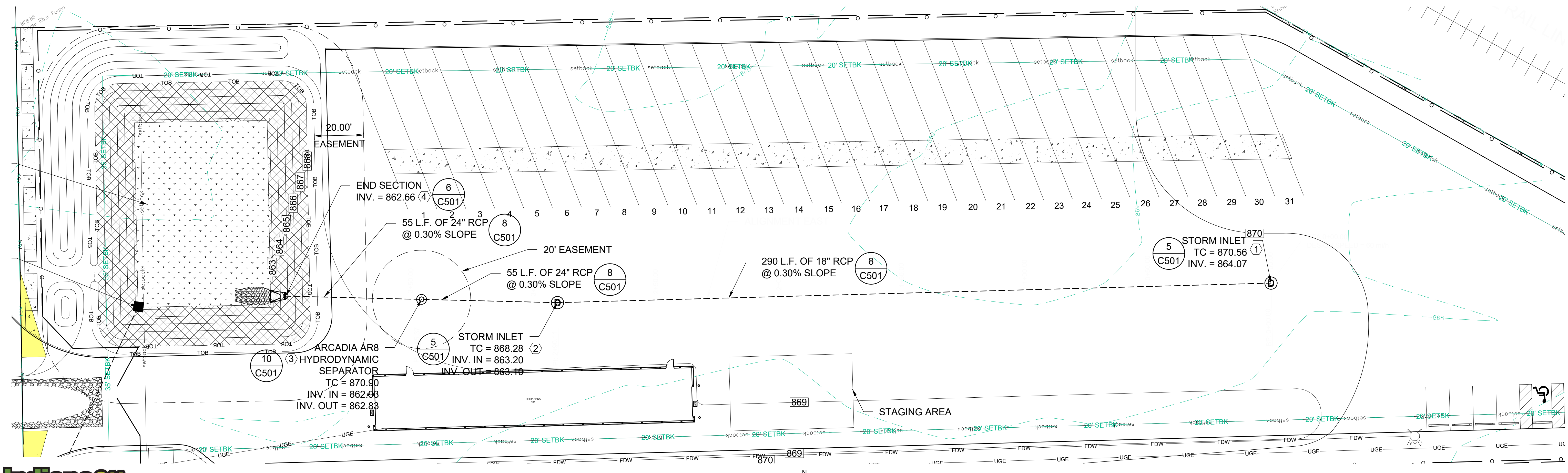
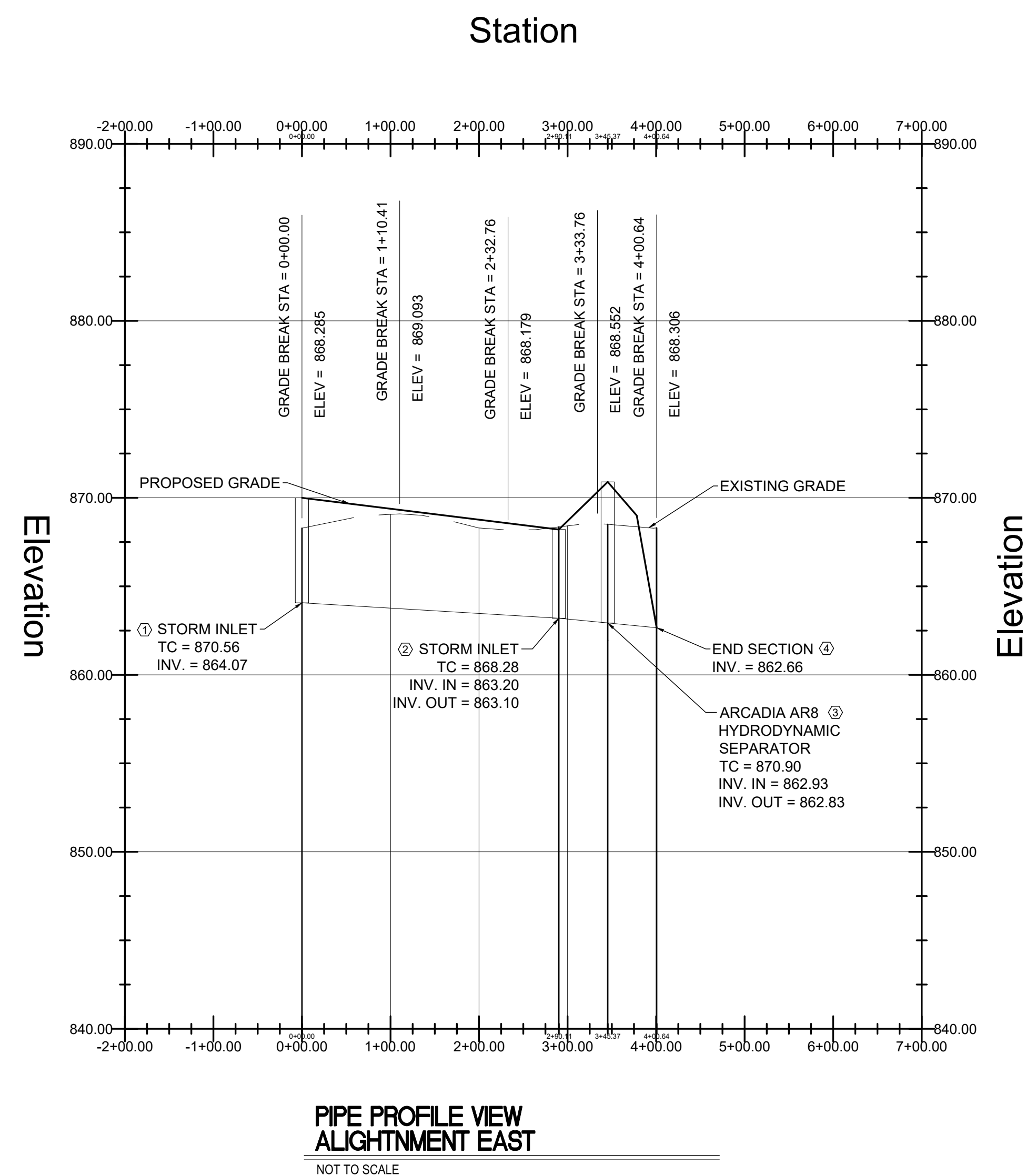


REVISIONS:

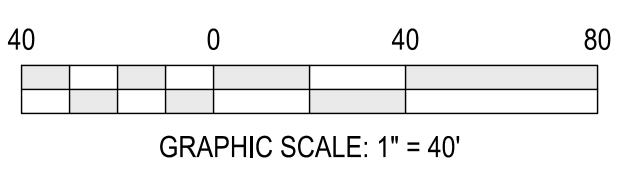
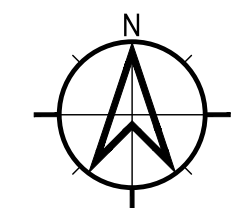
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C301D



ALIGNMENT EAST
 SCALE: 1" = 20'



SEASONAL SOIL PROTECTION CHART												
STABILIZATION PRACTICE	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
PERMANENT SEEDING		A										
DORMANT SEEDING	B										B	
TEMPORARY SEEDING		C										
SODDING		F**										
MULCHING												

* / / * = IRRIGATION NEEDED DURING JUNE, JULY, AUGUST AND/OR SEPTEMBER ** = IRRIGATION NEEDED FOR 2 WEEKS AFTER SUPPLYING SOD

A = KENTUCKY BLUEGRASS 100 LBS/ACRE, CREEPING RED FESCUE 100 LBS/ACRE, PLUS 2 TONS STRAW MULCH/ACRE, OR ADD ANNUAL RYEGRASS 30 LBS/ACRE FERTILIZE AS RECOMMENDED BY SOIL TEST. IF TESTING IS NOT DONE, APPLY 400-600 LBS/ACRE OF 12-12-12 ANALYSIS, OR EQUIVALENT, FERTILIZER.

B = KENTUCKY BLUEGRASS 120 LBS/ACRE, CREEPING RED FESCUE 120 LBS/ACRE, PLUS 2 TONS STRAW MULCH/ACRE, OR ADD ANNUAL RYEGRASS 30 LBS/ACRE FERTILIZE AS RECOMMENDED BY SOIL TEST. IF TESTING IS NOT DONE, APPLY 400-600 LBS/ACRE OF 12-12-12 ANALYSIS, OR EQUIVALENT, FERTILIZER.

C = SPRING OATS 3 BUSHEL/ACRE FERTILIZE AS RECOMMENDED BY SOIL TEST. IF TESTING IS NOT DONE, APPLY 400-600 LBS/ACRE OF 12-12-12 ANALYSIS, OR EQUIVALENT, FERTILIZER.

D = WHEAT OR RYE 2 BUSHEL/ACRE FERTILIZE AS RECOMMENDED BY SOIL TEST. IF TESTING IS NOT DONE, APPLY 400-600 LBS/ACRE OF 12-12-12 ANALYSIS, OR EQUIVALENT, FERTILIZER.

E = ANNUAL RYEGRASS 40 LBS/ACRE (1 LB/1000 SQ. FT.) FERTILIZE AS RECOMMENDED BY SOIL TEST. IF TESTING IS NOT DONE, APPLY 400-600 LBS/ACRE OF 12-12-12 ANALYSIS, OR EQUIVALENT, FERTILIZER.

