PROJECT PARCEL SITE
TOWN OF GROTON ASSESSOR'S MAP DATA

TAX MAP	PARCEL
222	55

PLANS TO ACCOMPANY PERMIT APPLICATIONS

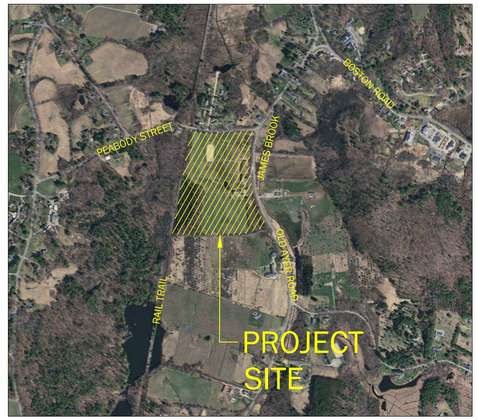
FOR

THE MUSIC CENTER AT INDIAN HILL-PHASE 2

OLD AYER ROAD

GROTON, MASSACHUSETTS

SEPTEMBER 14, 2016



LOCATION MAP
1"=1,000'

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UTILITY CONTACTS

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ELECTRIC
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T.978.448.1150

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T.774.409.3160

PUBLIC WORKS DEPARTMENT
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PERMITS

	LOCAL	GOVERNING BODY	STATUS
	SITE PLAN REVIEW	TOWN OF GROTON PLANNING BOARD GROTON TOWN HALL 173 MAIN STREET GROTON, MA 01450 ATTN: LAURIE BONAVITA	APPROVED JANUARY 12, 2017
	NOTICE OF INTENT	TOWN OF GROTON CONSERVATION COMMISSION GROTON TOWN HALL 173 MAIN STREET GRONTON, MA 01450 ATTN: TAKASHI TADA	APPROVED DECEMBER 8, 2016
	STORMWATER MANAGEMENT PERMIT	TOWN OF GROTON EARTH REMOVAL AND STORMWATER AND STORMWATER ADVISORY COMMITTEE GROTON TOWN HALL 173 MAIN STREET GROTON, MA 01450 ATTN: EDWARD PERKINS, CHAIR	APPROVED DECEMBER 6, 2016
	SEWER EXTENSION REVIEW	TOWN OF GROTON BOARD OF SELECTMAN GROTON TOWN HALL 173 MAIN STREET GROTON, MA 01450 ATTN: JAMES GMEINER, CHAIR	APPROVED OCTOBER 24, 2016
	BUILDING PERMIT	TOWN OF GROTON BUILDING DEPARTMENT GROTON TOWN HALL 173 MAIN STREET GROTON, MA 01450 ATTN: EDWARD M. CATALDO	TO BE FILED
STATE			
FEDERAL	NPDES CONSTRUCTION GENERAL PERMIT	U.S. ENVIRONMENTAL PROTECTION AGENCY NEW ENGLAND REGION 5 POST OFFICE SQUARE SUITE 100 BOSTON, MA 02109	TO BE FILED 14 DAYS PRIOR TO CONSTRUCTION

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PERMIT DRAWINGS - NOT FOR CONSTRUCTION

TODD P. MOREY, P.E. 48865 CIVIL

I HEREBY ACKNOWLEDGE THAT THESE PLANS AND SPECIFICATIONS WERE PREPARED UNDER MY DIRECT SUPERVISION AND THAT I AM REGISTERED IN THE COMMONWEALTH OF MASSACHUSETTS TO PRACTICE AS A PROFESSIONAL ENGINEER.

Know what's below. Call before you dig.

PROJECT NO. C-880
ORIGINAL ISSUE DATE: SEPTEMBER 14, 2016

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

REVISION	DATE
1) REVISED STORMWATER SYSTEM	11.18.16
2) CONTROL PLANS	1.12.17

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GENERAL NOTES

1. THE CONTRACTOR SHALL NOTIFY THE TOWN OF GORTON DEPARTMENT OF PUBLIC WORKS AT LEAST FORTY-EIGHT (48) HOURS IN ADVANCE OF ANY ROADWORK OR MUNICIPAL CONSTRUCTION.

2. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR THE ELEVATION OF THE EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, SURVEY INFORMATION BY THE PROJECT SURVEYOR, AND MEASUREMENTS TAKEN IN THE FIELD WHERE POSSIBLE. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AND DIGSAFE (1-888-DIG-SAFE) AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN. THE CONTRACTOR SHALL NOT RELOCATE ANY TOWN OWNED UTILITY WITHOUT PRIOR APPROVAL OF THE TOWN OF GROTON DEPARTMENT OF PUBLIC WORKS. ALL UTILITY WORK WITHIN THE RIGHT OF WAY SHALL BE PERFORMED BY A LICENSED DRAIN LAYER UNDER THE SUPERVISION OF THE TOWN OF GROTON DEPARTMENT OF PUBLIC WORKS.

3. MAINTENANCE OF EROSION CONTROL MEASURES IS OF PARAMOUNT IMPORTANCE, AND THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL EROSION CONTROL MEASURES SHOWN ON THE PLANS. ADDITIONAL EROSION CONTROL MEASURES SHALL BE INSTALLED AS DEEMED NECESSARY BY ONSITE INSPECTIONS BY THE OWNER OR THEIR REPRESENTATIVES AND THE MUNICIPAL CODE ENFORCEMENT OFFICER AT NO ADDITIONAL COST TO THE OWNER.

4. ALL MATERIAL SCHEDULES SHOWN ON THE PLANS ARE FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL PREPARE HIS OWN MATERIAL SCHEDULES BASED ON HIS PLAN REVIEW. ALL SCHEDULES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS OR PERFORMING WORK.

5. ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE TOWN OF GROTON SPECIFICATIONS, MASSACHUSETTS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION STANDARDS, AWWA STANDARDS AND OTHER RELATED INDUSTRY STANDARDS.

6. THIS PROJECT IS SUBJECT TO ALL TERMS AND CONDITIONS OF ALL REGULATIONS ADMINISTERED BY THE MASSACHUSETTS ENVIRONMENTAL POLICY ACT, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION, LOCAL UTILITY COMPANIES AND MUNICIPAL OFFICIALS.

7. THE CONTRACTOR SHALL REVIEW ALL RELEVANT FEDERAL, STATE AND MUNICIPAL PERMITS ASSOCIATED WITH THIS PROJECT. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CERTIFY THAT ALL RELEVANT REQUIREMENTS REGARDING CONSTRUCTION, TESTING, AND REPORTING OF THE PERMITS HAVE BEEN MET AND THE PROJECT HAS BEEN CONSTRUCTED IN COMPLIANCE WITH THESE PORTIONS OF THE PERMITS.

8. ALL SIGNAGE SHALL CONFORM TO THE STANDARDS FOR SIZE, HEIGHT, LOCATION, AND REFLECTIVITY SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), LATEST EDITION.

9. ALL CURB SHALL CONFORM TO THE SPECIFICATIONS OR THE MORE STRINGENT OF THE TOWN OF GROTON DEPARTMENT OF PUBLIC WORKS OR THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION, HIGHWAY DIVISION.

10. ALL DIMENSIONING UNLESS OTHERWISE NOTED IS TO THE FACE OF CURB, EDGE OF PAVEMENT OR FACE OF BUILDING.

11. THE PROJECT IS TO BE SERVED BY PUBLIC WATER, PRIVATE SEWER, AND UNDERGROUND CABLE, TELEPHONE, AND ELECTRIC UTILITIES.

12. AN APPROVED SET OF PLANS AND ALL APPLICABLE PERMITS MUST BE AVAILABLE AT THE CONSTRUCTION SITE.

13. ANY DAMAGE TO PUBLIC OR PRIVATE PROPERTY RESULTING FROM CONSTRUCTION ACTIVITIES SHALL BE REPAIRED BY THE CONTRACTOR AT NO EXPENSE TO THE OWNER.

14. PROPERTY MARKERS AND STREET LINE MONUMENTS SHALL BE PROPERLY PROTECTED AT ALL TIMES DURING CONSTRUCTION TO ENSURE INTEGRITY. IF DISTURBED, THEY SHALL BE REPLACED BY A REGISTERED SURVEYOR AT THE CONTRACTOR'S EXPENSE.

15. ADA ACCESSIBLE RAMPS SHALL BE PROVIDED ALONG SIDEWALKS AND AT ALL DRIVEWAY CROSSINGS. ALL ADA RAMPS SHALL CONFORM TO MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (AAB) STANDARDS AS WELL AS MASSACHUSETTS DEPARTMENT OF TRANSPORTATION STANDARDS.

GRADING & DRAINAGE NOTES

1. ALL STORM DRAIN PIPE SHALL BE HIGH DENSITY POLYETHYLENE PIPE (HDPE), SMOOTH BORE INTERIOR, PROVIDING A MANNING'S ROUGHNESS COEFFICIENT OF 0.013 OR LESS UNLESS OTHERWISE NOTED.

2. THE PROJECT ELEVATIONS ARE BASED ON NGVD 1988 VERTICAL DATUM. THE HORIZONTAL AND VERTICAL CONTROL FOR THE PROJECT WAS PERFORMED BY THE PROJECT SURVEYOR. THE SITE BENCHMARK(S) ARE NOTED ON THE EXISTING CONDITIONS PLANS.

3. ALL EXCESS SOIL EXCAVATED FROM THE PROJECT SITE SHALL BE DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.

4. ALL DISTURBED AREAS NOT TO BE PAVED, SODDED, OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, FERTILIZER, SEED AND MULCH.

5. COMPACTION REQUIREMENTS:

LOCATION	MINIMUM COMPACTION
SUBBASE AND BASE GRAVEL BELOW PAVED AREAS	95%
SUBGRADE FILL BELOW PAVED AREAS	92%
TRENCH BEDDING MATERIAL	95%
LOAM AND SEED AREAS	90%

ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557

6. ADJUST ALL MANHOLE COVERS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISHED GRADE.

7. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE FREE OF LOW SPOTS AND PONDING AREAS.

8. ALL SUBGRADE SURFACES SHALL BE SLOPED AT NO LESS THAN 1% TO PROMOTE ADEQUATE DRAINAGE TOWARDS DRAINAGE AREAS.

9. PROVIDE STABILIZATION OR SEPARATION GEOTEXTILE FABRIC OVER UNSTABLE SOILS AS DIRECTED BY THE OWNERS REPRESENTATIVE OR ENGINEER.

10. CATCH BASINS SHALL BE INSPECTED IN THE SPRING AND FALL. ANY STRUCTURES WHICH ARE INSPECTED AND HAVE AN ACCUMULATED SEDIMENT DEPTH OF 12" SHALL BE CLEANED. DISPOSAL OF ACCUMULATED SEDIMENT SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN, INSTALLATION, OPERATION AND REMOVAL OF APPROPRIATE EXCAVATION DEWATERING SYSTEMS AS WELL AS THE PROTECTION OF EXPOSED SUBGRADE SOILS AT NO ADDITIONAL COST TO THE OWNER. WATER ENTERING EXCAVATIONS SHALL BE CONTROLLED AND PROMPTLY REMOVED TO AVOID SUBGRADE DISTURBANCE. SURFACE WATER RUNOFF SHALL BE DIRECTED AWAY FROM EXPOSED SOIL SURFACES.

12. ALL EXISTING STRUCTURES, FENCES, TREES, ETC. WITHIN THE CONSTRUCTION AREA, UNLESS SPECIFICALLY NOTED TO REMAIN, SHALL BE REMOVED.

13. ALL DRAINAGE STRUCTURES SHALL BE PRECAST UNLESS OTHERWISE NOTED.

14. ALL DRAINAGE STRUCTURES AND STORM SEWER PIPE SHALL MEET HEAVY DUTY TRAFFIC (H-20) LOADING AND BE INSTALLED ACCORDINGLY.

EROSION CONTROL NOTES

1. LAND DISTURBING ACTIVITIES SHALL BE ACCOMPLISHED IN A MANNER AND SEQUENCE THAT CAUSES THE LEAST PRACTICAL DISTURBANCE OF THE SITE.

2. PRIOR TO BEGINNING ANY CLEARING OR LAND DISTURBING ACTIVITIES, THE CONTRACTOR SHALL INSTALL THE PERIMETER SILT FENCE OR EROSION CONTROL BARRIERS AND THE STABILIZED CONSTRUCTION ENTRANCES.

3. ALL GROUND AREAS GRADED FOR CONSTRUCTION SHALL BE GRADED, LOAMED AND SEEDED AS SOON AS POSSIBLE. PERMANENT SEED MIXTURE SHALL CONFORM TO THE SEEDING PLAN CONTAINED IN EROSION AND SEDIMENT CONTROL NOTES AND DETAILS ON THIS SET.

4. PRIOR TO PAVING, THE CONTRACTOR SHALL FLUSH SILT FROM ALL STORM DRAIN LINES.

5. SILT FENCES SHALL BE INSPECTED, REPAIRED AND CLEANED AS NOTED IN THE EROSION CONTROL NOTES AND DETAILS FOR THIS PROJECT.

6. THE CONTRACTOR SHALL REPAIR AND ADD STONE TO THE CONSTRUCTION ENTRANCES AS THEY BECOME SATURATED WITH MUD TO ENSURE THAT THEY FUNCTION AS INTENDED DURING CONSTRUCTION. ALL PUBLIC STREETS SHALL BE SWEPT AS NECESSARY.

7. SILT REMOVED FROM AROUND INLETS AND BEHIND THE SILT FENCES SHALL BE PLACED ON A TOPSOIL STOCKPILE AND MIXED INTO IT FOR LATER USE IN LANDSCAPING OPERATIONS.

8. THE CONTRACTOR IS CAUTIONED THAT FAILURE TO COMPLY WITH THE SEQUENCE OF CONSTRUCTION, EROSION/SEDIMENT CONTROL PLAN, AND OTHER PERMIT REQUIREMENTS MAY RESULT IN MONETARY PENALTIES. THE CONTRACTOR SHALL BE ASSESSED ALL SUCH PENALTIES AT NO COST TO THE OWNER.

UTILITY NOTES

1. ALL WATER UTILITY MATERIALS AND INSTALLATION METHODS SHALL CONFORM TO TOWN OF GROTON PUBLIC WORKS DEPARTMENT STANDARDS. ALL WATER DISTRIBUTION PIPING SHALL BE CLASS 52 DUCTILE IRON PIPE. DISINFECTION OF WATER LINES SHALL CONFORM TO AWWA STANDARDS. THE CONTRACTOR SHALL COORDINATE ALL CONNECTIONS TO THE MUNICIPAL SYSTEM WITH THE TOWN OF GROTON PUBLIC WORKS DEPARTMENT.

2. THE LOCATION OF THE ELECTRIC, TELEPHONE, AND CABLE SERVICES ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY COMPANIES FOR EXACT LOCATIONS.

3. SANITARY SEWER PIPE SHALL BE POLYVINYL CHLORIDE (PVC) PIPE MEETING THE REQUIREMENTS OF SDR-35 FOR GRAVITY PIPE AND SDR-11 FOR FORCEMAIN PIPE UNLESS OTHERWISE NOTED ON THE PLANS. ALL SEWER MATERIALS AND INSTALLATION METHODS SHALL CONFORM TO THE TOWN OF GROTON DEPARTMENT OF PUBLIC WORKS STANDARDS.

4. COORDINATE ALL UTILITY WORK WITH THE APPROPRIATE UTILITY COMPANY. ALL UTILITY WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARDS OF THAT UTILITY.

5. UNDERGROUND ELECTRICAL, TELEPHONE, AND CABLE CONDUIT SHALL CONFORM TO THE MATERIAL REQUIREMENTS OF THAT UTILITY.

6. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLE.

7. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL BOXES, FITTINGS, CONNECTORS, COVER PLATES AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THE DRAWINGS TO RENDER INSTALLATION OF THE UTILITIES COMPLETE AND OPERATIONAL AT NO EXTRA EXPENSE TO THE OWNER.

8. A 10 FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18 INCH OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER AND SANITARY SEWER CROSSINGS.

9. THRUST BLOCKS OR LOCKING RETAINER GLANDS SHALL BE PLACED ON THE WATER DISTRIBUTION LINES AT ALL BENDS, TEES, FIRE HYDRANTS, VALVES, OR CHANGES IN DIRECTION, ETC. THE THRUST BLOCKS OR LOCKING RETAINER GLANDS SHALL MEET THE REQUIREMENTS OF THE TOWN OF GROTON PUBLIC WORKS DEPARTMENT AND THE PROJECT SPECIFICATIONS.

10. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RECORD DRAWINGS THROUGHOUT THE PROJECT AND PROVIDING THE OWNER WITH A SET OF THE FINAL RECORD DRAWINGS WHEN THE PROJECT IS COMPLETE.

11. ALL TRENCHING, PIPE LAYING AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.

12. ALL WATER VALVES AND APPURTENANCES SHALL OPEN LEFT.

13. FIRE HYDRANTS SHALL BE MUELLER CENTURION, PAINTED YELLOW.

DEMOLITION NOTES

1. THE SITE SHALL BE STRIPPED OF EXISTING IMPROVEMENTS WITHIN THE PERIMETER CITY SIDEWALKS AND OWNERS PROPERTY. ALL MATERIALS FROM DEMOLITION SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR UNLESS OTHERWISE NOTED BY THE OWNER, ENGINEER, OR GOVERNING AGENCIES. REFER TO THE BUILDING AND SITE DEMOLITION PLANS FOR THE PROJECT.

2. REMOVAL OF EXISTING IMPROVEMENTS SHALL BE AS REQUIRED FOR THIS PROJECT. THE MATERIALS REMOVED FROM THE SITE SHALL BE DISPOSED OF IN A PROPER AND LEGAL MANNER PER FEDERAL, STATE, AND OR LOCAL LAWS AND ORDINANCES.

3. IF ANY HAZARDOUS MATERIALS ARE ENCOUNTERED THE OWNER SHALL BE NOTIFIED. THOSE MATERIALS SHALL BE REMOVED AND DISPOSED OF IN A MANNER AS APPROVED BY ALL GOVERNING AGENCIES AND IN A LANDFILL OR DISPOSAL FACILITY LICENSED TO ACCEPT HAZARDOUS MATERIALS.

4. PREDEMOLITION PHOTOGRAPHS SHALL BE TAKEN THAT SHOW THE EXISTING CONDITIONS OF THE SITE AND ADJOINING BUILDINGS TO REMAIN. PHOTOS SHALL INCLUDE DAMAGE TO FINISH SURFACES THAT MIGHT BE MISCONSTRUED AS DAMAGE CAUSED BY DEMOLITION OPERATIONS.

5. EXISTING BUILDING ADDITIONS, PAVEMENTS, SIDEWALKS, CURBS, DRIVEWAYS, ELECTRICAL TRANSFORMERS, DITCHES, DRAINAGE PIPES AND STRUCTURES, FENCES, LAWNS, TREES, BUSHES, MAILBOXES, SIGNS, POWER POLES, ETC. TO REMAIN SHALL BE PROTECTED FROM DAMAGE BY THE CONTRACTOR. ANY DAMAGE DURING CONSTRUCTION SHALL BE RESTORED, RECONSTRUCTED OR REPLACED TO AT LEAST THEIR ORIGINAL CONDITION OR AS REQUIRED OR DICTATED BY FEDERAL, STATE, COUNTY, CITY OR LOCAL GOVERNING AGENCIES. ANY UTILITIES REQUIRED TO REMAIN IN SERVICE FOR EXISTING BUILDING ADDITIONS TO REMAIN SHALL BE PROTECTED.

6. SAW CUT THE EDGES OF PAVED AREAS CLEAN, NEAT AND TRUE TO LINE SO NO UNWANTED CHIPPING OR BREAKING OF EXISTING PAVEMENT TO REMAIN WILL OCCUR.

7. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INSPECT EACH DAY AND REMOVE ALL MUD, DIRT, GRAVEL AND LOOSE MATERIALS TRACKED, DUMPED, SPILLED OR WIND BLOWN FROM THIS SITE ONTO OTHER SITES, RIGHT OF WAYS, PUBLIC OR PRIVATE STREETS OR ROADS, DRIVEWAYS, YARDS OR SIDEWALKS. THE CONTRACTOR SHALL REDUCE AIRBORNE DUST DURING THE ENTIRE DEMOLITION SCHEDULE. WATER MAY BE USED AS A REDUCER.

8. THE CONTRACTOR SHALL MAINTAIN EROSION CONTROL DEVICES AS REQUIRED DURING DEMOLITION.

9. IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER AND ALL THE UTILITY COMPANIES AND DEPARTMENTS 72 HOURS OR AS REQUIRED BEFORE DEMOLITION IS TO START TO VERIFY ANY UTILITIES THAT MAY BE PRESENT ON SITE. ALL VERIFICATIONS, LOCATIONS, SIZE AND DEPTHS SHALL BE MADE BY THE APPROPRIATE UTILITY COMPANIES OR DEPARTMENTS. WHEN EXCAVATING AROUND OR OVER EXISTING UTILITIES, THE CONTRACTOR MUST NOTIFY THE UTILITY COMPANY SO A REPRESENTATIVE OF THE UTILITY MAY BE PRESENT DURING THE EXCAVATION TO INSTRUCT AND OBSERVE DURING THE EXCAVATION. VERIFY THAT UTILITIES HAVE BEEN DISCONNECTED AND CAPPED BEFORE STARTING BUILDING DEMOLITION OPERATIONS.

10. IT IS THE RESPONSIBILITY OF THE CONTRACTOR OR CONTRACTORS TO OBTAIN ALL FEDERAL, STATE, COUNTY, CITY, AND LOCAL PERMITS FOR ANY AND ALL WORK REQUIRED UNLESS OTHERWISE NOTED. THIS SHALL INCLUDE ALL SUBMITTALS AS REQUIRED INCLUDING STORMWATER RUNOFF CONTROL. THE CONTRACTOR OR CONTRACTORS ARE RESPONSIBLE TO PAY FOR ALL REQUIRED PERMITS BY ANY OR ALL AGENCIES MENTIONED ABOVE UNLESS OTHERWISE NOTED BY THE CONTRACT OR SPECIFICATIONS.

11. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY WITH EACH UTILITY COMPANY AND OR AGENT WHO IS RESPONSIBLE TO REMOVE OR RELOCATE EACH EXISTING UTILITY. IT FURTHER SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BEAR THE COST FOR THE REMOVAL, TERMINATION OR RELOCATION OF THE UTILITIES IF THE RESPONSIBILITY IS NOT COVERED BY THE UTILITY COMPANY.

12. ALL CONTRACTORS SHALL TAKE PARTICULAR CARE WHEN EXCAVATING IN AND AROUND EXISTING UTILITY LINES AND EQUIPMENT. ACTUAL FIELD LOCATIONS OF ALL THE EXISTING UTILITIES ARE THE CONTRACTORS RESPONSIBILITY AND MUST BE LOCATED EITHER BY THE REPRESENTATIVE OF THE UTILITY COMPANY OR BY A PRIVATE UNDERGROUND UTILITY LOCATING COMPANY PRIOR TO THE START OF DEMOLITION ACTIVITIES.

13. REMOVAL OF EXISTING CONCRETE OR OTHER PAVED AREAS SHALL INCLUDE ALL AGGREGATE BASE MATERIALS. AREAS TO BE REMOVED SHALL BE SAW CUT LEAN, NEAT AND TRUE TO LINE. REMOVE ALL NONORGANIC MATTER THAT WOULD INTERFERE WITH THE GROWTH OF TURF OR PLANT MATERIAL.

14. THE CONTRACTOR SHALL NOTIFY THE OWNER PRIOR TO COMMENCEMENT OF DEMOLITION OPERATIONS. NO DEMOLITION, GRADING OR OTHER WORK SHALL COMMENCE WITHIN EASEMENTS ON ADJACENT PROPERTIES UNTIL A COORDINATION MEETING HAS BEEN HELD BETWEEN THE CONTRACTOR, OWNER, HIS REPRESENTATIVES AND OTHER STIPULATED PARTIES.

15. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE AT HIS EXPENSE ALL VEHICULAR AND PEDESTRIAN TRAFFIC CONTROL DEVICES REQUIRED BY FEDERAL, STATE, COUNTY, CITY AND LOCAL AGENCIES.

16. EXISTING BUILDINGS TO BE DEMOLISHED SHALL BE REMOVED IN THEIR ENTIRETY INCLUDING BASEMENT WALLS, SLABS, AND FOUNDATIONS.

17. RECYCLED CRUSHED OR PULVERIZED CONCRETE OR MASONRY MAY BE USED AS BACKFILL OR IN NEW CONSTRUCTION ONLY IF APPROVED BY THE ENVIRONMENTAL, GEOTECHNICAL, AND STRUCTURAL ENGINEERS.

18. PERFORM CLEARING, GRUBBING, STUMP REMOVAL, TOPSOIL STOCKPILE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS INCLUDING REMOVAL OF TREES, SHRUBS, STUMPS AND ROOT SYSTEMS TO A MINIMUM DEPTH TO ERADICATE THEM FROM SUB-GRADE, A MINIMUM DEPTH OF 42".

19. THE CONTRACTOR MUST VISIT THE SITE AND STUDY EXISTING PHYSICAL CONDITIONS, REVIEW DRAWINGS, AND REACH THEIR OWN CONCLUSIONS ON WORK NECESSARY TO ACCOMPLISH INTENDED RESULTS DESCRIED BY THE PROJECT DOCUMENTS.

20. INSTALL ORANGE SAFETY FENCE OR TEMPORARY CHAIN LINK FENCE AROUND THE PERIMETER OF THE DEMOLITION AREA. NO DEMOLITION EQUIPMENT OR DEMOLITION OPERATIONS SHALL OCCUR OUTSIDE OF THIS PERIMETER FENCING.

21. INSTALL SILT FENCE BARRIER ADJACENT TO SAFETY FENCE ALONG DOWNGRADIENT SIDE OF SITE IN ACCORDANCE WITH STANDARD BMP MEASURES.

22. KEEP PUBLIC STREETS CLEAR OF DUST, MUD AND DEBRIS. SURFACE MUST BE SWEPT AT THE CLOSE OF EACH WORK DAY AND AT OTHER INTERVALS AS NECESSARY TO AVOID TRACKING OF MUD OR CREATION OF DUST. INSTALL A STONE STABILIZED CONSTRUCTION ENTRANCE AT PRIMARY ACCESS ROUTE INTO WORK ZONE. MAINTAIN AND REPLACE AS NECESSARY.

23. THE OWNER MAKES NO REPRESENTATION AS TO THE VOLUME OF MATERIALS ATTENDANT WITH DEMOLITION. UPON COMPLETION OF THE BUILDING/FOUNDATION AND UTILITY DEMOLITION WORK, THE ENTIRE DISTURBED AREA SHALL BE REFILLED TO EXISTING SUBGRADE ELEVATION IN LIFTS (MAXIMUM THICKNESS 8 INCHES) COMPACTED TO 95% OPTIMUM DRY DENSITY (ASTM D-1557) WITH MATERIAL MEETING THE FOLLOWING GRADATION:

SIEVE SIZE	PERCENT FINER BY WEIGHT
6 INCH	100
NO. 1/4"	25 - 100
NO. 40	0 - 50
NO. 200	0 - 0.7

24. CONTACT DIGSAFE AT LEAST 72 HOURS, NOT INCLUDING SATURDAYS, SUNDAYS, AND LEGAL MASSACHUSETTS HOLIDAYS, BUT NOT MORE THAN 20 CALENDAR DAYS PRIOR TO THE COMMENCEMENT OF EXCAVATION.

25. THE CONTRACTOR SHALL REMOVE ALL EXISTING UNDERGROUND UTILITIES AS ENCOUNTERED DURING BUILDING DEMOLITION.

ACCESSIBILITY NOTES

GENERAL NOTES:

1. SPECIAL ATTENTION SHALL BE GIVEN TO COMPLIANCE WITH THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (AAB) RULES AND REGULATIONS AND THE AMERICANS DISABILITIES ACT STANDARDS FOR ACCESSIBLE DESIGN (ADAAG).
2. IT IS ESSENTIAL THAT CONTRACTORS BE AWARE OF THE SITE ACCESSIBILITY REQUIREMENTS. THESE NOTES AND DETAILS ARE INTENDED TO ASSURE THAT CONTRACTORS ARE AWARE OF THE REQUIREMENTS AT THE TIME WHEN THEY ARE BIDDING THE PROJECT. IF SLOPES / GRADES AND DIMENSIONS ARE NOT ACHIEVABLE, THE CONTRACTOR IS REQUIRED TO CONTACT THE OWNER IMMEDIATELY, BEFORE MOVING FORWARD WITH THE WORK.
3. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND CIVIL ENGINEER IMMEDIATELY OF ANY CONFLICT BETWEEN THESE NOTES AND DETAILS AND OTHER PROJECT DRAWINGS, WHETHER BY BEALS ASSOCIATES, INC. OR OTHERS. THE CONTRACTOR SHALL NOT PROCEED WITH THE WORK FOR WHICH THE ALLEGED CONFLICT HAS BEEN DISCOVERED UNTIL SUCH ALLEGED CONFLICT HAS BEEN RESOLVED. NO CLAIM SHALL BE MADE BY THE CONTRACTOR FOR DELAY DAMAGES AS A RESULT OF RESOLUTION OF ANY SUCH CONFLICT(S).
4. AAB REGULATIONS DO NOT ALLOW ANY TOLERANCE ON SLOPE REQUIREMENTS AND THE MAXIMUM SLOPES LISTED BELOW CAN NOT BE EXCEEDED.
5. IT IS RECOMMENDED THAT THE CONTRACTOR USE A 2-FOOT DIGITAL LEVEL TO VERIFY SLOPES PRIOR TO PLACING THE FINSHED SURFACE. IT IS FURTHER RECOMMENDED THAT FORMS BE CHECKED PRIOR TO PLACING CONCRETE OR ASPAHLT.
6. THESE ACCESSIBILITY NOTES AND DETAILS ARE INTENDED TO DEPICT SLOPE AND DIMENSIONAL REQUIREMENTS ONLY. REFER TO SIDEWALK, CURBING, AND PAVEMENT DETAILS FOR ADDITIONAL INFORMATION.

ACCESSIBLE ROUTE NOTES:

1. AT LEAST ONE ACCESSIBLE ROUTE SHALL BE PROVIDED WITHIN THE SITE FROM ACCESSIBLE PARKING SPACES AND ACCESSIBLE PASSENGER LOADING ZONES; PUBLIC STREETS OR SIDEWALKS; AND PUBLIC TRANSPORTATION STOPS TO THE ACCESSIBLE BUILDING OR FACILITY THEY SERVE.
2. AT LEAST ONE ACCESSIBLE ROUTE SHALL CONNECT ACCESSIBLE BUILDINGS, ACCESSIBLE FACILITIES, ACCESSIBLE ELEMENTS, AND ACCESSIBLE SPACES THAT ARE ON THE SAME SITE.
3. DIRECTIONAL SIGNAGE INDICATING THE ROUTE TO THE NEAREST ACCESSIBLE BUILDING ENTRANCE SHALL BE PROVIDED AT INACCESSIBLE BUILDING ENTRANCES.
4. TRANSITIONS BETWEEN RAMPS, WALKS, LANDINGS, GUTTERS OR STREETS SHALL BE FLUSH AND FREE OF ABRUPT VERTICAL CHANGES (1/4 INCH MAXIMUM VERTICAL CHANGE).

WALKWAYS:

1. WIDTH OF WALKWAYS SHALL NOT BE LESS THAN 48 INCHES, EXCLUDING CURB STONES.
2. WALKWAYS SHALL PROVIDE A MINIMUM OF 36 INCHES CLEAR, UNOBSTRUCTED PATH OF TRAVEL PAST ALL OBSTRUCTIONS. (I.E. UTILITY POLES, SIGNS, FIRE HYDRANTS, ETC.)
3. WALKING SURFACES SHALL HAVE A MAXIMUM RUNNING SLOPE OF 5.0% AND A MAXIMUM CROSS SLOPE OF 2.0%.
4. AT THE INTERSECTION OF TWO SIDEWALKS, THERE SHALL BE A LEVEL LANDING WITH NO SLOPE GREATER THAN 2% IN ANY DIRECTION.
5. ANY WALKING SURFACE WITH A RUNNING SLOPE GREATER THAN 5.0% IS CONSIDERED A RAMP AND SHALL COMPLY WITH THE GUIDELINES FOR RAMPS OR CURB CUT RAMPS.
6. ACCESSIBLE ROUTE SURFACES SHALL BE STABLE, FIRM AND SLIP RESISTANT.
7. IF CATCH BASINS OR OTHER GRATINGS ARE LOCATED WITHIN AN ACCESSIBLE ROUTE, THEN AN ADA GRATE SHALL BE USED WITH SPACES NO GREATER THAN ½ INCH WIDE IN THE DIRECTION OF TRAVEL.

RAMPS:

1. ANY PART OF AN ACCESSIBLE ROUTE WITH A RUNNING SLOPE GREATER THAN 5% SHALL BE CONSIDERED A RAMP OR A CURB CUT RAMP.
2. THE MAXIMUM RUNNING SLOPE FOR A RAMP SHALL BE 7.5% AND THE MAXIMUM CROSS SLOPE SHALL BE 1.5%
3. THE CLEAR WIDTH OF A RAMP SHALL BE 48 INCHES MINIMUM AS MEASURED BETWEEN THE HANDRAILS.
4. THE MAXIMUM RISE FOR ANY RAMP RUN SHALL BE 30 INCHES.
5. LANDINGS SHALL BE PROVIDED AT THE TOP AND BOTTOM OF RAMPS. LANDINGS SHALL HAVE A SLOPE NOT STEEPER THAN 2.0% IN ANY DIRECTION. THE LANDING CLEAR WIDTH SHALL BE AT LEAST AS WIDE AS THE WIDEST RAMP RUN LEADING TO THE LANDING. THE LANDING CLEAR LENGTH SHALL BE SIXTY (60) INCHES LONG MINIMUM. RAMPS THAT CHANGE DIRECTIONS BETWEEN RUNS AT LANDINGS SHALL HAVE A CLEAR LANDING OR SIXTY (60) INCHES BY SIXTY (60) INCHES MINIMUM.
6. EDGE PROTECTION COMPLYING WITH AAB AND ADAAG REQUIREMENTS SHALL BE PROVIDED ON EACH SIDE OF RAMP RUNS AND ON EACH SIDE OF RAMP LANDINGS.
7. WHERE DOORWAYS ARE LOCATED ADJACENT TO A RAMP LANDING, MANEUVERING CLEARANCES REQUIRED BY 521 CMR FIGURES 26d AND 26e SHALL BE COMPLIED WITH.

CURB CUT RAMPS:

1. CURB CUT RAMPS ARE REQUIRED AT THE CORNER OF EACH INTERSECTION AND WHERE A PEDESTRIAN PATH OF TRAVEL CROSSES A ROAD, DRIVEWAY OR OTHER VEHICULAR WAY.
2. THE MAXIMUM RUNNING SLOPE OF A CURB CUT RAMP SHALL BE 7.5% AND THE MAXIMUM CROSS SLOPE SHALL BE 1.5%.
3. CURB CUT RAMPS MAY EXTEND UP TO 15 FEET IN LENGTH.
4. MAXIMUM SLOPES OF ADJOINING GUTTERS AND ROAD SURFACES IMMEDIATELY ADJACENT TO THE CURB CUT RAMP SHALL NOT BE STEEPER THAN 5%. THE ADJACENT SURFACES AT TRANSITIONS AT CURB CUT RAMPS TO WALKS, CUTTERS AND STREETS SHALL BE AT THE SAME LEVEL.
5. THE MINIMUM CLEAR WIDTH OF A CURB CUT RAMP SHALL BE 36 INCHES, EXCLUSIVE OF FLARED SIDES, IF PROVIDED.
6. LANDINGS SHALL BE PROVIDED AT THE TOP OF CURB CUT RAMPS. THE CLEAR LENGTH OF THE LANDING SHALL BE 48 INCHES MINIMUM. THE CLEAR WIDTH OF THE LANDING SHALL BE AT LEAST AS WIDE AS THE CURB CUT RAMP, EXCLUDING FLARED SIDES, LEADING TO THE LANDING. LANDINGS SHALL HAVE A SLOPE NOT STEEPER THAN 2% IN ANY DIRECTION.
7. IF A CURB CUT RAMP IS LOCATED WHERE PEDESTRIANS MUST WALK ACROSS THE RAMP, OR WHERE IT IS NOT PROTECTED BY HANDRAILS OR GUARDRAILS, IT SHALL HAVE FLARED SIDES.
8. WHERE PROVIDED, CURB CUT RAMP FLARES SHALL NOT EXCEED 10%, IF THE CLEAR LENGTH OF THE LANDING IS LESS THAN FORTY-EIGHT (48) INCHES THAN THE SLOPE OF THE FLARED SIDES SHALL NOT EXCEED 8.33%.
9. CURB CUT RAMPS AND THE FLARED SIDES OF CURB CUT RAMPS SHALL BE LOCATED SO THAT THEY DO NOT PROJECT INTO VEHICULAR TRAFFIC LANES PARKING SPACES OR PARKING ACCESS AISLES. CURBS AT MARKED CROSSINGS SHALL BE WHOLLY CONTAINED WITHIN THE MARKINGS, EXCLUDING ANY FLARED SIDES.
10. CURB CUT RAMPS SHALL BE LOCATED OR PROTECTED TO PREVENT THEIR OBSTRUCTION BY PARKED VEHICLES.
11. CURB CUT RAMPS SHALL HAVE A TWENTY-FOUR (24) INCH DEEP DETECTABLE WARNING PANEL COMPLYING WITH ADAAG, EXTENDING THE FULL WIDTH OF THE RAMP. REFER TO DETECTABLE WARNING DETAILS AND NOTES FOR PLACEMENT.
12. WHERE PROVIDED, STOP LINES SHALL BE LOCATED IN ADVANCE OF CURB CUT RAMP.
13. WHERE PROVIDED, DRAINAGE INLETS SHALL BE LOCATED UPSTREAM OF CURB RAMPS AND NOT IN THE RAMP ARE

TYPICAL ABBREVIATIONS

Ø	DIAMETER
°	DEGREE
±	PLUS OR MINUS
℄	CENTERLINE
℔	PROPERTY LINE
ABAN	ABANDON, ABANDONED
ABUT	ABUTMENT
AC	ASPHALTIC CONCRETE
ADD	ADDENDUM
ADDL	ADDITIONAL
ADJ	ADJUST, ALGEBRAIC DIFFERENCE OF GRADES
ADT	AVERAGE DAILY TRAFFIC
ALT	ALTERNATE, ALTERNATIVE
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
AUX	AUXILIARY
AVE	AVENUE
AVG	AVERAGE DAILY TRAFFIC
AWG	AMERICAN WIRE GAUAGE
B&B	BALLED AND BURLAPPED
BC	BOTTOM CURB
BCC	BITUMINOUS CONCRETE CURB
BFE	BASEMENT FLOOR ELEVATION
BIT	BITUMINOUS CONCRETE CURB
BLDG	BUILDING
BM	BEAM, BENCHMARK
BO	BY OTHERS
BRG	BEARING
BW	BOTTOM OF WALL ELEVATION
BWLL	BROKEN WHITE LANE LINE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CENTER OF CURVE
CCB	CAPE COD BERM
CDF	CONTROLLED DENSITY FILL
CEM	CEMENT
CF	CUBIC FEET
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CG	CONTAINER GROWN
CIP	CAST IRON PIPE
CIP CONC	CAST IN PLACE CONCRETE
CIT	CHANGE IN TYPE
CIV	CIVIL
CJ	CONSTRUCTION JOINT, CONTROL JOINT
CL	CLASS
CLDIP	CEMENT LINED DUCTILE IRON PIPE
CLF	CHAIN LINK FENCE
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN-OUT, CONTY
COL	COLUMN
COMM	COMMUNICATIONS
CONC	CONCRETE
CONST	CONSTRUCT, CONSTRUCTION
CONT	CONTINUE(D), CONTINUATION, CONTINUOUS
CPP	CORRUGATED PLASTIC PIPE
CSO	COMBINED SEWER OVERFLOW
CTR	CENTER
CULV	CULVERT
CW	CROSSWALK
CY	CUBIC YARD
DCB	DOUBLE CATCH BASIN
DCBCI	DOUBLE CATCH BASIN WITH CURB INLET
DELTA	DEGREE OF CURVE
DEMO	DEMOLITION
DEPT	DEPARTMENT
DI	DROP INLET, DUCTILE IRON PIPE
DIA OR Ø	DIAMETER
DIAG	DIAGONAL, DIAGRAM
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DMH	DRAIN MANHOLE

TYPICAL ABBREVIATIONS

DN	DOWN
DWG	DRAWING
DWL	DOTTED WHITE LINE
DYCL	DOUBLE YELLOW CENTER
DYL	DOTTED YELLOW LINE
EA	EACH
EF	EACH FACE
EGL	ENERGY GRADE LINE
EHH	ELECTRIC HANDHOLE
ELEC	ELECTRIC
ELEV	ELEVATION
EMH	ELECTRIC MANHOLE
ENGR	ENGINEER
ENT	ENTRANCE
EOP	EDGE OF PAVEMENT
EQ	EQUAL
ES	EACH SIDE
ESMT	EASEMENT
EST	ESTIMATE
EW	EACH WAY
EX	EXISTING
EXC	EXCAVATION
EXP	EXPANSION
EXT	EXTERIOR
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN	FOUNDATION
FDR	FLOOR DRAIN
FES	FLARED END
FFE	FIRST FLOOR ELEVATION
FG	FINISHED GRADE, FIBERGLASS
FIN	FINISH
FLR	FLOOR
FM	FORCE MAIN
FND	FOUND
FSP	FIRE STANDPIPE
FT	FOOT, FEET
FTG	FOOTING
GA	GAUAGE
GALV	GALVANIZED
GEN	GENERAL
GEOTECH	GEOTECHNICAL
GFE	GARAGE FLOOR ELEVATION
GG	GAS GATE
GM	GAS METER
GP	GUARD POST
GRAN	GRANITE
GV	GAS VALVE
H	HORIZONTAL
HC	HANDICAP ACCESSIBLE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HDWL	HEADWALL
HGL	HYDRAULIC GRADE LINE
HH	HANDHOLE
HMA	HOT MIX ASPHALT
HORIZ	HORIZONTAL
HP	HIGH POINT
HYD	HYDRANT
ID	INSIDE DIAMETER, IDENTIFICATION
IF	INSIDE FACE
IN	INCH
INT	INTERSECTION, INTERIOR, INTERNAL
INV	INVERT
IP	IRON PIPE
IR	IRON ROD
JCT	JUNCTION
JT	JOINT
L	LENGTH
LAT	LATERAL
LB(S)	POUNDS(S)
LDSCP	LANDSCAPING
LF	LINEAR FEET
LOC	LOCATION, LOCAL
LOD	LIMIT OF DISTURBANCE
LOW	LIMIT OF WORK
LP	LIGHT POLE, LOW POINT
LT	LEFT

TYPICAL ABBREVIATIONS

MAX	MAXIMUM
ME	MATCH EXISTING
MECH	MECHANICAL
MH	MANHOLE
MHW	MEAN HIGH WATER
MIN	MINIMUM
MISC	MISCELLANEOUS
MLW	MEAN LOW WATER
MSE	MECHNICALLY STABILIZED EARTH
MSL	MEAN SEA LEVEL
N/A	NOT APPLICABLE
N/F	NOW OR FORMERLY
NAD	NORTH AMERICAN DATUM
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NIC	NOT IN CONTRACT
NO	NUMBER
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
OD	OUTSIDE DIAMETER
OG	ORIGINAL GROUND
OHW	OVERHEAD WIRES
OW	OBSERVATION WELL
PB	PULL BOX
PC	POINT OF CURVATURE
PCC	PORTLAND CEMENT CONCRETE CURB
PCC	POINT OF COMPOUND CURVATURE
PCF	POUNDS PER CUBIC FOOT
PE	POLYETHYLENE, PROFESSIONAL ENGINEER
PERF	PERFORATED
PERM	PERMANENT
PGL	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
PIV	POST INDICATOR VALVE
PREL	PRELIMINARY
PRIV	PRIVATE
PROJ	PROJECT
PROP	PROPOSED
PS	PUMPING STATION
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT, POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE PIPE
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
QTY	QUANTITY
R	RADIUS
R&D	REMOVE AND DISCARD
R&R	REMOVE AND RESET
R&S	REMOVE AND SALVAGE
R&S	REMOVE AND STACK
RAD	RADIUS
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REC	RECORD
REINF	REINFORCE, REINFORCING, REINFORCEMENT
REL	RELOCATE, RELOCATED
REM	REMOVE
REQD	REQUIRED
RET	RETAIN, RETAINING
REV	REVISION, REVISED
ROW	RIGHT OF WAY
RRP	RIPRAP
RT	RIGHT
SAN	SANITARY
SB	SPECIAL BORROW, STONE BOUND
SD	STANDARD DRAWING, STORM DRAIN, SUBDRAIN
SF	SQUARE FEET
SGC	SLOPED GRANITE CURB
SI	SQUARE INCH

TYPICAL ABBREVIATIONS

SIM	SIMILAR
SIP	STAY IN PLACE
SL	STOP LINE
SMH	SEWER MANHOLE
SP	STEEL PIPE OR STATIC PRESSURE
SPT	STANDARD PENETRATION TEST
SQ	SQUARE
SST	STAINLESS STEEL
ST	STEAM, STORM, STREET
STA	STATION
STD	STANDARD
SURF	SURFACE, SURFACING
SW	SIDEWALK
SWEL	SOLID WHITE EDGE LINE
SWGL	SOLID WHITE GORE LINE
SWLL	SOLID WHITE LANE LINE
SY	SQUARE YARD
SYEL	SOLID YELLOW EDGE LINE
SYM	SYMMETRICAL
T&B	TOP & BOTTOM
TAN	TANGENT
TBR	TO BE REMOVED
TC	TOP CURB
TCB	TRAFFIC CONTROL BOX
TEL	TELEPHONE
TELE	TELEPHONE
TEMP	TEMPERATURE, TEMPORARY
TF	TOP OF FOUNDATION ELEVATION
THRU	THROUGH
TMH	TELEPHONE MANHOLE
TOC	TOP OF CONCRETE, TOP OF CURB
TOF	TOP OF FOOTING
TOG	TOP OF GRATE
TOP	TOP OF PIPE
TOPO	TOPOGRAPHY
TOR	TOP OF RAIL
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TURNING POINT
TPF	TREE PROTECTION FENCE
TV	TELEVISION (CABLE)
TVMH	TELEVISON MANHOLE (CABLE)
TW	TOP OF WALL ELEVATION
TYP	TYPICAL
UD	UNDERDRAIN
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
UP	UTILITY POLE
USGS	UNITED STATES GEOLOGICAL SURVEY
UTIL	UTILITIES
V	DESIGN SPEED, VALVE; VERTICAL
VAR	VARIES, VARIABLE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VGC	VERTICAL GRANITE CURB
VIF	VERIFY IN FIELD
VOL	VOLUME
W/	WITH
W/O	WITHOUT
WCR	WHEELCHAIR RAMP
WE	WATER ELEVATION
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER, WATER MAIN
WMH	WATER MANHOLE
WQS	WATER QUALITY STRUCTURE
WV	WATER VALVE
WWF	WELDED WIRE FABRIC
X-SECT	CROSS-SECTION
YD	YARD

LEGEND:EXISTING

- PROPERTY LINE
- ABUTTING PROPERTY LINE/R.OW. LINE
- N/F WILL P. OWNER 5555/222 — PROPERTY OWNER NAME, MAP AND LOT, AND BOOK AND PAGE
- EASEMENT LINE
- EDGE OF WATER/STREAM CL
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING TREELINE
- WETLAND LINE
- 100' BUFFER LINE
- G — EXISTING GAS LINE
- W — EXISTING WATER LINE
- UGE — EXISTING UNDERGROUND ELECTRIC
- OHE — EXISTING OVERHEAD ELECTRIC
- E/T/C — EXISTING ELEC./CABLE/TELE
- S — EXISTING SEWER LINE
- D — EXISTING DRAIN LINE
- EXISTING FENCE
- EXISTING GUARDRAIL
- EXISTING EROSION CONTROL
- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING SHRUB
- EXISTING GUY WIRE
- EXISTING DRAIN MANHOLE
- EXISTING SEWER MANHOLE
- EXISTING ELECTRIC MANHOLE
- EXISTING UTILITY POLE
- EXISTING WATER SHUT OFF
- EXISTING GAS SHUT OFF
- EXISTING CATCH BASIN
- EXISTING FLARED END
- EXISTING STONEWALL
- EXISTING RIPRAP
- EXISTING RAILROAD
- EXISTING HYDRANT
- EXISTING STREET SIGN
- EXISTING STREETLIGHT
- SURVEY CONTROL POINT
- FLOOD PLAIN
- ZONING LINE
- PT 1-1 — PERC TEST
- TP 1-2 — DEEP HOLE TEST PIT

LEGEND:PROPOSED

- PROPOSED PROPERTY LINE
- PROPOSED EASEMENT LINE
- PROPOSED TREELINE
- PROPOSED GAS LINE
- PROPOSED WATER LINE
- UGE — PROPOSED UNDERGROUND ELECTRIC
- OHE — PROPOSED OVERHEAD ELECTRIC
- E/T/C — PROPOSED ELEC./CABLE/TELE
- PROPOSED SEWER LINE
- PROPOSED DRAIN LINE
- PROPOSED FENCE
- PROPOSED GUIDERAIL
- PROPOSED EROSION CONTROL
- PROPOSED DRAIN MANHOLE
- PROPOSED SEWER MANHOLE
- PROPOSED TELECOM CABLE MANHOLE
- PROPOSED ELECTRIC MANHOLE
- PROPOSED UTILITY POLE
- PROPOSED WATER VALVE
- PROPOSED GAS SHUT OFF
- PROPOSED CATCH BASIN
- PROPOSED FLARED END
- PROPOSED CONTOUR
- PROPOSED CURBLINE
- PROPOSED STONEWALL
- PROPOSED HYDRANT
- PROPOSED STREET SIGN
- PROPOSED STREETLIGHT
- PROPOSED RIP-RAP
- PROPOSED BARRIER FREE SYMBOL
- PROPOSED BOLLARD
- PROPOSED SIGN LABEL
- PROPOSED BUILDING
- PROPOSED RIPRAP INLET/OUTLET APRON
- 12" UD — PROPOSED UNDER DRAIN
- FD — PROPOSED FOUNDATION DRAIN
- PROPOSED TEST PIT
- PROPOSED TRANSFORMER PAD
- PROPOSED CONSTRUCTION ENTRANCE
- PROPOSED STONE CHECK DAM
- PROPOSED STONE SEDIMENT BARRIER
- PROPOSED GRAVEL SURFACE
- PROPOSED LIGHT DUTY PAVEMENT
- PROPOSED HEAVY DUTY PAVEMENT

SURFACE TREATMENT LEGEND

- STANDARD DUTY BITUMINOUS PAVEMENT
- HEAVY DUTY BITUMINOUS PAVEMENT
- CHIP SEAL PAVEMENT
- CONCRETE PAVEMENT
- CONCRETE SIDEWALK
- BRICK PAVER CROSSWALK
- STRUCTURAL GRASS PAVER

SYMBOLS

- ADA PARKING SPACE (SEE DETAIL) — AD
- BOLLARD — BO
- COBBLESTONES — CO
- CHIP SEAL PAVEMENT — CS
- CROSSWALK — CW
- DECOMPOSED GRANITE — DG
- FREESTANDING FIELDSTONE WALL — SW
- GATE — GA
- GENERATOR PAD — GP
- GUIDE RAIL (WOOD) — GR
- GRANITE CURB — GC
- PAVER CROSSWALK — PC
- LANDSCAPED ISLAND — LI
- RAISED PEDESTRIAN CROSSING — RC
- RETAINING WALL — RW
- SIDEWALK RAMP — SR
- TRANSFORMER PAD — TP
- DETECTABLE WARNING PADS — WP

NOTE:
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The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORFY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

LEGEND AND ABBREVIATIONS

DRAWING NUMBER:

C0.2

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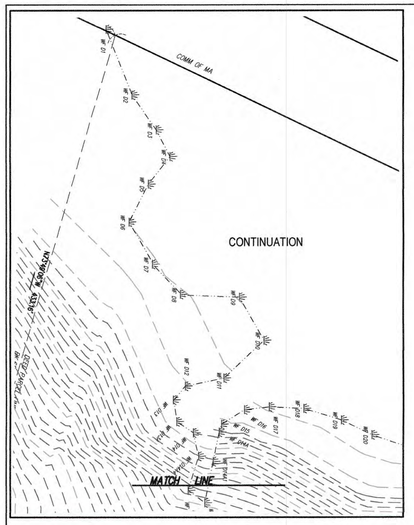

SEE CONTINUATION TO LEFT

MATCH LINE

COMMONWEALTH OF MASSACHUSETTS

ALAN D. HOCH
106 PEABODY ST.
MAP 222-56

EDMUND R. GUERARD 125 PEABODY ST. MAP 222-53

IAN R. MACKINTOSH
135 PEABODY ST.
MAP 222-67

ALFRED W. YOUNG
14 TEMPLE DR.
MAP 222-66

RONALD C. ENGLADE
147 PEABODY ST
MAP 222-68

SALZMAN FAMILY REALTY TRUST
78 OLD AYER RD.
MAP 222-69

MELINDA E. STEWART &
RICHARD HUSSONG
78 OLD AYER RD.
MAP 222-70

TEMPLE DR.

PEABODY STREET

OLD AYER ROAD

JAMES BROOK

INDIAN HILL MUSIC
33.5 ± ACRES
PL.190 of 2001
ASSESSORS MAP 222 PCL.55

Riding Arena

LEGEND

DESCRIPTION	DRAWING ENTITY
IP (f)	IRON PIPE FOUND
IR (f)	IRON ROD FOUND
DHCB (f)	CONCRETE BOUND w/DRILL HOLE FOUND
CB(f)	CONCRETE BOUND FOUND
DH (f)	DRILL HOLE FOUND
DHSB (f)	STONE BOUND w/ DRILL HOLE FOUND
	STONE WALL
	LIGHT POLE
	TELEPHONE POLE
	GUY WIRE
	HYDRANT
WF A1	WETLAND FLAG
	CATCH BASIN
WV	WATER GATE VALVE
GV	GAS GATE VALVE
E	ELECTRICAL METER
G	GAS METER
	STREAMS/RIVERS
	LIMIT OF RIVERFRONT AREA
	LAKES/PONDS/SURFACE WATER
	WETLANDS
	LIMIT OF BUFFER ZONE
	PROPERTY LINE
	EASEMENT LINE
180	CONTOUR (INDEX)
178	CONTOUR (INTERMEDIATE)
	BUILDING/HOUSE
TREE LINE	TREE LINE

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BOLTON, MASSACHUSETTS 01740 www.ddcdg.com
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OWNER:
INDIAN HILL MUSIC, INC.
36 KING STREET
LITTLETON, MA

SCALE:
60 0 30 60 120 240
1 in. = 60 ft.

RECORD OWNER:
INDIAN HILL MUSIC, INC.
36 KING STREET
LITTLETON, MA

DEED REFERENCES:
BOOK 66823 PAGE 83

PLAN REFERENCES:
PLAN 190 OF 2011

ASSESSORS MAP: 222 PARCEL 55
ZONING DISTRICT: RA

COMMONWEALTH OF MASSACHUSETTS
STANLEY R. DILLIS
No. 35162
REGISTERED LAND SURVEYOR

EXISTING CONDITIONS
OLD AYER,ROAD
GROTON, MASSACHUSETTS

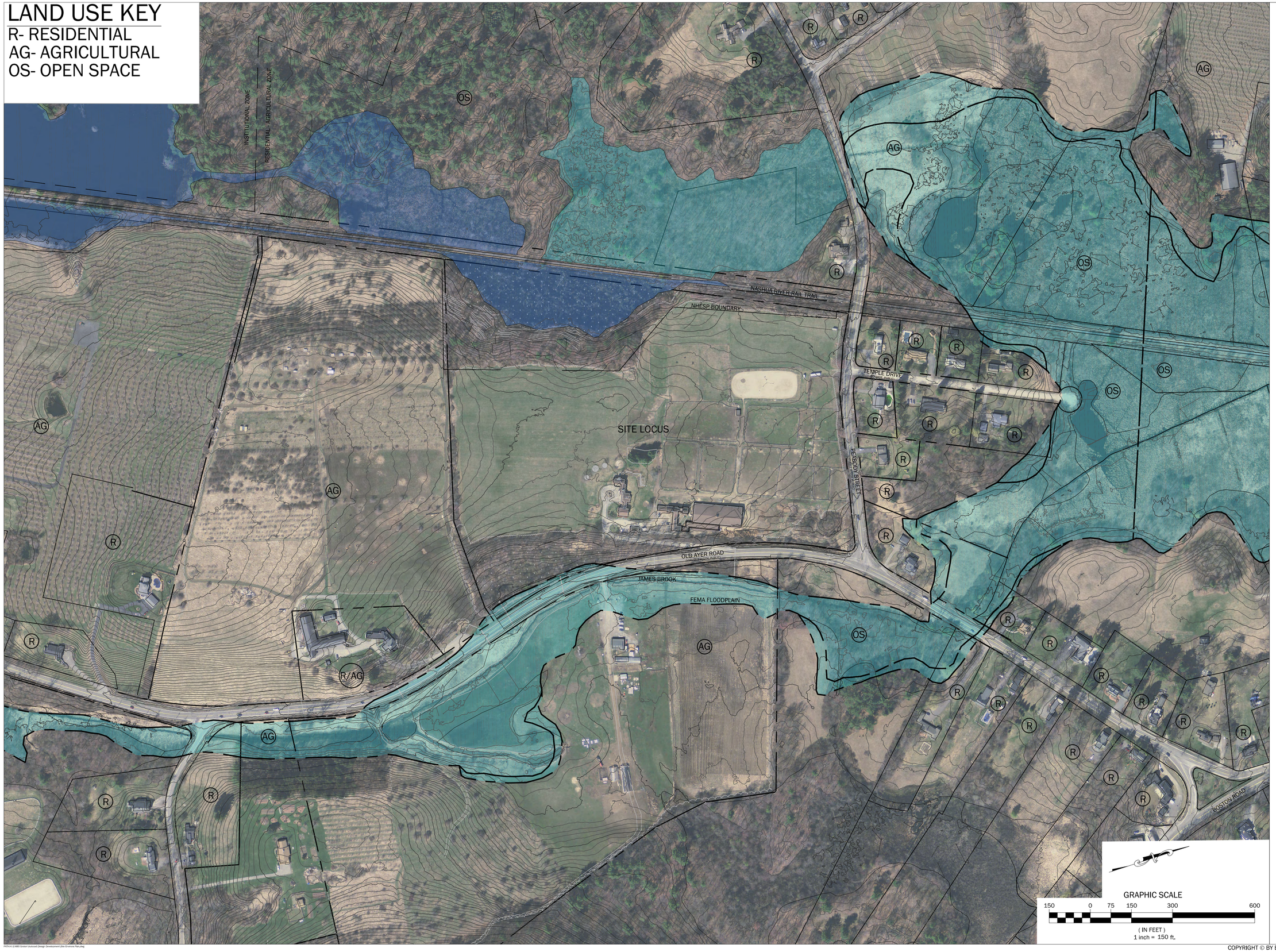
NO.	DATE	DESCRIPTION	BY

DATE: MARCH, 2016	JOB NO. 5213
DESIGN BY: SRD	DRAWING NO. 5213
DRAWN BY: SRD	SHEET NO. C1.0
CHECKED BY: SRD	OF 1

P:\Projects\5213\XREF\5213-BASE.dwg, 1:1

LAND USE KEY

R- RESIDENTIAL
AG- AGRICULTURAL
OS- OPEN SPACE



BEALS·ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER

1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 150'

DRAWING NAME:

SITE ENVIRONS PLAN

DRAWING NUMBER:

C1.1

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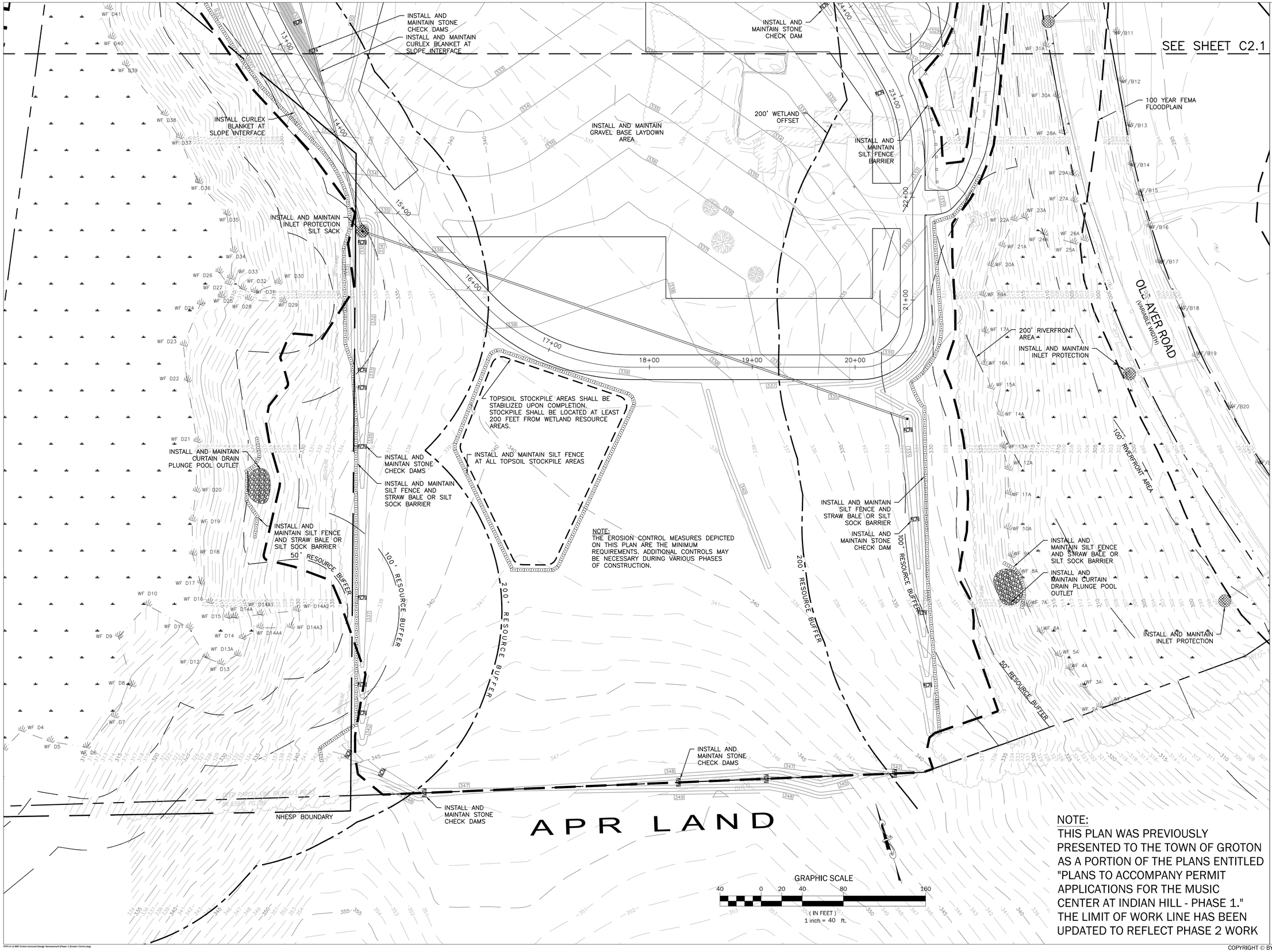

NOTE:
THIS PLAN WAS PREVIOUSLY PRESENTED TO THE TOWN OF GROTON AS A PORTION OF THE PLANS ENTITLED "PLANS TO ACCOMPANY PERMIT APPLICATIONS FOR THE MUSIC CENTER AT INDIAN HILL - PHASE 1." THE LIMIT OF WORK LINE HAS BEEN UPDATED TO REFLECT PHASE 2 WORK

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1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

EROSION AND SEDIMENTATION CONTROL PLAN SOUTH - PHASE A

DRAWING NUMBER:

C2.0

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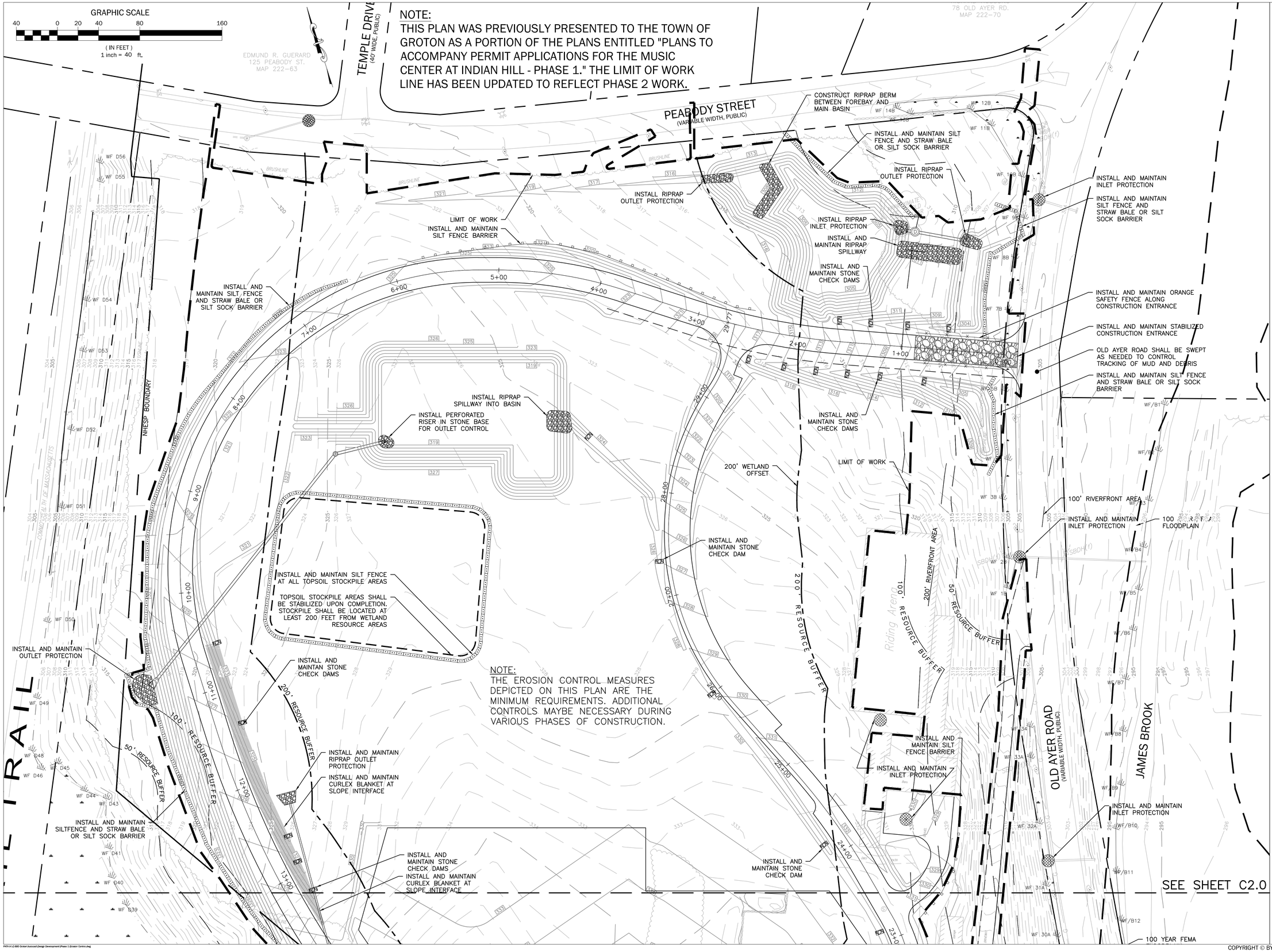

NOTE:
THIS PLAN WAS PREVIOUSLY PRESENTED TO THE TOWN OF GROTON AS A PORTION OF THE PLANS ENTITLED "PLANS TO ACCOMPANY PERMIT APPLICATIONS FOR THE MUSIC CENTER AT INDIAN HILL - PHASE 1." THE LIMIT OF WORK LINE HAS BEEN UPDATED TO REFLECT PHASE 2 WORK.

NOTE:
THE EROSION CONTROL MEASURES DEPICTED ON THIS PLAN ARE THE MINIMUM REQUIREMENTS. ADDITIONAL CONTROLS MAYBE NECESSARY DURING VARIOUS PHASES OF CONSTRUCTION.

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

EROSION AND SEDIMENTATION CONTROL PLAN NORTH - PHASE A

DRAWING NUMBER:

C2.1

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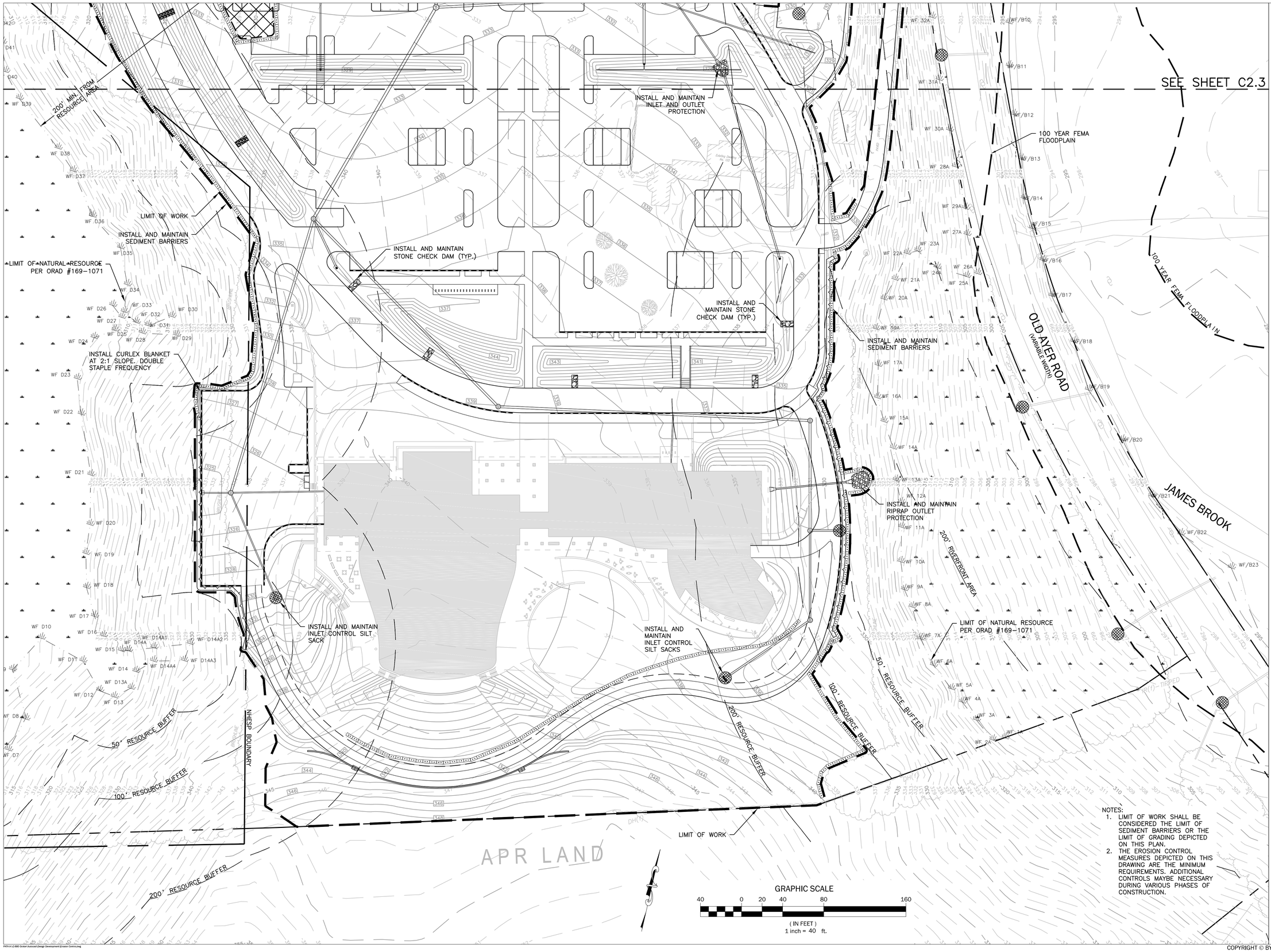

NOTES:
1. LIMIT OF WORK SHALL BE CONSIDERED THE LIMIT OF SEDIMENT BARRIERS OR THE LIMIT OF GRADING DEPICTED ON THIS PLAN.
2. THE EROSION CONTROL MEASURES DEPICTED ON THIS DRAWING ARE THE MINIMUM REQUIREMENTS. ADDITIONAL CONTROLS MAYBE NECESSARY DURING VARIOUS PHASES OF CONSTRUCTION.

