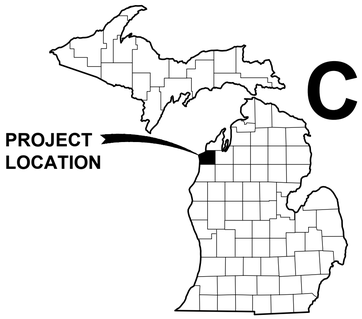
CONSTRUCTION PLANS

FOR

CRSYTAL LAKE BEULAH BEACH REMEDIATION AND STORM WATER REDUCTION PROJECT

VILLAGE OF BEULAH, BENZIE COUNTY, MICHIGAN



VICINITY MAP
SCALE

OWNER

VILLAGE OF BEULAH
7228 COMMERCIAL STREET
BEULAH, MI 49617
CONTACT: DAN HOOK

ENGINEER

GOSLING CZUBAK ENGINEERING SCIENCES, INC.
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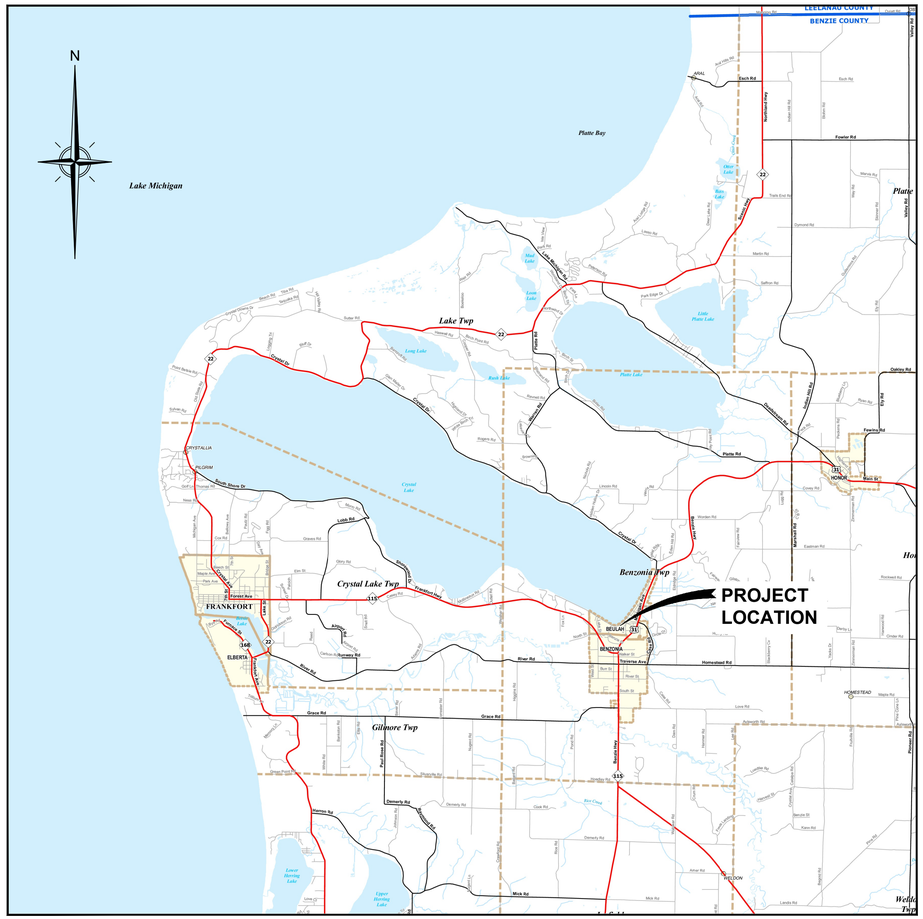
UTILITY CONTACTS

NAME OF OWNER	TYPE OF UTILITY
DTE ENERGY 231.590.2608	GAS
CONSUMER'S ENERGY 248.877.7744	ELECTRIC
CHARTER COMMUNICATIONS 800.778.9140	CABLE TV
AT&T 231.409.7939	TELEPHONE
VILLAGE OF BEULAH 231.882.4451	SEWER & WATER



LOCATION MAP
NOT TO SCALE

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Know what's below.
Call before you dig.

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1/7/24

BID SET - 01/06/2025

ORIGINAL SHEET SIZE IS 22x34 - HALF SCALE SHEET IS 11x17

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CRYSTAL LAKE BEULAH BEACH REMEDIATION & STRWTR RED PROJECT

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ALL PERMITS WILL BE OBTAINED BEFORE CONSTRUCTION BEGINS

1. THE CONTRACTOR SHALL ENSURE THAT ALL CONSTRUCTION IS IN COMPLIANCE WITH BENZIE COUNTY'S STANDARDS, ORDINANCES AND REGULATIONS, AND ALL OTHER AGENCIES HAVING JURISDICTION AND UTILITY PROVIDER REQUIREMENTS ARE MET.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING ANY EXISTING IMPROVEMENTS OR UNDERGROUND FACILITIES THAT ARE DAMAGED.
3. THE CONTRACTOR SHALL LEAVE AN EMERGENCY PHONE NUMBER WITH THE POLICE AND FIRE DEPARTMENTS AND KEEP THEM INFORMED OF CONSTRUCTION ACTIVITIES AND OF ANY DETOURS.
4. CONTRACTOR SHALL POST EMERGENCY PHONE NUMBERS AT THE SITE FOR THE PUBLIC WORKS, AMBULANCE, POLICE, FIRE DEPARTMENT, AND UTILITY LOCATE COMPANIES AT ALL TIMES.
5. THE CONTRACTOR SHALL CONDUCT THEIR WORK SO AS NOT TO INTERFERE WITH OR HINDER THE PROGRESS OF THE COMPLETION OF WORK BEING PERFORMED BY OTHER CONTRACTORS.
6. THE CONTRACTOR AND ALL SUBCONTRACTORS INVOLVED IN THE PROJECT, SHALL ASSUME LIABILITY, FINANCIAL OR OTHERWISE, IN CONNECTION WITH THEIR CONTRACT AND SHALL PROTECT AND HOLD HARMLESS THE ENGINEER AND THE ENGINEER'S REPRESENTATIVES FROM ANY AND ALL DAMAGES OR CLAIMS THAT MAY ARISE BECAUSE OF INCONVENIENCE, DELAYS, OR LOSS EXPERIENCED BECAUSE OF THE PRESENCE AND OPERATIONS OF OTHER CONTRACTORS OR CONSULTANTS WORKING ADJACENT TO OR WITHIN THE LIMITS OF THE PROJECT.
7. CONTRACTOR SHALL REPAIR ANY DAMAGE TO PROPERTY DURING CONSTRUCTION. DAMAGED PROPERTY SHALL BE RETURNED TO THE EXISTING CONDITIONS AT A MINIMUM.
8. PUBLIC SAFETY AND TRAFFIC CONTROL SHALL BE PROVIDED IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT) STANDARDS AND SPECIFICATIONS AND AS DIRECTED BY VILLAGE OF BEULAH DPW STAFF AND BENZIE COUNTY ROAD COMMISSION. SAFE VEHICULAR AND PEDESTRIAN ACCESS SHALL BE PROVIDED AROUND THE SITE AT ALL TIMES. ALL DETOURS/LANE CLOSURES MUST BE HANDLED USING TRAFFIC CONTROL DEVICES CONFORMING TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), CURRENT EDITION, AND MUST BE APPROVED BY MDOT AND THE BMIC.
9. ADEQUATE TEMPORARY OFF STREET PARKING FOR CONSTRUCTION WORKERS SHALL BE PROVIDED. PARKING ON NON-SURFACED AREAS SHALL BE PROHIBITED IN ORDER TO ELIMINATE THE CONDITION, WHEREBY MUD FROM CONSTRUCTION AND/OR WORKER'S VEHICLES IS TRACKED ONTO THE PAVEMENT CAUSING HAZARDOUS ROADWAY AND DRIVEWAY CONDITIONS.
10. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SITE FEATURES AND UTILITIES, AND REPORT ALL FINDINGS AND DISCREPANCIES TO THE ENGINEER.
11. ALL WORK, INSTALLATION, PROCEDURES, MATERIALS, AND TESTING ASSOCIATED WITH THIS PROJECT SHALL CONFORM TO THE FOLLOWING STANDARD SPECIFICATIONS AND REQUIREMENTS INSOFAR AS THEY APPLY (EXCEPT ALL REQUIREMENTS FOR METHOD OF MEASUREMENT OR PAYMENT DO NOT APPLY):
   - 11.1. STANDARD SPECIFICATIONS AS PUBLISHED BY THE MDOT, LATEST EDITIONS.
   - 11.2. NATIONAL MANUAL ON TRAFFIC CONTROL DEVICES, LATEST EDITION.
   - 11.3. UNITED STATES AMERICANS WITH DISABILITIES ACT.
   - 11.4. VILLAGE OF BEULAH'S ORDINANCES AND REGULATIONS.
   - 11.5. ALL ORDINANCES, LAWS, REGULATIONS, AND STANDARDS OF ALL PERTINENT AUTHORITIES HAVING JURISDICTION OVER THE WORK ASSOCIATED WITH THIS PROJECT.
   - 11.6. ANY INCONSISTENCIES, DISCREPANCIES OR CONFLICTS DISCOVERED BETWEEN THE VARIOUS STANDARDS, SPECIFICATIONS OR LAWS BY GOVERNING AUTHORITIES AND/OR THESE PLANS AND SPECIFICATIONS, THE MOST STRINGENT SHALL BE BINDING AND APPLICABLE TO THIS PROJECT.

CIVIL SITE NOTES:

1. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES FOR SAFETY PRECAUTIONS OR PROGRAMS. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE CONTRACTOR'S FAILURE TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. PRIOR TO CONSTRUCTION, THE ENGINEER AND REVIEWING AGENCY MUST APPROVE ANY ALTERATION OR VARIANCE FROM THE PLANS. ANY VARIATIONS FROM THESE PLANS SHALL BE PROPOSED ON THE CONSTRUCTION FIELD PRINTS AND TRANSMITTED TO THE ENGINEER.
3. ANY INSPECTION BY THE VILLAGE OF BEULAH, COUNTY, STATE OR THE ENGINEER SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH ALL APPLICABLE CODES AND AGENCY REQUIREMENTS.
4. REMOVAL AND REPLACEMENT QUANTITIES ARE APPROXIMATE AND THE EXACT LOCATION OF REMOVAL LIMITS SHALL BE VERIFIED IN THE FIELD AND APPROVED BY THE INSPECTOR PRIOR TO THE START OF CONSTRUCTION.
5. ALL LANDSCAPE AREAS SHALL BE FILLED WITH A MINIMUM OF 6 INCHES OF TOPSOIL.
6. THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL REQUIRED CONSTRUCTION PERMITS AND BONDS PRIOR TO CONSTRUCTION.
7. ALL SIGNAGE PROPOSED FOR THIS SITE SHALL BE IN COMPLIANCE WITH THE ORDINANCES OF THE VILLAGE.
8. THE CONTRACTOR SHALL HAVE A COPY OF THE CONTRACT DOCUMENTS INCLUDING THE PLANS, SPECIFICATIONS, COPIES OF REQUIRED CONSTRUCTION PERMITS, EROSION AND SEDIMENT CONTROL PLANS AND INSPECTION REPORTS AT THE JOB SITE AT ALL TIMES.
9. ALL COPIES OF COMPACTION, CONCRETE AND OTHER REQUIRED TEST RESULTS ARE TO BE SENT TO THE OWNER, VILLAGE DPW DIRECTOR, AND ENGINEER OF RECORD DIRECTLY FROM THE TESTING COMPANY.
10. THE CONTRACTOR SHALL THOROUGHLY CHECK AND COORDINATE THE ARCHITECTURAL, CIVIL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION, AND ALL OTHER PLANS PRIOR TO COMMENCING CONSTRUCTION. THE OWNER AND ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY PRIOR TO COMMENCING CONSTRUCTION.
11. ALL UTILITY CONDUITS SHALL BE FOUR (4) INCHES, UNLESS OTHERWISE INDICATED, U.L. LISTED SCHEDULE 40 PVC INSTALLED AT A MINIMUM OF 24" BELOW FINAL GRADE, UNLESS THE UTILITY COMPANY REQUIRES DIFFERENT INSTALLATION METHODS. ALL CONDUITS FOR GAS, ELECTRIC, AND COMMUNICATIONS SHALL BE INSTALLED PRIOR TO STREET/PAVEMENT INSTALLATION.
12. ALL UTILITY CONDUITS SHALL HAVE FULL WIRES INSTALLED. THE CONDUITS ENDS SHALL BE TEMPORARILY SEALED WITH TAPE AND 2"X4" INSTALLED AT EACH END. THE 2"X4" SHALL BE COLOR CODED TO MATCH THE STANDARD UTILITY LOCATING COLORS.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY RELOCATIONS INCLUDING BUT NOT LIMITED TO: UNDERGROUND AND OVERHEAD UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS AND POLES, IRRIGATION STRUCTURES, AND OTHER EXISTING APPURTENANCES AS REQUIRED TO FACILITATE THE INSTALLATION OF THE PROPOSED IMPROVEMENTS. ALL RELOCATION WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES/DISTRICT SPECIFICATIONS AND SHALL BE APPROVED BY THE GOVERNING AUTHORITIES/OWNERS PRIOR TO COMMENCEMENT OF ANY WORK. ALL RESULTING COSTS SHALL BE DEEMED TO BE INCLUDED IN THE CONTRACTOR'S COST/BID.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING ALL AREAS TO BE EXCAVATED OR FILLED.
15. THE CONTRACTOR SHALL NOT TAKE ADVANTAGE OF ANY APPARENT ERROR OR OMISSION ON THE PLANS OR SPECIFICATIONS. IN THE EVENT THE CONTRACTOR DISCOVERS ANY APPARENT ERROR OR DISCREPANCY, THEY SHALL IMMEDIATELY CALL UPON THE ENGINEER FOR THEIR INTERPRETATION AND DECISION.
16. THE CONTRACTOR SHALL COMPLY WITH ALL LEGAL ROAD RESTRICTIONS IN THE HAULING OF MATERIALS ON PUBLIC ROADS/STREETS BEYOND THE LIMITS OF THE WORK. A SPECIAL HAUL PERMIT WILL NOT RELIEVE THE CONTRACTOR OF LIABILITY FOR ANY DAMAGE WHICH MAY RESULT FROM THE MOVING OF MATERIAL OR EQUIPMENT.

CIVIL EROSION AND SEDIMENT CONTROL NOTES:

1. ALL SOIL AND EROSION MEASURES SHALL CONFORM TO AND BE IN COMPLIANCE WITH VILLAGE OF BEULAH, BENZIE COUNTY AND MICHIGAN DEPARTMENT OF TRANSPORTATION.
2. ALL WATER POLLUTION CONTROL BEST MANAGEMENT PRACTICES (BMP'S) SHOWN ON THESE PLANS ARE DIAGRAMMATIC. THE CONTRACTOR SHALL DETERMINE ACTUAL LOCATIONS THAT ARE APPROPRIATE FOR EACH PHASE OF CONSTRUCTION.
3. ALL SOIL AND EROSION CONTROL MEASURES SHALL CONFORM TO BMIC AND CHIPPEWA COUNTY'S STANDARDS.
4. ALL PERIMETER SILT FENCE SHALL BE INSTALLED PRIOR TO ANY GRADING.
5. EROSION CONTROL MEASURES SHOULD BE CONSIDERED ALONG THE FACE OF EACH SLOPE. EROSION CONTROL MEASURES TYPICALLY EMPLOYED WOULD INCLUDE, SILT FENCES, INLET PROTECTION, DITCH CHECKS AND TIMELY SEEDING OR SODDING.
6. ALL REMOVABLE PROTECTIVE EROSION CONTROL DEVICES SHOWN SHALL BE IN PLACE AT THE END OF EACH WORKING DAY.
7. AFTER A RAINFALL EVENT, ALL SILT AND DEBRIS SHALL BE REMOVED FROM ALL BMP'S.
8. GRADED AREAS AROUND THE PERIMETER MUST DRAIN AWAY FROM THE FACE OF THE SLOPE AT THE CONCLUSION OF EACH WORKING DAY
9. DURING CONSTRUCTION, THE CONTRACTOR SHALL TAKE PRECAUTION TO ENSURE THAT SEDIMENTATION DAMAGE WILL NOT OCCUR. THE CONTRACTOR SHALL RESTRICT THE AMOUNT OF LAND AREA GRADED AT ANY ONE TIME TO A MINIMUM. IT IS RECOMMENDED DURING AND AFTER GRADING, THAT A TEMPORARY VEGETATIVE COVER BE ESTABLISHED TO PROTECT THE BARE SOIL SURFACE.
10. THE CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATER CREATES A HAZARDOUS CONDITION.
11. THE ENGINEER RESERVES THE RIGHT TO MAKE CHANGES OR MODIFICATIONS TO THE EROSION AND SEDIMENT CONTROL PLAN AS DEEMED NECESSARY.
12. TEMPORARY EROSION PROTECTION IS REQUIRED FOR MANUFACTURED SLOPES PRIOR TO PERMANENT PLANTING.
13. AREAS SHALL BE MAINTAINED IN SUCH A STATE FOR FIRE ACCESS AT ALL TIMES (INCLUDING ACCESS TO NEIGHBORING PROPERTIES).
14. NO OBSTRUCTION OR DISTURBANCE OF NATURAL DRAINAGE COURSES OR EXISTING STORM DRAIN INLETS SHALL OCCUR, UNLESS ADEQUATE TEMPORARY/PERMANENT DRAINAGE FACILITIES HAVE BEEN APPROVED AND INSTALLED TO CARRY SURFACE WATER TO THE NEAREST PRACTICAL STREET, STORM DRAIN, OR NATURAL WATERCOURSE.
15. THE CONTRACTOR SHALL CONDUCT THEIR OPERATIONS IN SUCH A MANNER THAT STORM RUNOFF WILL BE CONTAINED WITHIN THE PROJECT OR CHANNELED INTO THE STORM DRAINAGE SYSTEM WHICH SERVES THE RUNOFF AREA. STORM RUNOFF FROM ONE AREA SHALL NOT BE ALLOWED TO DIVERT TO ANOTHER RUNOFF AREA.
16. ANY EROSION AND SEDIMENT CONTROL PLAN CONTAINED IN THE PROJECT PLANS SHOULD BE CONSIDERED A GENERAL GUIDELINE TO BE UTILIZED FOR EROSION CONTROL PREVENTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL EROSION AND DISPLACED SEDIMENT DOES NOT MIGRATE OFF SITE. IF UNEXPECTED EROSION OR SEDIMENTATION OCCURS, OR IF THE EROSION PLAN STRUCTURES BECOME DAMAGED, THE CONTRACTOR SHALL PROVIDE SUFFICIENT MEASURES TO REPAIR, REPLACE, OR INSTALL EROSION CONTROL STRUCTURES TO ENSURE OFF-SITE DAMAGE DOES NOT OCCUR. ANY SEDIMENT OR EROSION DAMAGE WHICH OCCURS OFF-SITE SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.
17. CONFORMANCE WITH THE REQUIREMENTS OF THESE PLANS SHALL IN NO WAY RELIEVE THE CONTRACTOR FROM THEIR RESPONSIBILITIES TO THE SITE AND ADJACENT PROPERTIES. TEMPORARY EROSION CONTROL SHALL CONSIST OF, BUT NOT LIMITED TO, CONSTRUCTING SUCH FACILITIES AND TAKING SUCH MEASURES AS ARE NECESSARY TO PREVENT, CONTROL AND ABATE WATER, MUD, AND EROSION DAMAGE TO PUBLIC AND PRIVATE PROPERTY AS A RESULT OF THE CONSTRUCTION OF THIS PROJECT.
18. FILL AREAS, WHILE BEING BROUGHT UP TO GRADE AND DURING PERIODS OF COMPLETION PRIOR TO FINAL GRADE, SHALL BE PROTECTED BY VARIOUS MEASURES TO ELIMINATE EROSION AND THE SILTATION OF DOWNSTREAM FACILITIES AND ADJACENT AREAS. THESE MEASURES MAY INCLUDE, BUT SHALL NOT BE LIMITED TO: TEMPORARY DOWNDRAINS, EITHER IN THE FORM OF PIPES OR PAVED DITCHES WITH PROTECTED OUTFALL AREAS; GRADED BERMS AROUND AREAS TO ELIMINATE EROSION OF FILL SLOPES BE SURFACE RUNOFF; CONFINED PONDING AREAS TO DESILT RUNOFF; TEMPORARY CHECK DAMS IN THE TOE SLOPE DITCHES TO DESILT RUNOFF; PROTECTION SUCH AS SAND BAGS AROUND INLETS WHICH HAVE NOT BEEN BROUGHT UP TO GRADE; AND EARTH BERMS AND APPROPRIATE GRADING TO DIRECT DRAINAGE AWAY FROM THE EDGE OF THE TOP OF SLOPES SHALL BE CONSTRUCTED AND MAINTAINED ON FILL AREAS WHERE EARTHWORK OPERATIONS AREA NOT IN PROGRESS.
19. CLEARING AND GRUBBING SHOULD BE LIMITED TO AREAS THAT WILL RECEIVE IMMEDIATE GRADING. EROSION CONTROL MEASURES WILL BE REQUIRED TO PROTECT AREAS THAT HAVE BEEN CLEARED AND GRUBBED PRIOR TO GRADING OPERATIONS. THESE MEASURES MAY INCLUDE BUT SHALL NOT BE LIMITED TO: GRADED DITCHES; BRUSH BARRIERS; AND SILT FENCES. CARE SHALL BE EXERCISED TO PRESERVE VEGETATION BEYOND THE LIMITS OF GRADING.
20. PAVED SURFACES WITH ACCUMULATED MATERIALS SHALL BE WASHED AND SWEPT WITH MECHANICAL EQUIPMENT AFTER PAVEMENT IS CONSTRUCTED, BUT PRIOR TO FINAL ACCEPTANCE.
21. VILLAGE OF BEULAH APPROVAL OF THESE PLANS DOES NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR THE CORRECTION OF ERRORS AND OMISSIONS DISCOVERED DURING CONSTRUCTION. UPON REQUEST, THE REQUIRED PLAN REVISIONS SHALL BE PROMPTLY SUBMITTED TO THE ENGINEER FOR APPROVAL.