F = SOD

G = STRAW MULCH 2 TONS/ACRE

INSTALLATION SCHEDULE:	
CONSTRUCTION PHASE	CONSTRUCTION SCHEDULE
PRE-CONSTRUCTION ACTIONS (EVALUATION/PROTECTION OF IMPORTANT SITE CHARACTERISTICS)	BEFORE CONSTRUCTION, EVALUATE, MARK AND PROTECT IMPORTANT TREES AND ASSOCIATED ROOTING ZONES, UNIQUE AREAS (e.g., WETLANDS) TO BE PRESERVED, ON-SITE SEPTIC SYSTEMS, ABSORPTION FIELDS IF APPLICABLE, AND VEGETATION SUITABLE FOR FILTER STRIPS, ESPECIALLY IN PERIMETER AREAS.
CONSTRUCTION ACCESS (CONSTRUCTION ENTRANCES, CONSTRUCTION ROUTES, EQUIPMENT PARKING AREAS)	STABILIZE BARE AREAS IMMEDIATELY WITH GRAVEL AND TEMPORARY VEGETATION AS WORK TAKES PLACE.
SEDIMENT BARRIERS AND TRAPS (BASIN TRAPS, SILT FENCES, OUTLET PROTECTION)	INSTALL PRINCIPAL BASINS AFTER CONSTRUCTION SITE IS ASSESSED. INSTALL ADDITIONAL RUNOFF CONTROL MEASURES DURING GRADING AS NEEDED.
RUNOFF CONVEYANCE SYSTEM (STABILIZED STREAM-BANKS, STORM DRAINS, INLET AND OUTLET PROTECTIONS, WATER QUALITY STRUCTURES)	WHERE NECESSARY, STABILIZE STREAMBANKS AS EARLY AS POSSIBLE. INSTALL PRINCIPLE CONVEYANCE SYSTEM WITH RUNOFF CONTROL MEASURES. INSTALL REMAINDER OF SYSTEM AFTER GRADING.
LAND CLEARING AND GRADING (CUTTING/FILLING, GRADING, DRAINS, SEDIMENT TRAPS, BARRIERS, DIVERSIONS, SURFACE ROUGHENING)	BEGIN MAJOR CLEARING AND GRADING AFTER INSTALLING THE KEY SEDIMENT AND RUNOFF MEASURES. CLEAR BORROW AND DISPOSAL AREAS AS NEEDED. INSTALL ADDITIONAL CONTROL MEASURES AS GRADING PROGRESSES.
SURFACE STABILIZATION (TEMPORARY AND PERMANENT SEEDING, MULCHING, SODDING, RIPRAP)	APPLY TEMPORARY OR PERMANENT STABILIZATION MEASURES IMMEDIATELY ON ALL DISTURBED AREAS WHERE WORK IS DELAYED OR COMPLETED.
BUILDING CONSTRUCTION (BUILDINGS, UTILITIES, PAVING)	INSTALL NECESSARY EROSION AND SEDIMENT CONTROL PRACTICES AS WORK TAKES PLACE.
LANDSCAPING & FINAL STABILIZATION (TOP SOILING, TREES AND SHRUBS, PERMANENT SEEDING, MULCHING, SODDING, RIPRAP)	STABILIZE ALL OPEN AREAS, INCLUDING BORROW AND SPOIL AREAS. REMOVE TEMPORARY CONTROL MEASURES AND STABILIZE.

RESPONSIBLE PARTY FOR EROSION CONTROL

COMPANY: LIONS TRAN INC.
 NAME: MALHI KULWINDER
 ADDRESS: 7655 E. US HWY 36
 AVON, INDIANA 46123
 PHONE: 317-989-1580

EROSION CONTROL NOTES:

SOIL EROSION CONTROL SUMMARY:

- CONTRACTOR SHALL INSTALL SODDING, INLET PROTECTION, AND FILTERS AS SHOWN.
- MASS GRADE THE SITE (SIDES OF SWALES, MOUNDS AND PONDS TO BE SODDED OR SEEDED AND MULCHED IMMEDIATELY UPON COMPLETION). TEMPORARY SEEDING SHALL BE RECOMMENDED FOR ALL SWALES AND DISTURBED AREAS THAT CANNOT BE FINAL SEEDED WITHIN A TIME PERIOD THAT WILL PREVENT SOIL EROSION. FOR TEMPORARY SEEDING THE CONTRACTOR SHALL UTILIZE A FAST GROWING SEED OF EITHER OATS, ANNUAL RYE GRASS, WHEAT OR RYE DEPENDING UPON TIME OF YEAR. DISTURBED AREAS SHOULD BE KEPT TO A MINIMUM AT ALL TIMES.
- CONTRACTOR SHALL CONTROL MUD ACCUMULATION ON ALL STREETS SURROUNDING THE PROJECT BY INSTALLING STONE SURFACE AT ALL LOCATIONS WHERE CONSTRUCTION TRAFFIC LEAVES THE SITE. DUST SHALL BE KEPT TO A MINIMUM BY UTILIZING SPRINKLING, CALCIUM CHLORIDE, VEGETATIVE COVER, SPRAY ON ADDITIVES OR OTHER APPROVED METHODS.
- MAINTAIN ALL FILTERS DURING CONSTRUCTION TO PREVENT ANY BLOCKAGES FROM ACCUMULATED SEDIMENT. ADDITIONAL SEEDING MAY BE REQUIRED DURING CONSTRUCTION AS SPECIFIED BY ENGINEER OR SOIL CONSERVATION SERVICE. RIPRAP SHALL BE PLACED IN AREAS OF HIGH VELOCITY STREAM FLOW (MINIMUM SIZE 1/3 CU.FT.). PAYMENT FOR ADDITIONAL RIPRAP NOT SHOWN ON PLANS AND SEEDING SHALL BE ON A UNIT BASIS.
- CONTRACTOR SHALL INSTALL ALL STORM SEWER INLET FILTERS AS STORM SEWER SYSTEM IS INSTALLED.
- ALL PROPOSED STREET AREAS TO BE PAVED AS SOON AS POSSIBLE AFTER SUBGRADE IS PREPARED.
- CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROLS ONLY WHEN THERE IS SUFFICIENT GROWTH OF GROUND COVER TO PREVENT FURTHER EROSION.
- ALL SWALES SHALL BE SEEDED AND SODDED (AS INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN) IMMEDIATELY AFTER FINAL GRADING.
- ALL EROSION CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH THE INDIANA HANDBOOK FOR EROSION CONTROL IN DEVELOPING AREAS, MOST RECENT EDITION.

MAINTENANCE:

INSPECT PERIODICALLY, ESPECIALLY AFTER STORM EVENTS, UNTIL THE STAND IS SUCCESSFULLY ESTABLISHED. (CHARACTERISTICS OF A SUCCESSFUL STAND INCLUDE: VIGOROUS DARK GREEN OR BLuish-GREEN SEEDLINGS, UNIFORM DENSITY WITH NURSE PLANTS, LEGUMES, AND GRASSES WELL INTER-MIXED; GREEN LEAVES, AND THE PERENNIALS REMAINING GREEN THROUGHOUT THE SUMMER, AT LEAST AT THE PLANT BASE.)

PLAN TO ADD FERTILIZER THE FOLLOWING GROWING SEASON ACCORDING TO SOIL TEST RECOMMENDATIONS.

REPAIR DAMAGED, BARE, OR SPARSE AREAS BY FILLING ANY GULLIES, RE-FERTILIZING, OVER-OR RE-SEEDING, AND MULCHING.

IF PLANT COVER IS SPARSE OR PATCHY, REVIEW THE PLANT MATERIALS CHOSEN, SOIL FERTILITY, MOISTURE CONDITION, AND MULCHING AFTER RE-PREPARING THE SEEDBED.

IF VEGETATION FAILS TO GROW, CONSIDER SOIL TESTING TO DETERMINE ACIDITY OR NUTRIENT DEFICIENCY PROBLEMS. CONTACT YOUR SWCD OR COOPERATIVE EXTENSION OFFICE FOR ASSISTANCE.)

IF ADDITIONAL FERTILIZATION IS NEEDED TO GET A SATISFACTORY STAND, DO SO ACCORDING TO SOIL TEST RECOMMENDATIONS.

EROSION CONTROL NOTES:

PRIOR TO ANY WORK BEING DONE, A TEMPORARY CONSTRUCTION ENTRANCE AND SILT FENCING SHALL BE INSTALLED.

AFTER COMPLETION OF A STORM STRUCTURE, THE CURB INLET PROTECTION SHALL BE INSTALLED IMMEDIATELY.

UPON COMPLETION OF SWALES AND SIDE SLOPES, CONTRACTOR SHALL INSTALL THE EROSION CONTROL BLANKETS.

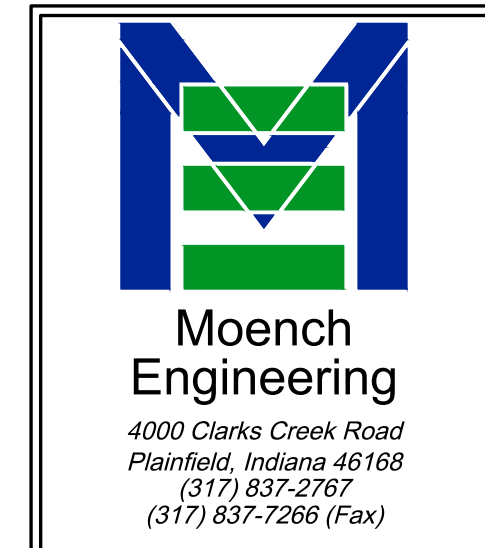
ALL AREAS NOT DENOTING PERMANENT SEEDING OR FIBER BLANKETS SHALL BE TEMPORARILY SEEDDED.

THE EARTHWORK CONTRACTOR IS RESPONSIBLE FOR KEEPING THE EXISTING ROADWAYS CLEAR OF DIRT AND DEBRIS.

ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED BY INSPECTOR AS CONDITIONS WARRANT.