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CIVIL
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1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

EROSION AND SEDIMENTATION CONTROL PLAN SOUTH - PHASE B

DRAWING NUMBER:

C2.2

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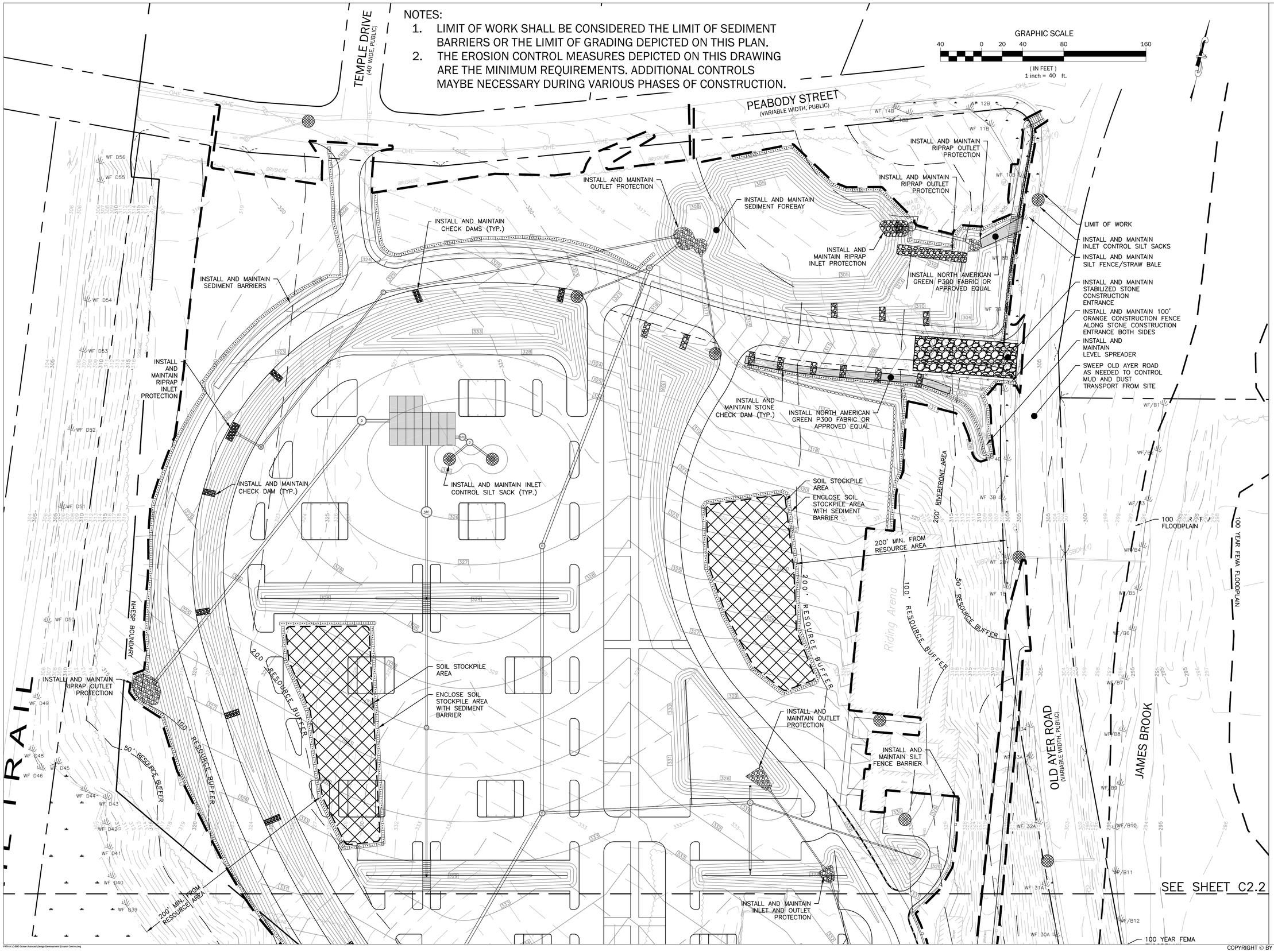

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REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

EROSION AND SEDIMENTATION CONTROL PLAN NORTH - PHASE B

DRAWING NUMBER:

C2.3

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. EROSION CONTROL NARRATIVE

a. OVERVIEW OF SOIL EROSION AND SEDIMENTATION CONCERNS

THE SUSCEPTIBILITY OF SOILS TO EROSION IS INDICATED ON A RELATIVE "K" SCALE OF VALUES OVER A RANGE OF 0.02 TO 0.69. THE "K" VALUE IS FREQUENTLY USED WITH THE UNIVERSAL SOIL LOSS EQUATION. THE HIGHER VALUES ARE INDICATIVE OF THE MORE ERODIBLE SOILS. THE MAJOR FACTORS AFFECTING K VALUES INCLUDE PARTICLE SIZES, ORGANIC MATTER, STRUCTURE, PERMEABILITY AND EVEN ROCK FRAGMENTS. IN VERY GENERAL TERMS, SOIL ERODIBILITY CAN ALSO BE A GENERAL EFFECT OF TEXTURE.

- FINE TEXTURED SOILS SUCH AS CLAYS ARE RESISTANT TO DETACHMENT DUE TO AGGREGATION (K FACTORS BETWEEN 0.05 AND 0.15)
- COURSE TEXTURES SUCH AS SANDS ARE EASILY DETACHED, BUT HAVE LOW RUNOFF POTENTIAL SINCE DENSE PARTICLES ARE NOT EASILY TRANSPORTED. (K FACTORS BETWEEN 0.05 AND 0.20)
- MEDIUM TEXTURED SOILS (LOAMS) ARE MODERATELY DETACHABLE AND FEATURE HIGH TO MODERATE RUNOFF. (K FACTORS BETWEEN 0.25 AND 0.45)
- SILTS ARE EASILY DETACHABLE AND FEATURE HIGH RUNOFF POTENTIAL DUE TO SMALL, EASILY TRANSPORTED PARTICLES. (K FACTORS BETWEEN 0.45 AND 0.65)

THE K-FACTORS OF SOILS CAN BE FURTHER DIVIDED INTO TWO CATEGORIES; KF AND KW. KF REPRESENTS ERODIBILITY FACTORS OF SOIL COMPONENTS THAT ARE FREE OF ROCK FRAGMENTS. KW INCLUDES THE ROCK FRAGMENTS WITHIN THE FACTOR.

THE NRCS SOIL MAPPING IDENTIFIES THE FOLLOWING SOILS AND CORRESPONDING K FACTORS ON THE SITE:

- BERNARDSTON VERY FINE SANDY LOAM - KF = 0.37, KW = 0.64
- PITTSTOWN SILT LOAM - KF = 0.37, KW = 0.55

THESE VALUES INDICATE A HIGH SUSCEPTIBILITY TO EROSION FOR THE SITE'S SOILS ONCE THE PRIMARY COVER IS STRIPPED. THE PRIMARY EMPHASIS OF THE EROSION AND SEDIMENTATION CONTROL PLAN TO BE IMPLEMENTED FOR THIS PROJECT WILL BE:

- PLAN THE PROJECT TO BE CONSTRUCTED FROM AREAS OF FLATTER GRADES AND AWAY FROM RESOURCES OR THE PROPERTY BOUNDARIES TO THE EXTENT PRACTICAL.
- DEVELOP A CAREFUL CONSTRUCTION SEQUENCE.
- RAPID STABILIZATION OF DENUDED AREAS TO MINIMIZE THE PERIOD OF SOIL EXPOSURE.
- RAPID STABILIZATION OF DRAINAGE PATHS TO AVOID RILL AND GULLY EROSION.
- THE USE OF ONSITE MEASURES TO CAPTURE SEDIMENT (STRAW BALES, SILT FENCE, ETC..)
- PROTECTION OF NATURAL RESOURCE AREAS AND DRAINAGE COURSES THROUGH BUFFERING AND THE USE OF BEST MANAGEMENT PRACTICES.
- THE IMPLEMENTATION OF LONG-TERM MEASURES FOR EROSION/SEDIMENT POLLUTION TREATMENT THROUGH THE CONSTRUCTION OF PERMANENT WATER QUALITY MEASURES.

b. DESCRIPTION AND LOCATION OF LIMITS OF PROPOSED EARTHWORKS

THE PROPOSED PROJECT WILL CONSIST OF THE DEVELOPMENT AND CONSTRUCTION OF THE MUSIC CENTER AT INDIAN HILL WHICH WILL INCLUDE, BUT NOT BE LIMITED TO A CONCERT HALL, RECITAL HALL AND MUSIC SCHOOL, APPROXIMATELY 675 PAVED PARKING SPACES AND UTILITY AND STORMWATER FACILITIES ACROSS THE SITE. DURING PHASE 1, A RING ROAD AND LAYDOWN AREA WERE CONSTRUCTED OF GRAVEL MATERIALS, AND PRELIMINARY STORMWATER MANAGEMENT SYSTEMS WERE INSTALLED. A SEDIMENT BASIN THAT WAS PUT IN PLACE TO SERVE THE PHASE 1 WORK WILL BE REMOVED AND A PERMANENT UNDERGROUND STORMWATER MANAGEMENT SYSTEM WILL BE INSTALLED IN ITS PLACE. IT IS ENVISIONED THAT THE GRAVEL RING ROAD WILL BE LEFT IN PLACE AND PAVED FOR FINAL USE AND THE GRAVEL LAYDOWN AREA WILL FORM A PORTION OF THE FINAL PARKING FACILITIES FOR THE PROJECT.

UPON ENTERING THE SITE FROM OLD AYER ROAD, THERE WILL BE A STORMWATER MANAGEMENT FACILITY ON THE NORTH OF THE ACCESS DRIVE. THIS IS IN THE SAME GENERAL LOCATION AS THE PHASE 1 FACILITY, BUT HAS BEEN ALTERED TO ALLOW THE CONSTRUCTION OF A PEDESTRIAN WALKWAY BETWEEN THE ACCESS DRIVE AND THE BASIN SLOPES. THIS BASIN DISCHARGES TO ONE OF TWO WETLAND CREATION AREAS CONSTRUCTED DURING PHASE 1.

THE ACCESS DRIVE WILL PROCEED GENERALLY TO THE WEST AND WILL TURN TOWARD THE SOUTH AS IT APPROACHES THE WESTERLY SIDE OF THE SITE, HEADING TOWARD THE FRONT OF THE PROPOSED NORTH FACING BUILDING. THE ROAD WILL DROP IN ELEVATION TO GENERALLY FOLLOW EXISTING GRADES AND TO ADD VERTICAL SEPARATION FROM THE PARKING AREAS IN THE CENTRAL PORTION OF THE SITE. ALONG THE FACE OF THE BUILDING, THE ROAD WILL TURN EASTERLY TO PARALLEL THE BUILDING FRONTAGE AND PROVIDE PASSENGER DROP OFF AREAS BEFORE TURNING TO THE NORTH AND COMPLETING A LOOP BY INTERSECTING WITH ITSELF APPROXIMATELY 250 FEET WEST OF THE ACCESS POINT OFF OLD AYER ROAD.

IN THE GENERAL BUILDING VICINITY, THERE WILL BE A SERVICE AREA TO THE WEST THAT WILL FEATURE LOADING AREAS AS WELL AS ADDITIONAL PARKING, MAINLY FOR BUILDING STAFF AND CONCERT PERFORMERS. THIS AREA WILL ALSO CONTAIN EXTERIOR UTILITY SUPPORT SYSTEMS SUCH AS AN ELECTRICAL TRANSFORMER, A GENERATOR AND A SANITARY SEWER PUMP STATION. THE AREA TO THE SOUTH OF THE BUILDING WILL FEATURE A LANDSCAPED PERFORMANCE LAWN THAT WILL ALLOW CONCERT GOERS VISUAL ACCESS TO THE CONCERT HALL FROM THE SLOPING LAWN THAT FACES INTO THE STRUCTURE.

THE SITE WILL UNDERGO SIGNIFICANT EARTHWORK OPERATIONS IN SEVERAL AREAS. AT THE SOUTHERLY END OF THE SITE, CUTS IF UP TO 35 FEET WILL BE REQUIRED FOR THE EXCAVATION OF THE BUILDING FOUNDATION AND SLABS. MATERIAL FROM THESE SITE CUT AREAS WILL BE STOCKPILED FOR LATER REUSE OR REMOVAL FROM THE SITE ALTOGETHER. AREAS IMMEDIATELY ADJACENT TO THE BUILDING WILL ALSO REALIZE EXTENSIVE EARTH REMOVAL OPERATIONS TO CREATE THE AREA FOR THE PERFORMANCE LAWN AND ASSOCIATED LANDSCAPE FEATURES. THE SERVICE AREA TO THE WEST OF THE BUILDING WILL REQUIRE CUTS OF APPROXIMATELY 8 TO 10 FEET TO FORM SUBGRADE IN THAT AREA. THE SMALLER SERVICE AREA TO THE EAST OF THE BUILDING WILL BE PLACED IN A FILL SECTION THAT WILL REQUIRE APPROXIMATELY SIX TO EIGHT FEET OF FILL. THE EASTERNMOST PORTION OF THIS FILL AREA WILL BE LOCATED WITHIN A BUFFER ZONE TO A RESOURCE AREA, AND AS SUCH WILL FEATURE STEEPENED SLOPES (2:1, H:V) TO MINIMIZE THE IMPACT TO THE BUFFER ZONE.

IN ORDER TO COMPLETE CONSTRUCTION OF THE PARKING FACILITIES, SEVERAL AREAS OF CUTS AND FILLS WILL BE NECESSARY TO BRING THE SITE TO SUBGRADE ELEVATIONS. MUCH OF THE EARTHWORK FOR THE STORMWATER MANAGEMENT SYSTEMS WILL BE COMPLETED DURING PHASE 1 AND WILL HAVE ALREADY BEEN REMOVED FROM THE SITE AT THE BEGINNING OF PHASE 2. ADDITIONAL STORMWATER FEATURES FOR PHASE 2 INCLUDE THE INTRODUCTION OF BIOFILTRATION AREAS THROUGHOUT THE PAVED PARKING LOT. THESE AREAS WILL BE EXCAVATED INTO THE EXISTING GROUND SURFACE PRIOR TO DEVELOPMENT OF THE FINAL PARKING LOT SUBGRADE. EXTENSIVE BERMING AROUND THE PERIMETER OF THE PARKING AREAS WILL UTILIZE MUCH OF THE EXCAVATED MATERIALS FROM THE EARTHWORK OPERATIONS. OTHER MATERIALS THAT HAVE BEEN EXCAVATED THAT WILL NOT BE USED FOR FILL MATERIALS WILL BE STOCKPILED ON SITE FOR DESIGNATION AND REMOVAL BY THE APPLICANT. OVERALL, THE PROJECT SITE IS CHARACTERIZED AS A CUT SITE AND WILL NOT REQUIRE IMPORT OF COMMON BORROW PROVIDED SOILS THAT ARE EXCAVATED REMAIN DRY AND USABLE PRIOR TO FILL OPERATIONS.

c. EXISTING AND PROPOSED DRAINAGE FEATURES

THE PREDEVELOPMENT SITE SHEDS RUNOFF VIA SURFACE FLOWS TO THE WETLAND AREAS TO THE EAST AND WEST OF THE PROJECT SITE. THE MAIN DIVIDING LINE IS THE "RIDGE" ALONG THE MIDDLE OF THE SITE. FLOWS TO THE WEST OF THE RIDGE ENTER THE LARGE WETLAND SYSTEM VIA SURFACE FLOW WITH NO KNOWN PIPES OR CULVERTS TO ASSIST DRAINAGE. FLOWS TO THE EAST MAKE THEIR WAY TO OLD AYER ROAD AND, UNDER SMALLER STORM EVENTS, ARE CONVEYED TO JAMES BROOK THROUGH A SERIES OF CULVERTS UNDER OLD AYER ROAD. DURING LARGER STORM EVENT, THE COMPUTER MODELING SUGGESTS THAT THERE IS OVERTOPPING OF OLD AYER ROAD ALONG MUCH OF THE PROPERTY FRONTAGE. GIVEN THE OVERALL RATE OF FLOWS COMPUTED, IT IS ASSUMED THIS OVERTOPPING IS RELATIVELY SHALLOW AND DOES NOT FEATURE HIGHLY EROSIVE VELOCITIES.

THE PHASE ONE SITE UTILIZED A SERIES OF BERMS, SWALES AND PONDS TO CONTROL THE RUNOFF GENERATED FROM THE CONSTRUCTION AREAS ONSITE. THOSE FEATURES ACCOMMODATED SEDIMENT CONTROL FEATURES AS WELL AS STORMWATER MANAGEMENT COMPONENTS IN ORDER TO OFFSET THE CHANGE IN COVER FROM THE NATURAL FIELDS TO GRAVEL SURFACES.

THE LARGE OFFSITE WATERSHED LOCATED UPSTREAM (SOUTH) OF THE AREA WHERE THE CURTAIN DRAINS WERE INSTALLED WILL BE DIVERTED AROUND THE SITE TO ALLOW THE CURTAIN DRAIN AREA TO REALIZE AS LITTLE SURFACE RUNOFF AS POSSIBLE, ALLOWING THE DRAINS TO FUNCTION WITHOUT COMPENSATING FOR POTENTIAL GROUNDWATER RECHARGE. THE DIVERSIONS WILL MAINTAIN THE ORIGINAL DISCHARGE LOCATIONS FOR THE OFFSITE FLOWS.

THE INTRODUCTION OF PAVED SURFACES AND BUILDINGS TO THE SITE WILL RESULT IN INCREASED STORMWATER RATES AND VOLUMES THAT WILL REQUIRE CONTROLS TO BE IN PLACE TO MITIGATE THE INCREASES PRIOR TO DISCHARGE OF THE TREATED RUNOFF. THIS WILL BE ACCOMPLISHED THROUGH THE USE OF OPEN DRAINAGE SWALES, UNDERGROUND STORMWATER DETENTION STRUCTURES AND BIOFILTRATION SYSTEMS DESIGNED FOR THE SITE.

THE STORMWATER TREATMENT TRAIN WILL INCLUDE COLLECTION THROUGH OPEN WALES THAT WILL DIRECT RUNOFF TO SEVERAL BIOFILTRATION AREAS ON THE SITE. SINCE THE SITE'S SOILS ARE NOT CONDUCIVE TO INFILTRATION, THE BIOFILTRATION AREAS WILL FEATURE ENGINEERED SOIL MIXES AND UNDERDRAIN COMPONENTS THAT WILL ALLOW FILTRATION OF THE STORMWATER TO OCCUR PRIOR TO DISCHARGE INTO A SUBSURFACE PIPED SYSTEM. THIS SYSTEM WILL DISCHARGE INTO AN UNDERGROUND STORMWATER DETENTION SYSTEM THAT WILL BE CONSTRUCTED BELOW THE PARKING AREAS. THE BOTTOM OF THE SYSTEM WILL FEATURE A STONE BASE THAT WILL ALLOW LIMITED RECHARGE OF RUNOFF TO APPROXIMATE THE VOLUME THAT WOULD BE REALIZED BY THE LOSS OF NATURAL SURFACE AREAS DUE TO PAVEMENT AND BUILDING SURFACES. THIS SYSTEM WILL DISCHARGE TO THE WEST OF THE SITE THROUGH A DISCHARGE PIPE THAT WAS INSTALLED DURING PHASE 1. A NEW OUTLET CONTROL STRUCTURE WILL BE INSTALLED TO MAINTAIN RUNOFF RATES AT OR BELOW PREDEVELOPMENT LEVELS.

THE BASIN ADJACENT TO THE MAIN ENTRANCE THAT WAS INSTALLED DURING PHASE 1 WILL BE RECONFIGURED SLIGHTLY TO ALLOW THE CONSTRUCTION OF A PEDESTRIAN CONNECTION FROM THE INTERSECTION OF OLD AYER ROAD AND PEABODY STREET TO THE MAIN PEDESTRIAN NETWORK ON THE SITE. UPON COMPLETION, THIS BASIN WILL CONTINUE TO DISCHARGE TO THE CONSTRUCTED WETLAND AREA NORTH OF THE MAIN SITE DRIVE.

d. NATURAL RESOURCE AREAS

THE PROJECT SITE CONTAINS TWO WETLAND RESOURCE AREAS THAT WERE SUBJECT TO AN ORDER OF RESOURCE AREA DELINEATION FROM THE TOWN OF GROTON CONSERVATION COMMISSION (MADEP FILE NO. 169-1071). THE WETLAND AREA TO THE EAST IS PRIMARILY THE FUNCTION OF POORLY DRAINED AREAS RECEIVING ROADWAY RUNOFF AND GROUNDWATER SEEPS ALONG THE NATURAL EMBANKMENT. THE WETLAND SYSTEM TO THE WEST WAS ORIGINALLY PART OF A MUCH LARGER WETLAND SYSTEM THAT WAS SEPARATED BY THE RAILROAD EMBANKMENT. BOTH WETLAND AREAS ARE SEPARATED FROM THE OPEN MEADOW PORTIONS OF THE SITE BY WOODED BUFFERS AND SOMETIMES SIGNIFICANT TOPOGRAPHY.

THE WESTERLY EDGE OF THE PROJECT SITE ALSO CONTAINS AN AREA NOTED BY THE NATURAL HERITAGE PROGRAM AS A PRIORITY HABITAT OF RARE SPECIES. BASED ON GIS MAPPING, THIS LINE IS RIGHT ALONG THE EDGE OF THE PROPOSED WORK; HOWEVER, THE GENERAL SHAPE OF THE LINE SUGGESTS THAT THE HABITAT IS ACTUALLY WITHIN THE NATURAL RESOURCE AREA NOTED ABOVE. INITIAL PERMITTING FOR PHASE 1 OF THE PROJECT RESULTED IN THE ISSUANCE OF A LETTER OF "NO TAKE" FROM THE DIVISION OF FISHERIES AND WILDLIFE. THE PHASE 2 PROJECT WILL RESULT IN ADDITIONAL MINOR IMPACTS WITHIN THE PRIORITY HABITAT AREA. THIS WILL BE REVIEWED BY NATURAL HERITAGE DURING THE WETLANDS PROTECTION ACT PERMITTING FOR THE PROJECT.

THE PROJECT SITE IS ALSO SUBJECT TO AN AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC) AS IS THE MAJORITY OF THE TOWN OF GROTON. THE SPECIFIC ACEC IS KNOWN AS THE PETAPAWAG ACEC AND WAS DESIGNATED BECAUSE OF THE UNIQUE CONFLUENCE OF DIVERSITY OF TOPOGRAPHY, SOILS, HYDROLOGY, AND VEGETATION, WHICH IN TURN RESULTED IN A CORRESPONDING DIVERSITY OF HABITAT TYPES AND THEREFORE OF BIODIVERSITY. BIOLOGICALLY, THE GENERAL AREA CONTAINS EIGHTEEN PRIORITY HABITATS AND ESTIMATED HABITATS FOR RARE WILDLIFE MAPPED BY THE NHESP. THERE ARE SIXTEEN STATE-LISTED RARE SPECIES INCLUDING SEVEN ENDANGERED SPECIES, ONE THREATENED SPECIES, AND EIGHT SPECIES OF SPECIAL CONCERN. ONE OF THE SPECIES IS ALSO A FEDERALLY THREATENED SPECIES.

THE ACEC CONTAINS MANY CERTIFIED VERNAL POOLS THAT SERVE AS HABITATS FOR THE ABOVE SPECIES, BUT THE PROJECT SITE DOES NOT CONTAIN ANY. THE AREA SURROUNDING THE PROJECT SITE, BUT NOT INCLUDING THE PROJECT SITE, IS DESIGNATED OPEN SPACE AND PARTS ARE ALSO UNDER AN AGRICULTURAL PRESERVATION RESTRICTION (APR). THE APR LAND IS CONSIDERED AN IMPORTANT PART OF THE OVERALL RESOURCE FRAMEWORK OF THE ACEC. MOREOVER, THE AREA SURROUNDING THE PROJECT SITE, AND MUCH OF SOUTHWESTERN GROTON, IS INCLUDED IN THE 1982 MASSACHUSETTS SCENIC LANDSCAPE INVENTORY BECAUSE OF THE OPEN FARMLANDS, HISTORIC STRUCTURES AND DISTRICTS, AND THE DISTINCTIVE GEOLOGIC FEATURES INCLUDING THE COMPLEX OF HILLS AND ESKERS.

OVERALL, THE ACEC DESIGNATION PROVIDES A FRAMEWORK FOR INTERMUNICIPAL, INTERGOVERNMENTAL, AND COMMUNITY-REGIONAL INTERACTION TO ENCOURAGE AND ENABLE STEWARDSHIP OF THESE RESOURCES. THE SIGNIFICANCE OF THIS ACEC REQUIRES THAT THE HIGHEST STANDARDS OF ENVIRONMENTAL REVIEW AND PROTECTION BE APPLIED TO ACTIONS THAT MAY AFFECT ITS RESOURCES.

e. EROSION AND SEDIMENT CONTROL DEVICES

PRIOR TO AND DURING THE DEVELOPMENT OF THE CONSTRUCTION ACTIVITIES, THE SITE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING EROSION AND SEDIMENTATION CONTROL MEASURES.

SILTATION FENCE

SILTATION FENCE SHALL BE INSTALLED DOWNSTREAM OF ANY DISTURBED AREAS TO TRAP RUNOFF BORNE SEDIMENTS UNTIL THE SITE HAS BEEN STABILIZED. THE SILT FENCE SHALL BE INSTALLED PER THE DETAILS ON THE CONSTRUCTION PLANS AND INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. REPAIRS SHALL BE MADE IMMEDIATELY BY THE CONTRACTOR IF THERE ARE ANY SIGNS OF EROSION OR SEDIMENTATION BELOW THE SILT FENCE LINE. IF SUCH EROSION IS OBSERVED, THE CONTRACTOR SHALL TAKE PROACTIVE ACTION TO IDENTIFY THE CAUSE OF THE EROSION AND TAKE ACTION TO AVOID ITS REOCCURRENCE. TYPICALLY, THIS REQUIRES THAT STABILIZATION MEASURE BE TAKEN TO THE DISTURBED TRIBUTARY AREA. PROPER PLACEMENT OF STAKES AND KEYING THE BOTTOM OF THE FABRIC INTO THE GROUND IS CRITICAL FOR THE FILTER'S EFFECTIVENESS. IF THERE ARE SIGNS OF UNDERCUTTING AT THE CENTER OR THE EDGES, OR IMPOUNDING OF LARGE VOLUMES OF WATER BEHIND THE FENCE, THE BARRIER SHALL BE REPLACED WITH A STONE CHECK DAM AND MEASURES TAKEN TO AVOID THE CONCENTRATION OF FLOWS NOT INTENDED TO BE DIRECTED TO THE SILT FENCE.

STRAW MULCH

STRAW MULCH INCLUDING HYDRO SEEDING IS INTENDED TO PROVIDE COVER FOR DENUDED OR SEEDED AREAS UNTIL REVEGETATION IS ESTABLISHED. MULCHING SHOULD BE OCCURRING SEVERAL TIMES PER WEEK WHEN THE SITE CONSTRUCTION ACTIVITY IS HIGH AND AT SUFFICIENT INTERVALS TO REDUCE THE PERIOD OF EXPOSURE OF BARE SOILS TO THE TIME LIMITS SET FORTH IN THIS PLAN. MULCH PLACED ON SLOPES OF LESS THAN 10 PERCENT SHALL BE ANCHORED BY APPLYING WATER; MULCH PLACED ON SLOPES STEEPER THAN 10 PERCENT SHALL BE COVERED WITH FABRIC NETTING AS IMMEDIATELY AFTER MULCHING AS PRACTICABLE AND ANCHORED WITH STAPLES IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. PROPOSED DRAINAGE CHANNELS, WHICH ARE TO BE REVEGETATED, SHALL RECEIVE CURLEX BLANKETS BY AMERICAN EXCELSIOR OR NORTH AMERICAN GREEN SELECTED FOR THE SLOPE, VELOCITY, AND WHETHER THE MEASURE IS TEMPORARY OR INTENDED TO BE IN PLACE FOR A SUSTAINED PERIOD. STRAW MULCH SHALL BE AVAILABLE ON SITE AT ALL TIMES IN ORDER TO PROVIDE IMMEDIATE TEMPORARY STABILIZATION WHEN NECESSARY.

TEMPORARY STORMWATER SETTLEMENT BASINS

TEMPORARY STORMWATER SETTLEMENT BASINS MAY BE CONSTRUCTED TO PROVIDE SEDIMENTATION CONTROL FOR STORMWATER RUNOFF FROM THE INDIVIDUAL SITE AREAS DURING CONSTRUCTION. THESE BASINS MAY BECOME NECESSARY WHERE OTHER EROSION CONTROL MEASURES ARE NOT ADEQUATE TO PREVENT OFFSITE SEDIMENTATION. THE BASIN SHOULD ONLY BE USED WHERE THERE IS SUFFICIENT SPACE AND APPROPRIATE TOPOGRAPHY. THE BASIN SHOULD BE LARGE ENOUGH TO HANDLE THE MAXIMUM AMOUNT OF EXPECTED SITE DRAINAGE. THE BASIN MAY BE CONSTRUCTED BY EXCAVATION, CONSTRUCTION OF A COMPACTED EMBANKMENT OR A COMBINATION OF BOTH. IT MAY HAVE ONE OR MORE INFLOW POINTS CARRYING POLLUTED RUNOFF. TO IMPROVE TRAP EFFICIENCY, THE BASIN SHOULD HAVE THE MAXIMUM SURFACE AREA POSSIBLE AND SEDIMENT SHOULD ENTER THE BASIN AS FAR FROM THE OUTLET AS POSSIBLE.

RIPRAP SLOPES AND DITCH LININGS

RIPRAP CAN BE USED AS A TEMPORARY (OR PERMANENT) METHOD TO PROTECT DENUDED GROUND FROM RUNOFF WITH EROSIVE VELOCITIES BY DISSIPATING ENERGY AND SLOWING DOWN SURFACE WATER RUNOFF. WELL GRADED RIPRAP FORMS A DENSE, FLEXIBLE, SELF-HEALING COVER THAT ADAPTS WELL TO UNEVEN SURFACES. RIPRAP SHOULD BE PLACED ON A PROPER FILTER MATERIAL OF SAND, GRAVEL OR FABRIC TO PREVENT SOIL FROM PIPING THROUGH THE STONE. FOR MOST APPLICATIONS, GRADED RIPRAP IS PREFERRED TO UNIFORM RIPRAP. GRADED RIPRAP FORMS A FLEXIBLE SELF-HEALING COVER WHILE UNIFORM RIPRAP IS MORE RIGID AND CANNOT WITHSTAND THE MOVEMENT OF THE STONES. GRADED RIPRAP IS CHEAPER TO INSTALL, REQUIRING ONLY THAT THE STONES BE DUMPED SO THAT THEY REMAIN IN A WELL-GRADED MASS. HAND OR MECHANICAL PLACEMENT OF INDIVIDUAL STONES IS LIMITED TO THAT NECESSARY TO ACHIEVE THE PROPER THICKNESS AND LINE. UNIFORM RIPRAP REQUIRES PLACEMENT IN A MORE OR LESS UNIFORM PATTERN, REQUIRING MORE HAND OR MECHANICAL LABOR.

STONE CHECK DAMS

A CHECK DAM IS A SMALL DAM CONSTRUCTED ACROSS A DRAINAGE DITCH, SWALE OR CHANNEL TO REDUCE THE VELOCITY OF THE SURFACE RUNOFF. REDUCED RUNOFF VELOCITY REDUCES EROSION AND GULLYING IN THE CHANNEL AND ALLOWS THE SEDIMENT TO SETTLE OUT. WHERE TEMPORARY CHANNELS OR PERMANENT CHANNELS ARE NOT YET VEGETATED, CHANNEL LINING IS INFEASIBLE AND VELOCITY CHECKS ARE REQUIRED, THIS PRACTICE MAY BE USED AS A TEMPORARY OR EMERGENCY MEASURE TO LIMIT EROSION BY REDUCING FLOW IN SMALL OPEN CHANNELS.

STRAW BALE BARRIERS

STRAW BALE BARRIERS ARE USED SIMILARLY TO SILT FENCE SPECIFICALLY WHERE THE AREA BELOW THE BARRIER IS UNDISTURBED AND VEGETATED. BALE BARRIERS REQUIRE MORE MAINTENANCE THAN SILT FENCE BARRIERS AND PERMEABILITY THROUGH BALE BARRIERS IS SLOWER THAN SILT FENCE. BALE BARRIERS SHOULD BE LOCATED WHERE THEY WILL TRAP SEDIMENT. BALES LOCATED ALONG THE TOP OF A RIDGE SERVE NO USEFUL PURPOSE. STRAW BALE BARRIERS SHOULD BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS, BUT NOT BEFORE THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.

CULVERT OUTLET APRONS

OUTLET PROTECTION SHOULD BE INSTALLED AT ALL PIPE, CULVERT OR SWALE OUTLETS WHERE VELOCITY OF FLOW MAY CAUSE EROSION AT THE PIPE OUTLET AND IN THE RECEIVING CHANNEL. EROSION AT THESE LOCATIONS IS COMMON AND CAN CAUSE STRUCTURAL FAILURE WITH SERIOUS DOWNSTREAM PROBLEMS. A RIPRAP LINED APRON IS THE MOST COMMONLY USED STRUCTURE FOR THIS PURPOSE BECAUSE IT HAS RELATIVELY LOW COST AND CAN BE INSTALLED EASILY ON MOST SITES.

CONSTRUCTION ENTRANCE

A CONSTRUCTION ENTRANCE WILL BE CONSTRUCTED AT ALL ACCESS POINTS ONTO THE SITE TO PREVENT TRACKING OF SOIL ONTO ADJACENT LOCAL ROADS. PROPOSED CONSTRUCTION ENTRANCES ARE SHOWN ON THE EROSION CONTROL PLAN. CONSTRUCTION ENTRANCES PROVIDE AN AREA WHERE MUD CAN BE REMOVED FROM VEHICLE TIRES BEFORE THEY ENTER A PUBLIC ROAD. IF THE ACTION OF THE VEHICLE TRAVELLING OVER THE GRAVEL PAD IS NOT SUFFICIENT TO REMOVE THE MAJORITY OF THE MUD, THEN TIRES MUST BE WASHED BEFORE THE VEHICLE ENTERS A PUBLIC ROAD.

INLET PROTECTION

STORM DRAIN CATCH BASIN INLET PROTECTION SHALL BE PROVIDED THROUGH THE USE OF STONE SEDIMENT BARRIERS OR A PREMANUFACTURED SILTSACK AS DISTRIBUTED BY A.H. HARRIS, THE BARRIERS SHALL BE INSPECTED AFTER EACH RAINFALL AND REPAIRS MADE AS NECESSARY. SEDIMENT SHALL BE REMOVED AND THE BARRIER RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER. THE BARRIER SHALL BE REMOVED WHEN THE TRIBUTARY DRAINAGE AREA HAS BEEN STABILIZED.

FILTER BAGS

FILTER BAGS WILL BE REQUIRED TO BE ONSITE AND AVAILABLE FOR CONSTRUCTION DEWATERING. THE USE OF FILTER BAGS WILL BE REQUIRED IN THE EVENT THAT TRENCH DEWATERING ACTIVITIES CANNOT BE DISCHARGED THROUGH A NATURAL BUFFER AREA AT LEAST 100 FEET IN LENGTH OR AT ANY SIGNS OF ANY TURBID DISCHARGE FROM THE SITE.

SLOPE PROTECTION

ADDITIONAL SLOPE PROTECTION WILL BE REQUIRED IN AREAS OF STEEP SLOPES AND WHERE PROPOSED GRADES MEET EXISTING GRADES AT ACUTE ANGLES THAT COULD CAUSE GULLY EROSION. THIS PROTECTION WILL BE MAINLY IN THE FORM OF THE INSTALLATION OF EROSION CONTROL BLANKETS IN AREAS WHERE SLOPES EXCEED 3:1, H:V, UP TO 2:1, H:V. AREAS WHERE SLOPES EXCEED 2:1, H:V, SHOULD BE STABILIZED WITH RIP RAP SLOPE PROTECTION.

LOAM AND SEED

LOAM AND SEED IS INTENDED TO SERVE AS THE PRIMARY PERMANENT REVEGETATIVE MEASURE FOR ALL DENUDED AREAS NOT PROVIDED WITH OTHER EROSION CONTROL MEASURES, SUCH AS RIPRAP OR PERMANENTLY COVERED WITH ROADWAY GRAVEL, PAVEMENT OR BUILDING AREA.

f. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

THE FOLLOWING ARE PLANNED AS TEMPORARY EROSION AND SEDIMENTATION CONTROL MEASURES DURING CONSTRUCTION:

- A CRUSHED STONE-STABILIZED CONSTRUCTION ENTRANCE SHALL BE PLACED AT ANY CONSTRUCTION ACCESS POINTS INTO THE SITE. THE LOCATIONS OF THE CONSTRUCTION ENTRANCES SHOWN ON THE DRAWINGS SHOULD BE CONSIDERED ILLUSTRATIVE AND ADJUSTED AS APPROPRIATE AND LOCATED AT ANY AREA WHERE TRACKING OF MUD AND DEBRIS ONTO EXISTING ROADS, PREVIOUSLY PAVED AREAS WITHIN THE PROJECT, OR STREETS IS A POTENTIAL. STONE STABILIZED CONSTRUCTION ENTRANCES WILL REQUIRE THE STONE TO BE REMOVED AND REPLACED AS IT BECOMES COVERED OR FILLED WITH MUD AND MATERIAL TRACKED BY VEHICLES EXITING THE SITE.
- SILTATION FENCE OR AN EQUIVALENT SEDIMENT BARRIER SHALL BE INSTALLED ALONG THE DOWNGRADIENT SIDE OF THE PROPOSED IMPROVEMENT AREAS. THE SILTATION FENCE WILL REMAIN IN PLACE AND PROPERLY MAINTAINED UNTIL THE SITE IS ACCEPTABLY REVEGETATED. SILTATION FENCE IS TO BE USED ALONG THE CONTOUR OF SIGNIFICANT FILL SLOPES AS ILLUSTRATED ON THE EROSION CONTROL PLAN SITE DRAWINGS. SILTATION FENCE NEEDS TO BE CHECKED TO INSURE THE BOTTOM IS PROPERLY KEYED IN AND INSPECTED AFTER SIGNIFICANT RAINS. WOOD CHIPS FROM CLEARING ARE OFTEN USED ON THE CONSTRUCTION SITE IN FRONT OF THE SILT FENCE TO PROVIDE AN EXTRA MARGIN OF SAFETY AND SECURITY FOR THE SILT FENCE. THIS PRACTICE IS ENCOURAGED, PROVIDED THE CHIPS ARE REMOVED OR DISPERSED INTO FORESTED AREAS WHEN THE FENCE IS REMOVED.
- FILTER BAGS SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS IN THE PLAN SET. THE FILTER BAG'S FUNCTION ON THE PROJECT IS TO RECEIVE ANY WATER PUMPED FROM EXCAVATIONS DURING CONSTRUCTION. A FILTER BAG SHALL BE INSTALLED AND PREPARED FOR OPERATION PRIOR TO ANY TRENCHING ON SITE. WHEN FILTER BAGS ARE OBSERVED TO BE AT 50% CAPACITY, THEY SHALL BE CLEANED OR REPLACED. STONE UNDER THE FILTER BAGS SHALL BE REMOVED AND REPLACED CONCURRENTLY.
- TEMPORARY STOCKPILES OF COMMON EXCAVATION WILL BE PROTECTED AS FOLLOWS:
  - TEMPORARY STOCKPILES SHALL NOT BE LOCATED WITHIN 100 FEET OF CRITICAL AREAS AND AT LEAST 50
  - FEET UPGRADIENT OF THE PERIMETER SILT FENCE.
  - INACTIVE STOCKPILES SHALL BE STABILIZED WITHIN 5 DAYS BY EITHER TEMPORARILY SEEDING THE STOCKPILE WITH A HYDRO SEED METHOD CONTAINING AN EMULSIFIED MULCH TACKIFIER OR BY COVERING THE STOCKPILE WITH MULCH. IF NECESSARY, MESH SHALL BE INSTALLED TO PREVENT WIND FROM REMOVING THE MULCH.
- OPEN AREAS OF THE SITE SHALL BE LIMITED TO 5 ACRES. ALL DENUDED AREAS WHICH HAVE BEEN ROUGH GRADED SHALL RECEIVE MULCH OR EROSION CONTROL MESH FABRIC WITHIN 7 DAYS OF INITIAL DISTURBANCE OF SOIL. DISTURBED AREAS WITHIN 75' OF CRITICAL AREAS MUST RECEIVE TEMPORARY EROSION CONTROL MEASURES WITHIN 48 HOURS.
- BETWEEN NOVEMBER 1 AND APRIL 1, OPEN AREA SHALL BE LIMITED TO THREE ACRES, AND DISTURBED SOIL SHALL BE COVERED WITH MULCH WITHIN 5 DAYS OF DISTURBANCE, PRIOR TO ANY PREDICTED STORM EVENT OF THE EQUIVALENT OF ½" OF EQUIVALENT RAINFALL IN A 24-HOUR PERIOD, OR PRIOR TO ANY WORK SHUTDOWN LASTING MORE THAN 48 HOURS (INCLUDING WEEKENDS AND HOLIDAYS). THE MULCH RATE SHALL BE DOUBLE THE NORMAL RATE.
  - FOR WORK THAT IS CONDUCTED BETWEEN NOVEMBER 1 AND APRIL 15 OF ANY CALENDAR YEAR, ALL DENUDED AREAS WILL BE COVERED WITH HAY MULCH, APPLIED AT TWICE THE NORMAL APPLICATION RATE, AND (IN AREAS OVER 10% GRADE) ANCHORED WITH A FABRIC NETTING. THE

g. STANDARDS FOR STABILIZING SITES FOR WINTER CONDITIONS

THE CONSTRUCTION OF THE PROJECT WILL EXTEND INTO THE WINTER SEASON, AND LIKELY THROUGH SEVERAL WINTER SEASONS. THE CONTRACTOR SHALL SCHEDULE WORK TO AVOID CONSTRUCTION OF STORMWATER BASINS DURING THE WINTER MONTHS. FOR PERMITTED WINTER CONSTRUCTION, THE EROSION CONTROL MEASURES ARE SUBSTANTIALLY MORE STRINGENT DUE TO COLD TEMPERATURES AND LACK OF MOISTURE WHICH AIDS IN DRYING THE SUBGRADE SOILS THROUGH EVAPORATION.

THE WINTER CONSTRUCTION PERIOD IS FROM NOVEMBER 15TH THROUGH MARCH 15TH. IF THE CONSTRUCTION SITE IS NOT STABILIZED WITH PAVEMENT, AGGREGATE SUBBASE GRAVEL, 90% MATURE VEGETATION COVER OR RIPRAP PRIOR TO NOVEMBER 15TH, THEN THE SITE NEEDS TO BE PROTECTED WITH OVER-WINTER STABILIZATION. AN AREA CONSIDERED OPEN IS ANY AREA THAT IS NOT STABILIZED WITH PAVEMENT, VEGETATION, MULCHING, EROSION CONTROL MIX, EROSION CONTROL MATS, RIPRAP OR SUBBASE GRAVEL.

DURING THE WINTER CONSTRUCTION PERIOD THE CONTRACTOR SHALL INSTALL EROSION CONTROL MIX BERMS IN LIEU OF SILT FENCE.

DURING THE WINTER CONSTRUCTION PERIOD, A DOUBLE ROW OF SEDIMENT BARRIERS SHALL BE PLACED BETWEEN ANY DRAINAGE PATH AND THE DISTURBED AREA.

IN ADDITION, DURING THE WINTER CONSTRUCTION PERIOD THE AMOUNT OF EXPOSED AREA SHALL BE LIMITED TO THAT WHICH CAN BE MULCHED WITHIN ONE DAY IN THE EVENT OF A PREDICTED STORM AND SHALL NOT EXCEED A MAXIMUM OPEN AREA OF ONE ACRE.

STANDARD FOR THE TIMELY STABILIZATION OF DITCHES AND CHANNELS: THE CONTRACTOR SHALL CONSTRUCT AND STABILIZE ALL STONE-LINED DITCHES AND CHANNELS ON THE SITE BY NOVEMBER 15TH. THE CONTRACTOR SHALL CONSTRUCT AND STABILIZE ALL GRASS LINED DITCHES AND CHANNELS ON THE SITE BY SEPTEMBER 1ST. IF THE CONTRACTOR FAILS TO STABILIZE A DITCH OR CHANNEL TO BE GRASS LINED BY SEPTEMBER 1ST, THEN THE CONTRACTOR SHALL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE DITCH FOR LATE FALL AND WINTER.

i. INSTALL A SOD LINING IN THE DITCH. THE CONTRACTOR SHALL LINE THE DITCH WITH PROPERLY INSTALLED SOD BY OCTOBER 1ST. PROPER INSTALLATION INCLUDES THE APPLICANT PINNING THE SOD ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTACT BETWEEN THE SOD AND UNDERLYING SOIL, WATERING THE SOD TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL, AND ANCHORING THE SOD WITH JUTE OR PLASTIC MESH TO PREVENT THE SOD STRIPS FROM SLOUGHING DURING FLOW CONDITIONS.

ii. INSTALL A STONE LINING IN THE DITCH. THE CONTRACTOR SHALL LINE THE DITCH WITH STONE RIPRAP BY NOVEMBER 1ST. THE CONTRACTOR SHALL HIRE A REGISTERED PROFESSIONAL ENGINEER TO DETERMINE THE STONE SIZE AND LINING THICKNESS NEEDED TO WITHSTAND THE ANTICIPATED FLOW VELOCITIES AND FLOW DEPTHS WITHIN THE DITCH. IF NECESSARY, THE CONTRACTOR SHALL REGRADE THE DITCH PRIOR TO PLACING THE STONE LINING SO AS TO PREVENT THE STONE LINING FROM REDUCING THE DITCH'S CROSS SECTIONAL AREA.

STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SLOPES: THE CONTRACTOR SHALL CONSTRUCT AND STABILIZE STONE COVERED SLOPES BY NOVEMBER 15TH. THE CONTRACTOR SHALL SEED AND MULCH ALL SLOPES TO BE VEGETATED BY SEPTEMBER 1ST. A SLOPE IS CONSIDERED ANY AREA HAVING A GRADE OF GREATER THAN 15% (10H:1V). IF THE CONTRACTOR FAILS TO STABILIZE ANY SLOPE TO BE VEGETATED BY SEPTEMBER 15TH, THEN THE CONTRACTOR SHALL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER:

i. STABILIZE THE SOIL WITH TEMPORARY VEGETATION AND EROSION CONTROL MESH. BY OCTOBER 1ST THE CONTRACTOR SHALL SEED THE DISTURBED SLOPE WITH WINTER RYE AT A SEEDING RATE OF 3 POUNDS PER 1000 SQUARE FEET AND APPLY EROSION CONTROL MATS OVER THE MULCHED SLOPE. THE CONTRACTOR SHALL MONITOR GROWTH OF THE RYE OVER THE NEXT 45 DAYS. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR FAILS TO COVER AT LEAST 75% OF THE DISTURBED SLOPE BY NOVEMBER 15TH, THEN THE CONTRACTOR SHALL COVER THE SLOPE WITH A LAYER OF WOOD WASTE COMPOST AS DESCRIBED IN ITEM III OF THIS STANDARD OR WITH STONE RIP RAP AS DESCRIBED IN ITEM IV OF THIS STANDARD.

ii. STABILIZE THE SLOPE WITH SOD. THE CONTRACTOR SHALL STABILIZE THE DISTURBED SLOPE WITH PROPERLY INSTALLED SOD BY OCTOBER 1ST. PROPER INSTALLATION INCLUDES THE CONTRACTOR PINNING THE SOD ONTO THE SLOPE WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTRACT BETWEEN THE SOD AND UNDERLYING SOIL, AND WATERING THE SOD TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL. THE CONTRACTOR SHALL NOT USE LATE-SEASON SOD INSTALLATION TO STABILIZE SLOPES HAVING A GRADE GREATER THAN 33% (3H: 1V) OR HAVING GROUNDWATER SEEPS ON THE SLOPE FACE.

iii. STABILIZE THE SLOPE WITH WOOD WASTE COMPOST. THE CONTRACTOR SHALL PLACE A SIX-INCH LAYER OF WOOD WASTE COMPOST ON THE SLOPE BY NOVEMBER 15TH. PRIOR TO PLACING THE WOOD WASTE COMPOST, THE CONTRACTOR SHALL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED SLOPE. THE CONTRACTOR SHALL NOT USE WOOD WASTE COMPOST TO STABILIZE SLOPES HAVING GRADES GREATER THAN 50% (2H: 1V) OR HAVING GROUNDWATER SEEPS ON THE SLOPE FACE.

iv. STABILIZE THE SLOPE WITH STONE RIPRAP. THE CONTRACTOR SHALL PLACE A LAYER OF STONE RIPRAP ON THE SLOPE BY NOVEMBER 15TH. THE CONTRACTOR SHALL HIRE A REGISTERED PROFESSIONAL ENGINEER TO DETERMINE THE STONE SIZE NEEDED FOR STABILITY AND TO DESIGN A FILTER LAYER FOR UNDERNEATH THE RIPRAP.

STANDARD FOR THE TIMELY STABILIZATION OF DISTURBED SOIL: BY SEPTEMBER 15TH, THE CONTRACTOR SHALL SEED AND MULCH ALL DISTURBED SOILS ON AREAS HAVING A SLOPE LESS THAN 15%. IF THE CONTRACTOR FAILS TO STABILIZE THESE SOILS BY THIS DATE, THEN THE CONTRACTOR SHALL TAKE ONE OF THE FOLLOWING ACTIONS TO STABILIZE THE SOIL FOR LATE FALL AND WINTER.

i. STABILIZE THE SOIL WITH TEMPORARY VEGETATION. BY OCTOBER 1ST, THE CONTRACTOR SHALL SEED THE DISTURBED SOIL WITH WINTER RYE AT A SEEDING RATE OF 3 POUNDS PER 1,000 SQUARE FEET, LIGHTLY MULCH THE SEEDED SOIL WITH HAY OR STRAW AT 75 POUNDS PER 1,000 SQUARE FEET, AND ANCHOR THE MULCH WITH PLASTIC NETTING. THE CONTRACTOR SHALL MONITOR THE GROWTH OF THE RYE OVER THE NEXT 45 DAYS. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR FAILS TO COVER AT LEAST 75% OF THE DISTURBED SOIL BEFORE NOVEMBER 1ST, THEN THE CONTRACTOR SHALL MULCH THE AREA FOR OVER-WINTER PROTECTION AS DESCRIBED IN ITEM III OF THIS STANDARD.

ii. STABILIZE THE SOIL WITH SOD. THE CONTRACTOR SHALL STABILIZE THE DISTURBED SOIL WITH PROPERLY INSTALLED SOD BY OCTOBER 1ST. PROPER INSTALLATION INCLUDES THE CONTRACTOR PINNING THE SOD ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOD TO GUARANTEE CONTACT BETWEEN THE SOD AND UNDERLYING SOIL, AND WATERING THE SOD TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL.

iii. STABILIZE THE SOIL WITH MULCH. BY NOVEMBER 15TH, THE CONTRACTOR SHALL MULCH THE DISTURBED SOIL BY SPREADING HAY OR STRAW AT A RATE OF AT LEAST 150 POUNDS PER 1,000 SQUARE FEET ON THE AREA SO THAT NO SOIL IS VISIBLE THROUGH THE MULCH. PRIOR TO APPLYING THE MULCH, THE CONTRACTOR SHALL REMOVE ANY SNOW ACCUMULATION ON THE DISTURBED AREA. IMMEDIATELY AFTER APPLYING THE MULCH, THE CONTRACTOR SHALL ANCHOR THE MULCH WITH PLASTIC NETTING TO PREVENT WIND FROM MOVING THE MULCH OFF THE DISTURBED SOIL.

STANDARD FOR TIMELY STABILIZATION OF SOIL STOCKPILES: STOCKPILES OF SOIL OR SUBSOIL WILL BE MULCHED FOR OVER WINTER PROTECTION WITH HAY OR STRAW AT TWICE THE NORMAL APPLICATION RATE OR WITH A FOUR-INCH THICK LAYER OF EROSION CONTROL MIX. THIS WILL BE COMPLETED WITHIN 24-HOURS OF STOCKPILING OR RE-ESTABLISHED PRIOR TO ANY PREDICTED RAINFALL OR SNOWFALL EVENT. ANY SOIL STOCKPILE WILL NOT BE PLACED (EVEN COVERED WITH MULCH) WITHIN 100 FEET FROM A NATURAL RESOURCE (I.E. WETLAND, ETC.).

h. SPECIAL MEASURES FOR SUMMER CONDITIONS

THE SUMMER PERIOD IS GENERALLY OPTIMUM FOR CONSTRUCTION FOR THIS SITE BUT IT IS ALSO THE PERIOD WHERE INTENSE SHORT DURATION STORMS ARE MOST COMMON MAKING DENUDED AREAS VERY SUSCEPTIBLE TO EROSION, WHERE DUST CONTROL NEEDS TO BE THE MOST STRINGENT, AND WHERE THE POTENTIAL TO ESTABLISH VEGETATION IS OFTEN RESTRICTED BY MOISTURE DEFICIT. DURING THESE PERIODS THE CONTRACTOR MUST:

- IMPLEMENT A PROGRAM TO APPLY DUST CONTROL MEASURES ON A DAILY BASIS EXCEPT THOSE DAYS WHERE THE PRECIPITATION EXCEEDS 0.25 INCHES;
- SPRAY THE MULCH AFTER ANCHORING WITH WATER TO DAMPEN THE SOIL AND ENCOURAGE EARLY GROWTH. TEMPORARY SEED MAY BE REQUIRED UNTIL THE LATE SUMMER SEEDING SEASON.
- MULCH, COVER, AND MOISTEN STOCKPILES OF FINE-GRAINED MATERIALS THAT ARE SUSCEPTIBLE TO EROSION.
- TAKE ADDITIONAL STEPS NEEDED TO CONTROL FUGITIVE DUST EMISSIONS TO MINIMIZE REDUCTIONS IN VISIBILITY AND THE AIRBORNE DISBURSEMENT OF FINE-GRAINED SOILS. THESE MEASURES MAY ALSO BE REQUIRED IN THE SPRING AND FALL DURING THE DRIER PERIODS OF THESE SEASONS.

i. PERMANENT EROSION CONTROL MEASURES

THE FOLLOWING PERMANENT EROSION CONTROL MEASURES HAVE BEEN DESIGNED AS PART OF THE EROSION AND SEDIMENTATION CONTROL PLAN:

- THE DRAINAGE CONVEYANCE SYSTEMS HAVE BEEN DESIGNED TO INTERCEPT AND CONVEY THE 25-YEAR STORM. IN THE CASE OF OPEN CHANNELS OR SWALES, THIS INCLUDES THE DESIGN OF MEASURES TO RESIST SCOUR OF THE CHANNEL.
- ALL STORM DRAIN PIPES SHALL HAVE RIPRAP APRONS AT THEIR OUTLET TO PROTECT THE OUTLET AND RECEIVING CHANNEL OF THE CULVERTS FROM SCOUR AND DETERIORATION. INSTALLATION DETAILS ARE PROVIDED IN THE PLAN SET. THE APRONS SHALL BE INSTALLED AND STABILIZED PRIOR TO DIRECTING RUNOFF TO THE TRIBUTARY PIPE OR CULVERT.
- ALL AREAS DISTURBED DURING CONSTRUCTION, BUT NOT SUBJECT TO OTHER RESTORATION (PAVING, RIPRAP, ETC.) WILL BE LOAMED, LIMED, FERTILIZED, MULCHED, AND SEEDED. FABRIC NETTING, ANCHORED WITH STAPLES, SHALL BE PLACED OVER THE MULCH IN AREAS WHERE THE FINISH GRADE SLOPE IS GREATER THAN 10 PERCENT. NATIVE TOPSOIL SHALL BE STOCKPILED AND TEMPORARILY STABILIZED WITH SEED AND MULCH AND REUSED FOR FINAL RESTORATION WHEN IT IS OF SUFFICIENT QUALITY.
- CATCH BASINS SHALL BE PROVIDED WITH SEDIMENT SUMPS FOR ALL OUTLET PIPES THAT ARE 12" IN DIAMETER OR GREATER.
- THIS PROJECT WILL FEATURE AN UNDERGROUND DETENTION SYSTEM, AN ABOVE GROUND DETENTION BASIN AND CONSTRUCTED WETLANDS. THERE WILL BE NUMEROUS BIOFILTRATION AREAS THROUGHOUT THE SITE TO COLLECT RUNOFF FROM THE PARKING FIELD.

j. TIMING AND SEQUENCE OF THE EROSION CONTROL MEASURES

THE FOLLOWING CONSTRUCTION SEQUENCE SHALL BE REQUIRED TO INSURE THE EFFECTIVENESS OF THE EROSION AND SEDIMENTATION CONTROL MEASURES ARE OPTIMIZED.

NOTE: FOR ALL GRADING ACTIVITIES, THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION NOT TO OVEREXPOSE THE SITE BY LIMITING THE DISTURBED AREA AND SHALL STABILIZE ANY STEEP SLOPES WITHIN 24 HOURS IF FINAL SLOPE GRADING AND STABILIZATION WILL NOT BE COMPLETED WITHIN 7 DAYS. ANY FINAL SLOPES SHALL HAVE THE SPECIFIED EROSION CONTROL MEASURES INSTALLED WITHIN 7 DAYS OF FINAL STABILIZATION.

- INSTALL CRUSHED STONE-STABILIZED CONSTRUCTION ENTRANCES AS SHOWN ON THE EROSION AND SEDIMENTATION CONTROL PLAN.
- MARK THE GRADING AND CLEARING LIMITS AND INITIATE CLEARING THAT WILL PERMIT THE CONTRACTOR TO ACCESS THE SITE AND INSTALL SILT FENCE.
- INSTALL SILTATION FENCE WHERE SHOWN ON THE CONTRACT DRAWINGS. DURING PERIODS OF NOVEMBER 1ST THROUGH APRIL 15TH, THE CONTRACTOR SHALL INSTALL EROSION CONTROL MIX BERMS IN LIEU OF SILT FENCE.
- ESTABLISH AND PREPARE FILTER BAG AREAS.
- SHAPE THE SUBGRADE OF THE PROPOSED WET POND FOR THE AREA OF THE SITE THAT IS UNDER CONSTRUCTION.
- CONSTRUCT DIVERSION AND DRAINAGE CHANNELS TO DIRECT FLOW TO THE STORMWATER FACILITIES FROM THE LOT DEVELOPMENT AND ROADWAY AREAS.
- PREPARE AREA TO RECEIVE EXCAVATED MATERIAL RECOGNIZING THE NEED TO LIMIT THE DENUDED AREA OF THE SITE.
- BEGIN EXCAVATION OF THE BUILDING PAD AREAS.
- CONSTRUCT THE DISTURBED AREAS TO SUBGRADE AND RESTORE THE SLOPES.
- INSTALL STONE AND HAY BALE CHECK DAMS AT ANY CONCENTRATED FLOW DISCHARGE POINTS.
- INSTALL STORM DRAIN AND OTHER UTILITY WORK. INSTALL INLET AND OUTLET PROTECTION IMMEDIATELY AFTER THE INSTALLATION OF ANY CULVERTS. PUMP ANY ACCUMULATED WATER WITHIN THE TRENCHES TO A FILTER BAG.
- PLACE GRAVELS IN THE PAVED AREAS AS SOON AS SUBGRADE IS PREPARED TO MINIMIZE THE PERIOD THAT THE UNPROTECTED SUBGRADE IS EXPOSED AND VULNERABLE TO EROSION FROM RUNOFF EVENTS.
- RAISE CATCH BASINS TO GRADE AND INSTALL INLET PROTECTION DEVICES, THE SILTSACK® INSIDE THE BASIN, AND THE EXTERNAL HAY BALES OR STONE FILTER (IF APPLICABLE).
- INSTALL BINDER PAVEMENT.
- LOAM, LIME, FERTILIZE, SEED AND MULCH ALL DISTURBED AND DENUDED AREAS.
- REMOVE ALL ACCUMULATED SEDIMENT FROM SILT BARRIERS.
- REVIEW STABILITY OF THE SITE. REMOVAL OF EROSION CONTROL MEASURES SHALL BE PERFORMED WITHIN 30 DAYS OF ESTABLISHING PERMANENT STABILIZATION. PERMANENT STABILIZATION IN GRASSED AREAS IS ESTABLISHED WITH 90% CATCH OF GRASS WITH NO EVIDENCE OF RILLING OR EROSION.

THIS SEQUENCE IS APPLICABLE TO ALL PHASES OF THE PROJECT.

SOIL WILL BE CONSIDERED DISTURBED IF IT DOES NOT HAVE AN ESTABLISHED STAND OF VEGETATION COVERING AT LEAST 90% OF THE SOIL SURFACE OR HAS NOT BEEN MULCHED WITH HAY APPLIED AT A RATE OF 230 LB./1,000 SQ. FT.

k. PROVISIONS FOR MAINTENANCE OF THE EROSION CONTROL MEASURES

THIS PROJECT IS SUBJECT TO THE REQUIREMENTS OF A US EPA NPDES PERMIT AND AN ACCOMPANYING STORMWATER POLLUTION PREVENTION PLAN (SWPPP.) THESE DOCUMENTS REQUIRE THE CONTRACTOR TO PREPARE A LIST AND DESIGNATE BY NAME, ADDRESS AND TELEPHONE NUMBER ALL INDIVIDUALS WHO WILL BE RESPONSIBLE FOR IMPLEMENTATION, INSPECTION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES IDENTIFIED WITHIN THIS SECTION AND AS CONTAINED WITHIN THE CONTRACT DRAWINGS. SPECIFIC RESPONSIBILITIES OF THE INSPECTOR(S) WILL INCLUDE, BUT NOT BE LIMITED TO:

- EXECUTION OF THE CONTRACTOR/SUBCONTRACTOR CERTIFICATION BY ANY AND ALL PARTIES RESPONSIBLE FOR EROSION CONTROL MEASURES ON THE SITE AS REQUIRED BY THE SWPPP.
- ASSURING AND CERTIFYING THE OWNER'S CONSTRUCTION SEQUENCE IS IN CONFORMANCE WITH THE SPECIFIED SCHEDULE OF THIS SECTION. A WEEKLY CERTIFICATION STATING COMPLIANCE, ANY DEVIATIONS, AND CORRECTIVE MEASURES NECESSARY TO COMPLY WITH THE EROSION CONTROL REQUIREMENTS OF THIS SECTION SHALL BE PREPARED AND SIGNED BY THE INSPECTOR(S).
- IN ADDITION TO THE WEEKLY CERTIFICATIONS, THE INSPECTOR(S) SHALL MAINTAIN WRITTEN REPORTS RECORDING CONSTRUCTION ACTIVITIES ON SITE WHICH INCLUDE DATES WHEN MAJOR GRADING ACTIVITIES OCCUR IN A PARTICULAR AREA; DATES WHEN MAJOR CONSTRUCTION ACTIVITIES CEASE IN A PARTICULAR AREA, EITHER TEMPORARY OR PERMANENT; DATES WHEN AN AREA IS STABILIZED.
- INSPECTION OF THE PROJECT WORK SITE AT LEAST ONCE EVERY SEVEN (7) CALENDAR DAYS AND BEFORE AND AFTER EACH SIGNIFICANT RAINFALL EVENT (0.1 INCHES OR MORE IN ANY 24-HOUR PERIOD) DURING CONSTRUCTION UNTIL PERMANENT EROSION CONTROL MEASURES HAVE BEEN PROPERLY INSTALLED AND THE SITE HAS BEEN STABILIZED. INSPECTION OF THE PROJECT WORK SITE SHALL INCLUDE:

A. IDENTIFICATION OF PROPER EROSION CONTROL MEASURE INSTALLATION IN ACCORDANCE WITH THE EROSION CONTROL DETAIL SHEET OR AS SPECIFIED IN THIS SECTION.

B. DETERMINE WHETHER EACH EROSION CONTROL MEASURE IS PROPERLY OPERATING. IF NOT, IDENTIFY DAMAGE TO THE CONTROL DEVICE AND DETERMINE REMEDIAL MEASURES.

C. IDENTIFY AREAS THAT APPEAR VULNERABLE TO EROSION AND DETERMINE ADDITIONAL EROSION CONTROL MEASURES THAT SHOULD BE USED TO IMPROVE CONDITIONS.

D. INSPECT AREAS OF RECENT SEEDING TO DETERMINE PERCENT CATCH OF GRASS. A MINIMUM CATCH OF 90 PERCENT IS REQUIRED PRIOR TO REMOVAL OF EROSION CONTROL MEASURES.

E. RECORD DATE OF INSTALLATION OF SORBENT BAGS IN CATCH BASINS, DATES OF PAVING (IF APPLICABLE), DATES REMOVED, AND THE DISPOSAL METHOD AND LOCATION.

- IF INSPECTION OF THE SITE INDICATES A CHANGE SHOULD BE MADE TO THE EROSION CONTROL PLAN, EITHER TO IMPROVE EFFECTIVENESS OR CORRECT A SITE-SPECIFIC DEFICIENCY, THE INSPECTOR SHALL IMMEDIATELY IMPLEMENT THE CORRECTIVE MEASURE AND NOTIFY THE OWNER OF THE CHANGE.

ONCE CONSTRUCTION HAS BEEN COMPLETED, LONG TERM MAINTENANCE OF THE FACILITIES WILL BE THE RESPONSIBILITY OF THE APPLICANT.

l. PRECONSTRUCTION CONFERENCE

PRIOR TO ANY CONSTRUCTION AT THE SITE, REPRESENTATIVES OF THE CONTRACTOR, TOWN OFFICIALS, AND THE SITE DESIGN ENGINEER SHALL ARRANGE FOR AND MEET WITH THE OWNER TO DISCUSS THE SCHEDULING OF THE SITE CONSTRUCTION, AND THE DESIGNATION OF THE RESPONSIBLE PARTIES FOR IMPLEMENTING THE PLAN. THIS MEETING SHALL BE SCHEDULED BY THE CONTRACTOR WITH REASONABLE ADVANCE NOTICE FOR ALL ATTENDEES. PRIOR TO THE MEETING THE CONTRACTOR SHALL PREPARE A DETAILED SCHEDULE AND A MARKED-UP SITE PLAN INDICATING AREAS AND COMPONENTS OF THE WORK AND KEY DATES SHOWING DATE OF DISTURBANCE AND COMPLETION OF THE WORK. IF BID THROUGH A GENERAL CONTRACTOR, THE GENERAL CONTRACTOR'S SUPERINTENDENT SHALL PROVIDE A WRITTEN ACKNOWLEDGEMENT THAT THE EROSION CONTROL PLAN HAS DEFINITIVE DATES FOR IMPLEMENTATION THAT MAY SUPERSEDE THE BUILDING SCHEDULE. THE CONTRACTOR SHALL CONDUCT A MEETING WITH EMPLOYEES AND SUB-CONTRACTORS TO REVIEW THE EROSION CONTROL PLAN, THE CONSTRUCTION TECHNIQUES WHICH WILL BE EMPLOYED TO IMPLEMENT THE PLAN, AND PROVIDE A LIST OF ATTENDEES AND ITEMS DISCUSSED AT THE MEETING TO THE OWNER. THREE COPIES OF THE SCHEDULE, THE CONTRACTOR'S MEETING MINUTES, AND MARKED-UP SITE PLAN SHALL BE PROVIDED TO THE OWNER AT THE PRECONSTRUCTION MEETING.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

EROSION CONTROL NOTES

DRAWING NUMBER:

C2.5

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NASHUA RIVER RAIL TRAIL

COMM OF MA

COMMONWEALTH OF MASSACHUSETTS

ALAN C. HOOT
106 PEABODY ST.
MAP 222-56

TO FARMER'S ROW
ROUTE 111

NHESP BOUNDARY

15' REAR/SIDE SETBACK

421'

50' RESOURCE BUFFER

100' RESOURCE BUFFER

50 SPACES FOR PERFORMERS AND STAFF (NOT PUBLIC)

50 OVERFLOW PARKING SPACES

EDMUND R. GUERARD
125 PEABODY ST.
MAP 222-63

TEMPLE DRIVE
(40' WIDE, PUBLIC)

EMERGENCY ACCESS ONLY

171 PAVED SPACES
(+12 UNPAVED SPACES)

189 PAVED SPACES
(+16 UNPAVED SPACES)

89 PAVED SPACES
(+4 UNPAVED SPACES)

1061'

LOADING/SERVICE AREA

137'

IAN R. MACKINTOSH
135 PEABODY ST.
MAP 222-67

50 OVERFLOW PARKING SPACES

50' FRONT SETBACK

APR LAND

BUS PARKING AND STAGING AREA

135 PAVED SPACES
(+12 UNPAVED SPACES)

RONALD C. ENGLADE
147 PEABODY ST
MAP 222-68

PEABODY STREET
(VARIABLE WIDTH, PUBLIC)

EMERGENCY ACCESS LOOP DESIGNED AS PEDESTRIAN PATH

LOADING/SERVICE AREA

177 OVERFLOW PARKING SPACES

Riding Arena

100' RESOURCE BUFFER

50' RESOURCE BUFFER

MELINDA E. STEWART
RICHARD HUSSONG
78 OLD AYER RD.
MAP 222-70

WETLAND RESOURCE AREA

261'

50' FRONT SETBACK

OLD AYER ROAD
(VARIABLE WIDTH, PUBLIC)

TO AYER AND POINTS SOUTH

MAIN SITE ENTRANCE

TO MAIN ST. / BOSTON ROAD ROUTE 119

JAMES BROOK

100 YEAR FEMA FLOODPLAIN

100 YEAR FEMA FLOODPLAIN

GRAPHIC SCALE
60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.