CIVIL PAVEMENT, SUB-GRADE, AND TRAFFIC CONTROL NOTES:

1. MATERIALS AND CONSTRUCTION TECHNIQUES SHALL BE IN ACCORDANCE WITH THE APPLICABLE SECTIONS OF THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION PUBLISHED BY THE MICHIGAN DEPARTMENT OF TRANSPORTATION (MDOT).
2. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH THE VILLAGE OF BEULAH REQUIREMENTS AND THE REQUIREMENTS PRESENTED IN THE CURRENT BUILDING CODE.
3. COMPACTION TESTING OF THE SUB-GRADE WILL BE PERFORMED BY THE CONTRACTOR AND WITNESSED BY THE OWNER'S ENGINEER.
4. ENTRANCE WORK AND UTILITY WORK SHALL BE COORDINATED WITH THE VILLAGE OF BEULAH AND BENZIE COUNTY ROAD COMMISSION PRIOR TO CONSTRUCTION PROCEEDING.
5. ALL TRAFFIC CONTROL (INCLUDING, BUT NOT LIMITED TO WORK ZONE, TEMPORARY, OR PERMANENT) SHALL BE FURNISHED, INSTALLED, MAINTAINED, RELOCATED, AND/OR REMOVED ACCORDING TO THE LATEST EDITION OF THE MDOT STANDARD SPECIFICATIONS.
6. CONTRACTOR TO REMOVE ALL EXISTING ITEMS (TREES AND GRAVEL) THAT INTERFERE WITH NEW CONSTRUCTION, COST TO BE INCLUDED IN BID ESTIMATE FOR THE CONTRACT.
7. THE CONTRACTOR MUST SUBMIT A MAINTENANCE OF TRAFFIC PLAN AT LEAST FIVE (5) WORKING DAYS PRIOR TO RESTRICTION OR CLOSURE OF ANY STREET.

MDOT RAILROAD ROW NOTES:

1. ALL SURPLUS AND UNSUITABLE MATERIAL SHALL BE EITHER:
   - 1.1. DISPOSED ON THE RAILROAD PROPERTY AND GRADED TO A SMOOTH SURFACE AND SO WATER WILL DRAIN TO RIGHT-OF-WAY LINE AWAY FROM NON-MOTORIZED TRAIL.
   - 1.2. DISPOSED OFF OF RAILROAD PROPERTY AT A LICENSED LANDFILL CERTIFIED IN TAKING NON-HAZARDOUS CONTAMINATED MATERIAL. IF DISPOSED OF AT LANDFILL, DISPOSAL TICKETS MUST BE PRESENTED TO MDOT.
2. SOD AND TOPSOIL SHALL BE STORED SEPARATELY FROM OTHER EXCAVATED MATERIAL AND SHALL BE USED FOR TURF ESTABLISHMENT. TURF RESTORATION SHALL BEGIN WITHIN ONE WEEK OF COMPLETING THE INSTALLATION. RESTORE THE GRADE BY PLACING SOD OR SEED, FERTILIZING AND MULCH. MULCH WHICH HAS BECOME DISPLACED PRIOR TO COMPLETE SEED GERMINATION SHALL BE RESTORED.

CIVIL GRADING, EARTHWORK, AND BACKFILL NOTES:

1. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH VILLAGE OF BEULAH REQUIREMENTS, THE GUIDELINES PRESENTED IN THE CURRENT BUILDING CODE. THE CONTRACTOR SHALL FOLLOW ALL PROCEDURES, RECOMMENDATIONS, AND REQUIREMENTS CONTAINED IN THE CODE, AND THESE REQUIREMENTS SHALL SUPERCEDE ALL INFORMATION AS NOTED ON THESE PLANS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF DISCREPANCIES BEFORE ANY ACTION IS TAKEN.
2. ALL IMPORTED MATERIAL SHALL BE APPROVED BY AN EXPERIENCED CIVIL ENGINEER OR THEIR FIELD REPRESENTATIVE.
3. AREA TO BE CUT OR TO RECEIVE FILL SHOULD BE STRIPPED OF SURFACE VEGETATION AND ORGANIC TOPSOIL. THE STRIPPING SHOULD BE REMOVED FROM THE STORM CHAMBER OR RAIN GARDEN AREAS AND STOCKPILED FOR LATER PLACEMENT IN LANDSCAPED OR COMMON GROUND AREAS, AS APPROPRIATE, ORGANIC TOPSOIL CAN BE RE-USED AS FILL, IF THOROUGHLY MIXED WITH OTHER, ACCEPTABLE, NON-ORGANIC, FILL MATERIALS, AS APPROVED BY THE ENGINEER.
4. FILL AREAS IN PAVEMENT AREAS SHALL BE PLACED TO AT LEAST 95% OF THE MATERIALS STANDARD PROCTER MAXIMUM DRY DENSITY (ASTM D698). THE UPPER 9 INCHES OF NATIVE SUBGRADE IN FILL AREAS AND DETENTION BASIN FILL AREAS SHALL BE RECOMPACTED TO AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTER MAXIMUM DRY DENSITY (ASTM D698).
5. COMPACTION TESTS ARE REQUIRED FOR EACH FILL LIFT. NO LIFT TO EXCEED 12 INCHES IN DEPTH. CONTRACTOR IS RESPONSIBLE FOR ALL PROCTOR AND COMPACTION TEST ON MATERIALS.
6. ALL DUST SHALL BE CONTROLLED BY WATERING WHEN NECESSARY.
7. THE CONTRACTOR SHALL REMOVE ALL VEGETATION AND DEBRIS PRIOR TO ANY GRADING.
8. ALL GRADES SHALL BE TO WITHIN +/- 1 INCH OF THOSE SHOWN ON THE GRADING PLAN WHILE MAINTAINING POSITIVE DRAINAGE.

CIVIL ACCESSIBILITY NOTES:

1. ALL WORK SHALL BE IN CONFORMANCE WITH THE CURRENT VERSION OF THE LOCAL ACCESSIBILITY CODE (BOTH BMIC AND STATE) AND WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT (ADA).
2. ALL RAMPS SHALL NOT BE EXCEED A RUNNING SLOPE OF 1:12 OR 8.33%.
3. RAMPS ARE DEFINED AS ANY WALKWAY BETWEEN SLOPES 1:20 OR 5.00% AND 1:12 OR 8.33% AND SHALL HAVE A MINIMUM CLEAR WIDTH OF 3 FEET AND A MAXIMUM CROSS-SLOPE OF 1:50 OR 2.00%. RAMPS EXCEEDING 30 INCHES OF VERTICAL CHANGE SHALL HAVE INTERMEDIATE (2.00% MAXIMUM SLOPE) LANDINGS HAVING A MINIMUM LENGTH IN DIRECTION OF TRAVEL OF 60 INCHES. BOTTOM LANDINGS SHALL HAVE A MINIMUM LENGTH OF 60 INCHES IN THE DIRECTION OF TRAVEL. LANDINGS SHALL BE AT LEAST THE WIDTH AS THE WIDEST RAMP RUN LEADING TO THE LANDING. LANDINGS AT RAMP DIRECTION CHANGES SHALL HAVE A MINIMUM WIDTH AND LENGTH OF 60 INCHES.
4. THE MAXIMUM CROSS-SLOPE ON ANY WALK OR RAMP SHALL BE 2.00%. ALL ACCESSIBLE PARKING SPACES AND LOADING ZONES SHALL HAVE A MAXIMUM SLOPE OF 2.00% IN ALL DIRECTIONS.
5. ALL ACCESSIBLE ROUTES OF TRAVEL SHALL HAVE A MINIMUM OF THREE (3) FOOT CLEAR WIDTH FOR ACCESSIBLE CONFORMANCE, UNLESS OTHERWISE NOTED PER THE PLANS.
6. TRUNCATED DOMES AS DETECTABLE WARNINGS MAY BE REQUIRED ON WALKS THAT CROSS OR ADJOIN A VEHICULAR WAY WITHOUT A VERTICAL SEPARATION BETWEEN THE WALKWAY AND VEHICULAR WAY.

VILLAGE OF BEULAH, BENZIE COUNTY, AND MDOT CONSTRUCTION NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR CONTACTING VILLAGE OF BEULAH, BENZIE COUNTY, AND/OR MDOT AT LEAST 48 HOURS PRIOR TO POURING CONCRETE, INSTALLING STORM SEWER, INSTALLING WATER LINE SERVICE AND SANITARY SEWER SERVICE, OR OTHERWISE PROVIDING SUCH ADVANCE NOTICE AS MAY BE REQUIRED BY THESE JURISDICTIONS.
2. ALL WORK, MATERIALS, AND INSTALLATION SHALL NOT BE DEEMED SATISFACTORY UNTIL SUCH TIME AS ALL APPROVALS ARE OBTAINED FROM THE JURISDICTIONAL AUTHORITY.
3. THE CONTRACTOR SHALL PROCEED AT THEIR OWN RISK IN PERFORMING ANY WORK PRIOR TO VERIFYING OR RECEIVING ALL NECESSARY PERMITS FOR THE WORK TO BE COMPLETED.
4. CONTRACTOR SHALL BE REQUIRED TO REMOVE AND REPLACE ANY SIGNS THAT NEED TO BE MOVED TO COMPLETE THE WORK. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT.
5. THE CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES.
6. ANY SIDEWALKS, CURB AND GUTTER, OR STREET ROADWAY PAVEMENT DAMAGED IN THE COURSE OF CONSTRUCTION ACTIVITY ON ADJACENT PRIVATE PROPERTY MUST BE REPLACED IN KIND.
7. ALL DISTURBED AREAS WITHIN VILLAGE OF BEULAH AND BENZIE COUNTY RIGHT-OF-WAY SHALL BE RESTORED PER THEIR REQUIREMENTS.

CIVIL STORM AND DRAINAGE NOTES:

1. STORM AND DRAINAGE SYSTEM CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH MDOT STANDARD SPECIFICATIONS AND STANDARD DRAWINGS, LATEST EDITION. ALL STORM SEWER PIPE SHALL BE REINFORCED CONCRETE OR SMOOTH INTERIOR WALL POLYETHYLENE IN ACCORDANCE WITH CURRENT MDOT STANDARD SPECIFICATIONS.
2. STORMWATER AND ALL OTHER UNPOLLUTED DRAINAGE SHALL BE DISCHARGED INTO SUCH SEWERS AS ARE SPECIFICALLY DESIGNED AS STORM SEWER OR TO A NATURAL OUTLET.
3. ALL STORM SEWER SHALL BE DISCHARGED AT AN ADEQUATE NATURAL DISCHARGE POINT. SINKHOLES ARE NOT ADEQUATE DISCHARGE POINTS.
4. ALL STORM SEWER STRUCTURES AND BEDDING REQUIRED FOR STORM SEWER PIPE SHALL BE CONSTRUCTED IN ACCORDANCE WITH VILLAGE OF BEULAH STANDARDS, LASTEST EDITION.
5. ALL TRENCHES UNDER AREAS TO BE PAVED AND UNDER EXISTING PAVED AREAS SHALL BE BACKFILLED AND PLACED IN ACCORDANCE WITH VILLAGE OF BEULAH STANDARDS.
6. ALL TRENCH BACKFILL UNDER PAVEMENT WITHIN PUBLIC RIGHT-OF-WAY SHALL BE GRANULAR BACKFILL. TRENCH BACKFILL UNDER PAVED AREAS AND OUTSIDE OF PUBLIC RIGHT-OF-WAY SHALL BE GRANULAR BACKFILL IN LIEU OF EARTH BACKFILL COMPACTED TO 90% OF THE MODIFIED ASSHTO T-180 COMPACTION TEST ASTM D-1557.
7. JETTING IS NOT AN ACCEPTABLE METHOD OF ACHIEVING BACKFILL BACKFILL COMPACTION. ALL BACKFILL MATERIAL SHALL BE MECHANICALLY COMPACTED TO AT LEAST 95% OF THE MATERIALS STANDARD PROCTOR MAXIMUM DRY DENSITY.
8. MINIMUM COVER OVER PVC PIPE SHALL BE ONE FOOT FROM THE TOP OF RIGID ROADWAY SURFACES OR THE BOTTOM OF FLEXIBLE ROADWAY SURFACES. AT SHALLOW DEPTHS OF COVER (1 FOOT TO 3 FOOT), CLASS 1 OR CLASS II MATERIAL PER ASTM D2321 WITH A MINIMUM OF 95% PROCTOR DENSITY.

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STATE OF MICHIGAN
WILLIAM C. BOTT
ENGINEER
License No. 6201043721
LICENSED PROFESSIONAL
1/7/24

No.	Date	Revision	By

GENERAL NOTES
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	N/A

Original sheet size is 22x34

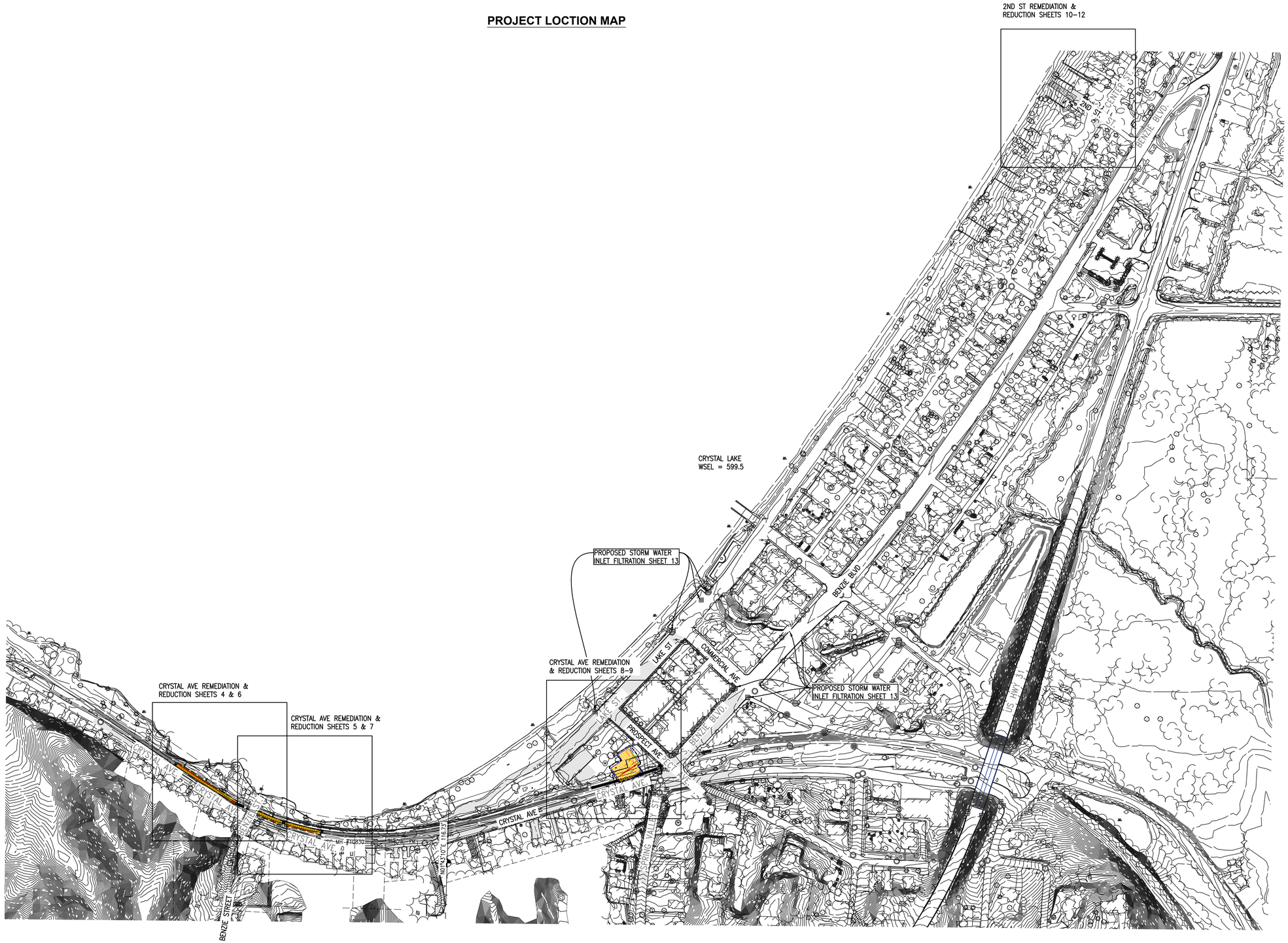
Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
2

P:\2021027003.00\CADD-Data\C3D\2021027003_P_DETAILS_CONSTRUCTION.dwg Tab: GENERAL NOTES Saved by: erprincing 12/31/2024 3:00 PM Plotted by: Chris Bott 1/7/2025 10:26 AM

PROJECT LOCTION MAP



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STATE OF MICHIGAN — WILLIAM C. BOTT — License No. 6201043721 — LICENSED PROFESSIONAL ENGINEER

1/7/25

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PROJECT LOCATION MAP
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
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Checked By:	WCB
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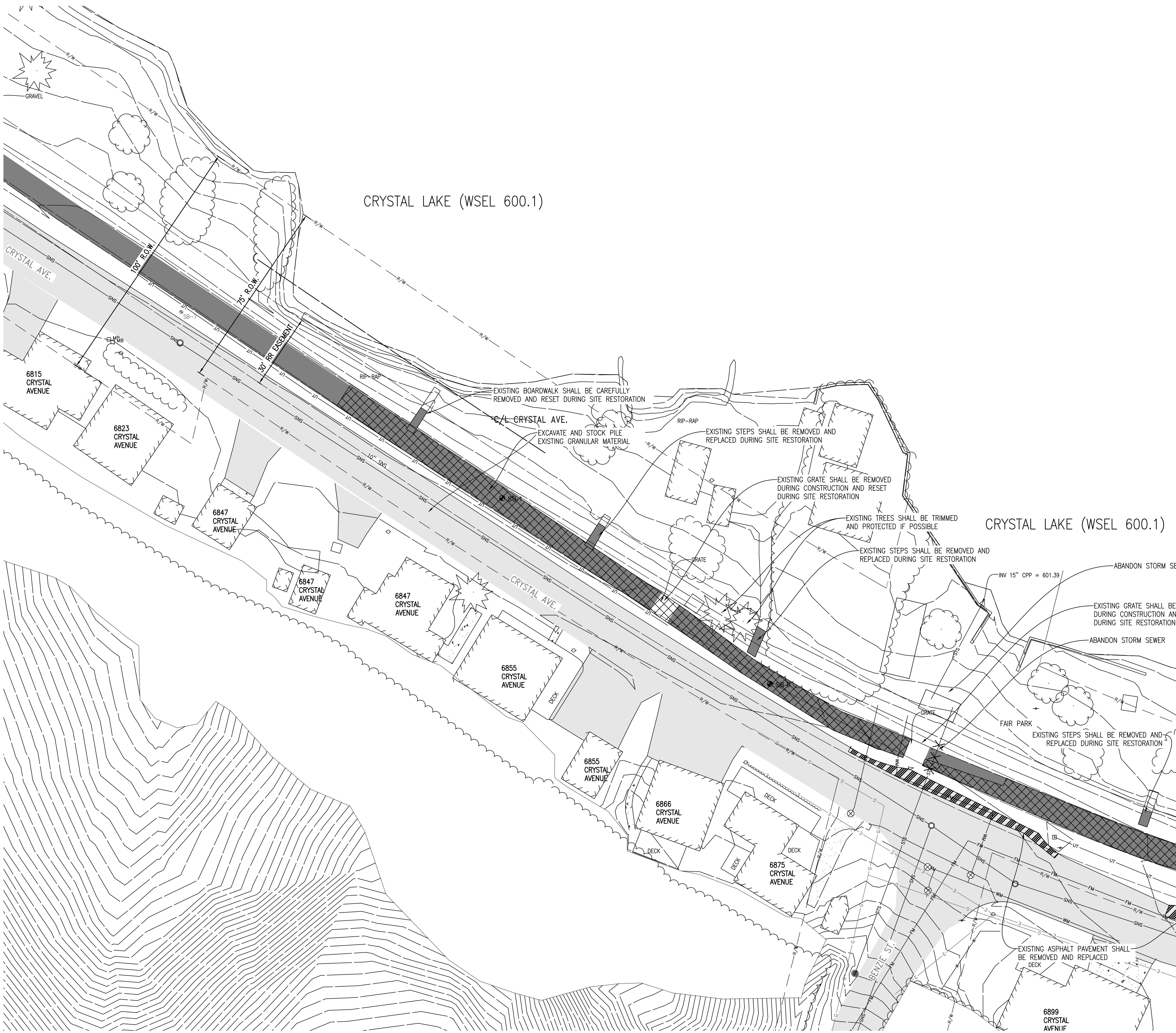
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
3

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



NORTH

SCALE 1" = 20'

0' 20' 40'

DEMOLITION PLAN LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING CONTOURS
- STOCKPILE GRAVEL
- ASPHALT REMOVE AND REPLACE
- BOARDWALK AND STEPS REMOVE AND REINSTALL
- SB — SOIL BORING
- RIGHT OF WAY LINE

DEMOLITION PLAN NOTES

CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND/OR PROTECTION OF THE EXISTING ITEMS AS NOTED.

THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY AND ALL DAMAGES.