EROSION PROTECTION DURING CONSTRUCTION AND SEEDING:

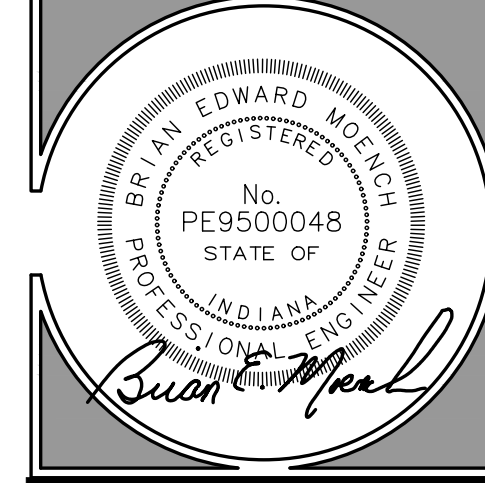
- THE CONTRACTOR SHALL PROVIDE ADEQUATE EROSION PROTECTION MEASURE DURING CONSTRUCTION SUCH AS, BUT NOT LIMITED TO:
 - A) SILT FENCING
 - B) MULCH AND SEEDING
 - C) SOIL STABILIZATION FABRIC
- DETAILS AND PLACEMENT SPECIFICATION FOR ABOVE ITEMS ARE AVAILABLE ON REQUEST FROM THE ENGINEER.
- ALL CONSTRUCTION AREAS ARE TO BE SEEDDED IMMEDIATELY FOLLOWING GRADING.
- WOOD CELLULOSE FIBER, STRAW OR MULCH SHALL BE APPLIED AT A RATE OF 3/4 TONS PER ACRE AND SHALL BE REQUIRED FOR ALL SWALE, LAKE SLOPE AND STREET SEEDING.



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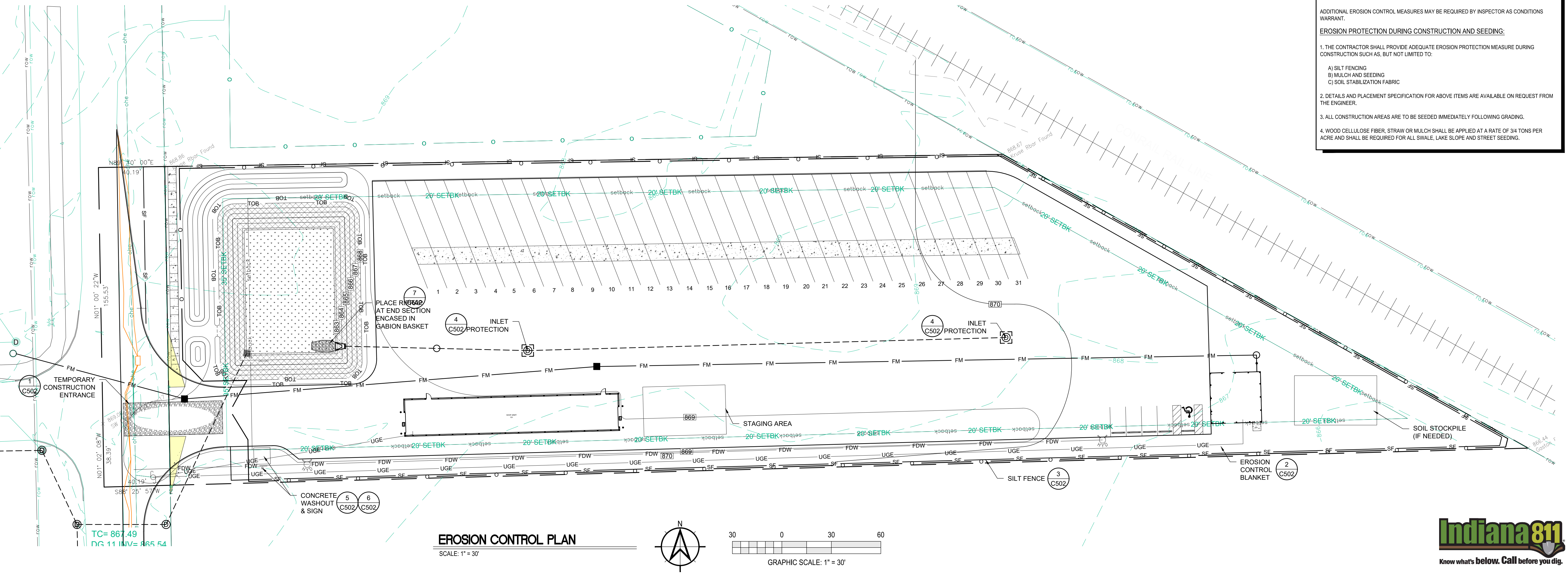
LIONS TRANS INC. (BROWNSBURG)
 4005 N CR 1000 E
 BROWNSBURG, IN 46122

EROSION CONTROL PLAN



REVISIONS:		
0	SUBMITTED FOR REVIEW	11/5/21
1	REVISED PER ISDH COMMENTS	12/3/21
2	REVISED TO ABOVE GROUND STORAGE	11/22/22
3	REVISED PER TOWN COMMENTS	9/09/24
4	REVISED PER TOWN COMMENTS	12/11/24
5	Revised Storm Outlet	9/28/25

DRAWN BY: JBF
 CHECKED BY: BEM
 PROJECT NUMBER: 21346
 DATE: 1/13/22
 SHEET NUMBER: C302



SECTION	TITLE	SHEET
A1	Index of the location of required plan elements in the construction plan	C000
A2	A vicinity map depicting the project site location in relationship to recognizable local landmarks, towns, and major roads	C000
A3	Narrative of the nature and purpose of the project	C303
A4	Latitude and longitude to the nearest fifteen (15) seconds	C000
A5	Legal description of the project site	C201
A6	11x17 inch plot showing building lot numbers/boundaries and road layout/names	C303
A7	Boundaries of the one hundred (100) year flood plains, floodway fringes, and floodways	C301
A8	Land use of all adjacent properties	C303
A9	Identification of a U.S. EPA approved or established TMDL	C303
A10	Name(s) of the receiving water(s)	C303
A11	Identification of discharges to a water on the current 303(d) list of impaired waters and the pollutant(s) for which it is impaired	C303
A12	Soils map of the predominate soil types	C301
A13	Identification and location of all known wetlands, lakes, and water courses on or adjacent to the project site (construction plan, existing site layout)	C303
A14	Identification of any other state or federal water quality permits or authorizations that are required for construction activities	C303
A15	Identification and delineation of existing cover, including natural buffers	C301
A16	Existing site topography at an interval appropriate to indicate drainage patterns	C301
A17	Location(s) where run-off enters the project site	C301
A18	Location(s) where run-off discharges from the project site prior to land disturbance	C301
A19	Location of all existing structures on the project site	N/A
A20	Existing permanent retention or detention facilities, including manmade wetlands, wetlands, designed for the purpose of stormwater management	N/A
A21	Locations where storm water may be directly discharged into ground water, such as abandoned wells, sinkholes, or karst features	C303
A22	Size of the project area expressed in acres	C000
A23	Total expected land disturbance expressed in acres	C000
A24	Proposed final topography	C301
A25	Locations and approximate boundaries of all disturbed areas	C201
A26	Locations, size, and dimensions of all storm water drainage system such as culverts, storm water sewer, and conveyance channels	C301
A27	Locations of specific points where storm water and non-storm water discharges will leave the project site	C301
A28	Location of all proposed site improvements, including roads, utilities, lot delineation and identification, proposed structures, and common areas	C201
A29	Location of all on-site and off-site soil stockpiles and borrow areas	C302
A30	Construction support activities that are expected to be part of the project	N/A
A31	Location of any in-stream activities that are planned for the project including, but not limited to, stream crossings and pump arounds	N/A
B1	Description of the potential pollutant generating sources and pollutants, including all potential non-storm water discharges	C303
B2	Stable construction entrance locations and specifications	C302
B3	Specifications for temporary and permanent stabilization	C302
B4	Sediment control measures for concentrated flow areas	C301
B5	Sediment control measures for sheet flow areas	C302
B6	Run off control measures	C302
B7	Storm water outlet protection location and specifications	C302/501
B8	Grade stabilization structure locations and specifications	N/A
B9	De-watering applications and management methods	C303
B10	Measures utilized for work within water bodies	N/A
B11	Maintenance guidelines for each proposed storm water quality measure	C303
B12	Planned construction sequence that describes the implementation of storm water quality measures in relation to land disturbance	C303
B13	Provisions for erosion and sediment control on individual residential building lots regulated under the proposed project	N/A
B14	Material handling and spill prevention and spill response plan meeting the requirements in 327 IAC 2-6.1	C303
B15	Material handling and storage procedures associated with construction activity	C303
C1	Description of pollutants and their sources associated with the proposed land use	C303
C2	Description of proposed post-construction storm water measures	C303
C3	Plan details for each storm water measure	C301/501
C4	Sequence describing storm water measure implementation	C303
C5	Maintenance guidelines for proposed post-construction storm water measures	C303
C6	Entity that will be responsible for operation and maintenance of the post-construction storm water measures	C302

NOTES:
 NA - NON APPLICABLE

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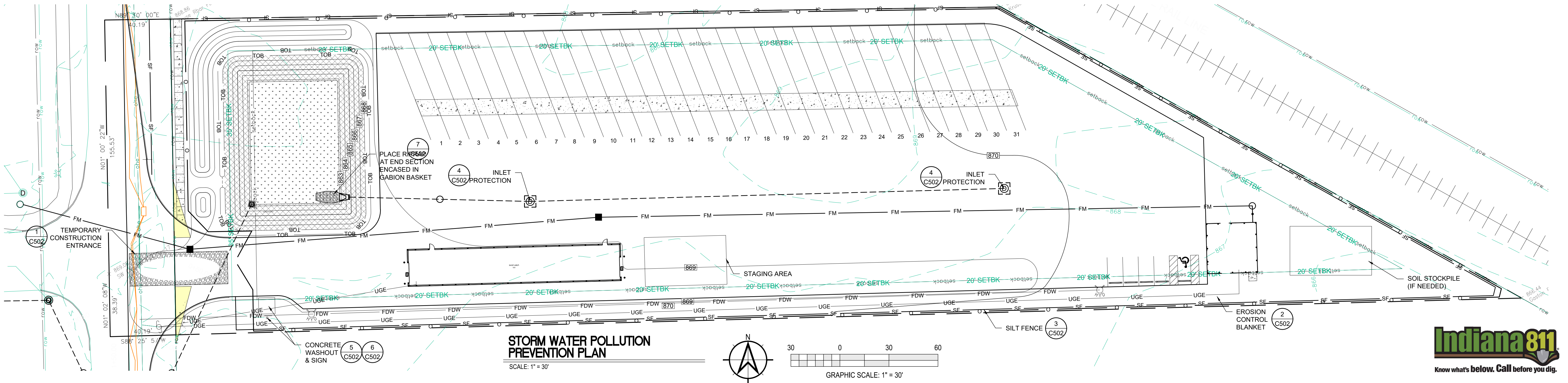
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Moench Engineering
 4000 Clarks Creek Road
 Plainfield, Indiana 46168
 (317) 837-2767
 (317) 837-7266 (Fax)