ZONING COMPLIANCE DATA

REFERENCE: ZONING BYLAW OF THE TOWN OF GROTON, MA

ZONE: RESIDENTIAL AGRICULTURAL DISTRICT

SCHEDULE OF ZONING INTENSITY, CHAPTER 218-20

CITERIA	STANDARD	PROVIDED
MINIMUM LOT AREA	80,000 SF	1,459,500 SF
MINIMUM FRONTAGE	225 FT	847 FT ON PEABODY 1,350 FT ON OLD AYER RD.
MAXIMUM HEIGHT	35ft OR 3 STORIES	70 FT*
MAXIMUM IMPERVIOUS COVERAGE	25%	32.4%*
MINIMUM OPEN SPACE	35%	67.6%
MAXIMUM WETLAND AREA OF OPEN SPACE	80%	21.7%
MINIMUM FRONT YARD SETBACK	50 FT	261 FT TO OLD AYER ROAD 1,061 FT TO PEABODY STREET
MINIMUM REAR YARD SETBACK	15 FT	421 FT
MINIMUM SIDE YARD SETBACK	15 FT	137 FT
NOTES:		

*TO BE ACCOMMODATED THROUGH APPLICATION OF THE "DOVER AMENDMENT" TO MGL CH. 40A-S3

OFF STREET PARKING, CHAPTER 218-23

REQUIRED			
BLDG USE	PUBLIC ASSEMBLY	SCHOOLS	TOTAL
MIN PARKING RATE	1/5 SEATS	1.5/CLASSROOM	
MAX PARKING RATE	1/3 SEATS	3/CLASSROOM	
UNITS	2,500 (INCL. OUTDOOR)	40	
MIN PARKING	500	60	560
MAX PARKING	834	120	954
PROVIDED			955 TOTAL SPACES
			678 PAVED SPACES
			277 OVERFLOW SPACES
TOTAL PROVIDED PARKING INCLUDES 16 ADA SPACES, 4 OF WHICH ARE VAN ACCESS ACCESSIBLE			

SIGNAGE, CHAPTER 192

FREESTANDING SIGNS	REQUIRED	PROVIDED
NUMBER	1	1
HEIGHT	10 FEET	710 FEET
AREA	20 S.F.	>20 S.F.
LIGHTING	EXTERNAL	EXTERNAL
BUILDING MOUNTED SIGNS		
IF BLDG IS >70' FROM STREET,		
NUMBER	1	TBD
AREA	60 S.F. FOR BLDG>10,000 S.F.	TBD

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The Music Center at Indian Hill

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DATE:

2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORTY
CIVIL
No. 48865
REGISTERED PROFESSIONAL ENGINEER

1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 60'

DRAWING NAME:

OVERALL SITE PLAN

DRAWING NUMBER:

C3.0

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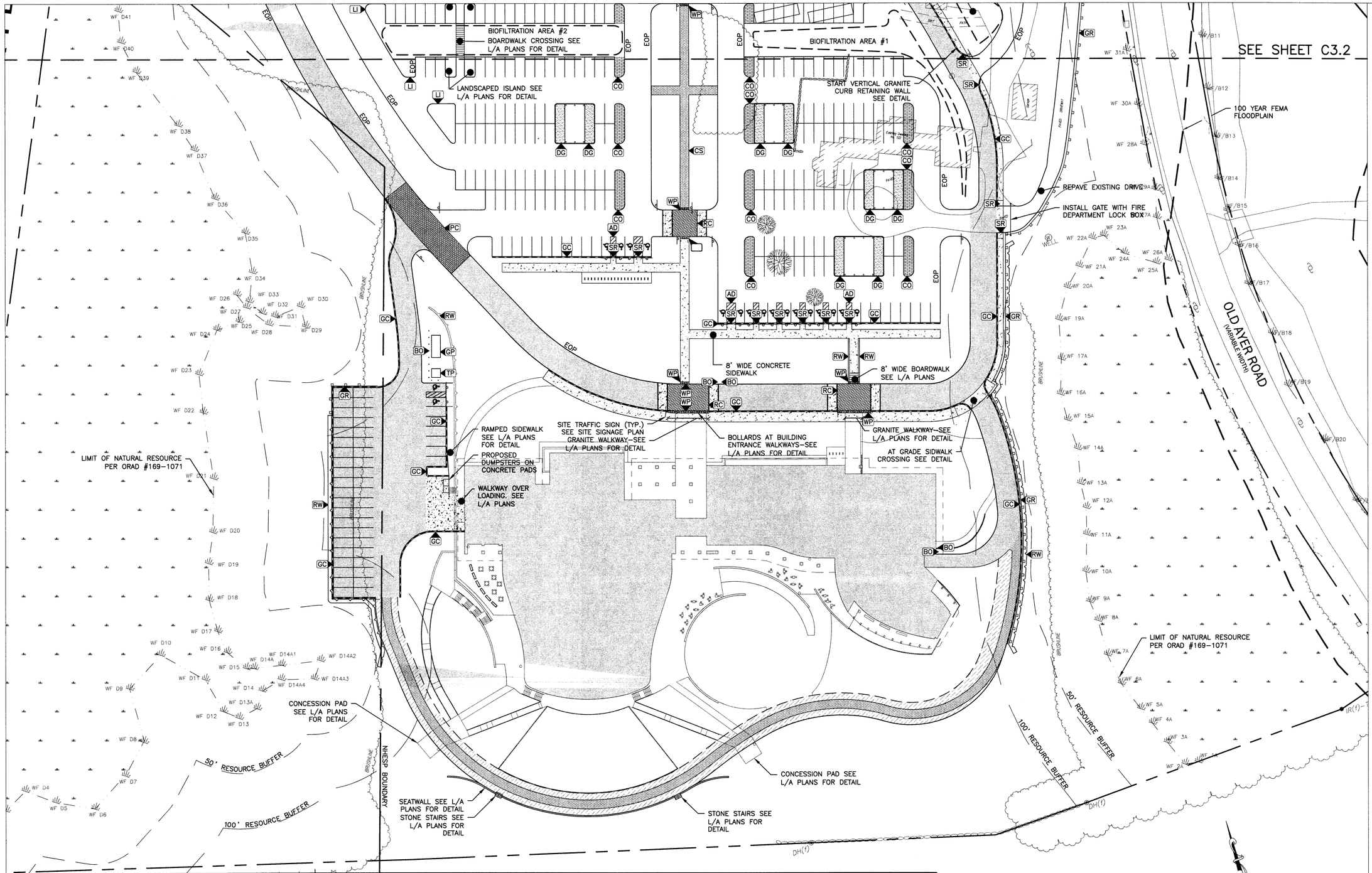

SURFACE TREATMENT LEGEND

- STANDARD DUTY BITUMINOUS PAVEMENT
- HEAVY DUTY BITUMINOUS PAVEMENT
- CHIP SEAL PAVEMENT
- CONCRETE PAVEMENT
- CONCRETE SIDEWALK
- DECOMPOSED GRANITE
- STRUCTURAL GRASS PAVER
- BRICK PAVER CROSSWALK

SMYBOLS LEGEND

ADA PARKING SPACE (SEE DETAIL)	AD	GATE	GA	RETAINING WALL	RW
BOLLARD	BO	GENERATOR PAD	GP	SIDEWALK RAMP	SR
COBBLESTONES	CO	GUIDE RAIL (WOOD)	GR	TRANSFORMER PAD	TP
CHIP SEAL PAVEMENT	CS	GRANITE CURB	GC	DETECTABLE WARNING PADS	WP
CROSSWALK	CW	PAVER CROSSWALK	PC		
DECOMPOSED GRANITE	DG	LANDSCAPED ISLAND	LI		
FREESTANDING FIELDSTONE WALL	SW	RAISED PEDESTRIAN CROSSING	RC		

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

SITE MATERIALS PLAN SOUTH

DRAWING NUMBER:

C3.1

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GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

TEMPLE DRIVE (40' WIDE, PUBLIC)

PEABODY STREET (VARIABLE WIDTH, PUBLIC)

50' RESOURCE BUFFER

100' RESOURCE BUFFER

NHESP BOUNDARY

SEE SHEET C3.1

GATE SEE L/A PLANS FOR DETAIL

SITE TRAFFIC SIGN (TYP.) SEE SITE SIGNAGE PLAN

SEDIMENT FOREBAY #1

WET BASIN #1

APPROXIMATE LOCATION OF OLD ROOT CELLAR

WETLAND CREATION #1

WETLAND CREATION #2

PROTECT EXISTING STONE WALL ALONG EDGE OF WALKWAY

CONSTRUCT BOARDWALK OVER DISCHARGE SWALE – SEE L/A PLANS FOR DETAIL

CONSTRUCT STONE WALL

END STONE WALL AT TANGENT

LANDSCAPED ISLAND SEE L/A PLANS FOR DETAIL

BIOFILTRATION AREA #3

BOARDWALK CROSSING SEE L/A PLANS FOR DETAIL

SEE L/A PLANS FOR PLANTING DETAIL IN ISLANDS

BIOFILTRATION AREA #2

BIOFILTRATION AREA #5

BIOFILTRATION AREA #1

BIOFILTRATION AREA #6

END VERTICAL GRANITE CURB RETAINING WALL SEE DETAIL

START VERTICAL GRANITE CURB RETAINING WALL SEE DETAIL

REPAVE EXISTING DRIVE

Riding Arena

OLD AYER ROAD (VARIABLE WIDTH, PUBLIC)

SMYBOLS LEGEND

ADA PARKING SPACE (SEE DETAIL)	AD
BOLLARD	BO
COBBLESTONES	CO
CHIP SEAL PAVEMENT	CS
CROSSWALK	CW
DECOMPOSED GRANITE	DG
FREESTANDING FIELDSTONE WALL	SW
GATE	GA
GENERATOR PAD	GP
GUIDE RAIL (WOOD)	GR
GRANITE CURB	GC
PAVER CROSSWALK	PC
LANDSCAPED ISLAND	LI
RAISED PEDESTRIAN CROSSING	RC
RETAINING WALL	RW
SIDEWALK RAMP	SR
TRANSFORMER PAD	TP
DETECTABLE WARNING PADS	WP

SURFACE TREATMENT LEGEND

- STANDARD DUTY BITUMINOUS PAVEMENT
- HEAVY DUTY BITUMINOUS PAVEMENT
- CHIP SEAL PAVEMENT
- CONCRETE PAVEMENT
- CONCRETE SIDEWALK
- DECOMPOSED GRANITE
- STRUCTURAL GRASS PAVER
- BRICK PAVER CROSSWALK

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DATE: 2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOFFY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

SITE MATERIALS PLAN NORTH

DRAWING NUMBER:

C3.2

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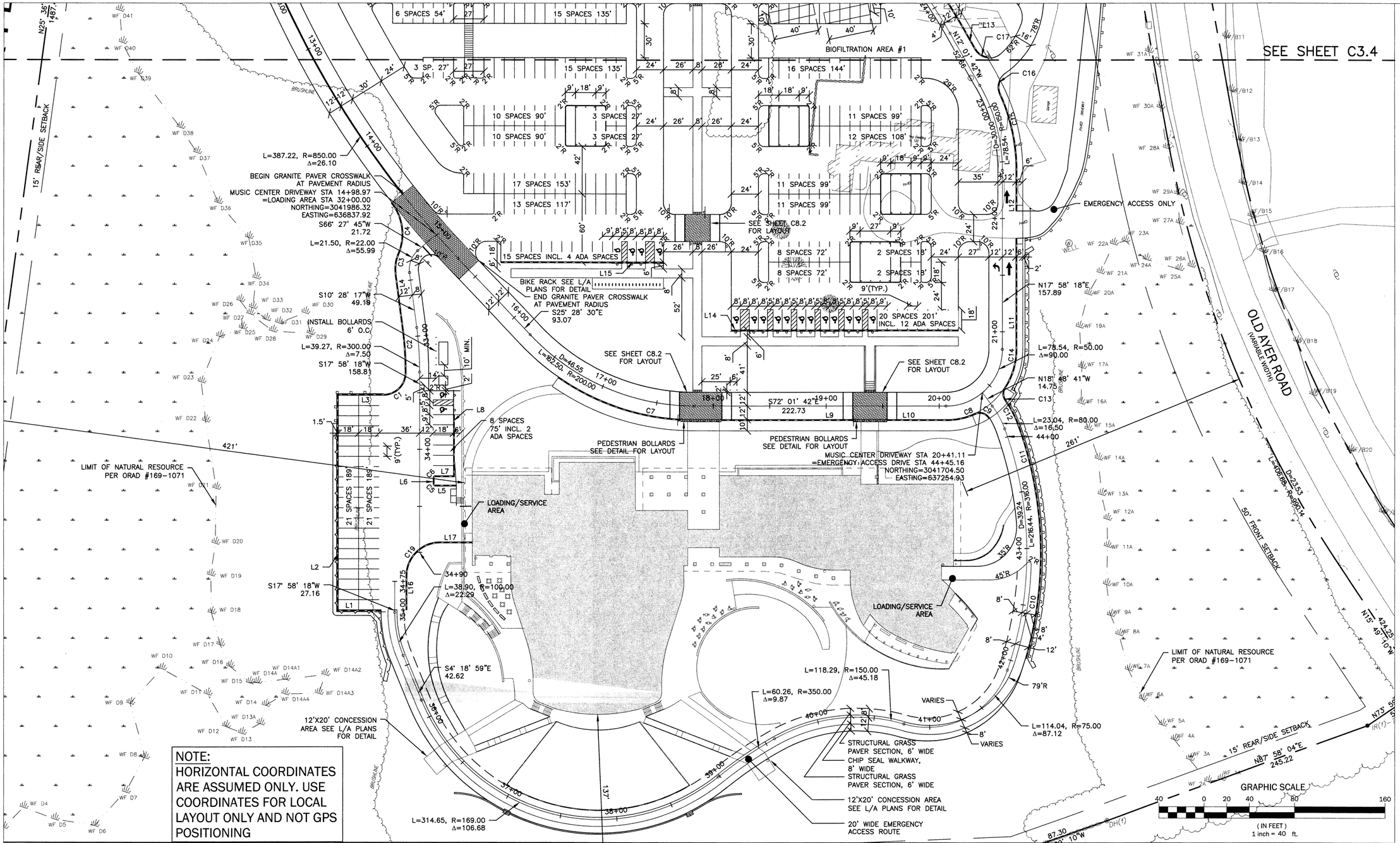

NOTE:
HORIZONTAL COORDINATES ARE ASSUMED ONLY. USE COORDINATES FOR LOCAL LAYOUT ONLY AND NOT GPS POSITIONING

CURB DATA TABLE

LINE#/CURVE#	LENGTH	DELTA/BEARING	RADIUS	NORTHING START	EASTING START	NORTHING END	EASTING END
C1	31.42	90.00	20.00	3041878.24	636774.98	3041865.38	636749.79
C2	37.70	7.50	288.00	3041915.29	636784.41	3041878.77	636775.16
C3	18.13	30.55	34.00	3041979.80	636801.13	3041963.66	636793.35
C4	48.26	61.44	45.00	3042025.03	636809.36	3041979.80	636801.13
C5	3.14	90.00	2.00	3041777.61	636767.57	3041775.09	636768.86
C6	3.14	90.00	2.00	3041783.65	636771.64	3041782.37	636769.12
C7	114.85	31.04	212.00	3041833.06	636902.28	3041764.85	636992.93
C8	26.56	24.54	62.00	3041691.80	637216.87	3041689.18	637243.10
C9	14.49	83.04	10.00	3041689.18	637243.10	3041681.59	637253.96
C10	66.68	11.65	328.00	3041528.69	637250.76	3041470.20	637218.98
C11	143.13	25.00	328.00	3041668.44	637275.89	3041528.69	637250.76
C12	23.91	14.89	92.00	3041691.94	637271.85	3041668.44	637275.89

CURB DATA TABLE

LINE#/CURVE#	LENGTH	DELTA/BEARING	RADIUS	NORTHING START	EASTING START	NORTHING END	EASTING END
C13	11.89	68.10	10.00	3041702.65	637275.10	3041691.94	637271.85
C14	35.64	32.93	62.00	3041731.64	637294.98	3041702.65	637275.10
C15	69.20	24.47	162.00	3041950.16	637350.55	3041881.83	637343.69
C16	13.39	51.16	15.00	3041962.40	637354.79	3041950.16	637350.55
C17	13.91	53.13	15.00	3041994.32	637341.91	3041983.84	637350.28
C18	74.48	7.33	582.00	3042088.73	637316.93	3042017.08	637337.07
C19	47.12	90.00	30.00	3041707.97	636719.75	3041727.25	636757.55
L1	38.00	S72° 01' 42"E		3041697.95	636653.42	3041686.22	636689.57
L2	189.00	S17° 58' 18"W		3041877.73	636711.74	3041697.95	636653.42
L3	40.00	N72° 01' 42"W		3041865.38	636749.79	3041877.73	636711.74
L4	49.19	S10° 28' 17"W		3041963.66	636793.35	3041915.29	636784.41
L5	18.50	S72° 01' 42"E		3041775.09	636768.86	3041769.39	636786.46

CURB DATA TABLE

LINE#/CURVE#	LENGTH	DELTA/BEARING	RADIUS	NORTHING START	EASTING START	NORTHING END	EASTING END
L6	5.00	S17° 58' 18"W		3041782.37	636769.12	3041777.61	636767.57
L7	16.00	N72° 01' 42"W		3041778.72	636786.86	3041783.65	636771.64
L8	54.00	S17° 58' 18"W		3041830.08	636803.52	3041778.72	636786.86
L9	116.28	S72° 01' 42"E		3041753.06	637028.01	3041717.18	637138.61
L10	52.27	S72° 01' 42"E		3041707.93	637167.15	3041691.80	637216.87
L11	98.11	S17° 58' 18"W		3041824.96	637325.25	3041731.64	637294.98
L12	35.77	S17° 58' 18"W		3041881.83	637343.69	3041847.80	637332.65
L13	23.27	S12° 01' 42"E		3042017.08	637337.07	3041994.32	637341.91
L14	201.00	N72° 01' 42"W		3041763.55	637251.71	3041825.57	637060.52
L15	144.00	N72° 01' 42"W		3041901.15	637021.96	3041945.58	636884.98
L16	30.00	N17° 58' 18"E		3041679.43	636710.50	3041707.97	636719.75
L17	28.64	S72° 01' 42"E		3041727.25	636757.55	3041718.41	636784.79

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DATE: 2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORFY
CIVIL
No. 48865
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1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

SITE LAYOUT PLAN SOUTH

DRAWING NUMBER:

C3.3

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GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

EDMUND R. GUERARD
125 PEABODY ST.
MAP 222-63

IAN R. MACKINTOSH
135 PEABODY ST.
MAP 222-67

78 OLD AYER RD.
MAP 222-70

TEMPLE DRIVE
(40' WIDE, PUBLIC)

PEABODY STREET
(VARIABLE WIDTH, PUBLIC)

PEABODY STREET ACCESS DRIVE STA 30+00.00
NORTHING=3042825.78
EASTING=637062.77

NORTHING=3042913.75
EASTING=636875.89

S61° 55' 11"E
107.71

S67° 55' 11"E
187.02

S22° 16' 10"W
2.87

S77° 44' 11"E
440.96

S78° 23' 40"E
111.10

L=45.59, R=24.88
Δ=104.99

TIE LINE FROM PROPERTY CORNER TO STA 0+00
N25° 41' 24"E 213.13'

NORTHING=3042640.90
EASTING=637700.50

S27° 41' 50"W
74.21

CONSTRUCT SIDEWALK 1.5' OFF PROPERTY LINE

50' FRONT SETBACK

15' REAR/SIDE SETBACK

BRUSHLINE

APPROXIMATE LOC. OF OLD ROOT CELLAR

L=127.74, R=300.00
D=24.40

L=124.02, R=400.00
D=17.76

N72° 01' 42"W
18.13

MUSIC CENTER DRIVEWAY STA 6+30.38
=PEABODY STREET ACCESS DRIVE STA 31+30.62
NORTHING=3042698.46
EASTING=637038.60

MUSIC CENTER DRIVEWAY STA 2+83.34
=MUSIC CENTER DRIVEWAY STA 29+76.90
NORTHING=3042557.74
EASTING=637368.58

N32° 09' 39"E
32.19

L=144.79, R=624.00
Δ=13.29

MUSIC CENTER DRIVEWAY STA 0+00.00
NORTHING=3042449.13
EASTING=637608.09

N67° 33' 33"W
157.48

N27° 41' 50"E
96.93

STA:8+00.00
OFF:17.00'R

L=543.33, R=290.00
D=107.35

L=34.56, R=100.00
Δ=19.80

L=330.01, R=250.00
Δ=75.63

L=265.22, R=1298.81
D=11.70

N15° 59' 50"E
195.78

TIE LINE FROM PROPERTY CORNER TO STA 0+00
N17° 46' 21"E 195.21'

S15° 59' 50"W
68.85

NORTHING=3042263.26
EASTING=637548.51

L=203.99, R=1410.99
Δ=8.28

L=95.31, R=1350.99
D=8.28

S7° 42' 50"W
199.47

N25° 36' 20"E
1487.43

S0° 37' 33"W
77.24

N23° 40' 13"W
90.68

L=387.22, R=850.00
D=26.10

SEE DETAIL FOR LAYOUT

L=115.82, R=570.00
Δ=11.64

BIOFILTRATION AREA #1

Riding Arena

OLD AYER ROAD
(VARIABLE WIDTH, PUBLIC)

JAMES BROOK

COMMONWEALTH OF MASSACHUSETTS

TRAIL

VARIABLE

SEE SHEET C3.3

NOTE:
HORIZONTAL COORDINATES ARE ASSUMED ONLY. USE COORDINATES FOR LOCAL LAYOUT ONLY AND NOT GPS POSITIONING

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE: 2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORFY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

SITE LAYOUT PLAN NORTH

DRAWING NUMBER:

C3.4

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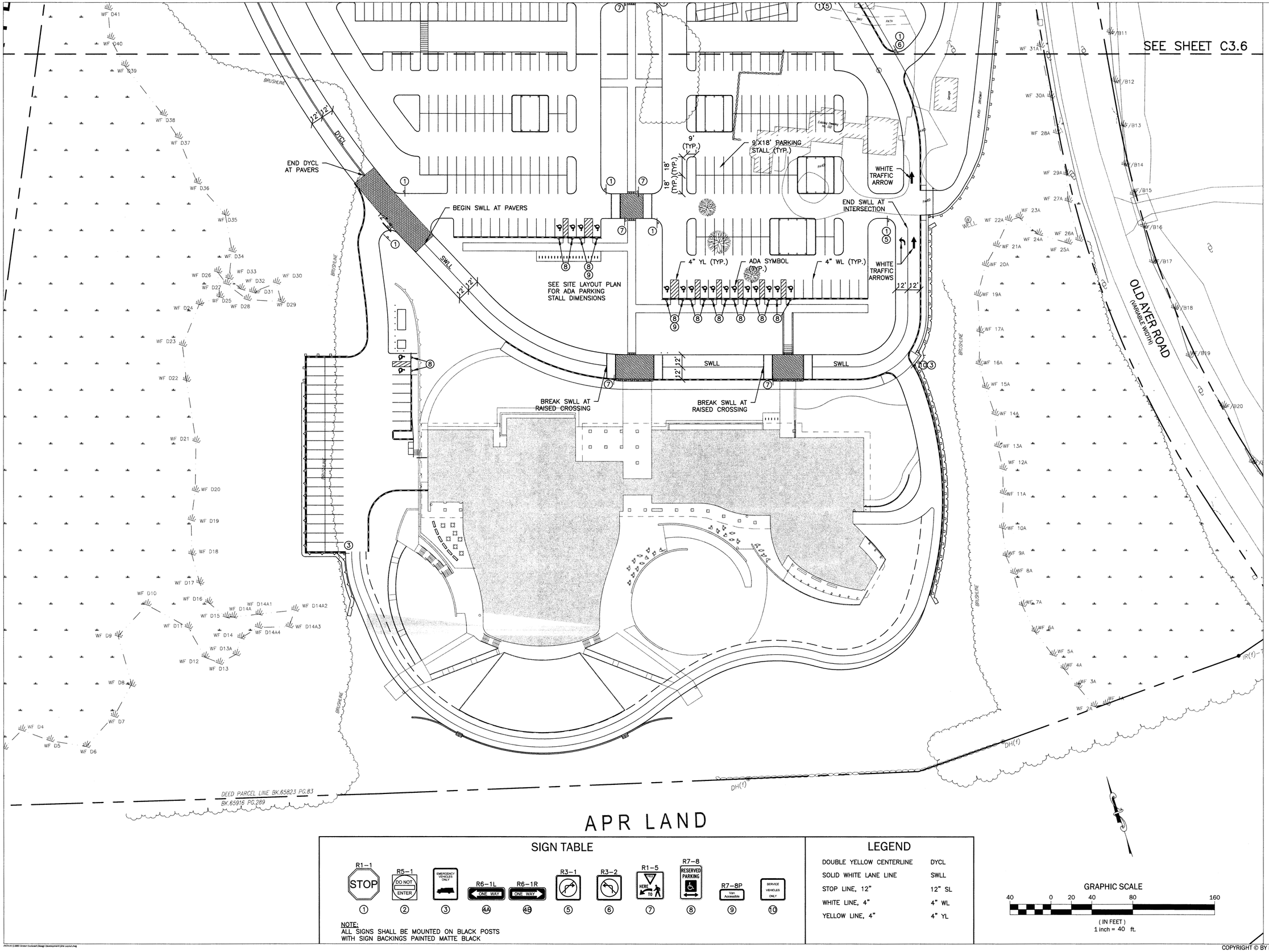

SIGN TABLE

R1-1 STOP	R5-1 DO NOT ENTER	EMERGENCY VEHICLES ONLY	R6-1L ONE WAY	R6-1R ONE WAY	R3-1	R3-2	R1-5 HERE TO	R7-8 RESERVED PARKING	R7-8P Van Accessible	SERVICE VEHICLES ONLY
①	②	③	4A	4B	⑤	⑥	⑦	⑧	⑨	⑩

NOTE:
ALL SIGNS SHALL BE MOUNTED ON BLACK POSTS WITH SIGN BACKINGS PAINTED MATTE BLACK

LEGEND

DOUBLE YELLOW CENTERLINE	DYCL
SOLID WHITE LANE LINE	SWLL
STOP LINE, 12"	12" SL
WHITE LINE, 4"	4" WL
YELLOW LINE, 4"	4" YL

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

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PHONE 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE: 2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORFEY
CIVIL
No. 48865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

SIGNAGE AND STRIPING PLAN SOUTH

DRAWING NUMBER:

C3.5

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GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

TEMPLE DRIVE (40' WIDE, PUBLIC)

PEABODY STREET (VARIABLE WIDTH, PUBLIC)

BREAK DYCL AT INTERSECTION

BREAK DYCL AT INTERSECTION AND PEDESTRIAN CROSSING

END DYCL AT SL

DYCL

12" SL

PROJECT SIGN– SEE L/A PLANS FOR ACTUAL LOCATION

APPROXIMATE LOC. OF OLD ROOT CELLAR

4" WL (TYP.)

10'X40' BUS PARKING STALL (TYP.)

4" RED LINE (TYP.)
4" WL (TYP.)

Riding Arena

OLD AYER ROAD (VARIABLE WIDTH, PUBLIC)

JAMES BROOK

BRUSHLINE

WF D56 WF D55 WF D54 WF D53 WF D52 WF D51 WF D50 WF D49 WF D48 WF D46 WF D45 WF D44 WF D43 WF D42 WF D41 WF D40 WF D39

WF 14B WF 12B WF 11B WF 10B WF 9B WF 7B WF 5B WF 4B WF 3B WF 28 WF 1B WF 34 WF 33A WF 32A WF 31A WF 30A

WF/B1 WF/B2 WF/B3 WF/B4 WF/B5 WF/B6 WF/B7 WF/B8 WF/B9 WF/B10 WF/B11 WF/B12

SEE SHEET C3.5

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The Music Center at Indian Hill

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Groton, Massacusetts

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DATE: 2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORICY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

SIGNAGE AND STRIPING PLAN NORTH

DRAWING NUMBER:

C3.6

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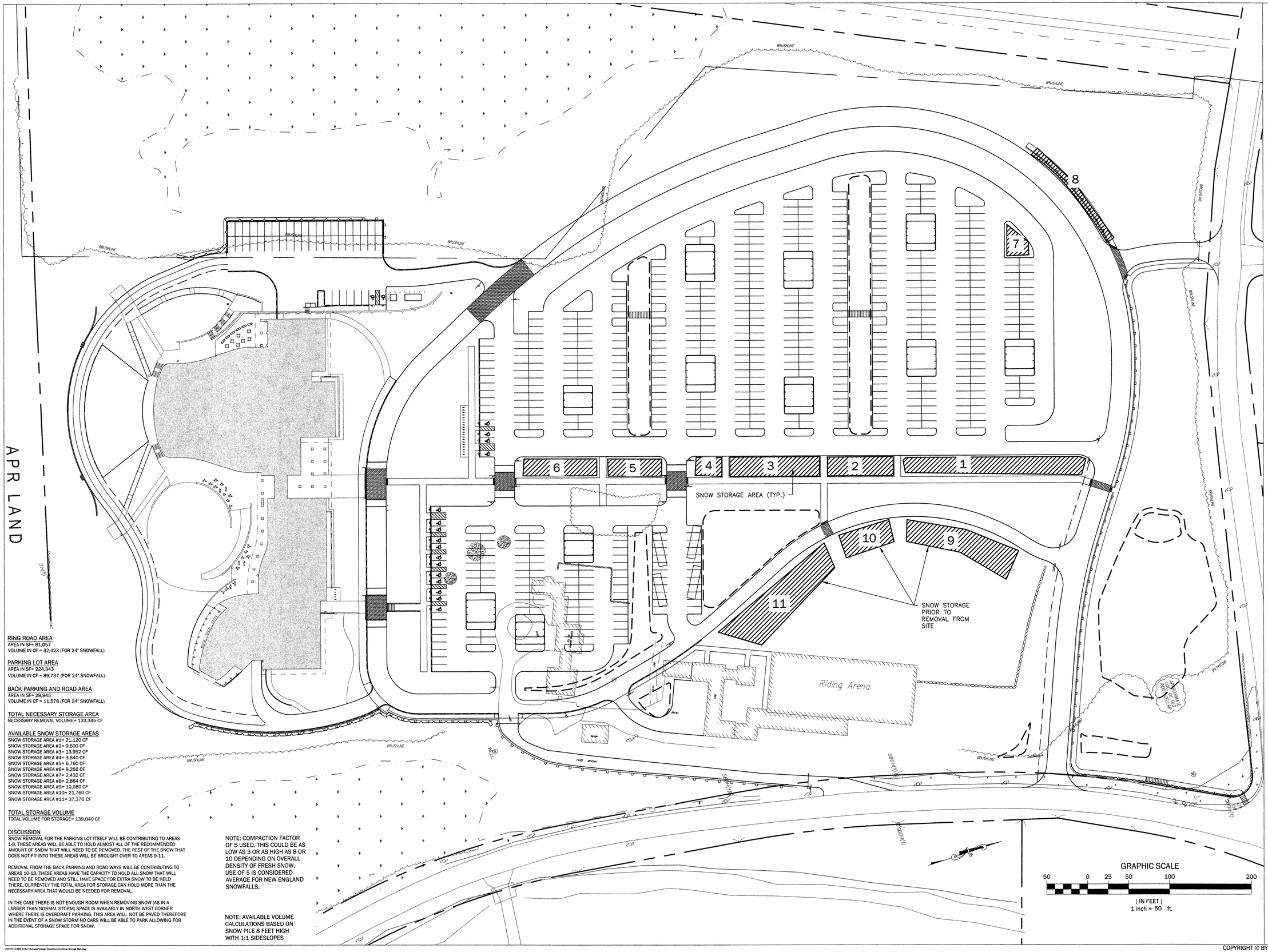

RING ROAD AREA
AREA IN SF= 81,057
VOLUME IN CF = 32,423 (FOR 24" SNOWFALL)

PARKING LOT AREA
AREA IN SF= 224,343
VOLUME IN CF = 89,737 (FOR 24" SNOWFALL)

BACK PARKING AND ROAD AREA
AREA IN SF= 28,945
VOLUME IN CF = 11,578 (FOR 24" SNOWFALL)

TOTAL NECESSARY STORAGE AREA
NECESSARY REMOVAL VOLUME= 133,345 CF

AVAILABLE SNOW STORAGE AREAS
SNOW STORAGE AREA #1= 21,120 CF
SNOW STORAGE AREA #2= 9,600 CF
SNOW STORAGE AREA #3= 13,952 CF
SNOW STORAGE AREA #4= 3,840 CF
SNOW STORAGE AREA #5= 6,760 CF
SNOW STORAGE AREA #6= 9,256 CF
SNOW STORAGE AREA #7= 2,432 CF
SNOW STORAGE AREA #8= 2,864 CF
SNOW STORAGE AREA #9= 10,080 CF
SNOW STORAGE AREA #10= 21,760 CF
SNOW STORAGE AREA #11= 37,376 CF

TOTAL STORAGE VOLUME
TOTAL VOLUME FOR STORAGE= 139,040 CF

DISCUSSION
SNOW REMOVAL FOR THE PARKING LOT ITSELF WILL BE CONTRIBUTING TO AREAS 1-9. THESE AREAS WILL BE ABLE TO HOLD ALMOST ALL OF THE RECOMMENDED AMOUNT OF SNOW THAT WILL NEED TO BE REMOVED. THE REST OF THE SNOW THAT DOES NOT FIT INTO THESE AREAS WILL BE BROUGHT OVER TO AREAS 9-11.

REMOVAL FROM THE BACK PARKING AND ROAD WAYS WILL BE CONTRIBUTING TO AREAS 10-13. THESE AREAS HAVE THE CAPACITY TO HOLD ALL SNOW THAT WILL NEED TO BE REMOVED AND STILL HAVE SPACE FOR EXTRA SNOW TO BE HELD THERE. CURRENTLY THE TOTAL AREA FOR STORAGE CAN HOLD MORE THAN THE NECESSARY AREA THAT WOULD BE NEEDED FOR REMOVAL.

IN THE CASE THERE IS NOT ENOUGH ROOM WHEN REMOVING SNOW (AS IN A LARGER THAN NORMAL STORM) SPACE IS AVAILABLY IN NORTH WEST CORNER WHERE THERE IS OVERDRAFT PARKING. THIS AREA WILL NOT BE PAVED THEREFORE IN THE EVENT OF A SNOW STORM NO CARS WILL BE ABLE TO PARK ALLOWING FOR ADDITIONAL STORAGE SPACE FOR SNOW.

NOTE: COMPACTION FACTOR OF 5 USED. THIS COULD BE AS LOW AS 3 OR AS HIGH AS 8 OR 10 DEPENDING ON OVERALL DENSITY OF FRESH SNOW. USE OF 5 IS CONSIDERED AVERAGE FOR NEW ENGLAND SNOWFALLS.

NOTE: AVAILABLE VOLUME CALCULATIONS BASED ON SNOW PILE 8 FEET HIGH WITH 1:1 SIDESLOPES

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DATE: 2/23/17

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORFY
CIVIL
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REGISTERED PROFESSIONAL ENGINEER
1.12.17

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1"=50'

DRAWING NAME:

SNOW STORAGE PLAN

DRAWING NUMBER:

C3.7

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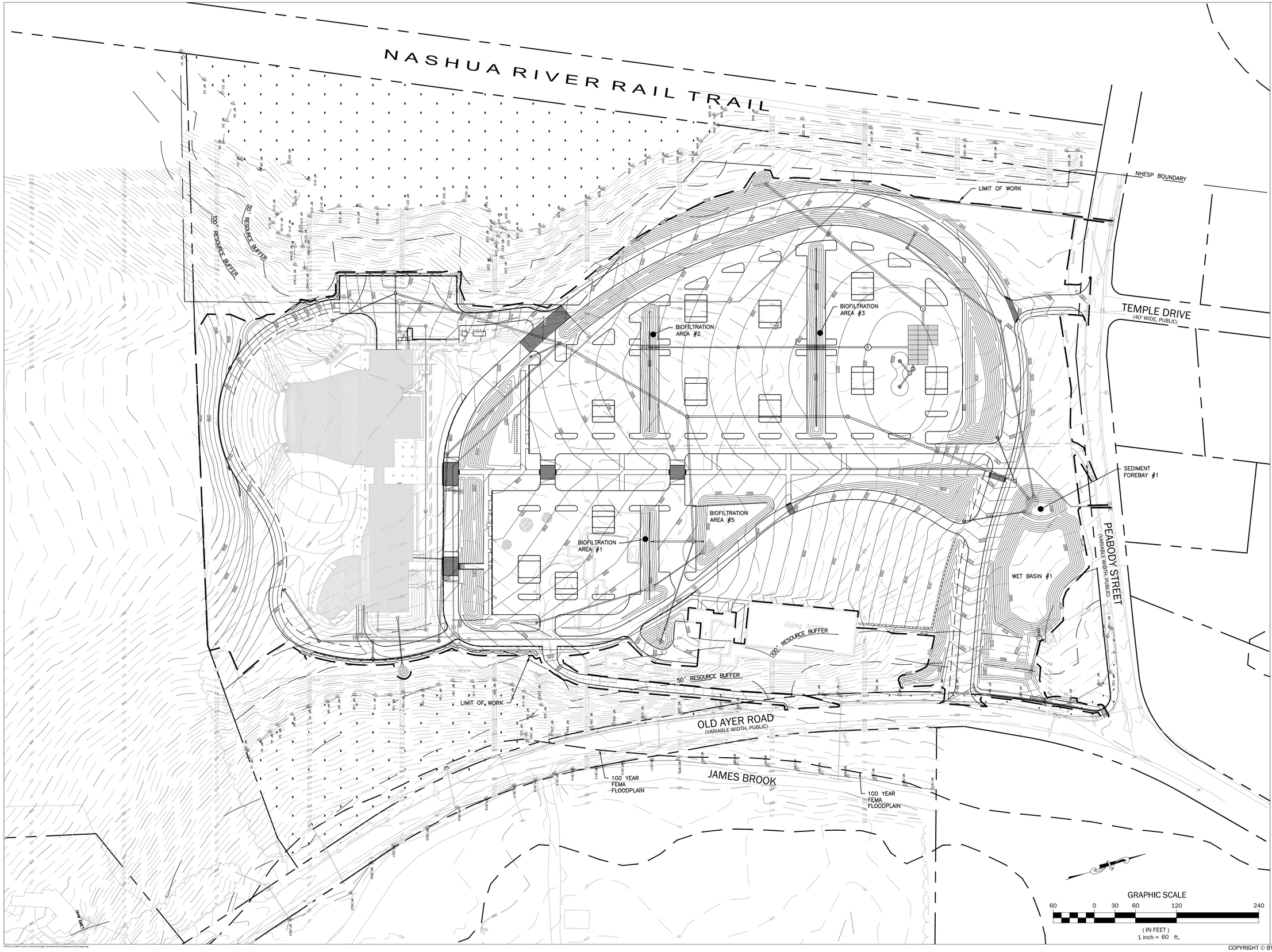

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 60'

DRAWING NAME:

OVERALL GRADING AND DRAINAGE PLAN

DRAWING NUMBER:

C4.0

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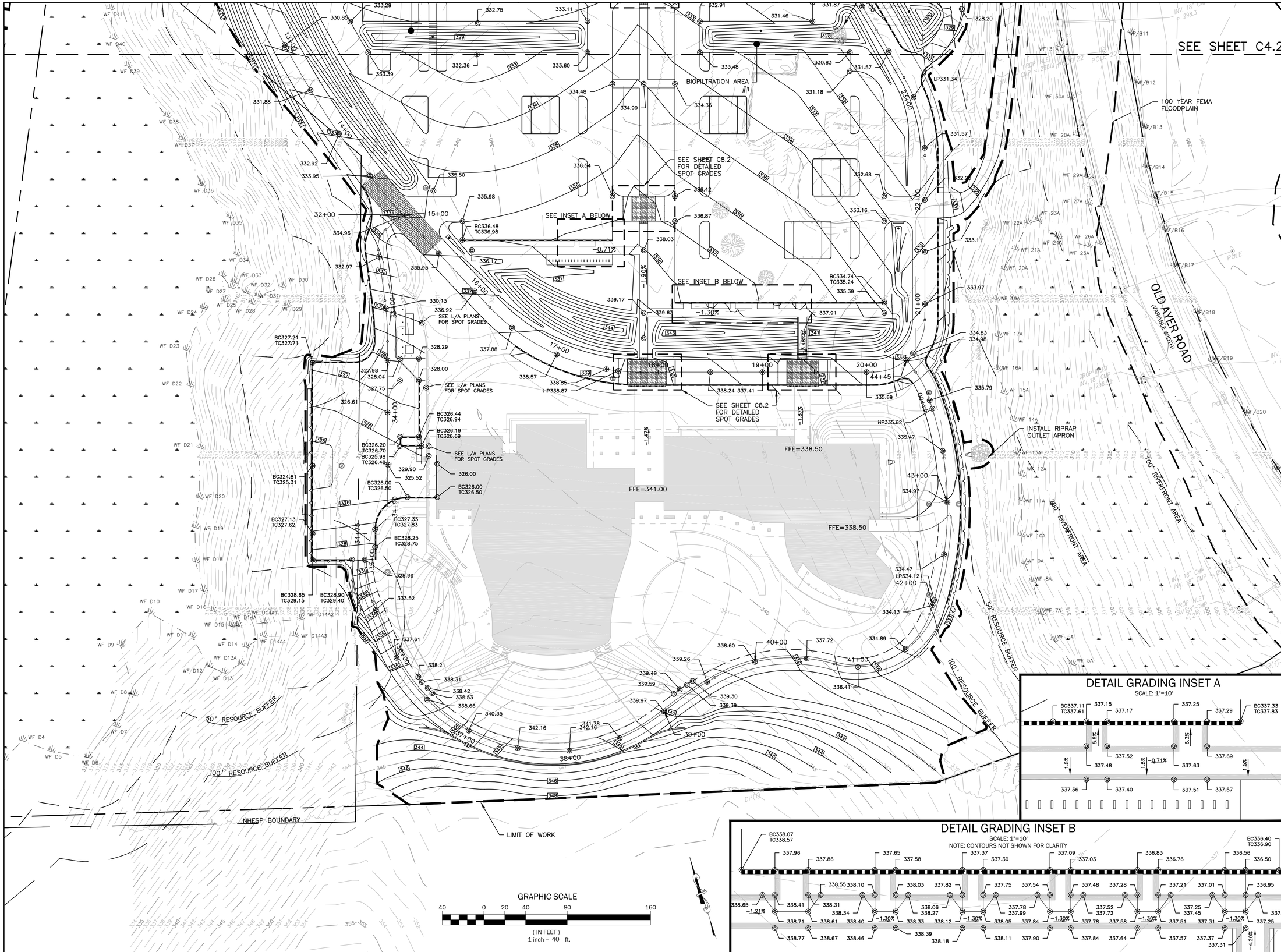

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

GRADING PLAN SOUTH

DRAWING NUMBER:

C4.1

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DATE:

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TODD P. MOREY
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1.12.17

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

GRADING PLAN NORTH

DRAWING NUMBER:

C4.2

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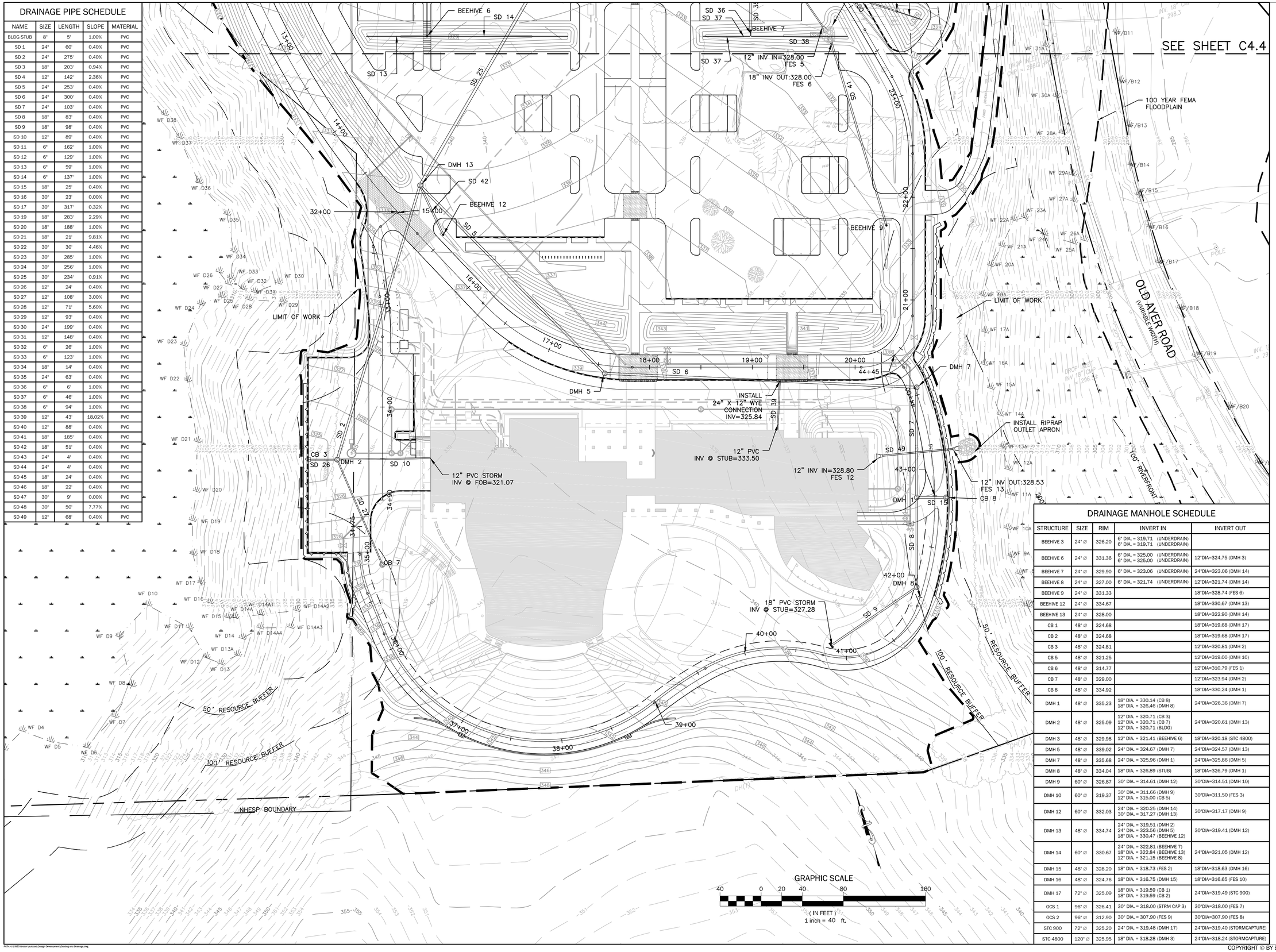
DRAINAGE PIPE SCHEDULE

NAME	SIZE	LENGTH	SLOPE	MATERIAL
BLDG STUB	8"	5'	1.00%	PVC
SD 1	24"	60'	0.40%	PVC
SD 2	24"	275'	0.40%	PVC
SD 3	18"	203'	0.94%	PVC
SD 4	12"	142'	2.36%	PVC
SD 5	24"	253'	0.40%	PVC
SD 6	24"	300'	0.40%	PVC
SD 7	24"	103'	0.40%	PVC
SD 8	18"	83'	0.40%	PVC
SD 9	18"	98'	0.40%	PVC
SD 10	12"	89'	0.40%	PVC
SD 11	6"	162'	1.00%	PVC
SD 12	6"	129'	1.00%	PVC
SD 13	6"	59'	1.00%	PVC
SD 14	6"	137'	1.00%	PVC
SD 15	18"	25'	0.40%	PVC
SD 16	30"	23'	0.00%	PVC
SD 17	30"	317'	0.32%	PVC
SD 19	18"	283'	2.29%	PVC
SD 20	18"	188'	1.00%	PVC
SD 21	18"	21'	9.81%	PVC
SD 22	30"	30'	4.46%	PVC
SD 23	30"	285'	1.00%	PVC
SD 24	30"	256'	1.00%	PVC
SD 25	30"	234'	0.91%	PVC
SD 26	12"	24'	0.40%	PVC
SD 27	12"	108'	3.00%	PVC
SD 28	12"	71'	5.60%	PVC
SD 29	12"	93'	0.40%	PVC
SD 30	24"	199'	0.40%	PVC
SD 31	12"	148'	0.40%	PVC
SD 32	6"	26'	1.00%	PVC
SD 33	6"	123'	1.00%	PVC
SD 34	18"	14'	0.40%	PVC
SD 35	24"	63'	0.40%	PVC
SD 36	6"	6'	1.00%	PVC
SD 37	6"	46'	1.00%	PVC
SD 38	6"	94'	1.00%	PVC
SD 39	12"	43'	18.02%	PVC
SD 40	12"	88'	0.40%	PVC
SD 41	18"	185'	0.40%	PVC
SD 42	18"	51'	0.40%	PVC
SD 43	24"	4'	0.40%	PVC
SD 44	24"	4'	0.40%	PVC
SD 45	18"	24'	0.40%	PVC
SD 46	18"	22'	0.40%	PVC
SD 47	30"	9'	0.00%	PVC
SD 48	30"	50'	7.77%	PVC
SD 49	12"	68'	0.40%	PVC



DRAINAGE MANHOLE SCHEDULE

STRUCTURE	SIZE	RIM	INVERT IN	INVERT OUT
BEEHIVE 3	24" ∅	326.20	6" DIA. = 319.71 (UNDERDRAIN) 6" DIA = 319.71 (UNDERDRAIN)	
BEEHIVE 6	24" ∅	331.36	6" DIA. = 325.00 (UNDERDRAIN) 6" DIA = 325.00 (UNDERDRAIN)	12"DIA=324.75 (DMH 3)
BEEHIVE 7	24" ∅	329.90	6" DIA. = 323.06 (UNDERDRAIN)	24"DIA=323.06 (DMH 14)
BEEHIVE 8	24" ∅	327.00	6" DIA. = 321.74 (UNDERDRAIN)	12"DIA=321.74 (DMH 14)
BEEHIVE 9	24" ∅	331.33		18"DIA=328.74 (FES 6)
BEEHIVE 12	24" ∅	334.67		18"DIA=330.67 (DMH 13)
BEEHIVE 13	24" ∅	328.00		18"DIA=322.90 (DMH 14)
CB 1	48" ∅	324.68		18"DIA=319.68 (DMH 17)
CB 2	48" ∅	324.68		18"DIA=319.68 (DMH 17)
CB 3	48" ∅	324.81		12"DIA=320.81 (DMH 2)
CB 5	48" ∅	321.25		12"DIA=319.00 (DMH 10)
CB 6	48" ∅	314.77		12"DIA=310.79 (FES 1)
CB 7	48" ∅	329.00		12"DIA=323.94 (DMH 2)
CB 8	48" ∅	334.92		18"DIA=330.24 (DMH 1)
DMH 1	48" ∅	335.23	18" DIA. = 330.14 (CB 8) 18" DIA. = 326.46 (DMH 8)	24"DIA=326.36 (DMH 7)
DMH 2	48" ∅	325.09	12" DIA. = 320.71 (CB 3) 12" DIA. = 320.71 (CB 7) 12" DIA. = 320.71 (BLDG)	24"DIA=320.61 (DMH 13)
DMH 3	48" ∅	329.98	12" DIA. = 321.41 (BEEHIVE 6)	18"DIA=320.18 (STC 4800)
DMH 5	48" ∅	339.02	24" DIA. = 324.67 (DMH 7)	24"DIA=324.57 (DMH 13)
DMH 7	48" ∅	335.68	24" DIA. = 325.96 (DMH 1)	24"DIA=325.86 (DMH 5)
DMH 8	48" ∅	334.04	18" DIA. = 326.89 (STUB)	18"DIA=326.79 (DMH 1)
DMH 9	60" ∅	326.87	30" DIA. = 314.61 (DMH 12)	30"DIA=314.51 (DMH 10)
DMH 10	60" ∅	319.37	30" DIA. = 311.66 (DMH 9) 12" DIA. = 315.00 (CB 5)	30"DIA=311.50 (FES 3)
DMH 12	60" ∅	332.03	24" DIA. = 320.25 (DMH 14) 30" DIA. = 317.27 (DMH 13)	30"DIA=317.17 (DMH 9)
DMH 13	48" ∅	334.74	24" DIA. = 319.51 (DMH 2) 24" DIA. = 323.56 (DMH 5) 18" DIA. = 330.47 (BEEHIVE 12)	30"DIA=319.41 (DMH 12)
DMH 14	60" ∅	330.67	24" DIA. = 322.81 (BEEHIVE 7) 18" DIA. = 322.84 (BEEHIVE 13) 12" DIA. = 321.15 (BEEHIVE 8)	24"DIA=321.05 (DMH 12)
DMH 15	48" ∅	328.20	18" DIA. = 318.73 (FES 2)	18"DIA=318.63 (DMH 16)
DMH 16	48" ∅	324.76	18" DIA. = 316.75 (DMH 15)	18"DIA=316.65 (FES 10)
DMH 17	72" ∅	325.09	18" DIA. = 319.59 (CB 1) 18" DIA. = 319.59 (CB 2)	24"DIA=319.49 (STC 900)
OCS 1	96" ∅	326.41	30" DIA. = 318.00 (STRM CAP 3)	30"DIA=318.00 (FES 7)
OCS 2	96" ∅	312.90	30" DIA. = 307.90 (FES 9)	30"DIA=307.90 (FES 8)
STC 900	72" ∅	325.20	24" DIA. = 319.48 (DMH 17)	24"DIA=319.40 (STORMCAPTURE)
STC 4800	120" ∅	325.95	18" DIA. = 318.28 (DMH 3)	24"DIA=318.24 (STORMCAPTURE)

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

DRAINAGE PLAN SOUTH

DRAWING NUMBER:

C4.3

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DRAINAGE PIPE SCHEDULE

NAME	SIZE	LENGTH	SLOPE	MATERIAL
BLDG STUB	8"	5'	1.00%	PVC
SD 1	24"	60'	0.40%	PVC
SD 2	24"	275'	0.40%	PVC
SD 3	18"	203'	0.94%	PVC
SD 4	12"	142'	2.36%	PVC
SD 5	24"	253'	0.40%	PVC
SD 6	24"	300'	0.40%	PVC
SD 7	24"	103'	0.40%	PVC
SD 8	18"	83'	0.40%	PVC
SD 9	18"	98'	0.40%	PVC
SD 10	12"	89'	0.40%	PVC
SD 11	6"	162'	1.00%	PVC
SD 12	6"	129'	1.00%	PVC
SD 13	6"	59'	1.00%	PVC
SD 14	6"	137'	1.00%	PVC
SD 15	18"	25'	0.40%	PVC
SD 16	30"	23'	0.00%	PVC
SD 17	30"	317'	0.32%	PVC
SD 19	18"	283'	2.29%	PVC
SD 20	18"	188'	1.00%	PVC
SD 21	18"	21'	9.81%	PVC
SD 22	30"	30'	4.46%	PVC
SD 23	30"	285'	1.00%	PVC
SD 24	30"	256'	1.00%	PVC
SD 25	30"	234'	0.91%	PVC
SD 26	12"	24'	0.40%	PVC
SD 27	12"	108'	3.00%	PVC
SD 28	12"	71'	5.60%	PVC
SD 29	12"	93'	0.40%	PVC
SD 30	24"	199'	0.40%	PVC
SD 31	12"	148'	0.40%	PVC
SD 32	6"	26'	1.00%	PVC
SD 33	6"	123'	1.00%	PVC
SD 34	18"	14'	0.40%	PVC
SD 35	24"	63'	0.40%	PVC
SD 36	6"	6'	1.00%	PVC
SD 37	6"	46'	1.00%	PVC
SD 38	6"	94'	1.00%	PVC
SD 39	12"	43'	18.02%	PVC
SD 40	12"	88'	0.40%	PVC
SD 41	18"	185'	0.40%	PVC
SD 42	18"	51'	0.40%	PVC
SD 43	24"	4'	0.40%	PVC
SD 44	24"	4'	0.40%	PVC
SD 45	18"	24'	0.40%	PVC
SD 46	18"	22'	0.40%	PVC
SD 47	30"	9'	0.00%	PVC
SD 48	30"	50'	7.77%	PVC
SD 49	12"	68'	0.40%	PVC

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

TEMPLE DRIVE
(40' WIDE, PUBLIC)

PEABODY STREET
(VARIABLE WIDTH, PUBLIC)

OLD AYER ROAD
(VARIABLE WIDTH, PUBLIC)

JAMES BROOK

Riding Arena

LIMIT OF WORK

12" INV OUT:310.42
FES 1

18" INV OUT:310.16
FES 10

30" INV OUT:310.16
FES 3

30" INV IN=307.90
FES 9

OCS 2

FES 9

SD 48

SD 47

SD 19

SD 22

DMH 10

SD 28

CB 5

DMH 16

SD 29

CB 6

30" INV OUT:304.00
INSTALL RIPRAP
OUTLET PROTECTION
FES 8

UNDERGROUND STORMWATER
MANAGEMENT SYSTEM. SEE
SHEET C7.1 FOR LAYOUT DATA

24" PVC STORM
INV @ SYSTEM=319.38

SD 20

OCS 1

SD 16

SD 43

STC 900

SD 44

DMH 17

30" PVC STORM
INV @ SYSTEM=318.00

DMH 15

SD 21

CB 1

CB 2

SD 45

24" PVC STORM
INV @ SYSTEM=318.00

SD 46

SD 1

18" INV IN=320.80
FES 2

STC 4800

SD 3

DMH 9

SD 23

SD 17

SD 11

SD 12

BEEHIVE 3

INSTALL RIPRAP
OUTLET APRON

30" INV OUT:317.00
FES 7

SD 24

DMH 3

SD 4

INSTALL RIPRAP
OUTLET APRON

12" INV OUT:327.65
FES 4

SD 33

BEEHIVE 13

SD 34

SD 30

DMH 14

SD 31

SD 40

BEEHIVE 8
SD 32

SD 36
SD 37

SD 35

BEEHIVE 7

SD 38

SD 37

12" INV IN=328.00
FES 5

18" INV OUT:328.00
FES 6

SD 41

INSTALL RIPRAP
OUTLET APRON

DMH 12

BEEHIVE 6

SD 14

SD 13

SD 25

100' RESOURCE BUFFER

50' RESOURCE BUFFER

200' RIVERFRONT AREA

100 YEAR FEMA
FLOODPLAIN

ANHESP BOUNDARY

SEE SHEET C4.3

DRAINAGE MANHOLE SCHEDULE

STRUCTURE	SIZE	RIM	INVERT IN	INVERT OUT
BEEHIVE 3	24" ∅	326.20	6" DIA. = 319.71 (UNDERDRAIN) 6" DIA. = 319.71 (UNDERDRAIN)	
BEEHIVE 6	24" ∅	331.36	6" DIA. = 325.00 (UNDERDRAIN) 6" DIA. = 325.00 (UNDERDRAIN)	12"DIA=324.75 (DMH 3)
BEEHIVE 7	24" ∅	329.90	6" DIA. = 323.06 (UNDERDRAIN)	24"DIA=323.06 (DMH 14)
BEEHIVE 8	24" ∅	327.00	6" DIA. = 321.74 (UNDERDRAIN)	12"DIA=321.74 (DMH 14)
BEEHIVE 9	24" ∅	331.33		18"DIA=328.74 (FES 6)
BEEHIVE 12	24" ∅	334.67		18"DIA=330.67 (DMH 13)
BEEHIVE 13	24" ∅	328.00		18"DIA=322.90 (DMH 14)
CB 1	48" ∅	324.68		18"DIA=319.68 (DMH 17)
CB 2	48" ∅	324.68		18"DIA=319.68 (DMH 17)
CB 3	48" ∅	324.81		12"DIA=320.81 (DMH 2)
CB 5	48" ∅	321.25		12"DIA=319.00 (DMH 10)
CB 6	48" ∅	314.77		12"DIA=310.79 (FES 1)
CB 7	48" ∅	329.00		12"DIA=323.94 (DMH 2)
CB 8	48" ∅	334.92		18"DIA=330.24 (DMH 1)
DMH 1	48" ∅	335.23	18" DIA. = 330.14 (CB 8) 18" DIA. = 326.46 (DMH 8)	24"DIA=326.36 (DMH 7)
DMH 2	48" ∅	325.09	12" DIA. = 320.71 (CB 3) 12" DIA. = 320.71 (CB 7) 12" DIA. = 320.71 (BLDG)	24"DIA=320.61 (DMH 13)
DMH 3	48" ∅	329.98	12" DIA. = 321.41 (BEEHIVE 6)	18"DIA=320.18 (STC 4800)
DMH 5	48" ∅	339.02	24" DIA. = 324.67 (DMH 7)	24"DIA=324.57 (DMH 13)
DMH 7	48" ∅	335.68	24" DIA. = 325.96 (DMH 1)	24"DIA=325.86 (DMH 5)
DMH 8	48" ∅	334.04	18" DIA. = 326.89 (STUB)	18"DIA=326.79 (DMH 1)
DMH 9	60" ∅	326.87	30" DIA. = 314.61 (DMH 12)	30"DIA=314.51 (DMH 10)
DMH 10	60" ∅	319.37	30" DIA. = 311.66 (DMH 9) 12" DIA. = 315.00 (CB 5)	30"DIA=311.50 (FES 3)
DMH 12	60" ∅	332.03	24" DIA. = 320.25 (DMH 14) 30" DIA. = 317.27 (DMH 13)	30"DIA=317.17 (DMH 9)
DMH 13	48" ∅	334.74	24" DIA. = 319.51 (DMH 2) 24" DIA. = 323.56 (DMH 5) 18" DIA. = 330.47 (BEEHIVE 12)	30"DIA=319.41 (DMH 12)
DMH 14	60" ∅	330.67	24" DIA. = 322.81 (BEEHIVE 7) 18" DIA. = 322.84 (BEEHIVE 13) 12" DIA. = 321.15 (BEEHIVE 8)	24"DIA=321.05 (DMH 12)
DMH 15	48" ∅	328.20	18" DIA. = 318.73 (FES 2)	18"DIA=318.63 (DMH 16)
DMH 16	48" ∅	324.76	18" DIA. = 316.75 (DMH 15)	18"DIA=316.65 (FES 10)
DMH 17	72" ∅	325.09	18" DIA. = 319.59 (CB 1) 18" DIA. = 319.59 (CB 2)	24"DIA=319.49 (STC 900)
OCS 1	96" ∅	326.41	30" DIA. = 318.00 (STRM CAP 3)	30"DIA=318.00 (FES 7)
OCS 2	96" ∅	312.90	30" DIA. = 307.90 (FES 9)	30"DIA=307.90 (FES 8)
STC 900	72" ∅	325.20	24" DIA. = 319.48 (DMH 17)	24"DIA=319.40 (STORMCAPTURE)
STC 4800	120" ∅	325.95	18" DIA. = 318.28 (DMH 3)	24"DIA=318.24 (STORMCAPTURE)

BEALS ASSOCIATES INC.
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PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

DRAINAGE PLAN NORTH

DRAWING NUMBER:

C4.4

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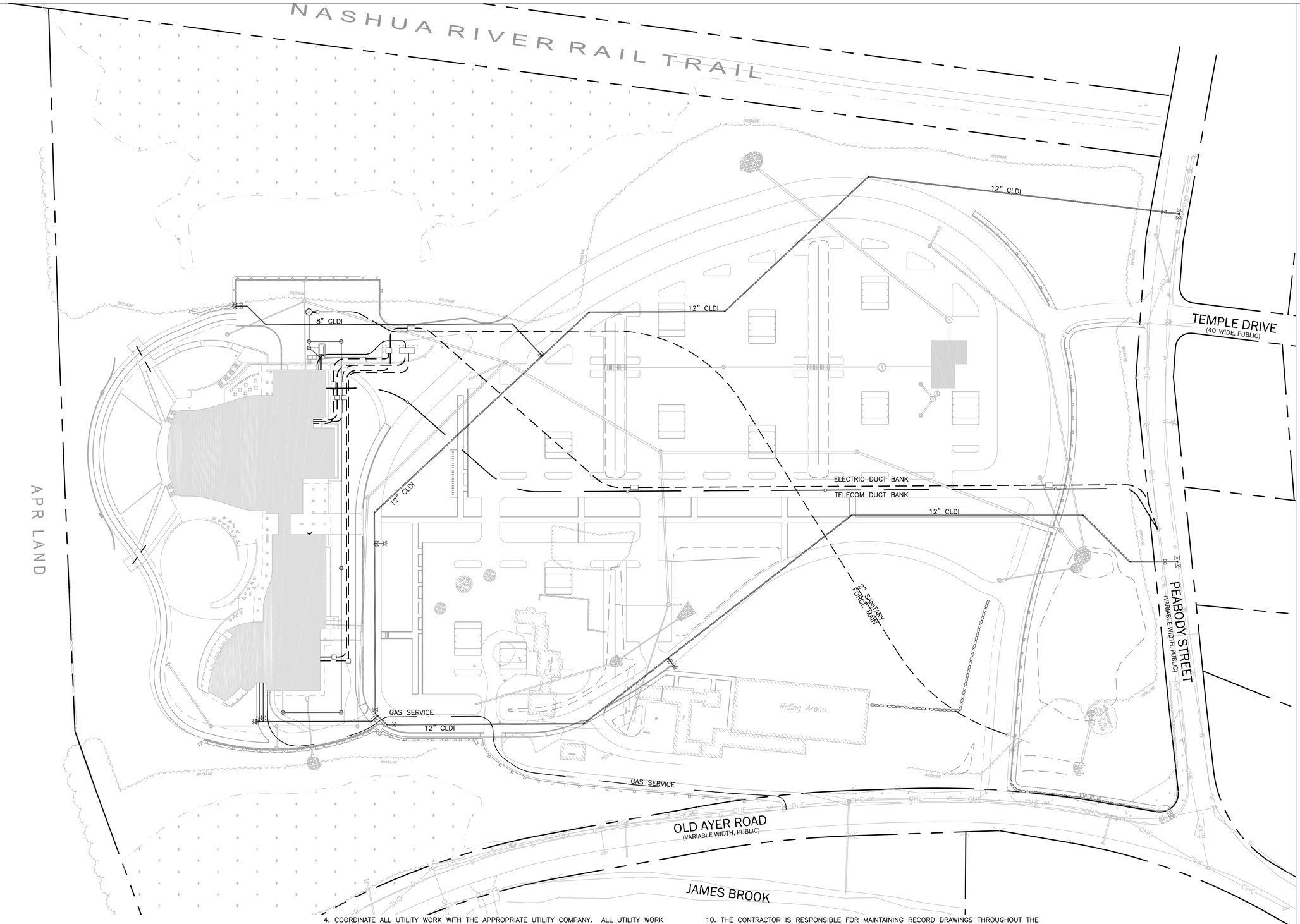

UTILITY NOTES

1. ALL WATER UTILITY MATERIALS AND INSTALLATION METHODS SHALL CONFORM TO LOCAL PUBLIC WORKS DEPARTMENT STANDARDS. ALL WATER DISTRIBUTION PIPING SHALL BE CLASS 52 DUCTILE IRON PIPE. DISINFECTION OF WATER LINES SHALL CONFORM TO AWWA STANDARDS. THE CONTRACTOR SHALL COORDINATE ALL CONNECTIONS TO THE MUNICIPAL SYSTEM WITH THE LOCAL PUBLIC WORKS DEPARTMENT.
2. THE LOCATION OF THE ELECTRIC, TELEPHONE, CABLE AND FIRE ALARM SERVICES ARE APPROXIMATE. THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE UTILITY COMPANIES FOR EXACT LOCATIONS.
3. SANITARY SEWER PIPE SHALL BE POLYVINYL CHLORIDE (PVC) PIPE MEETING THE REQUIREMENTS OF SDR-35 FOR GRAVITY PIPE AND SDR-11 FOR FORCEMAIN PIPE UNLESS OTHERWISE NOTED ON THE PLANS. ALL SEWER MATERIALS AND INSTALLATION METHODS SHALL CONFORM TO THE LOCAL DEPARTMENT OF PUBLIC WORKS STANDARDS. THE CONTRACTOR SHALL COORDINATE ALL CONNECTIONS TO THE MUNICIPAL SYSTEM WITH THE LOCAL PUBLIC WORKS DEPARTMENT.
4. COORDINATE ALL UTILITY WORK WITH THE APPROPRIATE UTILITY COMPANY. ALL UTILITY WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE STANDARDS OF THAT UTILITY.
5. UNDERGROUND ELECTRICAL, TELEPHONE, CABLE AND FIRE ALARM CONDUIT SHALL CONFORM TO THE MATERIAL REQUIREMENTS OF THAT UTILITY.
6. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLE.
7. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL BOXES, FITTINGS, CONNECTORS, COVER PLATES AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THE DRAWINGS TO RENDER INSTALLATION OF THE UTILITIES COMPLETE AND OPERATIONAL AT NO EXTRA EXPENSE TO THE OWNER.
8. A 10 FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18 INCH OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER AND SANITARY SEWER CROSSINGS.
9. THRUST BLOCKS OR LOCKING RETAINER GLANDS SHALL BE PLACED ON THE WATER DISTRIBUTION LINES AT ALL BENDS, TEES, FIRE HYDRANTS, VALVES, CHANGES IN DIRECTION, ETC. THE THRUST BLOCKS OR LOCKING RETAINER GLANDS SHALL MEET THE REQUIREMENTS OF THE LOCAL PUBLIC WORKS DEPARTMENT AND THE PROJECT SPECIFICATIONS.
10. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RECORD DRAWINGS THROUGHOUT THE PROJECT AND PROVIDING THE OWNER WITH A SET OF THE FINAL RECORD DRAWINGS WHEN THE PROJECT IS COMPLETE.
11. ALL TRENCHING, PIPE LAYING AND BACKFILLING SHALL BE IN ACCORDANCE WITH FEDERAL OSHA REGULATIONS.

GRAPHIC SCALE

60 0 30 60 120 240

(IN FEET)
1 inch = 60 ft.

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The Music Center at Indian Hill

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 60'

DRAWING NAME:

OVERALL UTILITY PLAN

DRAWING NUMBER:

C5.0

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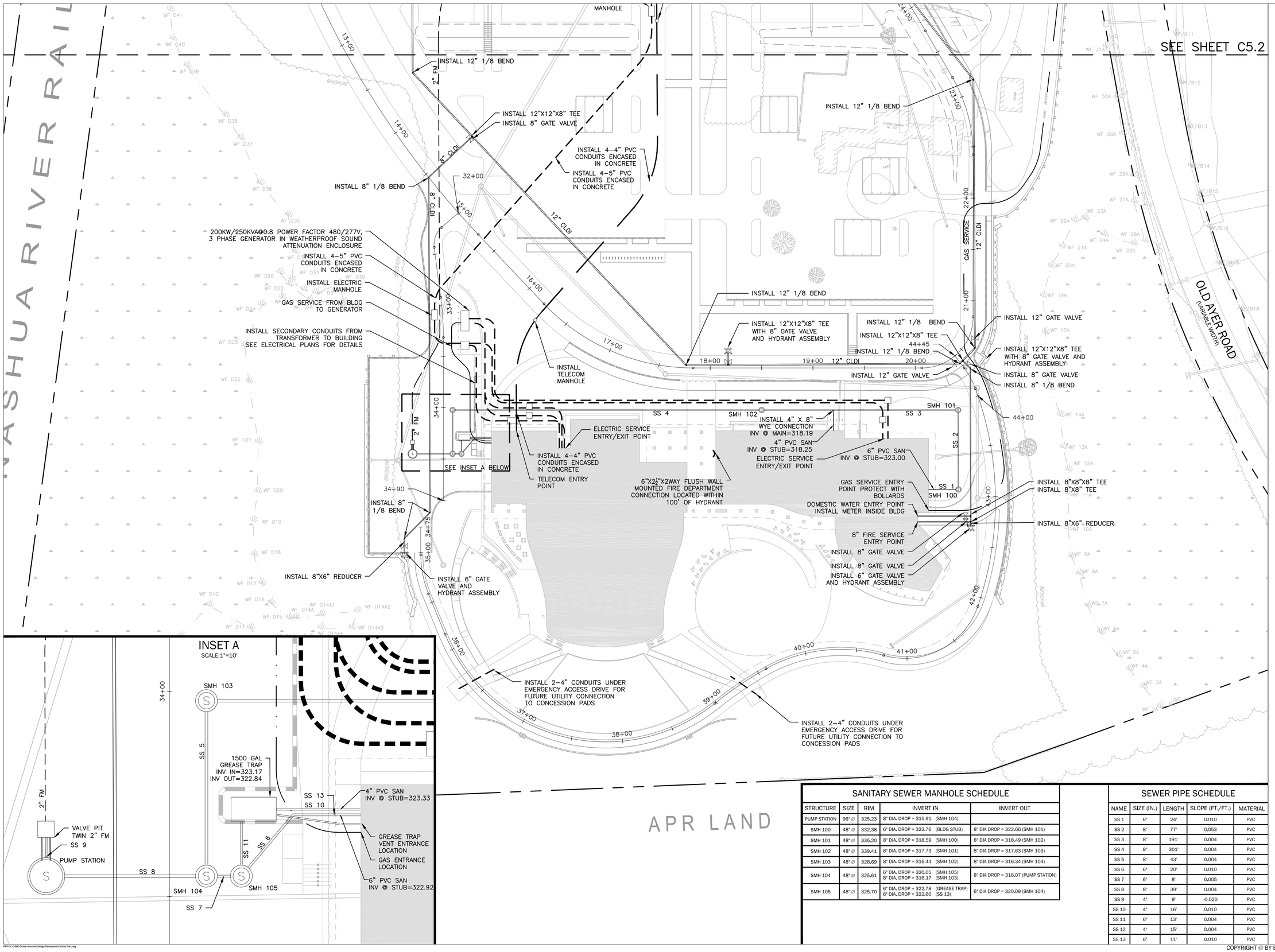

SANITARY SEWER MANHOLE SCHEDULE

STRUCTURE	SIZE	RIM	INVERT IN	INVERT OUT
PUMP STATION	96" ∅	325.23	8" DIA. DROP = 315.91 (SMH 104)	
SMH 100	48" ∅	332.38	6" DIA. DROP = 322.76 (BLDG STUB)	8" DIA DROP = 322.66 (SMH 101)
SMH 101	48" ∅	335.20	8" DIA. DROP = 318.59 (SMH 100)	8" DIA DROP = 318.49 (SMH 102)
SMH 102	48" ∅	339.41	8" DIA. DROP = 317.73 (SMH 101)	8" DIA DROP = 317.63 (SMH 103)
SMH 103	48" ∅	326.69	8" DIA. DROP = 316.44 (SMH 102)	8" DIA DROP = 316.34 (SMH 104)
SMH 104	48" ∅	325.61	6" DIA. DROP = 320.05 (SMH 105) 8" DIA. DROP = 316.17 (SMH 103)	8" DIA DROP = 316.07 (PUMP STATION)
SMH 105	48" ∅	325.70	6" DIA. DROP = 322.78 (GREASE TRAP) 6" DIA. DROP = 322.60 (SS 13)	6" DIA DROP = 320.09 (SMH 104)

SEWER PIPE SCHEDULE

NAME	SIZE (IN.)	LENGTH	SLOPE (FT./FT.)	MATERIAL
SS 1	6"	24'	0.010	PVC
SS 2	8"	77'	0.053	PVC
SS 3	8"	191'	0.004	PVC
SS 4	8"	301'	0.004	PVC
SS 5	8"	43'	0.004	PVC
SS 6	6"	20'	0.010	PVC
SS 7	6"	8'	0.005	PVC
SS 8	8"	39'	0.004	PVC
SS 9	4"	9'	-0.020	PVC
SS 10	4"	16'	0.010	PVC
SS 11	6"	13'	0.004	PVC
SS 12	4"	15'	0.004	PVC
SS 13	6"	11'	0.010	PVC

BEALS ASSOCIATES INC.
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PHONE: 617-242-1120

The Music Center at Indian Hill

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

UTILITY PLAN SOUTH

DRAWING NUMBER:

C5.1

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INSTALL 12" GATE VALVE

INSTALL 12"X12"X12" TEE ON EXISTING 12" WATER MAIN IN PEABODY STREET. TEST PIT TO VERIFY LOCATION

INSTALL 12" GATE VALVE

TEMPLE DRIVE
(40' WIDE, PUBLIC)

INSTALL ELECTRIC AND TELECOMMUNICATIONS SERVICE DROPS AT EXISTING UTILITY POLE. EXTEND UNDERGROUND ELECTRIC AND TELECOM DUCT BANKS ONTO PROPERTY

INSTALL (2) 12" GATE VALVE

RELOCATE UTILITY POLE

PEABODY STREET
(VARIABLE WIDTH, PUBLIC)

INSTALL 12"X12"X12" TEE ON EXISTING 12" WATER MAIN IN PEABODY STREET. TEST PIT TO VERIFY LOCATION

INSTALL 12" GATE VALVE

INSTALL 4-5" PVC CONDUITS ENCASED IN CONCRETE

INSTALL 4-4" PVC CONDUITS ENCASED IN CONCRETE

INSTALL 12" 1/8 BEND

INSTALL 12" 1/8 BEND

UTILITIES LOCATED WITHIN THIS ZONE MAY BE SHIFTED UP TO 10' TO AVOID UNNECESSARY REMOVAL OF EXISTING TREES

INSTALL TELECOM MANHOLE

CONTINUE FORCE MAIN WITHIN ABANDONED 6" WATER MAIN ALONG OLD AYER ROAD TO NEW TERMINOUS MANHOLE AT OLD AYER ROAD/BOSTON ROAD TRIANGLE. GRAVITY FLOW FROM TERMINOUS MANHOLE TO EXISTING GRAVITY SEWER

INSTALL ELECTRIC MANHOLE

INSTALL 12" 1/8 BEND

2" SANITARY FORCE MAIN

INSTALL 12" 1/8 BEND

INSTALL TELECOM MANHOLE

INSTALL 4-4" PVC CONDUITS ENCASED IN CONCRETE

INSTALL 4-5" PVC CONDUITS ENCASED IN CONCRETE

INSTALL 8"X6" REDUCER

INSTALL 12"X12"X8" TEE WITH 6" GATE VALVE AND HYDRANT ASSEMBLY

INSTALL ELECTRIC MANHOLE

INSTALL TELECOM MANHOLE

INSTALL 12" 1/8 BEND

INSTALL 12" 1/8 BEND

CONNECT TO EXISTING GAS MAIN. CONTRACTOR SHALL PROVIDE ALL EXCAVATION AND BACKFILL FOR GAS SERVICE. UTILITY TO INSTALL SERVICE PIPE AND MAKE ALL CONNECTIONS

12" CLDI

2" FM

2" SANITARY FORCE MAIN

TELECOM DUCT BANK

ELECTRIC DUCT BANK

GAS SERVICE

OLD AYER ROAD
(VARIABLE WIDTH, PUBLIC)

JAMES BROOK

Riding Arena

APPROXIMATE LOCATION OF OLD ROOT CELLAR

SEE SHEET C5.1

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COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

UTILITY PLAN NORTH

DRAWING NUMBER:

C5.2

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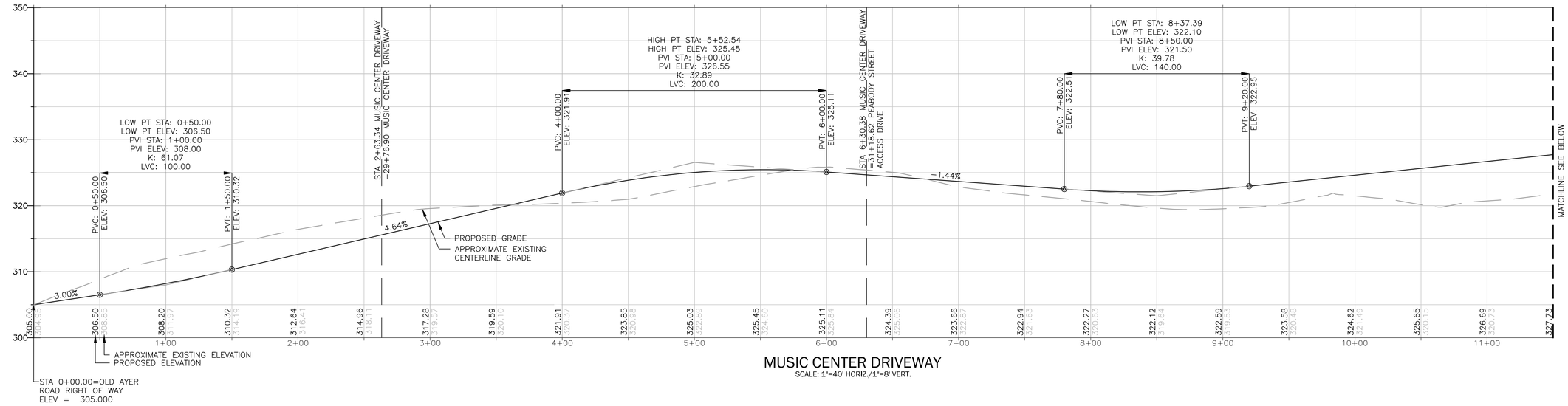
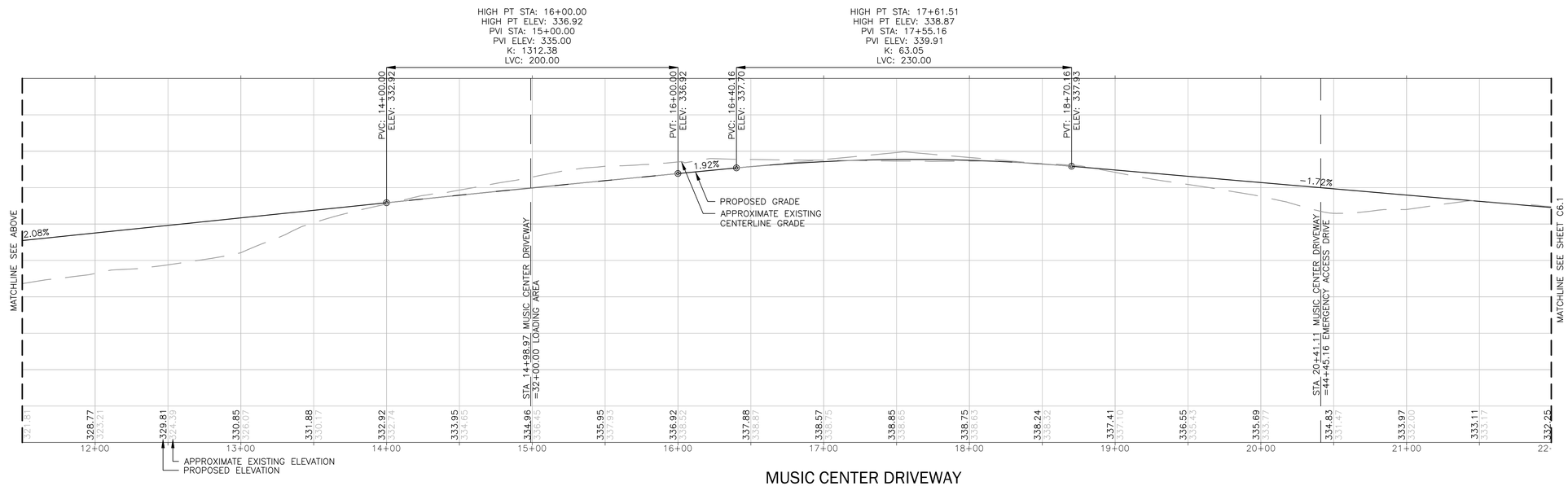


MUSIC CENTER DRIVEWAY
SCALE: 1"=40' HORIZ./1"=8' VERT.