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STATE OF MICHIGAN — WILLIAM C. BOTT — LICENSED PROFESSIONAL ENGINEER — 1/7/24

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DEMOLITION PLAN - CRYTSAL AVE
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
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Project Number: 2021027003

Sheet: 4

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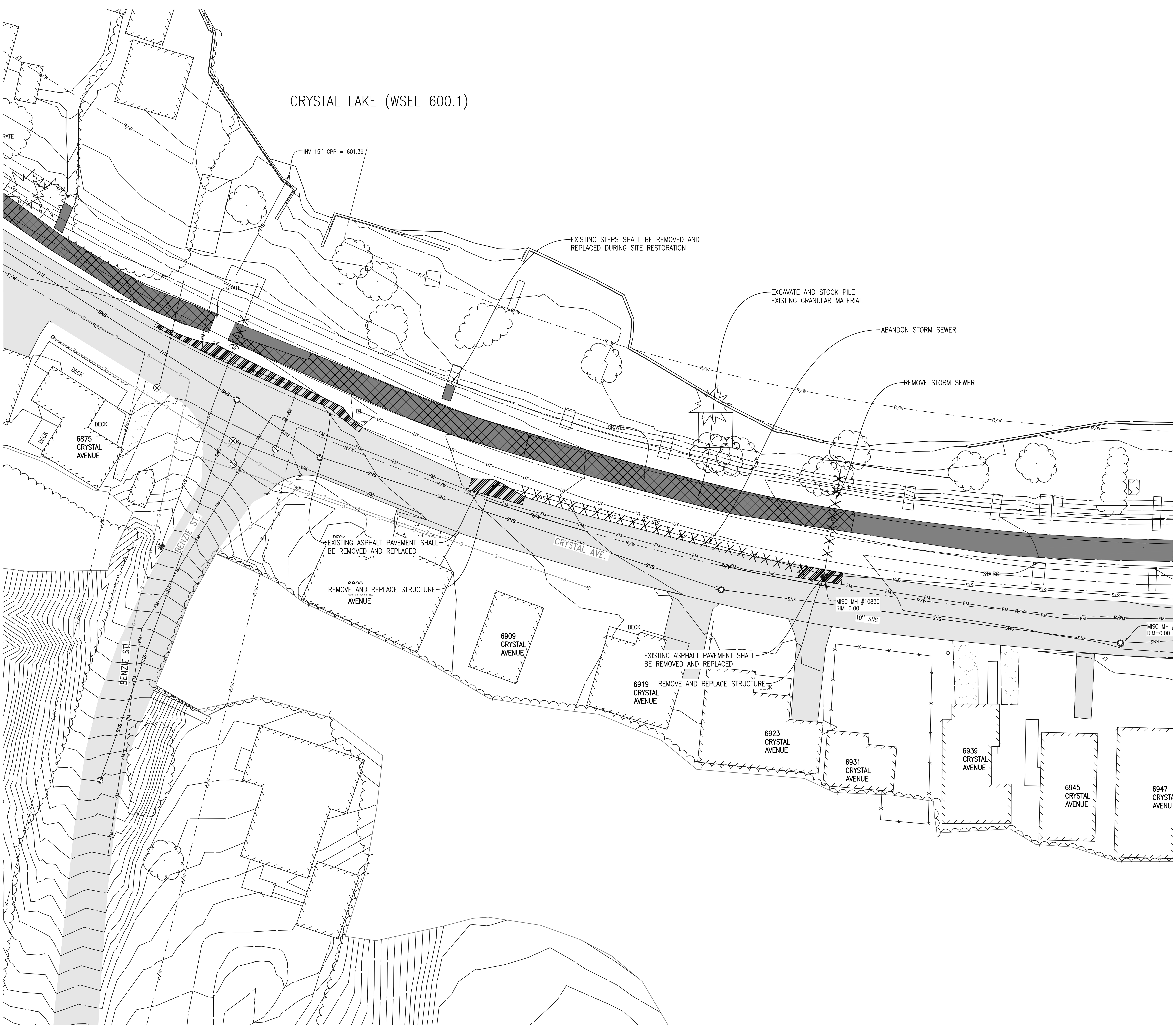

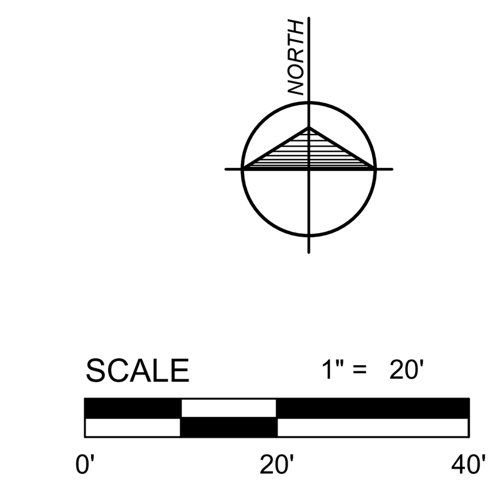

DEMOLITION PLAN LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING CONTOURS
- STOCKPILE GRAVEL
- ASPHALT REMOVE AND REPLACE
- BOARDWALK REMOVE AND REINSTALL
- SB SOIL BORING
- RIGHT OF WAY LINE

DEMOLITION PLAN NOTES

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Sheet: 5

GROUND
6" MIN
18" MIN*
16"
EL = 604.17 (603.50)
EL = 603.67 (603.00)
6" MIN
SC-310 END CAP
6" MIN
34"
12" MIN
GW EL = 601.15
SC-310
NOT TO SCALE

STORM DRAIN KEY NOTES

STORM SEWER STRUCTURES AND PIPE SHALL MEET AND BE INSTALLED ACCORDING TO MDOT STANDARDS AND SPECIFICATIONS.

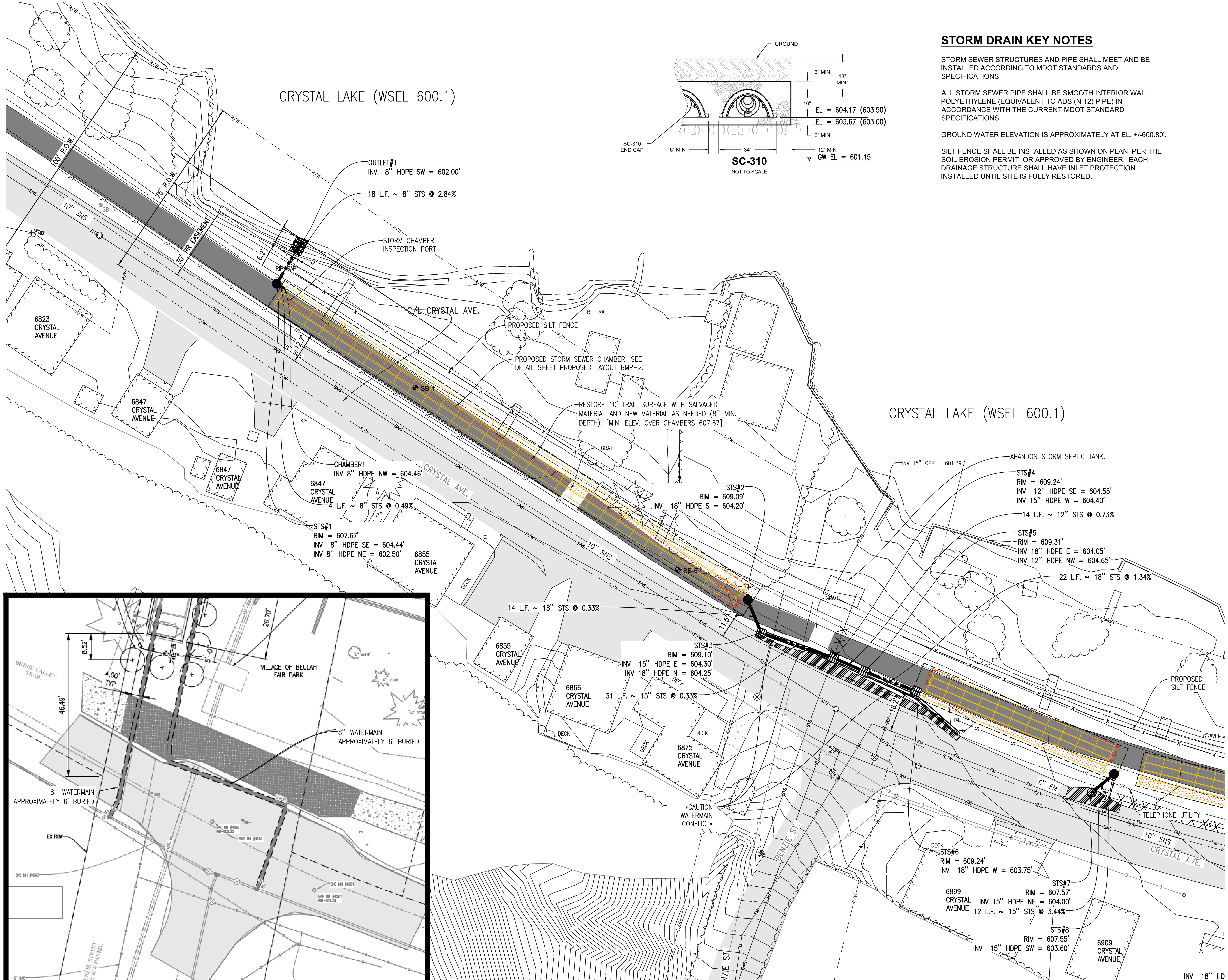
ALL STORM SEWER PIPE SHALL BE SMOOTH INTERIOR WALL POLYETHYLENE (EQUIVALENT TO ADS (N-12) PIPE) IN ACCORDANCE WITH THE CURRENT MDOT STANDARD SPECIFICATIONS.

GROUND WATER ELEVATION IS APPROXIMATELY AT EL. +/-600.80'.

SILT FENCE SHALL BE INSTALLED AS SHOWN ON PLAN, PER THE SOIL EROSION PERMIT, OR APPROVED BY ENGINEER. EACH DRAINAGE STRUCTURE SHALL HAVE INLET PROTECTION INSTALLED UNTIL SITE IS FULLY RESTORED.

NORTH

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



8.52'
4.00' TYP
46.49'
26.70'
BETSIE VALLEY TRAIL
VILLAGE OF BEULAH FAIR PARK
8" WATERMAIN APPROXIMATELY 6' BURIED
8" WATERMAIN APPROXIMATELY 6' BURIED
EX ROW
2017 WATERMAIN PROJECT
WATERMAIN CONFLICT ENLARGEMENT

LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- PROPOSED CONTOURS
- NEW & SALVAGED GRAVEL SURFACE
- ASPHALT SURFACE
- GRASS AREA
- STORM SEWER
- SLOPE TOP/BOTTOM
- SITE DISTURBANCE
- PROPERTY LINES
- PROPOSED 6" CONCRETE BARRIER CURB
- SB SOIL BORING
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED STORM CHAMBER ENTRANCE STRUCTURE
- PROPOSED STORM CHAMBER MANIFOLD
- PROPOSED STORM CHAMBERS
- RIGHT OF WAY LINE

PROPOSED STRUCTURE TYPES:

OUTLET#1 - PIPE END 8" WITH STONE RIPRAP PER DETAIL

STS#1 - 48"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER & 24" SUMP

CHAMBER1 - 8" STS PIPE CONNECTION TO CHAMBER PER DETAIL

STS#2 - 60"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER & 24" SUMP

STS#3 - 72"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 36" SUMP

STS#4 - 60"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 24" SUMP
TIE IN EXISTING SOUTH STORM SEWER & CAP/PLUG EXISTING NORTH STS. EXISTING STS SHALL BE REMOVED TO INSTALL STRUCTURE.

STS#5 - 72"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 36" SUMP

STS#6 - 48"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 24" SUMP

STS#7 - 24"-DIA. DRAIN. STR. W/ MDOT TYPE D COVER & 24" SUMP

STS#8 - 48"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER & 24" SUMP

DIA. = DIAMETER
DRAIN. = DRAINAGE
STR. = STRUCTURE
STS = STORM SEWER

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VILLAGE OF BEULAH

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BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
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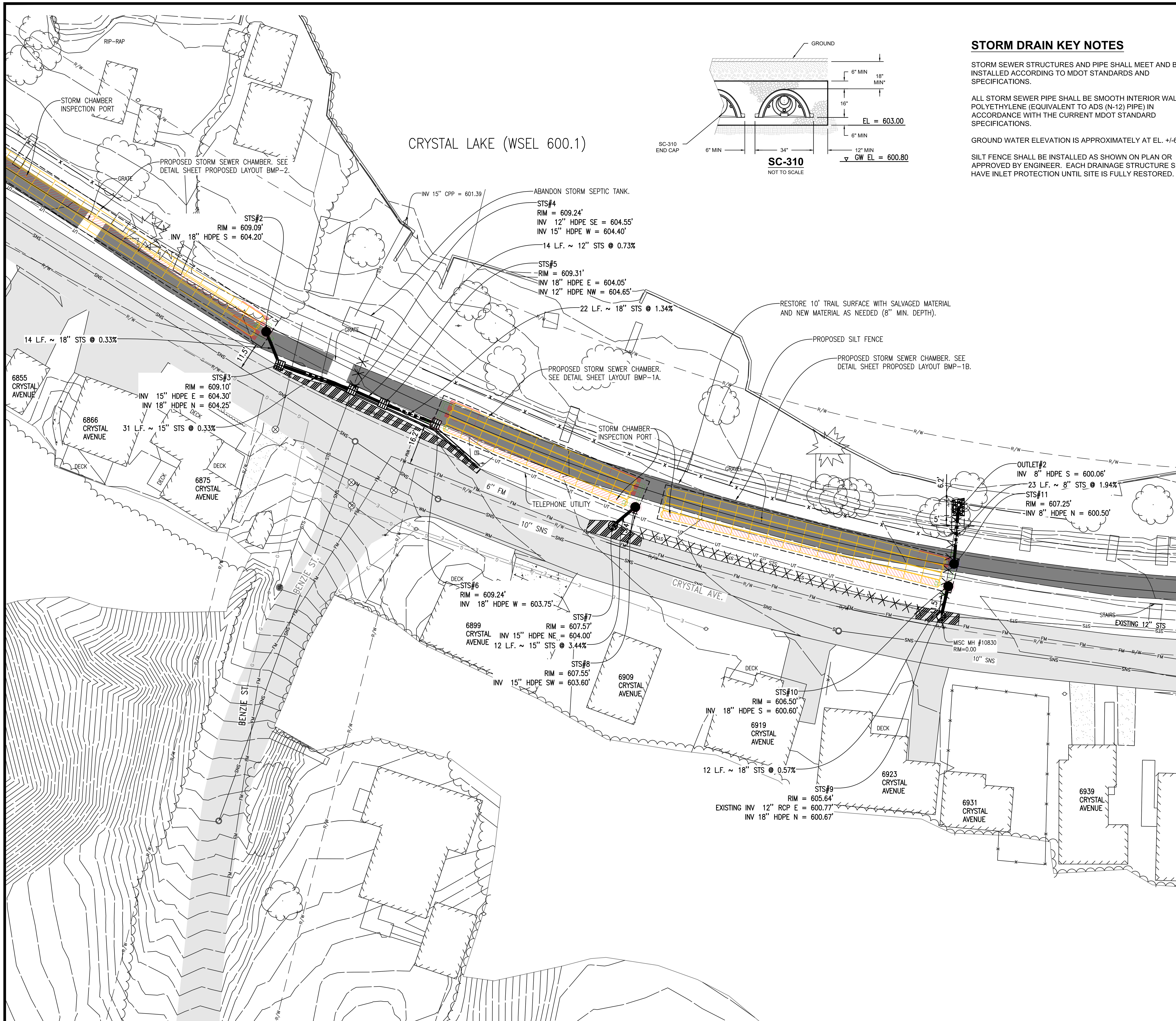

SC-310
NOT TO SCALE

STORM DRAIN KEY NOTES

STORM SEWER STRUCTURES AND PIPE SHALL MEET AND BE INSTALLED ACCORDING TO MDOT STANDARDS AND SPECIFICATIONS.

ALL STORM SEWER PIPE SHALL BE SMOOTH INTERIOR WALL POLYETHYLENE (EQUIVALENT TO ADS (N-12) PIPE) IN ACCORDANCE WITH THE CURRENT MDOT STANDARD SPECIFICATIONS.

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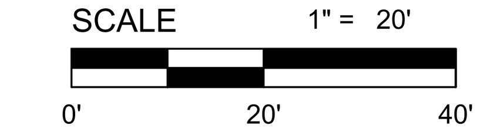

LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- PROPOSED CONTOURS
- NEW & SALVAGED GRAVEL SURFACE
- ASPHALT SURFACE
- GRASS AREA
- STORM SEWER
- SLOPE TOP/BOTTOM
- PROPERTY LINES
- PROPOSED 6" CONCRETE BARRIER CURB
- SB SOIL BORING
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED STORM CHAMBER ENTRANCE STRUCTURE
- PROPOSED STORM CHAMBER MANIFOLD
- PROPOSED STORM CHAMBERS
- RIGHT OF WAY LINE

PROPOSED STRUCTURE TYPES:

STS#2 - 60"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER & 24" SUMP

STS#3 - 72"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 60" SUMP

STS#4 - 60"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 24" SUMP
TIE IN EXISTING SOUTH STORM SEWER & CAP/PLUG EXISTING NORTH STS. EXISTING STS SHALL BE REMOVED TO INSTALL STRUCTURE.

STS#5 - 72"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 60" SUMP

STS#6 - 48"-DIA. DRAIN. STR. W/ EJ 7500 GRATE & 24" SUMP

STS#7 - 24"-DIA. DRAIN. STR. W/ MDOT TYPE D COVER & 24" SUMP

STS#8 - 48"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER & 24" SUMP

STS#9 - 48"-DIA. DRAIN. STR. W/ MDOT TYPE D COVER & 48" SUMP

STS#10 - BARRACUDA S4 (48") W/ MDOT TYPE B COVER

STS#11 - 48"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER & 24" SUMP

OUTLET#2 - PIPE END 8" WITH STONE RIPRAP

DIA. = DIAMETER
DRAIN. = DRAINAGE
STR. = STRUCTURE
STS = STORM SEWER

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BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
7

NORTH

SCALE 1" = 20'

0' 20' 40'

DEMOLITION PLAN LEGEND

- EXISTING DECIDUOUS TREE
- REMOVE EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING CONTOURS
- STOCKPILE GRAVEL
- ASPHALT REMOVE AND REPLACE
- SB SOIL BORING
- RIGHT OF WAY LINE

DEMOLITION PLAN NOTES

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STATE OF MICHIGAN WILLIAM C. BOT LICENSED PROFESSIONAL ENGINEER License No. 6201043712
1/7/24

No.	Date	Revision	By

DEMOLITION PLAN - BEULAH VILLAGE PARK
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

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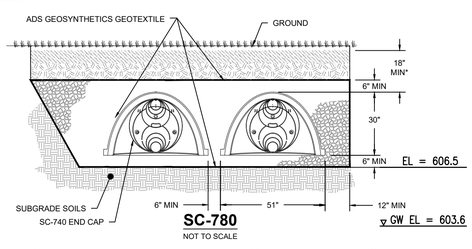

LAKE STREET

EX STR#136
RIM = 611.16'
FLOW CHANNEL (NOT A TYP. STRUCTURE)
INV. 12" CMP NE = 608.78'
PROP. INV 8" HDPE W = 606.50'
STRUCTURE TO BE CORED FOR PROP. 8" OVERFLOW PIPE.

DECK

LAKE ST.

12 L.F. ~ 8" STS @ 4.74%

STR#21
RIM = 611.19'
INV 8" HDPE S = 607.16'
INV 8" HDPE E = 607.06'

21 L.F. ~ 8" STS @ 1.77%

STR#20
RIM = 611.36'
INV 8" HDPE N = 607.53'

7118
PROSPECT
AVENUE

C/L PROSPECT AVE.

PROSPECT AVE.

284
S BENZIE
BLVD.

S. BENZIE BLVD.

RELOCATE TREES OUTSIDE OF DRAIN FIELD AREA.

PROPOSED STORM SEWER CHAMBER. SEE DETAIL SHEET PROPOSED LAYOUT BMP-3.

STS#13
RIM = 612.90'
INV 36" HDPE E = 607.25'

SEWER CROSSING
EX. 12" SNS INV. = 600.7±
PROP. 24" STS INV. = 608.2±

RELOCATE TREES OUTSIDE OF DRAIN FIELD AREA.

72 L.F. ~ 36" STS @ 5.19%

STS#12
RIM = 616.00'
INV 20" DIP S = 611.36'
INV 18" RCP S = 611.81'
PROP. INV 36" HDPE W = 611.00'
STRUCTURE TO BE CORED FOR PROP. 36" DOWNSTREAM PIPE. EX. 20" DOWNSTREAM PIPE TO BE PLUGGED.
RIM = TOP OF BACK OF CURB.

EXISTING 20" STS

EXISTING 18" STS

ASPHALT

TENNIS COURT

CONC.

PROPOSED SILT FENCE

STORM CHAMBER INSPECTION PORT

CRYSTAL AVE.

RESTORE 10' TRAIL SURFACE WITH SALVAGED MATERIAL AND NEW MATERIAL AS NEEDED (8" MIN. DEPTH).