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LIONS TRANS INC. (BROWNSBURG)
 4005 N CR 1000 E
 BROWNSBURG, IN 46122

STORM WATER POLLUTION PREVENTION PLAN



REGISTERED PROFESSIONAL ENGINEER
 No. PE950048
 STATE OF INDIANA
 Susan Moench

REVISIONS:		
0	SUBMITTED FOR REVIEW	11/5/21
1	REVISED PER ISDH COMMENTS	12/3/21
2	REVISED TO ABOVE GROUND STORAGE	11/22/22
3	REVISED PER TOWN COMMENTS	9/09/24
4	REVISED PER TOWN COMMENTS	12/11/24
5	REVISED STORM OUTLET	9/26/25

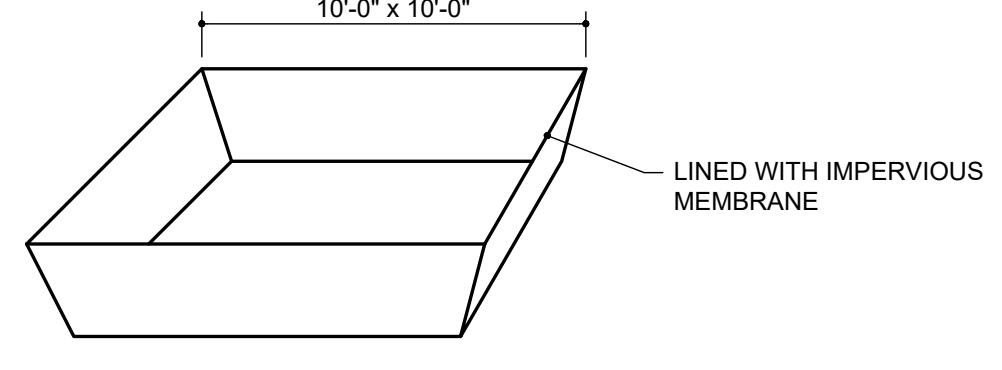
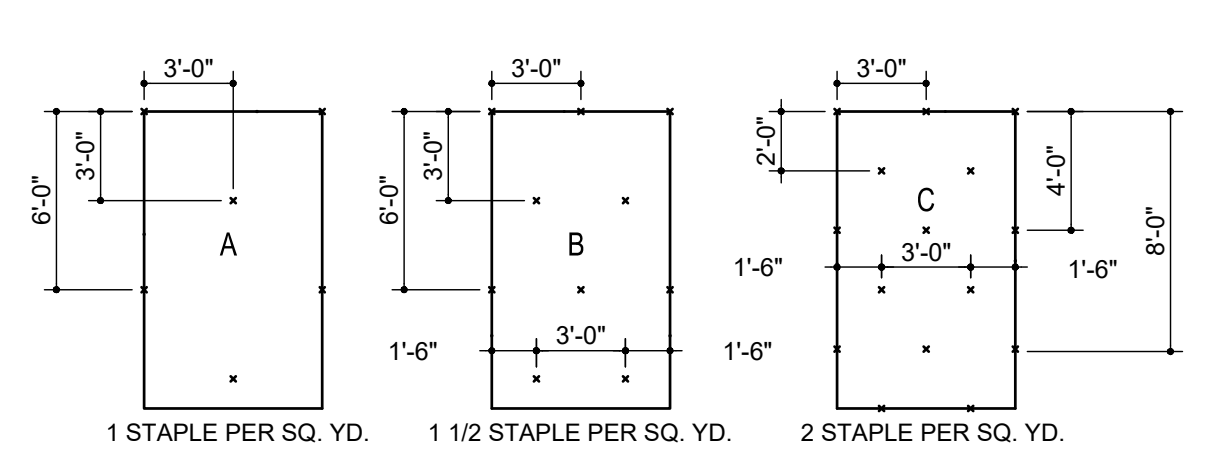
DRAWN BY: JBF
 CHECKED BY: BEM
 PROJECT NUMBER: 21346
 DATE: 1/13/22
 SHEET NUMBER: C303

Indiana811
 Know what's below. Call before you dig.

REVISIONS:		
0	SUBMITTED FOR REVIEW	11/5/21
1	REVISED PER ISDH COMMENTS	12/3/21
2	REVISED TO ABOVE GROUND STORAGE	1/12/22
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5	Revised Storm Outlet	9/26/25

DRAWN BY:	JBF
CHECKED BY:	BEM
PROJECT NUMBER:	21346
DATE:	1/13/22
SHEET NUMBER:	

C502

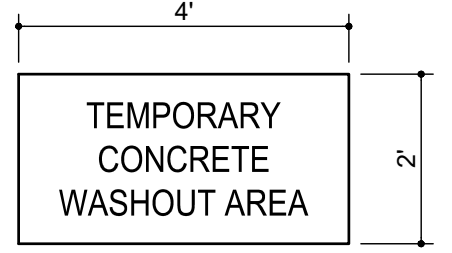


NOTE:
1. A LINED ROLLOFF DUMPSTER OR CONTAINER TO BE USED IN LIEU OF A CONSTRUCTED WASHOUT BASIN.

CONCRETE WASHOUT BASIN

NOT TO SCALE

6
C502



NOTES:
1. SIGN TO BE POSTED THROUGHOUT CONSTRUCTION ACTIVITY.
2. SIGN TO BE MADE OF SEMI-PERMANENT MATERIAL, I.E. WOOD.

CONCRETE WASHOUT SIGN

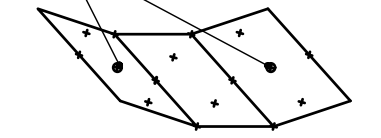
NOT TO SCALE

5
C502

GENERAL STAPLE RECOMMENDATIONS

SLOPE LENGTH IN FEET	4:1	3:1	2:1	1:1 CHANNEL LINING
300	B	C	C	C
275	B	C	C	C
250	B	C	C	C
225	B	C	C	C
200	B	C	C	C
175	A	B	C	C
150	A	B	C	C
125	A	B	C	C
100	A	B	C	C
75	A	B	C	C
50	A	B	C	C
25	A	B	C	C

ADDITIONAL STAPLED AS REQ'D.



CHANNEL LININGS UTILIZE STAPLE PATTERN "C" WITH ADDITIONAL STAPLES ON SIDE SLOPES.

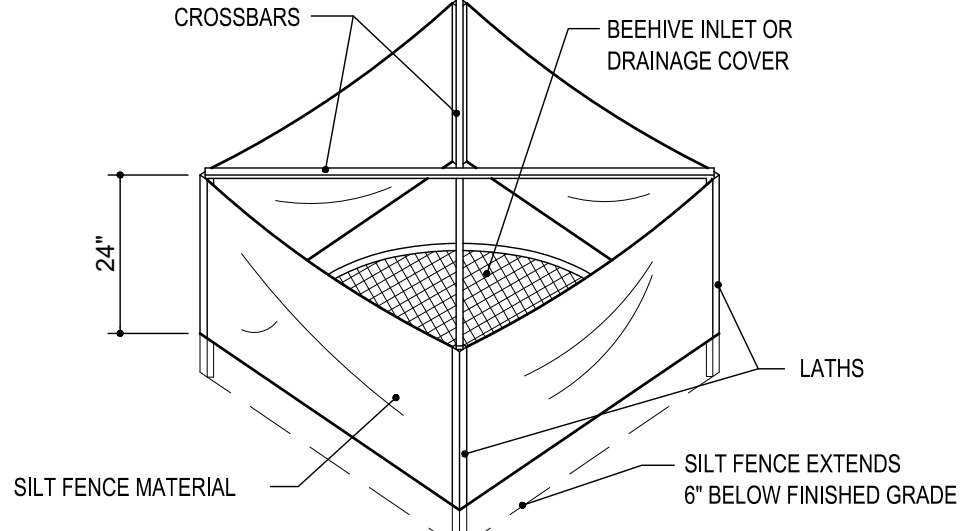
SLOPE GRADIENT

- NOTES:
1. STAPLE PATTERNS APPLY TO ALL NORTH AMERICAN GREEN EROSION BLANKETS.
2. STAPLE PATTERNS MAY VARY DEPENDING UPON SOIL TYPE AND AVERAGE ANNUAL RAINFALL.
3. AT SLOPE LENGTHS GREATER THAN 300 FEET OR WHERE DRAINAGE OVER LARGE AREAS IS DIRECTED ONTO BLANKETS, STAPLE PATTERN "C" SHOULD BE UTILIZED.
4. CHANNEL LININGS REQUIRE A 2' (MIN.) OVERLAP AT LONGITUDINAL JOINTS AND SIDE SLOPES REQUIRE A 6" (MIN.) OVERLAP. WHERE OVERLAPS OCCUR, THE UPSTREAM BLANKET SHALL OVERLAP THE DOWNSTREAM.
5. NORTH AMERICAN GREEN S150BN TO BE USED FOR EROSION CONTROL BLANKETS.