MUSIC CENTER DRIVEWAY
SCALE: 1"=40' HORIZ./1"=8' VERT.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

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TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER

1.12.17

PERMIT DOCUMENTS

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

ACCESS DRIVE PROFILES

DRAWING NUMBER:

C6.0

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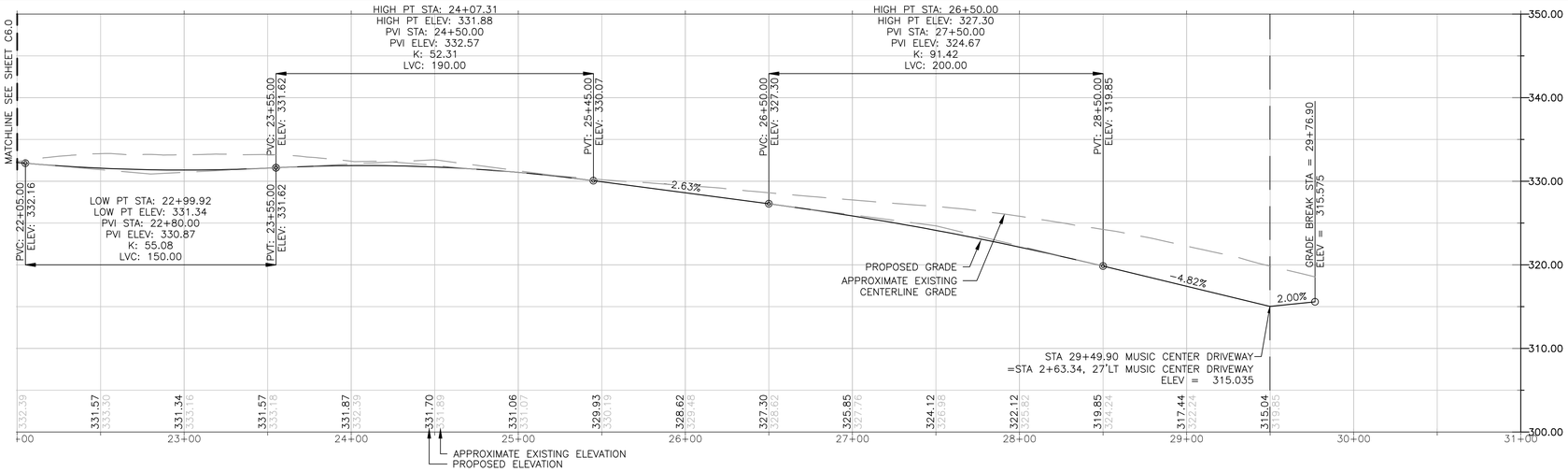
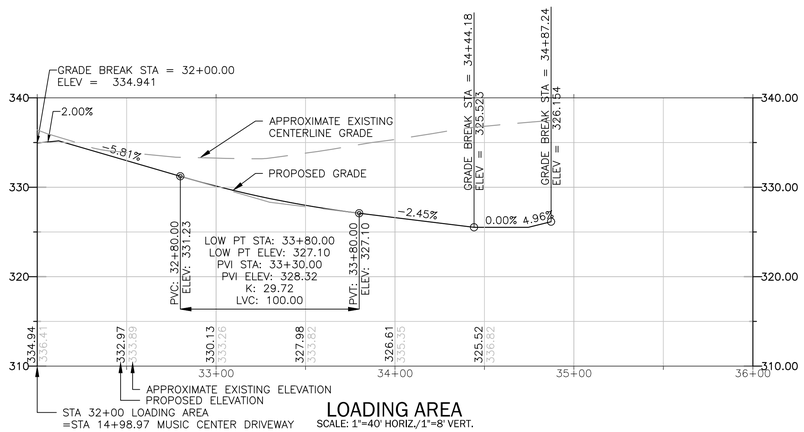
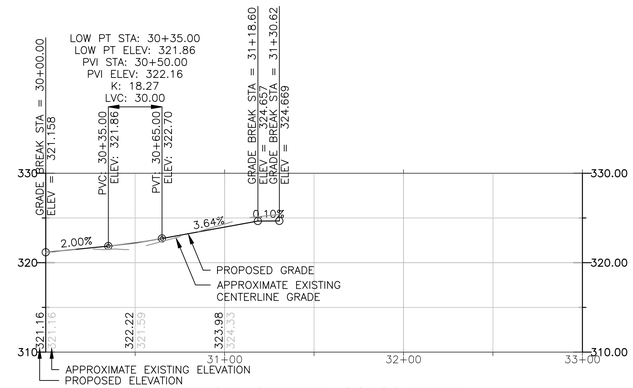


MUSIC CENTER DRIVEWAY
SCALE: 1"=40' HORIZ./1"=8' VERT.



LOADING AREA
SCALE: 1"=40' HORIZ./1"=8' VERT.

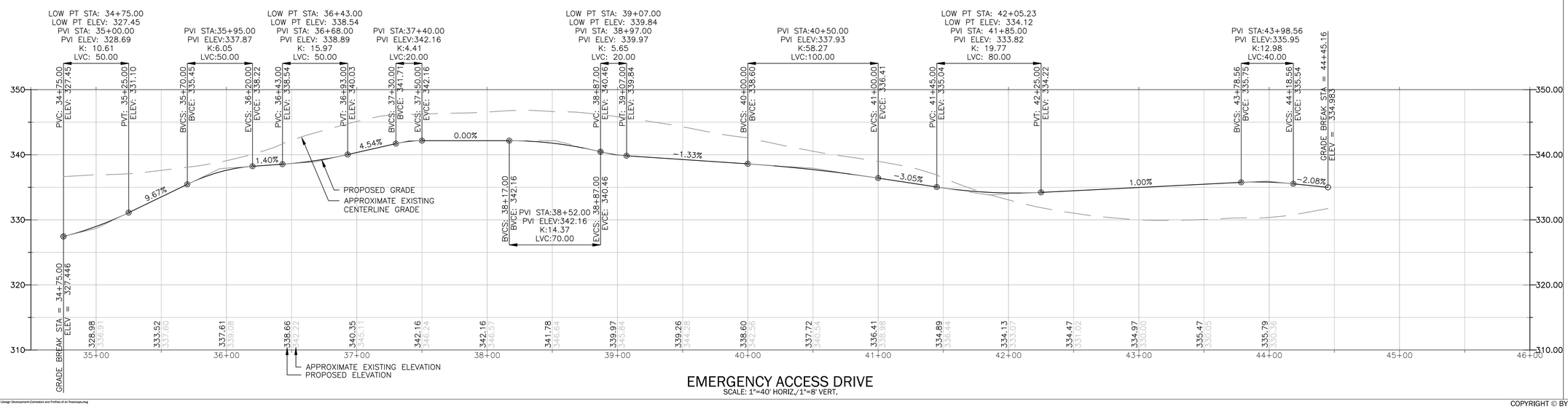


PEABODY STREET ACCESS DRIVE
SCALE: 1"=40' HORIZ./1"=8' VERT.

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.



EMERGENCY ACCESS DRIVE
SCALE: 1"=40' HORIZ./1"=8' VERT.

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The Music Center at Indian Hill

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 40'

DRAWING NAME:

ACCESS DRIVE PROFILES

DRAWING NUMBER:

C6.1

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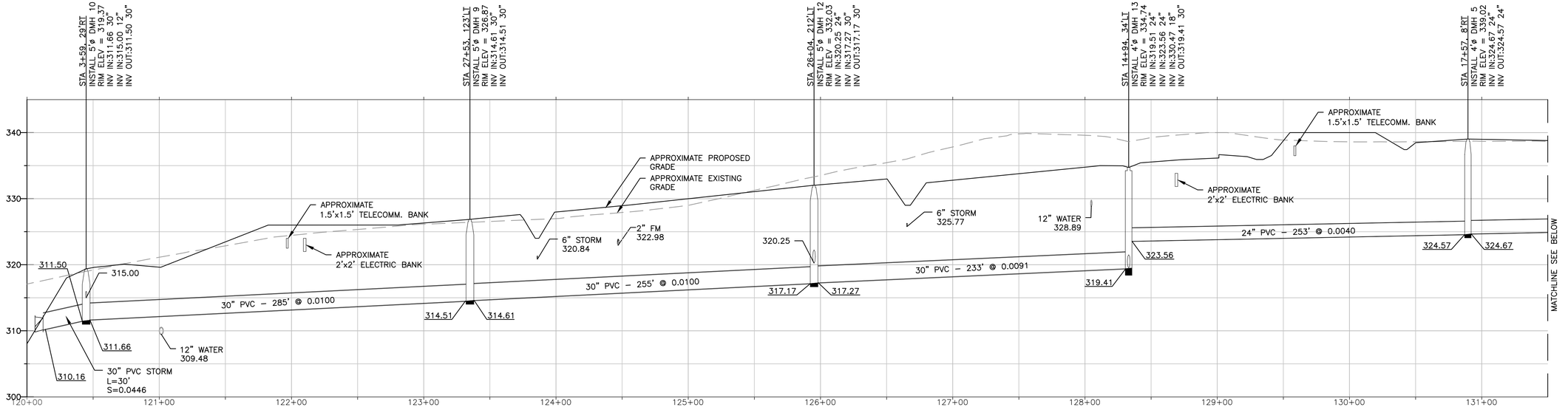
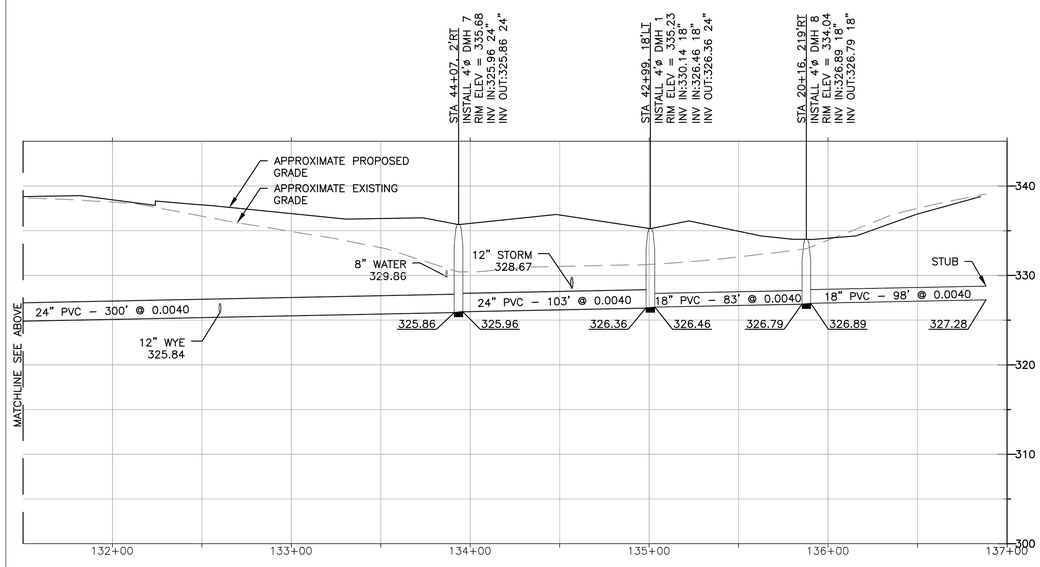


STORM DRAIN PROFILE A
SCALE: 1"=40' HORIZ./1"=8' VERT.



STORM DRAIN PROFILE B
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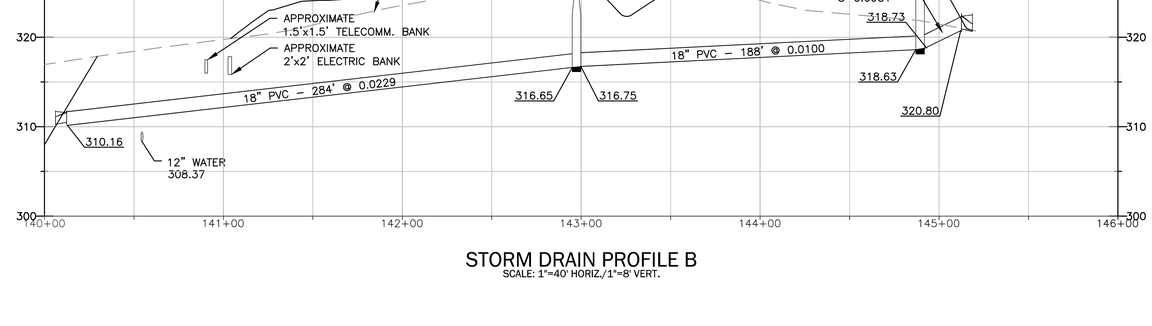
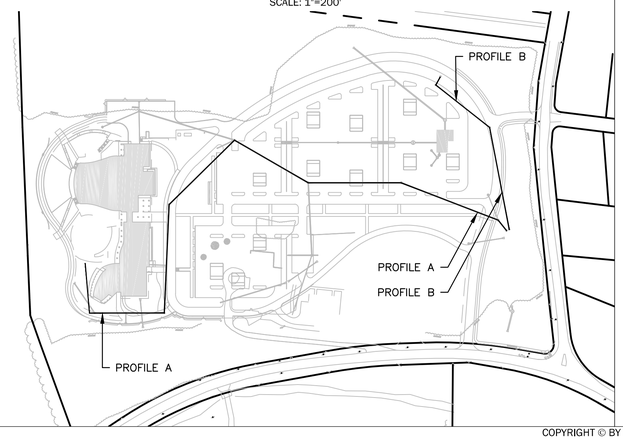


LOCUS MAP
SCALE: 1"=200'



GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 48365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

STORM DRAIN PROFILES

DRAWING NUMBER:

C6.2

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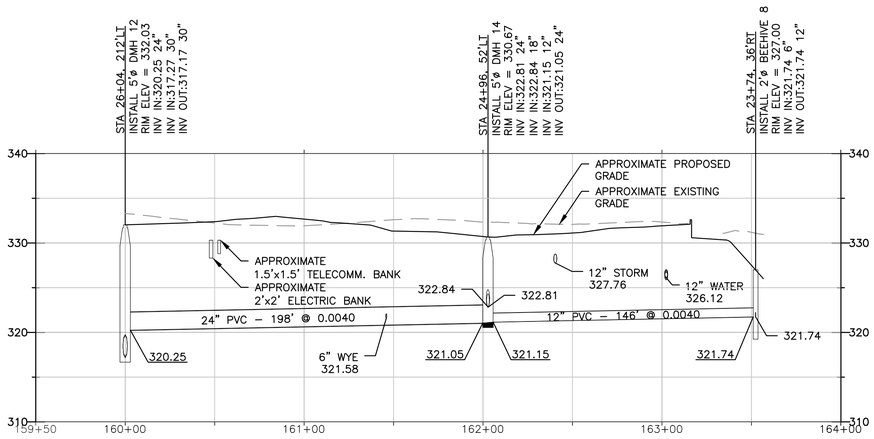
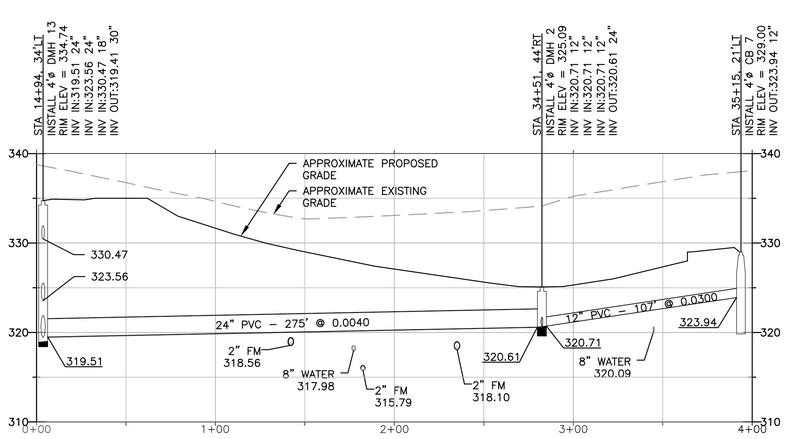


STORM DRAIN PROFILE C
SCALE: 1"=40' HORIZ./1"=8' VERT.



STORM DRAIN PROFILE D
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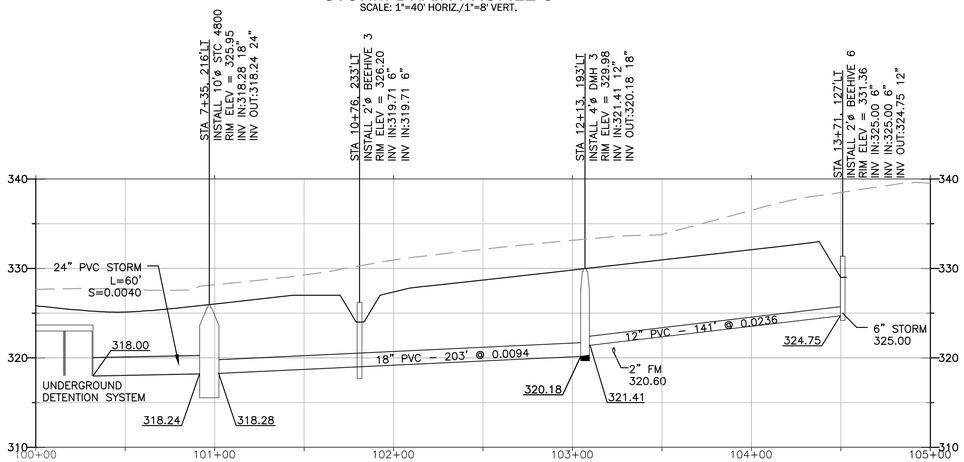

STORM DRAIN PROFILE E
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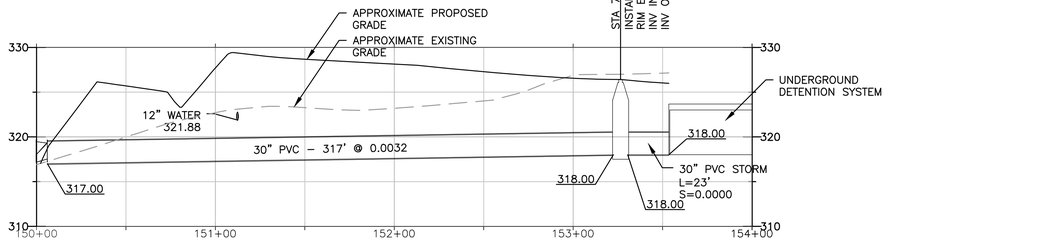

STORM DRAIN PROFILE F
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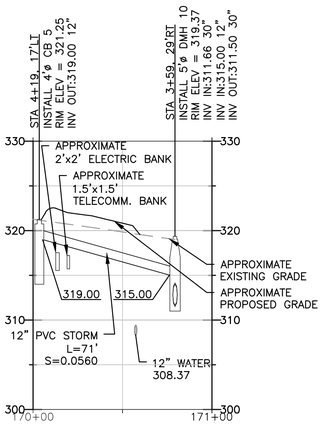


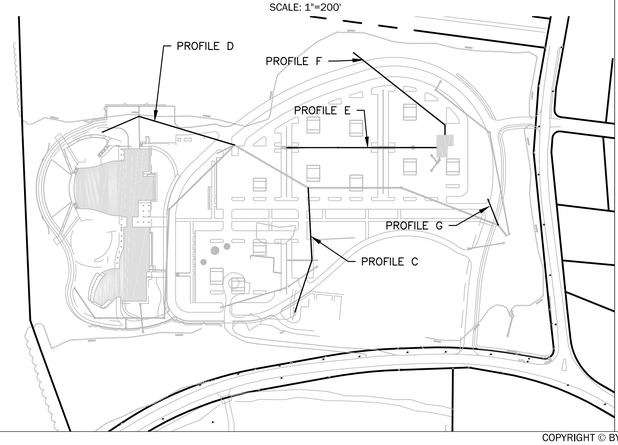
STORM DRAIN PROFILE G
SCALE: 1"=40' HORIZ./1"=8' VERT.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

LOCUS MAP
SCALE: 1"=200'



BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

STORM DRAIN PROFILES

DRAWING NUMBER:

C6.3

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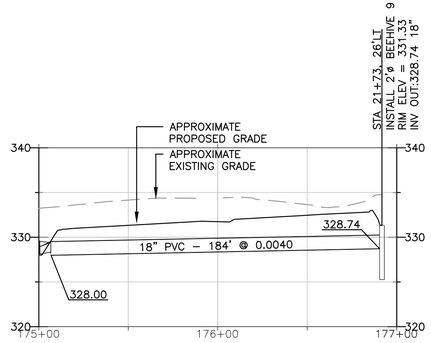

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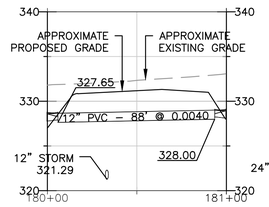
SCALE: 1"=40' HORIZ./1"=8' VERT.



STORM DRAIN PROFILE I
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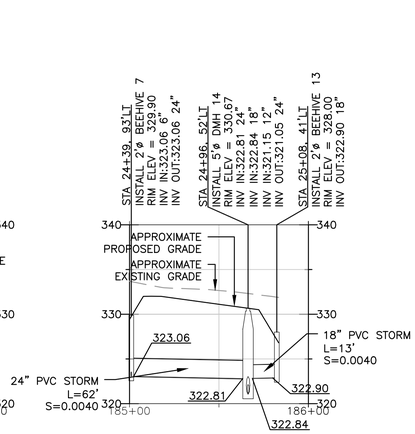

STORM DRAIN PROFILE J
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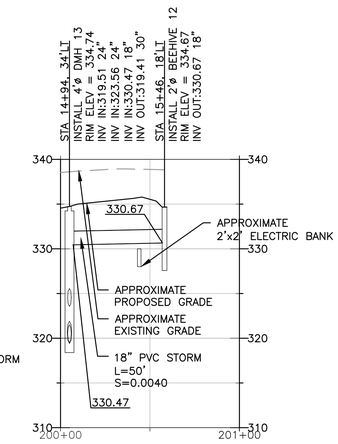

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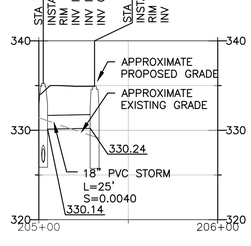

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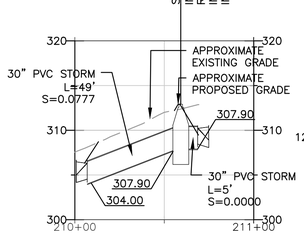

STORM DRAIN PROFILE M
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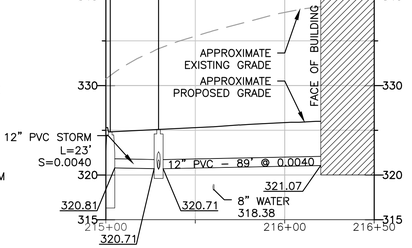

STORM DRAIN PROFILE N
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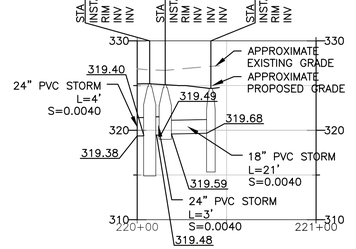


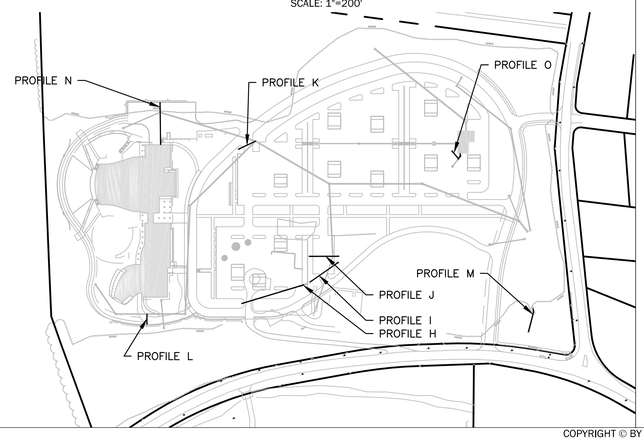
STORM DRAIN PROFILE O
SCALE: 1"=40' HORIZ./1"=8' VERT.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

LOCUS MAP
SCALE: 1"=200'



BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

STORM DRAIN PROFILES

DRAWING NUMBER:

C6.4

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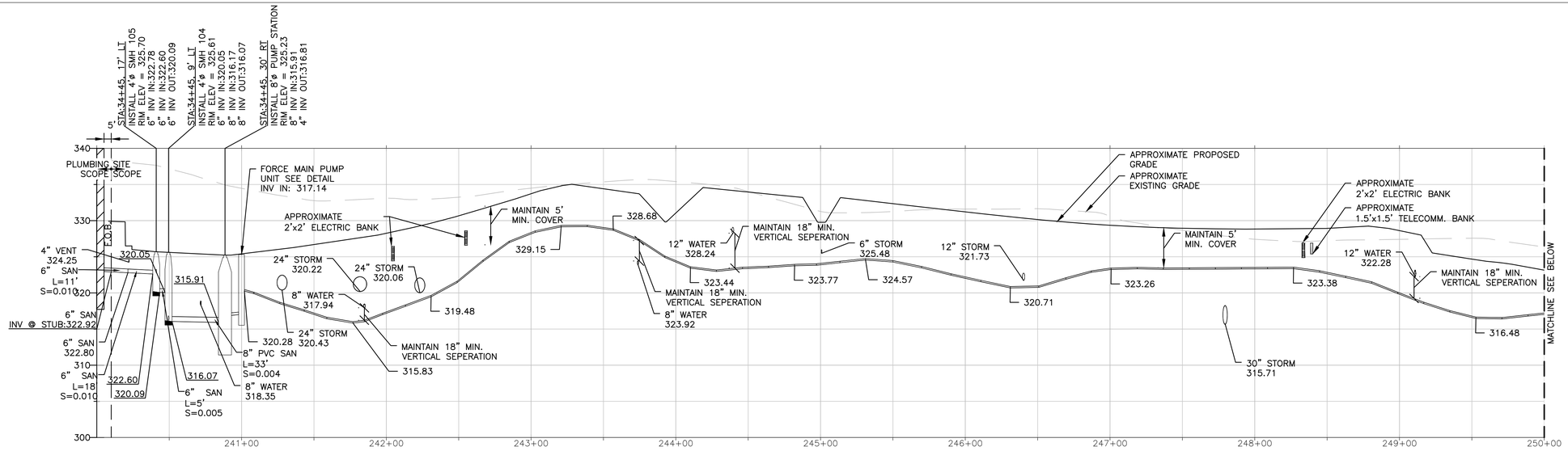
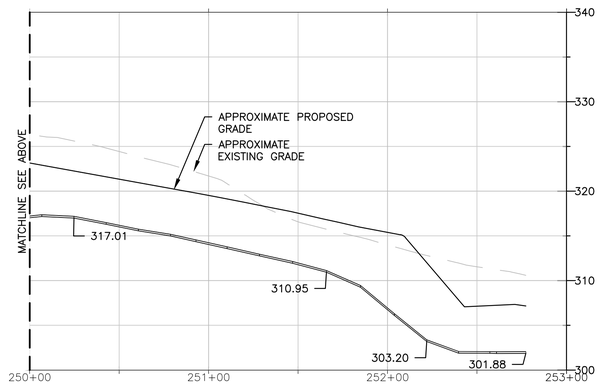


SEWER PROFILE A
SCALE: 1"=40' HORIZ./1"=8' VERT.



SEWER PROFILE C
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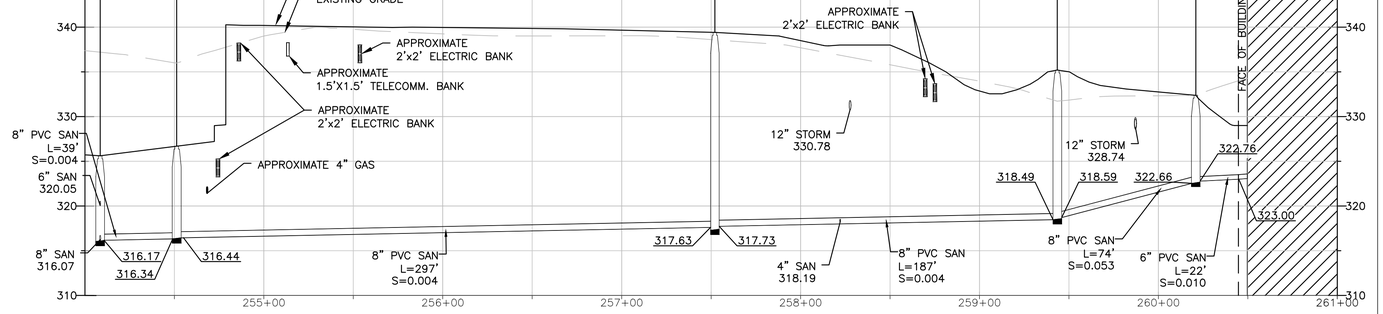

SEWER PROFILE B
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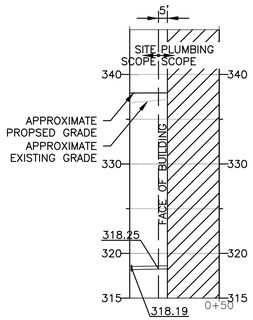

SEWER PROFILE C
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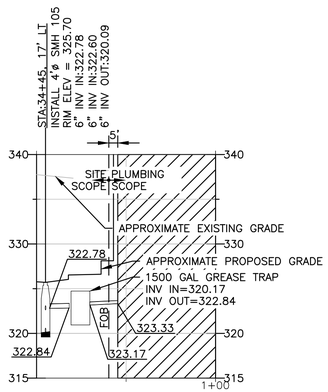

SEWER PROFILE D
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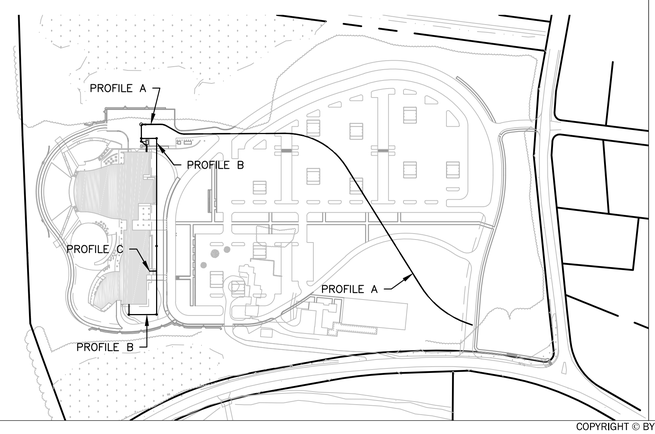

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 48365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

SANITARY SEWER PROFILES

DRAWING NUMBER:

C6.5

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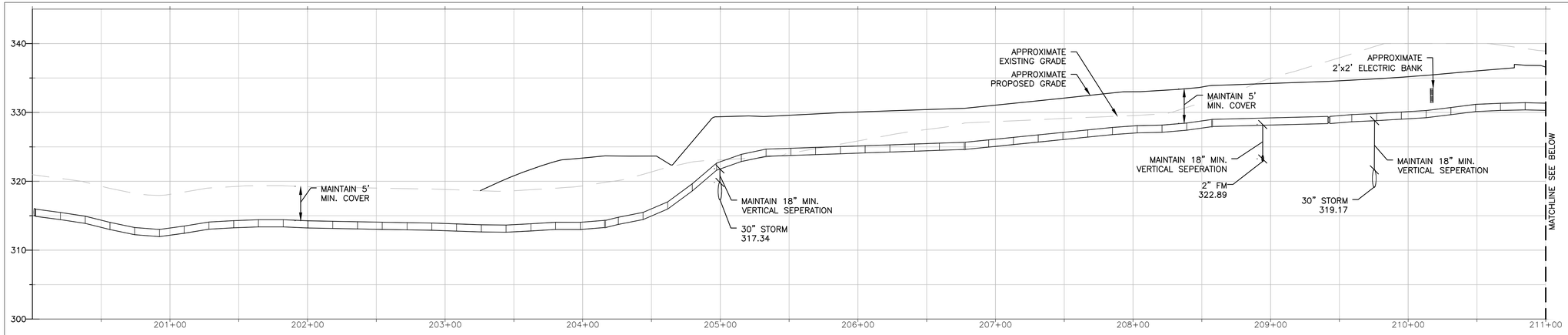
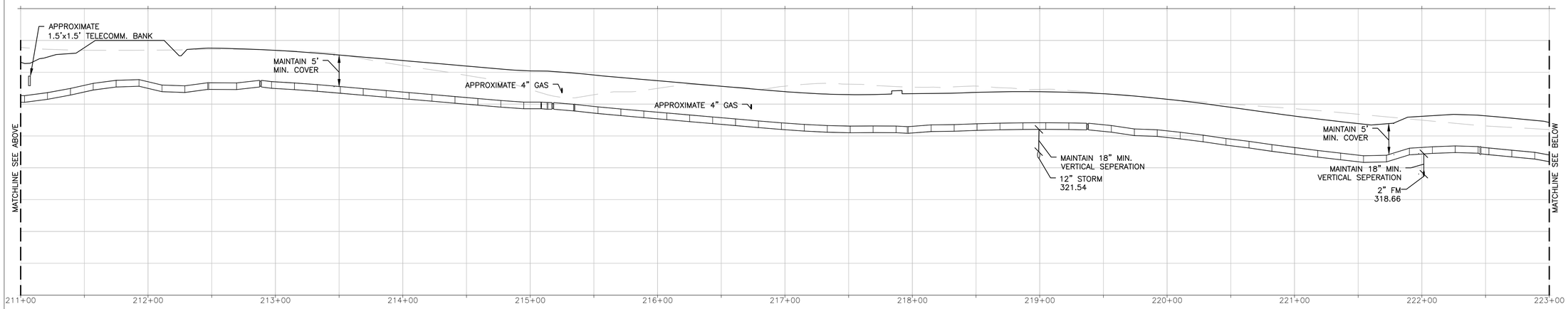


WATER MAIN PROFILE A
SCALE: 1"=40' HORIZ./1"=8' VERT.



WATER MAIN PROFILE A
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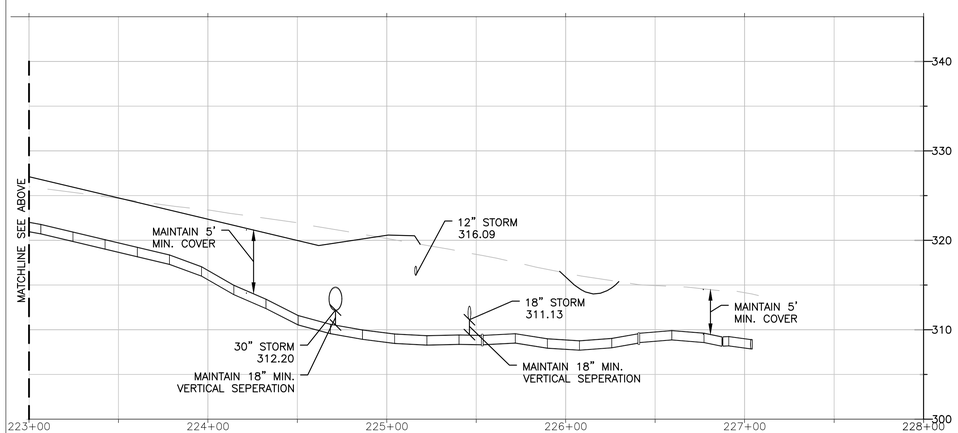


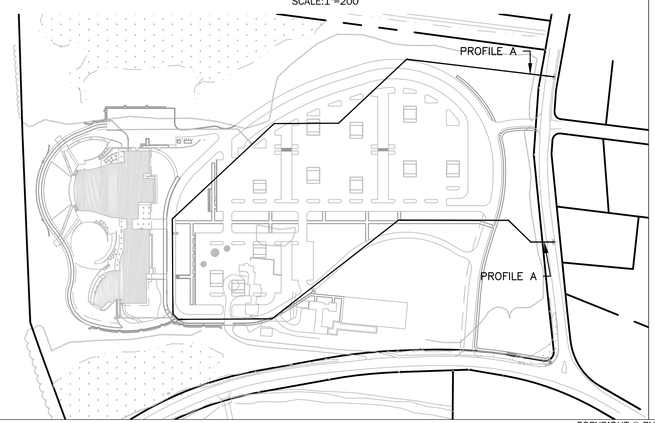
WATER MAIN PROFILE A
SCALE: 1"=40' HORIZ./1"=8' VERT.

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

LOCUS MAP
SCALE:1"=200'



BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

WATER MAIN PROFILES

DRAWING NUMBER:

C6.6

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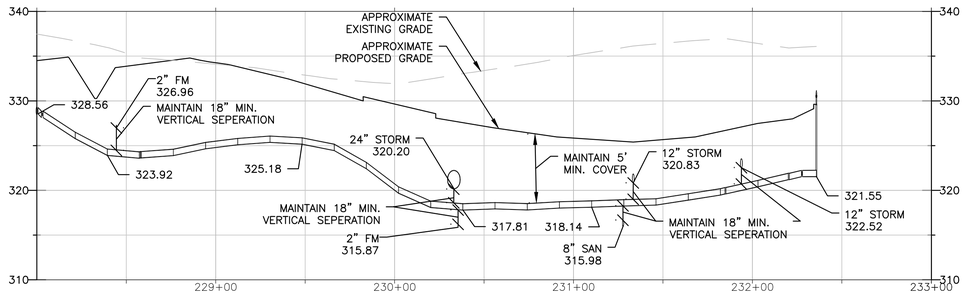
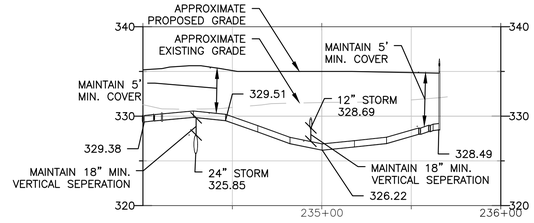
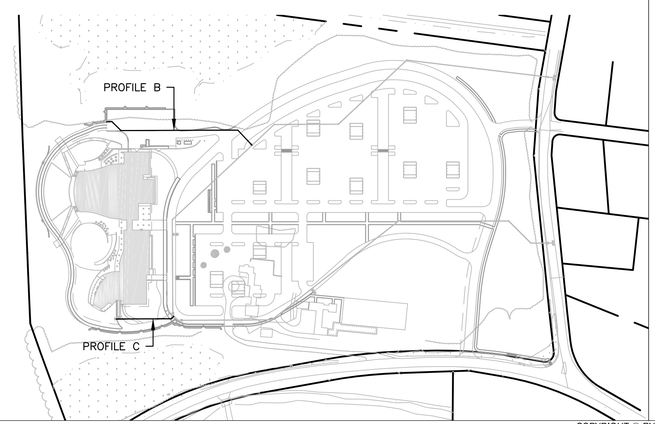
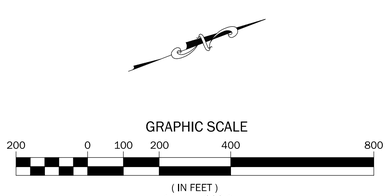


WATER MAIN PROFILE B
SCALE: 1"=40' HORIZ./1"=8' VERT.



WATER MAIN PROFILE C
SCALE: 1"=40' HORIZ./1"=8' VERT.





BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:



PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

WATER MAIN PROFILES

DRAWING NUMBER:

C6.7

PATH:H:\C-880 Groton\Autocad\Design Development\Utility Plan.dwg

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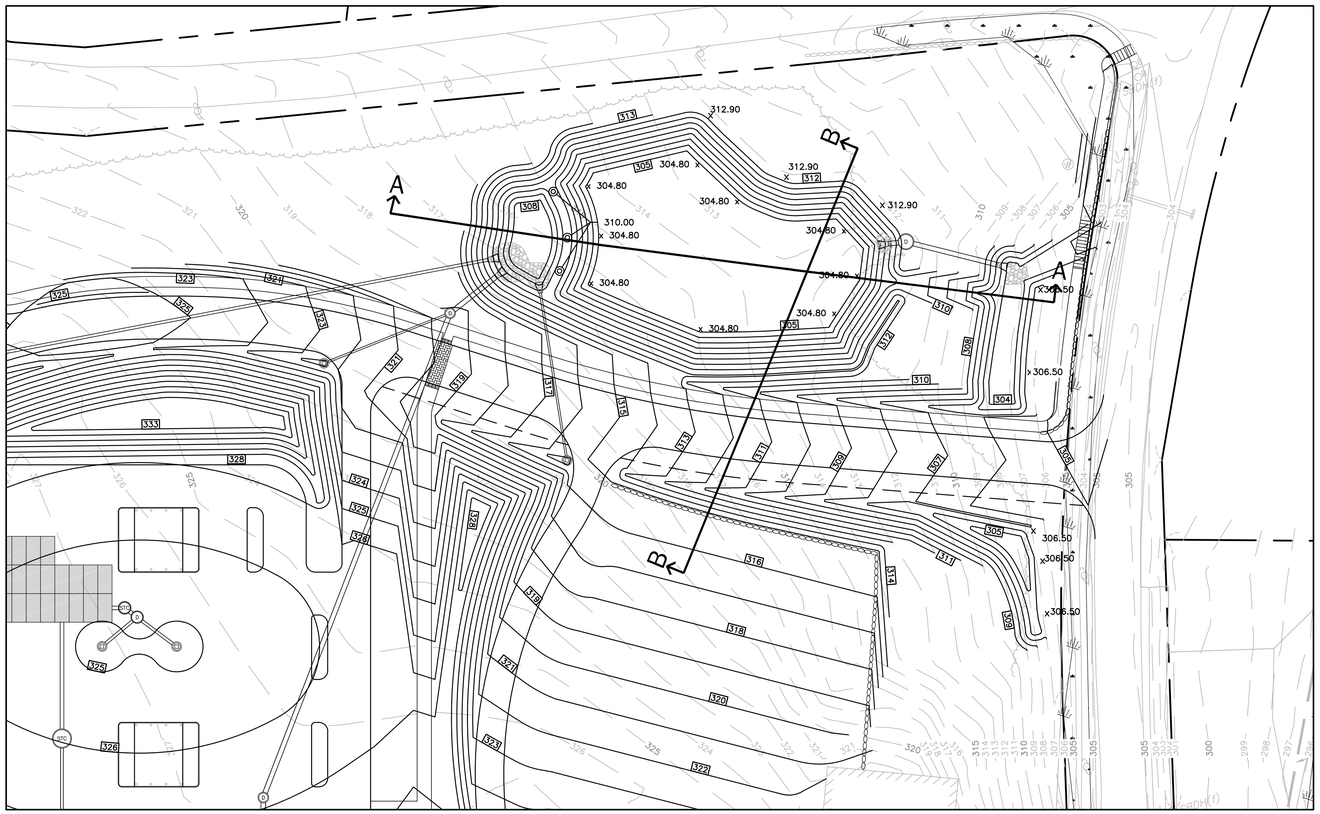
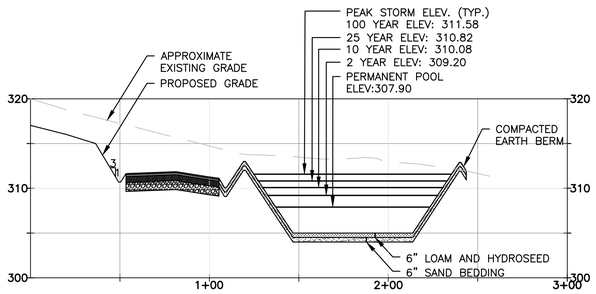


WET BASIN
SCALE:1"=40'

WET BASIN					
STORM EVENT	RAINFALL	PEAK FLOW IN, CFS	PEAK FLOW OUT, CFS	PEAK ELEVATION	PEAK VOLUME
2-YEAR	3.01	19.93	10.03	309.20	59,327 CF
10-YEAR	4.46	35.48	14.28	310.08	75,651 CF
25-YEAR	5.58	51.27	17.40	310.82	90,929 CF
100-YEAR	7.85	73.06	41.20	311.58	107,837 CF

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.



SECTION B-B
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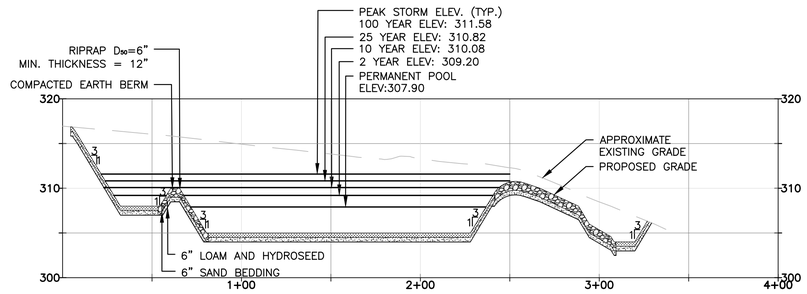

SECTION A-A
SCALE: 1"=40' HORIZ./1"=8' VERT.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

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DATE:

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REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

STORMWATER DETENTION FACILITY PLAN AND SECTIONS

DRAWING NUMBER:

C7.0

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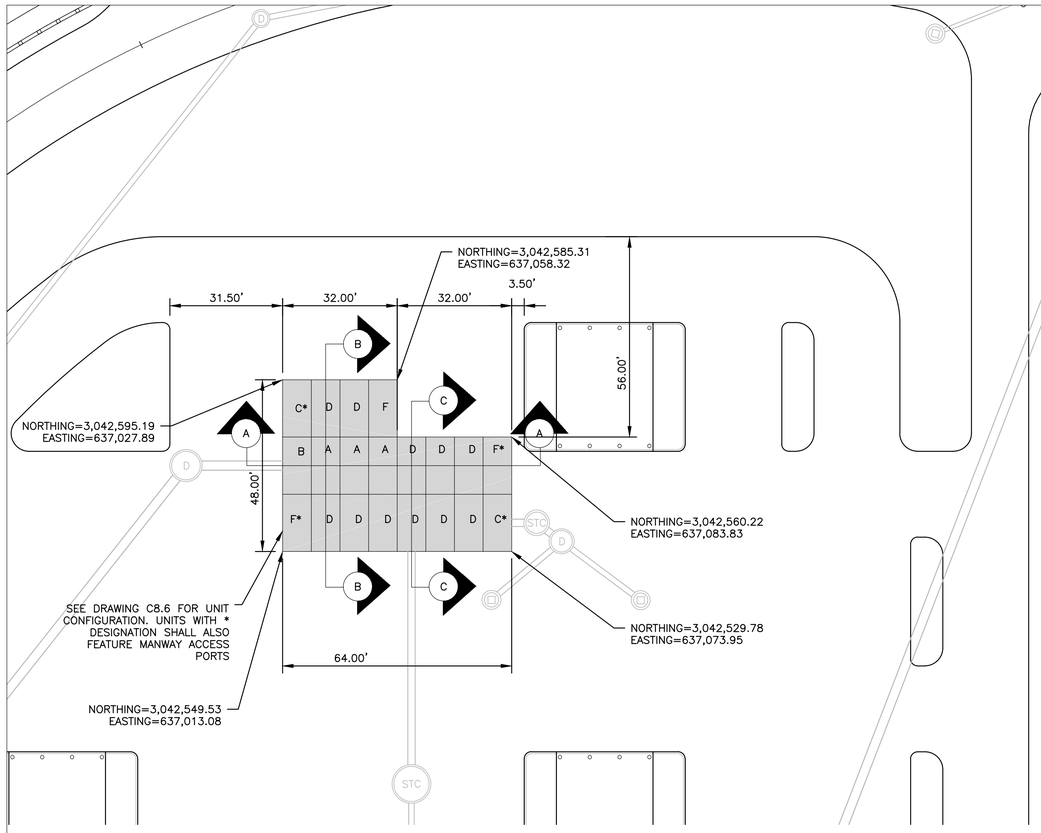
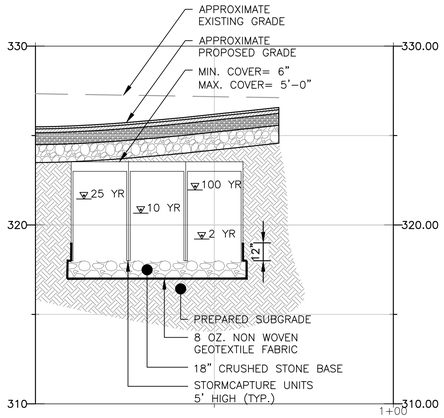


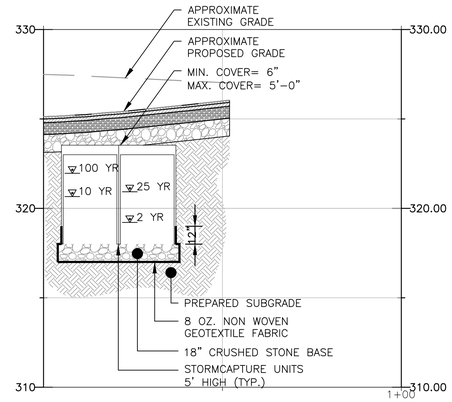
SYSTEM LAYOUT

SCALE: 1"=20'



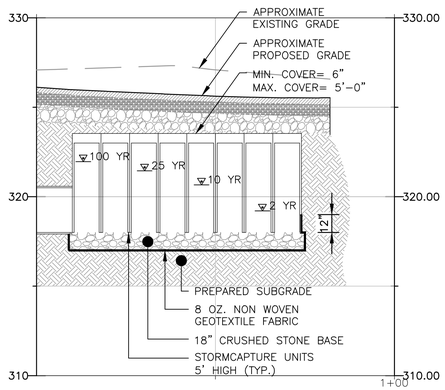
SECTION B

SCALE: 1"= 20' HORIZ./1"= 4' VERT.



SECTION C

SCALE: 1"= 20' HORIZ./1"= 4' VERT.



SECTION A

SCALE: 1"= 20' HORIZ./1"= 4' VERT.

LEGEND

- 4" BITUMINOUS PAVEMENT
- 8" BASE GRAVEL
- 12" SUBBASE GRAVEL
- COMMON BACKFILL AND SUBGRADE MATERIAL

SEE PAVEMENT DETAILS FOR MATERIAL SPECIFICATIONS

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

STORMCAPTURE PERFORMANCE CHART

STORM EVENT	24-HR RAINFALL	PEAK FLOW IN, CFS	PEAK FLOW OUT, CFS	PEAK ELEVATION	PEAK STORAGE
2-YR	3.01"	7.71	6.93	319.21	2,542 CF
10-YR	4.46"	17.71	13.65	320.66	5,586 CF
25-YR	5.58"	23.20	19.28	321.45	7,252 CF
100-YR	7.85"	30.62	29.28	321.96	8,307 CF

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

UNDERGROUND STORMWATER DETENTION FACILITY PLAN AND SECTIONS

DRAWING NUMBER:

C7.1

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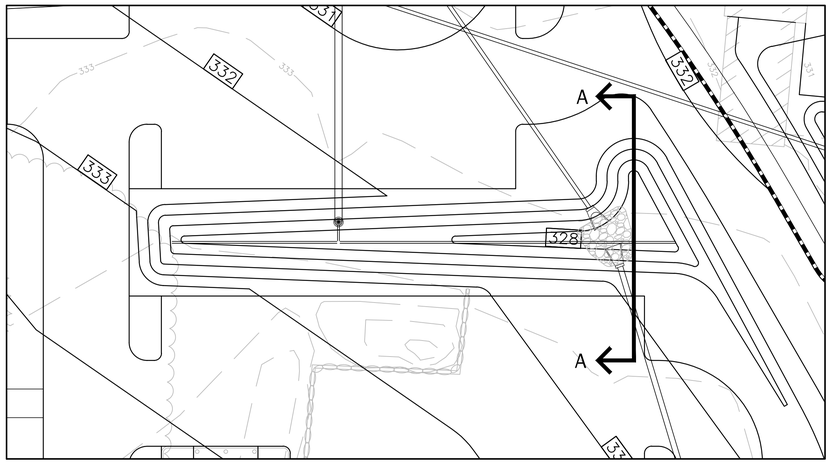
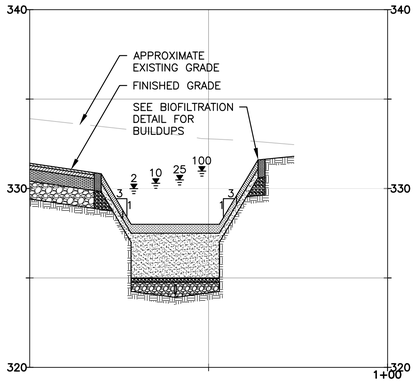


BIOFILTRATION AREA #1

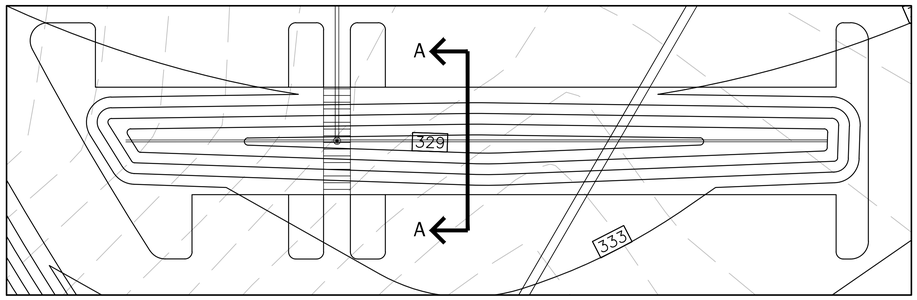
SCALE:1"=20'



SECTION A-A

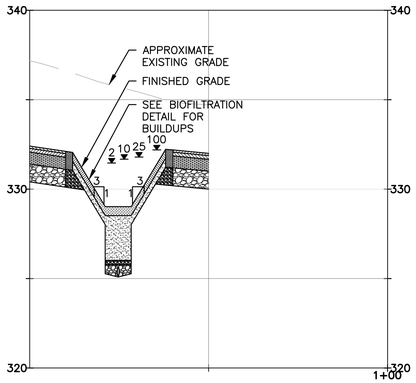
SCALE:1"=20' HORIZ./1"=4' VERT.

BIOFILTRATION AREA #1					
STORM EVENT	RAINFALL	PEAK FLOW IN, CFS	PEAK FLOW OUT, CFS	PEAK ELEVATION	PEAK VOLUME
2-YEAR	3.01	6.90	4.73	329.99	2,184 CF
10-YEAR	4.46	10.58	9.50	330.29	2,875 CF
25-YEAR	5.58	13.39	11.66	330.48	3,381 CF
100-YEAR	7.85	19.06	14.57	330.97	5,023 CF



BIOFILTRATION AREA #2

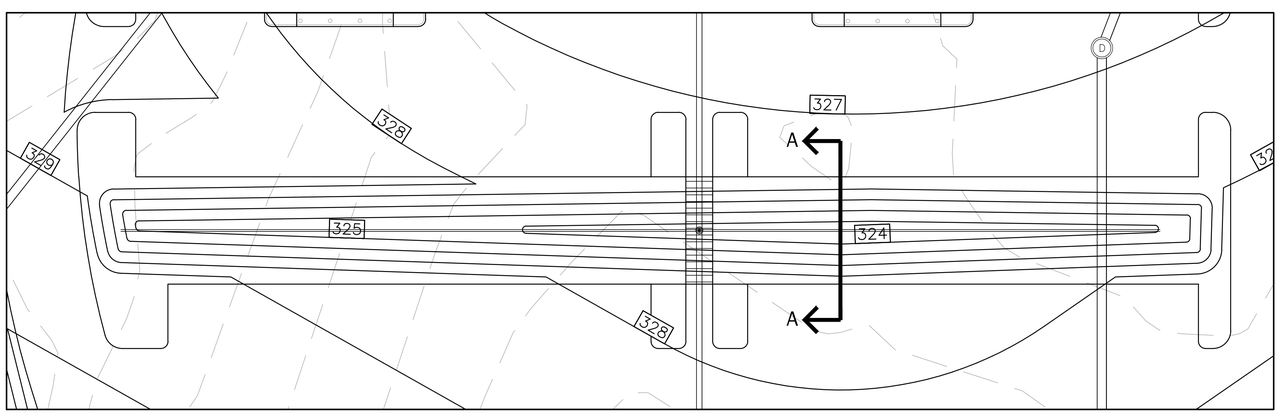
SCALE:1"=20'



SECTION A-A

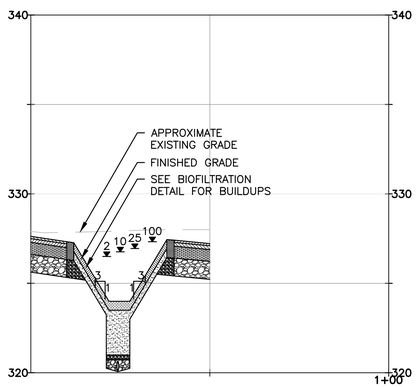
SCALE:1"=20' HORIZ./1"=4' VERT.

BIOFILTRATION AREA #2					
STORM EVENT	RAINFALL	PEAK FLOW IN, CFS	PEAK FLOW OUT, CFS	PEAK ELEVATION	PEAK VOLUME
2-YEAR	3.01	3.47	0.82	331.46	5,221 CF
10-YEAR	4.46	5.35	3.74	331.67	6,031 CF
25-YEAR	5.58	6.78	5.72	331.79	6,489 CF
100-YEAR	7.85	9.66	8.29	332.19	8,256 CF



BIOFILTRATION AREA #3

SCALE:1"=20'



SECTION A-A

SCALE:1"=20' HORIZ./1"=4' VERT.

BIOFILTRATION AREA #3					
STORM EVENT	RAINFALL	PEAK FLOW IN, CFS	PEAK FLOW OUT, CFS	PEAK ELEVATION	PEAK VOLUME
2-YEAR	3.01	6.26	3.58	326.50	7,339 CF
10-YEAR	4.46	9.52	6.95	326.76	8,755 CF
25-YEAR	5.58	12.02	7.92	326.95	9,865 CF
100-YEAR	7.85	17.05	9.62	327.33	12,457 CF

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)

1 inch = 20 ft.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

BIOFILTRATION AREA PLAN AND SECTIONS

DRAWING NUMBER:

C7.2

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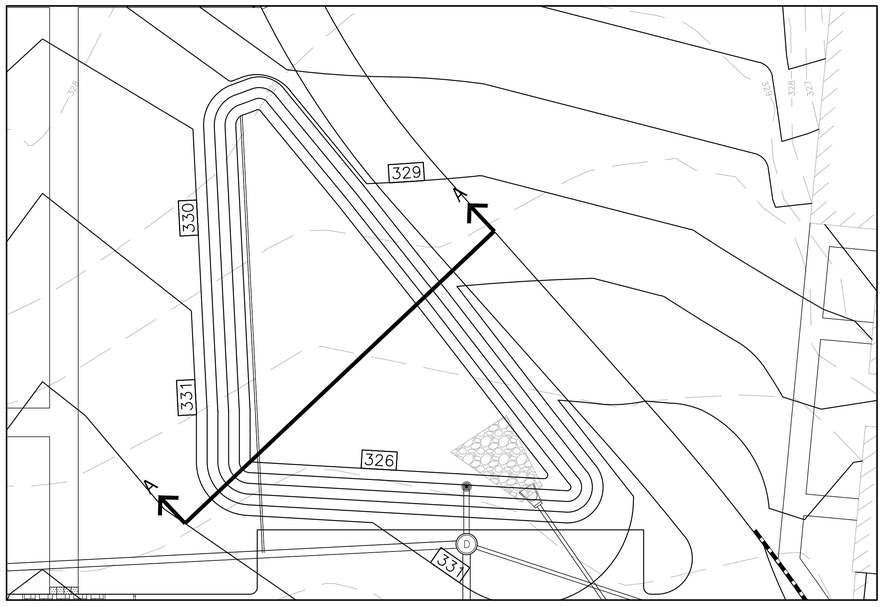
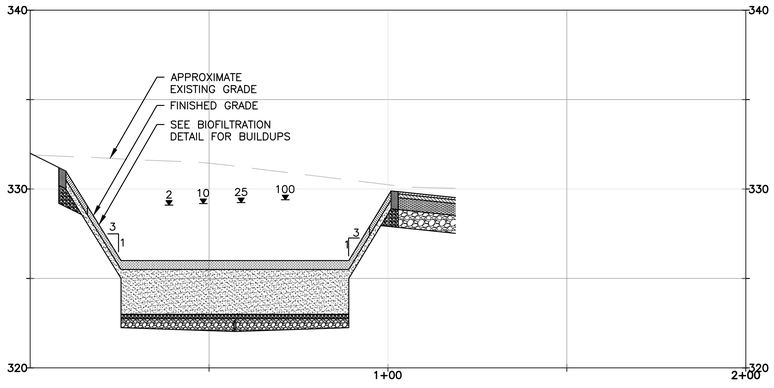


BIOFILTRATION AREA #5

SCALE:1"=20'



SECTION A-A

SCALE:1"=20' HORIZ./1"=4' VERT.

BIOFILTRATION AREA #5					
STORM EVENT	RAINFALL	PEAK FLOW IN, CFS	PEAK FLOW OUT, CFS	PEAK ELEVATION	PEAK VOLUME
2-YEAR	3.01	5.68	2.17	328.20	11,946 CF
10-YEAR	4.46	7.46	4.92	328.37	13,125 CF
25-YEAR	5.58	8.53	6.45	328.48	13,838 CF
100-YEAR	7.85	10.68	8.26	328.80	16,241 CF

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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SCALE: AS NOTED

DRAWING NAME:

BIOFILTRATION AREA PLAN AND SECTIONS

DRAWING NUMBER:

C7.3

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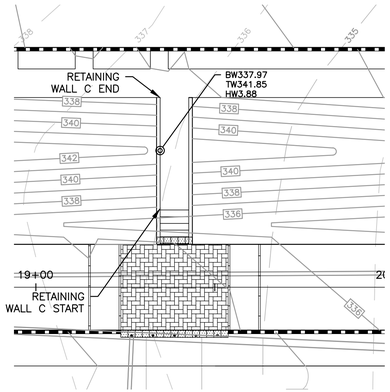
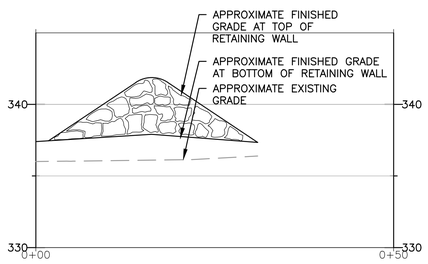
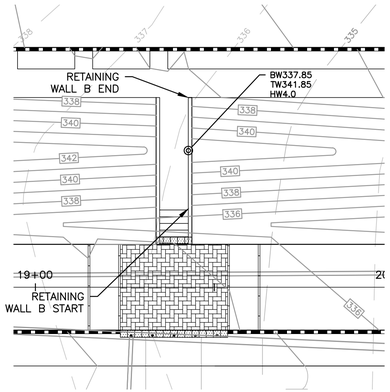


RETAINING WALL C
SCALE: 1"=20'

NOTE: FOR CLARITY THE SCALE OF THE PROFILE HAS BEEN ALTERED AS NOTED.

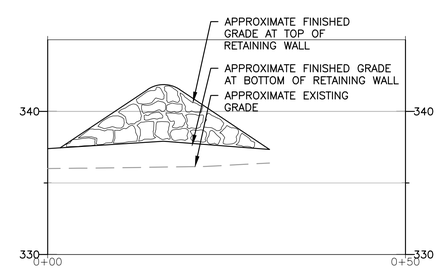


RETAINING WALL C
SCALE: 1"=10' HOIRZ./1"=5' VERT.

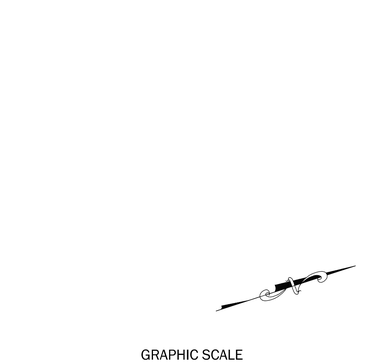


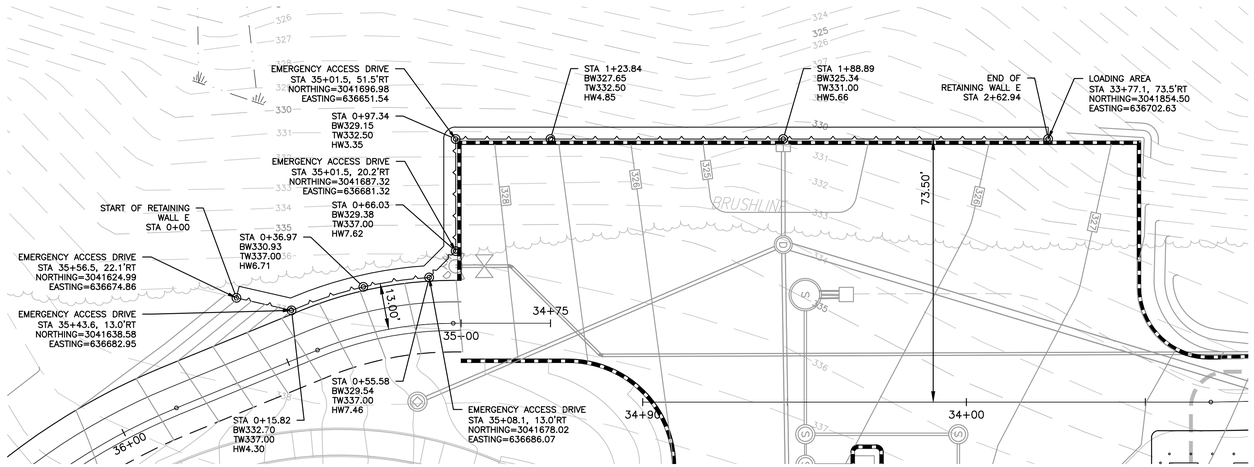
RETAINING WALL B
SCALE: 1"=20'

NOTE: FOR CLARITY THE SCALE OF THE PROFILE HAS BEEN ALTERED AS NOTED.



RETAINING WALL B
SCALE: 1"=10' HOIRZ./1"=5' VERT.





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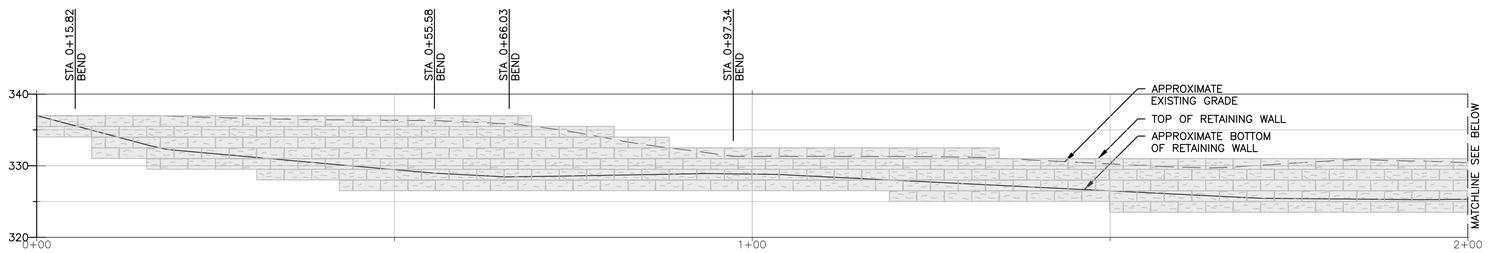

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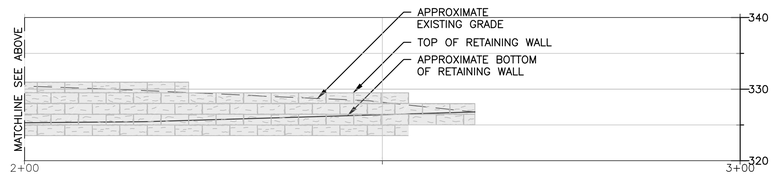

RETAINING WALL E
SCALE: 1"=10' HOIRZ./1"=10' VERT.

ELEVATION NOTE TABLE

TW	TOP OF WALL ELEVATION
BW	BOTTOM OF WALL ELEVATION
HW	HEIGHT OF WALL

NOTE: CONTRACTOR SHALL SUBMIT FINAL WALL DESIGN PLANS STAMPED BY A REGISTERED STRUCTURAL ENGINEER FOR ALL WALLS GREATER THAN 4 FEET IN HEIGHT PRIOR TO CONSTRUCTION

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

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1.12.17

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SCALE: AS NOTED

DRAWING NAME:

RETAINING WALL PLAN/PROFILE

DRAWING NUMBER:

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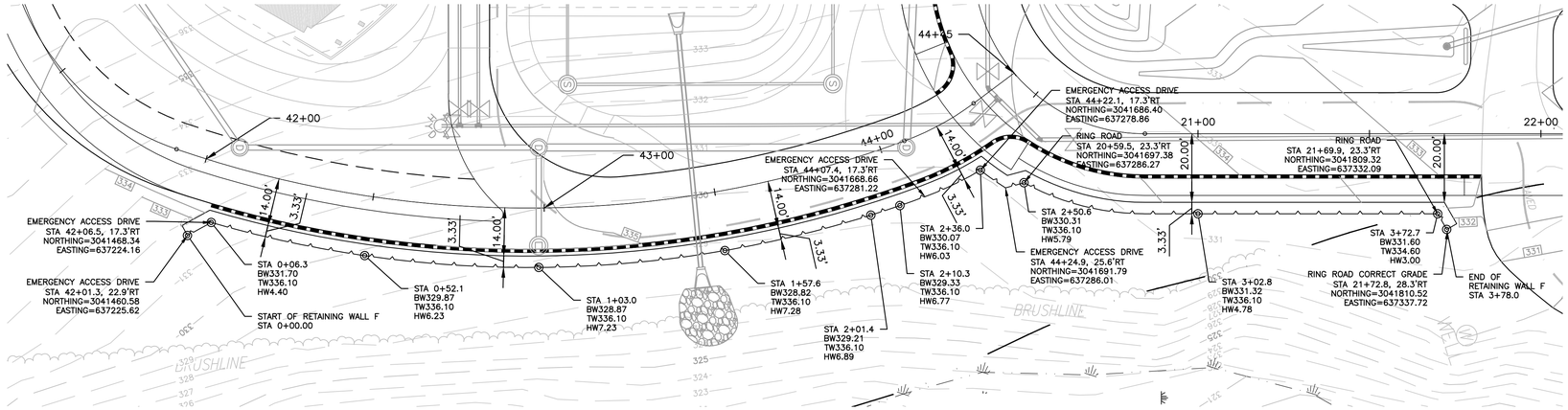
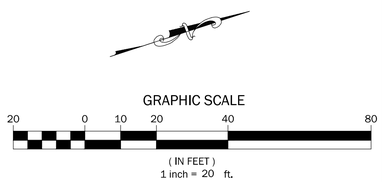
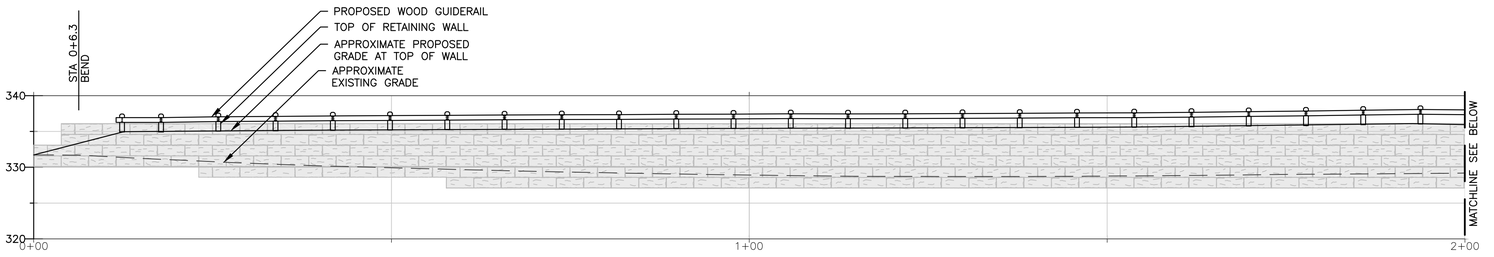


RETAINING WALL F
SCALE: 1"=20'



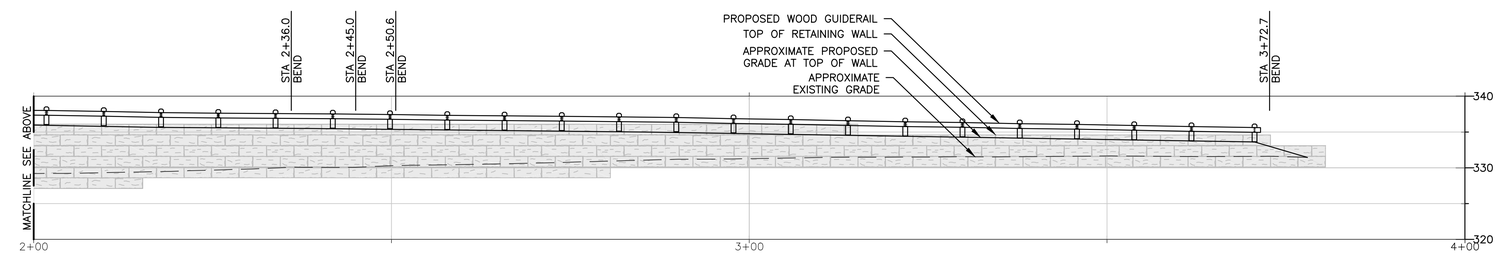
ELEVATION NOTE TABLE

TW	TOP OF WALL ELEVATION
BW	BOTTOM OF WALL ELEVATION
HW	HEIGHT OF WALL



RETAINING WALL F
SCALE: 1"=10' HOIRZ./1"=10' VERT.

NOTE: CONTRACTOR SHALL SUBMIT FINAL WALL DESIGN PLANS STAMPED BY A REGISTERED STRUCTURAL ENGINEER FOR ALL WALLS GREATER THAN 4 FEET IN HEIGHT PRIOR TO CONSTRUCTION



RETAINING WALL F
SCALE: 1"=10' HOIRZ./1"=10' VERT.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

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RETAINING WALL PLAN/PROFILE

DRAWING NUMBER:

C7.5

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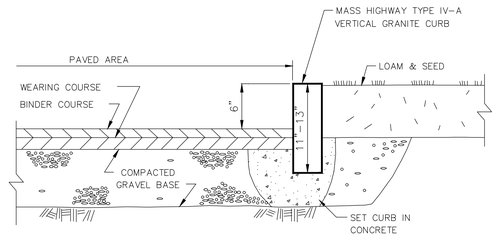
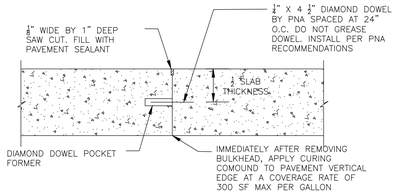


VERTICAL GRANITE CURB

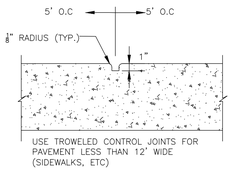
NOT TO SCALE

DET NO. 1-1



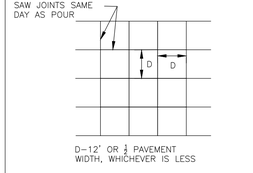
CONSTRUCTION JOINT

N.T.S.