EX STR#4165
RIM = 619.11'
INV 20" DIP N = 614.44'

POOL

7119
CRYSTAL
AVENUE

7099
CRYSTAL
AVENUE

7059

7071
CRYSTAL

PATIO

EX STR#130(204171)
RIM = 623.97'
INV 18" RCP N = 612.83'

HW 10" CLAY = 621.22

NORTH

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

LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- PROPOSED CONTOURS
- +991.14 EXISTING SPOT GRADE
- 991.00 SPOT GRADE (TOP OF GRAVEL/TOP SOIL)
- 1.5% FLOW
- NEW & SALVAGED GRAVEL SURFACE
- ASPHALT SURFACE
- GRASS AREA
- STORM SEWER
- SLOPE TOP/BOTTOM
- SITE DISTURBANCE
- PROPERTY LINES
- PROPOSED 6" CONCRETE BARRIER CURB
- SB SOIL BORING
- PROPOSED DRAINAGE STRUCTURE
- PROPOSED STORM CHAMBER ENTRANCE STR.
- PROPOSED STORM CHAMBER MANIFOLD
- PROPOSED STORM CHAMBERS
- RIGHT OF WAY LINE
- RELOCATE EXISTING TREE

PROPOSED STRUCTURE TYPES:

STS#12 - 72"-DIA. DRAIN. STR. (W/ TWO 24"-DIA. HOLES IN LID) W/ (2) EJ 7460 GRATE & 36" SUMP

STS#13 - 60"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER 24" SUMP

STS#20 - 24"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER 24" SUMP W/ WEIR - TOP EL. 609.50

STS#21 - 48"-DIA. DRAIN. STR. W/ MDOT TYPE B COVER 24" SUMP

DIA. = DIAMETER
DRAIN. = DRAINAGE
STR. = STRUCTURE
EL. = ELEVATION
STS = STORM SEWER

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Project Number:
2021027003

Sheet:
9

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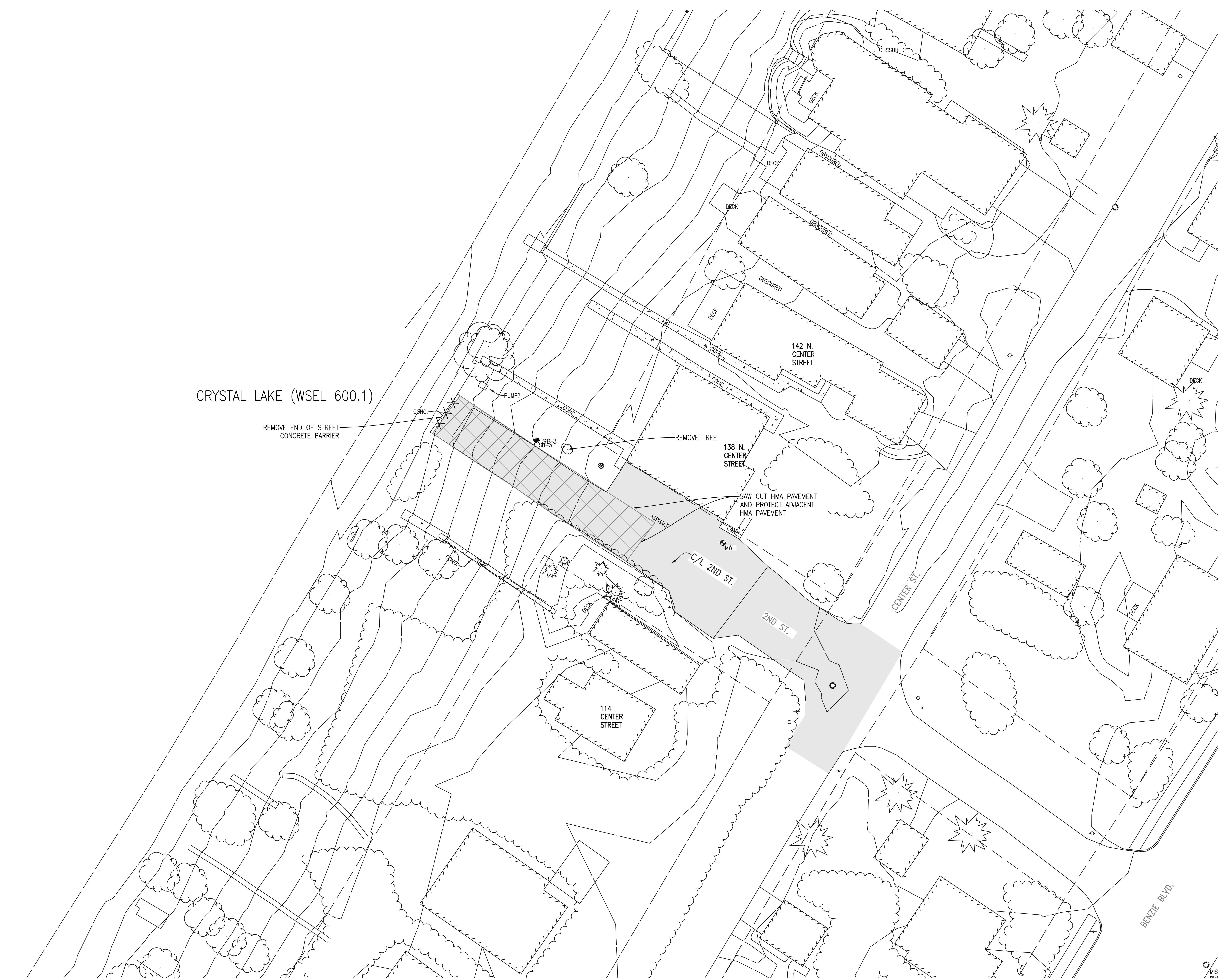

NORTH

SCALE 1" = 20'

0' 20' 40'

DEMOLITION PLAN LEGEND

(symbol)	EXISTING DECIDUOUS TREE
(symbol)	EXISTING CONIFEROUS TREE
(line)	EXISTING CONTOURS
(hatch)	ASPHALT REMOVE
SB	SOIL BORING
(line)	RIGHT OF WAY LINE

DEMOLITION PLAN NOTES

CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND/OR PROTECTION OF THE EXISTING ITEMS AS NOTED.

THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO AVOID PROPERTY DAMAGE TO ADJACENT PROPERTIES DURING THE CONSTRUCTION PHASES OF THIS PROJECT. THE CONTRACTOR WILL BE HELD SOLELY RESPONSIBLE FOR ANY AND ALL DAMAGES.

CONTRACTOR IS TO DISPOSE OF ALL MATERIAL RESULTING FROM DEMOLITION IN ACCORDANCE WITH ALL LOCAL, STATE, AND/OR FEDERAL REGULATIONS.

THE CONTRACTOR IS CAUTIONED TO LOCATE ALL EXISTING UTILITIES AND CONFLICTS. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY CONSTRUCTION ACTIVITY IN ORDER TO FIELD VERIFY EXISTING UTILITY INFORMATION.

CONTRACTOR SHALL PROTECT EXISTING STREET LIGHTS & POSTS, TRAFFIC CONTROL DEVICES, SIGNS, UTILITY BOXES, ELECTRIC, TELEPHONE, GAS, FIBER OPTIC, CABLE, WATER, STORM SEWER, SANITARY SEWER, AND ALL OTHER UTILITIES UNLESS OTHERWISE NOTED ON THE PLANS.

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1280 Business Park Dr.
Traverse City, Michigan
231-946-9191 phone
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www.goslingczubak.com

CIVIL ENGINEERING
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DRILLING
LANDSCAPE ARCHITECTURE

STATE OF MICHIGAN WILLIAM C. BOTT LICENSED PROFESSIONAL ENGINEER License No. 6201043721

1/7/24

No.	Date	Revision	By

DEMOLITION PLAN - 2ND ST
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	1" = 20'

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number: 2021027003

Sheet: 10

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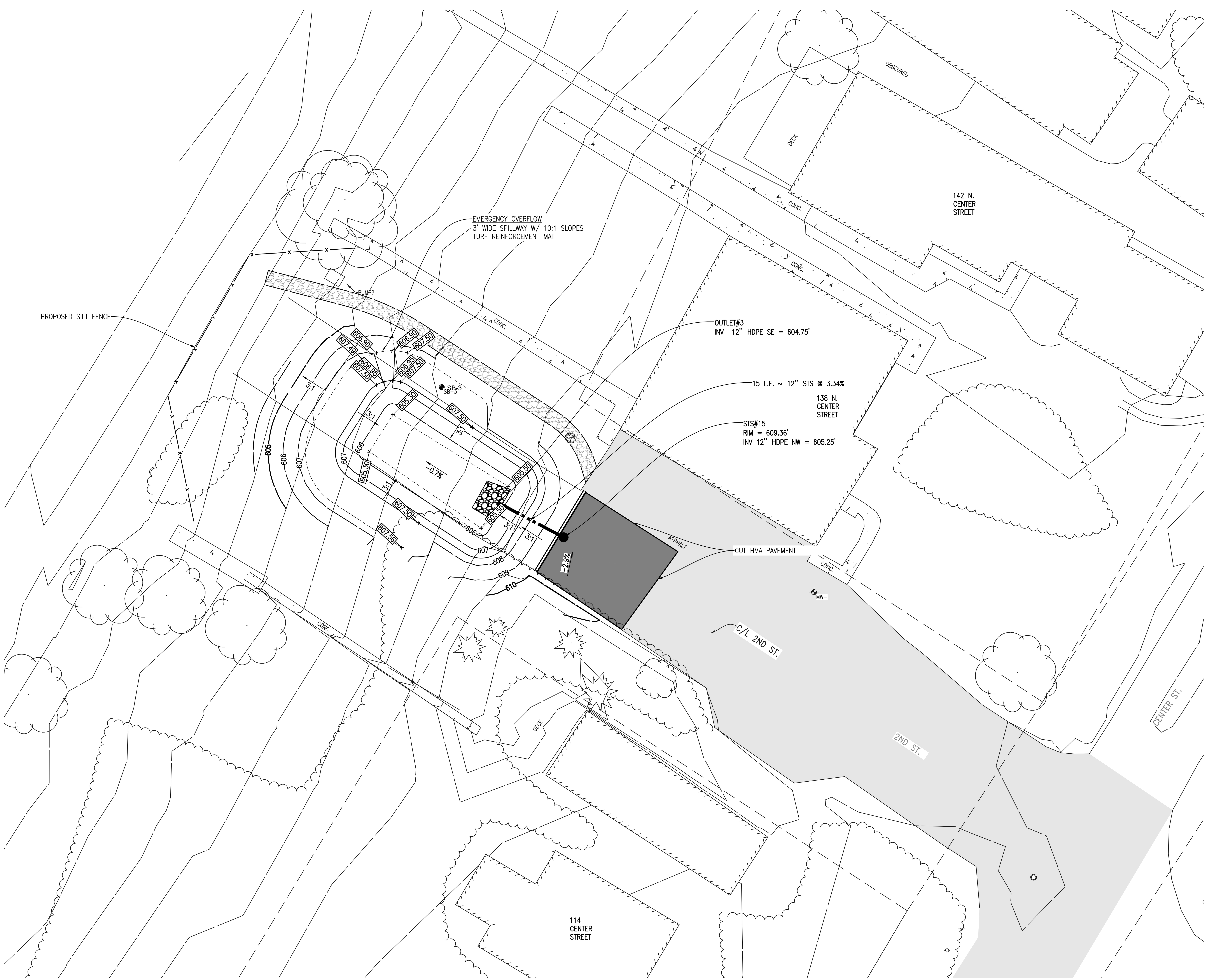

SCALE 1" = 20'

0' 20' 40'

GRADING PLAN LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING CONIFEROUS TREE TO BE REMOVED
- PROPOSED CONTOURS
- +991.14 EXISTING SPOT GRADE
- 991.00 SPOT GRADE (TOP OF GRAVEL/TOP SOIL)
- -1.5% FLOW
- NEW & SALVAGED GRAVEL SURFACE
- ASPHALT SURFACE
- STORM SEWER
- SLOPE TOP/BOTTOM
- PROPERTY LINES
- PROPOSED 6" CONCRETE BARRIER CURB
- SB SOIL BORING
- PROPOSED DRAINAGE STRUCTURE
- RIGHT OF WAY LINE

PROPOSED STRUCTURE TYPES:

STS#15 - BARRACUDA S4 W/ MDOT TYPE G COVER

OUTLET#3 - PIPE END 12" WITH STONE RIPRAP

2nd STREET QUANTITIES

13 L.F.	GUARD RAIL REMOVAL.
172 S.Y.	HMA PAVEMENT REMOVAL
19 L.F.	6" CONCRETE CURB
6 TON	HOT-MIX ASPHALT
16 TON	AGGREGATE BASE COURSE (8") SALVAGED- ROAD
9 TON	AGGREGATE BASE COURSE (6") SALVAGED - WALKWAY
3 TON	PEA GRAVEL (2") - WALKWAY
6 S.Y.	STONE RIPRAP (3 SY EACH OUTLET)

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No.	Date	Revision	By

REMEDIATION & REDUCTION PLAN - 2ND ST

BEACH REMEDIATION & STORM REDUCTION PROJECT

VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
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Location:
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PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
11

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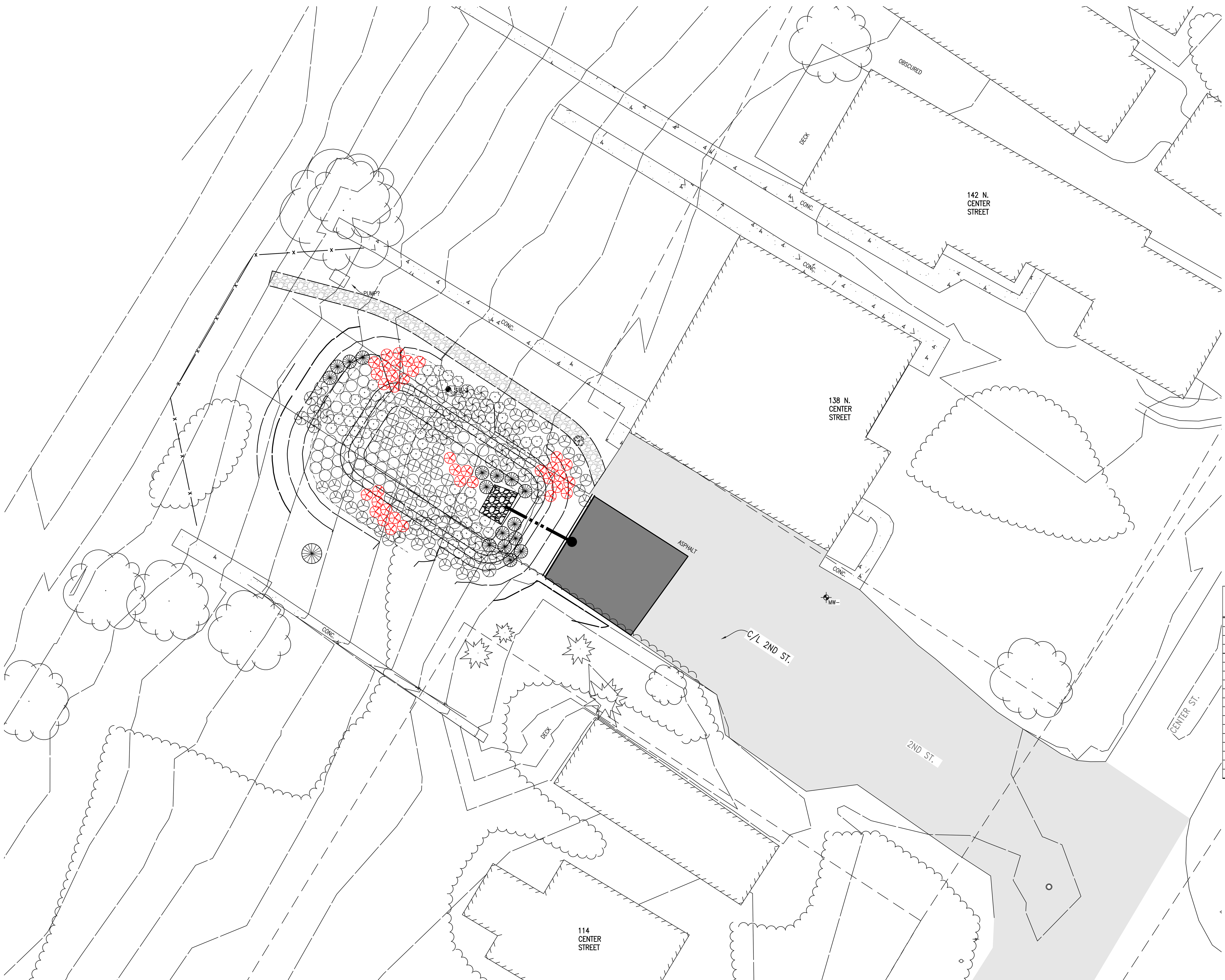

NORTH

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

GRADING PLAN LEGEND

- EXISTING DECIDUOUS TREE
- EXISTING CONIFEROUS TREE
- EXISTING CONIFEROUS TREE TO BE REMOVED
- PROPOSED CONTOURS
- NEW & SALVAGED GRAVEL SURFACE
- ASPHALT SURFACE
- GRASS AREA
- STORM SEWER
- SLOPE TOP/BOTTOM
- SITE DISTURBANCE
- PROPERTY LINES
- PROPOSED 6" CONCRETE BARRIER CURB
- SB SOIL BORING
- PROPOSED DRAINAGE STRUCTURE
- RIGHT OF WAY LINE

Key	Botanical Name Common Name	Size	Plant Qty.	Notes
	PERENNIALS			
A.t.	Asclepias tuberosa	#1-5 Pot	37	
	Butterfly Weed			
H.k.	Hypericum kalmianum	#1-5 Pot	16	
	Kalm's St. John's wort			
L.c.	Lanceleaf Coreopsis	#1-5 Pot	30	
	Coreopsis lanceoleta			
R.h.	*Rudbeckia hirta*	#1-5 Pot	66	
	Black-eyed Susan			
M.f.	Monarda fistulosa	#1-5 Pot	30	
	Bee-Balm			
	GRASSES			
K.m.	*Koeleria macrantha*	#1-5 Pot	44	
	June Grass			
S.s	Schizachyrium scoparium	#1-5 Pot	47	
	Little Bluestem			

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STATE OF MICHIGAN, WILLIAM C. BOTT, LICENSED PROFESSIONAL ENGINEER

No.	Date	Revision	By

PLANTING PLAN - 2ND ST
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued: 1-6-2025
Date Surveyed: 12-14-2021
Designed By: WCB
Drawn By: ERP
Checked By: WCB
Scale: 1" = 20'

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Location:
PT OF THE NE 1/4 SEC 27
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T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
12

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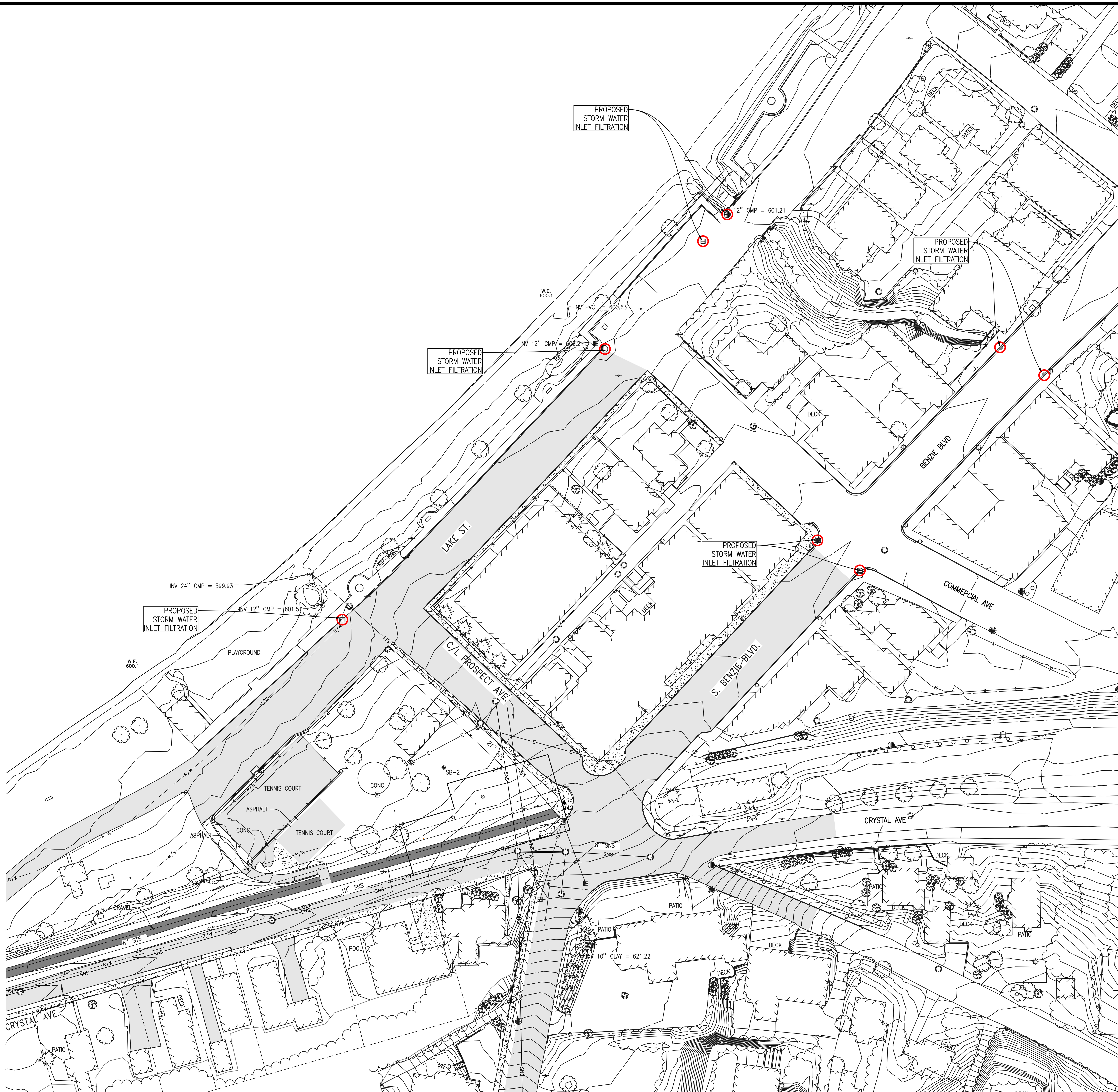

NORTH

SCALE 1" = 50'

0' 50' 100'

INLET FILTRATION NOTES

PROPOSED INLET FILTRATION SYSTEM SHALL BE FABCO CARTRIDGE-BASED INLET FILTRATION TO HANDLE COLIFORM BACTERIA, SEDIMENT, AND NUTRIENTS OR ENGINEER APPROVED EQUAL. ENGINEER APPROVED EQUAL REQUIRES CONTRACTOR TO PROVIDE SHOP DRAWINGS, MAINTENANCE AND CARTRIDGE REPLACEMENT COSTS OF PROPOSED FILTRATION SYSTEM FOR APPROVAL.