EROSION CONTROL BLANKET STAPLE PATTERN

NOT TO SCALE

2
C502

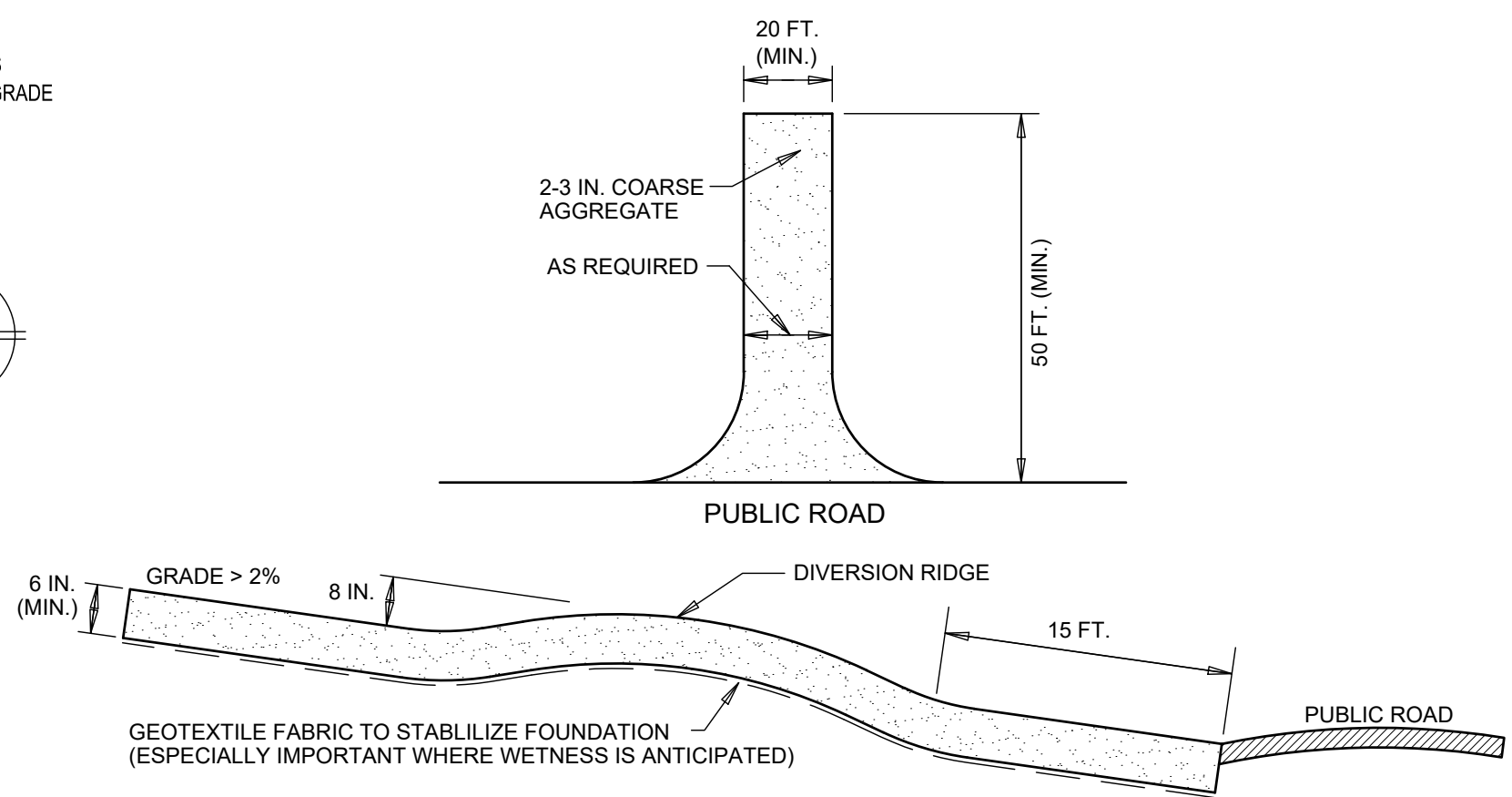


NOTE:
1. SEE SILT FENCE DETAIL FOR MATERIAL SPECIFICATIONS.
2. SILT FENCE SHALL BE PREASSEMBLED BY SUPPLIER.

SILT FENCE INLET PROTECTION DETAIL

NOT TO SCALE

4
C502



GEOTEXTILE FABRIC TO STABILIZE FOUNDATION (ESPECIALLY IMPORTANT WHERE WETNESS IS ANTICIPATED)

REQUIREMENTS:

- Material: 2-3 in. washed stone (INDOT CA No.2) over a stable foundation.
Thickness: 6 in. minimum
Width: 12 ft. minimum or full width of entrance/exit roadway, whichever is greater.
Length: 50 ft. minimum. The length can be shorter for small sites such as for an individual home.
Washing facility (optional): Level area with 3 in washed stone minimum or a commercial rack, and waste water diverted to a sediment trap or basin.
Geotextile fabric underliner: May be used under wet conditions or for soils within a high seasonal water table to provide greater bearing strength.

INSTALLATION:

- Avoid locating on steep slopes or at curves in public roads.
- Remove all vegetation and other objectionable material from the foundation area, and grade and crown for positive drainage.
- If slope towards the road exceeds 2%, construct a 6-8 in.-high water bar (ridge) with 3:1 side slopes across the foundation area about 15 ft. from the entrance to divert runoff away from the road.
- Install pipe under the pad if needed to maintain proper public road drainage.
- If wet conditions are anticipated, place geotextile fabric on the graded foundation to improve stability.
- Place stone to dimensions and grade shown in the erosion control plan, leaving the surface smooth and sloped for drainage.
- Divert all surface runoff and drainage from the stone pad to a sediment trap or basin.

MAINTENANCE:

- Inspect entrance drive and sediment disposal area weekly and after storm events or heavy use.
- Reshape pad as needed for drainage and runoff control.
- Topdress with clean stone as needed.
- Immediately remove mud and sediment tracked or washed onto public roads by brushing or sweeping. Flushing should only be used if the water is conveyed into a sediment trap or basin.
- Repair any broken road pavement immediately.

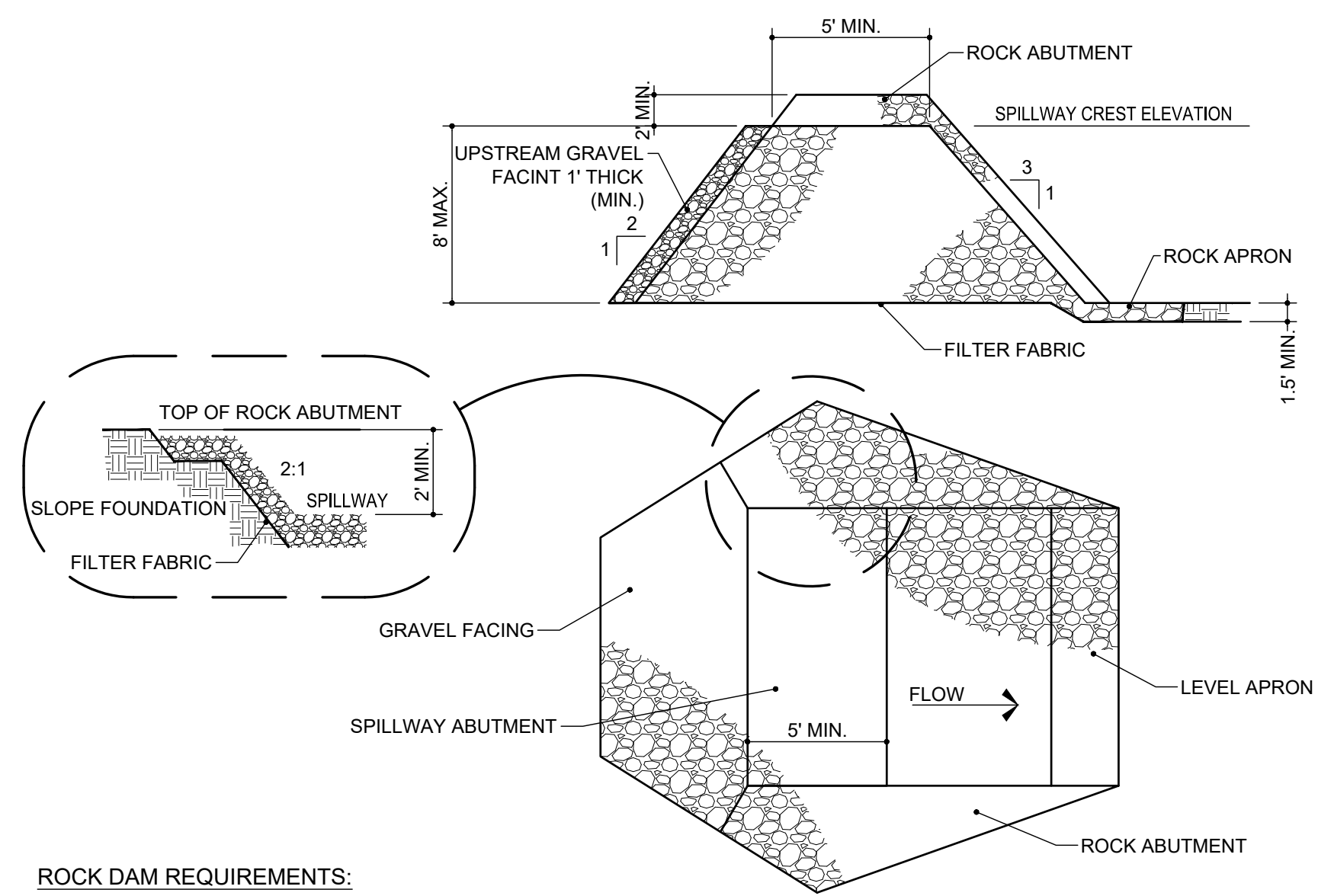
COMMON CONCERNS:

- Inadequate runoff control--results in sediment washing onto road.
Stone too small, pad too thin, or geotextile fabric absent--results in ruts and a muddy condition as stone is pressed into the soil: add more stone. Pad too short for heavy construction traffic--extend the pad beyond the 50-ft. length as needed.
Pad not flared sufficiently at road entrance--results in mud being tracked onto the road and possible damage to the road edge: widen stone entrance and repair road damage.
Unstable foundation--use geotextile fabric under th pad and/or improve foundation drainage.