TROWELED CONTROL JOINT

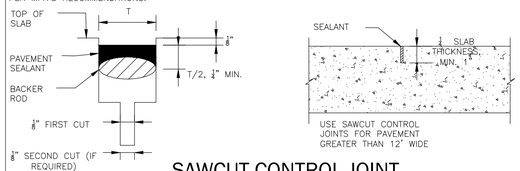
N.T.S.



SAWCUT CONTROL JOINT SPACING

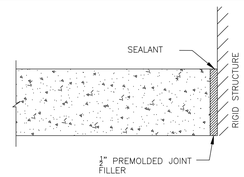
N.T.S.

WAIT AS LONG AS FEASIBLE TO SEAL JOINTS TO ALLOW CONCRETE SHRINKAGE TO OCCUR. IF REQUIRED, REWAS JOINT IMMEDIATELY PRIOR TO INSTALLING SEALANT TO ACHIEVE A 1/4" JOINT WIDTH. ENSURE JOINT IS CLEAN, DRY AND SIDES PREPARED PER MFR'S RECOMMENDATIONS.



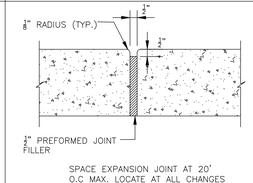
SAWCUT CONTROL JOINT

N.T.S.



STRUCTURE ISOLATION JOINT

N.T.S.

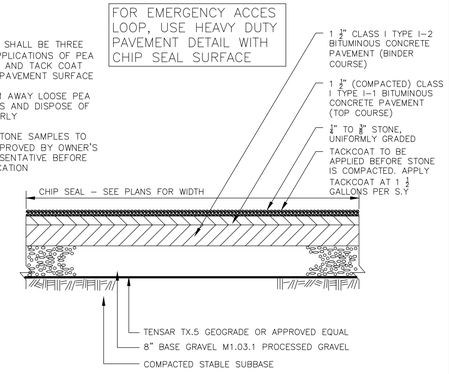


EXPANSION JOINT

N.T.S.

NOTES:
1. THERE SHALL BE THREE (3) APPLICATIONS OF PEA STONE AND TACK COAT OVER PAVEMENT SURFACE
2. BROOM AWAY LOOSE PEA STONES AND DISPOSE OF PROPERLY
3. PEA STONE SAMPLES TO BE APPROVED BY OWNER'S REPRESENTATIVE BEFORE APPLICATION

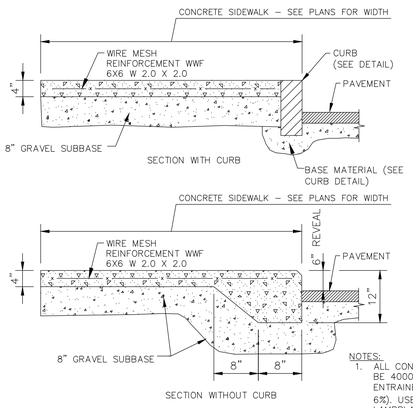
FOR EMERGENCY ACCES LOOP, USE HEAVY DUTY PAVEMENT DETAIL WITH CHIP SEAL SURFACE



CHIP SEAL SIDEWALK PAVEMENT DETAIL

NOT TO SCALE

DET NO. 1-18



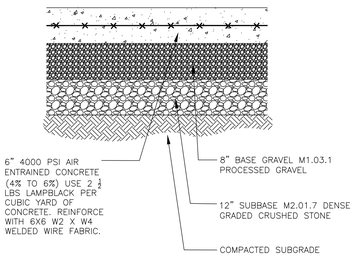
NOTES:
1. ALL CONCRETE SHALL BE 4000 PSI, AIR ENTRAINED (4% TO 6%). USE 2 1/4 LBS LAMPBLACK PER CUBIC YARD OF CONCRETE.
2. ALL CONCRETE SIDEWALKS SHALL HAVE SANDBLAST FINISH TO EXPOSE AGGREGATE.

CONCRETE SIDEWALK

N.T.S.

DET NO. 1-2

NOTES:
1. ALL MATERIALS SHALL CONFORM TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST REVISION.
2. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE GEOTECHNICAL REPORT.
3. AN ADDITIONAL LAYER OF GEOGRID MAY BE REQUIRED IN AREAS OF WET OR UNSTABLE SUBGRADE. CONTACT ENGINEER FOR CLARIFICATION.

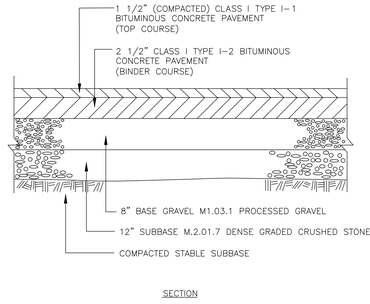


CONCRETE PAVEMENT DETAIL

N.T.S

DET NO. 1-19

NOTES:
1. ALL MATERIALS SHALL CONFORM TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST REVISION.
2. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE GEOTECHNICAL REPORT.
3. AN ADDITIONAL LAYER OF GEOGRID MAY BE REQUIRED IN AREAS OF WET OR UNSTABLE SUBGRADE. CONTACT ENGINEER FOR CLARIFICATION.



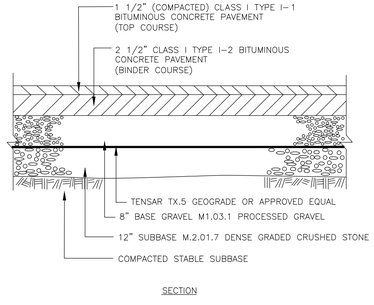
SECTION

STANDARD DUTY PAVEMENT

N.T.S.

DET NO. 1-4

NOTES:
1. ALL MATERIALS SHALL CONFORM TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST REVISION.
2. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE GEOTECHNICAL REPORT.
3. AN ADDITIONAL LAYER OF GEOGRID MAY BE REQUIRED IN AREAS OF WET OR UNSTABLE SUBGRADE. CONTACT ENGINEER FOR CLARIFICATION.

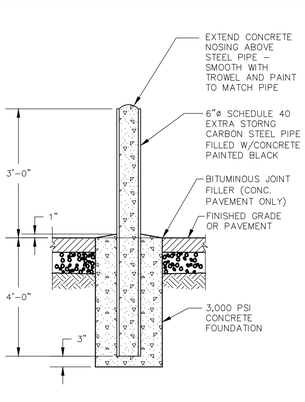


SECTION

HEAVY DUTY PAVEMENT

N.T.S.

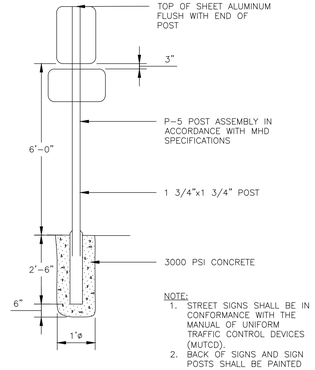
DET NO. 1-5



STEEL PIPE BOLLARD DETAIL

NOT TO SCALE

DET NO. 1-12

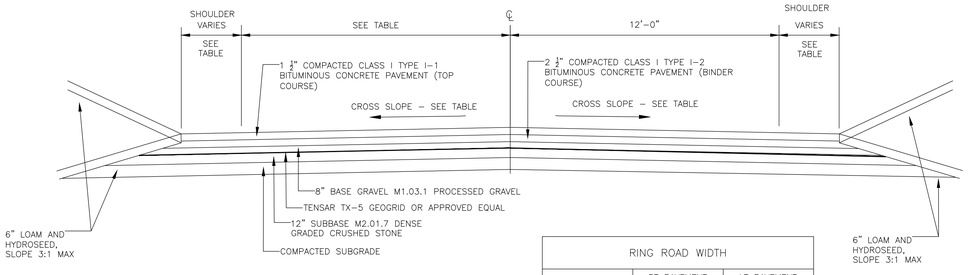


NOTE:
1. STREET SIGNS SHALL BE IN CONFORMANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
2. BACK OF SIGNS AND SIGN POSTS SHALL BE PAINTED MATTE BLACK.

SIGN POST INSTALLATION

N.T.S.

DET NO. 1-9



ROADWAY ELEMENTS TABLE				
STATION INTERVAL	RT CROSS SLOPE FROM CENTERLINE	LT CROSS SLOPE FROM CENTERLINE	RT SHOULDER WIDTH	LT SHOULDER WIDTH
0+00 TO 2+50	-2%	-2%	5'	15'
2+50 TO 3+87	-2%	-2%	2'	15'
3+37 TO 6+07	-2%	-2%	2'	2'
6+07 TO 15+00	2%	-2%	5'	2'
15+00 TO 24+48	2%	-2%	2'	2'
24+48 TO 29+50	-2%	2%	5'	2'

TRANSITION CROSS SLOPE OVER 50'

RING ROAD WIDTH		
STATION INTERVAL	RT PAVEMENT WIDTH	LT PAVEMENT WIDTH
0+00 TO 21+80	12'	12'
21+80 TO 29+77	12'	4'

NOTES:
1. ALL MATERIALS SHALL CONFORM TO MASSACHUSETTS DEPARTMENT OF TRANSPORTATION SPECIFICATIONS, LATEST REVISION.
2. COMPACTION OF ALL MATERIALS TO BE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE GEOTECHNICAL REPORT.
3. AN ADDITIONAL LAYER OF GEOGRID MAY BE REQUIRED IN AREAS OF WET OR UNSTABLE SUBGRADE. CONTACT ENGINEER FOR CLARIFICATION.

RING ROAD SECTION

N.T.S.

DET NO. 1-11

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

SITE DETAILS

DRAWING NUMBER:

C8.0

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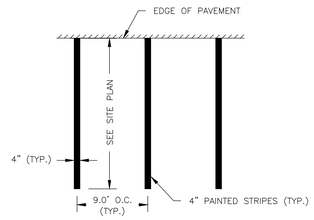
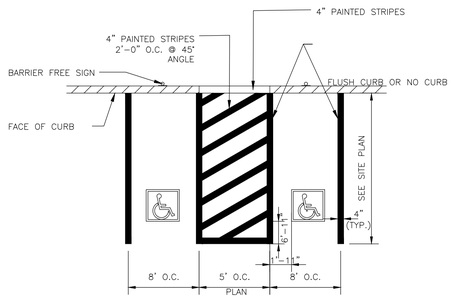
PATH:K:\C-880 Groton\Autocad\Design Development\Details.dwg



PARKING STALLS SHALL BE PAINTED WHITE ON BITUMINOUS PAVEMENT SURFACES AND YELLOW ON CONCRETE SURFACES UNLESS OTHERWISE NOTES.

PARKING STALL STRIPING
N.T.S.

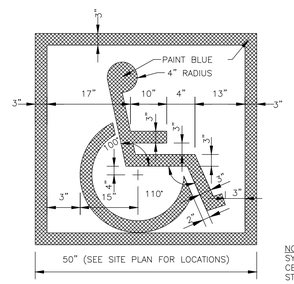
DET NO. 2-1



ONE IN 8 BARRIER FREE SPACES MUST BE VAN ACCESSIBLE WITH A MIN. 8'-0" BARRIER FREE SPACE. THIS HAS BEEN PROVIDED ON THE SITE PLAN.

ADA STALL STRIPING
N.T.S.

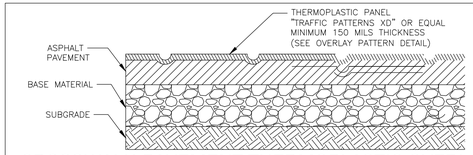
DET NO. 2-2



NOTE:
SYMBOL SHALL BE CENTERED IN PARKING STALL

ADA SYMBOL
N.T.S.

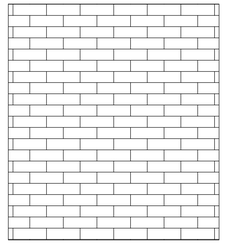
DET NO. 2-3



CROSSWALK PAVEMENT THERMOPLASTIC OVERLAY TYPICAL CROSS SECTION
N.T.S.

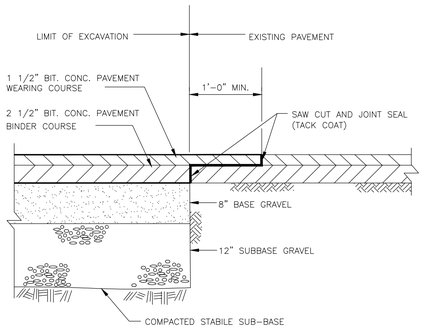
NOTES:

1. THERMOPLASTIC OVERLAY TO BE INSTALLED BY APPROVED ENNIS-FLINT APPLICATION CONTRACTOR.
2. THERMOPLASTIC OVERLAY PATTERN TO BE "OFFSET BRICK" TYPE WITH BRICK SIZE 4-3/4"X9-5/8"
3. THERMOPLASTIC OVERLAY COLOR TO BE "TRAFFIC PATTERNS XD" BRICK RED, PMS 7624C" OR EQUAL.
4. CONTRACTOR SHALL FOLLOW MANUFACTURERS SPECIFICATIONS DURING INSTALLATION.



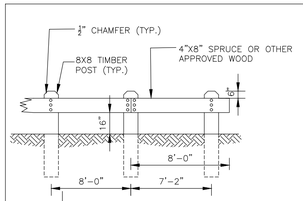
THERMOPLASTIC PANEL OVERLAY PATTERN DETAIL
N.T.S.

DET NO. 2-21



PAVEMENT MATCHING DETAIL
N.T.S.

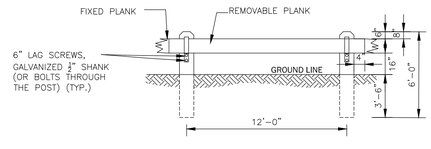
DET NO. 1-22



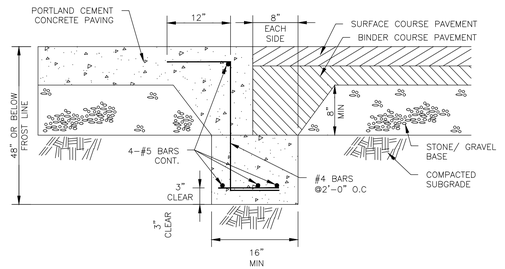
FIRST AND LAST POSTS OF EACH SECTION TO BE SET BACK TWELVE INCHES FROM THE GENERAL LINE OF POSTS WHEN FOUR OR MORE POSTS ARE REQUIRED. ALL WOOD MEMBERS SHALL BE GIVEN A PRESERVATIVE TREATMENT.

PLANK RAIL
N.T.S

NOTE:
THIS GUIDE RAIL IS INTENDED TO PROVIDE A VISUAL BARRIER AND GUIDE ALONG ROUTES WHERE OFF PAVEMENT CONDITIONS MAY BE CONSIDERED ROADSIDE HAZARDS. THIS GUIDE RAIL IS NOT INTENDED TO PREVENT VEHICLES FROM TRAVELLING OFF PAVEMENT AND WILL NOT WITHSTAND VEHICLE STRIKES.

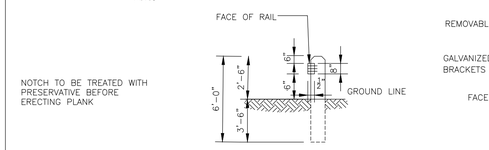


ENTRANCE THROUGH PLANK RAIL
N.T.S

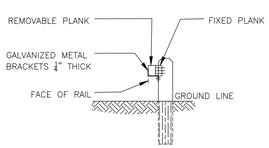


CONCRETE TO ASPHALT PAVING JOINT DETAIL
N.T.S.

DET NO. 1-17

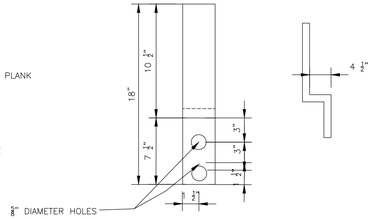


NOTCH TO BE TREATED WITH PRESERVATIVE BEFORE ERECTING PLANK

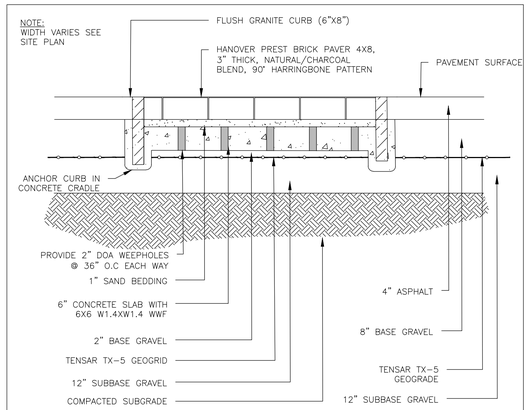


TIMBER GUIDE RAIL DETAIL
N.T.S

DET NO. 1-12

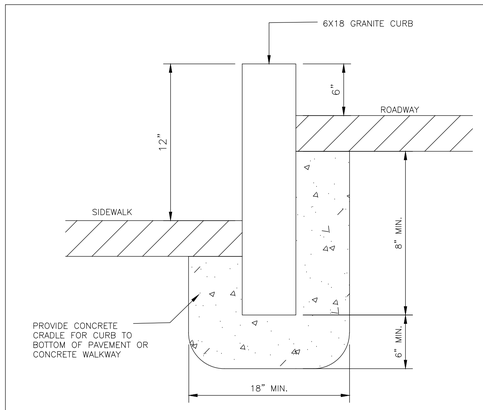


BRACKET DETAIL
N.T.S

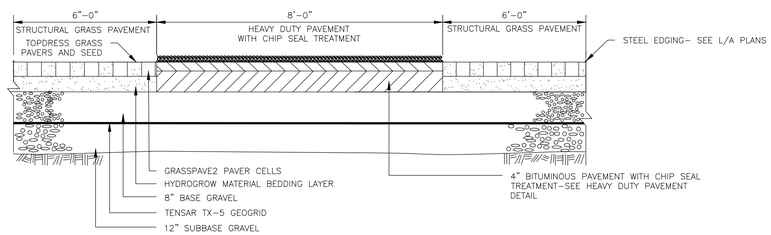


PAVER CROSSWALK DETAIL
N.T.S.

DET NO. 1-23



VERTICAL GRANITE CURB RETAINING WALL
N.T.S.



ROADWAY ELEMENTS TABLE		
STATION INTERVAL	RT CROSS SLOPE FROM CENTERLINE	LT CROSS SLOPE FROM CENTERLINE
35+00 TO 35+75	-2.0%	2.0%
36+25 TO 42+70	1.4%	-1.4%
43+20 TO END	-2.0%	2.0%

EMERGENCY ACCESS DRIVE DETAIL
N.T.S.

DET NO. 1-24

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

SITE DETAILS

DRAWING NUMBER:

C8.1

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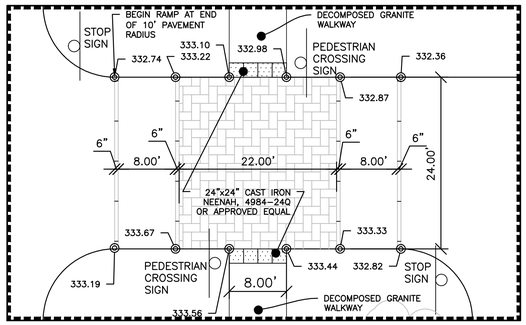
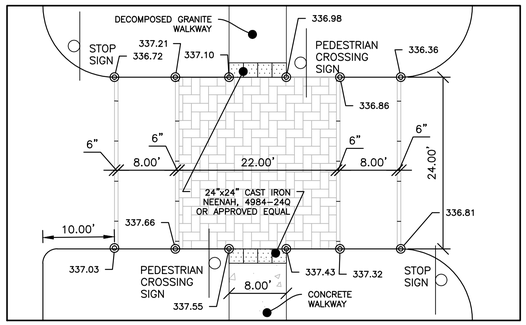


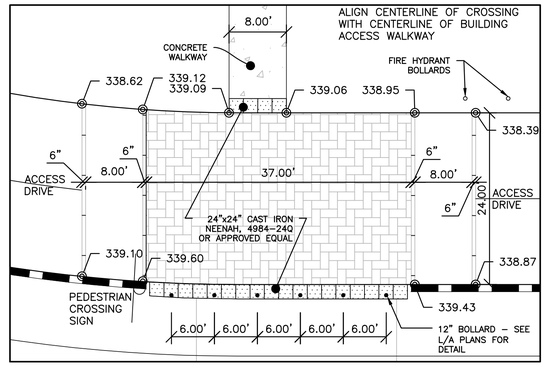
RAISED CROSSING A

SCALE: 1"=10'



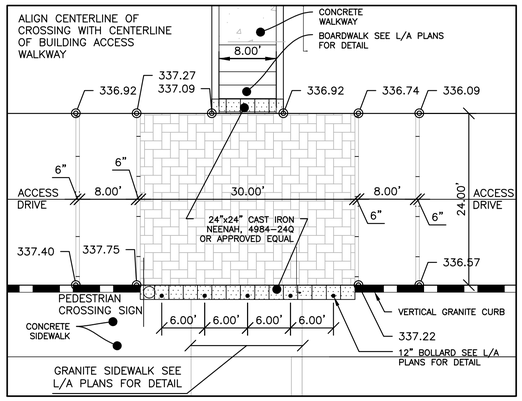
RAISED CROSSING B

SCALE: 1"=10'



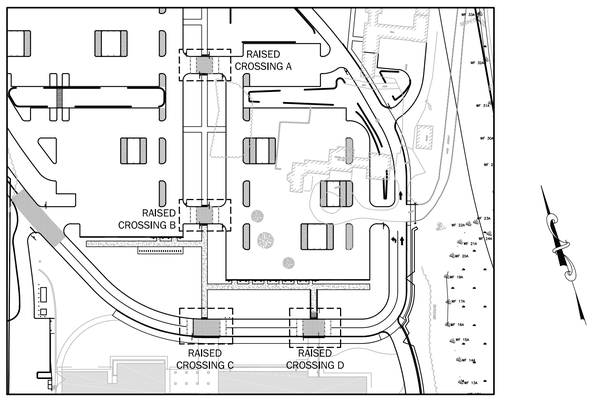
RAISED CROSSING C

SCALE: 1"=10'



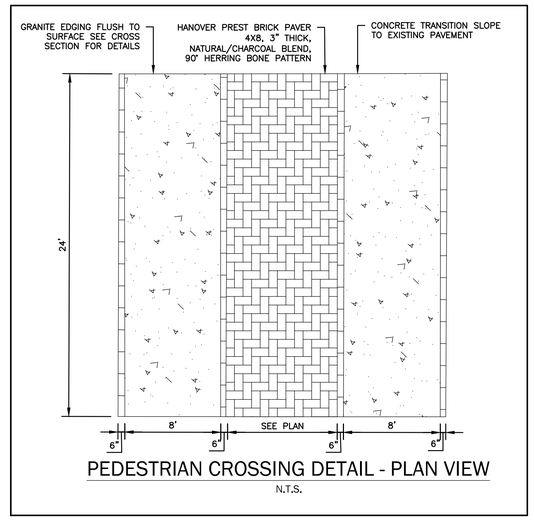
RAISED CROSSING D

SCALE: 1"=10'



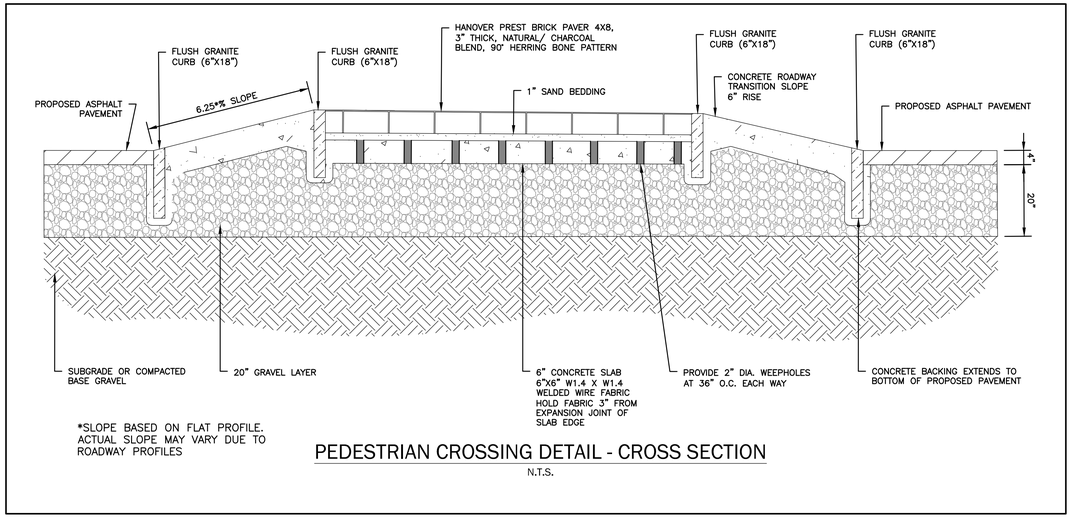
KEY PLAN

SCALE: 1"=100'



PEDESTRIAN CROSSING DETAIL - PLAN VIEW

N.T.S.



*SLOPE BASED ON FLAT PROFILE. ACTUAL SLOPE MAY VARY DUE TO ROADWAY PROFILES

PEDESTRIAN CROSSING DETAIL - CROSS SECTION

N.T.S.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

RAISED CROSSWALK DETAILS

DRAWING NUMBER:

C8.2

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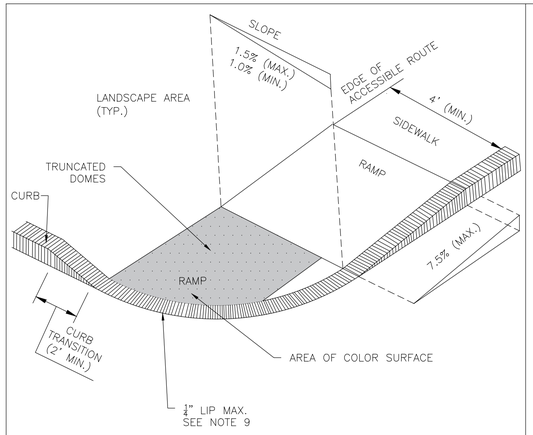
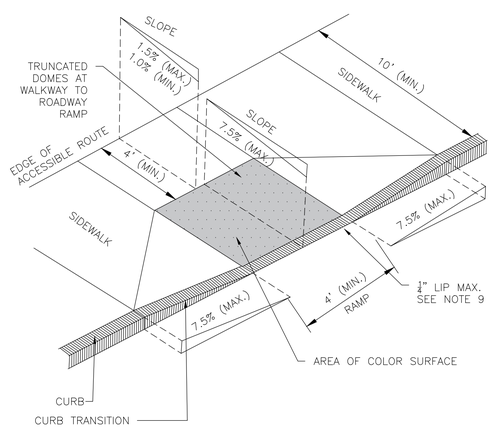


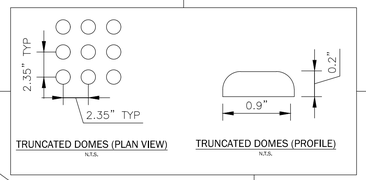
ADA CURB RAMP A

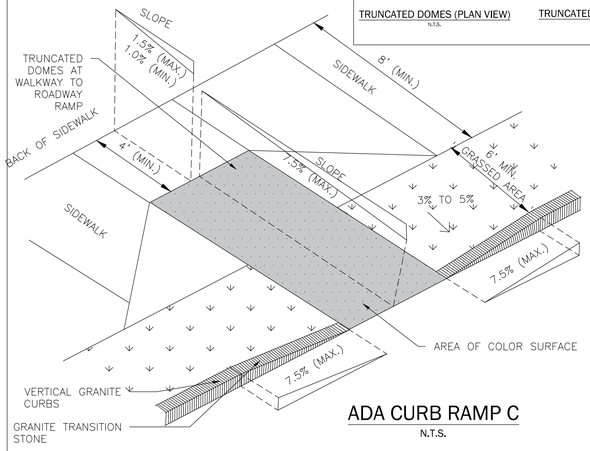
N.T.S.



ADA CURB RAMP B

N.T.S.





ADA CURB RAMP C

N.T.S.

DET NO. 1-25

NOTES:

1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5 (1% MIN.).
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE CURB RAMPS SHALL BE 7.5%.
4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (1.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. RAMP, CURB, AND ADJACENT PAVEMENTS SHALL BE GRADED TO PREVENT PONDING.
7. SEE TYPICAL SIDEWALK SECTION FOR RAMP SECTION CONSTRUCTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5'X5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ELIMINATE CURBING AT RAMP WHERE IT ABUTS ROADWAY, EXCEPT WHERE VERTICAL CURBING IS INDICATED ON THE DRAWINGS TO BE SET FLUSH.
10. DETECTABLE WARNINGS SHALL CONTRAST VISUALLY WITH ADJOINING SURFACES.
11. DETECTIBLE WARNINGS SHALL BE INSTALLED PERPENDICULAR TO THE ACCESSIBLE ROUTE.

ADA RAMP DETAILS

N.T.S.

SPECIFICATIONS

UNIT SIZE – 20" X 20" X 1"

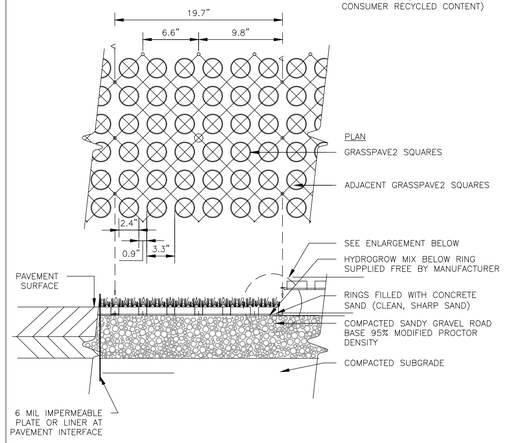
AVAILABLE IN 9 STANDARD ROLL SIZES

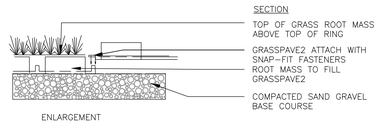
UNIT WEIGHT–18 OZ. OR 4.5 LBS

STRENGTH–5720 PSI

COLOR– BLACK (STANDARD)

RESIN– HDPE (WITH SOME POST–CONSUMER RECYCLED CONTENT)





NOTE:
GRASS/PLANT TYPES SHALL BE SPECIFIED BY A LANDSCAPE ARCHITECT OR LANDSCAPE DESIGNER

TYPICAL GRASSPAVE2 DETAIL

N.T.S.

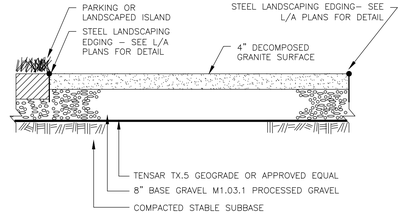
DET NO. 1–27

NOTES:

1. DECOMPOSED GRANITE MATERIAL SHALL CONSIST OF CRUSHED GRANITE SCREENINGS MIXED WITH STABILIZER
2. STONE SCREENING GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
3/8 INCH	100
No. 4	95–100
No. 8	75–80
No. 16	55–65
No. 30	40–50
No. 50	25–35
No. 100	20–25
No. 200	5–15

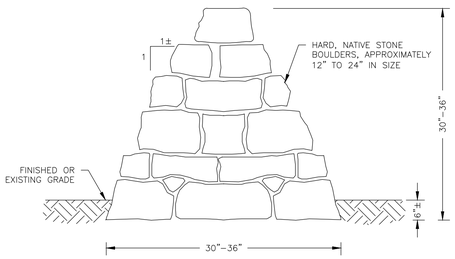
3. STABILIZER SHALL BE PSYLLIUM BASED, NON–TOXIC, COLORLESS, ODORLESS CONCENTRATED POWDER ORGANIC BINDER



DECOMPOSED GRANITE

NOT TO SCALE

DET NO. 3-30



FREESTANDING FIELDSTONE WALL

N.T.S.

DET NO. 3-31

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

SITE DETAILS

DRAWING NUMBER:

C8.3

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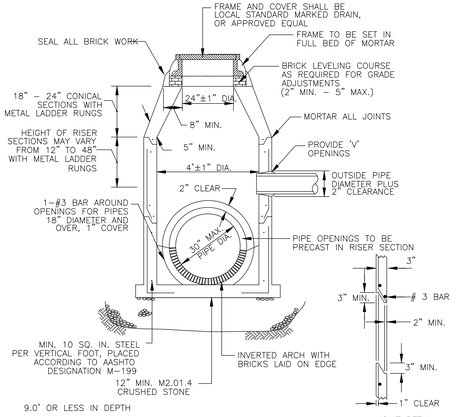
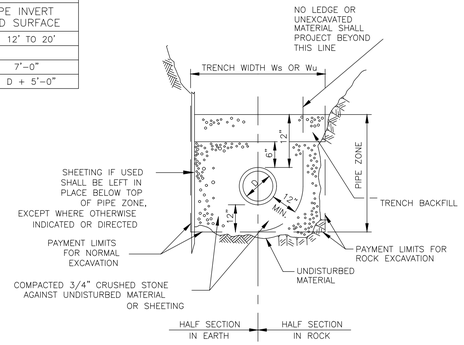


STANDARD DRAINAGE MANHOLE

N.T.S.

DET NO. 3-2

TRENCH WIDTH Ws OR Wu		
NOMINAL PIPE DIAMETER D	DEPTH OF PIPE INVERT BELOW GROUND SURFACE	
	0 TO 12'	12' TO 20'
24" AND SMALLER	5'–0"	7'–0"
OVER 24"	D + 3'–0"	D + 5'–0"



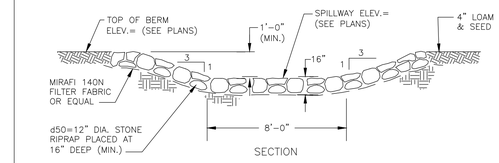
NOTES:

1. TRENCH BACKFILL TO BE USED WITHIN THE RIGHT–OF–WAY SHALL CONSIST OF EITHER GRAVEL BORROW MEETING MASSDOT SPECIFICATION M1.03.0, TYPE "B" OR PROCESSED GRAVEL BRORROW FOR SUBBASE MEETING MASSDOT SPECIFICATION M1.03.1
2. WHERE THE REMOVAL OF 100 SQUARE FEET OR LESS OF ASPHALT IS REQUIRED WITHIN THE RIGHT–OF–WAY, THEN THE TRENCH BACKFILL MATERIAL SHALL CONSIST OF CONTROLLED DENSITY FILL MEETING MASSDOT SPECIFICATION M4.08.0, TYPE "1E" OR "2E".
3. TRENCH BACKFILL MATERIAL TO BE USED OUTSIDE OF THE RIGHT–OF–WAY MAY CONSIST OF MATERIAL GENERATED DURING EXCAVATIONS PROVIDED ALL STONES GREATER THAN 4" ARE REMOVED PRIOR TO PLACEMENT AND COMPACTION.
4. GRANULAR TRENCH BACKFILL MATERIAL USED WITHIN THE RIGHT–OF–WAY SHALL BE PLACED IN MAXIMUM 6" LIFTS AND MECHANICALLY COMPACTED TO A MINIMUM OF 95% OF THE MATERIAL'S MAXIMUM DRY DENSITY AND 90% ELSEWHERE AS DETERMINED BY ASTM D 1557.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGNING AND MAINTAINING PROPER TRENCH PROTECTION AND OBTAINING ALL REQUIRED PERMITS.

STORM DRAIN TRENCH SECTION

N.T.S.

DET NO. 3-3

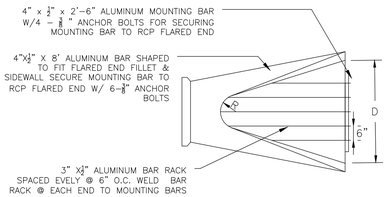


SECTION

BASIN SPILLWAY SECTION

N.T.S.

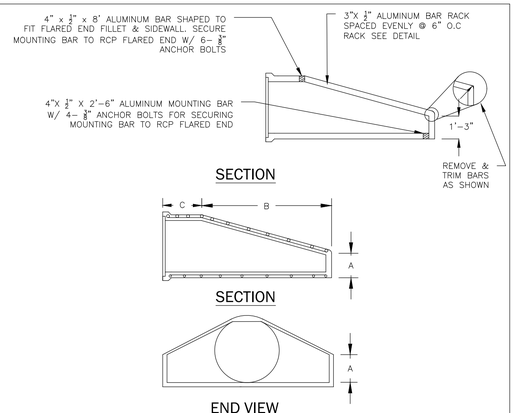
DET NO. 3-13



PLAN VIEW - TYP. EACH PIPE

DIA.	A	B	C	D	E	R
18"	9"	2'–3"	3'–10"	3'–0"	2 1/2"	11"
24"	9 1/2"	3'–7 1/2"	2'–6"	4'–0"	3"	14"
30"	12"	4'–6"	1'–7 1/4"	5'0"	3 1/2"	15"
36"	15"	5'–3"	2'–10 3/4"	6'–0"	4"	20"
42"	21"	5'–3"	2'–11"	6'–6"	4 1/2"	22"
48"	24"	6'–0"	2'–2"	7'–0"	5"	22"
54"	27"	5'–5"	2'–11"	7'–6"	5 1/2"	24"
60"	30"	5'–0"	3'–3"	8'–0"	6"	24"

NOTE:
JOINTS MAY BE FURNISHED WITH EITHER BELL & SPIGOT OR TOUNGE AND GROOVE ENDS.

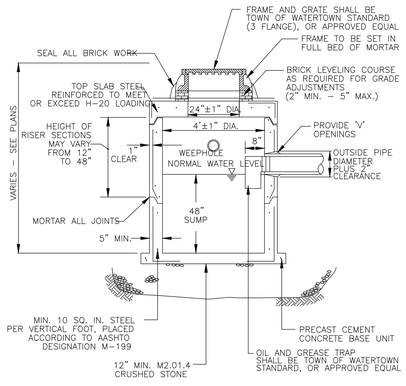


*USE FIELD MITRE FOR CULVERTS WITH A DIAMETER LESS THAN 18"
*BAR RACKS ARE ONLY REQUIRED ON PIPES 18" AND OVER IN SIZE.

FLARED END WITH BAR RACK DETAIL

N.T.S.

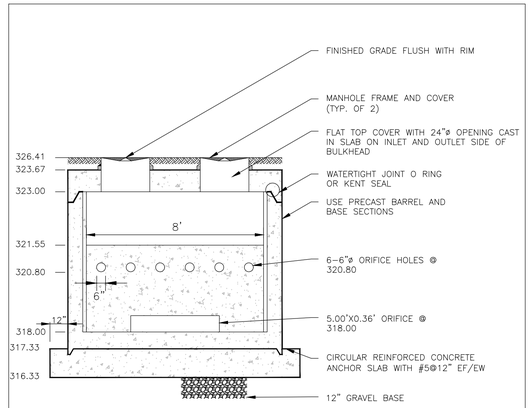
DET NO. 3-15



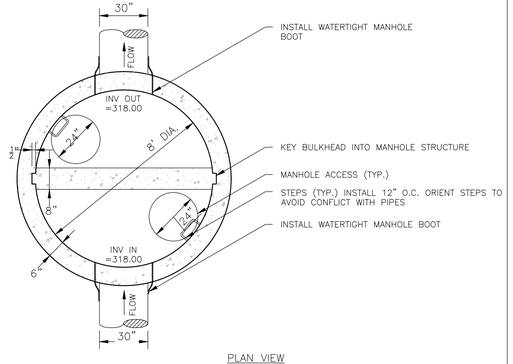
STANDARD CATCH BASIN

N.T.S.

DET NO. 3-1



SECTION VIEW

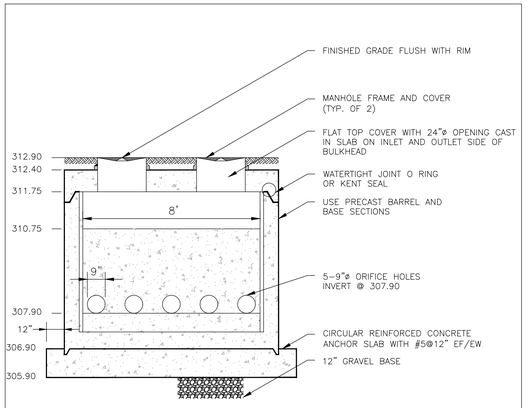


PLAN VIEW

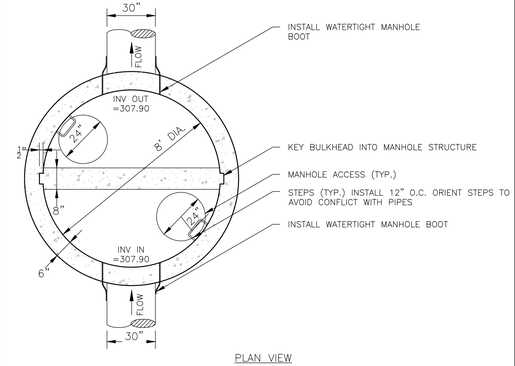
OUTLET CONTROL STRUCTURE #1

N.T.S.

DET NO. 3-14



SECTION VIEW



PLAN VIEW

OUTLET CONTROL STRUCTURE #2

N.T.S.

DET NO. 3-17

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MORFY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

STORMWATER DETAILS

DRAWING NUMBER:

C8.4

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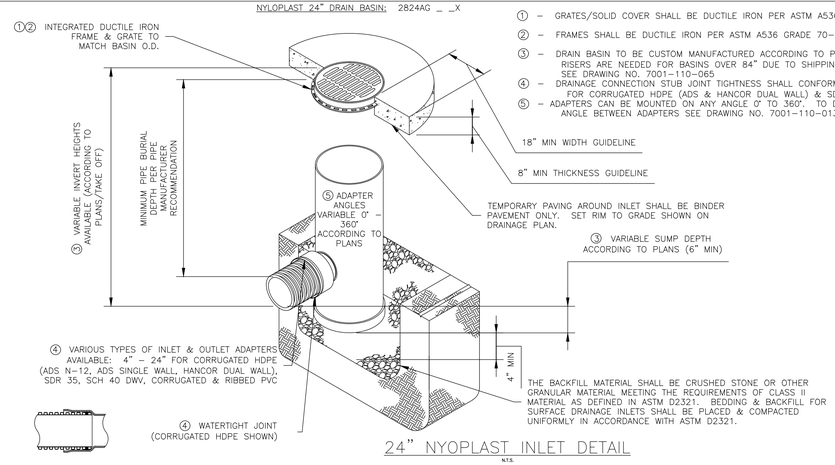
NYLOPLAST 24" DRAIN BASIN: 2824AG _ _X



① – GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70–50–05.

② – FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70–50–05

③ – DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 84" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001–110–065.

④ – DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC

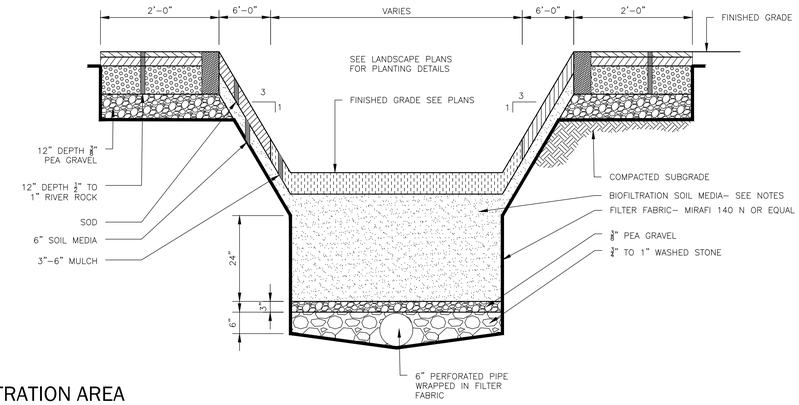
⑤ – ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001–110–013.

24" NYOPLAST INLET DETAIL

N.T.S

DET NO.
3–6

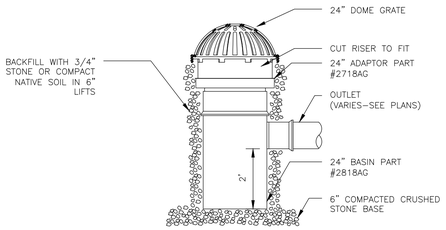
NOTES:
1. THE SOIL MIX FOR BIOFILTRATION AREAS SHALL BE AS FOLLOWS:
   –40% SAND
   –20% TO 30% TOPSOIL
   –30% TO 40% COMPOST
2. SOIL MIX SHALL BE UNIFORM, FREE OF STONE, STUMPS, ROOTS OR SIMILAR OBJECTS LARGER THAN 2 INCHES. CLAY CONTENT SHOULD NOT EXCEED 5%.
3. SOIL PH SHALL BE BETWEEN 5.5 AND 6.5.
4. USE SOILS WITH 1.5% TO 3% ORGANIC CONTENT AND MAXIMUM 500–PPM SOLUBLE SALTS.
5. SAND SHALL BE GRAVELLY SAND THAT MEETS ASTM D 422.
6. TOPSOIL SHALL BE A SANDY LOAM, LOAMY SAND OR LOAM TEXTURE.
7. COMPOST SHALL BE PROCESSED FROM YARD WASTE IN ACCORDANCE WITH MASS DEP GUIDELINES. THE COMPOST SHALL NOT CONTAIN BIOSOLIDS.



BIOFILTRATION AREA

N.T.S

DET NO.
3-18

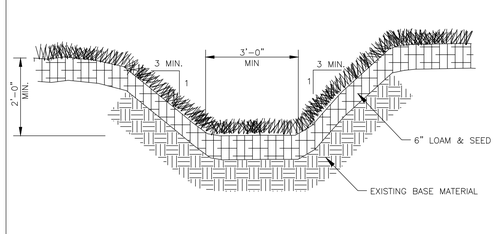


CROSS SECTION

TYPICAL BEEHIVE DRAIN

N.T.S.

DET NO.
3-16



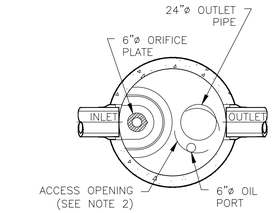
TYPICAL SWALE

N.T.S.

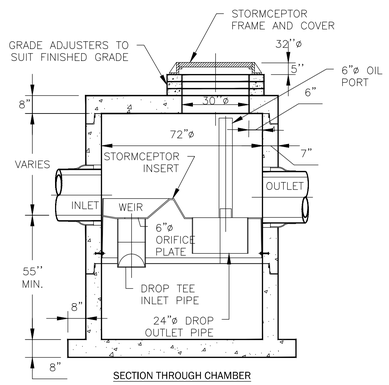
DET NO.
3-8

NOTES:

1. THE USE OF FLEXIBLE CONNECTION IS RECOMMENDED AT THE INLET AND OUTLET WHERE APPLICABLE.
2. THE COVER SHOULD BE POSITIONED OVER THE OUTLET DROP PIPE AND THE OIL PORT.
3. THE STORMCEPTOR SYSTEM IS PROTECTED BY ONE OR MMORE OF THE FOLLOWING U.S. PATENTS #4985148, #5498331, #5725760, #5753115, #5849181, #6068765, #6371690.
4. CONTACT A CONCRETE PIPE DIVISION REPRESENTATIVE FOR FURTHER DETAILS NOT LISTED ON THIS DRAWING



PLAN VIEW

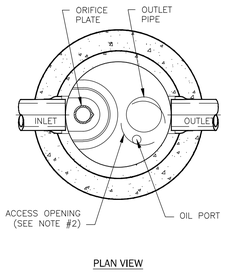


SECTION THROUGH CHAMBER

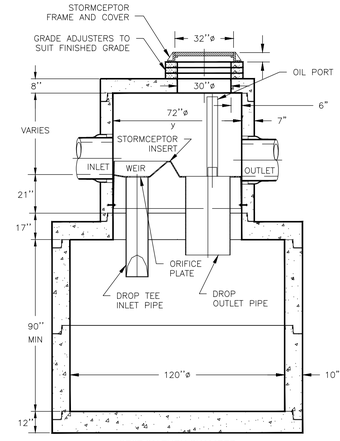
STORMCEPTOR STC 900 DETAIL

N.T.S.

DET NO.
3-10



PLAN VIEW



SECTION THRU CHAMBER

STORMCEPTOR 4800 DETAIL

NOT TO SCALE

DET NO.
3-19

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

STORMWATER DETAILS

DRAWING NUMBER:

C8.5

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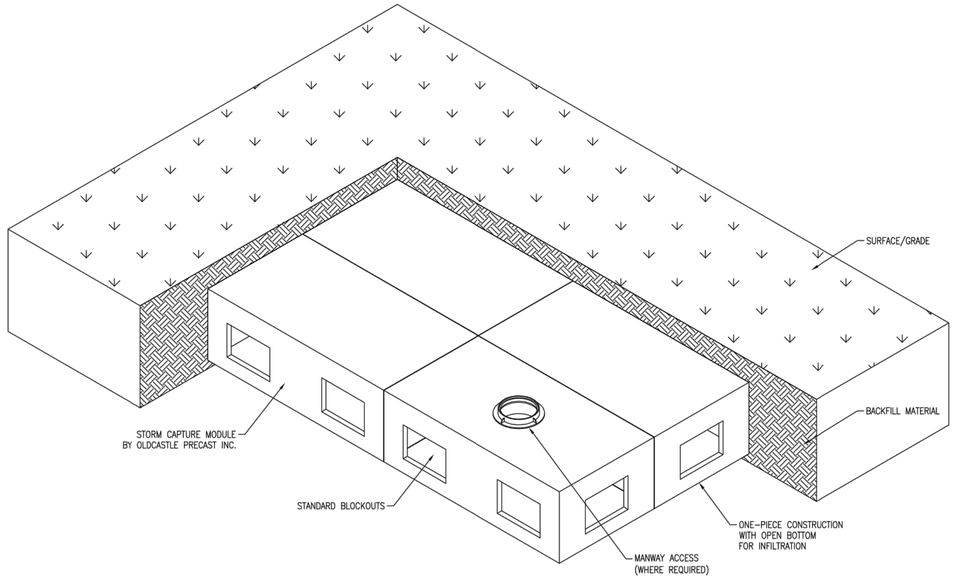
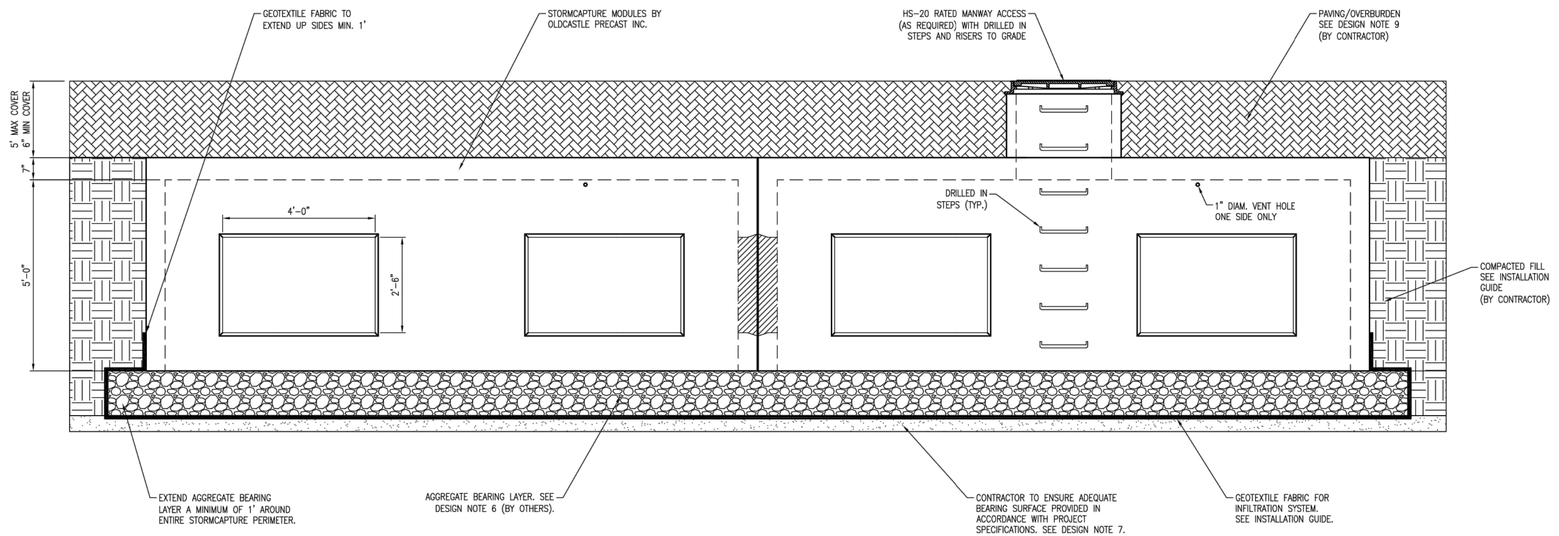
NOTE: DETAILS PROVIDED BY OLDCASTLE STORMWATER SOLUTIONS FOR STORMCAPTURE SYSTEM



INFILTRATION MODULE ISO VIEW

N.T.S.



TYPICAL ELEVATION

N.T.S.

NOTE:
FOR INFILTRATION - EXFILTRATION SYSTEMS, THE AGGREGATE SUBGRADE MUST BE WASHED AND CLEAN.

BEALS·ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER

1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

STORMCAPTURE DETAILS

DRAWING NUMBER:

C8.6

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NOTE: DETAILS PROVIDED BY OLDCASTLE STORMWATER SOLUTIONS FOR STORMCAPTURE SYSTEM

GENERAL NOTES:

THE STORMCAPTURE™ SYSTEM BY OLDCASTLE PRECAST IS PART OF THE STORMWATER MANAGEMENT SYSTEM FOR THE RESPECTIVE SITE, AS PREPARED BY THE PROJECT DESIGN ENGINEER. IT IS THE RESPONSIBILITY OF THE DESIGN ENGINEER TO DETERMINE DESIGN LOW RATES, PRE-TREATMENT AND POST-TREATMENT REQUIREMENTS, STORAGE VOLUME, AND ENSURE THE FINAL DESIGN MEETS ALL CONVEYANCE AND STORAGE REQUIREMENTS. SYSTEM DESIGN AND TYPE, SOIL ANALYSIS, LOADING REQUIREMENTS, COVER HEIGHT AND MODULE SIZE DETERMINE THE FOUNDATION TYPE AND REQUIREMENTS AS STATED HEREIN. ANY VARIATIONS FOUND DURING CONSTRUCTION FROM THE SITE AND SYSTEM ANALYSIS MUST BE REPORTED TO THE PROJECT DESIGN ENGINEER. THE PROJECT DESIGN ENGINEER IS RESPONSIBLE FOR OBTAINING A GEOTECHNICAL ENGINEERING REPORT VERIFYING THE BEARING CAPACITY STATED IN DESIGN NOTES.

DESIGN NOTES:

1. DESIGN LOADINGS:
   - A. AASHTO HS20-4 W/ IMPACT.
   - B. DEPTH OF COVER = 6" - 5'-0" (120 PCF ASSUMED).
   - C. ASSUMED WATER TABLE = BELOW BOTTOM OF PRECAST.
   - D. DRY LATERAL EARTH PRESSURE (EFP) = 45 PCF.
   - E. LATERAL LIVE LOAD SURCHARGE = 80 PSF (APPLIED TO 8' BELOW GRADE).
   - F. NO LATERAL SURCHARGE FROM ADJACENT STRUCTURES.
2. CONCRETE 28 DAY COMPRESSIVE STRENGTH SHALL BE 6,000 PSI.
3. STEEL REINFORCEMENT: REBAR, ASTM A-615 OR A-706, GRADE 60.
4. CEMENT: ASTM C-150 SPECIFICATION.
5. STORMCAPTURE MODULE TYPE = INFILTRATION.
6. DEPTH OF AGGREGATE BEARING LAYER TO BE DETERMINED BY GEOTECHNICAL ENGINEER (SEE OLDCASTLE TECH NOTE SC-01).
7. ALLOWABLE SOIL BEARING PRESSURE ADDRESSED IN OLDCASTLE TECH NOTE SC-01.
8. REFERENCE STANDARDS:
   - A. ASTM C 890
   - B. ASTM C 891
   - C. ASTM C 913
9. ANY DESIGN CONSTRAINT DIFFERENT FROM ABOVE REQUIRES CUSTOM STRUCTURAL DESIGN AND MAY REQUIRE THICKER SUBGRADE AND REVISED PRICING.

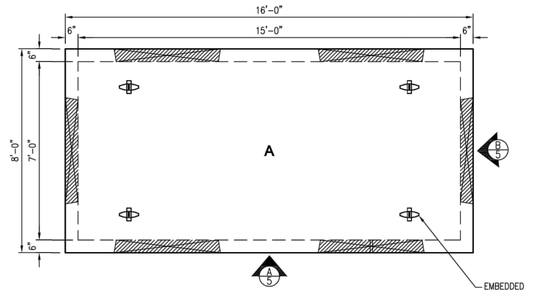
INSTALATION NOTES:

THE STORMCAPTURE™ MODULE SYSTEM IS TO BE INSTALLED IN ACCORDANCE WITH ASTM C891, INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES. PROJECT PLAN AND SPECIFICATIONS MUST BE FOLLOWED ALONG WITH ANY APPLICABLE REGULATIONS.

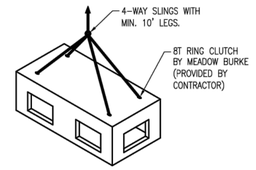
1. PLAN LINE, GRADE AND ELEVATIONS MUST BE FOLLOWED.
2. WHERE SPECIFIED, AN 8 OZ. NON-WOVEN GEOTEXTILE FABRIC MUST BE USED AS A SEPARATION LAYER AROUND THE STORM CAPTURE SYSTEM.
3. PENETRATIONS IN THE GEOTEXTILE MAY ONLY BE MADE WITH SMOOTH WALL PIPES. MAKE PENETRATIONS FOR AL OUTLETS BEFORE MAKING PENETRATIONS FOR ANY INLETS.
4. THE AGGREGATE BEARING LAYER SHALL CONSIST OF CLEAN, DURABLE CRUSHED AGGREGATE COMPACTED AS DIRECTED BY THE ENGINEER. OLDCASTLE RECOMMENDS MATERIALS SUCH AS NO. 56 OR NO. 57 STONE PER ASTM C33.
5. DESIGNATED EMBEDDED LIFTERS MUST BE USED. USE PROPER RIGGING TO ASSURE ALL LIFTERS ARE EQUALLY ENGAGED WITH A MINIMUM 60 DEGREE ANGLE ON SLINGS AS NOTED AND IN ACCORDANCE WITH OLDCASTLE LIFTING PROCEDURES.
6. MODULES MUST BE PLACED AS CLOSE TOGETHER AS POSSIBLE, AND GAPS SHALL NOT BE GREATER THAN 3/4". AL EXTERIOR SYSTEM JOINTS SHALL BE COVERED WITH A MIN. 8" JOINT WRAP ON SIDES AND TOP (CS-212 CONCEAL OR EQUIVALENT). INSTALL ONE ROW CS-102 CONCEAL (OR EQUIVALENT) BETWEEN PRECAST PIECES.
7. AUTHORIZATION SHALL BE GIVEN BY THE PROJECT ENGINEER OR DESIGNATED PERSON PRIOR TO PLACEMENT ON BACKFILL FOR THE SYSTEM. CARE SHOULD BE TAKEN DURING PLACEMENT OF BACKFILL NOT TO DISPLACE MODULES OR JOINT WRAP. BACKFILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY OR AS SPECIFIED, AND SHOULD NOT BE COMPACTED WITHIN 6" OF MODULE.
8. CONSTRUCTION EQUIPMENT EXCEEDING DESIGN LOADING SHALL NOT BE ALLOWED ON STRUCTURE.

SPLASH PADS, INLETS AND RISERS:

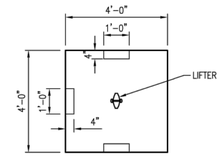
PLACE SPLASH PADS AS DESIGNATED TO PREVENT SCOUR FROM INLETS AND INLET PIPES. ALL PIPE INLETS SHAL EXTEND INSIDE MODULE A MINIMUM OF 4". PLACE A NON-SHRINK, NON-METALIC GROUT, MIN. 3.0 PSI IN ANULAR SPACE TO ELIMINATE ALL VOIDS.



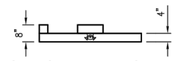
STORMCAPTURE PLAN VIEW
N.T.S.



MODULE LIFTING DETAIL
N.T.S.

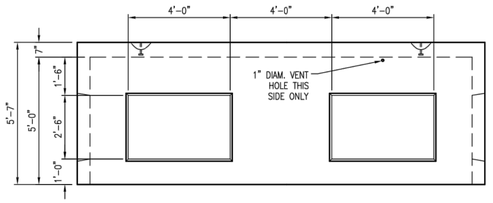


SPLASH PAD PLAN



SPLASH PAD PROFILE

SPLASH PAD DETAIL
N.T.S.



VIEW A
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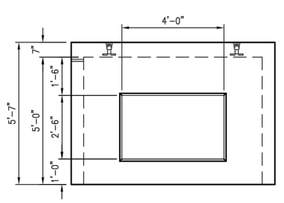

VIEW B
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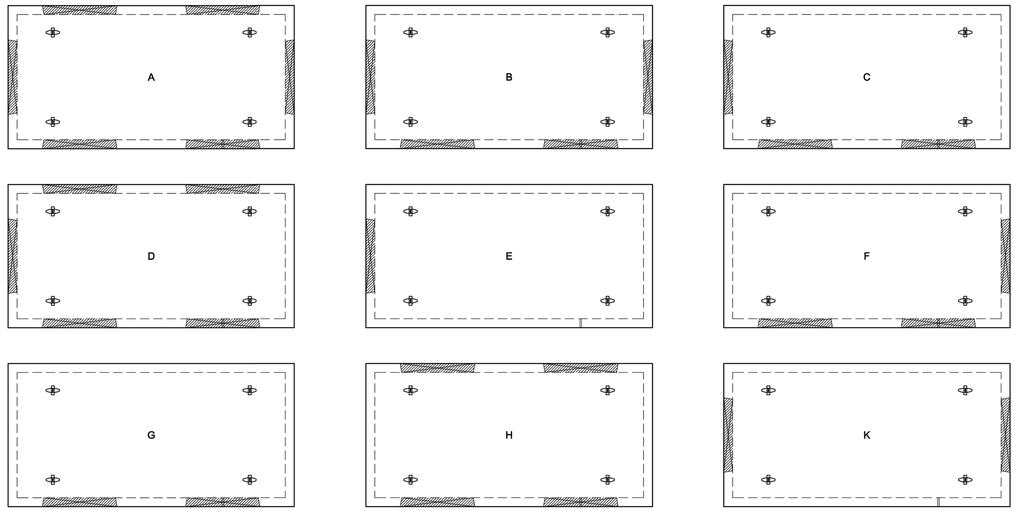
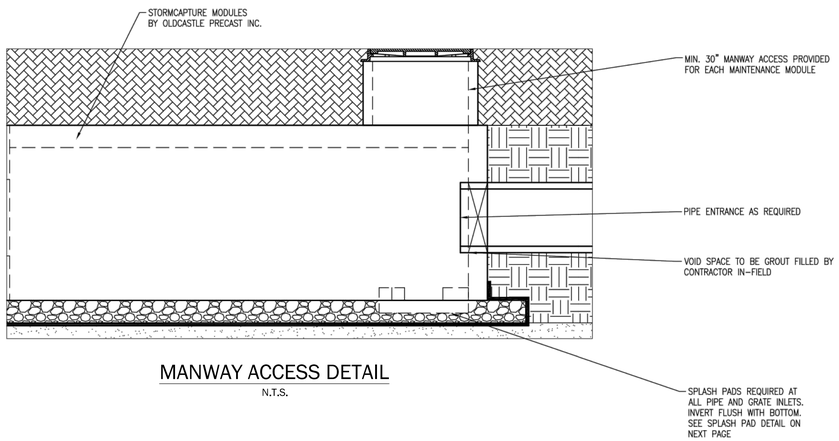


MODULE JOINT DETAIL
N.T.S.



MANWAY ACCESS DETAIL
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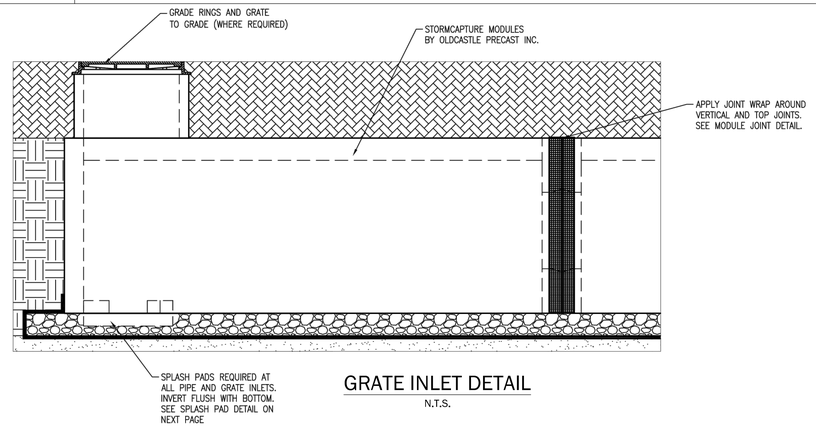

GRATE INLET DETAIL
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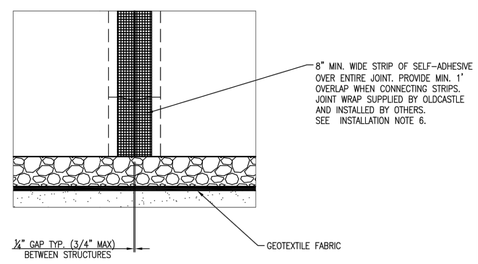

MODULE JOINT DETAIL
N.T.S.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

STORMCAPTURE DETAILS

DRAWING NUMBER:

C8.7

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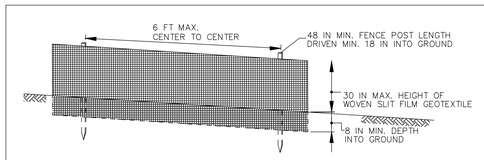
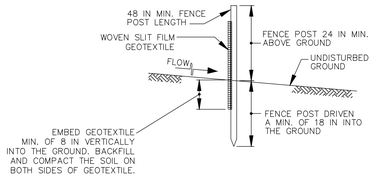
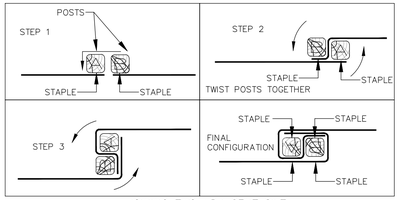


ELEVATION



CROSS SECTION



JOINING TWO ADJACENT SILT FENCE SECTIONS (TOP VIEW)

CONSTRUCTION SPECIFICATIONS

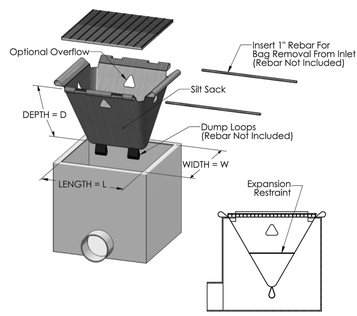
1. USE WOOD POSTS 1⅜ X 1¾ ± 1/16 INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT.
2. USE 48 INCH MINIMUM POSTS DRIVEN 18 INCH MINIMUM INTO GROUND NO MORE THAN 8 FEET APART.
3. USE WOVEN SLIT FILM GEOTEXTILE AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION.
4. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC.
5. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL.
6. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE.
7. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE.

SILT FENCE DETAIL

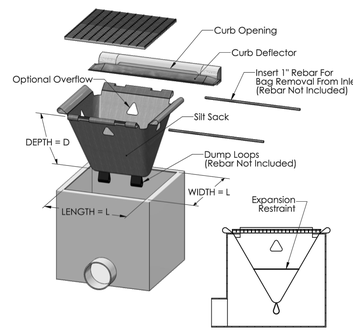
N.T.S.

DET NO. 4.2

Silt Sack - Type A



Silt Sack - Type B



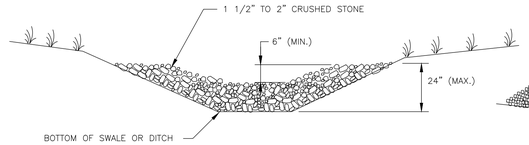
NOTES:

1. SILTSACKS SHOULD BE INSPECTED AFTER EVERY MAJOR RAIN EVENT GREATER THAN 0.25 INCHES.
2. IF THERE HAVE BEEN NO MAJOR RAIN EVENTS, SILTSACKS SHOULD BE INSPECTED EVERY TWO TO THREE WEEKS.
3. WHEN THE EXPANSION RESTRAINT CORD IS NO LONGER VISIBLE, SILTSACKS SHOULD EITHER BE REMOVED, CLEANED AND REINSTALLED, OR DISCARDED AND REPLACED.

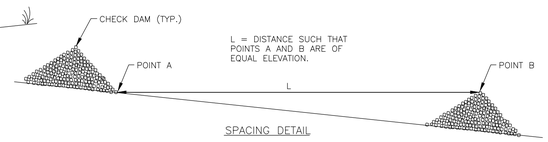
SILTSACK INSTALLATION DETAIL

N.T.S.

DET NO. 4.5

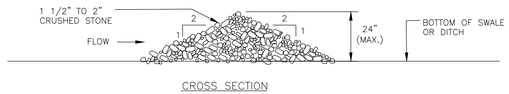


ELEVATION



L = DISTANCE SUCH THAT POINTS A AND B ARE OF EQUAL ELEVATION.

SPACING DETAIL



CROSS SECTION

GUIDELINES:
– THE DRAINAGE AREA OF THE DITCH OR SWALE BEING PROTECTED SHOULD NOT EXCEED 10 ACRES EXCEPT AS MAY BE REQUIRED BY THE PLANS.
– THE MAXIMUM HEIGHT OF THE CHECK DAM SHALL NOT EXCEED ONE HALF THE DEPTH OF THE CHANNEL.
– THE MAXIMUM SPACING BETWEEN THE CHECK DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM DAM.

MAINTENANCE:
– SEDIMENT MUST BE REMOVED WHEN IT ACCUMULATES TO 25% OF THE ORIGINAL HEIGHT OF THE CENTER OF THE CHECK DAM. SPOILS ARE TO BE PLACED WHERE THEY WILL NOT BE WASHED BACK INTO A DRAINAGE SYSTEM OR WETLAND AREA.

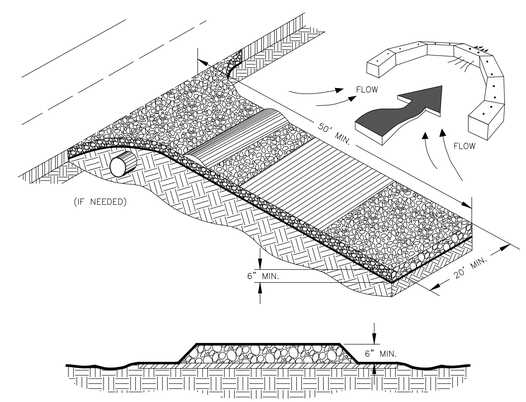
SPACING BETWEEN CHECK DAMS

SLOPE (FT./FT.)	L (FT.)
0.020	100
0.030	66
0.040	50
0.050	40
0.080	25
0.100	20

TEMPORARY STONE CHECK DAM

N.T.S.

DET NO. 4.3



NOTES:
1. STONE SHALL BE COURSE AGGREGATE, 2 TO 3 INCH STONE.
2. THE LENGTH OF THE CONSTRUCTION EXIT SHALL NOT BE LESS THAN 50 FEET, EXCEPT FOR A SINGLE FAMILY RESIDENTIAL LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY.
3. THE MINIMUM THICKNESS OF THE STABILIZED EXIT SHALL NOT BE LESS THAN 8 INCHES.
4. THE WIDTH SHALL NOT BE LESS THAN THE FULL WIDTH OF THE INGRESS OR EGRESS POINT OR 20 FEET, WHICHEVER IS GREATER.
5. GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE. FILTER CLOTH IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENTIAL LOT.
6. AVOID LOCATING ON STEEP SLOPES OR AT CURVES ON PUBLIC ROADS.
7. ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SIDE SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR PIPE.
8. WASHRACKS AND/OR TIRE WASHERS MAY BE REQUIRED DEPENDING ON SCALE AND CIRCUMSTANCE. IF NECESSARY, WASHRACK DESIGN MAY CONSIST OF ANY MATERIAL SUITABLE FOR TRUCK TRAFFIC THAT WILL REMOVE MUD AND DIRT.
9. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH, OR WATERCOURSE THROUGH THE USE OF SAND BAGS, GRAVEL, BOARDS OR OTHER APPROVED METHODS.
10. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED PROMPTLY.

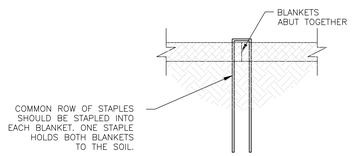
STABILIZED CONSTRUCTION ENTRANCE N.T.S.

DET NO. 4.6



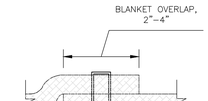
SLOPE CREST ANCHOR METHOD "A" (NO TRENCH)

DO NOT NEED TO TRENCH BLANKET IN IF IT CAN BE EXTENDED A MINIMUM OF 3'-0" OVER THE CREST OF THE SLOPE.

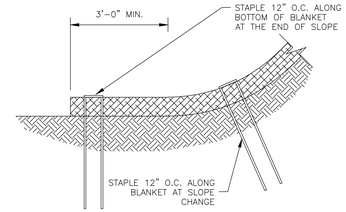


SIDE SEAM ABUT STAPLE DETAIL

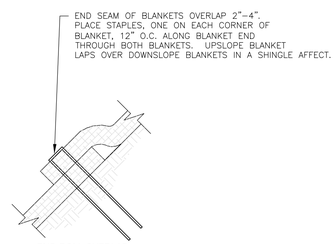
SLOPE DETAIL



SIDE SEAM OVERLAP STAPLE DETAIL



BOTTOM OF SLOPE TERMINATION



END ROLL OVERLAP

CURLEX BLANKET

N.T.S.