INLET FILTRATION REQUIRES AN BYPASS FOR PEAK STORM EVENTS.

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STATE OF MICHIGAN — WILLIAM C. BOTT — LICENSED PROFESSIONAL ENGINEER — License No. 6201043721 — 1/7/24

No.	Date	Revision	By

INLET INFILTRATION PLAN
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
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Scale:	1"=50'

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Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number: 2021027003

Sheet: 13

Gosling Czubak engineering sciences, inc.

Engineers Surveyors
Landscape Architecture
Environmental and Drilling Services
1280 Business Park Dr., Traverse City, Michigan 49686
(231) 946-9191

LOG OF BORING: SB-7

PROJECT: Beulah Beach Remediation and Stormwater	GROUND ELEVATION: 607.7 — DATE: 3/15/22
PROJECT NO.: 2021027003	DRILLING LOCATION: Refer to Site Plan
PROJECT LOCATION: Village of Beulah	DRILLING METHOD: 4.25-inch (I.D.) Hollow-Stem Auger
CLIENT: Village of Beulah	BOREHOLE DIAMETER (IN): 10"+/- — TOTAL DEPTH (FT): 10
DRILLING COMPANY: Gosling Czubak — RIG: CME-75	STATIC WATER LEVEL: 7
DRILLER: M.G. Allen — LOGGED BY: M.G. Allen	CAVING DEPTH: 7

Depth (feet)	Soil Description (See Boring Log Key)
0	Sub-Base Fill Material
1.2	Fine SAND (SM) - little silt - trace gravel - loose to medium dense - brown - moist
3	Gravelly fine SAND (SM/GM) - little silt - medium dense - brown - moist
	Gravelly fine to medium SAND (SM/GM) - little silt - trace clay - medium dense - brown - moist Wet below 7' <1" Clay seam @ 7'
8	Silty fine SAND (SM) - medium dense - brown - wet
10	Boring terminated at 10 ft.

Sample Type	Sample No.	Recovery (in)	Blow Counts	Notes	Pocket Penetrometer (tsf)	% < #200	SPT N Value
SS	SS1	12	7 4 3				7
SS	SS2	12	7 13 14				27
SS	SS3	12	10 8 7				15
SS	SS4	13	8 9 13				22

Borehole was backfilled with augered soil cuttings. Asphalt patch was used where necessary.

Figure PAGE 1 of 1

LOG OF BORING: SB-1

PROJECT: Beulah Beach Remediation and Stormwater	GROUND ELEVATION: 607.40 — DATE: 12/20/21
PROJECT NO.: 2021027003	DRILLING LOCATION: Refer to Site Plan
PROJECT LOCATION: Village of Beulah	DRILLING METHOD: 4.25-inch (I.D.) Hollow-Stem Auger
CLIENT: Village of Beulah	BOREHOLE DIAMETER (IN): 10"+/- — TOTAL DEPTH (FT): 10
DRILLING COMPANY: Gosling Czubak — RIG: CME-75	STATIC WATER LEVEL: 5
DRILLER: M.G. Allen — LOGGED BY: M.G. Allen	CAVING DEPTH: 7

Depth (feet)	Soil Description (See Boring Log Key)
0	Gravel Walkway Material
1	Fine to medium SAND (SP) - trace gravel - medium dense - brown
2	Fine SAND (SM) - little silt - trace gravel - medium dense - brown 3" silt lense at 4.5'
	Fine to medium SAND (SP) - trace gravel - loose - brown - wet
6	CLAY (CL) - trace silt - hard - brown
9.5	Silty clayey fine SAND (SC/SM) - loose - brown - wet
10	Boring terminated at 10 ft.

Sample Type	Sample No.	Recovery (in)	Blow Counts	Notes	Pocket Penetrometer (tsf)	% < #200	SPT N Value
SS	SS1	12	8 6 17				23
SS	SS2	18	6 7 7				14
SS	SS3	18	3 4 4		3.25		8
SS	SS4	18	4 4 5				9

Borehole was backfilled with augered soil cuttings. Asphalt patch was used where necessary. Boring surface elevation was surveyed by GCES.

Figure PAGE 1 of 1

LOG OF BORING: SB-6

PROJECT: Beulah Beach Remediation and Stormwater	GROUND ELEVATION: 608.2 — DATE: 3/15/22
PROJECT NO.: 2021027003	DRILLING LOCATION: Refer to Site Plan
PROJECT LOCATION: Village of Beulah	DRILLING METHOD: 4.25-inch (I.D.) Hollow-Stem Auger
CLIENT: Village of Beulah	BOREHOLE DIAMETER (IN): 10"+/- — TOTAL DEPTH (FT): 10
DRILLING COMPANY: Gosling Czubak — RIG: CME-75	STATIC WATER LEVEL: 7
DRILLER: M.G. Allen — LOGGED BY: M.G. Allen	CAVING DEPTH: 8

Depth (feet)	Soil Description (See Boring Log Key)
0	ASPHALT
.2	Sub-Base Fill Material
1.25	Fine SAND (SM/GM) - little silt and gravel - very loose to medium dense - brown - moist
	Fine SAND (SM) - little silt - trace gravel - medium dense - yellow/brown - wet
	Fine SAND (SM) - little silt - medium dense - red/brown - wet
9	Silty fine SAND (SM/SC) - little clay - medium dense - red/brown - wet
10	Boring terminated at 10 ft.

Sample Type	Sample No.	Recovery (in)	Blow Counts	Notes	Pocket Penetrometer (tsf)	% < #200	SPT N Value
SS	SS1	12	9 9 4				13
SS	SS2	12	3 2 1				3
SS	SS3	12	4 9 8				17
SS	SS4	12	7 7 10				17

Borehole was backfilled with augered soil cuttings. Asphalt patch was used where necessary.

Figure PAGE 1 of 1

LOG OF BORING: SB-3

PROJECT: Beulah Beach Remediation and Stormwater	GROUND ELEVATION: 607.22 — DATE: 12/20/21
PROJECT NO.: 2021027003	DRILLING LOCATION: Refer to Site Plan
PROJECT LOCATION: Village of Beulah	DRILLING METHOD: 4.25-inch (I.D.) Hollow-Stem Auger
CLIENT: Village of Beulah	BOREHOLE DIAMETER (IN): 10"+/- — TOTAL DEPTH (FT): 10
DRILLING COMPANY: Gosling Czubak — RIG: CME-75	STATIC WATER LEVEL: 6
DRILLER: M.G. Allen — LOGGED BY: M.G. Allen	CAVING DEPTH: 6

Depth (feet)	Soil Description (See Boring Log Key)
0	TOPSOIL - dark brown
1	Fine to medium SAND (SP/GP) - little gravel - medium dense - brown
6	Fine to medium SAND (SP) - trace gravel and silt - medium dense - brown - wet
8	Silty fine to medium SAND (SM) - trace gravel - medium dense - brown - wet
10	Boring terminated at 10 ft.

Sample Type	Sample No.	Recovery (in)	Blow Counts	Notes	Pocket Penetrometer (tsf)	% < #200	SPT N Value
SS	SS1	18	4 6 17				23
SS	SS2	18	10 11 12				23
SS	SS3	18	7 8 8				16
SS	SS4	18	3 6 9				15

Borehole was backfilled with augered soil cuttings. Asphalt patch was used where necessary. Boring surface elevation was surveyed by GCES.

Figure PAGE 1 of 1

LOG OF BORING: SB-2

PROJECT: Beulah Beach Remediation and Stormwater	GROUND ELEVATION: 613.59 — DATE: 12/20/21
PROJECT NO.: 2021027003	DRILLING LOCATION: Refer to Site Plan
PROJECT LOCATION: Village of Beulah	DRILLING METHOD: 4.25-inch (I.D.) Hollow-Stem Auger
CLIENT: Village of Beulah	BOREHOLE DIAMETER (IN): 10"+/- — TOTAL DEPTH (FT): 10
DRILLING COMPANY: Gosling Czubak — RIG: CME-75	STATIC WATER LEVEL: Dry
DRILLER: M.G. Allen — LOGGED BY: M.G. Allen	CAVING DEPTH: 7

Depth (feet)	Soil Description (See Boring Log Key)
0	TOPSOIL - dark brown
.5	Fine to medium SAND (SP/GP) - little gravel - loose - brown
3	Silty fine to medium SAND (SM) - loose - brown - moist
6	Fine to medium SAND (SP/GP) - little gravel - loose to medium dense - brown - moist
10	Boring terminated at 10 ft.

Sample Type	Sample No.	Recovery (in)	Blow Counts	Notes	Pocket Penetrometer (tsf)	% < #200	SPT N Value
SS	SS1	18	3 3 3				6
SS	SS2	18	2 3 2				5
SS	SS3	18	3 4 5				9
SS	SS4	18	3 7 10				17

Borehole was backfilled with augered soil cuttings. Asphalt patch was used where necessary. Boring surface elevation was surveyed by GCES.

Figure PAGE 1 of 1

This information pertains only to this boring and should not be interpreted as being indicitive of the site.

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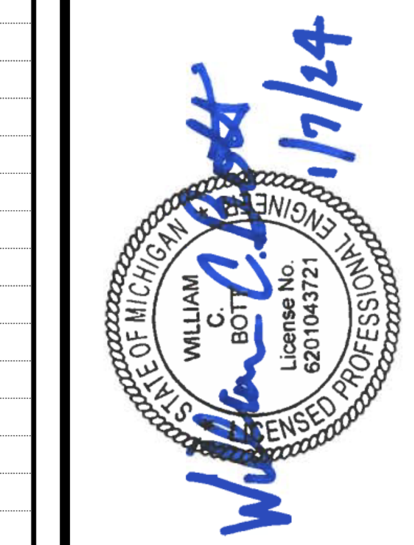

No.	Date	Revision	By

REMEDIATION & REDUCTION PLAN - CRYTSAL AVE BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
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Scale:	N/A

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
14

SC-310 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-310.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 400 LBS/IN/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

1. STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 3" (75 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

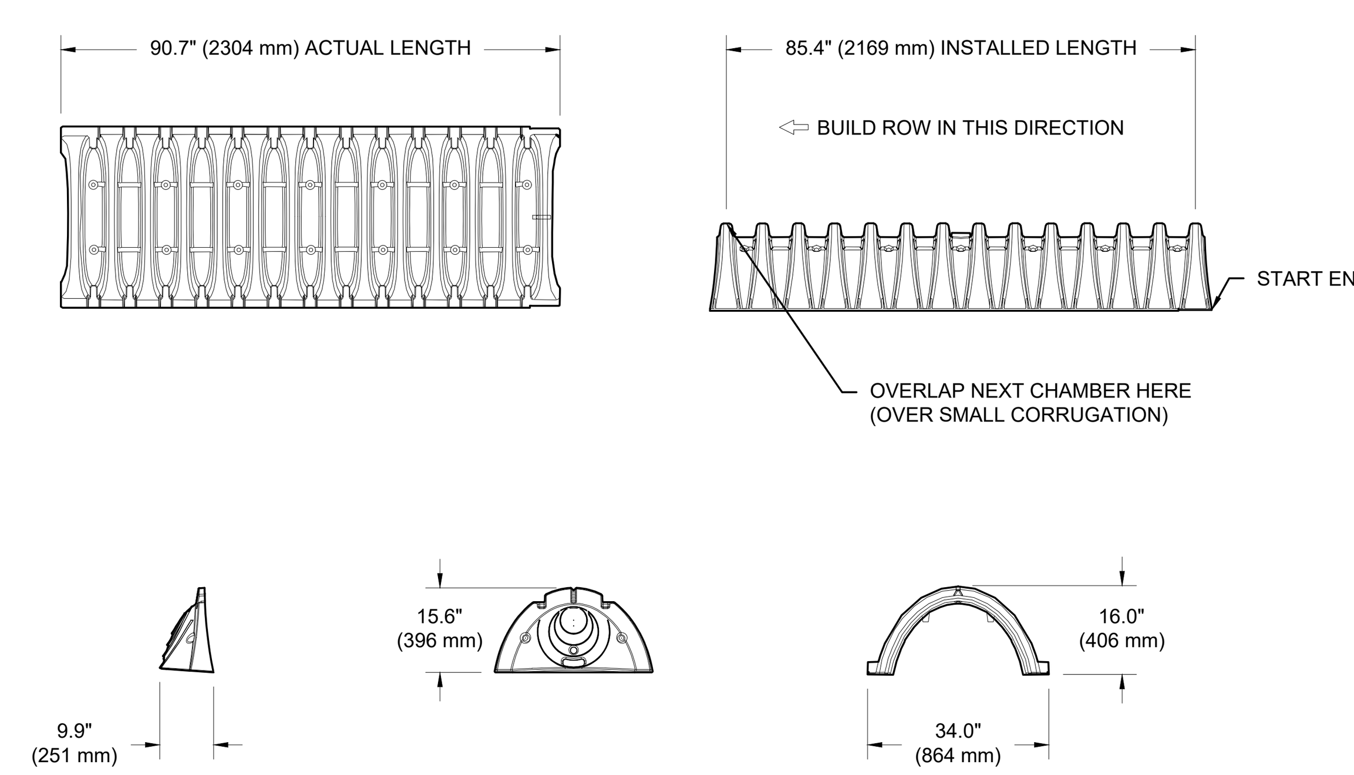
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

ADS SiteAssist
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

SC-310 TECHNICAL SPECIFICATION

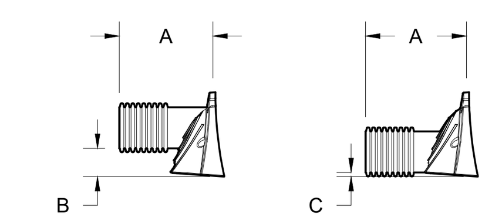
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

SC-740 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-740.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 550 LBS/IN/IN. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-740 SYSTEM

1. STORMTECH SC-740 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 6" (150 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 3/4-2" (20-50 mm).
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

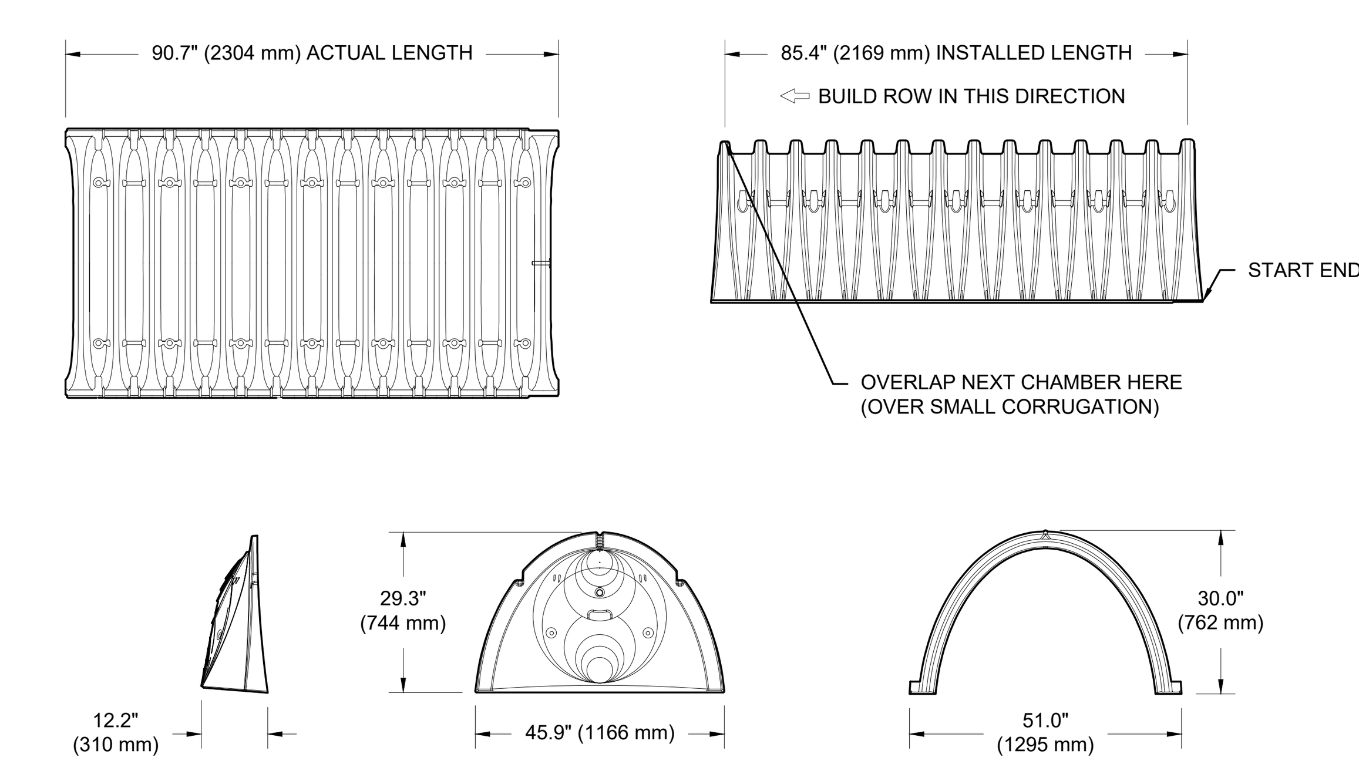
1. STORMTECH SC-740 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-740 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

SC-740 TECHNICAL SPECIFICATION

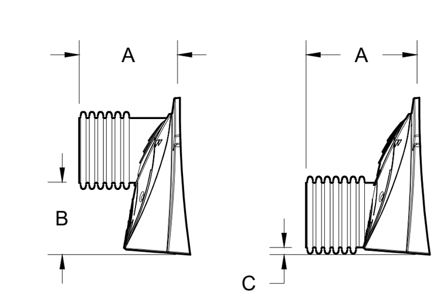
NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
PRE-CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	---
SC740EPE06B / SC740EPE06BPC			---	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	---
SC740EPE08B / SC740EPE08BPC			---	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	---
SC740EPE10B / SC740EPE10BPC			---	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	---
SC740EPE12B / SC740EPE12BPC			---	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	---
SC740EPE15B / SC740EPE15BPC			---	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	---
SC740EPE18B / SC740EPE18BPC			---	1.6" (41 mm)
SC740ECEZ*	24" (600 mm)	18.5" (470 mm)	---	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740ECEZ THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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No.	Date	Revision	By

STORM CHAMBER DETAILS
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	N/A

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

PROPOSED LAYOUT BMP-1A

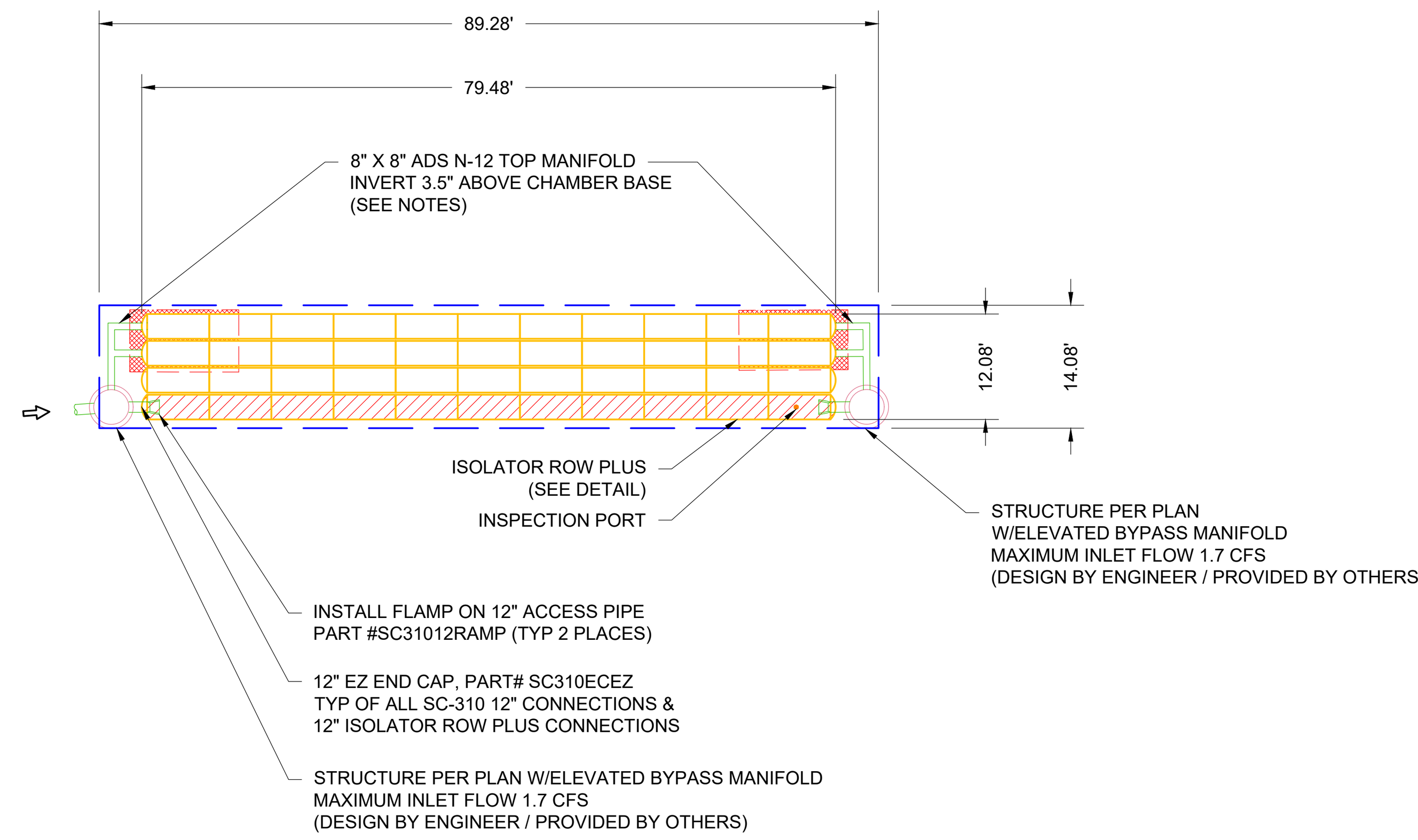
44	STORMTECH SC-310-3 CHAMBERS
8	STORMTECH SC-310 END CAPS
6	STONE ABOVE (in)
6	STONE BELOW (in)
40	% STONE VOID
1,563	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED)**
1257	SYSTEM AREA (ft²)
207	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS BMP-1A

612.83	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
606.83	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
606.33	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
606.33	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
606.16	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
605.33	TOP OF STONE
604.83	TOP OF SC-310 CHAMBER
603.79	8" TOP MANIFOLD INVERT
603.58	12" ISOLATOR ROW PLUS CONNECTION INVERT
603.50	BOTTOM OF SC-310 CHAMBER
603.00	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- THE SITE DESIGN ENGINEER MUST REVIEW THE PROXIMITY OF THE CHAMBERS TO THE SLOPE AND CONSIDER EFFECTS OF POSSIBLE SATURATED SOILS ON THE SLOPE'S INTEGRITY.