TEMPORARY CONSTRUCTION ENTRANCE

NOT TO SCALE

1
C502



ROCK DAM REQUIREMENTS:

- CONTRIBUTING DRAINAGE AREA: 50 ACRES MAXIMUM
- DESIGN LIFE: LIMITED TO 3 YRS.
- SEDIMENT STORAGE: 1,800 CU.FT./ACRE DISTURBED (MINIMUM) MEASURED 1 FT. BELOW SPILLWAY CREST.
- BASIN SHAPE: MINIMUM 2:1 LENGTH-TO-WIDTH RATIO.
- BASIN AREA: VARIABLE; THE LARGER THE SURFACE AREA THE GREATER THE TRAPPING EFFICIENCY.
- DAM CREST HEIGHT: LIMITED TO 8 FT.
- SPILLWAY CAPACITY: PEAK RUNOFF FROM A 10-YR. FREQUENCY, 24-HR. DURATION STORM EVENT, A MAXIMUM FLOW DEPTH OF 1 FT. AND MINIMUM FREEBOARD OF 1 FT. (ENTIRE LENGTH OF DAM BETWEEN ROCK ABUTMENTS MAY SERVE AS SPILLWAY.)
- DAM DIMENSIONS: TOP WIDTH, 5 FT. MINIMUM; SIDE SLOPES, 2:1 OR FLATTER UPSTREAM, 3:1 OR FLATTER DOWNSTREAM.
- EARTH ABUTMENTS: SMOOTH, STABLE, 2:1 OR FLATTER SLOPES.
- ROCK ABUTMENTS (TO PROTECT EARTH ABUTMENTS): EXTENDED ALONG DOWNSTREAM FACE TO TOE OF DAM AND AT LEAST 1 FT. HIGHER THAN SPILLWAY FACE AT ALL POINTS, 2 FT. ABOVE SPILLWAY CREST, AND 1 FT. THICK, WITH 2:1 OR FLATTER SIDE SLOPES.
- OUTLET PROTECTION: ROCK APRON, 1-1/2 FT. THICK (MINIMUM), ZERO GRADE, WITH LENGTH EQUAL TO HEIGHT OF DAM OR EXTENDED TO STABLE GRADE, WHICHEVER IS GREATER.
- ROCK MATERIAL: INDOT REVETMENT RIPRAP.
- PROTECTION FROM PIPING: GEOTEXTILE FABRIC FOR SEPARATION AND FILTRATION COVERING ENTIRE FOUNDATION, INCLUDING EARTH ABUTMENTS AND APRON.
- BASIN DE-WATERING: THROUGH A 1 FT. THICK LAYER OF INDOT CA NO. 5 STONE ON UPSTREAM FACE OF THE DAM.

INSTALLATION

- SITE PREPARATION:**
- DIVERT RUNOFF FROM UNDISTURBED AREAS AWAY FROM THE ROCK DAM AND BASIN AREA.
 - EXCAVATE THE FOUNDATION FOR THE APRON, USING IT AS A TEMPORARY SEDIMENT BASIN DURING CONSTRUCTION OF THE DAM.
 - CLEAR AND GRUB THE AREA UNDER THE DAM, REMOVING AND PROPERLY DISPOSING OF ALL ROOT MAT, BRUSH, AND OTHER DEBRIS.
 - GRADE THE EARTH ABUTMENTS NO STEEPER THAN 2:1.
- DAM AND BASIN CONSTRUCTION**
- EXCAVATE A CUTOFF TRENCH AT THE CENTER LINE OF THE DAM, EXTENDING ALL THE WAY UP THE EARTH ABUTMENTS, AND BACKFILL WITH COMPACTED EARTH FILL.
 - SMOOTH THE DAM FOUNDATION.
 - COVER THE ENTIRE FOUNDATION, INCLUDING BOTH EARTH ABUTMENTS, WITH GEOTEXTILE FABRIC, MAKING SURE THE UPSTREAM STRIPS OVERLAP THE DOWNSTREAM STRIPS AT LEAST 1 FT.
 - CONSTRUCT THE DAM TO PLANNED DIMENSIONS.
 - ONCE THE DAM IS IN PLACE, CLEAR THE SEDIMENT BASIN AREA, PROPERLY DISPOSING OF THE CLEARED MATERIAL.
 - SET A MARKER STAKE TO INDICATE THE CLEANOUT ELEVATION (I.E., POINT AT WHICH THE BASIN IS 50% FULL OF SEDIMENT).
 - DIVERT CONSTRUCTION SITE RUNOFF FLOW INTO THE UPPER END OF THE BASIN USING TEMPORARY DIVERSIONS.
 - STABILIZE ALL DISTURBED AREAS EXCEPT THE LOWER HALF OF THE BASIN.

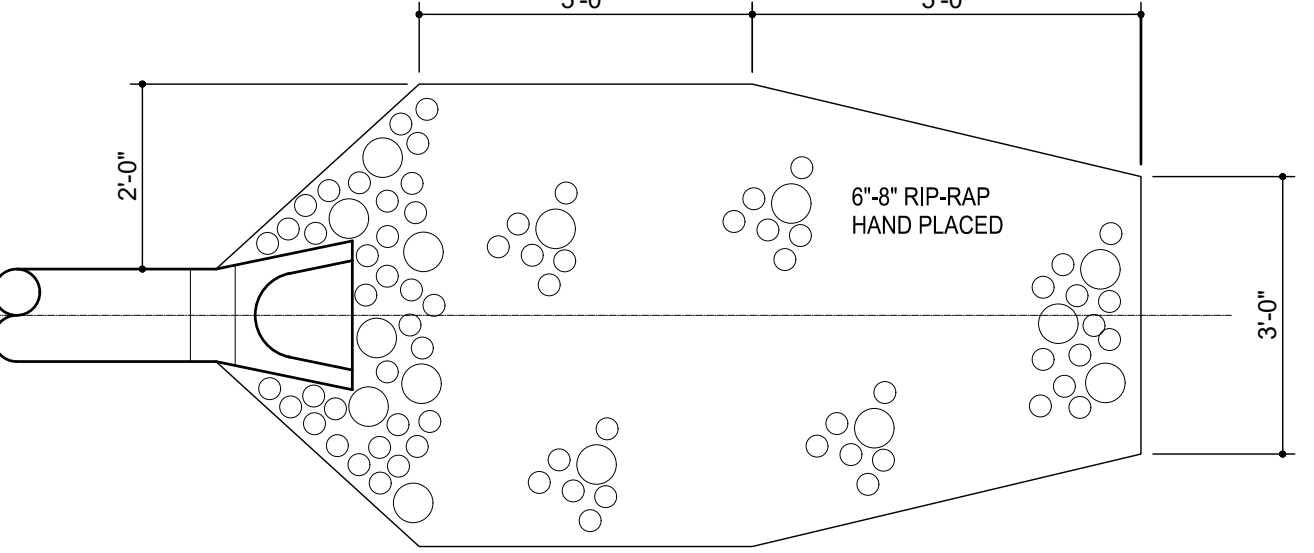
SAFETY PRECAUTIONS:

- BECAUSE SEDIMENT BASINS THAT IMPOUND WATER ARE HAZARDOUS, (A) BE SURE SIDE SLOPES ARE 2:1 OR FLATTER, (B) FENCE WITH WARNING SIGNS IF TRESPASSING IS LIKELY, (C) DE-WATER THE BASIN BETWEEN STORM EVENTS, AND (D) FOLLOW ALL STATE AND LOCAL IMPOUNDMENT SITE REQUIREMENTS.

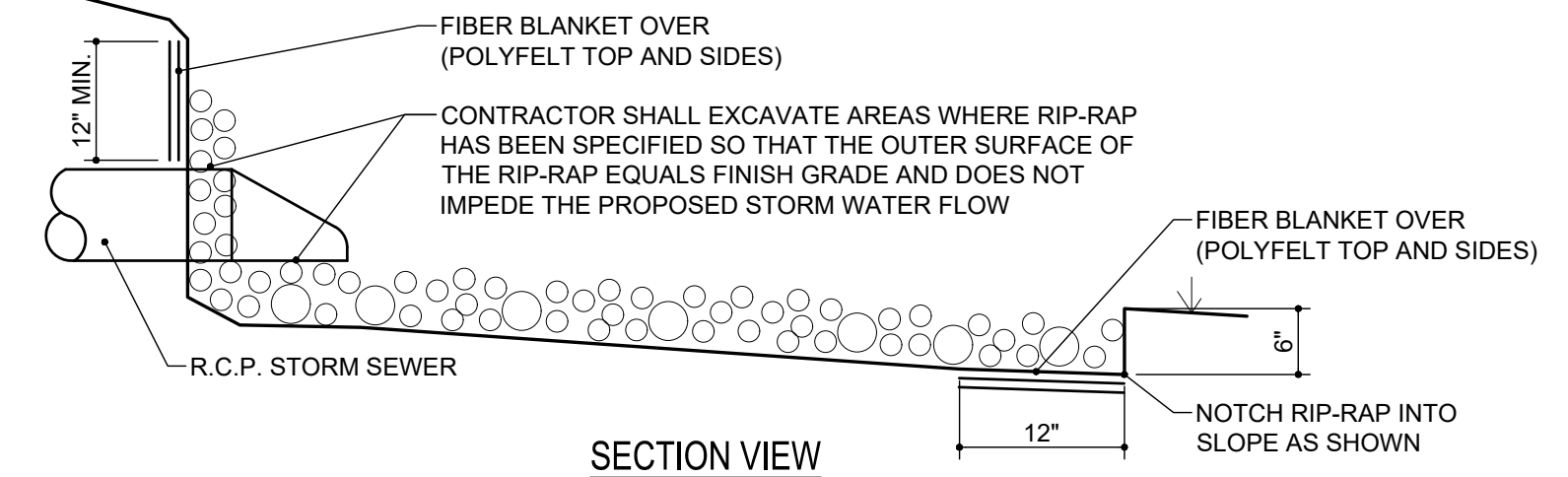
MAINTENANCE

- INSPECT THE ROCK DAM AND BASIN AFTER EACH STORM EVENT.
- REMOVE SEDIMENT WHEN IT ACCUMULATES TO HALF THE DESIGN VOLUME (MARKED BY A STAKE).
- CHECK THE DAM AND ABUTMENTS FOR EROSION, PIPING, OR ROCK DISPLACEMENT, AND REPAIR IMMEDIATELY.
- IF THE BASIN DOES NOT DRAIN BETWEEN STORMS, REPLACE THE STONE ON THE UPSTREAM FACE OF THE DAM.
- IF THE BASIN DRAINS TOO RAPIDLY FOLLOWING A STORM (I.E., LESS THAN 6 HRS.), ADD INDOT CA NO. 5 GRAVEL ON THE UPSTREAM FACE OF THE DAM.
- ONCE THE CONTRIBUTING DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED, (A) REMOVE WATER AND SEDIMENT FROM THE BASIN; (B) REMOVE THE DAM, DISPOSING OF THE ROCK IN DESIGNATED DISPOSAL AREAS; (C) SMOOTH THE SITE TO BLEND WITH THE SURROUNDING AREA; AND (D) STABILIZE.