DET NO. 4.4

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

EROSION CONTROL DETAILS

DRAWING NUMBER:

C8.8

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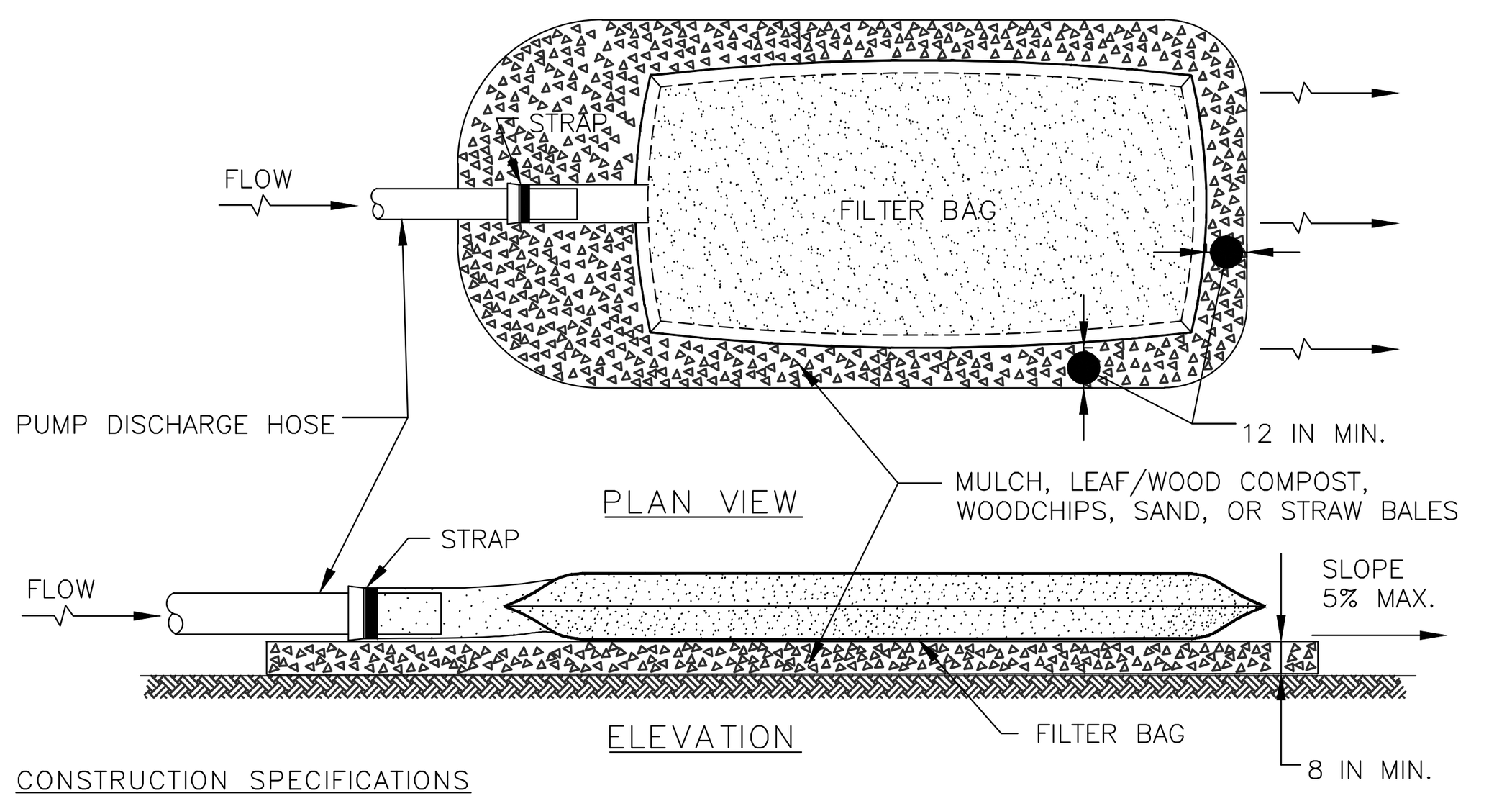


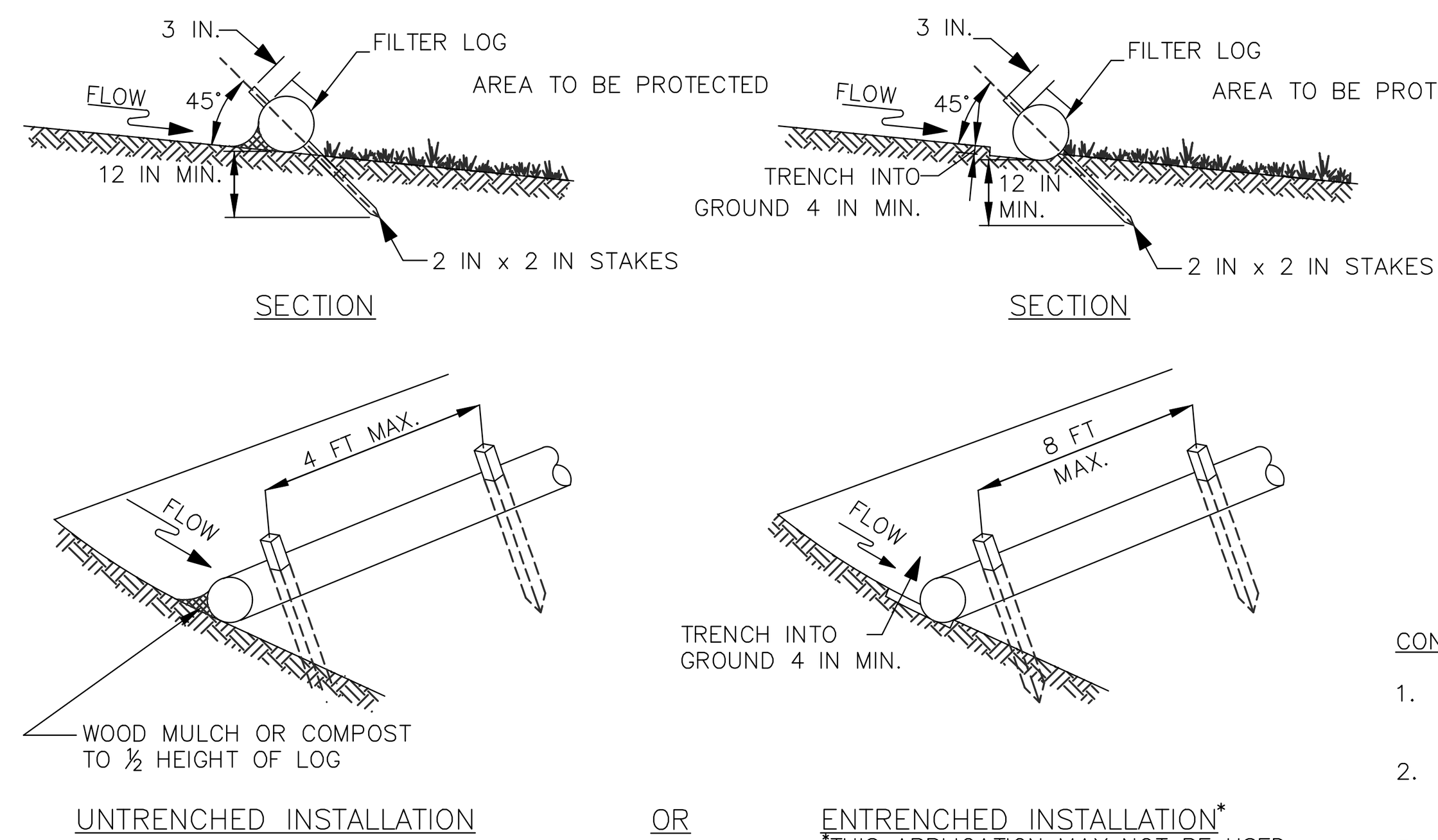
CONSTRUCTION SPECIFICATIONS

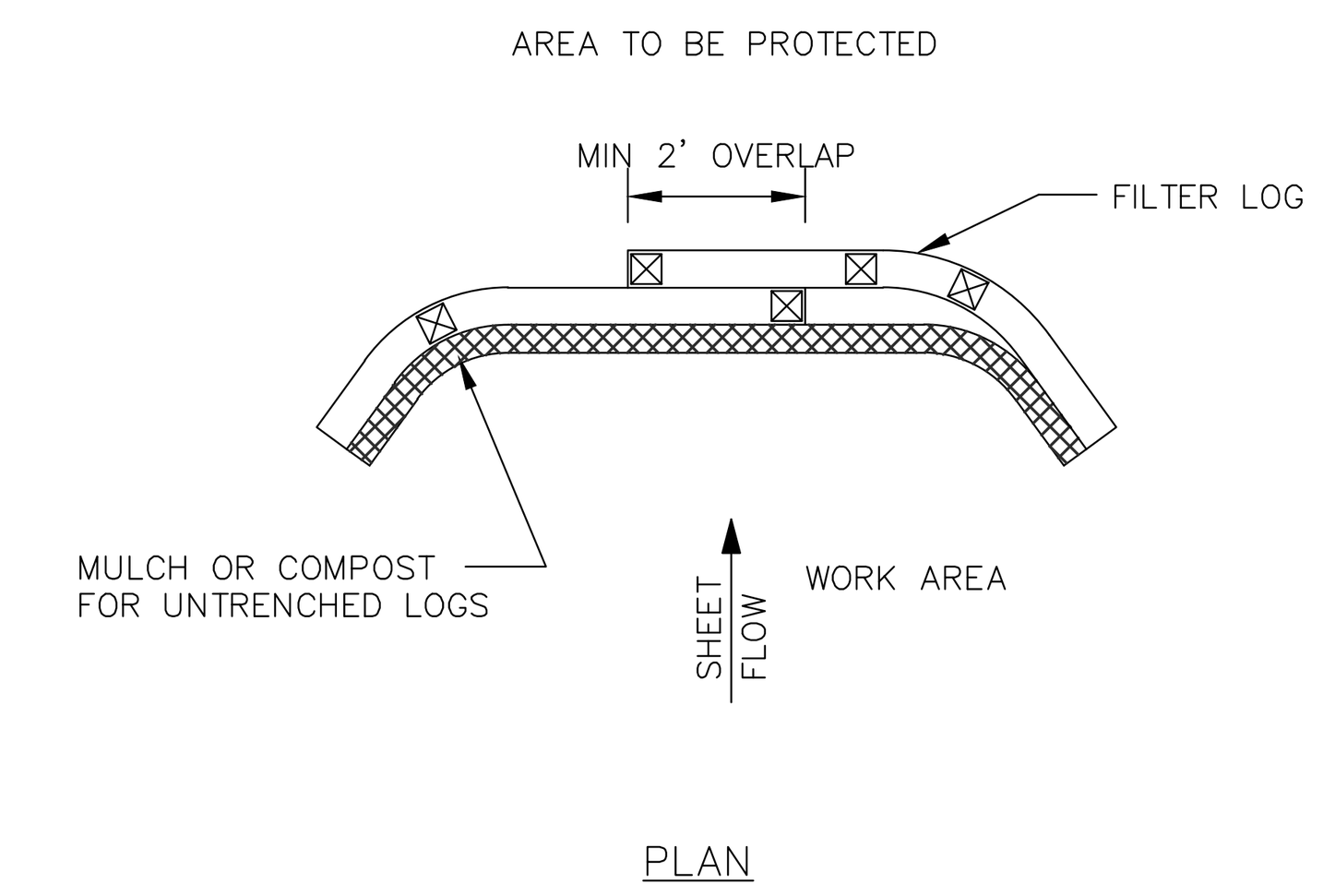
1. TIGHTLY SEAL SLEEVE AROUND THE PUMP DISCHARGE HOSE WITH A STRAP OR SIMILAR DEVICE.
2. PLACE FILTER BAG ON SUITABLE BASE (E.G., MULCH, LEAF/WOOD COMPOST, WOODCHIPS, SAND, OR STRAW BALES) LOCATED ON A LEVEL OR 5% MAXIMUM SLOPING SURFACE. DISCHARGE TO A STABILIZED AREA. EXTEND BASE A MINIMUM OF 12 INCHES FROM EDGES OF BAG.
3. CONTROL PUMPING RATE TO PREVENT EXCESSIVE PRESSURE WITHIN THE FILTER BAG IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS. AS THE BAG FILLS WITH SEDIMENT, REDUCE PUMPING RATE.
4. REMOVE AND PROPERLY DISPOSE OF FILTER BAG UPON COMPLETION OF PUMPING OPERATIONS OR AFTER BAG HAS REACHED CAPACITY, WHICHEVER OCCURS FIRST. SPREAD THE DEWATERED SEDIMENT FROM THE BAG IN AN APPROVED UPLAND AREA AND STABILIZE WITH SEED AND MULCH BY THE END OF THE WORK DAY. RESTORE THE SURFACE AREA BENEATH THE BAG TO ORIGINAL CONDITION UPON REMOVAL OF THE DEVICE.
5. REPLACE FILTER BAG IF BAG CLOGS OR HAS RIPS, TEARS, OR PUNCTURES. DURING OPERATION KEEP CONNECTION BETWEEN PUMP HOSE AND FILTER BAG WATER TIGHT. REPLACE BEDDING IF IT BECOMES DISPLACED.

FILTER BAG

N.T.S.

DET NO. 4-1





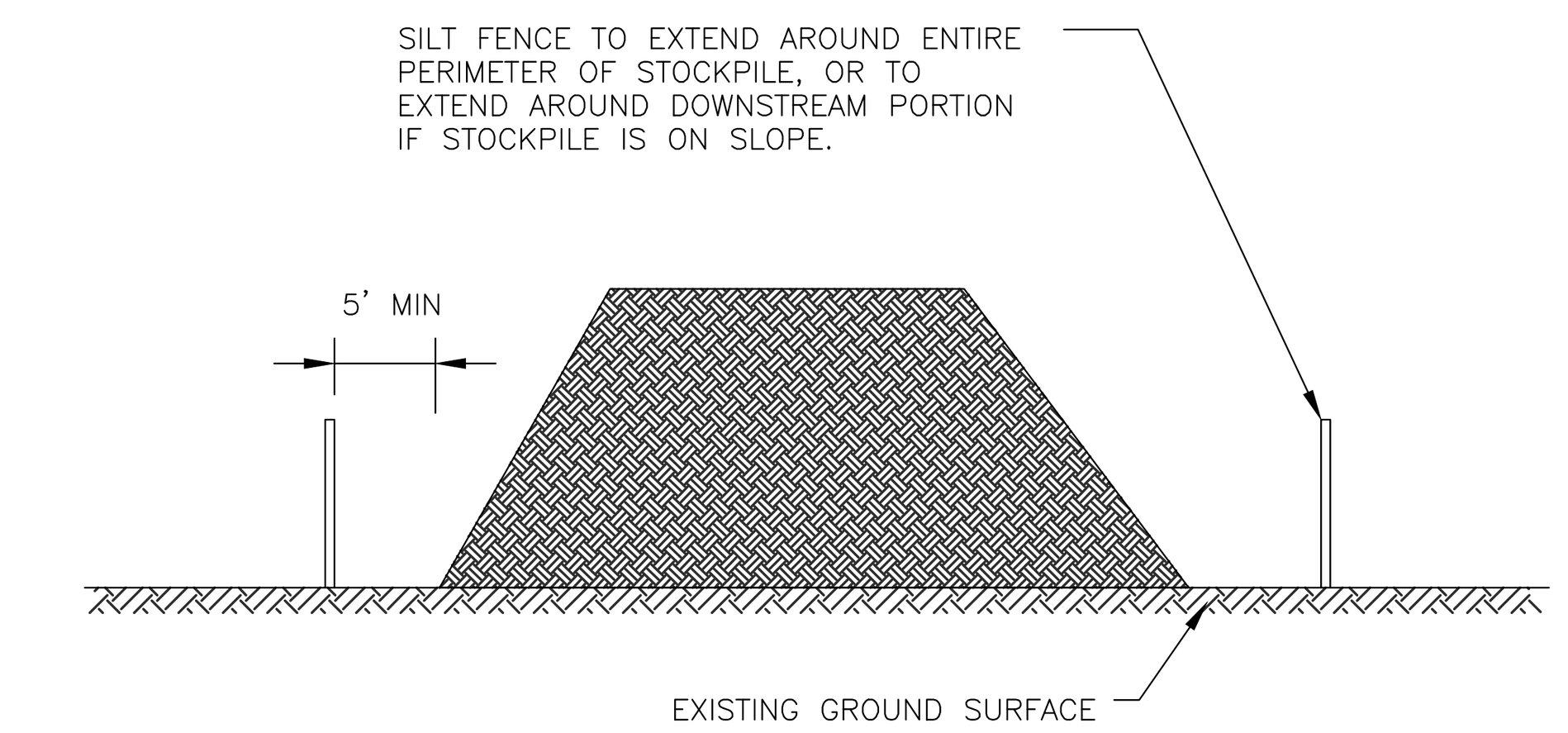
CONSTRUCTION SPECIFICATIONS

1. PRIOR TO INSTALLATION, CLEAR ALL OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH THAT MAY INTERFERE WITH PROPER FUNCTION OF FILTER LOG.
2. FILL LOG NETTING UNIFORMLY WITH COMPOST, STRAW, WOOD CHIPS, OR OTHER APPROVED BIODEGRADABLE MATERIAL TO DESIRED LENGTH SUCH THAT LOGS DO NOT DEFORM.
3. INSTALL FILTER LOGS PERPENDICULAR TO THE FLOW DIRECTION AND PARALLEL TO THE SLOPE WITH THE BEGINNING AND END OF THE INSTALLATION POINTING SLIGHTLY UP THE SLOPE CREATING A "J" SHAPE AT EACH END TO PREVENT BYPASS.
4. FOR UNTRENCHED INSTALLATION BLOW OR HAND PLACE MULCH OR COMPOST ON UPHILL SIDE OF THE SLOPE ALONG LOG.
5. STAKE FILTER LOG EVERY 4 FEET OR CLOSER ALONG ENTIRE LENGTH OF LOG OR TRENCH LOG INTO GROUND A MINIMUM OF 4 INCHES AND STAKE LOG EVERY 4 FEET OR CLOSER.
6. USE STAKES WITH A MINIMUM NOMINAL CROSS SECTION OF 2X2 INCH AND OF SUFFICIENT LENGTH TO ATTAIN A MINIMUM OF 12 INCHES INTO THE GROUND AND 3 INCHES PROTRUDING ABOVE LOG.
7. WHEN MORE THAN ONE LOG IS NEEDED, OVERLAP ENDS 12 INCHES MINIMUM AND STAKE.
8. REMOVE SEDIMENT WHEN IT HAS ACCUMULATED TO A DEPTH OF ½ THE EXPOSED HEIGHT OF LOG AND REPLACE MULCH. REPLACE FILTER LOG IF TORN. REINSTALL FILTER LOG IF UNDERMINING OR DISLODGING OCCURS. REPLACE CLOGGED FILTER LOGS.

SILT SOCK DETAIL

N.T.S.

DET NO. 4-8



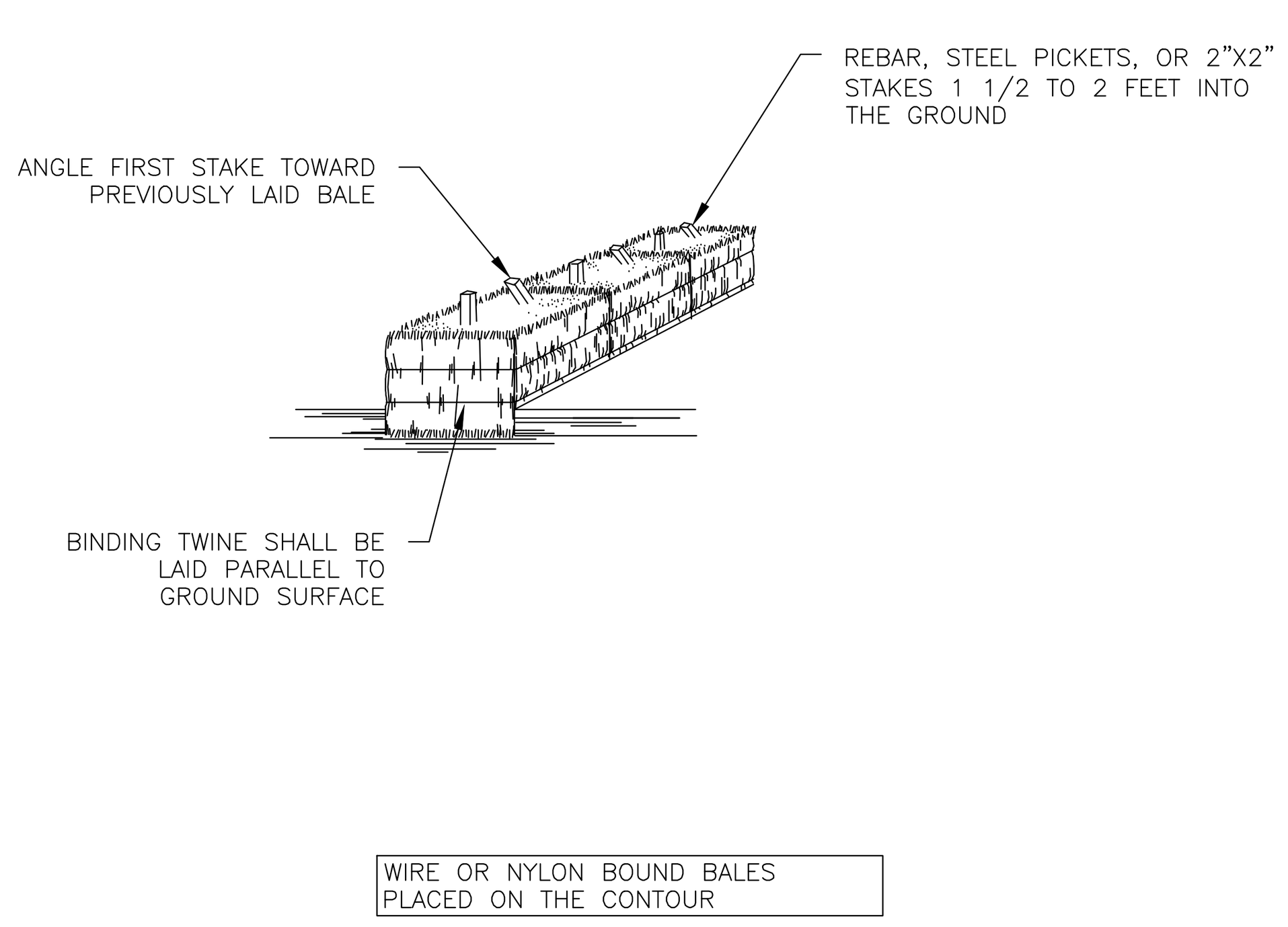
NOTES

1. AN ON–SITE DRAINAGE SWALE SHALL BE LOCATED BETWEEN THE STOCKPILE AND OFF–SITE PROPERTY.
2. REFERENCE IS MADE TO THE SILT FENCE DETAIL FOR MATERIALS AND INSTALLATION METHODS.
3. IF THE STOCKPILE IS TO REMAIN FOR MORE THAN 14 DAYS, IT SHALL BE STABILIZED WITH STRAW BLANKET OR SEEDED TO MINIMIZE EROSION.
4. INSPECTION OF SILT FENCES SHALL BE AT LEAST ONCE PER WEEK AND AFTER RAIN EVENTS IN EXCESS OF HALF INCH (1/2") PER DAY OR EQUAL SNOW MELT. REPAIR OR REPLACEMENT OF SILT FENCE SHALL BE MADE PROMPTLY AS REQUIRED.
5. SEDIMENT TRAPPED BY THE SILT FENCES SHALL BE REMOVED AND PROPERLY DISPOSED OF WHENEVER SEDIMENT ACCUMULATION DEPTH AT THE SILT FENCE IS APPROXIMATELY EQUAL TO 12 INCHES OR ONE HALF THE SILT FENCE HEIGHT, WHICHEVER IS LESS.
6. SILT FENCES SHALL BE MAINTAINED IN PLACE UNTIL TOPSOIL STOCKPILE HAS BEEN ELIMINATED AND SHALL BE REMOVED ONLY WHEN DIRECTED BY THE ENGINEER.

TEMPORARY STOCKPILE DETAIL

N.T.S.

DET NO. 4-11



WIRE OR NYLON BOUND BALES PLACED ON THE CONTOUR

INSTALLATION PROCEDURE FOR SHEET FLOW APPLICATIONS:

1. EXCAVATE A 4 INCH DEEP TRENCH THE WIDTH OF A BALE AND THE LENGTH OF THE PROPOSED BARRIER. THE BARRIER SHOULD FOLLOW THE SLOPE CONTOUR. IF THE BARRIER IS AT THE TOE OF THE SLOPE, PLACE IT 5 TO 6 FEET AWAY FROM THE SLOPE IF POSSIBLE. THIS PLACEMENT WILL PROVIDE ACCESS FOR MAINTENANCE AND ALLOW COURSE SEDIMENT TO DROP OUT OF SUSPENSION BEFORE IT REACHES THE BARRIER.

2. PLACE BALES IN THE TRENCH WITH THEIR ENDS TIGHTLY ABUTTING. CORNER ABUTMENT IS NOT ACCEPTABLE. A TIGHT FIT IS IMPORTANT TO PREVENT SEDIMENT FROM ESCAPING THROUGH THE SPACES BETWEEN BALES.

3. ALL BALES MUST BE EITHER WIRE–BOUND OR STRING TIED. INSTALL BALES SO THAT BINDINGS ARE ORIENTED AROUND THE SIDES RATHER THAN ALONG THE TOPS AND BOTTOMS OF THE BALES. IF THE BINDING IS PLACED IN CONTACT WITH THE SOIL, IT WILL SOON DISINTEGRATE AND CAUSE THE BALE TO FALL APART.

4. SECURELY ANCHOR EACH BALE BY DRIVING AT LEAST TWO STAKES THROUGH THE BALE. DRIVE THE FIRST STAKE IN EACH BALE TOWARD THE PREVIOUSLY LAID BALE TO FORCE THE BALES TOGETHER. DRIVE THE STAKES AT LEAST 1 1/2 FEET INTO THE GROUND. WOOD STAKES 2 BY 2 INCHES BY 4 FT. ARE BEST. REBAR ALSO CAN BE USED AS STAKES, BUT THEY ARE NOT RECOMMENDED BECAUSE THEY CAN POSE A HAZARD TO EQUIPMENT WHEN BALES DISINTEGRATE.

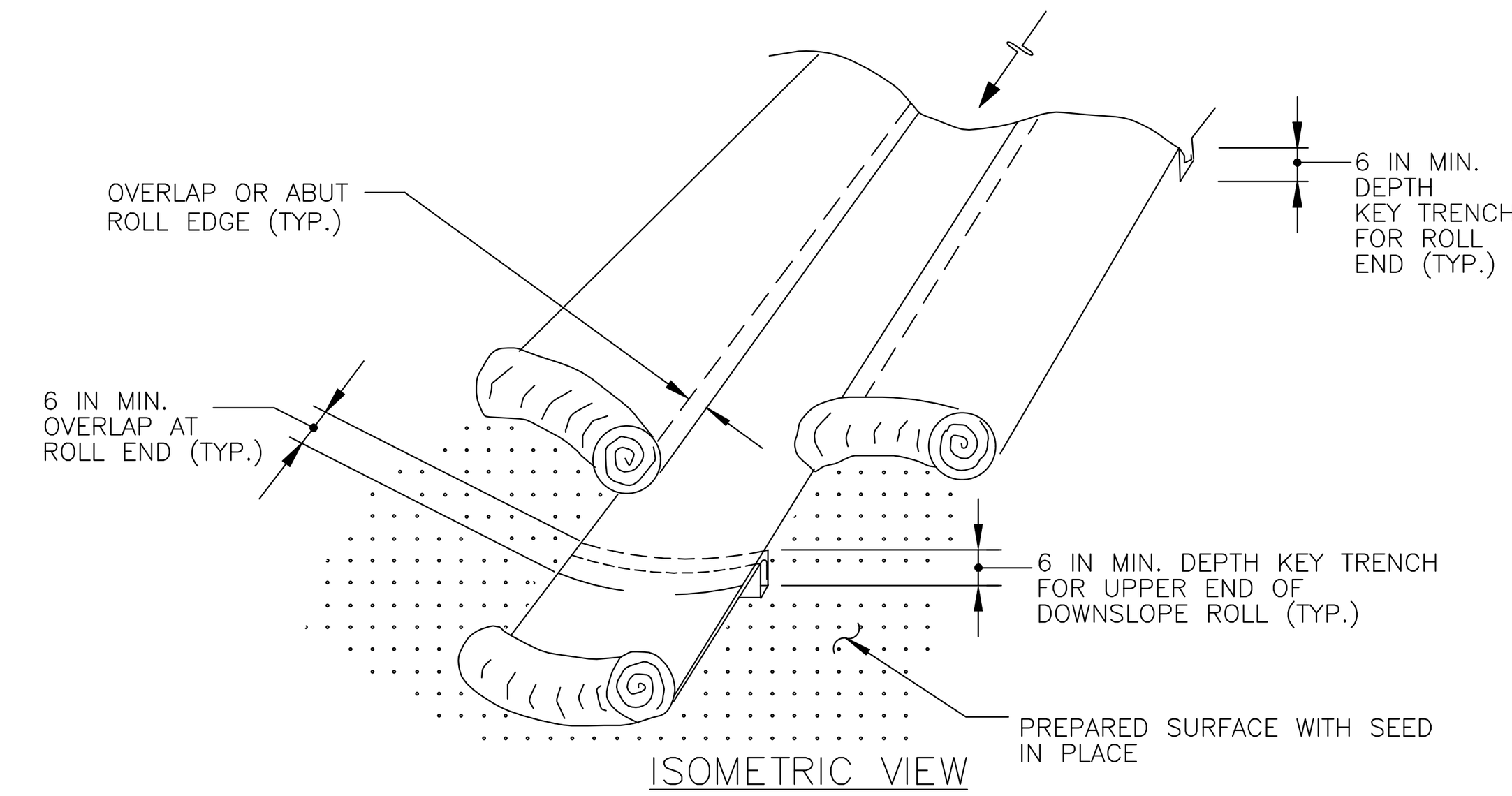
5. FILL ANY GAPS BETWEEN BALES BY WEDGING LOOSE STRAW BETWEEN THE BALES. LOOSE STRAW SCATTERED OVER THE AREA IMMEDIATELY UPHILL FROM A STRAW BALE BARRIER TENDS TO INCREASE BARRIER EFFICIENCY. IT IS PICKED UP BY RUNOFF AND TRANSPORTED TO HOLES IN THE BARRIER, WHICH IT TENDS TO SEAL. BACKFILL THE TRENCH WITH THE EXCAVATED SOIL AND COMPACT IT. THE BACKFILL SOIL SHOULD CONFORM TO THE GROUND LEVEL ON THE DOWNHILL SIDE OF THE BARRIER AND SHOULD BE BUILT UP TO 4 INCHES ABOVE THE GROUND ON THE UPHILL SIDE OF THE BALES.

6. INSPECT AND REPAIR OR REPLACE DAMAGED BALES PROMPTLY. STRAW BALES TYPICALLY DETERIORATE WITHIN THREE MONTHS WHEN WET. REMOVE THE STRAW BALES WHEN THE UPSLOPE AREAS HAVE BEEN PERMANENTLY STABILIZED.

STRAW BALE

N.T.S.

DET NO. 4-7



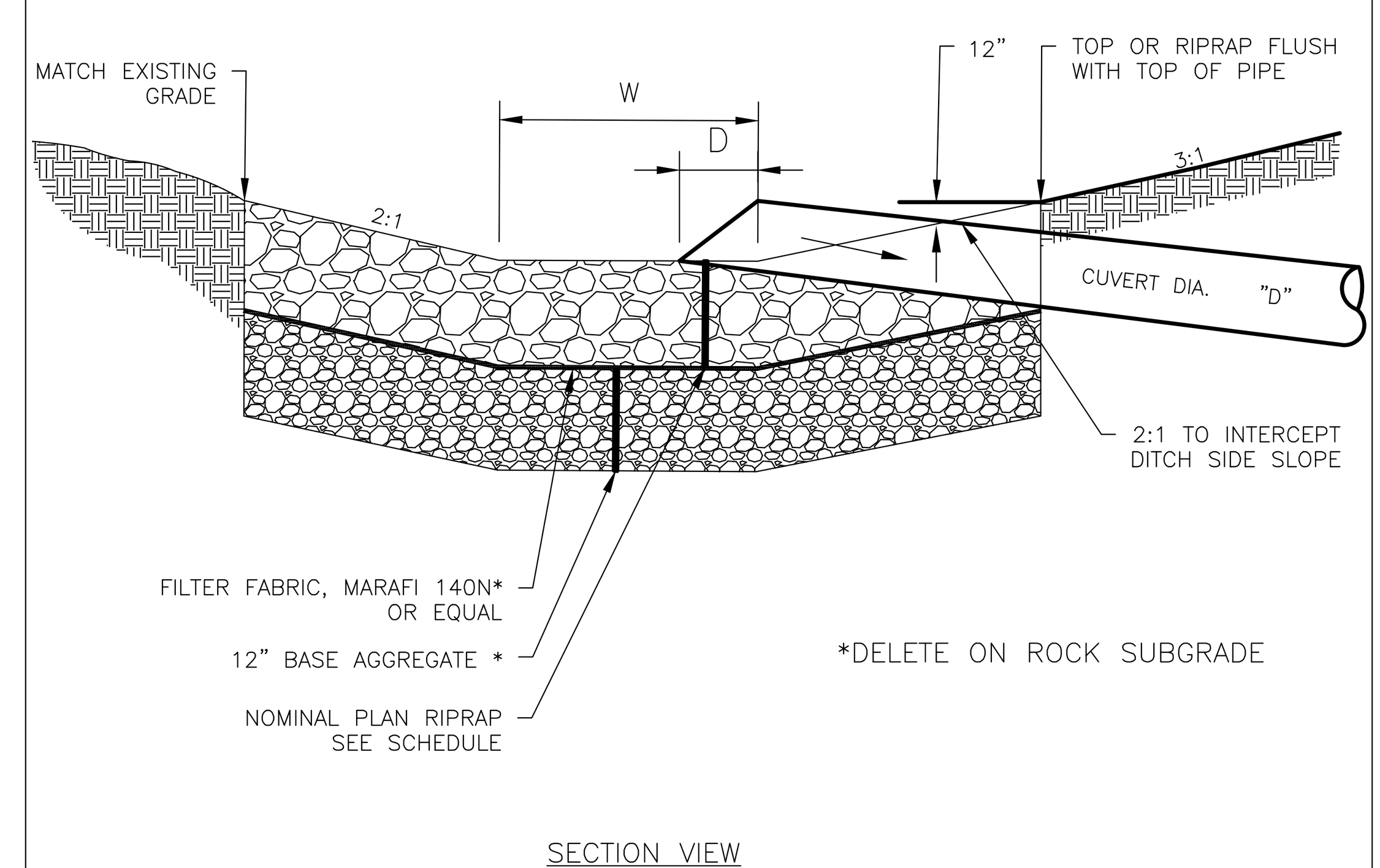
CONSTRUCTION SPECIFICATIONS

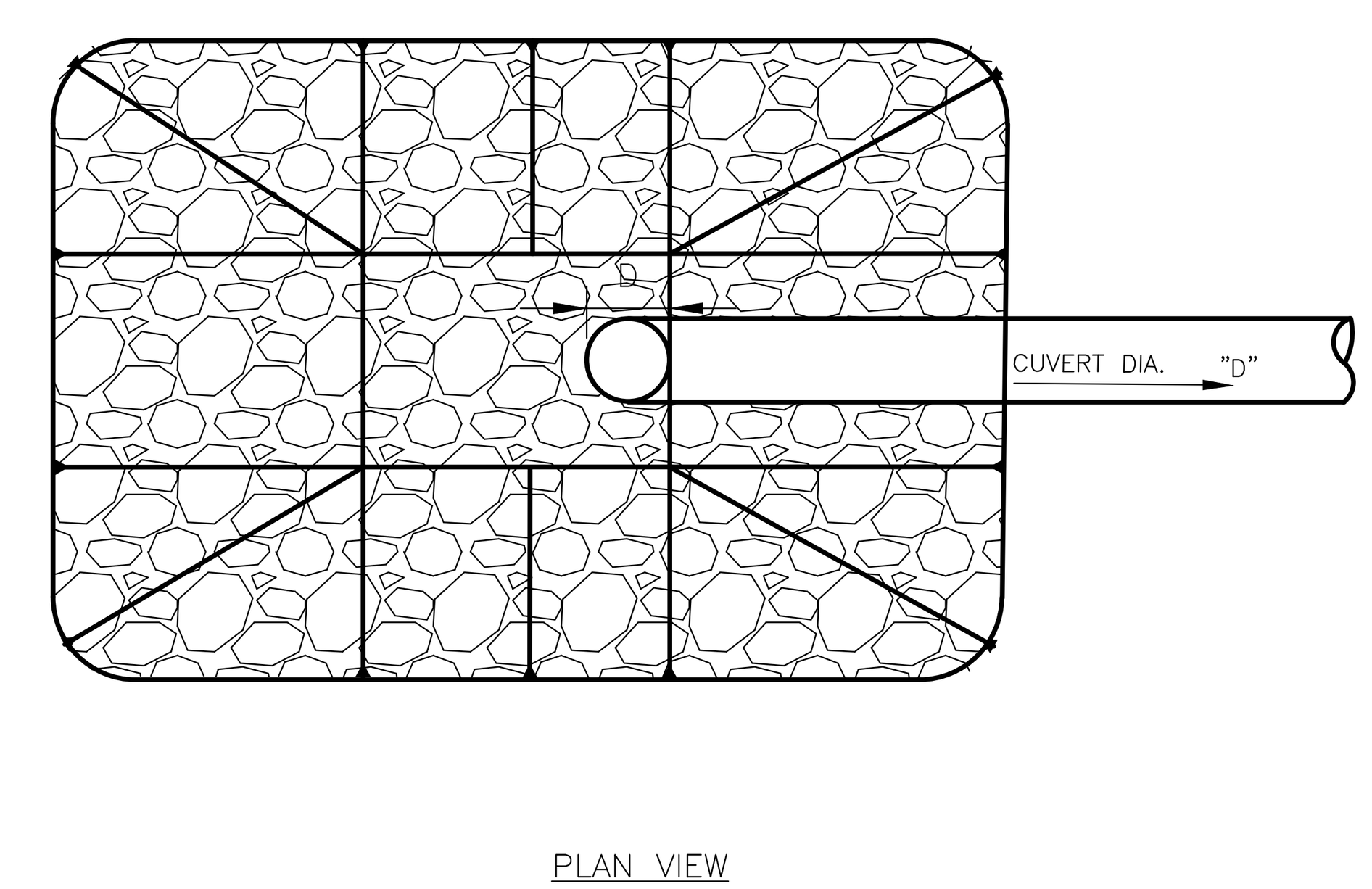
1. USE MATTING THAT HAS A DESIGN VALUE FOR SHEAR STRESS EQUAL TO OR HIGHER THAN THE SHEAR STRESS DESIGNATED ON APPROVED PLANS.
2. USE TEMPORARY SOIL STABILIZATION MATTING MADE OF DEGRADABLE (LASTS 6 MONTHS MINIMUM) NATURAL OR MAN–MADE FIBERS (MOSTLY ORGANIC). MAT MUST HAVE UNIFORM THICKNESS AND DISTRIBUTION OF FIBERS THROUGHOUT AND BE SMOLDER RESISTANT. CHEMICALS USED IN THE MAT MUST BE NON–LEACHING AND NON–TOXIC TO VEGETATION AND SEED GERMINATION AND NON–INJURIOUS TO THE SKIN. IF PRESENT, NETTING MUST BE EXTRUDED PLASTIC WITH A MAXIMUM MESH OPENING OF 2x2 INCHES AND SUFFICIENTLY BONDED OR SEWN ON 2 INCH CENTERS ALONG LONGITUDINAL AXIS OF THE MATERIAL TO PREVENT SEPARATION OF THE NET FROM THE PARENT MATERIAL.
3. SECURE MATTING USING STEEL STAPLES, WOOD STAKES, OR BIODEGRADABLE EQUIVALENT. STAPLES MUST BE "U" OR "T" SHAPED STEEL WIRE HAVING A MINIMUM GAUGE OF NO. 11 AND NO. 8 RESPECTIVELY. "U" SHAPED STAPLES MUST AVERAGE 1 TO 1½ INCHES WIDE AND BE A MINIMUM OF
6 INCHES LONG. "T" SHAPED STAPLES MUST HAVE A MINIMUM 8 INCH MAIN LEG, A MINIMUM 1 INCH SECONDARY LEG, AND A MINIMUM 4 INCH HEAD. WOOD STAKES MUST BE ROUGH–SAWN HARDWOOD, 12 TO 24 INCHES IN LENGTH, 1x3 INCH IN CROSS SECTION, AND WEDGE SHAPED AT THE BOTTOM.
4. PERFORM FINAL GRADING, TOPSOIL APPLICATION, SEEDBED PREPARATION, AND PERMANENT SEEDING IN ACCORDANCE WITH SPECIFICATIONS. PLACE MATTING WITHIN 48 HOURS OF COMPLETING SEEDING OPERATIONS UNLESS END OF WORKDAY STABILIZATION IS SPECIFIED ON THE APPROVED EROSION AND SEDIMENT CONTROL PLAN.
5. UNROLL MATTING IN DIRECTION OF WATER FLOW, CENTERING THE FIRST ROLL ON THE CHANNEL CENTERLINE. WORK FROM CENTER OF CHANNEL OUTWARD WHEN PLACING ROLLS. LAY MAT SMOOTHLY AND FIRMLY ON THE SEEDED SURFACE. AVOID STRETCHING THE MATTING.
6. KEY–IN UPSTREAM END OF EACH MAT ROLL BY DIGGING A 6 INCH (MINIMUM) TRENCH AT THE UPSTREAM END OF THE MATTING, PLACING THE ROLL END IN THE TRENCH, STAPLING THE MAT IN PLACE, REPLACING THE EXCAVATED MATERIAL, AND TAMPING TO SECURE THE MAT END.
7. OVERLAP OR ABUT THE ROLL EDGES PER MANUFACTURER RECOMMENDATIONS. OVERLAP ROLL ENDS BY 6 INCHES (MINIMUM), WITH THE UPSTREAM MAT OVERLAPPING ON TOP OF THE NEXT DOWNSTREAM MAT.
8. STAPLE/STAKE MAT IN A STAGGERED PATTERN ON 4 FOOT (MAXIMUM) CENTERS THROUGHOUT AND 2 FOOT (MAXIMUM) CENTERS ALONG SEAMS, JOINTS, AND ROLL ENDS.
9. ESTABLISH AND MAINTAIN VEGETATION SO THAT REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT ARE CONTINUOUSLY MET IN ACCORDANCE WITH SECTION B–4 VEGETATIVE STABILIZATION.

CHANNEL STABILIZATION FABRIC

N.T.S.

DET NO. 4-10



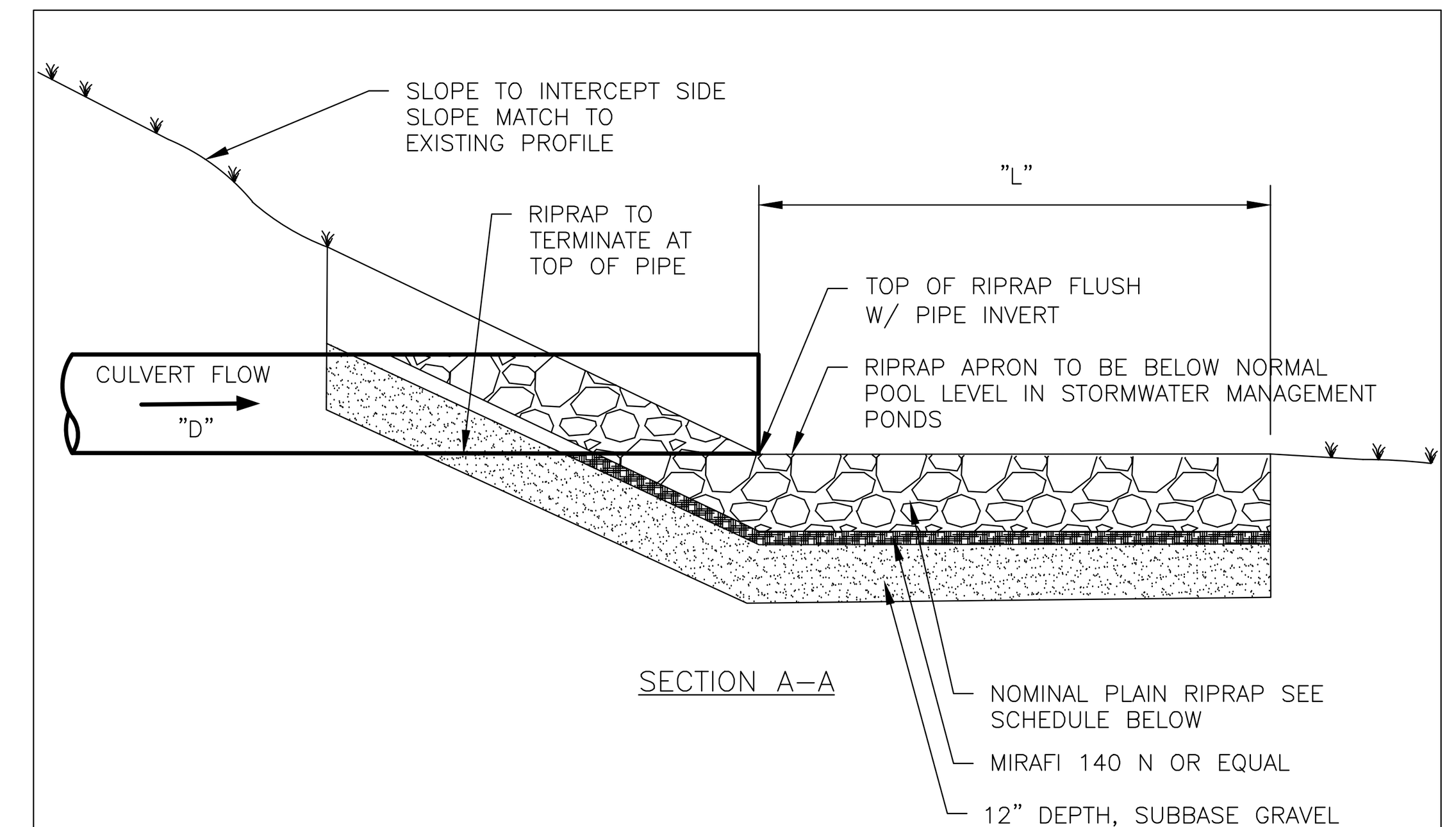


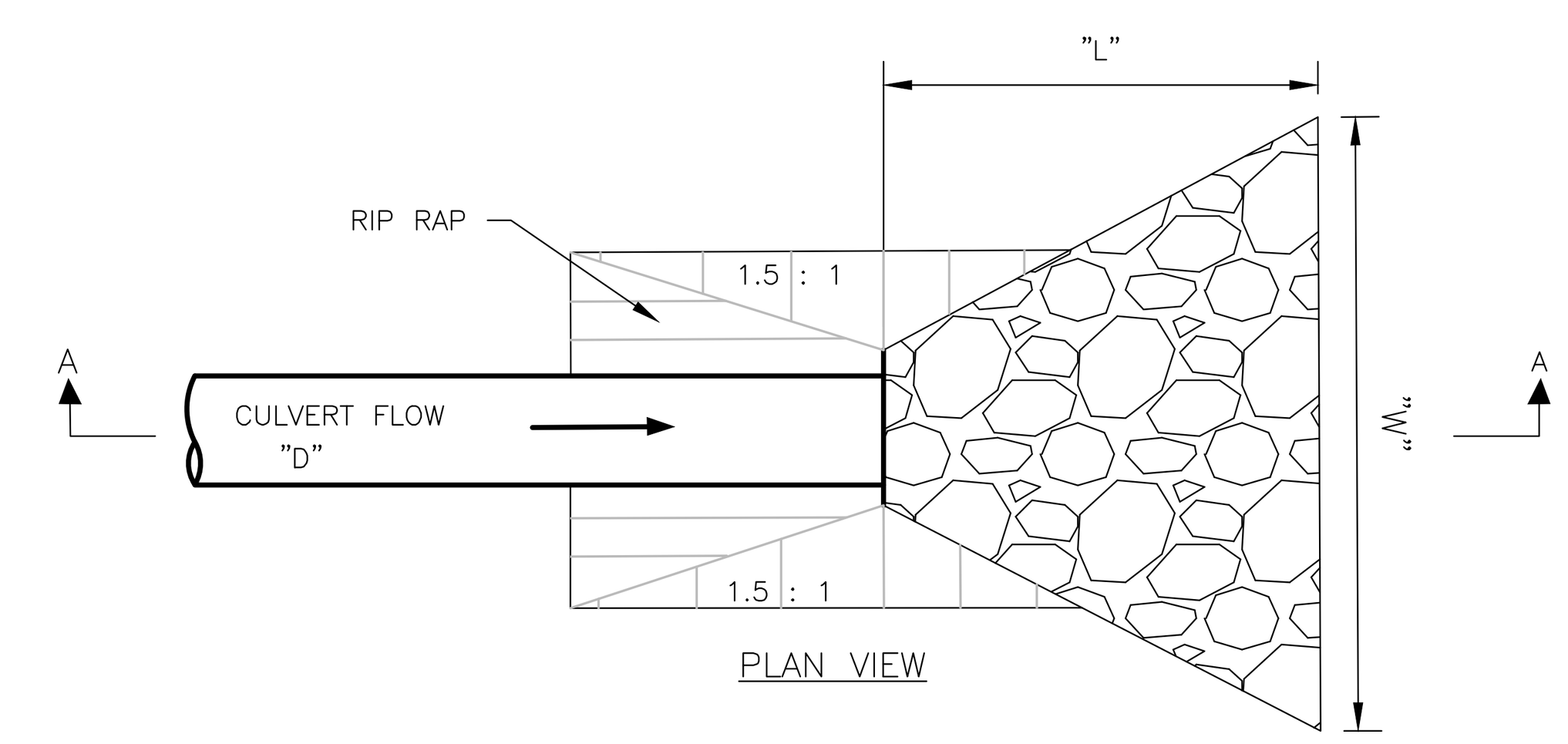
SCHEDULE			
CULVERT DIAMETER (D)	WIDTH (W)	STONE D_{50}	RIPRAP THICKNESS
12"	2'	6"	14"
15"	4'	6"	14"
18"	4'	6"	14"
24"	6'	6"	14"
30"	8'	12"	27"
36"	8'	12"	27"
42"	10'	12"	27"
48"	12'	12"	27"

RIPRAP INLET APRON

N.T.S.

DET NO. 4-12





NOTE:
RIPRAP GRADATION AND PLACEMENT– THE RIPRAP GRADATION SHALL BE WELL– GRADED MIX FROM ABOUT 1.5 TIMES THE D SIZE TO ABOUT 25 PERCENT OF THE D SIZE. THE RIPRAP STONES SHALL BE CAREFULLY PLACED WORKING FROM THE TOE OF THE SLOPE UPWARD. THE STONES SHOULD BE LOWERED TO THE SLOPE AND NOT BE ALLOWED TO DROP MORE THAN 12 INCHES ONTO THE GEOTEXTILE. THE FINISHED SURFACE SHALL BE A RELATIVELY SMOOTH UNIFORMLY SLOPED SURFACE.

SCHEDULE FOR STORM DRAIN				
CULVERT DIAMETER (D)	LENGTH (L)	WIDTH (W)	STONE d_{50}	RIPRAP THICKNESS
12"	8"	12"	6"	14"
15"	8"	12"	6"	14"
18"	10"	12"	6"	14"
24"	12"	14"	6"	14"
30"	20"	23"	12"	27"
36"	20"	23"	12"	27"
42"	24"	28"	12"	27"
48"	28"	32"	12"	27"

RIPRAP OUTLET APRON

N.T.S.

DET NO. 4-15

BEALS · ASSOCIATES INC.
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PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS TODD P. MOREY CIVIL No. 48865 REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

EROSION CONTROL DETAILS

DRAWING NUMBER:

C8.9

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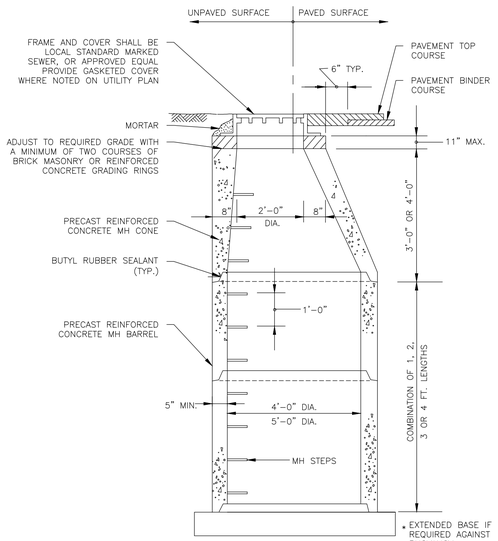
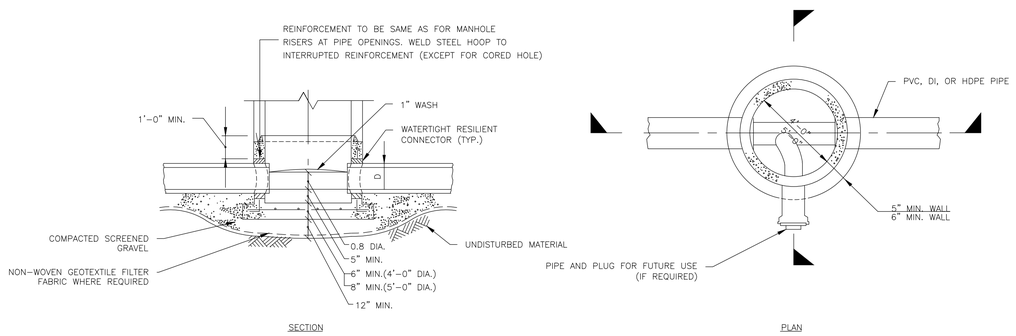
NOTE:
ALL EXTERIOR SURFACES OF MANHOLE GRADE ADJUSTMENT COURSES SHALL BE COVERED WITH 1/4" TO 3/8" MASONRY CEMENT PLASTER



SEWER MANHOLE DETAIL
N.T.S.

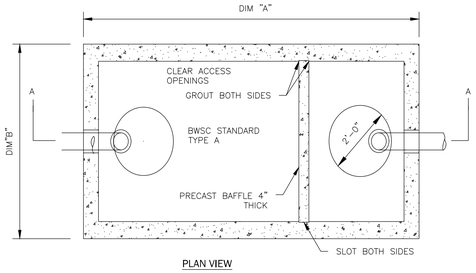
DET NO.
5-1



SEWER MANHOLE BASE
N.T.S.

DET NO.
5-3

SIZING CHART					
GALLON CAPACITY	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"
600	7'-0"	4'-8"	7'-0"	3'-6"	3'-2"
750	7'-0"	4'-8"	7'-0"	4'-3"	3'-11"
1000	9'-0"	5'-0"	7'-2"	4'-2"	3'-10"
1250	9'-0"	5'-0"	7'-2"	5'-2"	4'-10"
1500	11'-2"	5'-8"	7'-2"	4'-4"	4'-0"
1750	11'-2"	5'-8"	7'-2"	4'-11"	4'-7"
2000	12'-8"	6'-8"	8'-0"	4'-7"	3'-10"
2500	12'-8"	6'-8"	8'-0"	5'-6"	4'-9"
2750	12'-8"	6'-8"	8'-0"	6'-0"	5'-3"
3000	15'-7"	9'-7"	8'-6.5"	5'-0"	3'-9"
4000	15'-7"	9'-7"	8'-6.5"	6'-3"	5'-0"
5000	19'-11"	9'-11"	8'-11"	6'-2"	4'-9"
6000	19'-11"	9'-11"	10'-5"	7'-2"	5'-9"

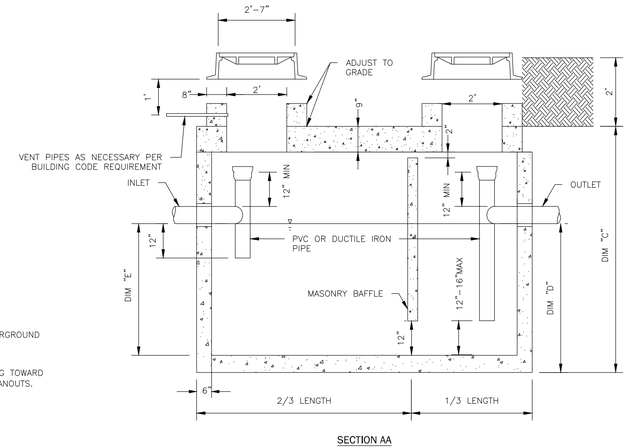


PLAN VIEW

NOTES:

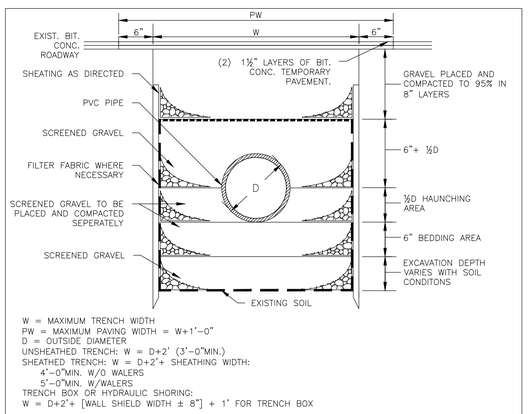
1. CONCRETE:28 DAY F'c=4500 PSI
2. REBAR: ASTM A615 GRADE 60.
3. MESH: ASTM A-185 GRADE 65.
4. DESIGN: AC1318-83 BUILDING CODE. ASTM C-857 MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES
5. LOADS: H-20 LOADING
6. FILL WITH CLEAN WATER PRIOR TO START UP OF SYSTEM
7. CONTRACTOR TO SUPPLY AND INSTALL ALL PIPING AND SANITARY TEES, 4 CLEAN OUTS, FOR CLEANING TOWARD TRAP AND FOR CLEANING AWAY FROM TRAP ON BOTH THE INLET AND OUTLET/ALT. DUAL SWEEP CLEANOUTS.
8. GRAY WATER ONLY, BLACK WATER SHALL BE CARRIED BY SEPERATE SEWER.
9. LARGER SIZES MAY BE REQUIRED AS PER REVIEW OF FACILITY.
10. TRAP SIZE WILL BE BASED ON 15GPD PER SEAT.

STANDARD GREASE TRAP DETAIL
N.T.S.



SECTION AA

DET NO.
5-4



W = MAXIMUM TRENCH WIDTH
PW = MAXIMUM PAVING WIDTH = W+1'-0"
D = OUTSIDE DIAMETER
UNSHEATHED TRENCH: W = D+2' (3'-0"MIN.)
SHEATHED TRENCH: W = D+2'+ SHEATHING WIDTH:
4'-0"MIN. W/O WALERS
5'-0"MIN. W/WALERS
TRENCH BOX OR HYDRAULIC SHORING:
W = D+2'+ [WALL SHIELD WIDTH ± 8"] + 1' FOR TRENCH BOX

TRENCH DETAIL FOR PVC OR HDPE PIPE
N.T.S.

DET NO.
5-5

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

SANITARY SEWER DETAILS

DRAWING NUMBER:

C8.10

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PREPACKAGED GRINDER PUMP STATION SPECIFICATIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1, DIVISION 31, DIVISION 32 AND DIVISION 33 SPECIFICATION SECTIONS APPLY TO THIS SECTION.

1.02 DESCRIPTION OF WORK

A. THE WORK INCLUDES PROVIDING SUBMERSIBLE SEWAGE GRINDER PUMP STATION AND RELATED WORK. PROVIDE SYSTEM COMPLETE AND READY FOR OPERATIONS. GRINDER PUMP STATION SYSTEM INCLUDING EQUIPMENT, MATERIALS, INSTALLATION, AND WORKMANSHIP AS SPECIFIED HEREIN.

1.03 REFERENCES STANDARDS

THE PUBLICATIONS LISTED BELOW FORM A PART OF THIS SPECIFICATION TO THE EXTENT REFERENCED. THE PUBLICATIONS ARE REFERRED TO WITHIN THE TEXT BY THE BASIC DESIGNATION ONLY.

A. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

1. M198 - STANDARD SPECIFICATION FOR JOINTS FOR CONCRETE PIPE, MANHOLES, AND PRECAST BOX SECTIONS USING PREFORMED FLEXIBLE JOINT SEALANTS

B. AMERICAN WATER WORKS ASSOCIATION (AWWA)

1. C104/A21.4 - CEMENT-MORTAR LINING FOR DUCTILE-IRON PIPE AND FITTINGS FOR WATER
1. C110/A21.10 - DUCTILE-IRON AND GRAY-IRON FITTINGS FOR WATER
2. C111/A21.11 - RUBBER-GASKET JOINTS FOR DUCTILE-IRON PRESSURE PIPE AND FITTINGS
3. C115/A21.15 - FLANGED DUCTILE-IRON PIPE WITH DUCTILE-IRON OR GRAY-IRON THREADED FLANGES
4. C151/A21.51 - DUCTILE-IRON PIPE, CENTRIFUGALLY CAST, FOR WATER
5. C500 - METAL-SEATED GATE VALVES FOR WATER SUPPLY SERVICE
6. C509 - RESILIENT-SEATED GATE VALVES FOR WATER SUPPLY SERVICE
7. C600 - INSTALLATION OF DUCTILE-IRON WATER MAINS AND THEIR APPURTENANCES
8. M23 - PVC PIPE - DESIGN AND INSTALLATION

C. ASME INTERNATIONAL (ASME)

1. B1.20.1 - PIPE THREADS, GENERAL PURPOSE (INCH)
2. B16.1 - GRAY IRON PIPE FLANGES AND FLANGED FITTINGS CLASSES 25, 125, AND 250
3. B16.11 - FORGED FITTINGS, SOCKET-WELDING AND THREADED
4. B16.3 - MALLEABLE IRON THREADED FITTINGS, CLASSES 150 AND 300
5. B31.3 - PROCESS PIPING

D. ASTM INTERNATIONAL (ASTM)

1. A123/A123M - STANDARD SPECIFICATION FOR ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS
2. A126 - STANDARD SPECIFICATION FOR GRAY IRON CASTINGS FOR VALVES, FLANGES, AND PIPE FITTINGS
3. A53/A53M - STANDARD SPECIFICATION FOR PIPE, STEEL, BLACK AND HOT-DIPPED, ZINC-COATED, WELDED AND SEAMLESS
4. A536 - STANDARD SPECIFICATION FOR DUCTILE IRON CASTINGS
5. A615/A615M - STANDARD SPECIFICATION FOR DEFORMED AND PLAIN CARBON-STEEL BARS FOR CONCRETE REINFORCEMENT
6. C443/C443M - STANDARD SPECIFICATION FOR JOINTS FOR CONCRETE PIPE AND MANHOLES, USING RUBBER GASKETS
7. C478/C478M - STANDARD SPECIFICATION FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS
8. D1784 - STANDARD SPECIFICATION FOR RIGID POLYVINYL CHLORIDE) (PVC) COMPOUNDS AND CHLORINATED POLY(VINYL CHLORIDE) (CPVC) COMPOUNDS
9. D1785 - STANDARD SPECIFICATION FOR POLYVINYL CHLORIDE) (PVC), PLASTIC PIPE, SCHEDULES 40, 80, AND 120
10. D2241 - STANDARD SPECIFICATION FOR POLYVINYL CHLORIDE) (PVC) PRESSURE-RATED PIPE (SDR SERIES)
11. D2464 - STANDARD SPECIFICATION FOR THREADED POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE FITTINGS, SCHEDULE 80
12. D2466 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE FITTINGS, SCHEDULE 40
13. D2467 - STANDARD SPECIFICATION FOR POLY(VINYL CHLORIDE) (PVC) PLASTIC PIPE FITTINGS, SCHEDULE 80
14. D3139 - JOINTS FOR PLASTIC PRESSURE PIPES USING FLEXIBLE ELASTOMERIC SEALS
15. F477 - STANDARD SPECIFICATION FOR ELASTOMERIC SEALS (GASKETS) FOR JOINING PLASTIC PIPE

E. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

1. MG 1 - MOTORS AND GENERATORS

1.04 SUBMITTALS

A. SUBMIT THE FOLLOWING IN ACCORDANCE WITH SECTION 01 33 00

1. PIPE AND FITTINGS
2. CHECK VALVES
3. GATE VALVES
4. PUMP MOTOR
5. FLEXIBLE FLANGED COUPLING
6. OPERATION AND MAINTENANCE DATA
7. SUBMERSIBLE SEWAGE GRINDER PUMP STATION PACKAGE

B. THE SUBMERSIBLE SEWAGE GRINDER PUMP STATION PACKAGE SUBMITTAL SHALL INCLUDE PUMPS, ALARMS, AND MOTORS. INCLUDE ALL INFORMATION ON ALL EQUIPMENT, ALARM PANEL AND CONTROLS, PUMPS AND PUMP PERFORMANCE CURVES AND STATION LAYOUT IN DATA FOR SUBMERSIBLE SEWAGE GRINDER PUMP STATION.

1.05 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

A. DELIVERY AND STORAGE

INSPECT MATERIALS DELIVERED TO SITE FOR DAMAGE. UNLOAD AND STORE WITH MINIMUM HANDLING. STORE MATERIALS IN ENCLOSURES OR UNDER PROTECTIVE COVERING. STORE RUBBER GASKETS NOT TO BE INSTALLED IMMEDIATELY UNDER COVER, OUT OF DIRECT SUNLIGHT. DO NOT STORE MATERIALS DIRECTLY ON THE GROUND. KEEP INTERIOR OF PIPES AND FITTINGS FREE OF DIRT AND DEBRIS.

B. HANDLING

HANDLE PIPE, FITTINGS, VALVES, AND OTHER ACCESSORIES IN SUCH MANNER AS TO ENSURE DELIVERY TO THE TRENCH IN SOUND, UNDAMAGED CONDITION. AVOID INJURY TO COATINGS AND LININGS ON PIPE AND FITTINGS; MAKE SATISFACTORY REPAIRS IF COATINGS OR LININGS ARE DAMAGED. CARRY PIPE TO THE TRENCH; DO NOT DRAG IT.

1.06 EXCAVATION, TRENCHING, AND BACKFILLING

A. PROVIDE IN ACCORDANCE WITH SECTION 31 00 00 EARTHWORK, EXCEPT AS SPECIFIED HEREIN.

PART 2 PRODUCTS

2.01 PIPE AND FITTINGS

A. PROVIDE PRESSURE PIPING, AIR RELEASE VALVES, AND RELATED ACCESSORIES FOR FORCE MAIN PIPING OUTSIDE THE SEWAGE WET WELL AND VALVE VAULT IN ACCORDANCE WITH SECTION 33 30 00 SANITARY SEWERS.

1. DUCTILE-IRON PIPE - AWWA C151/A21.51, THICKNESS CLASS 52.

2. FLANGED PIPE - AWWA C115/A21.15, DUCTILE IRON.

3. FITTINGS - AWWA C110/A21.10, FLANGED. PROVIDE FLANGED JOINT FITTINGS WITHIN WET WELL AND VALVE VAULT AS INDICATED. PROVIDE MECHANICAL JOINT FITTINGS OUTSIDE VALVE VAULT ENCLOSURE AS INDICATED. USE FITTINGS WITH PRESSURE RATING AT LEAST EQUIVALENT TO THAT OF THE PIPE.

4. JOINTS - AWWA C115/A21.15 FOR FLANGED JOINTS. USE BOLTS, NUTS, AND GASKETS FOR FLANGED CONNECTIONS RECOMMENDED IN THE APPENDIX TO AWWA C115/A21.15. FLANGE FOR SETSCREWED FLANGES MUST BE OF DUCTILE IRON. ASTM A536, GRADE 65-45-12, CONFORMING TO THE APPLICABLE REQUIREMENTS OF ASME B16.1, CLASS 250. SETSCREWS FOR SETSCREWED FLANGES MUST BE 190,000 PSI TENSILE STRENGTH, HEAT TREATED, AND ZINC-COATED STEEL. CONFORM TO THE APPLICABLE REQUIREMENTS FOR MECHANICAL-JOINT GASKETS SPECIFIED IN AWWA C111/A21.11FOR SETSCREWED FLANGE GASKETS. USE SETSCREWED GASKET DESIGNED TO PROVIDE FOR CONFINEMENT AND COMPRESSION OF GASKET WHEN JOINT TO ADJOINING FLANGE IS MADE.

B. PVC PLASTIC PRESSURE PIPE AND ASSOCIATED FITTINGS

1. PIPE AND FITTINGS LESS THAN 4 INCH DIAMETER

USE PIPE, COUPLINGS AND FITTINGS MANUFACTURED OF MATERIALS CONFORMING TO ASTM D1784, CLASS 12454-B.

A. SCREW-JOINT: USE PIPE CONFORMING TO DIMENSIONAL REQUIREMENTS OF ASTM D1785 SCHEDULE 80, WITH JOINTS MEETING REQUIREMENTS OF 150 PSI WORKING PRESSURE, 200 PSI HYDROSTATIC TEST PRESSURE, UNLESS OTHERWISE SHOWN OR SPECIFIED. USE THREADED PIPE FITTINGS CONFORMING TO REQUIREMENTS OF ASTM D2464, THREADED TO CONFORM TO THE REQUIREMENTS OF ASME B1.20.1 FOR USE WITH SCHEDULE 80 PIPE AND FITTINGS. TEST PIPE COUPLINGS WHEN USED, AS REQUIRED BY ASTM D2464.

B. PUSH-ON JOINT: ASTM D3139, WITH ASTM F477 GASKETS. FITTINGS FOR PUSH-ON JOINTS: AWWA C110/A21.10 OR AWWA C111/A21.11. IRON FITTINGS AND SPECIALS: CEMENT-MORTAR LINED (STANDARD THICKNESS) IN ACCORDANCE WITH AWWA C104/A21.4.

C. SOLVENT CEMENT JOINT: USE PIPE CONFORMING TO DIMENSIONAL REQUIREMENTS OF ASTM D1785 OR ASTM D2241 WITH JOINTS MEETING THE REQUIREMENTS OF 150 PSI WORKING PRESSURE AND 200 PSI HYDROSTATIC TEST PRESSURE. USE FITTINGS FOR SOLVENT CEMENT JOINTING CONFORMING TO ASTM D2466 OR ASTM D2467.

C. INSULATING JOINTS: PROVIDE BETWEEN PIPES OF DISSIMILAR METALS A RUBBER GASKET OR OTHER APPROVED TYPE OF INSULATING JOINT OR DIELECTRIC COUPLING TO EFFECTIVELY PREVENT METAL-TO-METAL CONTACT BETWEEN ADJACENT SECTIONS OF PIPING.

D. ACCESSORIES: PROVIDE FLANGES, CONNECTING PIECES, TRANSITION GLANDS, TRANSITION SLEEVES, AND OTHER ADAPTERS AS REQUIRED.

E. FLEXIBLE FLANGED COUPLING: PROVIDE FLEXIBLE FLANGED COUPLING APPLICABLE FOR SEWAGE AS INDICATED. USE FLEXIBLE FLANGED COUPLING DESIGNED FOR A WORKING PRESSURE OF 350 PSI.

2.02 VALVES AND OTHER PIPING ACCESSORIES

A. GATE VALVES IN VALVE VAULT: CONFORM TO AWWA C500 FOR VALVES WITH OUTSIDE-SCREW-AND-YOKE RISING-STEM TYPE WITH DOUBLE DISC GATES AND FLANGED ENDS. CONFORM TO AWWA C509 FOR VALVES WITH OUTSIDE-SCREW-AND-YOKE RISING-STEM TYPE WITH FLANGED ENDS. PROVIDE VALVES WITH HAND WHEELS THAT OPEN BY COUNTERCLOCKWISE ROTATION OF THE VALVE STEM. BOLT AND CONSTRUCT STUFFING BOXES TO PERMIT EASY REMOVAL OF PARTS FOR REPAIR. USE VALVES FROM ONE MANUFACTURER.

B. CHECK VALVES LESS THAN 4 INCH DIAMETER: NEOPRENE BALL CHECK VALVE WITH INTEGRAL HYDRAULIC SEALING FLANGE, DESIGNED FOR A HYDRAULIC WORKING PRESSURE OF 175 PSI.

C. CHECK VALVES 4 IN AND LARGER DIAMETER: NONCLOGGING SWING CHECK VALVE RATED FOR NOT LESS THAN 175 PSIG WORKING PRESSURE CAPABLE OF PASSING 3-INCH DIAMETER SOLIDS. CAST IRON CONFORMING TO ASTM A126. BUNA-N DISC AND INTEGRAL SEAT. FLANGED ENDS CONFORMING TO AWWA C110/A21.10.

D. IDENTIFICATION TAGS AND PLATES: PROVIDE VALVES WITH TAGS OR PLATES NUMBERED AND STAMPED FOR THEIR USAGE. USE PLATES AND TAGS OF BRASS OR NONFERROUS MATERIAL AND MOUNTED OR ATTACHED TO THE VALVE.

E. PIPE SUPPORT: USE PIPE SUPPORT SCHEDULE 40 GALVANIZED STEEL PIPING CONFORMING TO ASTM A53/A53M. PROVIDE EITHER ASME B16.3 OR ASME B16.11 GALVANIZED THREADED FITTINGS.

F. MISCELLANEOUS METALS: USE STAINLESS STEEL BOLTS, NUTS, WASHERS, ANCHORS, AND SUPPORTS FOR INSTALLATION OF EQUIPMENT.

G. QUICK DISCONNECT SYSTEM WITH HYDRAULIC SEALING FLANGE: USE QUICK DISCONNECT SYSTEM CONSISTING OF A STEEL BASE PLATE FOR SUPPORTING THE PUMPS, A HYDRAULIC SEALING FLANGE, PUMP GUIDE RAILS AND THE DISCHARGE PIPE SUPPORTS. USE TWO GUIDE RAILS OF GALVANIZED STEEL IN ACCORDANCE WITH ASTM A123/A123M. PROVIDE A STEEL LIFTING CHAIN FOR RAISING AND LOWERING THE PUMP IN THE BASIN. BUILD GUIDES ONTO PUMP HOUSING TO FIT THE GUIDE POST TO ASSURE PERFECT ALIGNMENT BETWEEN PUMP AND GUIDE RAILS.

H. WET WELL VENT: 4" PVC VENT TIED INTO BUILDING VENT STACK.

2.03 SUBMERSIBLE SEWAGE GRINDER PUMPS

A. PROVIDE SUBMERSIBLE SEWAGE PUMPS WITH GRINDER UNITS AS SHOWN ON THE DRAWINGS. PROVIDE SUBMERSIBLE, CENTRIFUGAL SEWAGE PUMPS AND GRINDER UNITS CAPABLE OF GRINDING ALL MATERIALS FOUND IN NORMAL DOMESTIC SEWAGE, INCLUDING PLASTICS, RUBBER, SANITARY NAPKINS, DISPOSABLE DIAPERS, AND WOODEN ARTICLES INTO A FINELY GROUND SLURRY WITH PARTICLE DIMENSIONS NO GREATER THAN 1/4 INCH. PUMP CAPACITY AND MOTOR CHARACTERISTICS AS INDICATED. DESIGN PUMP TO OPERATE IN A SUBMERGED OR PARTIALLY SUBMERGED CONDITION. PROVIDE AN INTEGRAL SLIDING GUIDE BRACKET AND TWO GUIDE BARS CAPABLE OF SUPPORTING THE ENTIRE WEIGHT OF THE PUMPING UNIT.