PROPOSED LAYOUT BMP-2

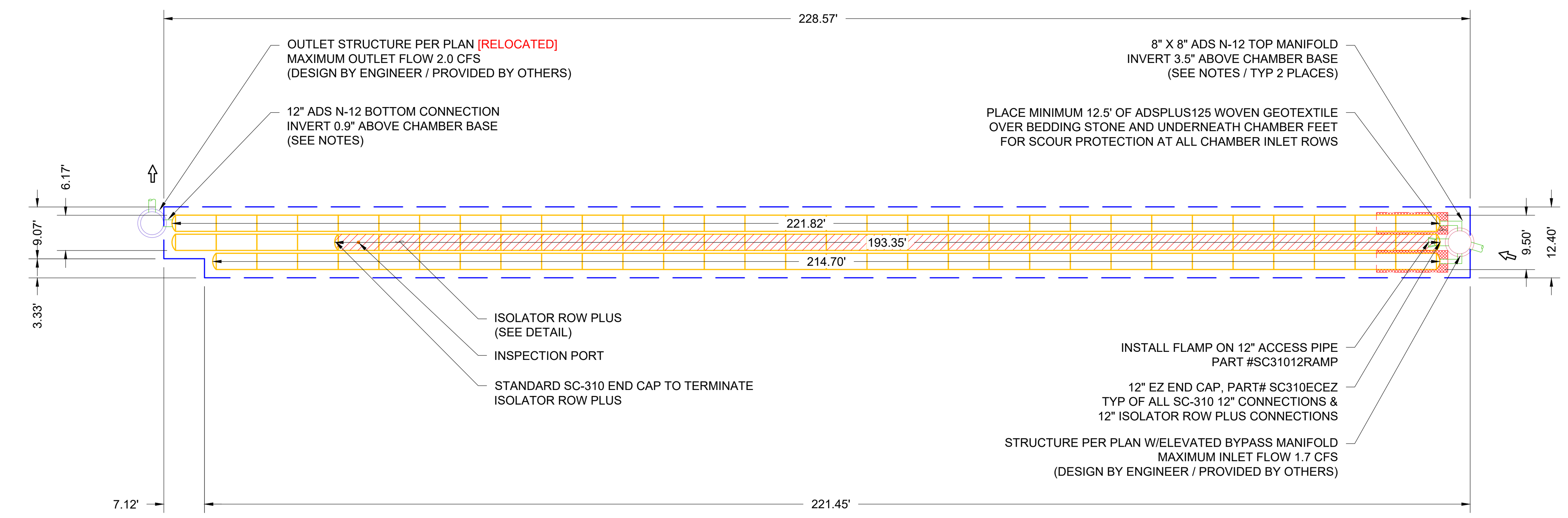
92	STORMTECH SC-310 CHAMBERS
6	STORMTECH SC-310 END CAPS
6	STONE ABOVE (in)
6	STONE BELOW (in)
40	% STONE VOID
3,437	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED)**
2810	SYSTEM AREA (ft²)
482	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS BMP-2

613.50	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
607.50	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
607.00	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
607.00	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
606.83	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
606.00	TOP OF STONE
605.50	TOP OF SC-310 CHAMBER
604.46	8" TOP MANIFOLD INVERT
604.25	12" ISOLATOR ROW PLUS CONNECTION INVERT
604.25	12" BOTTOM CONNECTION INVERT
604.17	BOTTOM OF SC-310 CHAMBER
603.67	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- THE SITE DESIGN ENGINEER MUST REVIEW THE PROXIMITY OF THE CHAMBERS TO THE SLOPE AND CONSIDER EFFECTS OF POSSIBLE SATURATED SOILS ON THE SLOPE'S INTEGRITY.



PROPOSED LAYOUT BMP-1B

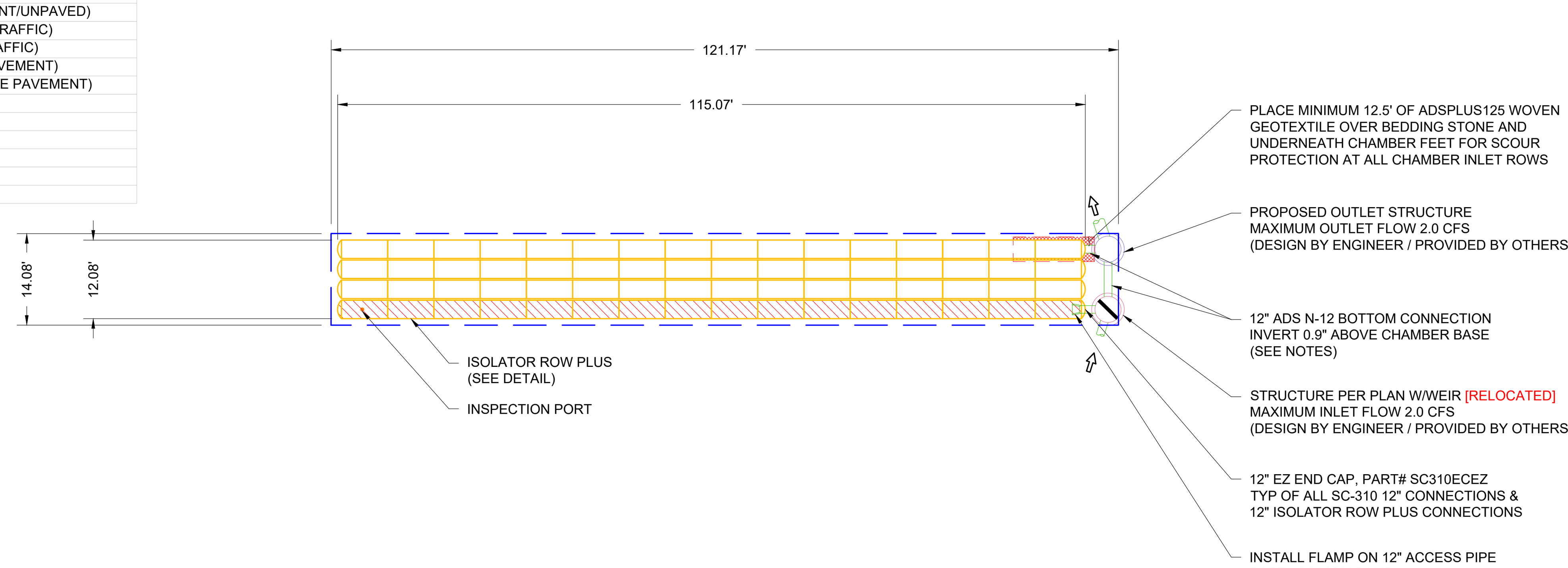
64	STORMTECH SC-310-3 CHAMBERS
8	STORMTECH SC-310 END CAPS
6	STONE ABOVE (in)
6	STONE BELOW (in)
40	% STONE VOID
2,159	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED)**
1706	SYSTEM AREA (ft²)
271	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS BMP-1B

609.85	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
603.85	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
603.35	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
603.35	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
603.18	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
602.35	TOP OF STONE
601.85	TOP OF SC-310 CHAMBER
600.60	12" ISOLATOR ROW PLUS CONNECTION INVERT
600.60	12" BOTTOM CONNECTION INVERT
600.52	BOTTOM OF SC-310 CHAMBER
600.02	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- THE SITE DESIGN ENGINEER MUST REVIEW THE PROXIMITY OF THE CHAMBERS TO THE SLOPE AND CONSIDER EFFECTS OF POSSIBLE SATURATED SOILS ON THE SLOPE'S INTEGRITY.



PROPOSED LAYOUT BMP-3

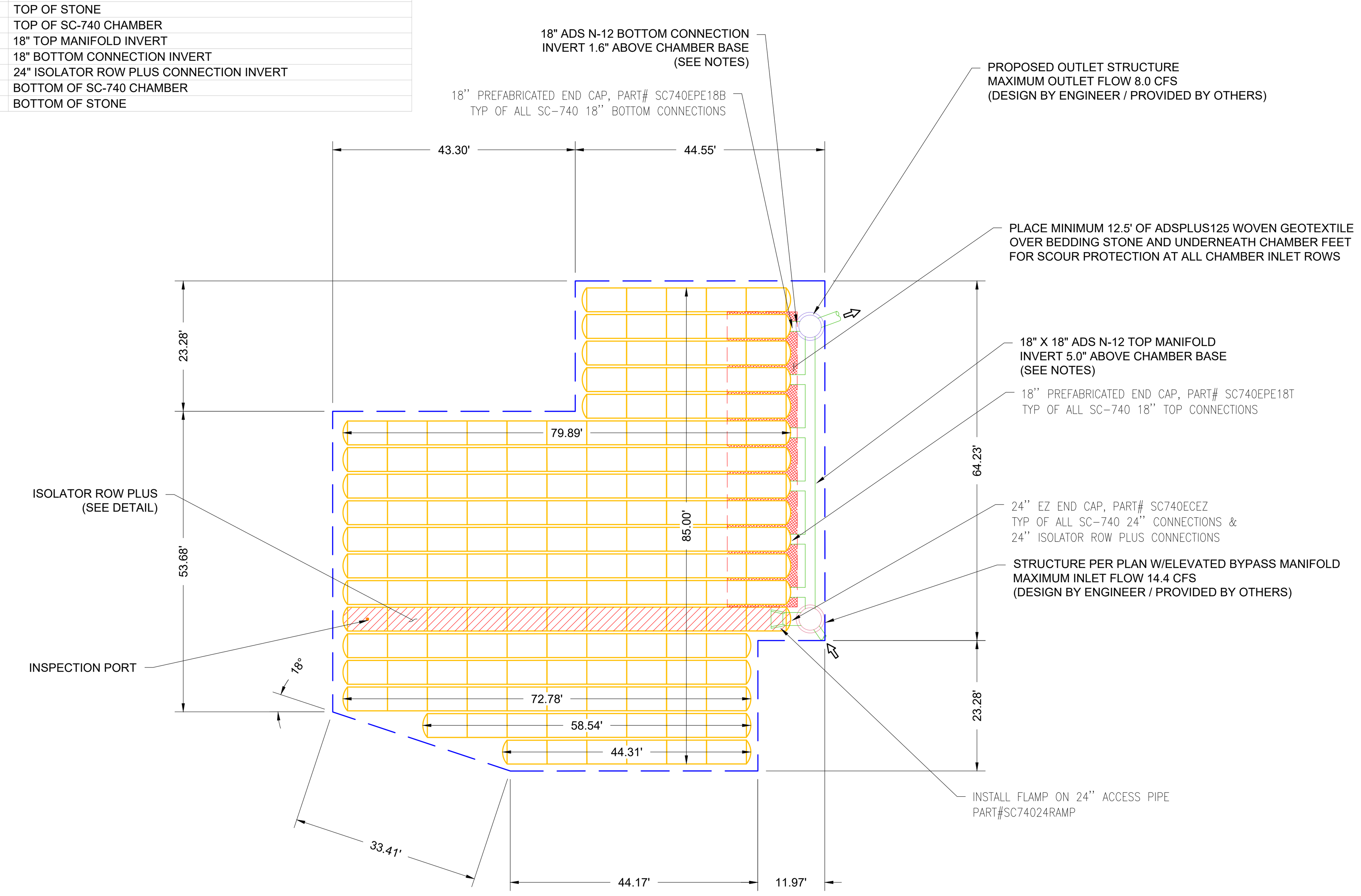
157	STORMTECH SC-740 CHAMBERS
36	STORMTECH SC-740 END CAPS
6	STONE ABOVE (in)
6	STONE BELOW (in)
40	% STONE VOID
13,055	**INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED)**
6233	SYSTEM AREA (ft²)
342	SYSTEM PERIMETER (ft)

PROPOSED ELEVATIONS BMP-3

617.60	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED)
611.60	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC)
611.10	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC)
611.10	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT)
611.10	MINIMUM ALLOWABLE GRADE (TOP OF RIGID PAVEMENT)
610.10	TOP OF STONE
609.60	TOP OF SC-740 CHAMBER
607.52	18" TOP MANIFOLD INVERT
607.23	18" BOTTOM CONNECTION INVERT
607.11	24" ISOLATOR ROW PLUS CONNECTION INVERT
607.10	BOTTOM OF SC-740 CHAMBER
606.60	BOTTOM OF STONE

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECHNICAL NOTE 6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- THIS DRAWING IS NOT INTENDED FOR USE IN BIDDING OR CONSTRUCTION WITHOUT THE PRIOR APPROVAL OF THE PROJECT'S ENGINEER OF RECORD ("EOR"). AS WITH ALL PROPOSED ADS LAYOUTS, THE EOR SHOULD REVIEW AND APPROVE THIS DRAWING PRIOR TO USE IN BIDDING AND/OR CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE EOR TO ENSURE THAT THE PRODUCT(S) DEPICTED AND THE ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.



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No.	Date	Revision	By

STORM CHAMBER DETAILS
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	N/A

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

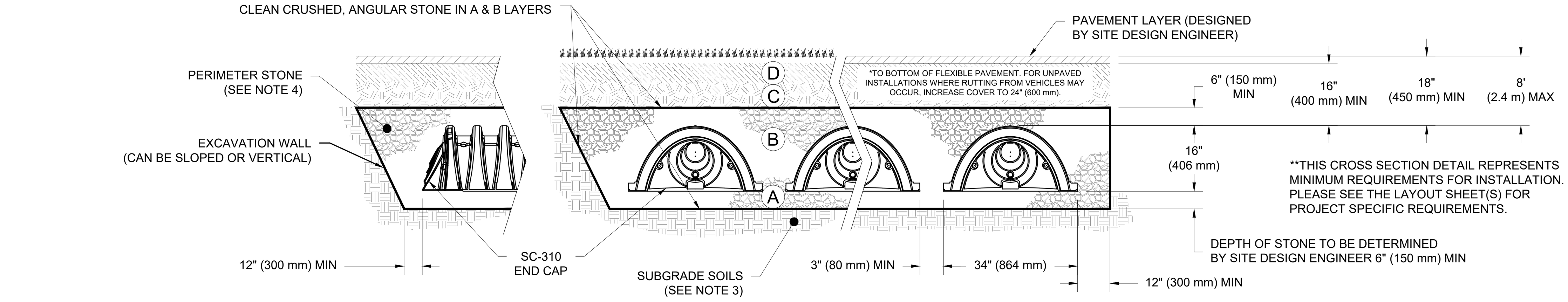
Project Number:
2021027003

Sheet:
16

ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

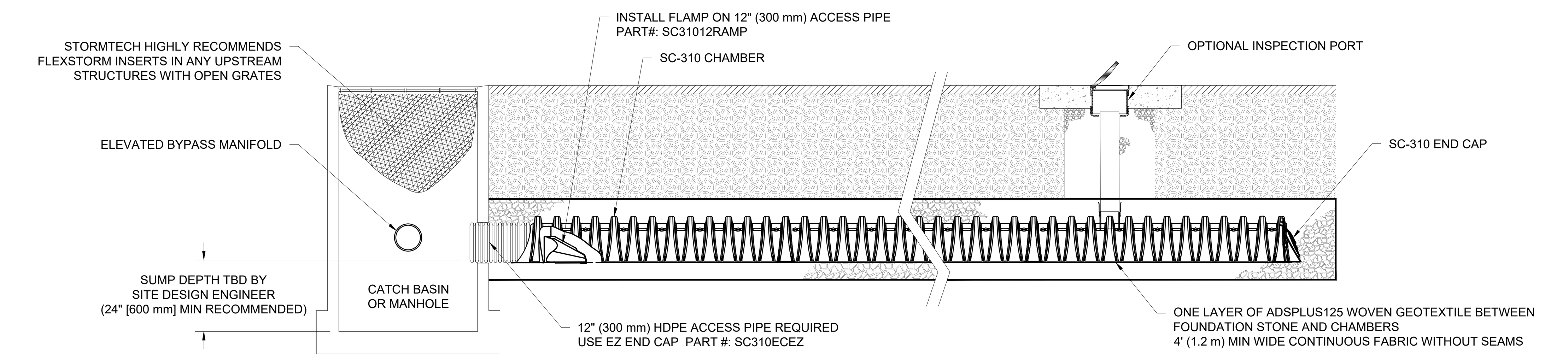
MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



SC-310 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

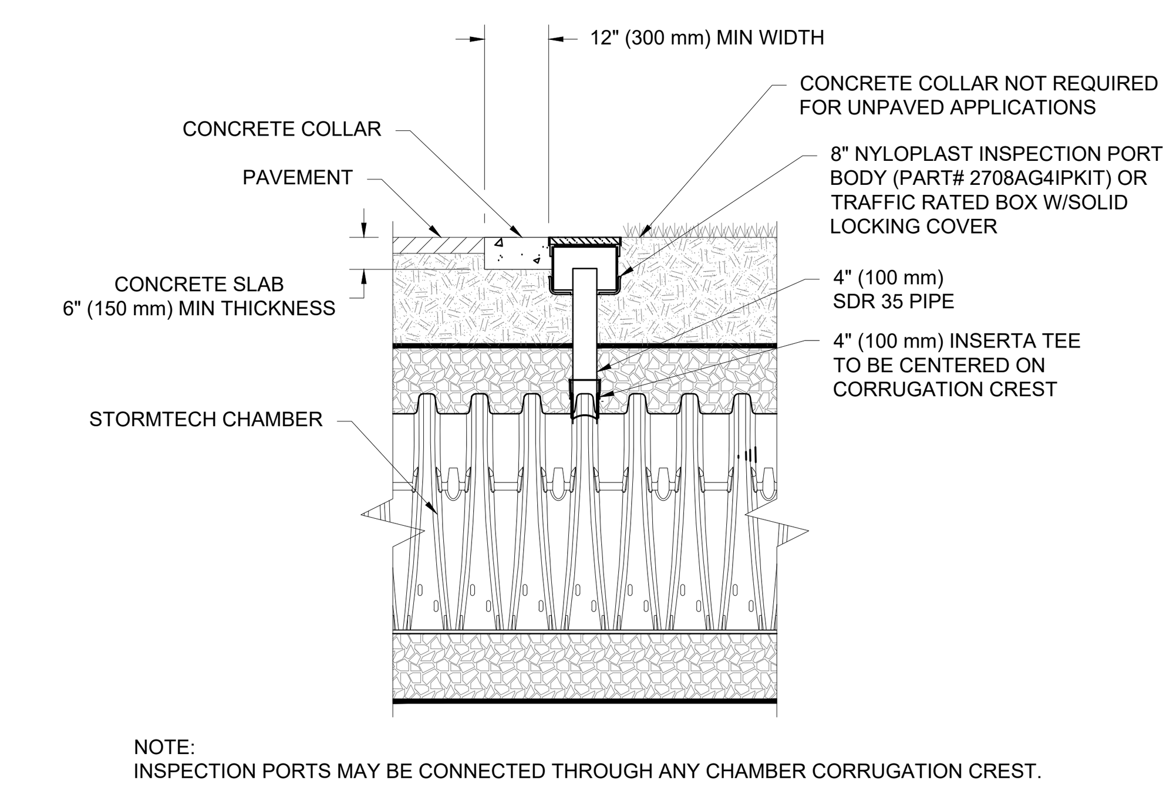
STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



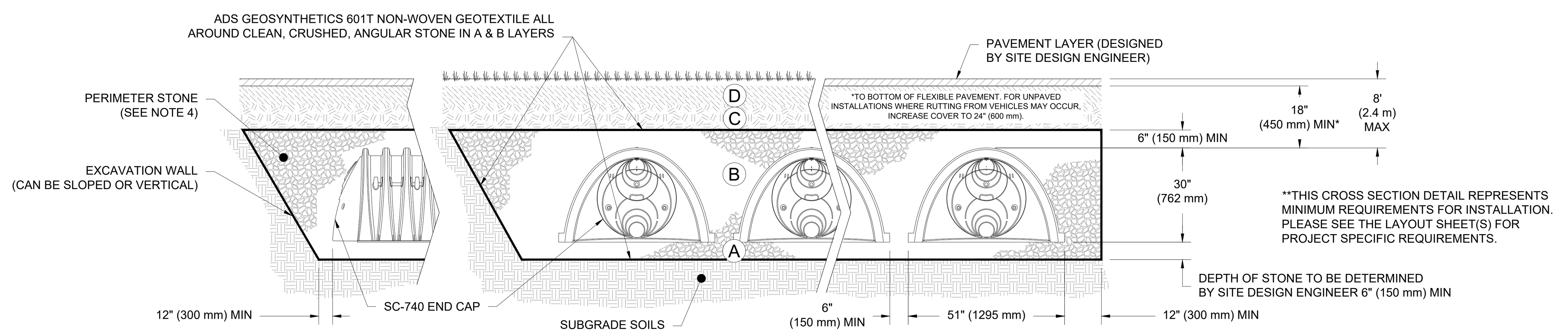
NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4" PVC INSPECTION PORT DETAIL (SC SERIES CHAMBER)
NTS

ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
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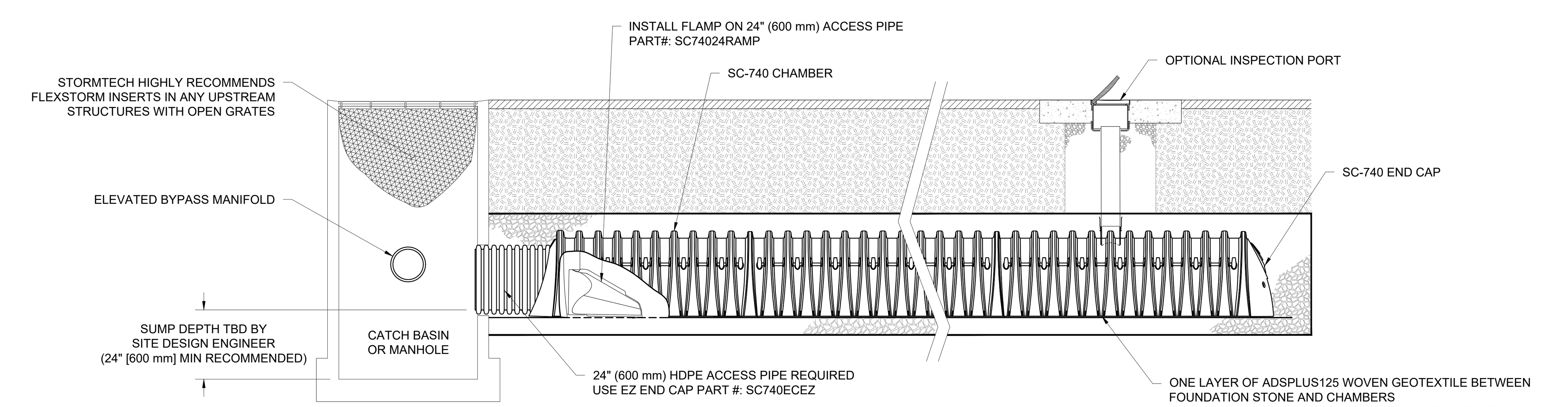
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 550 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



SC-740 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

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No.	Date	Revision	By

STORM CHAMBER DETAILS
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

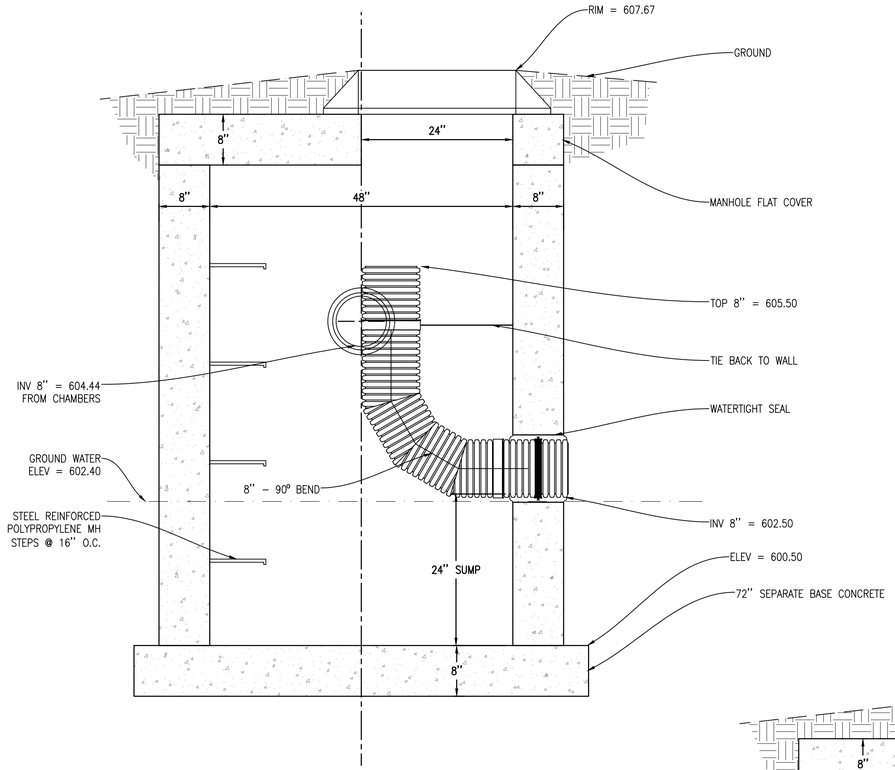
Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	N/A

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
17

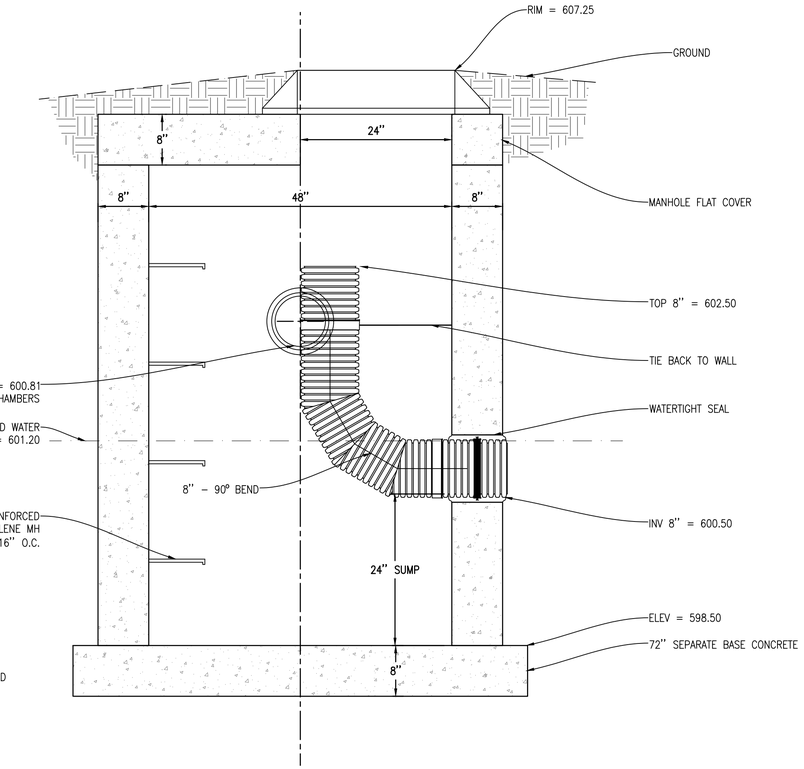


NOTES:

- ALL STORM SEWER SHALL BE ADS N-12 OR EQUAL
- STS #1: 48" STRUCTURE W/ FLAT CONCRETE COVER AND TYPE B ACCESS COVER
- CHAMBER INVERT: 604.17

STS #1 DETAIL

SCALE: 1" = 1'

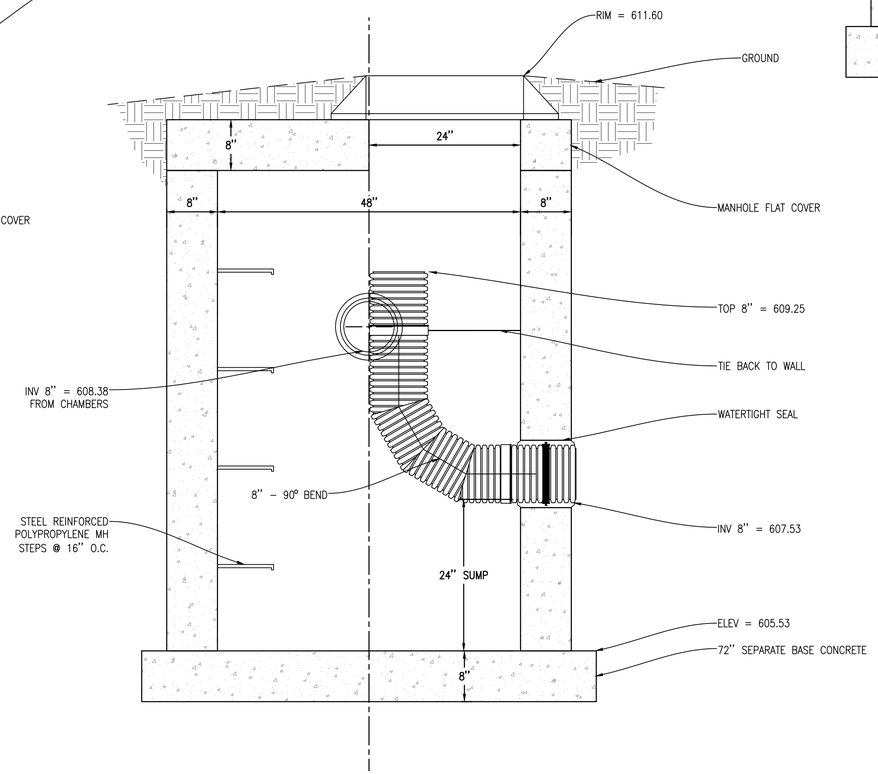


NOTES:

- ALL STORM SEWER SHALL BE ADS N-12 OR EQUAL
- STS #11: 48" STRUCTURE W/ FLAT CONCRETE COVER AND TYPE B ACCESS COVER
- CHAMBER INVERT: 600.50

STS #11 DETAIL

SCALE: 1" = 1'



NOTES:

- ALL STORM SEWER SHALL BE ADS N-12 OR EQUAL
- STS #14: 48" STRUCTURE W/ FLAT CONCRETE COVER AND TYPE B ACCESS COVER
- CHAMBER INVERT: 607.00

STS #14 DETAIL

SCALE: 1" = 1'

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STATE OF MICHIGAN — WILLIAM C. BOTT — LICENSED PROFESSIONAL ENGINEER — License No. 6201043721

1/7/24

No.	Date	Revision	By

STORM OVERFLOW MANHOLE DETAILS
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

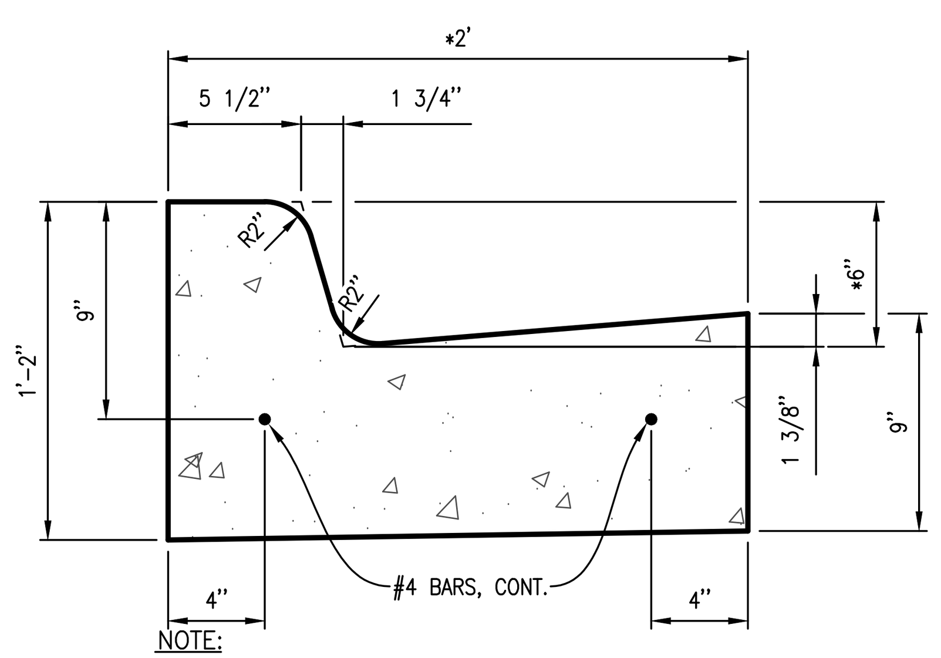
Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	1"=160'