COMMON CONCERNS:
FAILURE FROM PIPING ALONG ABUTMENTS-BECAUSE THE FILTER MATERIAL WAS NOT PROPERLY INSTALLED OR THE EARTH ABUTMENTS ARE TOO STEEP. STONE DISPLACEMENT FROM FACE OF DAM-BECAUSE STONE SIZE IS TOO SMALL OR THE FACE IS TOO STEEP. EROSION BELOW DAM BECAUSE THE APRON WAS NOT EXTENDED TO STABLE GRADE. EROSION OF ABUTMENTS DURING SPILLWAY FLOW-BECAUSE THE ROCK ABUTMENT IS NOT HIGH ENOUGH. SEDIMENT CARRIED THROUGH SPILLWAY-BECAUSE THE DRAINAGE AREA IS TOO LARGE; TO SOLVE, DIVERT RUNOFF FROM THE UNDISTURBED AREA AWAY FROM THE BASIN. SEDIMENT LOSS THROUGH DAM-BECAUSE THE LAYER OF AGGREGATE ON THE UPSTREAM FACE IS NOT THICK ENOUGH OR IS TOO COARSE TO RESTRICT FLOW THROUGH THE DAM.



PLAN VIEW



SECTION VIEW

RIP-RAP REQUIREMENTS:

- CONTRIBUTING DRAINAGE AREA: 100 ACRES MAXIMUM.
CAPACITY: PEAK RUNOFF FROM 10-YR. FREQUENCY, 24-HR. DURATION STORM EVENT.
APRON: DESIGN DEPENDS ON CHANNEL DEFINITION, BUT IS LONG ENOUGH TO DISSIPATE RUNOFF ENERGY. SET ON ZERO GRADE, STRAIGHT AND ALIGNED WITH THE RECEIVING STREAM. (IF SITE CONDITIONS REQUIRE A CURVE, SET IT NEAR THE UPSTREAM END.)
FOUNDATION: GEOTEXTILE FABRIC FOR STABILIZATION AND FILTRATION OR WELL-GRADED GRAVEL FILTER LAYER AT LEAST 6 IN. THICK.
MATERIAL: HARD, ANGULAR, AND HIGHLY WEATHER-RESISTANT RIPRAP STONE OF 6 - 8 INCHES IN SIZE.
THICKNESS: 12 IN. MINIMUM OR TWO TIMES THE D 50 STONE DIAMETER,WHICHEVER IS GREATER.

INSTALLATION:

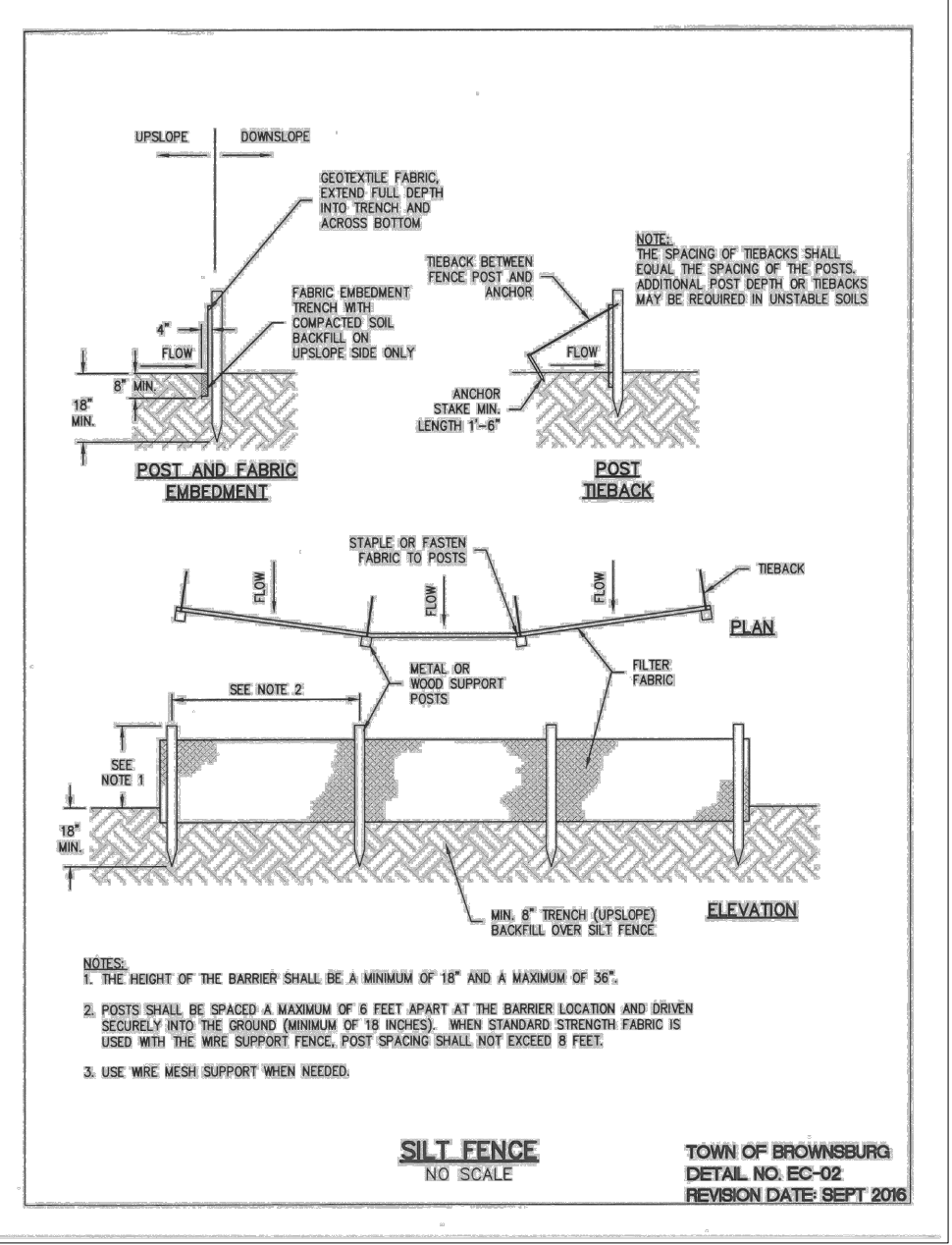
- EXCAVATE THE APRON AREA SUBGRADE BELOW DESIGN ELEVATION TO ALLOW FOR THICKNESS OF THE FILTER (OR GRAVEL LAYER) AND THE RIPRAP. (THIS OVER-EXCAVATION GREATLY INCREASES THE AMOUNT OF SPOIL.)
- COMPACT ANY FILL USED IN THE SUBGRADE TO THE DENSITY OF THE SURROUNDING UNDISTURBED MATERIAL, AND SMOOTH ENOUGH TO PROTECT FABRIC FROM TEARING.
- PLACE THE GEOTEXTILE FABRIC (OR GRAVEL LAYER) ON THE COMPACTED AND SMOOTHED FOUNDATION. IF MORE THAN ONE FABRIC PIECE IS NEEDED, THE UPSTREAM PIECE SHOULD OVERLAP THE DOWNSTREAM PIECE BY AT LEAST 1 FT.
- INSTALL THE RIPRAP TO THE LINES AND ELEVATIONS SHOWN IN THE DESIGN. IF THE CHANNEL IS POORLY DEFINED, THE FINAL CROSS-SECTION SHOULD BE LEVEL OR SLIGHTLY DEPRESSED IN THE MIDDLE; IF WELL DEFINED, THE FILTER (OR GROUND LAYER) AND RIPRAP SHOULD EXTEND TO THE TOP OF THE BANK.
- IF THE GEOTEXTILE FABRIC TEARS WHEN PLACING TH RIPRAP, REPAIR IMMEDIATELY BY LAYING AND STAPLING A PIECE OF FABRIC OVER THE DAMAGE AREA, OVERLAPPING THE UNDAMAGED AREAS BY AT LEAST 12 INCHES.
- MAKE SURE THE TOP OF THE RIPRAP APRON IS LEVEL WITH OR SLIGHTLY BELOW THE RECEIVING STREAM. (RIPRAP SHOULD NOT RESTRICT THE CHANNEL OR PRODUCE AN OVERFALL.)
- BLEND THE RIPRAP SMOOTHLY TO THE SURROUNDING GRADE.
- STABILIZE ALL DISTURBED AREAS IMMEDIATELY FOLLOWING INSTALLATION.

MAINTENANCE:

- INSPECT ROCK CHUTES AFTER STORM EVENTS FOR STONE DISPLACEMENT AND FOR EROSION AT THE SIDES AND ENDS OF THE APRON.
- MAKE NEEDED REPAIRS IMMEDIATELY; USE APPROPRIATE SIZE STONE; AND DO NOT PLACE THEM ABOVE FINISHED GRADE.