B. CASING: PROVIDE HARD, CLOSE-GRAINED CAST IRON CASING WHICH IS FREE FROM BLOW HOLES, POROSITY, HARD SPOTS, SHRINKAGE DEFECTS, CRACKS, AND OTHER INJURIOUS DEFECTS. DESIGN CASINGS TO PERMIT REPLACEMENT OF WEARING PARTS. DESIGN PASSAGEWAYS TO PERMIT SMOOTH FLOW OF SEWAGE AND TO BE FREE OF SHARP TURNS AND PROJECTIONS.

C. IMPELLER: PROVIDE NON-CLOGGING TYPE BRONZE IMPELLER. MAKE IMPELLER WITH SMOOTH SURFACES, FREE FLOWING WITH THE NECESSARY CLEARANCE TO PERMIT OBJECTS IN THE SEWAGE TO PASS. FIT AND KEY, SPLINE, OR THREAD IMPELLER ON SHAFT, AND LOCK IN SUCH MANNER THAT LATERAL MOVEMENT WILL BE PREVENTED AND REVERSE ROTATION WILL NOT CAUSE LOOSENING.

D. SHAFT AND SHAFT SEALS: PROVIDE SHAFT OF STAINLESS STEEL. PROVIDE MECHANICAL SEAL OF DOUBLE CARBON AND CERAMIC CONSTRUCTION WITH MATING SURFACES LAPPED TO A FLATNESS TOLERANCE OF ONE LIGHT BAND. HOLD ROTATING CERAMICS IN MATING POSITION WITH STATIONARY CARBONS BY A STAINLESS STEEL SPRING. OIL LUBRICATE BEARINGS.

E. BEARINGS: PROVIDE HEAVY DUTY BALL THRUST BEARING OR ROLLER TYPE BEARING OF ADEQUATE SIZE TO WITHSTAND IMPOSED LOADS. OIL LUBRICATE BEARINGS.

F. PUMP AND MOTOR: USE PUMP AND MOTOR ASSEMBLED ON A SINGLE STAINLESS STEEL SHAFT IN A HEAVY DUTY CAST-IRON SHELL. USE FREE STANDING PUMP SUPPORT LEGS OF CAST-IRON PROVIDING ENOUGH CLEARANCE FOR THE SOLIDS TO GET INTO THE GRINDER.

2.04 PUMP MOTOR

A. PROVIDE SUBMERSIBLE SEWAGE PUMPS IN WET WELL, NEMA MG 1, MAXIMUM 1800 RPM, 480 VOLT, THREE PHASE, AND 60 HZ CYCLE AND FOR SUBMERSIBLE PUMPS, MOTOR HORSEPOWER MUST BE NOT LESS THAN PUMP HORSEPOWER AT ANY POINT ON THE PUMP PERFORMANCE CURVE. FIT MOTORS WITH LIFTING "EYES" CAPABLE OF SUPPORTING ENTIRE WEIGHT OF PUMP AND MOTOR.

2.05 PUMP CONTROL SYSTEM

A. PROVIDE A SEALED MERCURY FLOAT SWITCH CONTROL SYSTEM AS INDICATED, AUTOMATICALLY ALTERNATE OPERATION FROM ONE PUMP TO THE OTHER AND START SECOND PUMP IN THE EVENT FIRST PUMP CANNOT HANDLE INCOMING FLOW. PROVIDE MANUAL "ON-OFF" SWITCH FOR EACH PUMP. PROVIDE INDEPENDENT ADJUSTABLE HIGH AND LOW WATER LEVEL SWITCHES. PROVIDE FLOATS, SUPPORTS, AND ALARM. METAL PARTS, IF USED, MUST BE OF BRONZE OR EQUIVALENT CORROSION RESISTANT MATERIAL.

B. FLOAT ASSEMBLY DESCRIPTION: USE A DIRECT ACTING FLOAT SWITCH CONSISTING OF A NORMALLY-OPEN MERCURY SWITCH ENCLOSED IN A FLOAT. USE PIPE MOUNTED FLOAT ASSEMBLY. USE FLOAT MOLDED OF RIGID HIGH-DENSITY POLYURETHANE FOAM, COLOR-CODED AND COATED WITH A DURABLE, WATER AND CORROSION-RESISTANT JACKET OF CLEAR URETHANE. PROVIDE CONNECTING CABLE AND SUPPORT POLE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PROVIDE A CAST ALUMINUM NEMA TYPE 4 JUNCTION BOX TO CONNECT FLOAT ASSEMBLY. USE BOX WITH A GASKETED COVER WITH TAPPED FLOAT FITTING AND CONDUIT ENTRANCE PIPE THREADED OPENING. MOUNT FLOATS AT FIXED ELEVATIONS AS SHOWN. USE FLOATS DESIGNED TO TILT AND OPERATE THEIR SWITCHES CAUSING SEQUENTIAL TURN-ON TURN-OFF OF THE PUMP. WHEN THE LIQUID LEVEL BEING SENSED RISES OR FALLS PAST THE FLOAT.

C. ALTERNATOR: PROVIDE AN ALTERNATOR CONTROL SWITCH TO OPERATE IN CONNECTION WITH EACH FLOAT. USE ALTERNATOR CONTROL SWITCH TO ALTERNATE THE OPERATION OF THE PUMPS AND OPERATE BOTH PUMPS IF THE WATER LEVEL RISES ABOVE THE SECOND HIGH WATER LEVEL. INCORPORATE TIME DELAY FUNCTION AND DEVICES IN THE ALTERNATOR CONTROLS SUCH THAT BOTH SEWAGE PUMPS CANNOT BE STARTED SIMULTANEOUSLY FOR AN ADJUSTABLE PERIOD OF 10 TO 120 SECONDS AFTER SHUTDOWN. USE DELAY FUNCTION DESIGNED TO OPERATE IN ANY CONDITION OF START-UP IN EITHER NORMAL OR EMERGENCY OPERATIONAL MODE.

D. SEWAGE PUMP ALARM AND CONTROL PANEL: ENCLOSE ALARM PANEL IN NEMA IV ENCLOSURE AND WITH A FLASHING RED LIGHT WITH LONG LIFE BULB IN GUARDED ENCLOSURE AND 6 INCH DIAMETER HORN. HORN MUST EMIT 120 DB AT 10 FEET. POWER ALARM HORN AND LIGHT FROM 12V DC POWER SUPPLY WITH BATTERY BACKUP. PROVIDE A RECHARGEABLE BATTERY RATED TO POWER BOTH THE HORN AND LIGHT FOR A MINIMUM OF TWO HOURS UPON LOSS OF MAIN POWER. PROVIDE CIRCUITRY TO AUTOMATICALLY RECHARGE THE BATTERY AFTER MAIN POWER IS RESTORED. FULL CHARGE OF BATTERY MUST TAKE NO MORE THAN 20 HOURS. USE PANEL SWITCH POWER ON LIGHT, PUSH TO TEST BUTTON FOR HORN AND LIGHT AND PUSH TO SILENCE BUTTON FOR HORN AND LIGHT WITH AUTOMATIC RESET FOR NEXT ALARM. USE ALARM DESIGNED TO ACTIVATE UNDER THE FOLLOWING CONDITIONS:

A. UTILITY POWER FAILURE
B. UPS BATTERY LOW
C. GENERATOR RUNNING/STOPPED
d. WET WELL LEVEL HIGH
e. PH HIGH
f. FLOW HIGH
g. GENERATOR FAULT
h. PUMP 1 FAILURE
i. PUMP 2 FAILURE
j. GENERATOR LOW FUEL LEVEL
k. COMMUNICATION ERROR
l. THREE (3) EXPANSION SLOTS

E. ELECTRICAL REQUIREMENTS: FURNISH MOTORS WITH THEIR RESPECTIVE PIECES OF EQUIPMENT. FURNISH INTERNAL WIRING FOR COMPONENTS OF PACKAGED EQUIPMENT AS AN INTEGRAL PART OF THE EQUIPMENT. PROVIDE POWER WIRING AND CONDUIT FOR FIELD INSTALLED EQUIPMENT. PROVIDE MINIMUM 100 FEET OF WIRING FOR EACH PUMP AND CONTROLS.

F. ELECTRIC MOTOR: USE HERMETICALLY SEALED ELECTRIC MOTOR. SEAL THE POWER CABLE INSIDE THE MOTOR END BELL. PROVIDE A NEOPRENE COVERED CABLE WITH A FLEXIBLE METAL COVER OVER IT FOR ITS FULL LENGTH.

2.06 UNDERGROUND EQUIPMENT ENCLOSURE

A. ACCESS HATCH COVER: PROVIDE ALUMINUM ACCESS HATCH COVER AS INDICATED. INCLUDE LIFTING MECHANISM, AUTOMATIC HOLD OPEN ARM, SLAM LOCK WITH HANDLE, AND FLUSH LIFT HANDLE WITH RED VINYL GRIP. USE AUTOMATIC HOLD OPEN ARM THAT LOCKS IN THE 90 DEGREE POSITION. USE COVER THAT IS 1/4 INCH DIAMOND PLATE WITH 1/4 INCH CHANNEL FRAME AND CONTINUOUS ANCHOR FLANGE, USE ACCESS HATCH COVER CAPABLE OF WITHSTANDING A LIVE LOAD OF 300 LBS./SQ. FT. PROVIDE STAINLESS STEEL CYLINDER LOCK WITH TWO KEYS PER LOCK. KEY ALL THE LOCKS THE SAME.

B. WET WELL AND VALVE VAULT: PROVIDE CONCRETE WET WELL AND VALVE VAULT WITH INSIDE DIAMETER AS INDICATED STRUCTURES MAY BE PROVIDED IN LIEU OF CAST-IN-PLACE STRUCTURES.

1. CAST-IN-PLACE CONCRETE STRUCTURES: PROVIDE WET WELL AND VALVE VAULT WITH A COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS AS SPECIFIED IN SECTION 03 30 00 CAST-IN-PLACE CONCRETE.

2. PRECAST CONCRETE STRUCTURES: ASTM C478M ASTM C478, EXCEPT AS SPECIFIED HEREIN, PROVIDE PRECAST CONCRETE STRUCTURES WITH A COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS AND AN AIR ENTRAINMENT OF 6 PERCENT, PLUS, OR MINUS 2 PERCENT AND A MINIMUM WALL THICKNESS OF 5 INCHES. ASTM A615/A615M REINFORCING BARS. ASTM C443M ASTM C443 OR AASHTO M 198, TYPE B GASKETS FOR JOINT CONNECTIONS. USE MONOLITHIC BASE AND FIRST RISER.

C. WET WELL BASE MATERIAL: PROVIDE CRUSHED STONE AS INDICATED AND SPECIFIED IN SECTION 31 00 00 EARTHWORK. PROVIDE POLYETHYLENE VAPOR BARRIER AS INDICATED AND SPECIFIED IN SECTION 03 30 00 CAST-IN-PLACE CONCRETE.

PART 3 EXECUTION

3.01 INSTALLATION

A. PROVIDE PUMP STATION IN ACCORDANCE WITH DRAWINGS AND REQUIREMENTS OF THE RESPECTIVE EQUIPMENT MANUFACTURERS. DAMPEN AND ISOLATE EQUIPMENT VIBRATION.

B. INSTALLATION OF DUCTILE-IRON PRESSURE LINES: UNLESS OTHERWISE SPECIFIED, INSTALL PIPE AND FITTINGS IN ACCORDANCE WITH PARAGRAPH ENTITLED, "GENERAL REQUIREMENTS FOR INSTALLATION OF PIPELINES" OF SECTION 33 30 00 SANITARY SEWERS, AND WITH THE REQUIREMENTS OF AWWA C600 FOR PIPE INSTALLATION, JOINT ASSEMBLY, AND VALVE-AND-FITTING INSTALLATION. MAKE FLANGED JOINT WITH GASKETS, BOLTS, AND NUTS SPECIFIED FOR THIS TYPE JOINT. MAKE FLANGED JOINTS UP TIGHT, TAKING CARE TO AVOID UNDUE STRAIN ON FLANGES, FITTINGS, AND OTHER ACCESSORIES. ALIGN BOLT HOLES FOR EACH FLANGED JOINT. USE SIZE BOLTS FOR THE BOLT HOLES; USE OF UNDERSIZED BOLTS TO MAKE UP FOR MISALIGNMENT OF BOLT HOLES OR FOR ANY OTHER PURPOSE WILL NOT BE PERMITTED. DO NOT ALLOW ADJOINING FLANGE FACES TO BE OUT OF PARALLEL TO SUCH DEGREE THAT THE FLANGED JOINT CANNOT BE MADE WATERTIGHT WITHOUT OVERSTRAINING THE FLANGE.

C. INSTALLATION OF PVC PLASTIC PRESSURE PIPE AND FITTINGS: UNLESS OTHERWISE SPECIFIED, INSTALL PIPE AND FITTINGS IN ACCORDANCE WITH PARAGRAPH ENTITLED "GENERAL REQUIREMENTS FOR INSTALLATION OF PIPELINES" OF THIS SECTION AND WITH THE RECOMMENDATIONS FOR PIPE JOINT ASSEMBLY AND APPURTENANCE INSTALLATION IN AWWA M23, CHAPTER 7, "INSTALLATION".

1. PIPE LESS THAN 4 INCH DIAMETER:

a. MAKE THREADED JOINTS BY WRAPPING THE MALE THREADS WITH JOINT TAPE OR BY APPLYING AN APPROVED THREAD LUBRICANT, THAN THREADING THE JOINING MEMBERS TOGETHER. TIGHTEN JOINTS WITH STRAP WRENCHES THAT WILL NOT DAMAGE THE PIPE AND FITTINGS. DO NOT TIGHTEN JOINT MORE THAN 2 THREADS PAST HAND-TIGHT.
b. PUSH-ON JOINTS: BEVEL ENDS OF PIPE FOR PUSH-ON JOINTS TO FACILITATE ASSEMBLY. MARK PIPE TO INDICATE WHEN THE PIPE IS FULLY SEATED. LUBRICATE GASKET TO PREVENT DISPLACEMENT. EXERCISE CARE TO ENSURE THAT THE GASKET REMAINS IN PROPER POSITION IN THE BELL OR COUPLING WHILE MAKING THE JOINT.

c. SOLVENT-WELD JOINTS: COMPLY WITH THE MANUFACTURER'S INSTRUCTIONS.

D. VALVES: INSTALLATION OF VALVES: INSTALL GATE VALVES CONFORMING TO AWWA C500 IN ACCORDANCE WITH AWWA C600 FOR VALVE-AND-FITTING INSTALLATION AND WITH THE RECOMMENDATIONS OF THE APPENDIX ("INSTALLATION, OPERATION, AND MAINTENANCE OF GATE VALVES") TO AWWA C500. INSTALL GATE VALVES CONFORMING TO AWWA C509 IN ACCORDANCE WITH AWWA C600 FOR VALVE-AND-FITTING INSTALLATION AND WITH THE RECOMMENDATIONS OF THE APPENDIX ("INSTALLATION, OPERATION, AND MAINTENANCE OF GATE VALVES") TO AWWA C509. [INSTALL CHECK VALVES IN ACCORDANCE WITH THE APPLICABLE REQUIREMENTS OF AWWA C600 FOR VALVE-AND-FITTING INSTALLATION EXCEPT AS OTHERWISE INDICATED

E. STEEL PIPING: INSTALL STEEL PIPING IN ACCORDANCE WITH ASME B31.3. USE PTFE PIPE THREAD PASTE OR PTFE POWDER AND OIL FOR JOINTING COMPOUND FOR PIPE THREADS.

F. FORCE MAIN: PROVIDE IN ACCORDANCE WITH SECTION 33 30 00 SANITARY SEWERS.

G. EQUIPMENT INSTALLATION: INSTALL EQUIPMENT IN ACCORDANCE WITH THESE SPECIFICATIONS AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. GROUT EQUIPMENT MOUNTED ON CONCRETE FOUNDATIONS BEFORE INSTALLING PIPING. INSTALL PIPING TO AVOID IMPOSING STRESS ON ANY EQUIPMENT. MATCH FLANGES ACCURATELY BEFORE SECURING BOLTS.

3.02 FIELD TESTS AND INSPECTIONS

A. PERFORM ALL FIELD TESTS, AND PROVIDE ALL LABOR, EQUIPMENT, AND INCIDENTALS REQUIRED FOR TESTING. EXCEPT THAT WATER AND ELECTRIC POWER NEEDED FOR FIELD TESTS WILL BE FURNISHED AS SET FORTH IN DIVISION 01. PRODUCE EVIDENCE, WHEN REQUIRED, THAT ANY ITEM OF WORK HAS BEEN CONSTRUCTED IN ACCORDANCE WITH CONTRACT REQUIREMENTS. ALLOW CONCRETE TO CURE A MINIMUM OF 5 DAYS BEFORE TESTING ANY SECTION OF PIPING WHERE CONCRETE THRUST BLOCKS HAVE BEEN PROVIDED.

B. TESTING PROCEDURE: TEST PIPING IN ACCORDANCE WITH THE SECTION 33 30 00 SANITARY SEWERS. TEST IN OPERATION ALL EQUIPMENT TO DEMONSTRATE COMPLIANCE WITH THE CONTRACT REQUIREMENTS.

C. SEWAGE GRINDER PUMP LIFT STATION: TEST PUMPS AND CONTROLS, IN OPERATION, UNDER DESIGN CONDITIONS TO INSURE PROPER OPERATION OF ALL EQUIPMENT. PROVIDE ALL APPLIANCES, MATERIALS, WATER, AND EQUIPMENT FOR TESTING, AND BEAR ALL EXPENSES IN CONNECTION WITH THE TESTING. CONDUCT TESTING AFTER ALL EQUIPMENT IS PROPERLY INSTALLED, ELECTRICAL SERVICES AND PIPING IS INSTALLED, LIQUID IS FLOWING, AND THE PUMP STATION IS READY FOR OPERATION. CORRECT ALL DEFECTS DISCOVERED TO THE SATISFACTION OF THE CONTRACTING OFFICER, AND ALL TESTS REPEATED, AT THE EXPENSE OF THE CONTRACTOR, UNTIL THE EQUIPMENT IS IN PROPER WORKING ORDER.

NOTE:

PUMP STATION SPECIFICATIONS AND DETAILS SHALL BE CONFIRMED BASED ON FINAL FORCE MAIN DESIGN WITHIN OLD AYER ROAD.

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 48065
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PUMP STATION SPECIFICATIONS

DRAWING NUMBER:

C8.11

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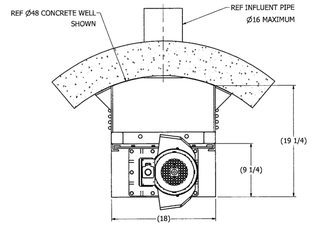
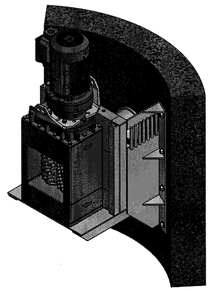
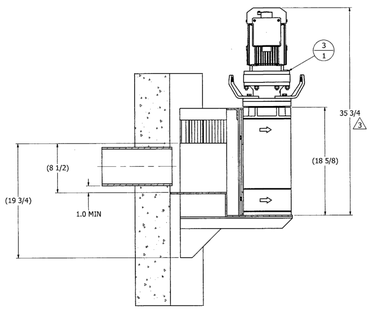
NOTES: UNLESS OTHERWISE SPECIFIED

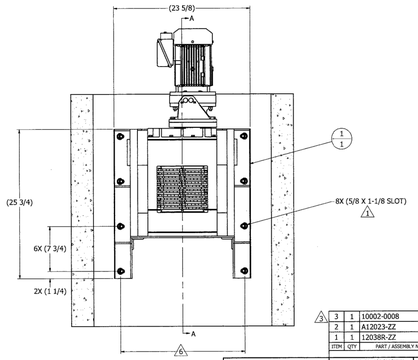
1. ANCHOR BOLTS (8) Ø1/2 X 3-3/4 MINIMUM ARE PROVIDED BY OTHERS.
2. CONTRACTOR SHALL GROUT OR SEAL GAPS BETWEEN FRAME AND CONCRETE TO PREVENT ANY LARGE PARTICLES FROM PASSING.
3. SEE DRAWING 10002-CD FOR GRINDER DIMENSIONS AND DETAILS. 3 HP TEFC GEARMOTOR SHOWN.
4. ALL DIMENSIONS NEED TO BE CONFIRMED TO ENSURE PROPER FIT.
5. APPROXIMATE WEIGHTS: FRAME: 100 LBS (45 KG) GRINDER: 350 LBS (160 KG)
6. FRAME MAY BE USED AS A TEMPLATE TO LOCATE HOLES FOR ANCHORS.
7. TO SPECIFY MATERIAL, REPLACE -ZZ WITH ONE OF THE FOLLOWING:
   - -SS (AISI 304 SST)
   - -SSL (AISI 304L SST)
   - -SU (AISI 316 SST)
   - -SUL (AISI 316L SST)







SECTION A-A



ZONE	REV	DESCRIPTION	ECO NO.	DATE	CHK	PE	MFG	QC
ALL	A	INITIAL RELEASE	01-1099	10-22-14	TN	RS	VQ	RF
A1	B	UPDATED NAME TO 10K OPEN CHANNEL MUFFIN MONSTER	01-1356	12-30-14	TN	RS	VQ	RF

CONTROLLED

ITEM	QTY	PART / ASSEMBLY NUMBER	DESCRIPTION	MATERIAL
3	1	10002-0008	GRINDER ASSEMBLY	
2	1	A12023-ZZ	GUIDE PLATE ASSEMBLY, 8"	SST
1	1	12038R-ZZ	ROUND WALL FRAME WELDMENT	SST

PARTS LIST

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UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [MM] FRACTIONS ± 1/16 DECIMALS XX ± .030 X ± .005 ANGLES ± 1°
MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN: J. SCHATZLEIN	10-14-14
CHECKED: T. NYDAM	11-24-14
ENGR: Y. QUINTANA	11-25-14
QC: R. FELIX	11-25-14

JWC ENVIRONMENTAL
200 PAULARINO AVE, COSTA MESA, CA 92626

GENERAL ARRANGEMENT
ROUND WALL FRAME
10K OPEN CHANNEL MUFFIN MONSTER

SIZE: D | DRAWING NO.: 12038R-GA | REV: B
SCALE: 1/6 | SHEET 1 OF 1

MUFFIN MONSTER INSTALLATION DETAILS

NOT TO SCALE

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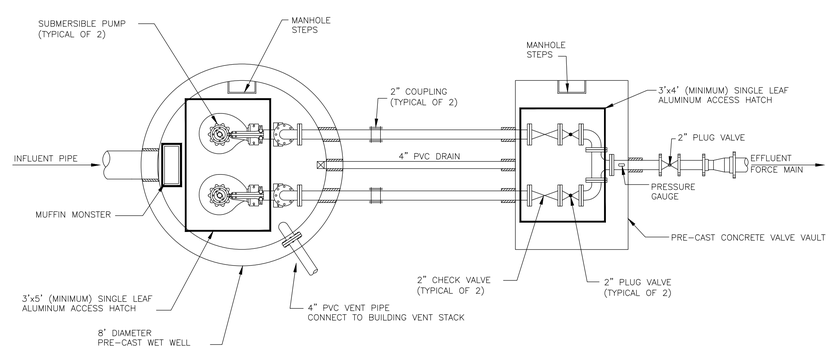


NOTE:

PUMP STATION SPECIFICATIONS AND DETAILS SHALL BE CONFIRMED BASED ON FINAL FORCE MAIN DESIGN WITHIN OLD AYER ROAD.

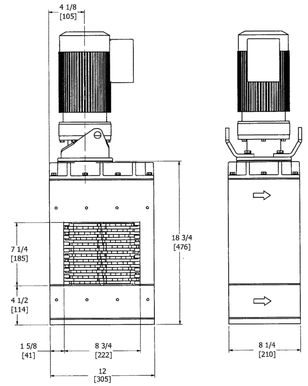
WET WELL AND VALVE VAULT - PLAN VIEW

NOT TO SCALE

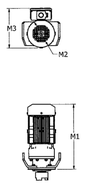
DET NO. 3-8

NOTES UNLESS OTHERWISE SPECIFIED:

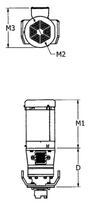
1. INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994 STANDARDS.
2. DIMENSIONS ARE IN INCHES [MM].
3. WEIGHT OF UNIT LESS DRIVE: 250 LBS [113.4 KG]



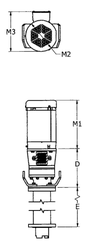
ELECTRIC GEARMOTOR



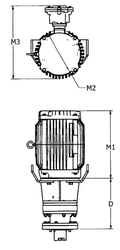
ELECTRIC MOTOR



EXTENDED SHAFT ELECTRIC MOTOR



IMMERSIBLE MOTOR



DRIVE DIMENSIONS				
TYPE	M1	M2	M3	WEIGHT
2 HP [1.5KW] ELECTRIC GEARMOTOR				LB [KG]
TEFC	14-15/16 [380]	Ø6-5/16 [160]	9 [229]	54 [24.5]
3 HP [2.2 KW] ELECTRIC GEARMOTOR				
TEFC	16-15/16 [430]	Ø6-13/16 [173]	9-9/16 [243]	88 [39.9]
2 HP[1.5 KW] ELECTRIC MOTOR/SPEED REDUCER				
TEFC	11-3/16 [284]	Ø7-3/16 [183]	9-3/8 [238]	41 [18.6]
SUPER-E	10-7/8 [276]	Ø8 [203]	10-3/8 [264]	59 [26.8]
WASHDOWN DUTY	13-3/8 [340]	Ø7-3/16 [183]	9-5/16 [237]	41 [18.6]
XPFC	13-1/8 [333]	Ø7-1/8 [181]	10-3/16 [259]	60 [27.2]
IMMERSIBLE	15-3/4 [400]	Ø11-7/16 [291]	17 [432]	205 [92.9]
3 HP [2.2 KW] ELECTRIC MOTOR/SPEED REDUCER				
TEFC	13-7/16 [341]	Ø7-3/16 [183]	9-5/16 [237]	60 [27.2]
SUPER-E	13-1/8 [333]	Ø8-1/2 [216]	11-15/16 [303]	98 [44.5]
WASHDOWN DUTY	13-7/16 [341]	Ø7 [178]	9-5/16 [237]	62 [28.1]
XPFC	16-1/4 [413]	Ø8-5/8 [219]	11-13/16 [300]	91 [41.3]
IMMERSIBLE	15-3/4 [400]	Ø11-7/16 [291]	17 [432]	212 [96.2]

REDUCER SPOOL DIMENSION INCLUDING ADAPTER (D)	
2 HP	9 [229]
3 HP	11-15/16 [303]

EXTENDED SHAFT LENGTHS (E)													
12 [305]	18 [457]	24 [610]	30 [762]	36 [914]	42 [1067]	48 [1219]	54 [1372]	60 [1524]	66 [1676]	72 [1829]	78 [1981]	84 [2134]	90 [2286]	96 [2438]

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UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES [MM] FRACTIONS ± 1/8 DECIMALS .XX ± .030 .XXX ± .005 ANGLES ± 1°
MATERIAL
FINISH
DO NOT SCALE DRAWING

CONTRACT NO.

APPROVALS	DATE
DRAWN: B. WEBER	6-2-14
CHECKED: C. GLADERMAN	10-23-14
ENGR:	
QC:	

JWC ENVIRONMENTAL
200 PAULARINO AVE, COSTA MESA, CA 92626

OPEN CHANNEL CONFIGURATION
DRIVE OPTIONS
10K OPEN CHANNEL MUFFIN MONSTER

SIZE: D | DRAWING NO.: 10002-CD | REV: B
SCALE: 1/4 | CAD MODEL: A10010-E-2HP | SHEET 1 OF 1

MUFFIN MONSTER GRINDER DETAILS

NOT TO SCALE

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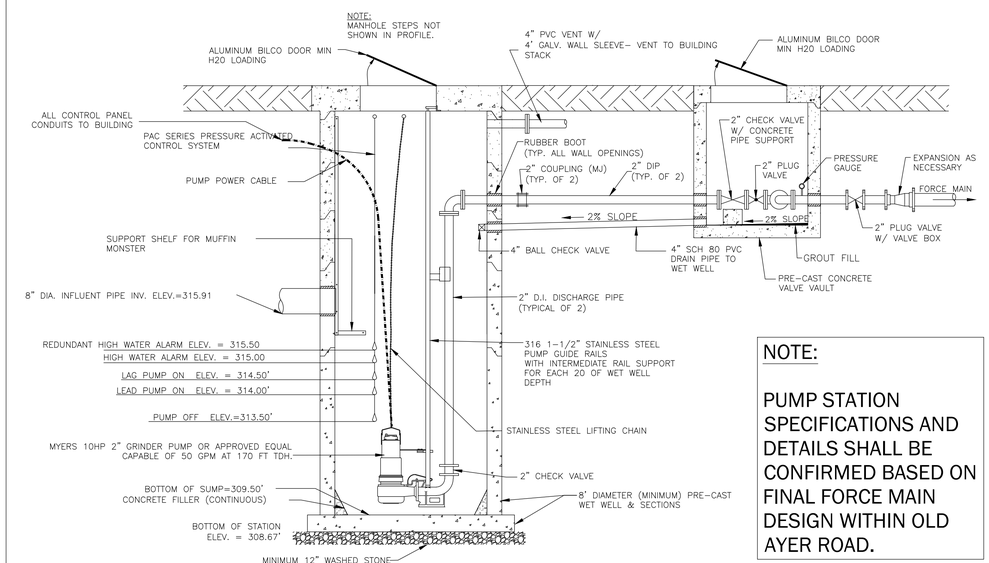

NOTE:

PUMP STATION SPECIFICATIONS AND DETAILS SHALL BE CONFIRMED BASED ON FINAL FORCE MAIN DESIGN WITHIN OLD AYER ROAD.

WET WELL AND VALVE VAULT - SECTION

NOT TO SCALE

DET NO. 3-7

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 48365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: NTS

DRAWING NAME:

PUMP STATION DETAILS

DRAWING NUMBER:

C8.12

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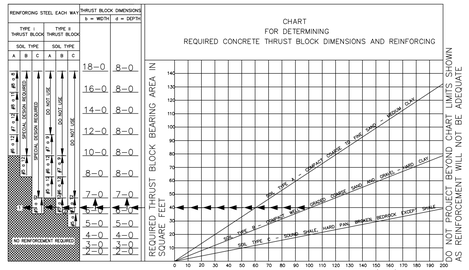
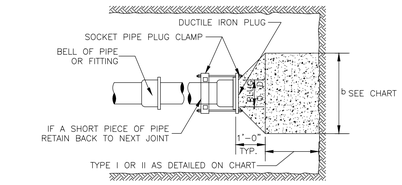
TABLE II - "a" DIMENSION - FEET		
PIPE DIAMETER – INCHES	90° FITTING	OTHERS
6, 8, 10 & 12	1 – 6	1 – 0
16 & 20	2 – 0	1 – 6
24 – 30	3 – 0	2 – 0

TABLE I - THRUST - KIPS (WATER PRESSURE = 200 P.S.I.

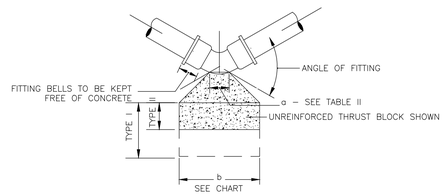
PIPE DIAMETER INCHES		6	8	10	12	16	20	24	30	36	42
DEAD ENDS AND TEES		5.6	10	15.8	22.6	40.2	62.8	90.4	141.0	203.6	277.0
ANGLE FITTINGS	90°	7.9	14.2	22.4	32.0	56.8	88.8	127.7	199.0	288.0	392.0
	67 1/2°	–	11.1	17.6	25.1	44.7	70.0	100.2	157.0	226.0	308.0
	56 1/4°	–	–	14.9	21.2	37.9	59.2	85.1	133.0	192.0	261.0
	45°	–	–	–	17.3	30.8	48.1	69.0	108.0	156.0	212.0
	33 3/4°	–	–	–	13.1	23.3	36.5	52.5	82.0	118.0	161.0
	22 1/2°	–	–	–	8.8	15.7	24.5	35.2	55.0	79.5	108.0

DESIGN THRUST BLOCKS OR OTHER SUITABLE ANCHORAGE TO SUIT ACTUAL CONDITIONS

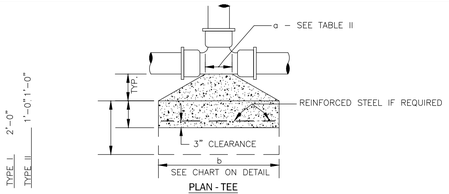




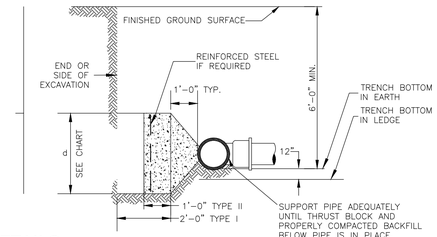
PLAN - DEAD END



PLAN - BEND



PLAN - TEE



TYPICAL SECTION

THRUST BLOCK DETAILS

N.T.S.

NOTES:

1. ALL FITTINGS SHALL BE ANCHORED BY MECHANICAL MEANS OR BY CONCRETE THRUST BLOCKS, OR BOTH, IF REQUIRED BY THE PUBLIC WORKS DEPARTMENT OR AS NOTED ON THE CONTRACT PLANS.
2. ALL EXPOSED METAL SHALL BE PAINTED OR COATED.
3. CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRESS OF 3,000 P.S.I. AT 28 DAYS.
4. REINFORCING STEEL SHALL BE A.S.T.M. A615 GRADE 40.
5. WATER PRESSURE IN TABLE 1 INCLUDES WATER HAMMER ALLOWANCE.
6. THE ACTUAL METHOD OF RESTRAINT MUST BE DETERMINED BY ACTUAL FIELD CONDITIONS.
7. THESE ARE TYPICAL INSTALLATIONS TO BE USED AS A GUIDE TO THE DESIGNER.
8. FINAL DESIGNS ARE SUBJECT TO REVIEW BY THE DEPARTMENT OF PUBLIC WORKS.

ILLUSTRATIVE PROBLEM

DESIGN A THRUST BLOCK FOR A 67–1/2° BEND, A 24–INCH DIAMETER WATER MAIN, CARRYING A MAXIMUM PRESSURE OF 200 P.S.I SOIL CLASSIFIED AS A WELL GRADED COMPACT COURSE SAND AND GRAVEL.

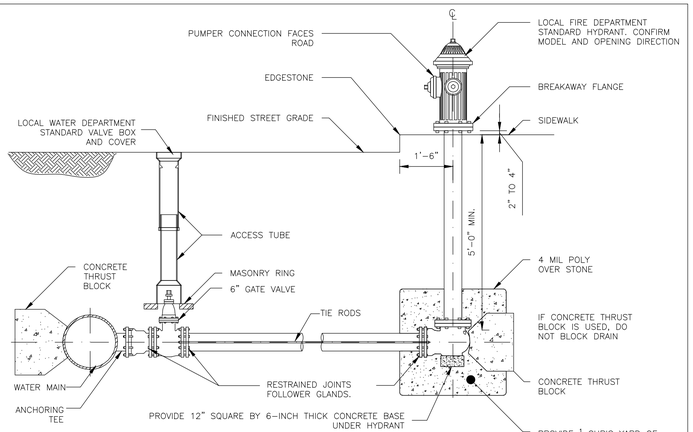
SOLUTION

1. ENTER TABLE 1 AT 24–INCH PIPE DIAMETER – GO VERTICALLY DOWN COLUMN UNTIL OPPOSITE 67–1/2° ANGLE FITTING. READ THRUST = 100.2 KIPS.
2. SEE CHART IMMEDIATELY BELOW TABLE 1 – SELECT SOIL TYPE CURVE REFLECTING ACTUAL SOIL CLASSIFICATION. TYPE B FOR THIS PROBLEM.
3. ENTER CHART AT THRUST TO BE RESISTED AND GO VERTICALLY TO SOIL TYPE CURVE SELECTED IN 2 ABOVE – SEE CHART AND FOLLOW ILLUSTRATIVE PROBLEM ARROW LINE FROM 100.2 KIP THRUST TO SOIL TYPE B CURVE.
4. FROM THIS INTERSECTION GO HORIZONTALLY FOLLOWING ARROW LINE TO INTERSECTION WITH REQUIRED THRUST BLOCK BEARING AREA IN SQUARE FEET – 40 SQUARE FEET MINIMUM IS REQUIRED TO RESIST THRUST.
5. CONTINUE HORIZONTALLY TO "THRUST BLOCK DIMENSIONS" COLUMN AND SELECT DIMENSIONS "b" AND "d" IMMEDIATELY ABOVE HORIZONTAL ARROW LINE PROJECTION.
6. CONTINUE HORIZONTALLY TO "REINFORCING STEEL – EACH WAY" COLUMN, NOTING COLUMNS FURTHER CLASSIFICATION BY SOIL TYPE AND FOOTING TYPE. (SEE "THRUST BLOCK DETAIL", FOR TYPE I AND TYPE II REQUIREMENTS.)
   TWO SOLUTIONS TO ILLUSTRATIVE PROBLEM ARE ACCEPTABLE:
   SOLUTION 1 – TYPE 1 THRUST BLOCK AND SOIL TYPE B INDICATES NO REINFORCEMENT REQUIRED.
   SOLUTION 2 – TYPE II THRUST BLOCK AND SOIL TYPE B INDICATES #5 a 12 EACH WAY REQUIRED.

DET NO. 6-2

NOTES:

1. CONCRETE THRUST BLOCK TO BE USED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.
2. USE RESTRAINED JOINT FOLLOWER GLANDS, OR TIE RODS, WHERE CONCRETE THRUST BLOCK IS UNACCEPTABLE.
3. SIZE OF BLOCK OR FITTING TO BE DESIGNED FOR SPECIFIC CONDITIONS, OR ANY NECESSARY BENDS.
4. PIPE MATERIAL AND APPURTANCES SHALL CONFORM TO LOCAL WATER DEPARTMENT STANDARDS.



TYPICAL HYDRANT DETAIL

N.T.S.

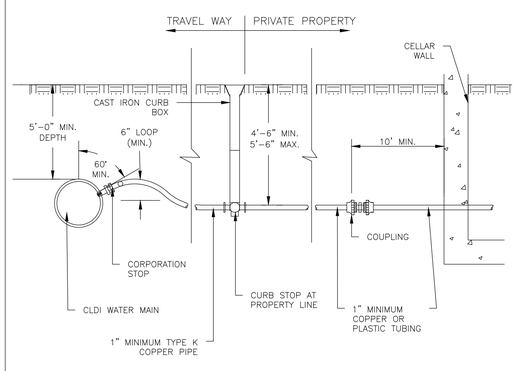
DET NO. 6-1

NOTES:
1. CONTRACTOR RESPONSIBLE FOR DESIGNING AND MAINTAINING PROPER TRENCH PROTECTION AND OBTAINING ALL REQUIRED PERMITS.
2. SEE ADDITIONAL DETAILS FOR EARTH AND PAVING MATERIALS WITHIN THIS PLAN SET.

WATER TRENCH DETAIL

N.T.S.

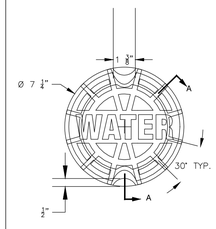
DET NO. 6-3

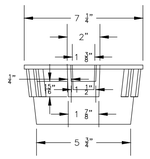


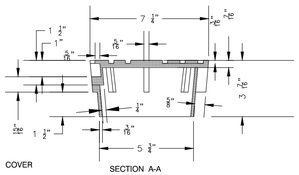
WATER SERVICE DETAIL

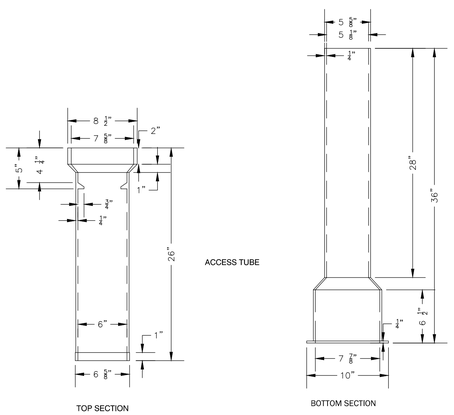
N.T.S.

DET NO. 6-4





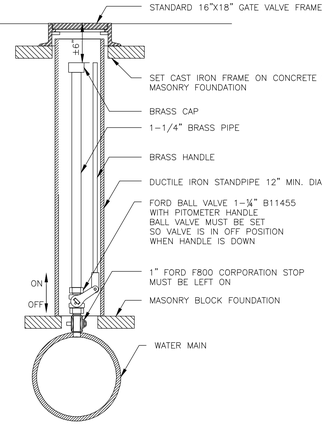




BUFFALO TYPE VALVE BOX

N.T.S.

DET NO. 6-5



TYPICAL PITOMETER TAP AND AIR RELEASE VALVE

N.T.S.

DET NO. 6-6

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

WATER MAIN DETAILS

DRAWING NUMBER:

C8.13

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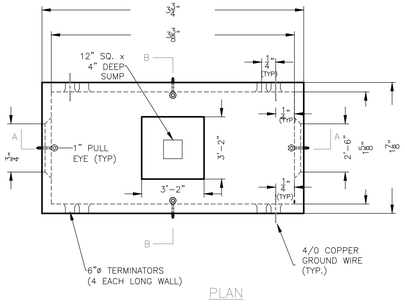
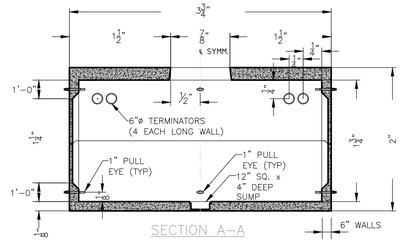
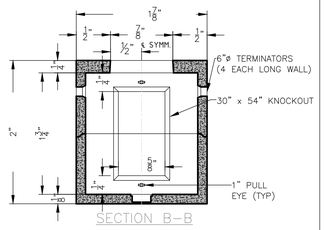




OPPOSITE WALLS ARE MIRROR IMAGES.



OPPOSITE WALLS ARE MIRROR IMAGES.

NOTES:

1. CONCRETE MINIMUM STRENGTH 5,000 PSI AFTER 28 DAYS.
2. STEEL REINFORCEMENT – ASTM A615, GRADE 60.
3. MINIMUM STEEL COVER – 1 INCH.
4. DESIGN LOADING – AASHTO HS20-44.

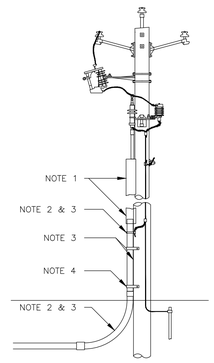
ELECTRIC MANHOLE

N.T.S

DET NO. 7-5

NOTES:

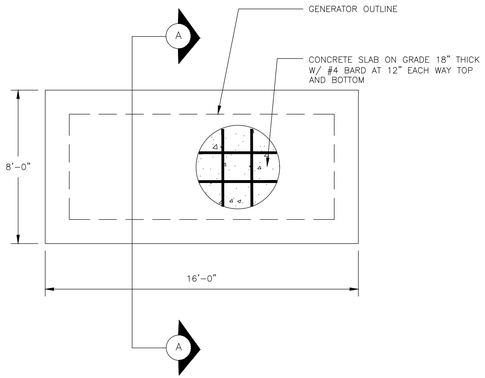
1. U-GUARD
2. GALVANIZED STEEL CONDUIT AND BEND ARE TO BE USED, THEY SHALL BE GROUNDED BY BONDING TO AN APPROVED U-BOLT TYPE GROUND CLAMP 6" FROM TOP OF THE CONDUIT. A 24" CONDUCTOR SHALL BE PROVIDED TO EXTEND TO THE UTILITY GROUNDING CONDUCTOR. THE CONDUCTOR SHALL BE SIZED AS REQUIREDBY THE NATIONAL ELECTRICAL CODE, ARTILCLE250, BUT IN NO CASE SHALL IT BE SMALLER THAN #4 AWG COPPER. RECOMMEND USE OF CORROSION RESISTANT BEND IN LOCATIONSSUBJECT TO HIGHWAY SALTING.
3. GALVANIZED STEEL CONDUIT, GALVANIZED STEEL SWEEP, ATTACHMENT CLAMPS, GROUNDING CLAMP AND 24" GROUNDING CONDUCTOR SHALL BE FURNISHED AND INSTALLED. NORMALLY, THE CONDUIT SHALL RISE ON THE SIDE OF POLE AWAY FROM TRAFFIC UP TO 8 FT. TO 11 FT. CONSULT THE UTILITY FOR PROPER LOCATION ON POLE.
4. PIPE STRAPS, INSTALL AT NOT MORE THAN 30" INTERVALS.
5. THE CONDUIT BURIAL DEPTH SHALL BE 18" MINIMUM.



RISER DIAGRAM TO UTILITY POLE

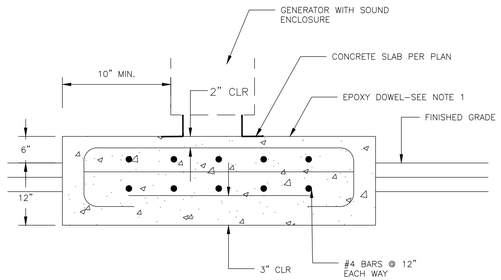
N.T.S.

DET NO. 7-1



NOTES:

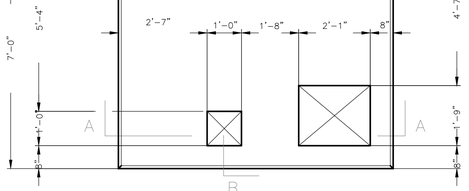
1. INSTALL ¾" DIAMETER THREADED ROD, ASTM F593, W/4" MINIMUM EMBEDMENT INTO SLAB USING HILT1 HIT-RE 500-SD EPOXY ANCHORING SYSTEM. INSTALL ANCHOR AT EACH MOUNTING HOLE PROVIDED IN EQUIPMENT.

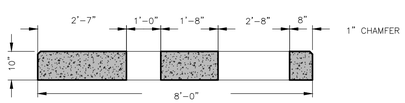


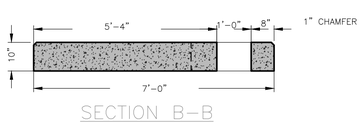
GENERATOR PAD DETAIL

N.T.S.

DET NO. 7-4







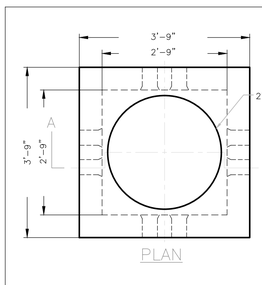
NOTES:

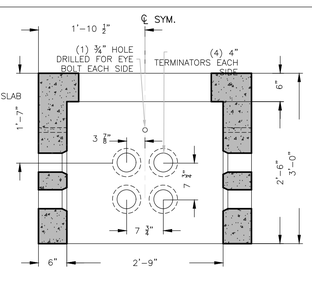
1. CONCRETE MINIMUM STRENGTH 5,000 PSI AFTER 28 DAYS.
2. STEEL REINFORCEMENT – ASTM A615, GRADE 60.
3. MINIMUM STEEL COVER – 1 INCH.

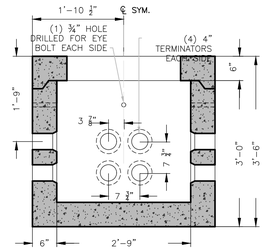
TRANSFORMER PAD DETAIL

N.T.S

DET NO. 7-7







NOTES:

1. CONCRETE: 5,000 PSI MINIMUM AFTER 28 DAYS.
2. STEEL REINFORCEMENT CONFORMS TO ASTM A615, GRADE 60. MINIMUM STEEL COVER 1".
3. DESIGN LOADING: AASHTO HS20-44, 0 TO 5 FEET COVER.
4. OPTIONAL OPENINGS AVAILABLE BY SPECIAL ORDER.

	WEIGHT
SHEA CONCRETE	2680 LBS

	WEIGHT
SHEA CONCRETE	3690 LBS

TELECOMM MANHOLE

N.T.S

DET NO. 7-6

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
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NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

UTILITY DETAILS

DRAWING NUMBER:

C8.14

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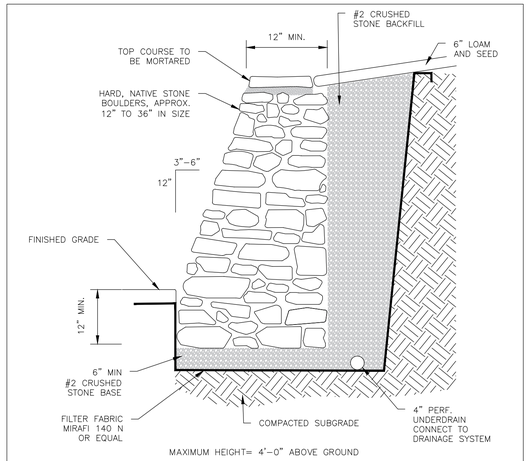
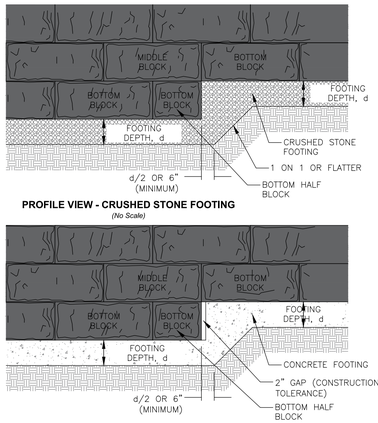


STONE WALL DETAIL

N.T.S.

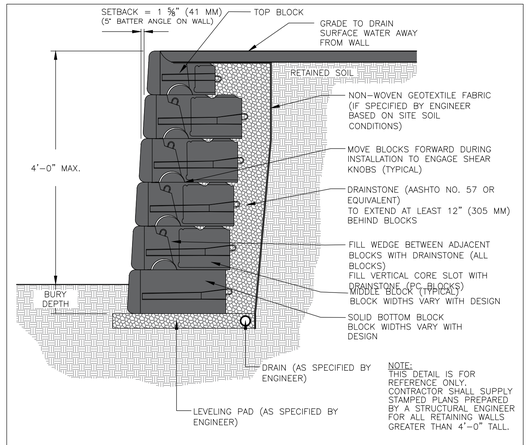
DET NO. 9-2



[DETAIL PROVIDED BY REDI-ROCK]
STEP FOOTING DETAIL

N.T.S.

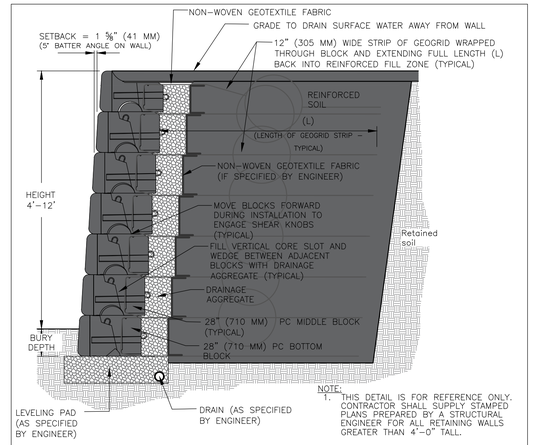
DET NO. 9-3



[DETAIL PROVIDED BY REDI-ROCK]
TYPICAL GRAVITY WALL SECTION

N.T.S.

DET NO. 9-4



[DETAIL PROVIDED BY REDI-ROCK]
TYPICAL REINFORCED WALL SECTION

N.T.S.

DET NO. 9-5

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46865
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: N.T.S.

DRAWING NAME:

RETAINING WALL DETAILS

DRAWING NUMBER:

C8.15

P:\PLN\C-0880 Groton\Autocad Design Development\Details.dwg

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DATE:

COMMONWEALTH OF MASSACHUSETTS
TODD P. MOREY
CIVIL
No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 100'

DRAWING NAME:

EXISTING WATERSHED MAP

DRAWING NUMBER:

C9.1

P:\Work\C-880 Groton\Autocad\Design Development\Existing Stormwater Catchments.dwg

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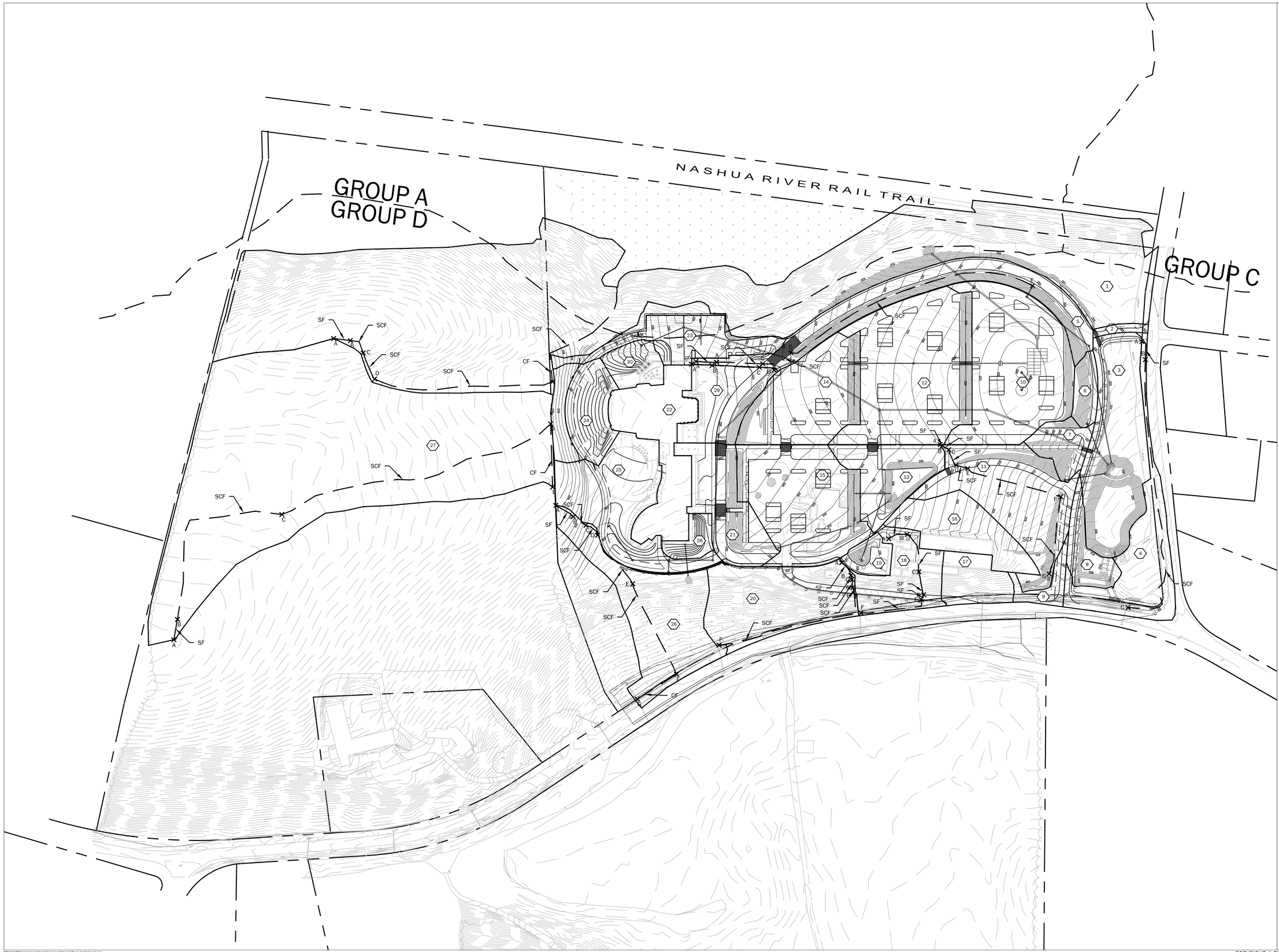

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TODD P. MOREY
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No. 46365
REGISTERED PROFESSIONAL ENGINEER
1.12.17

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE: 1" = 100'

DRAWING NAME:

PROPOSED WATERSHED MAP

DRAWING NUMBER:

C9.2

P:\Work (C-880 Groton\Autocad\Design Development\Proposed Stormwater Catchments.dwg

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LANDSCAPE CALCULATIONS

	Proposed	Required	Notes
Parking Area (sf)	434,121		
Landscape Area (sf)	171,309		
Parking/Landscape	**39.46**	5%	
Parking Spaces	678		
4" Caliper Trees	34	85	White and Pin Oaks only, 678 parking spaces/8 = 85 required trees
All Trees	145		All trees shown within Parking Lot Area - Sizes range from 2" - 4" cal.
Caliper Inches	**423**	340	Min. Caliper x Quantity for each species, 85 trees x 4" cal. = 340 required caliper inches
Planting Area per Tree (sf)	**1,622**	60	Landscape Area / (423 Total Inches / 4")

PLANT_SCHEDULE

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	CONT	CAL	QTY
AR	Acer rubrum `Autumn Blaze` / Autumn Blaze Red Maple	B & B	2.5"-3" Cal	27
AS	Acer saccharum `Green Mountain` TM / Green Mountain Sugar Maple	B & B	3.5"-4" Cal	24
BN2	Betula nigra / River Birch	B & B	2.5"-3" Cal	3
CO	Carya ovata / Shagbark Hickory	B & B	2.5"-3" Cal	9
FG	Fagus grandifolia / American Beech	B & B	3"-3.5" Cal	7
NS2	Nyssa sylvatica / Sour Gum	B & B	3"-3.5" Cal	14
QA	Quercus alba / White Oak	B & B	4"-4.5" Cal	18
QB2	Quercus bicolor / Swamp White Oak	B & B	2.5"-3" Cal	3
QP	Quercus palustris / Pin Oak	B & B	4"-4.5" Cal	15
EVERGREEN TREES	**BOTANICAL NAME / COMMON NAME**	**CONT**	**SIZE**	**QTY**
AB	Abies balsamea phanerolepis / Canaan Balsam Fir	B & B	10`-12` H	6
JV4	Juniperus virginiana / Eastern Red Cedar	B & B	5`-6` H	3
JV3	Juniperus virginiana / Eastern Red Cedar	B & B	6`-7` H	2
JV2	Juniperus virginiana / Eastern Red Cedar	B & B	8`-10` H	4
PG	Picea glauca / White Spruce	B & B	10`-12` H	4
UNDERSTORY TREES	**BOTANICAL NAME / COMMON NAME**	**CONT**	**CAL**	**QTY**
AL	Amelanchier laevis / Allegheny Serviceberry	B & B	12`-14` H	14
CF	Cornus florida / Eastern Dogwood	B & B	2"-2.5" Cal	6
MZ	Malus zumi calocarpa / Redbud Zumi Crabapple	B & B	3"-3.5" Cal	22
SHRUBS	**BOTANICAL NAME / COMMON NAME**	**CONT**	**SIZE**	**QTY**
CP	Comptonia peregrina / Sweet Fern	2 Gal		20
CS	Cornus sericea `Artic Fire` / Artic Fire Dogwood	B & B	18-24"	87
HV	Hamamelis virginiana / Common Witch Hazel	B & B	5`-6` H	14
IG	Ilex glabra `Shamrock` / Inkberry	B & B	2`-2.5`	36
IR	Ilex verticillata `Red Sprite` / Red Sprite Winterberry	B & B	3`-3.5` H	34
IV	Ilex verticillata `Sparkleberry` / Winterberry	B & B	3`-4` H	51
MP	Myrica pensylvanica / Northern Bayberry	B & B	2.5`-3`	31
RT	Rhus typhina / Staghorn Sumac	#1		100
GROUND COVERS	**BOTANICAL NAME / COMMON NAME**	**CONT**	**SPACING**	**QTY**
L	LAWN no mow fescue seed mix	Seed		68,670 sf
MM	Meadow Seed Mix Wildflower mix	Seed		325,238 sf
SS	Schizachyrium scoparium / Little Bluestem Grass	2" Plug	15" o.c.	289
SB	Stormwater Basin Seed Mix	Seed		60,715 sf

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

MASSACHUSETTS · STEPHEN C. ST... · No. 973 · REGISTERED LANDSCAPE ARCHITECT

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17
3	CONTROL PLANS	2.23.17

SCALE: 1"=40'-0"

DRAWING NAME:

PLANTING PLAN NORTH

DRAWING NUMBER:

L-1.0

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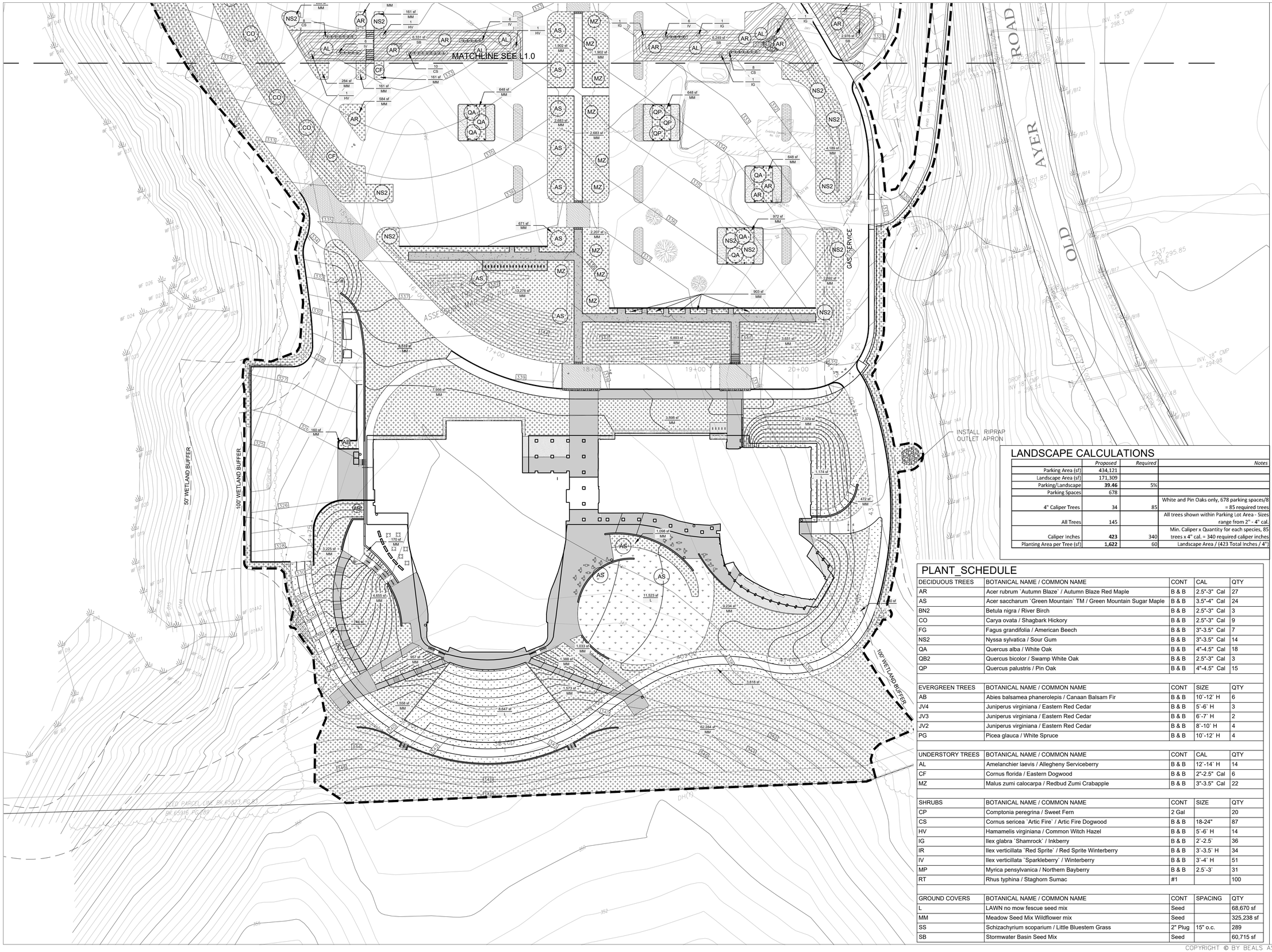

LANDSCAPE CALCULATIONS

	Proposed	Required	Notes
Parking Area (sf)	434,121		
Landscape Area (sf)	171,309		
Parking/Landscape	**39.46**	5%	
Parking Spaces	678		
4" Caliper Trees	34	85	White and Pin Oaks only, 678 parking spaces/8 = 85 required trees
All Trees	145		All trees shown within Parking Lot Area - Sizes range from 2" - 4" cal.
Caliper inches	**423**	340	Min. Caliper x Quantity for each species, 85 trees x 4" cal. = 340 required caliper inches
Planting Area per Tree (sf)	**1,622**	60	Landscape Area / (423 Total Inches / 4")

PLANT_SCHEDULE

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	CONT	CAL	QTY
AR	Acer rubrum `Autumn Blaze` / Autumn Blaze Red Maple	B & B	2.5"-3" Cal	27
AS	Acer saccharum `Green Mountain` TM / Green Mountain Sugar Maple	B & B	3.5"-4" Cal	24
BN2	Betula nigra / River Birch	B & B	2.5"-3" Cal	3
CO	Carya ovata / Shagbark Hickory	B & B	2.5"-3" Cal	9
FG	Fagus grandifolia / American Beech	B & B	3"-3.5" Cal	7
NS2	Nyssa sylvatica / Sour Gum	B & B	3"-3.5" Cal	14
QA	Quercus alba / White Oak	B & B	4"-4.5" Cal	18
QB2	Quercus bicolor / Swamp White Oak	B & B	2.5"-3" Cal	3
QP	Quercus palustris / Pin Oak	B & B	4"-4.5" Cal	15
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
AB	Abies balsamea phanerolepis / Canaan Balsam Fir	B & B	10`-12` H	6
JV4	Juniperus virginiana / Eastern Red Cedar	B & B	5`-6` H	3
JV3	Juniperus virginiana / Eastern Red Cedar	B & B	6`-7` H	2
JV2	Juniperus virginiana / Eastern Red Cedar	B & B	8`-10` H	4
PG	Picea glauca / White Spruce	B & B	10`-12` H	4
UNDERSTORY TREES	BOTANICAL NAME / COMMON NAME	CONT	CAL	QTY
AL	Amelanchier laevis / Allegheny Serviceberry	B & B	12`-14` H	14
CF	Cornus florida / Eastern Dogwood	B & B	2"-2.5" Cal	6
MZ	Malus zumi calocarpa / Redbud Zumi Crabapple	B & B	3"-3.5" Cal	22
SHRUBS	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
CP	Comptonia peregrina / Sweet Fern	2 Gal		20
CS	Cornus sericea `Artic Fire` / Artic Fire Dogwood	B & B	18-24"	87
HV	Hamamelis virginiana / Common Witch Hazel	B & B	5`-6` H	14
IG	Ilex glabra `Shamrock` / Inkberry	B & B	2`-2.5`	36
IR	Ilex verticillata `Red Sprite` / Red Sprite Winterberry	B & B	3`-3.5` H	34
IV	Ilex verticillata `Sparkleberry` / Winterberry	B & B	3`-4` H	51
MP	Myrica pensylvanica / Northern Bayberry	B & B	2.5`-3`	31
RT	Rhus typhina / Staghorn Sumac	#1		100
GROUND COVERS	BOTANICAL NAME / COMMON NAME	CONT	SPACING	QTY
L	LAWN no mow fescue seed mix	Seed		68,670 sf
MM	Meadow Seed Mix Wildflower mix	Seed		325,238 sf
SS	Schizachyrium scoparium / Little Bluestem Grass	2" Plug	15" o.c.	289
SB	Stormwater Basin Seed Mix	Seed		60,715 sf

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

COMMONWEALTH OF MASSACHUSETTS
JEFFREY D. BEALS
No. 973
REGISTERED LANDSCAPE ARCHITECT

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17
3	CONTROL PLANS	2.23.17

SCALE: 1"=40'-0"

DRAWING NAME:

PLANTING PLAN SOUTH

DRAWING NUMBER:

L-1.1

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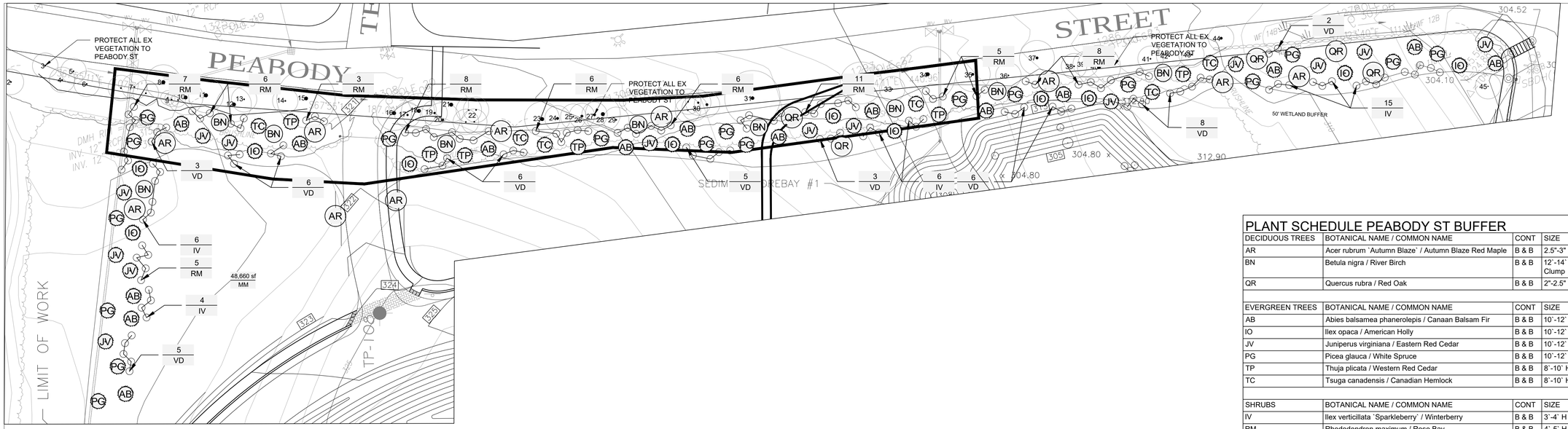
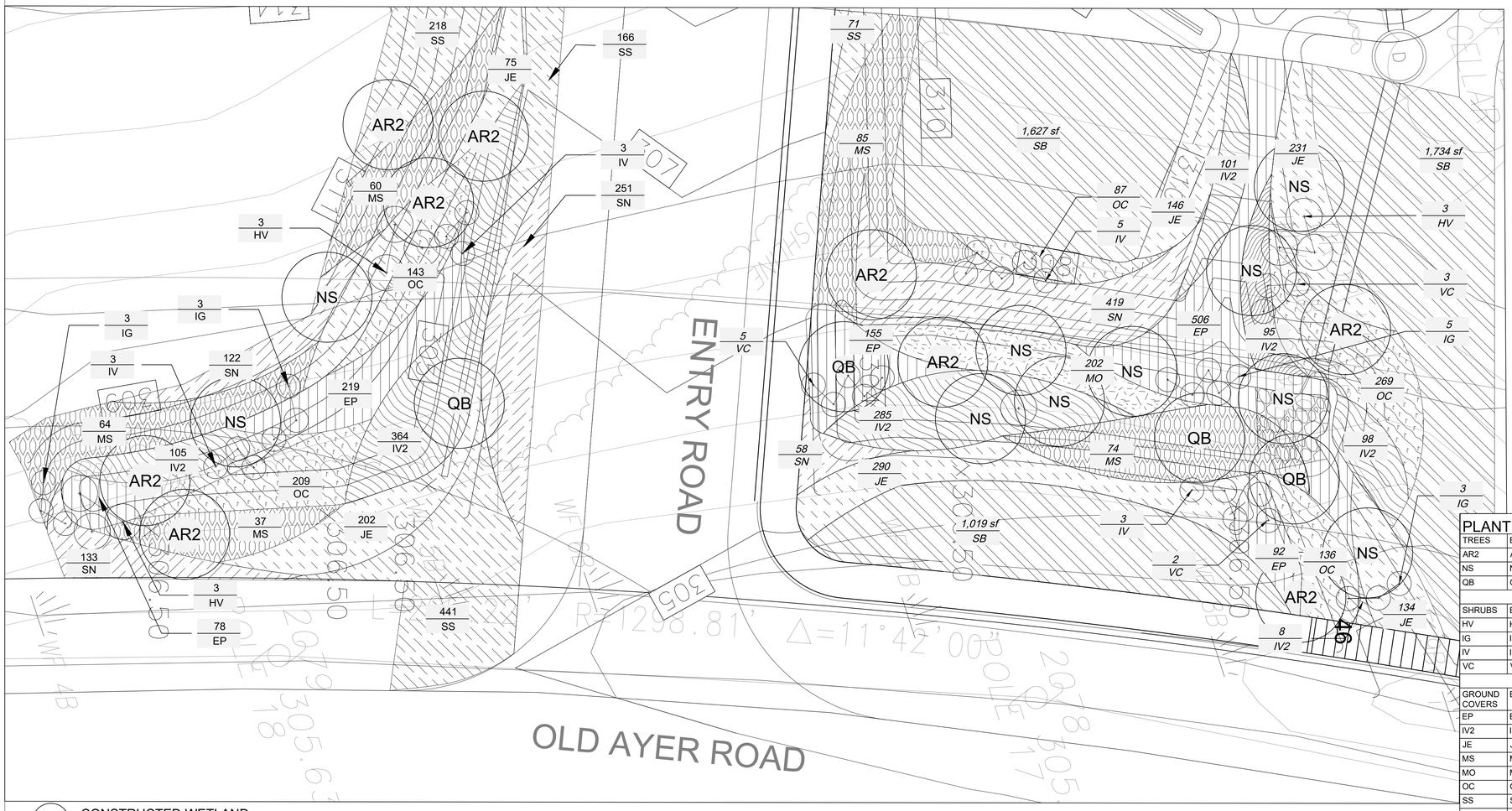


1 PEABODY ST BUFFER
1"=30'-0"

PLANT SCHEDULE PEABODY ST BUFFER

DECIDUOUS TREES	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
AR	Acer rubrum `Autumn Blaze` / Autumn Blaze Red Maple	B & B	2.5"-3" Cal	10
BN	Betula nigra / River Birch	B & B	12`-14` Clump	9
QR	Quercus rubra / Red Oak	B & B	2"-2.5" Cal	5
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
AB	Abies balsamea phanerolepis / Canaan Balsam Fir	B & B	10`-12` H	15
IO	Ilex opaca / American Holly	B & B	10`-12` H	11
JV	Juniperus virginiana / Eastern Red Cedar	B & B	10`-12` H	14
PG	Picea glauca / White Spruce	B & B	10`-12` H	18
TP	Thuja plicata / Western Red Cedar	B & B	8`-10` H	6
TC	Tsuga canadensis / Canadian Hemlock	B & B	8`-10` H	6
SHRUBS	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
IV	Ilex verticillata `Sparkleberry` / Winterberry	B & B	3`-4` H	31
RM	Rhododendron maximum / Rose Bay	B & B	4`-5` H	65
VD	Viburnum dentatum / Viburnum	B & B	4`-5` H	44