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

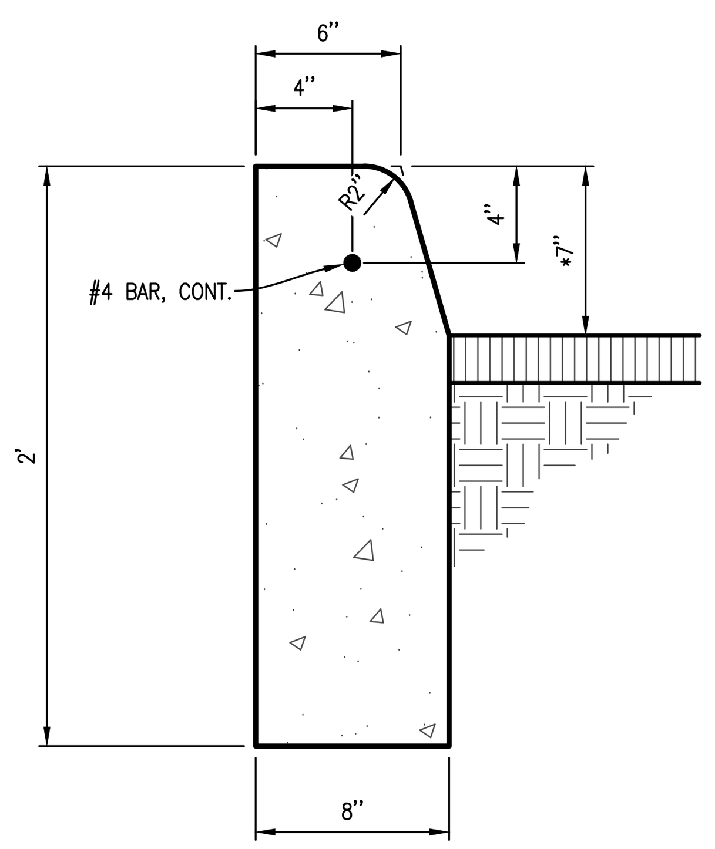
Project Number:
2021027003

Sheet:
18



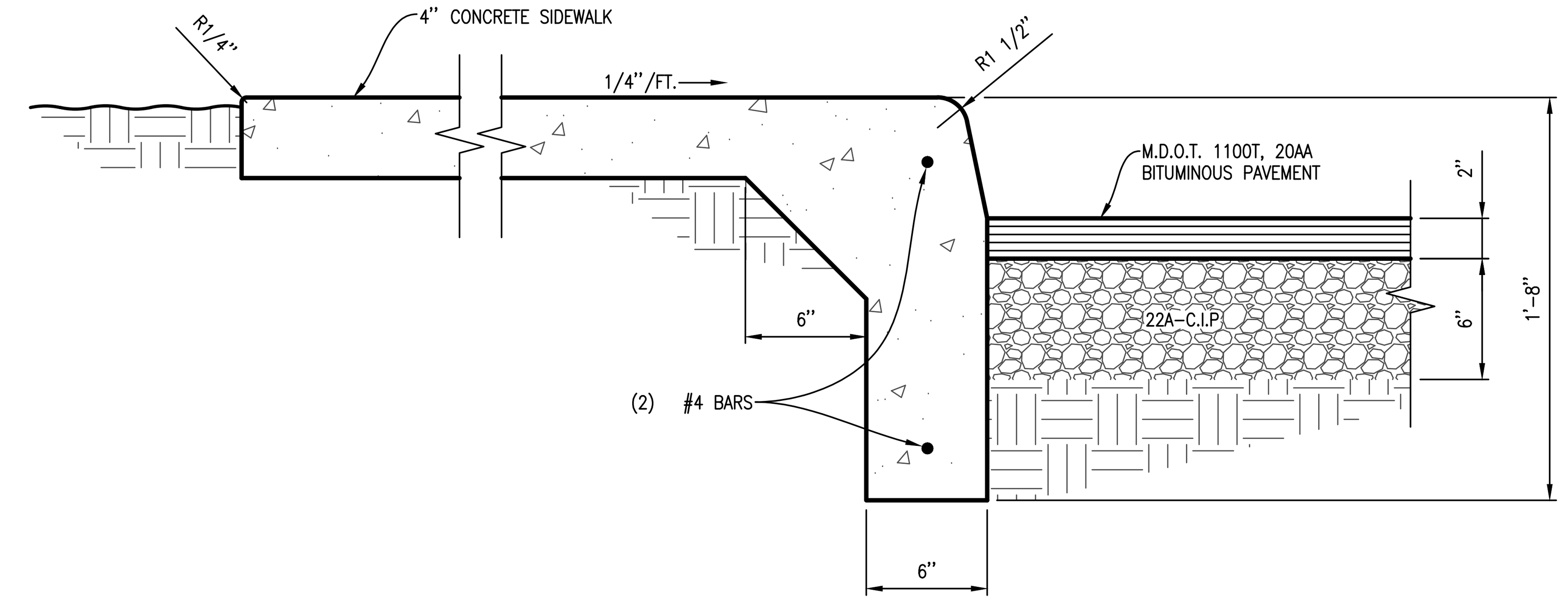
STANDARD M.D.O.T. "F4" CONCRETE CURB & GUTTER DETAIL
NOT TO SCALE

*MATCH EXISTING CURB WIDTH AND HEIGHTS

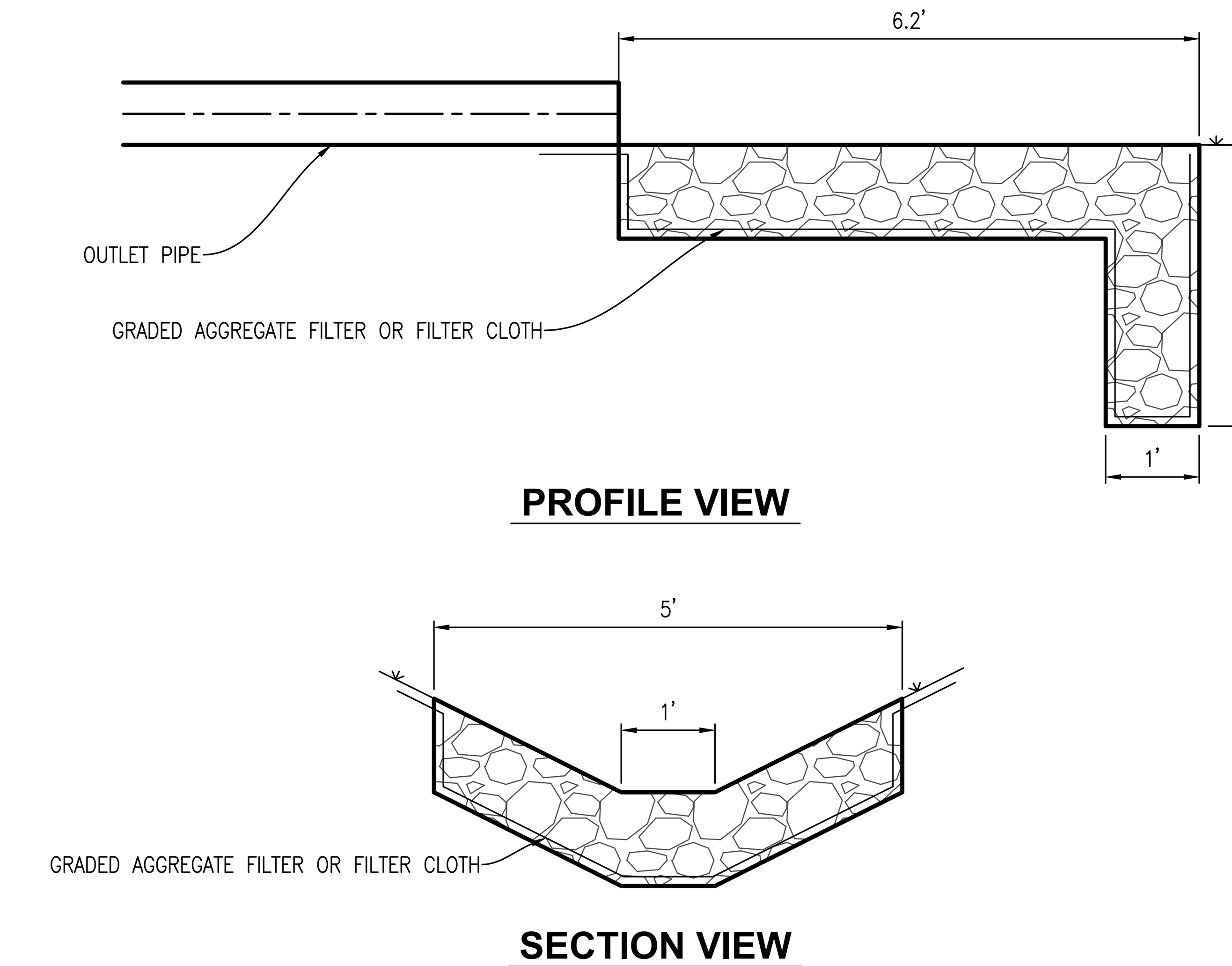


STANDARD M.D.O.T. "E2" CONCRETE CURB & GUTTER DETAIL
NOT TO SCALE

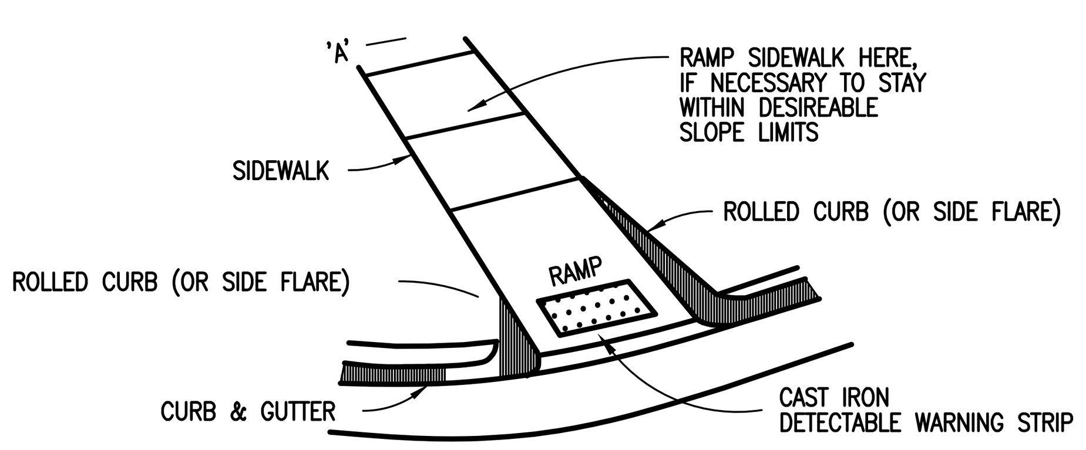
NOTE:
*MATCH EXISTING CURB HEIGHT



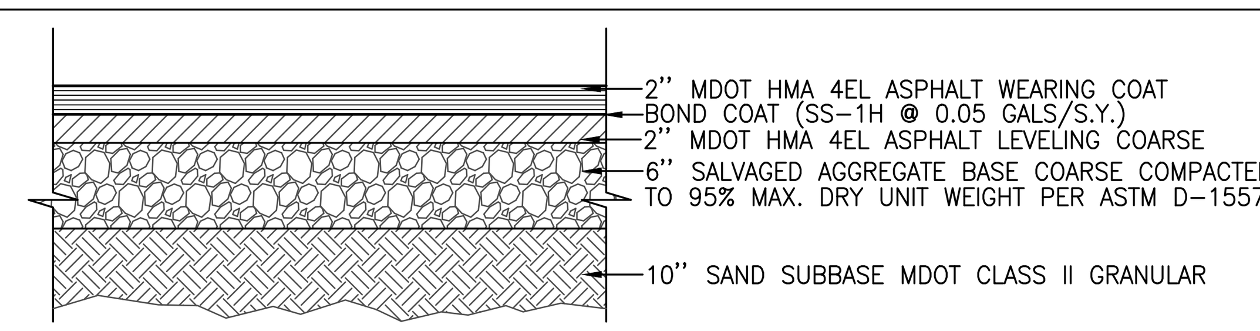
INTEGRAL SIDEWALK AND CURB DETAIL
NOT TO SCALE



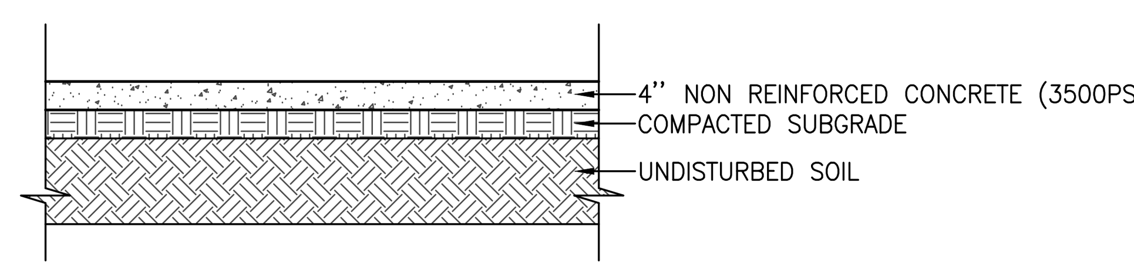
RIPRAP DETAIL
NOT TO SCALE



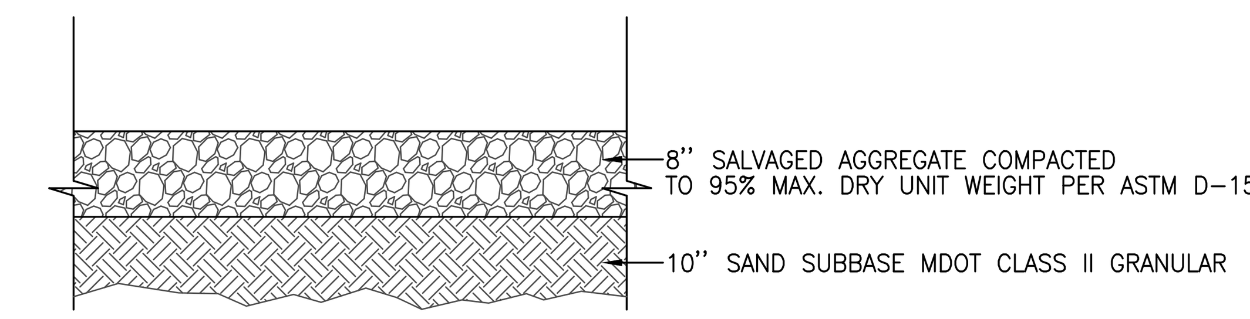
SIDEWALK RAMP



ASPHALT PAVEMENT DETAIL

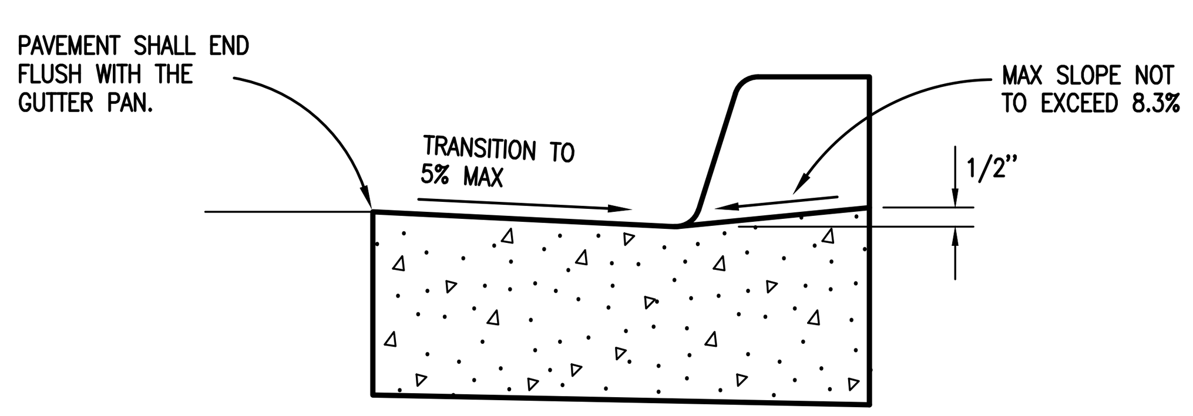


CONCRETE WALKWAY DETAIL

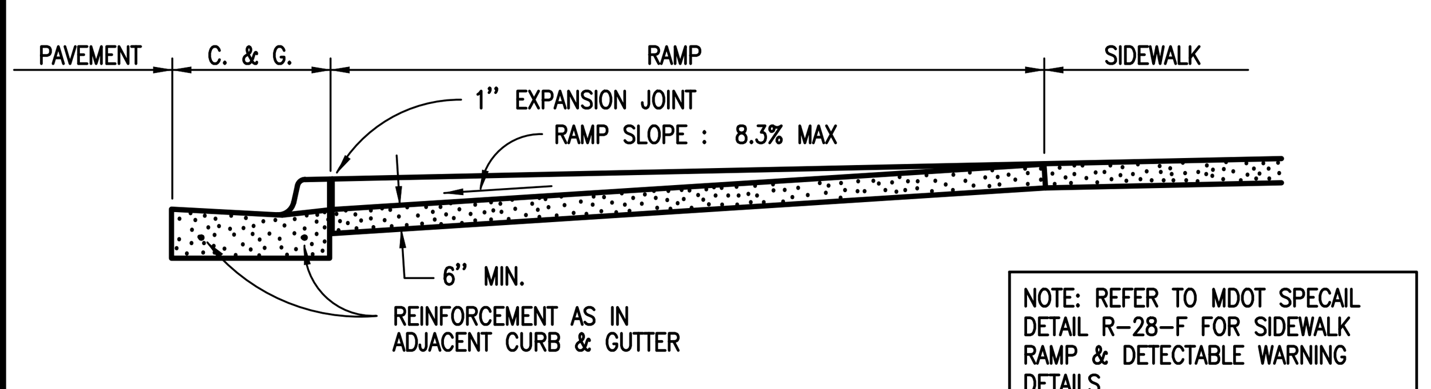


GRAVEL DETAIL

TYPICAL SURFACE SECTIONS
NOT TO SCALE

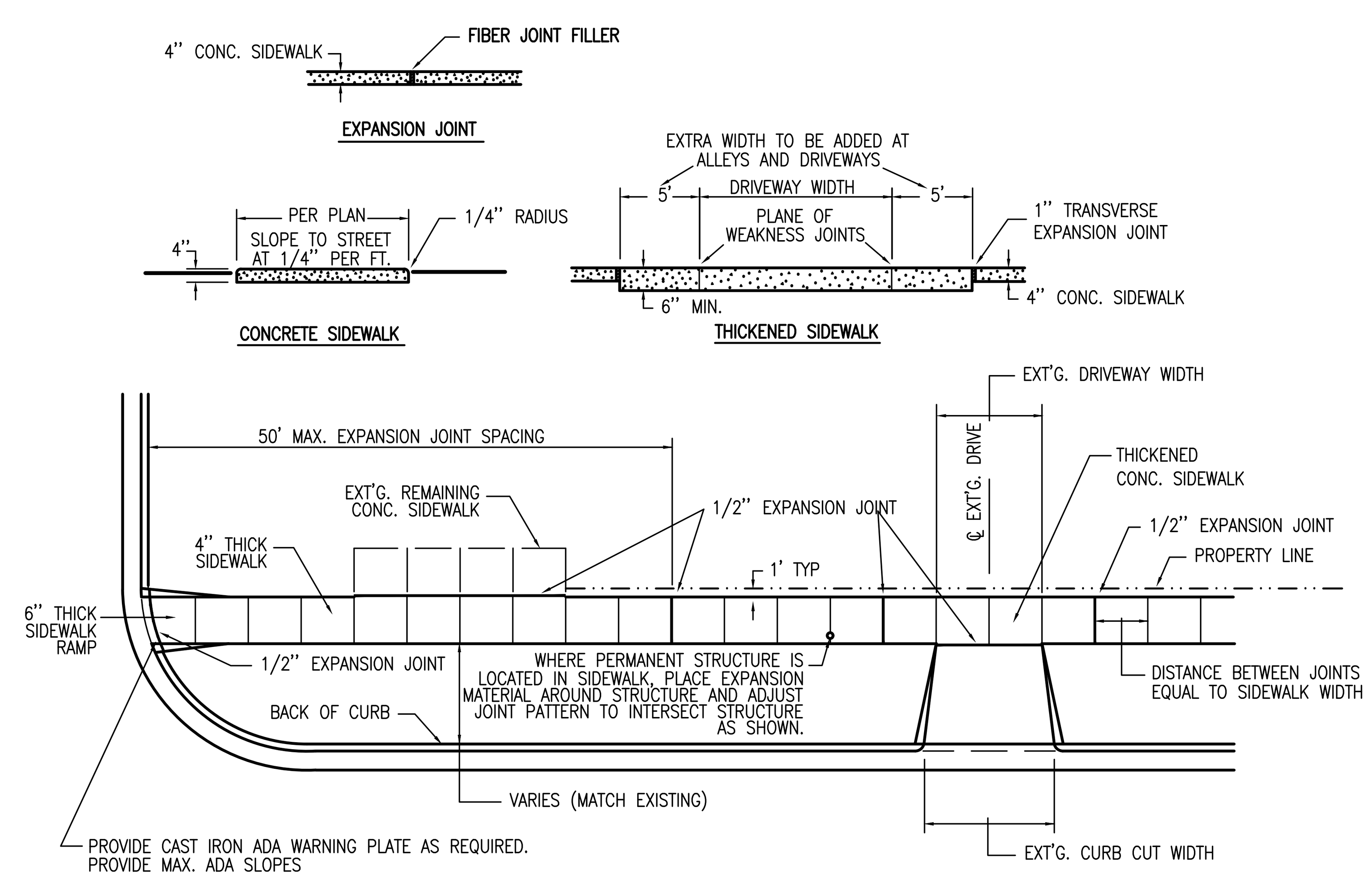


SECTION THRU CURB CUT

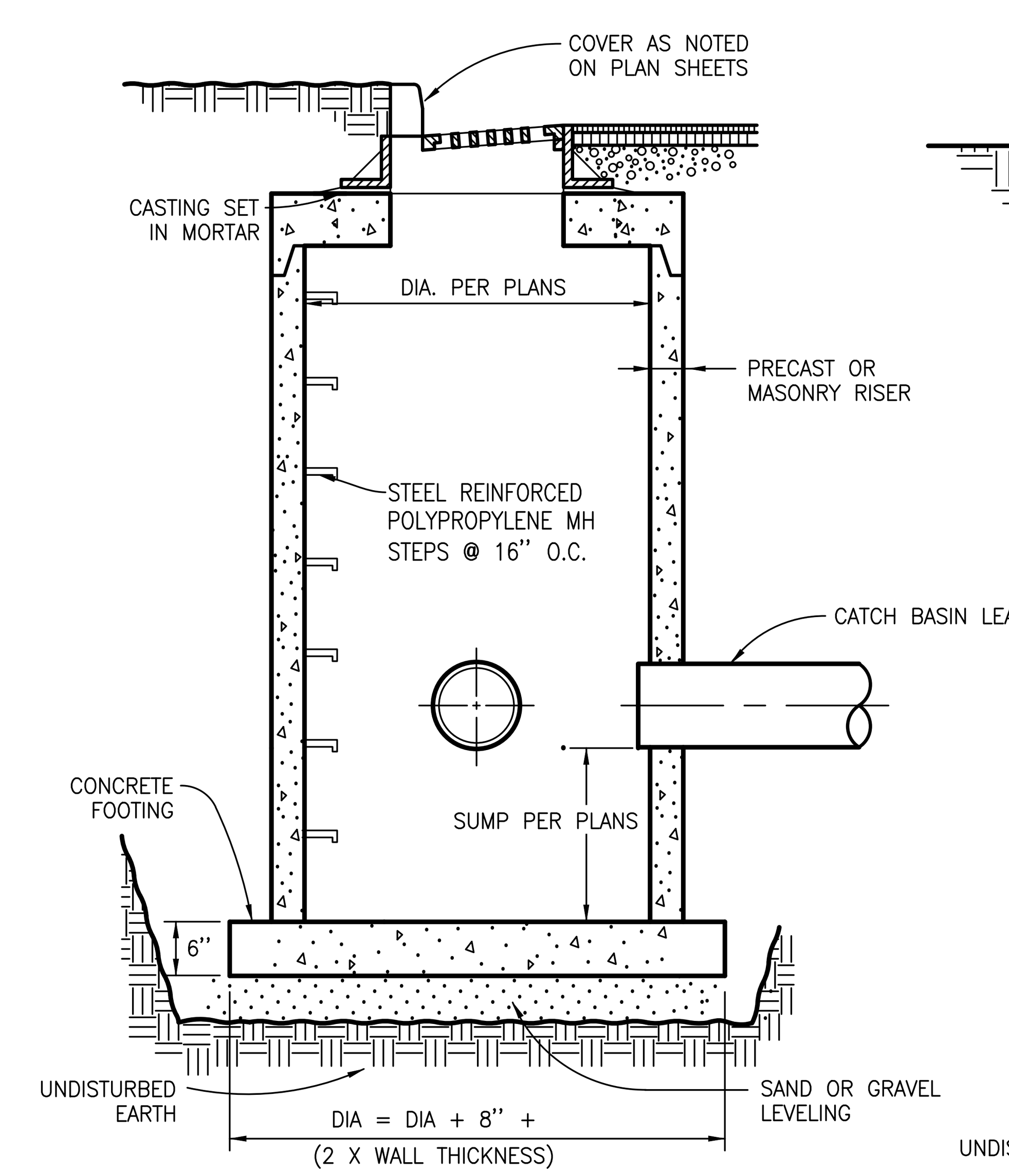


SECTION "A-A"

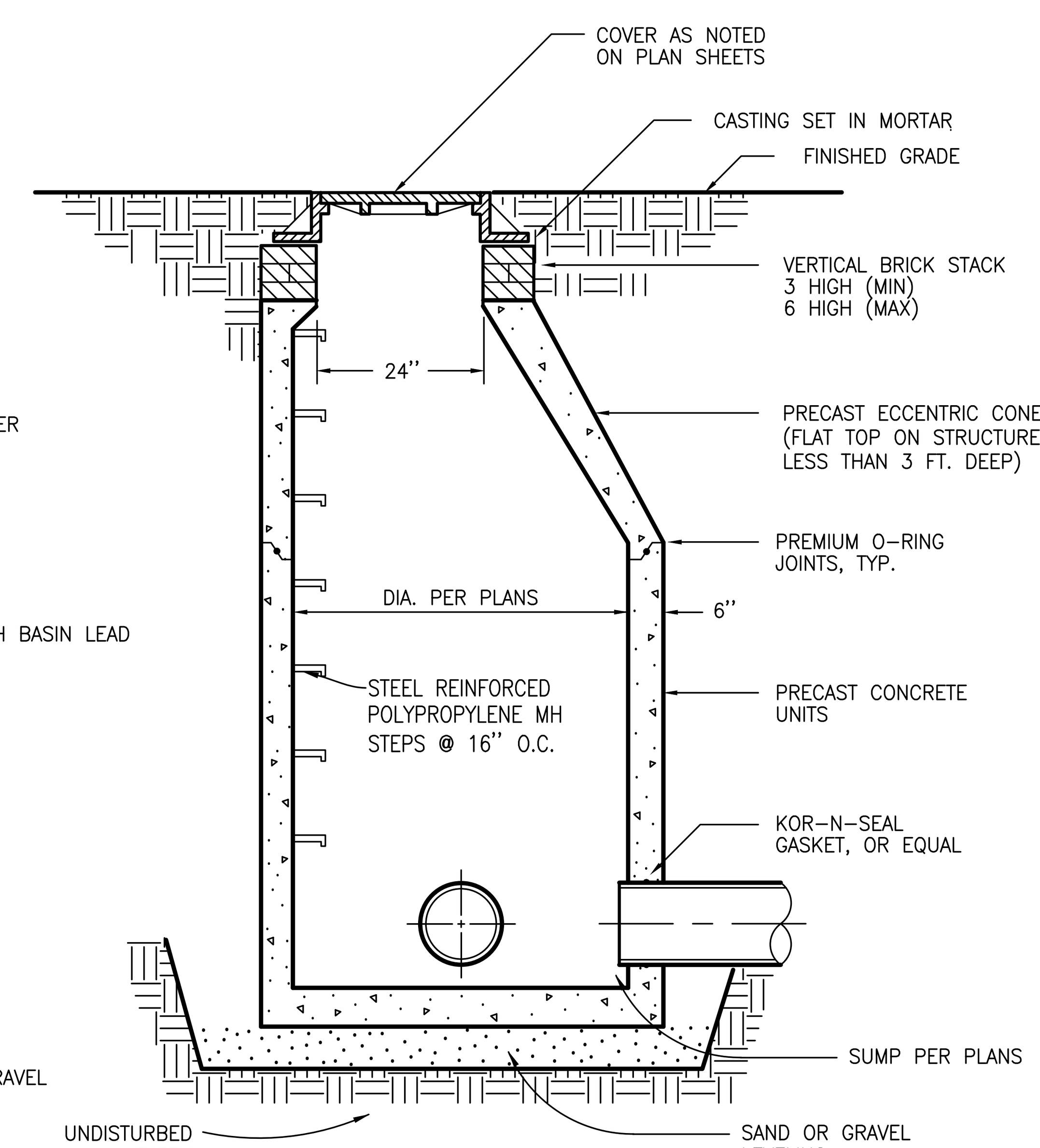
CONCRETE SIDEWALK ADA RAMP DETAILS
NOT TO SCALE



CONCRETE SIDEWALK DETAILS
NOT TO SCALE



CATCH BASIN DETAIL
NOT TO SCALE



STORM MANHOLE DETAIL
NOT TO SCALE

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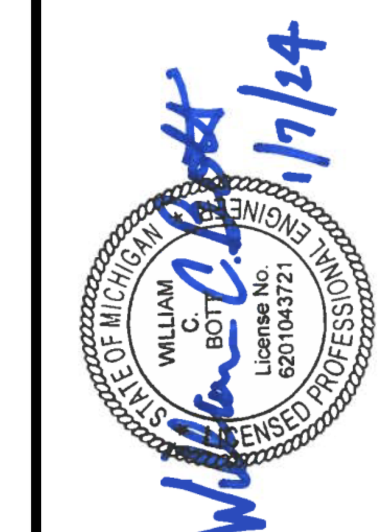
CONSTRUCTION SERVICES
DRILLING
LANDSCAPE ARCHITECTURE



No.	Date	Revision	By

PROJECT LOCATION MAP
BEACH REMEDIATION & STORM REDUCTION PROJECT
VILLAGE OF BEULAH

Date Issued:	1-6-2025
Date Surveyed:	12-14-2021
Designed By:	WCB
Drawn By:	ERP
Checked By:	WCB
Scale:	N/A

Original sheet size is 22x34

Location:
PT OF THE NE 1/4 SEC 27
PT OF THE NW 1/4 SEC 28
T26N, R15W
BENZONIA TOWNSHIP
BENZIE COUNTY, MI.

Project Number:
2021027003

Sheet:
19