COMMON CONCERNS:

FOUNDATION NOT EXCAVATED DEEP ENOUGH OR WIDE ENOUGH--RIPRAP RESTRICTS THE FLOW CROSS SECTION, RESULTING IN EROSION AROUND THE APRON AND SCOUR HOLES AT THE OUTLET.
RIPRAP APRON ON ZERO GRADE--



SILT FENCE DETAIL

NOT TO SCALE

3
C502

ROCK DAM

NOT TO SCALE

8
C502

RIP-RAP DETAIL

NOT TO SCALE

7
C502

TEMPORARY CONSTRUCTION ENTRANCE

NOT TO SCALE

1
C502

Appendix B

Inspection Schedule

<u>Inspection Frequency</u>	<u>Maintenance Item</u>	<u>Maintenance Follow-up</u>	<u>Action Taken</u>
Annual & Post Major Storm Event		Vegetation	Routine mowing to a minimum 3 in.
Semi -Annually & Post Major Storm Events	Pond Banks	Erosion on Embankment	Erosion Control Measure will be repaired immediately
Semi-Annually & Post Major Storm Events	Pond Banks	Animal Burrows	Burrows should be removed at the time of routine mowing
Annually & Post Major Storm Events	Drains	Drains Clear & Functioning	Drains shall be inspected to ensure positive drainage
		Leaks or Seeps	Leaks shall be repaired immediately to ensure positive flow
Semi-Annually & Post Major Storm Events		Slope Protection Failure	Erosion Control Measure will be repaired immediately
		Obstructions	Obstructions shall be removed during routine mowing
Annual & Post Major Storm Event		Outlet Pipe Blocked	Outlet shall be cleared of debris immediately upon finding
Semi -Annually & Post Major Storm Events		Debris Removed from Trash Guard	Obstructions shall be removed during routine mowing
		Sediment Build-up	Sediment shall be removed at a depth of 2 inches
Annually & Post Major Storm Events		Pipe Condition	Pipes shall be inspected and repaired if needed
Annually & Post Major Storm Events		Outfall Channel Function	Erosion Control Measure will be repaired immediately
Monthly & Post Major Storm Events		Sediment Build-up	Sediment shall be removed at a depth of 2 inches
Monthly & Post Major Storm Events	Miscellaneous	Erosion at Outfalls	Erosion Control Measure will be repaired immediately
		Encroachment into Easements	Encroachments shall be removed from all easements
		Complaints from Surrounding Owners	Complaints shall be heard and considered
		Public Hazards	All hazards to public safety shall be removed immediately
Quarterly / Major Storm Event	Impervious Surfaces	Drainage Flow to Collection Point	Remove obstructions
Quarterly / Major Storm Event	Swales	Drainage Flow	Remove obstructions
Quarterly / Major Storm Event	Storm Pipes / Cleanouts	Pipe Blockage	Remove obstructions / Flush
Annual	Hydrodynamic Separator	Debris, oil, sediment buildup	Remove obstructions and clean manhole. Refill manhole to invert of outlet
Semi-Annually & Post Major Storm Events	Volume Control Facilities	Debris and or sediment buildup	Remove debris and sediment to allow proper flow

**APPENDIX C
BMP CHECKLIST**

Maintenance Guide

One of Arcadia's advantages is the ease of maintenance. Like any system that collects pollutants, the Arcadia hydrodynamic separator must be regularly maintained for continued effectiveness. Maintenance is a simple procedure performed using a vacuum truck or similar equipment. The system is designed to minimize the volume of water lost during routine maintenance, reducing disposal costs.

Contractors can access the pollutants stored in the manhole through the manhole cover. This allows them to gain vacuum hose access to the bottom of the manhole to remove sediment and trash. There is no confined space entry necessary for inspection or maintenance.

The entire maintenance procedure typically takes 2 to 4 hours, depending on the system's size, the amount of captured material, and the vacuum truck's capacity.

Local regulations may apply to the maintenance procedure. Safe and legal disposal of pollutants is the responsibility of the maintenance contractor. Maintenance should be performed only by a qualified contractor.

Inspection and Cleaning Cycle

Periodic inspection is necessary to determine the need for and frequency of maintenance. Inspections should begin as soon as construction is complete and then on an annual basis ongoing. Under normal use, the system will need to be cleaned every 1-3 years.

Sites that have excessive oil, fuel or sediment runoff may shorten the maintenance cycle. Periodic inspection is important.

Determining When to Clean

To determine the sediment depth, the maintenance contractor should lower a stadia rod into the manhole until it reaches the top of the captured sediment. Mark this spot on the rod, then continue pushing the rod through the sediment until it reaches the bottom of the sump. Next, mark the second spot on the rod then compare the two markings to determine the depth of the captured sediment.

Maintenance should occur when the sediment has reached a depth of 18" (450 mm).

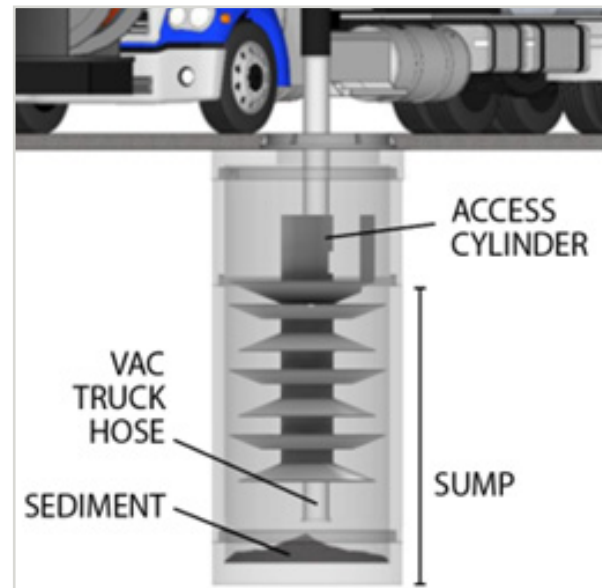
Arcadia Storage Capacities

Model	Manhole Diameter in (mm)	Total System Volume Gallons (Liters)	Treatment Chamber Capacity Gallons (Liters)	Standard Sediment Capacity (18" depth) Yards ³ (m ³)	NJDEP Sediment Capacity (50% of Standard Depth) Yards ³ (m ³)
AR3	36 (914)	242 (917)	203 (767)	0.39 (0.30)	0.19 (0.15)
AR4	48 (1219)	635 (2402)	564 (2135)	0.70 (0.53)	0.35 (0.27)
AR5	60 (1524)	991 (3753)	881 (3336)	1.09 (0.83)	0.55 (0.42)
AR6	72 (1829)	1428 (5404)	1269 (4804)	1.57 (1.20)	0.79 (0.60)
AR8	96 (2438)	4136 (15656)	3854 (14588)	2.79 (2.14)	1.40 (1.07)
AR10	120 (3048)	7931 (30022)	7490 (28354)	4.36 (3.34)	2.18 (1.67)

Maintenance Procedures

1. Remove the manhole cover to provide access to the pollutant storage. Pollutants are stored in the sump, below the unit assembly. Access this area through the access cylinder (larger than 10" (254 mm) diameter for all sizes).
2. Use a vacuum truck or other similar equipment to remove all water, debris, oil and sediment. See Figure 1.
3. Use a high pressure hose to clean the manhole of all remaining sediment and debris. Then, use the vacuum truck to remove the water.
4. Fill the clean manhole with water until the level reaches the invert of the outlet pipe.
5. Replace the manhole cover.
6. Dispose of the polluted water, oil, sediment and trash at an approved facility.
 - a. Local regulations prohibit the discharge of solid material into the sanitary system. Check with the local sewer authority for authorization to discharge the liquid.
 - b. Some localities treat the pollutants as leachate. Check with local regulators about disposal requirements.
 - c. Additional local regulations may apply to the maintenance procedure.

Figure 1





INSPECTION REPORT

POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Hydrodynamic Separator	Asset ID	
Design Criteria	<p>This hydrodynamic separator was designed to remove Total Suspended Solids (TSS) from stormwater runoff. The inspection and maintenance of this stormwater device should follow the manufacturer's guidelines and items outlined in this document.</p>	Location	Coordinates, Driving Directions
		Manufacturer, Model & Serial Number	
Information			
<p>Is a Diversion Structure present? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Is there land use upstream with high probability of pollutants? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Can the unit be accessed directly from INDOT right-of-way? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Will traffic control be required for vac truck access? <input type="checkbox"/> Yes <input type="checkbox"/> No</p>			
Inspection Criteria			
<u>Maintenance Issues:</u>			
Floatables – Does trash/debris buildup cover 100% of the water surface? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Sediment – Does sedimentation buildup exceed 75%? <input type="checkbox"/> Yes <input type="checkbox"/> No Depth: _____ inches			
Visible pollution – Is there an oil sheen, etc.? <input type="checkbox"/> Yes <input type="checkbox"/> No Depth: _____ inches			
Is there staining present on structures, pipes, or pavement? <input type="checkbox"/> Yes <input type="checkbox"/> No Description: _____.			
Is there an odor present? <input type="checkbox"/> Yes <input type="checkbox"/> No Description: _____.			
Is the inflow or outflow point blocked? <input type="checkbox"/> Yes <input type="checkbox"/> No Description: _____.			
Is the Diversion structure blocked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A Description: _____.			
Is access to the unit blocked? <input type="checkbox"/> Yes <input type="checkbox"/> No Description: _____.			
<u>Structural Issues:</u>			
Is there structural damage to the Manufactured Device? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Is the Manufactured Device casting broken or missing? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Is there structural damage to the Diversion Structure? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Is the Diversion Structure casting broken or missing? <input type="checkbox"/> Yes <input type="checkbox"/> No			
<u>Comments:</u>			
_____.			
_____.			
_____.			
_____.			
_____.			
_____.			
Last Inspected		Current Inspection	



INSPECTION REPORT

POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Hydrodynamic Separator	Asset ID	
Typical Corrective Actions	<ul style="list-style-type: none">• Floatables – Remove floatable trash and debris from unit• Sediment buildup – Remove sediment from unit per manufacture’s guidelines• Visible pollution – Remove oil from unit• Inflow and outflow points – Remove blockages• Diversion structure – Remove any blockages, note if device has been installed inline, repair any damages• Inlets and manholes – Repair damages• Maintenance accessibility – Blocked or missing maintenance access		
Maintenance Recommendations			
Last Inspected		Current Inspection	



INSPECTION REPORT

POST-CONSTRUCTION STORMWATER MEASURE

Structure Type	Hydrodynamic Separator	Asset ID	
Plans and Plan Cross Section(s)			
INSPECTED BY		APPROVED BY	
Printed Name/Title		_____ Printed Name/Title	