2 CONSTRUCTED WETLAND
1"=10'-0"

PLANT SCHEDULE CONSTRUCTED WETLAND

TREES	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
AR2	Acer rubrum `Autumn Blaze` / Autumn Blaze Red Maple	B & B	2"-2.5" Cal	9
NS	Nyssa sylvatica / Sour Gum	B & B	1.5"-2" Cal	10
QB	Quercus bicolor / Swamp White Oak	B & B	3.5"-4" Cal	4
SHRUBS	BOTANICAL NAME / COMMON NAME	CONT	SIZE	QTY
HV	Hamamelis virginiana / Common Witch Hazel	B & B	5`-6` H	10
IG	Ilex glabra `Shamrock` / Inkberry	B & B	2`-2.5` H	14
IV	Ilex verticillata `Sparkleberry` / Winterberry	B & B	3`-4` H	14
VC	Vaccinium corymbosum / Highbush Blueberry	B & B	1.5`-2` H	10
GROUND COVERS	BOTANICAL NAME / COMMON NAME	CONT	SPACING	QTY
EP	Eleocharis palustris / Great Spike Rush	2" Plug	15" o.c.	1,050
IV2	Iris versicolor / Blue Flag	2" Plug	15" o.c.	1,056
JE	Juncus effusus / Soft Rush	2" Plug	15" o.c.	1,204
MS	Matteuccia struthiopteris / Ostrich Fern	1 Gal	30" o.c.	320
MO	Molinia caerulea / Moor Grass	2" Plug	15" o.c.	202
OC	Osmunda claytoniana / Interrupted Fern	2" Plug	15" o.c.	844
SS	Schizachyrium scoparium / Little Bluestem Grass	2" Plug	15" o.c.	896
SN	Sorghastrum nutans / Indian Grass	2" Plug	15" o.c.	983
SB	Stormwater Basin Seed Mix	Seed		4,380 sf

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: AS DRAWN

DRAWING NAME:

PLANTING PLAN ENLARGEMENTS

DRAWING NUMBER:

L-1.2

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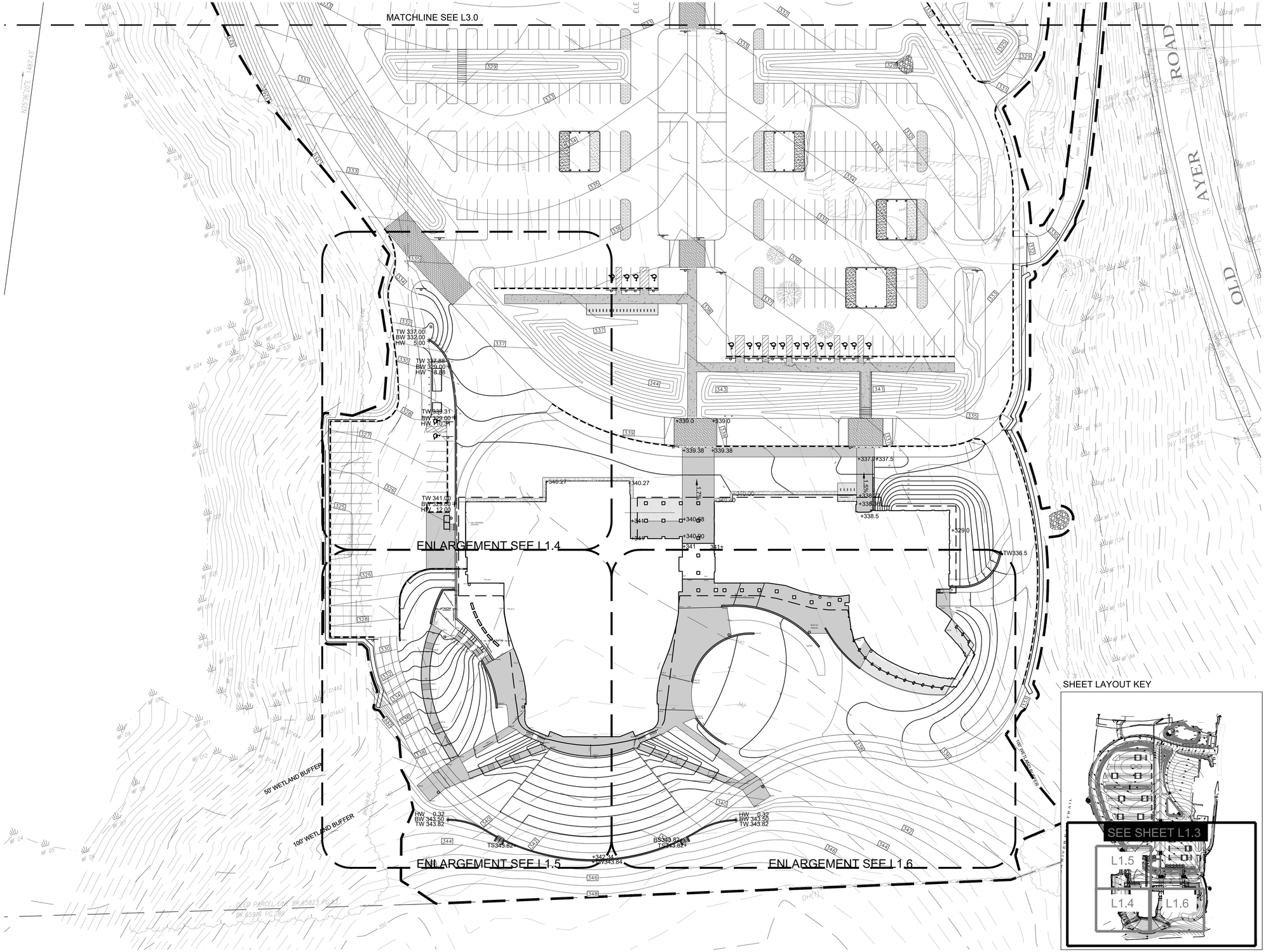

SHEET LAYOUT KEY

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: 1"=40'-0"

DRAWING NAME:

NORTH

GRADING PLAN SOUTH

DRAWING NUMBER:

L-1.3

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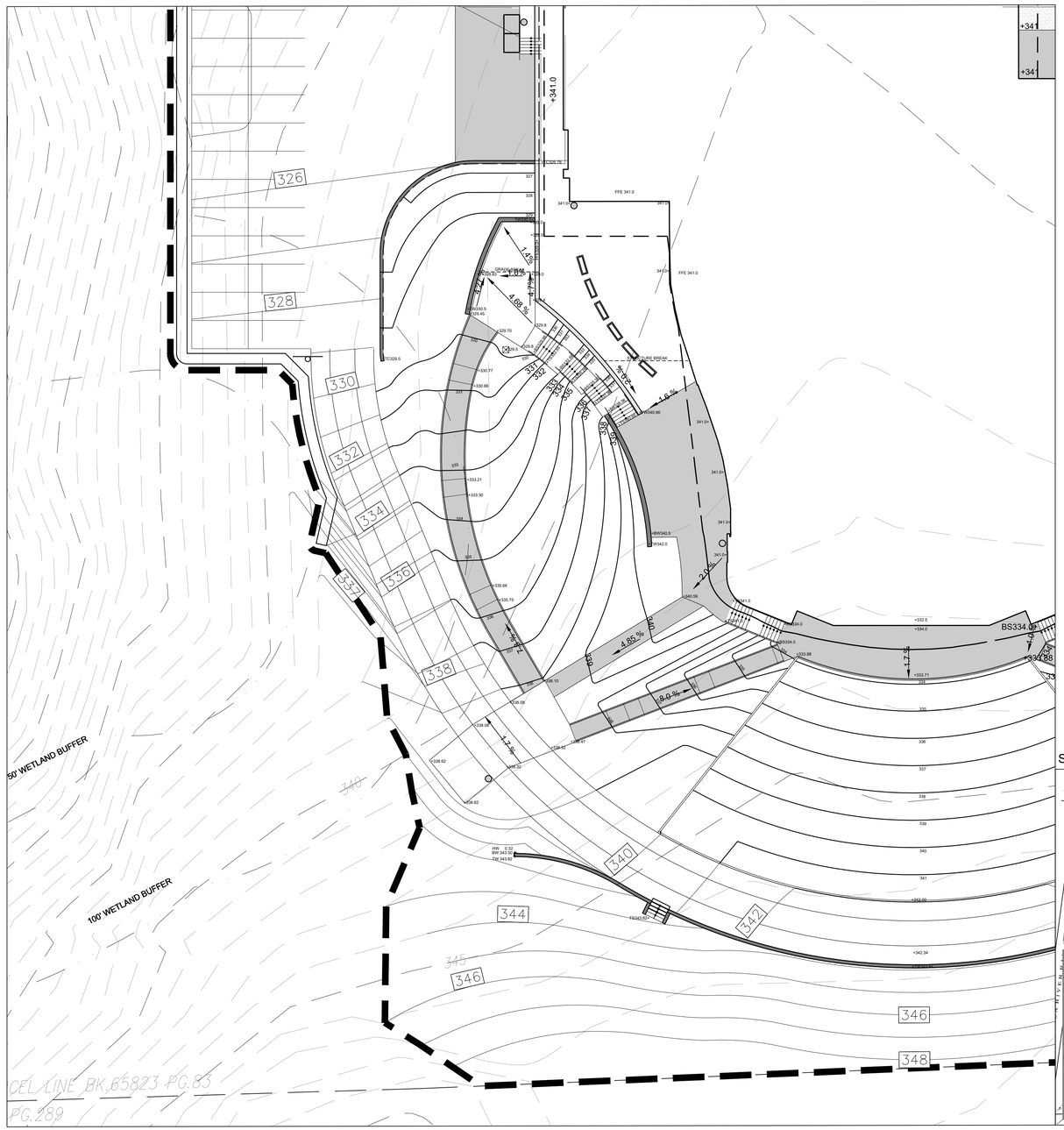

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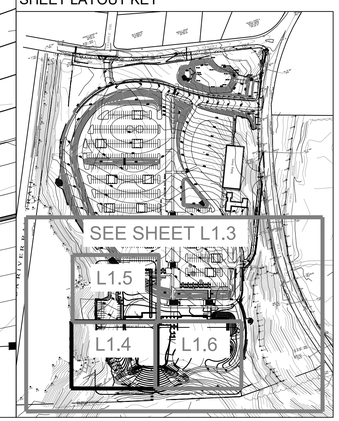

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DATE:

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NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: 1"=20'-0"

DRAWING NAME:

NORTH

GRADING PLAN ENLARGEMENT

DRAWING NUMBER:

L-1.4

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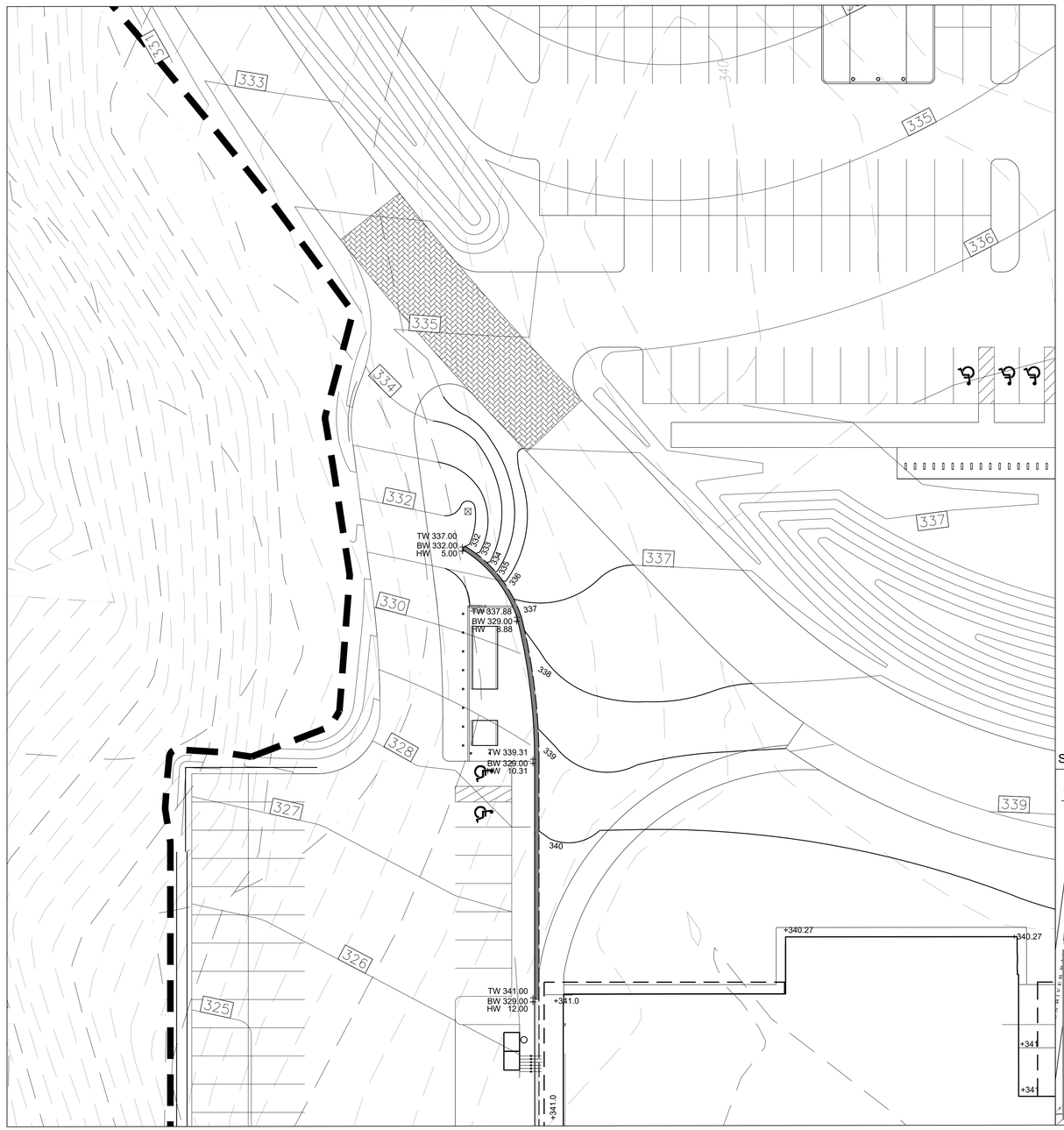
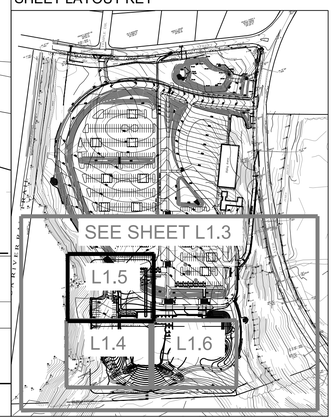


SHEET LAYOUT KEY



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2 Park Plaza Suite 200 Boston, MA 02116
Phone: 617-242-1120

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Groton, Massacusetts

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

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2	CONTROL PLANS	1.12.17

SCALE: 1"=20'-0"

DRAWING NAME:

NORTH

GRADING PLAN ENLARGEMENT

DRAWING NUMBER:

L-1.5

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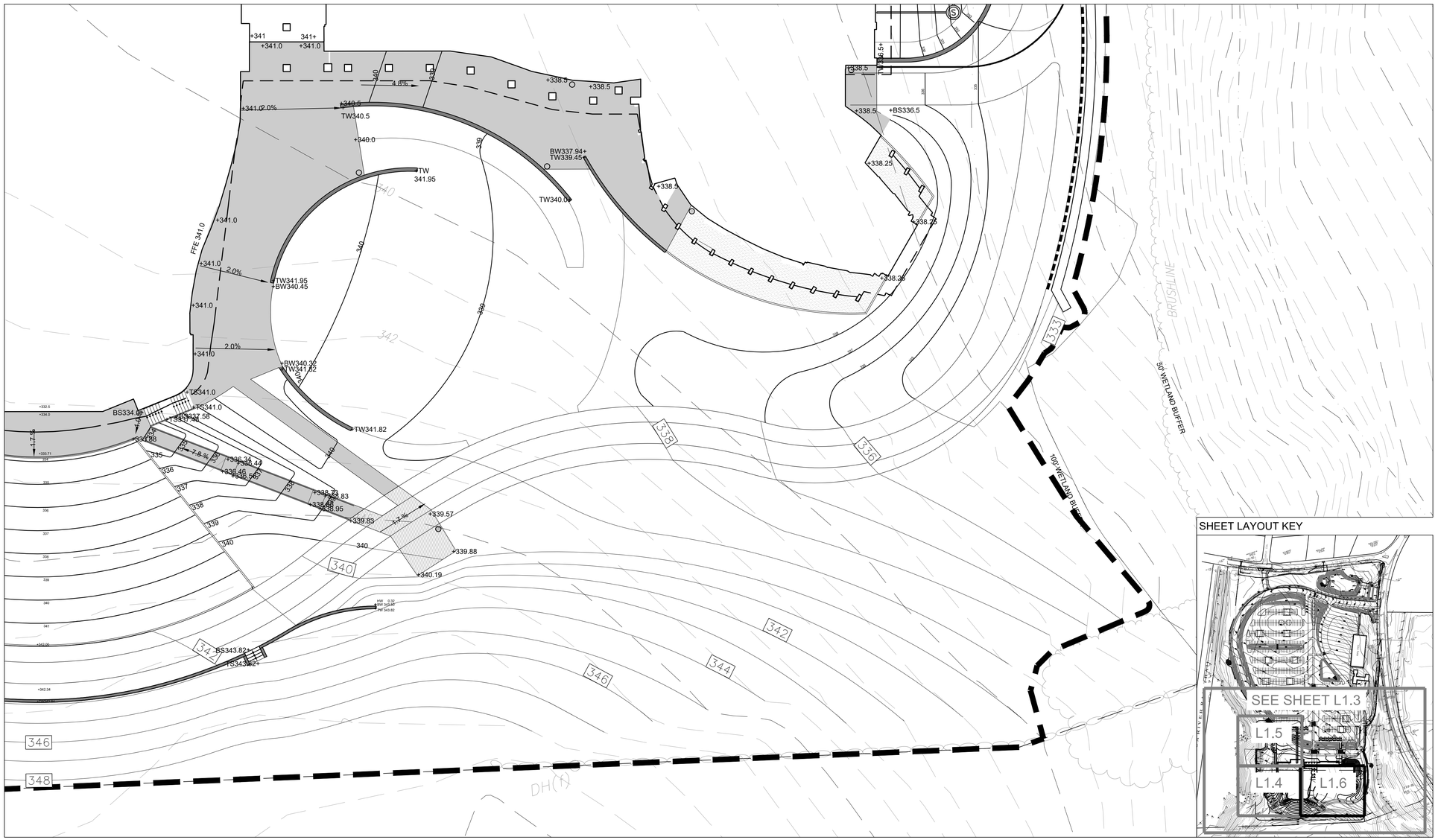

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SEPTEMBER 9, 2016

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2	CONTROL PLANS	1.12.17

SCALE: 1"=20'-0"

DRAWING NAME:

NORTH

GRADING PLAN ENLARGEMENT

DRAWING NUMBER:

L-1.6

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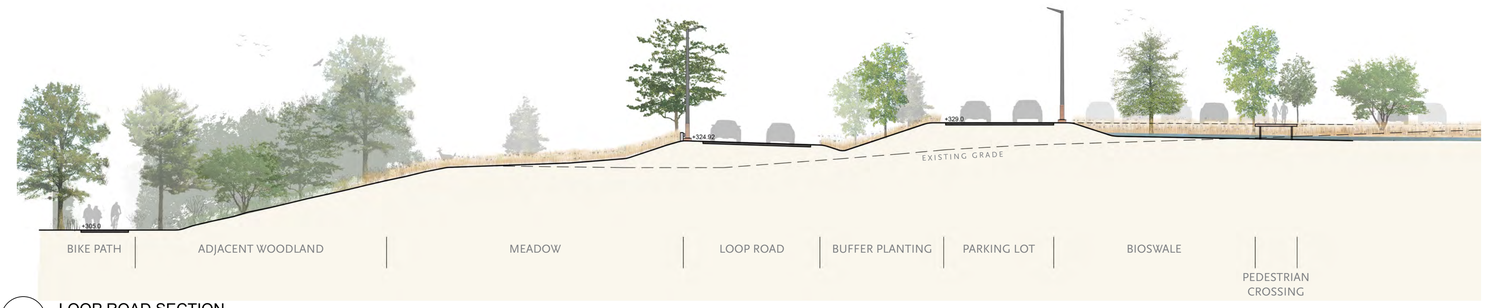
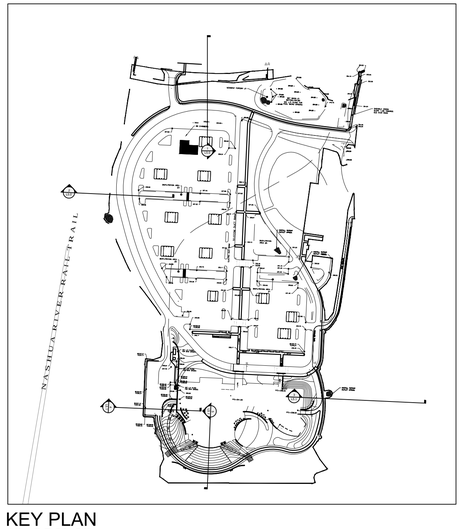
1 PEABODY STREET SECTION
1/16"=1'-0"



2 LOOP ROAD SECTION
1/16"=1'-0"



KEY PLAN
1"=250'-0"

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

SITE SECTIONS

DRAWING NUMBER:

L-2.0

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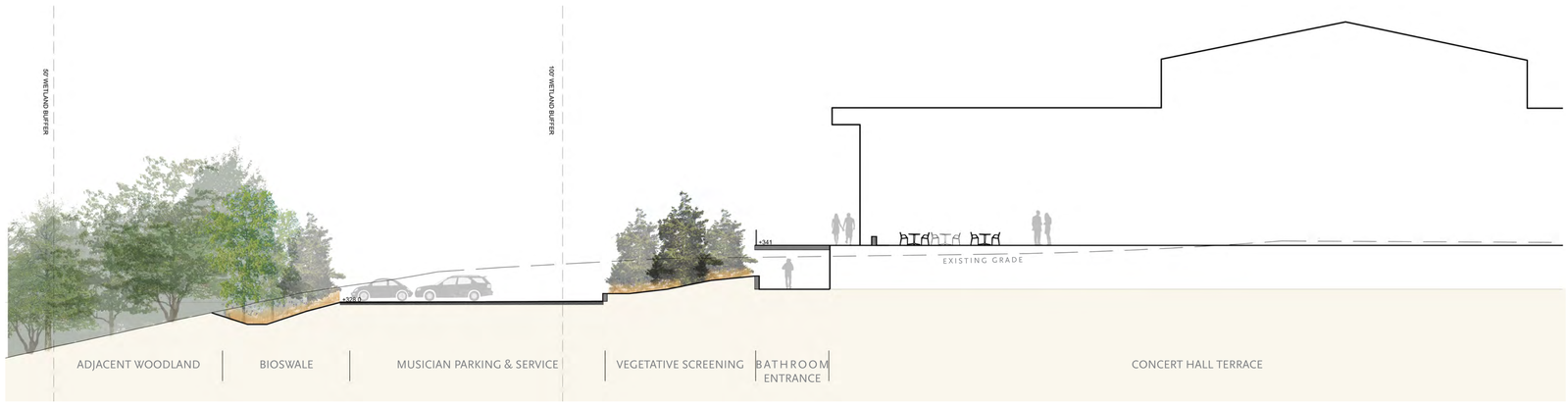
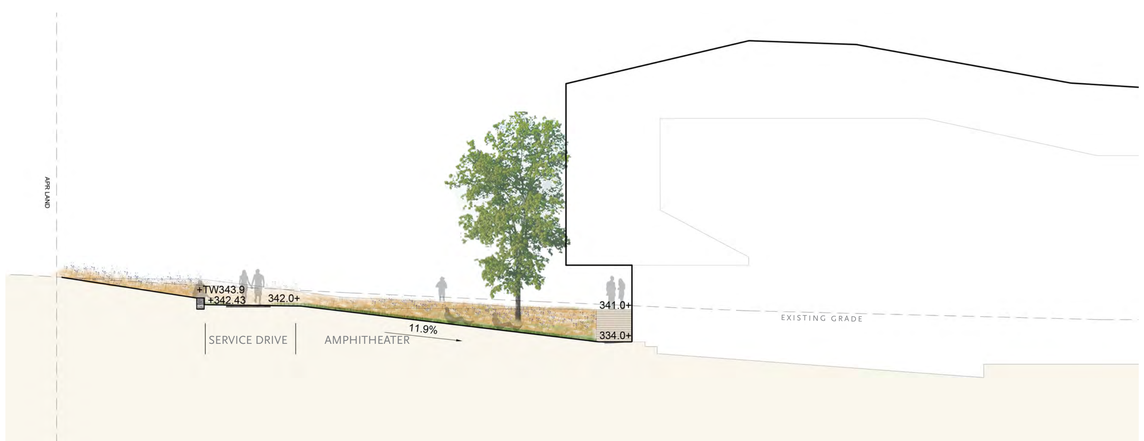
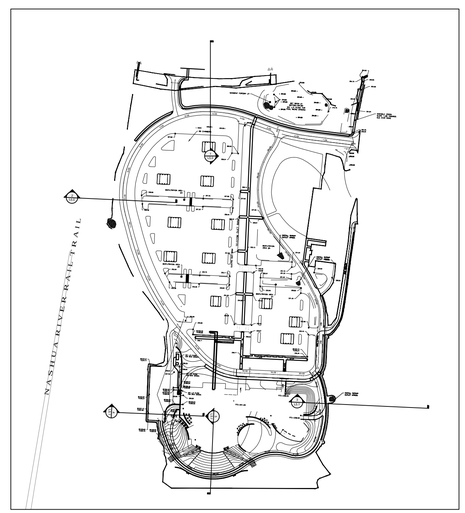
3 SECTION FROM OLD AYER ROAD
1/16"=1'-0"



4 SERVICE SECTION
1/16"=1'-0"



5 AMPHITHEATER SECTION
1/16"=1'-0"



KEY PLAN
1"=250'-0"

BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

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SCALE: AS NOTED

DRAWING NAME:

SITE SECTIONS

DRAWING NUMBER:

L-2.1

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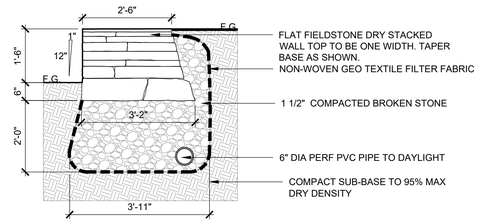
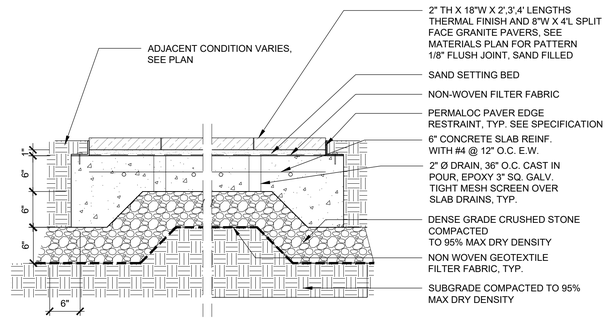
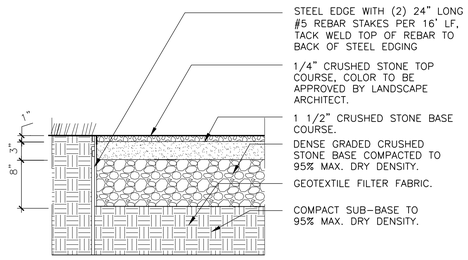


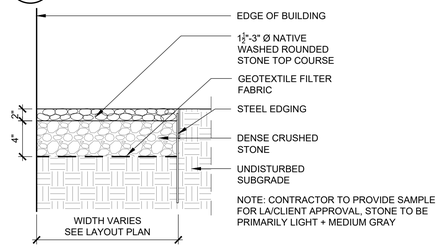
3 STONE SEATWALL WITH CONCRETE FOUNDATION
1/2" = 1'-0"



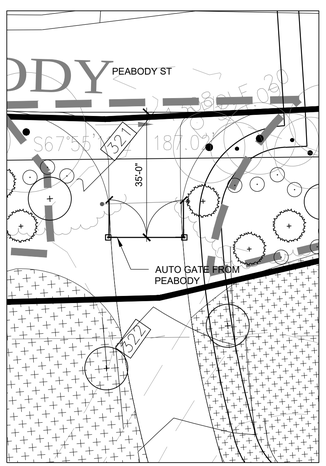
4 GRANITE PAVER SIDEWALK
1" = 1'-0"



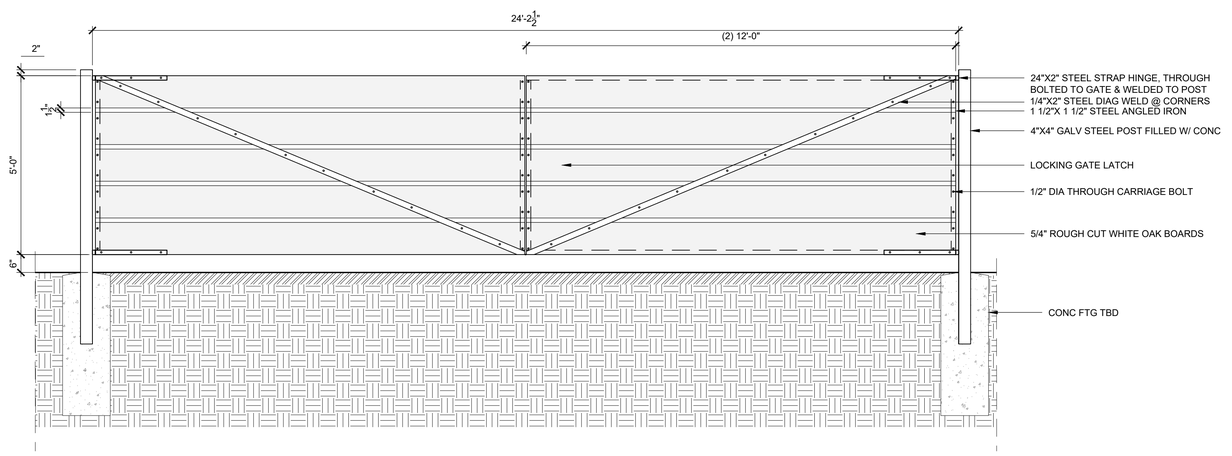
1 GRAVEL PAVEMENT @ CONCESSION PAD
1" = 1'-0"



2 MAINTENANCE EDGE
1"=1'-0"



6 AUTO GATE LOCATION
1"=20'-0"



5 AUTO GATE
1/2"=1'-0"

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2 Park Plaza Suite 200 Boston, MA 02116
Phone: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

SITE DETAILS

DRAWING NUMBER:

L-3.0

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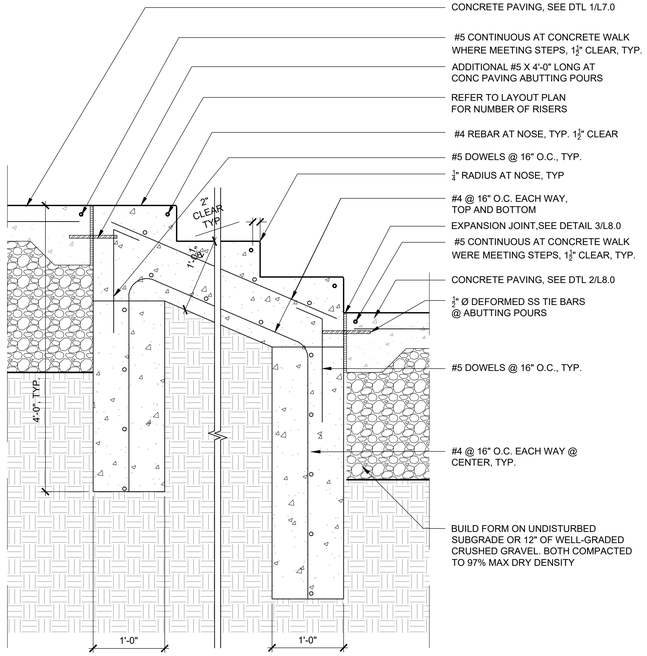
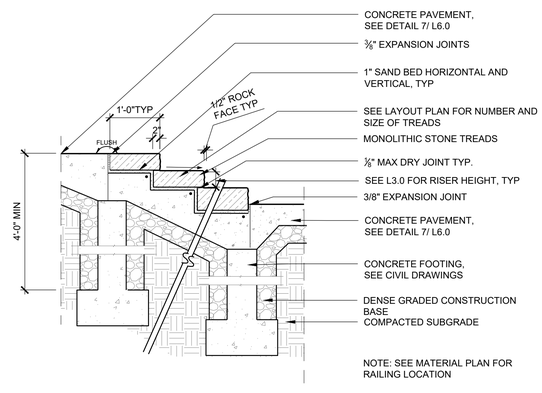
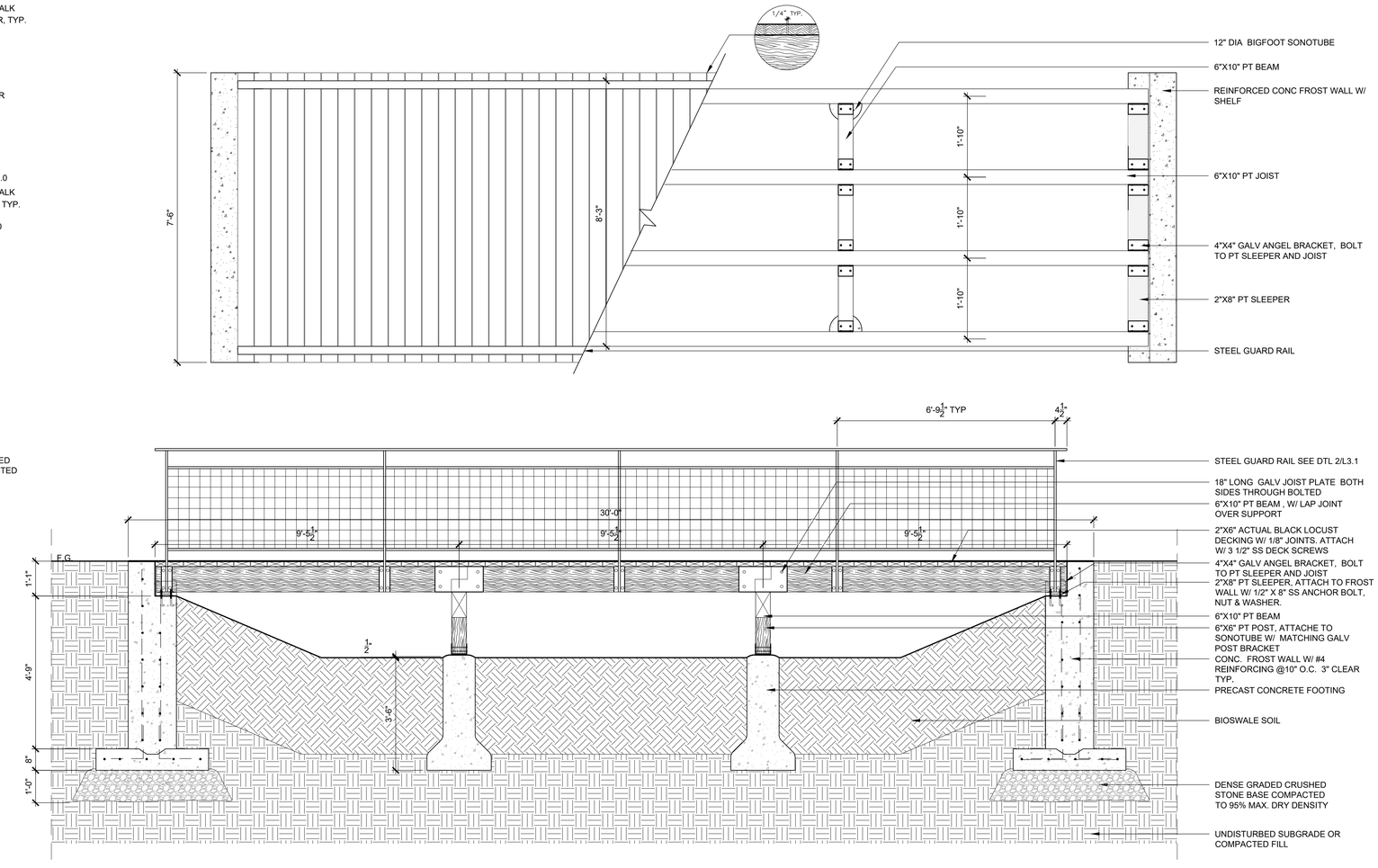


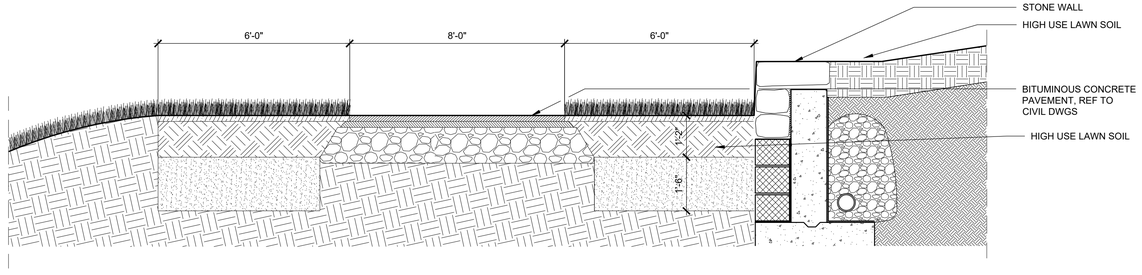
4 CONCRETE STEPS-TYP
1"=1'-0"



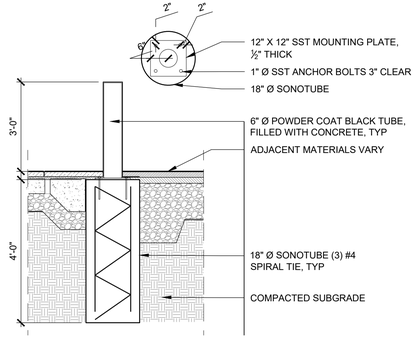
5 STONE STEPS
1/2" = 1'-0"



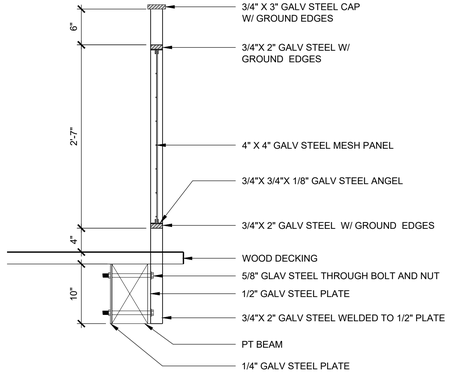
1 WOOD BOARDWALK AT BIOSWALE
1/2" = 1'-0"



6 SERVICE ROAD AT PERFORMANCE AREA
1/2" = 1'-0"



3 STEEL BOLLARD
1/2" = 1'-0"



2 STEEL GUARD RAIL
1" = 1'-0"

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2 PARK PLAZA SUITE 200 BOSTON, MA 02116
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SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

SITE DETAILS

DRAWING NUMBER:

L-3.1

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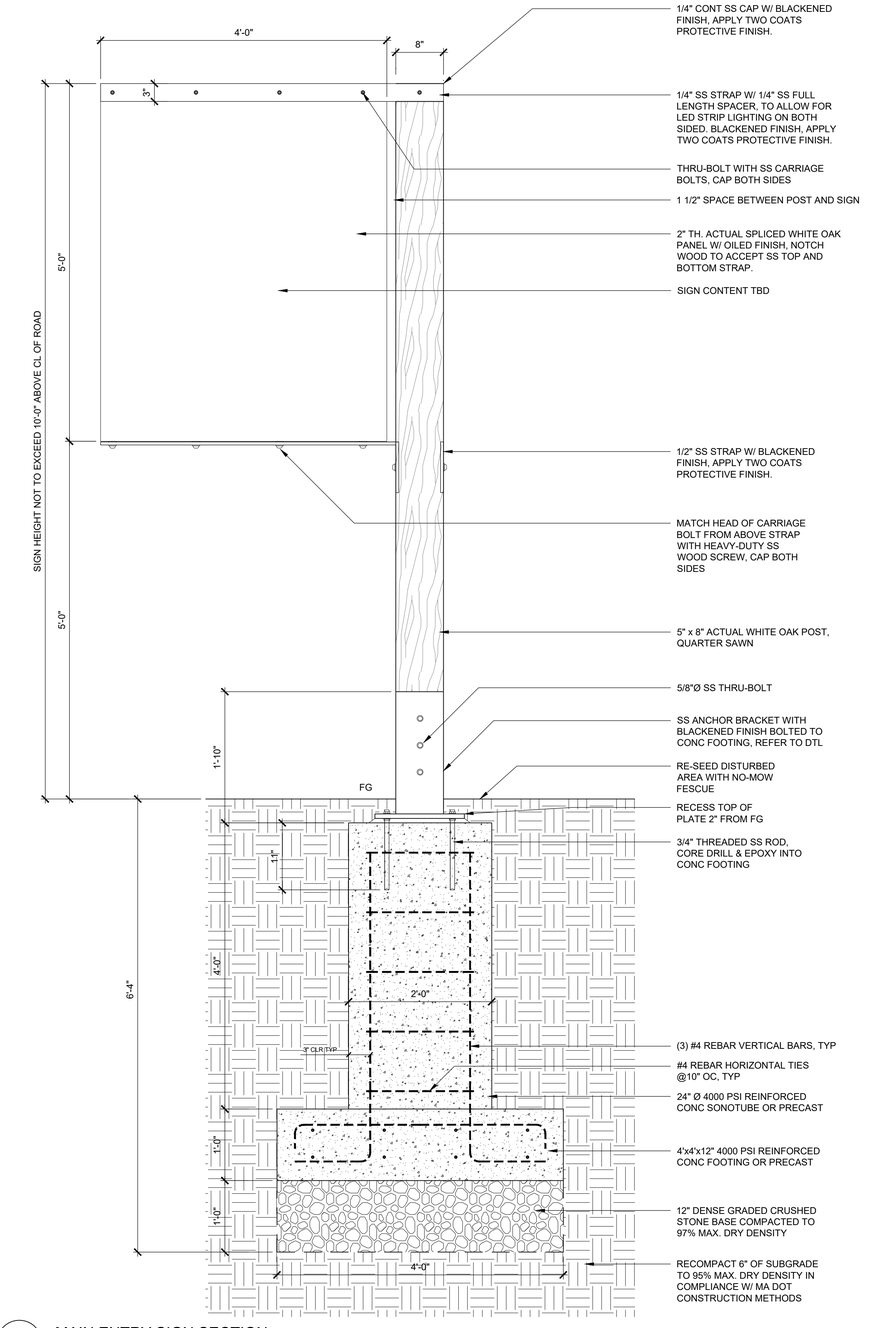
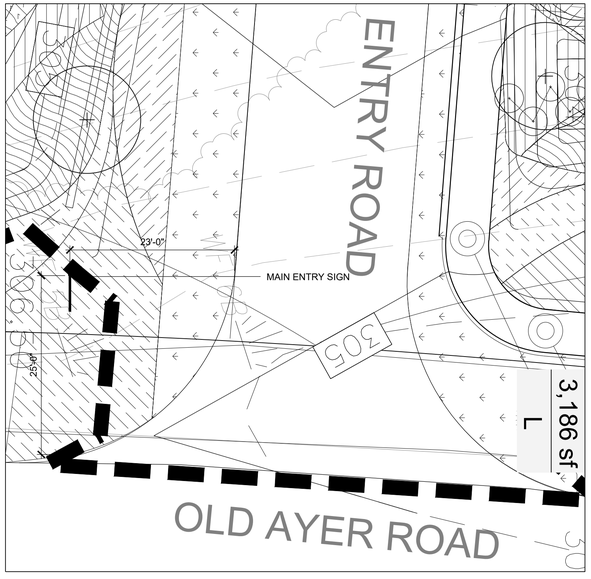


1 MAIN ENTRY SIGN SECTION
1" = 1'-0"



2 MAIN ENTRY SIGN LOCATION
1"=10'-0"

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2 Park Plaza Suite 200 Boston, MA 02116
Phone: 617-242-1120

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DATE:

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

SITE DETAILS

DRAWING NUMBER:

L-3.2

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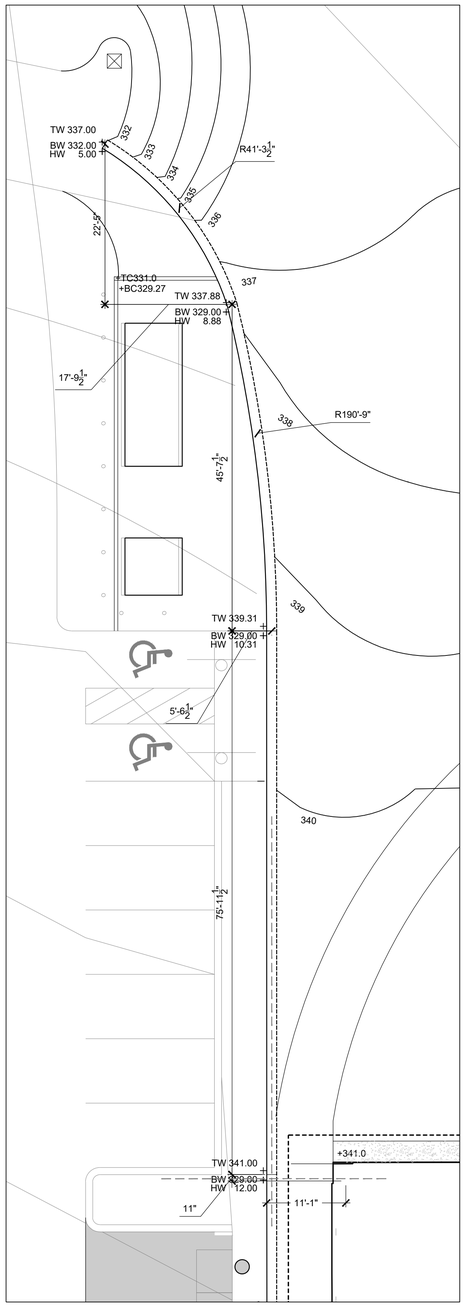
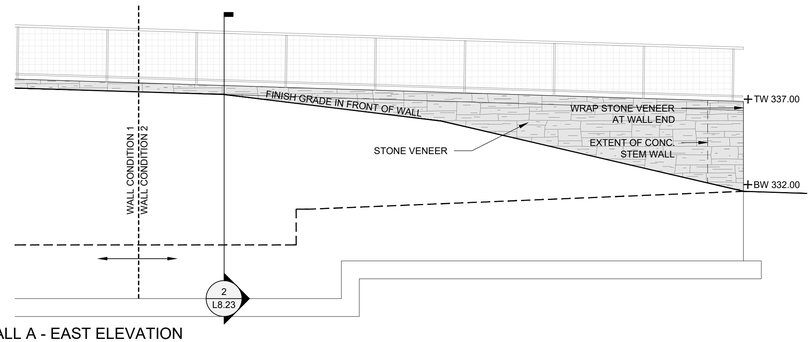
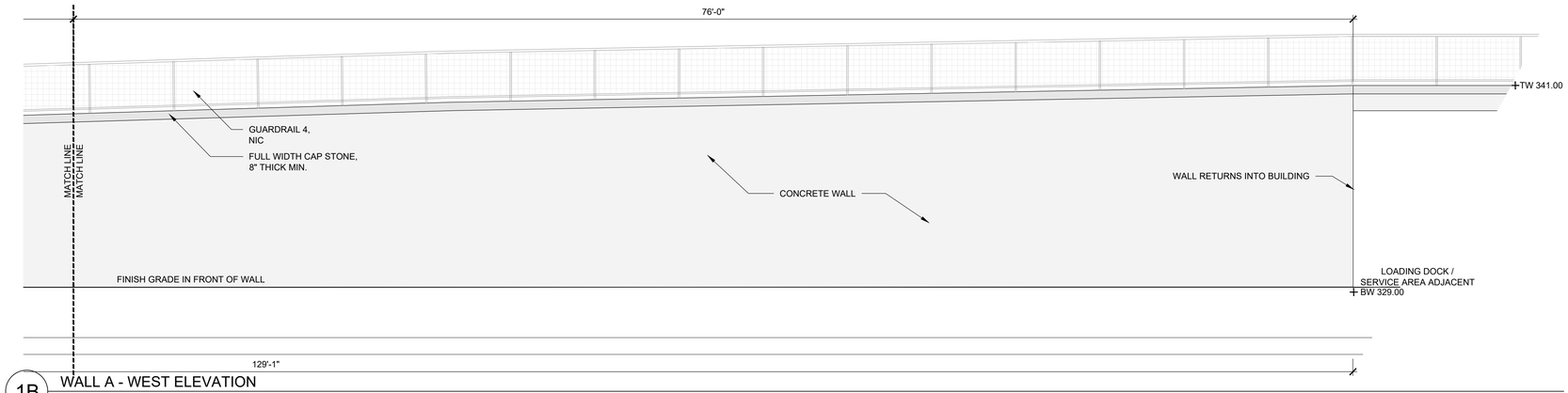


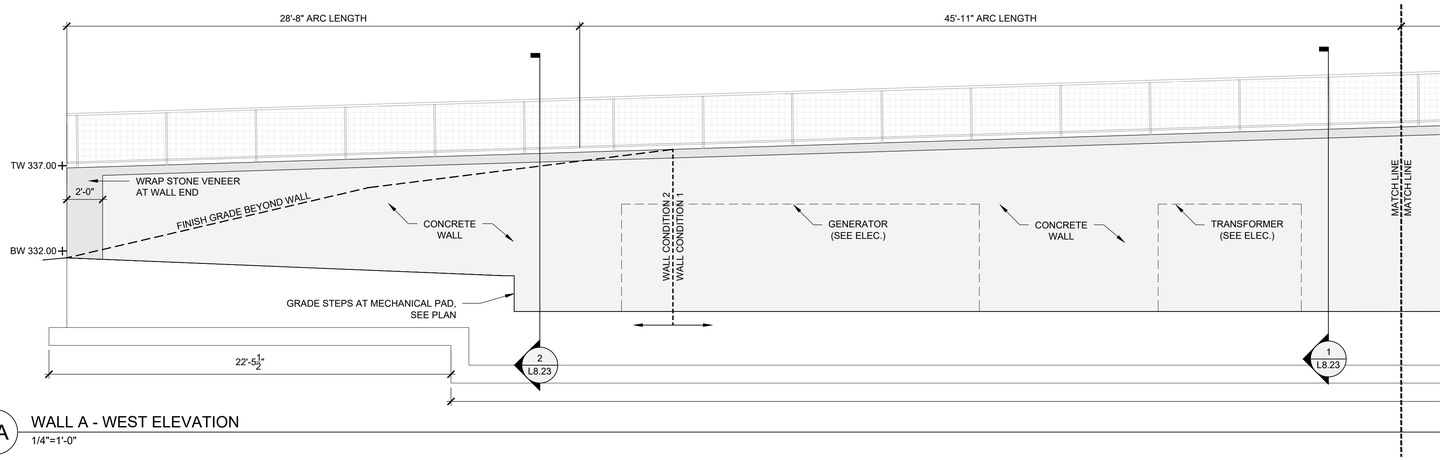
2 WALL A - PLAN
1" = 20'



1C WALL A - EAST ELEVATION
1/4"=1'-0"

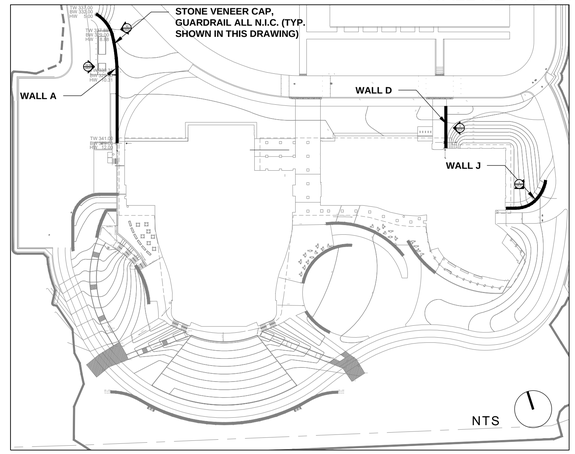


1B WALL A - WEST ELEVATION
1/4" = 1'-0"



1A WALL A - WEST ELEVATION
1/4"=1'-0"

WALL KEY PLAN



BEALS ASSOCIATES INC.
2 PARK PLAZA SUITE 200 BOSTON, MA 02116
PHONE: 617-242-1120

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	CONTROL PLANS	12.22.16
2	CONTROL PLANS	1.12.17
3	CONTROL PLANS	2.23.17

SCALE: AS NOTED

DRAWING NAME:

WALL ELEVATIONS

DRAWING NUMBER:

L-3.3

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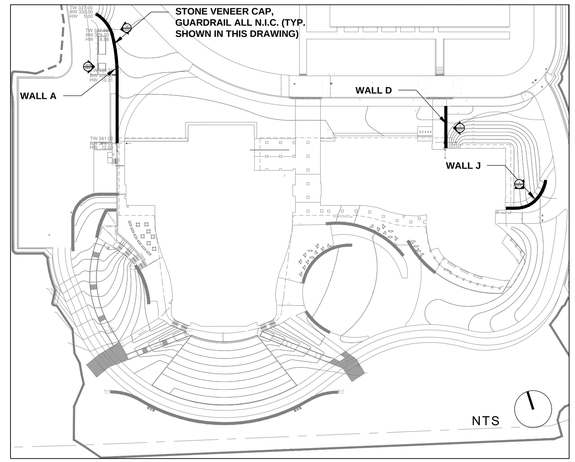
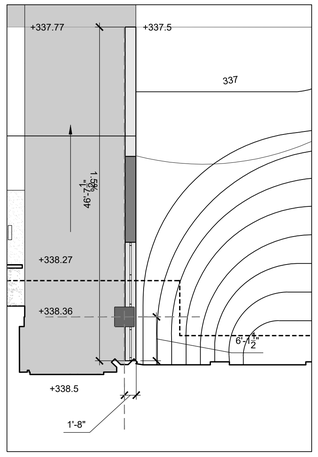
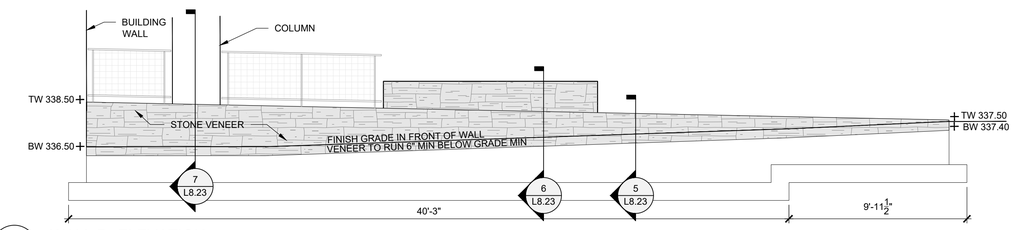
WALL KEY PLAN

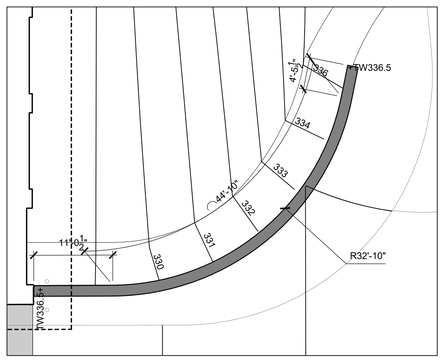




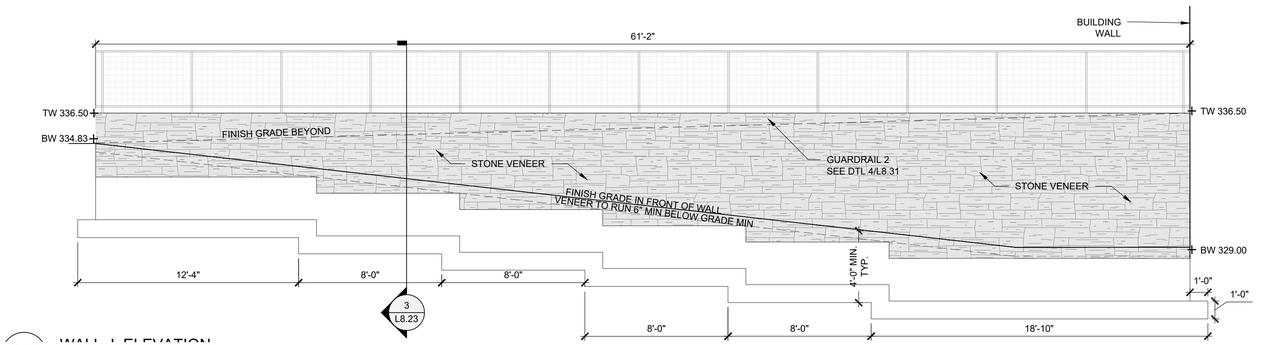
4 WALL D- PLAN
1" = 10'



3 WALL D- ELEVATION
1/4" = 1'-0"



2 WALL J - PLAN
1" = 10'



1 WALL J - ELEVATION
1/4" = 1'-0"

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2 Park Plaza Suite 200 Boston, MA 02116
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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

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3	CONTROL PLANS	2.23.17

SCALE: AS NOTED

DRAWING NAME:

WALL ELEVATIONS

DRAWING NUMBER:

L-3.4

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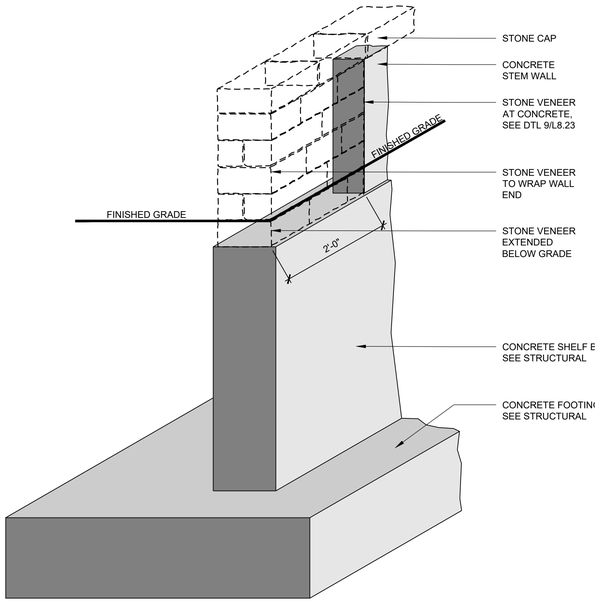
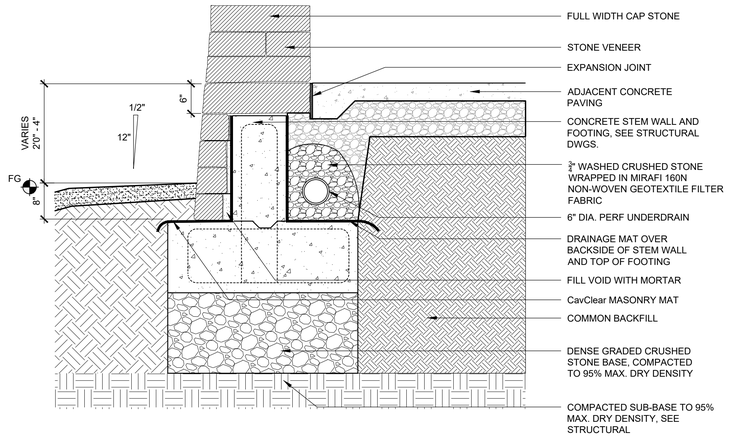
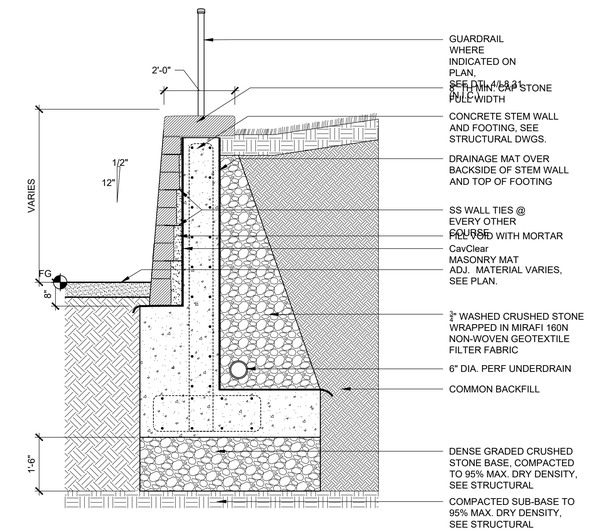


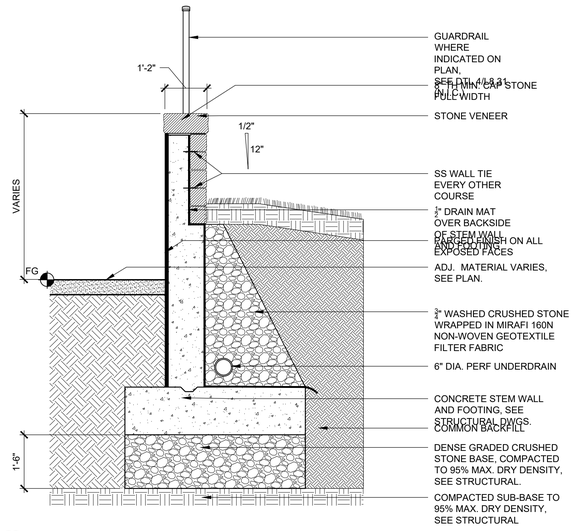
8 WALL A - NORTHERN END CONDITION
1/2" = 1' - 0"



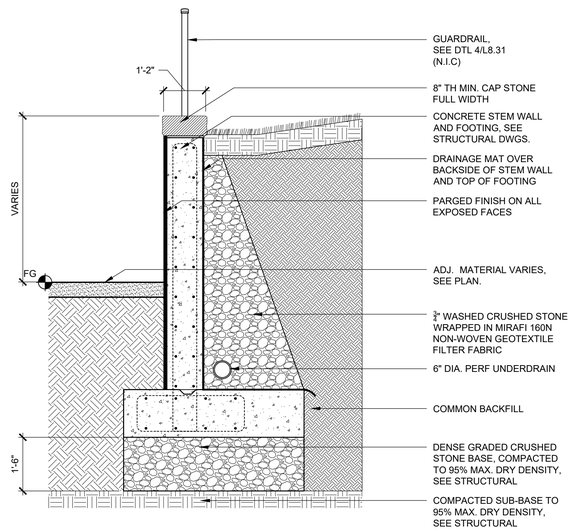
6 WALL D @ STONE SEATWALL
3/4" = 1' - 0"



3 WALL J - STONE RETAINING WALL WITH GUARDRAIL
1/2" = 1'-0"



2 WALL A - STONE RETAINING WALL WITH GUARDRAIL
1/2" = 1'-0"



1 WALL A (CONDITION 1) - CONCRETE RETAINING WALL
1/2" = 1'-0"

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2 PARK PLAZA SUITE 200 BOSTON, MA 02116
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The Music Center at Indian Hill

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DATE:

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

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2	CONTROL PLANS	1.12.17

SCALE: AS NOTED

DRAWING NAME:

WALL DETAILS

DRAWING NUMBER:

L-3.5

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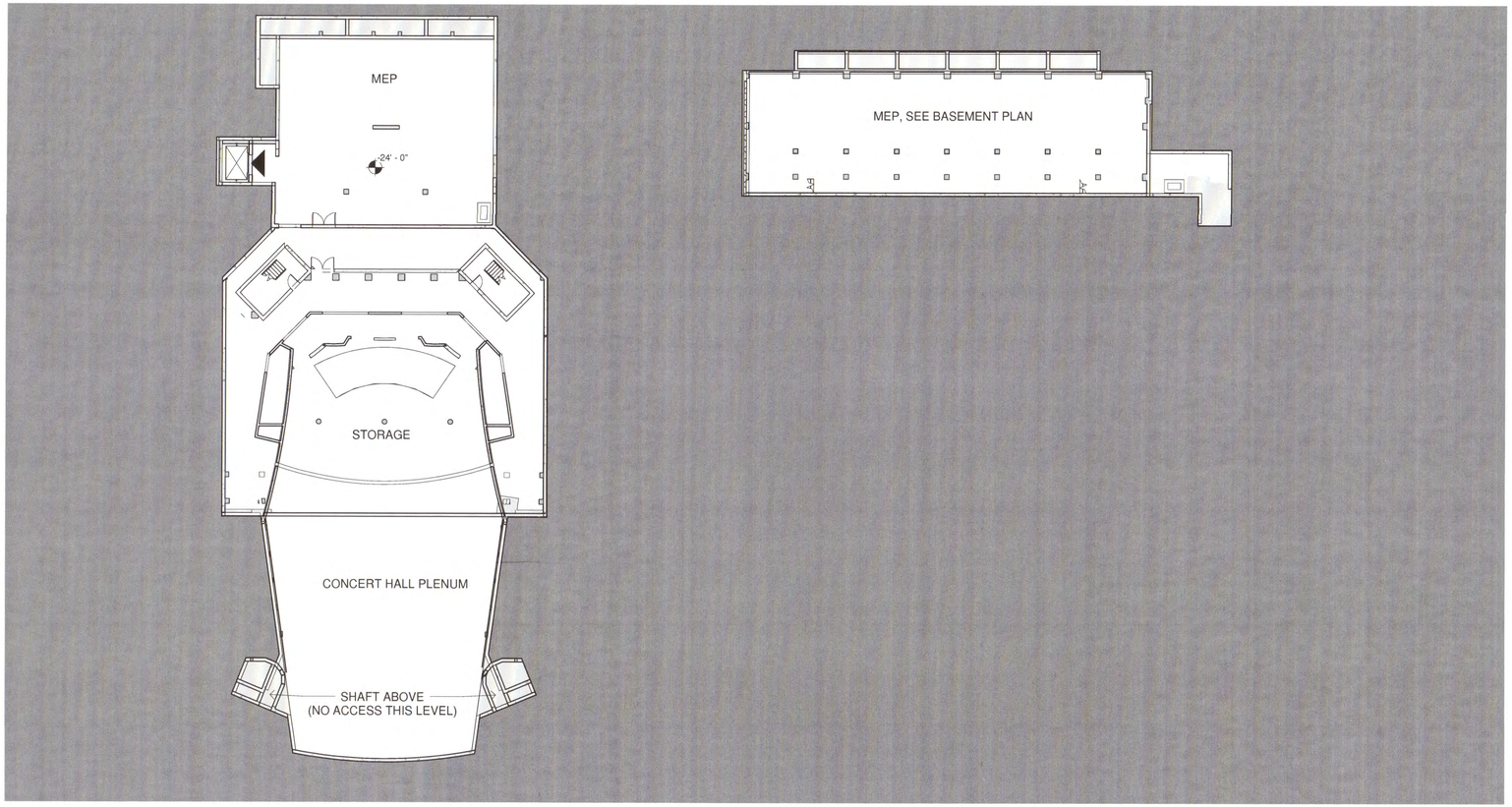

1 Permitting Plan - Sub Basement

N

ARCHITECT:
EPSTEIN JOSLIN ARCHITECTS
80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
T: 617 868 1766

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT ALAN JOSLIN No. 05097 CAMBRIDGE MA

PERMIT DOCUMENTS

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PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PERMITTING PLAN - SUB BASEMENT

DRAWING NUMBER:

AP-001

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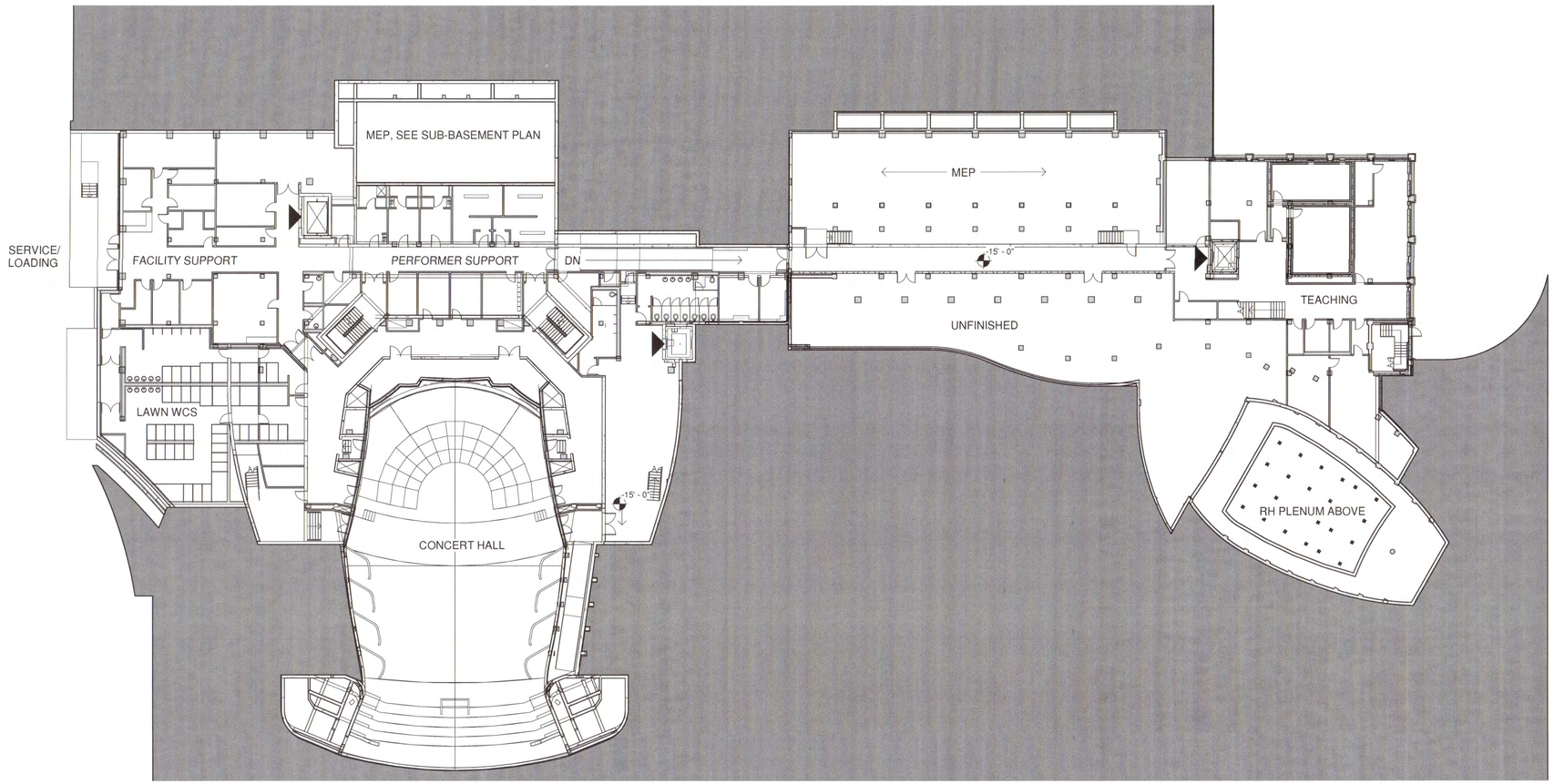

1 Permitting Plan - Basement

N

ARCHITECT:
EPSTEIN JOSLIN ARCHITECTS
80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
T: 617 868 1766

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT
ALAN JOSLIN
No. 06997
CAMBRIDGE MA
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PERMITTING PLAN - BASEMENT

DRAWING NUMBER:

AP-002

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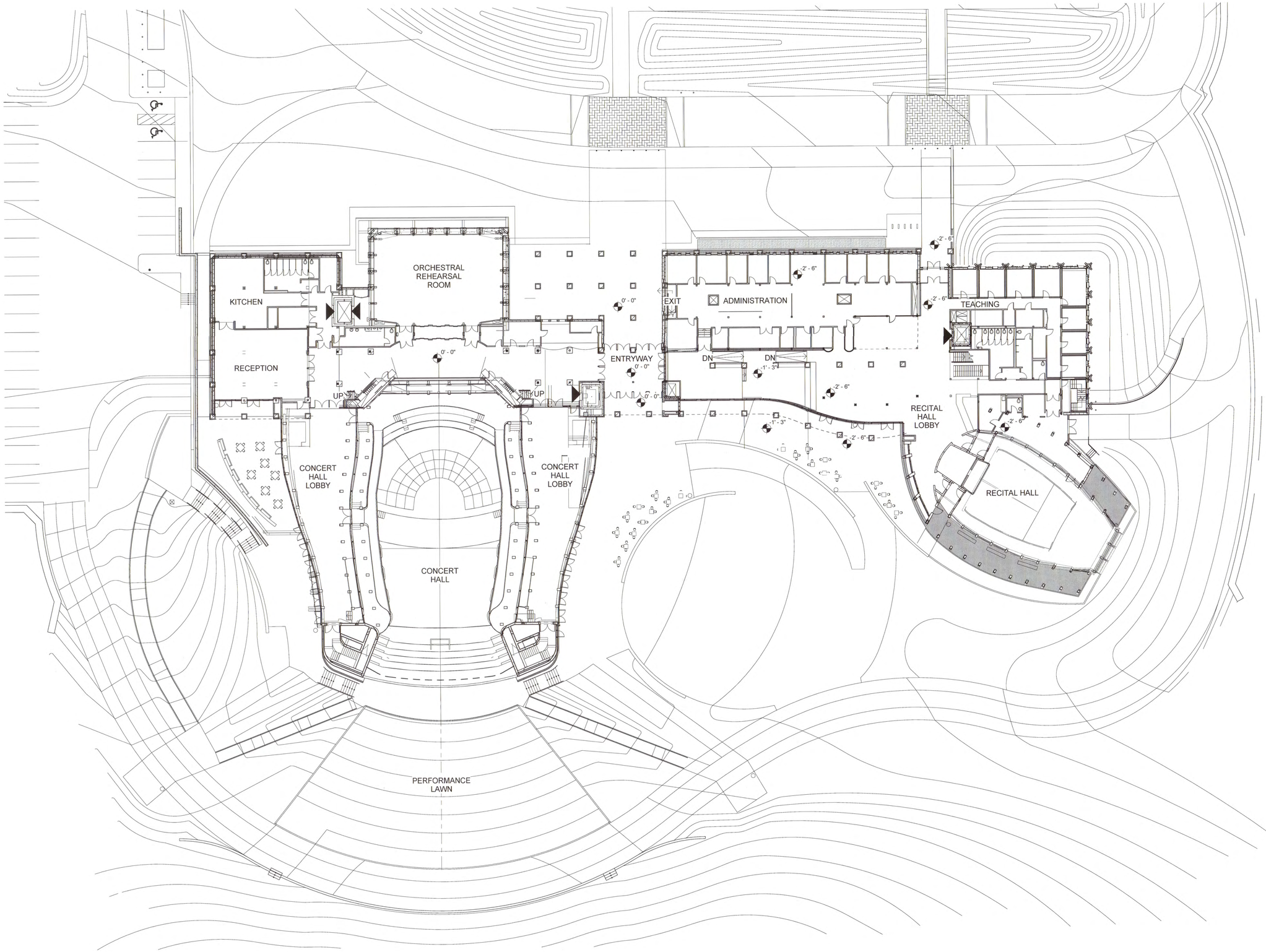

1 Permitting Plan - First Floor

N

ARCHITECT:
EPSTEIN JOSLIN ARCHITECTS
80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
T: 617 868 1766

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Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

REGISTERED ARCHITECT
ALAN JOSLIN
No. 08997
CAMBRIDGE MA
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PERMITTING PLAN - FIRST FLOOR

DRAWING NUMBER:

AP-003

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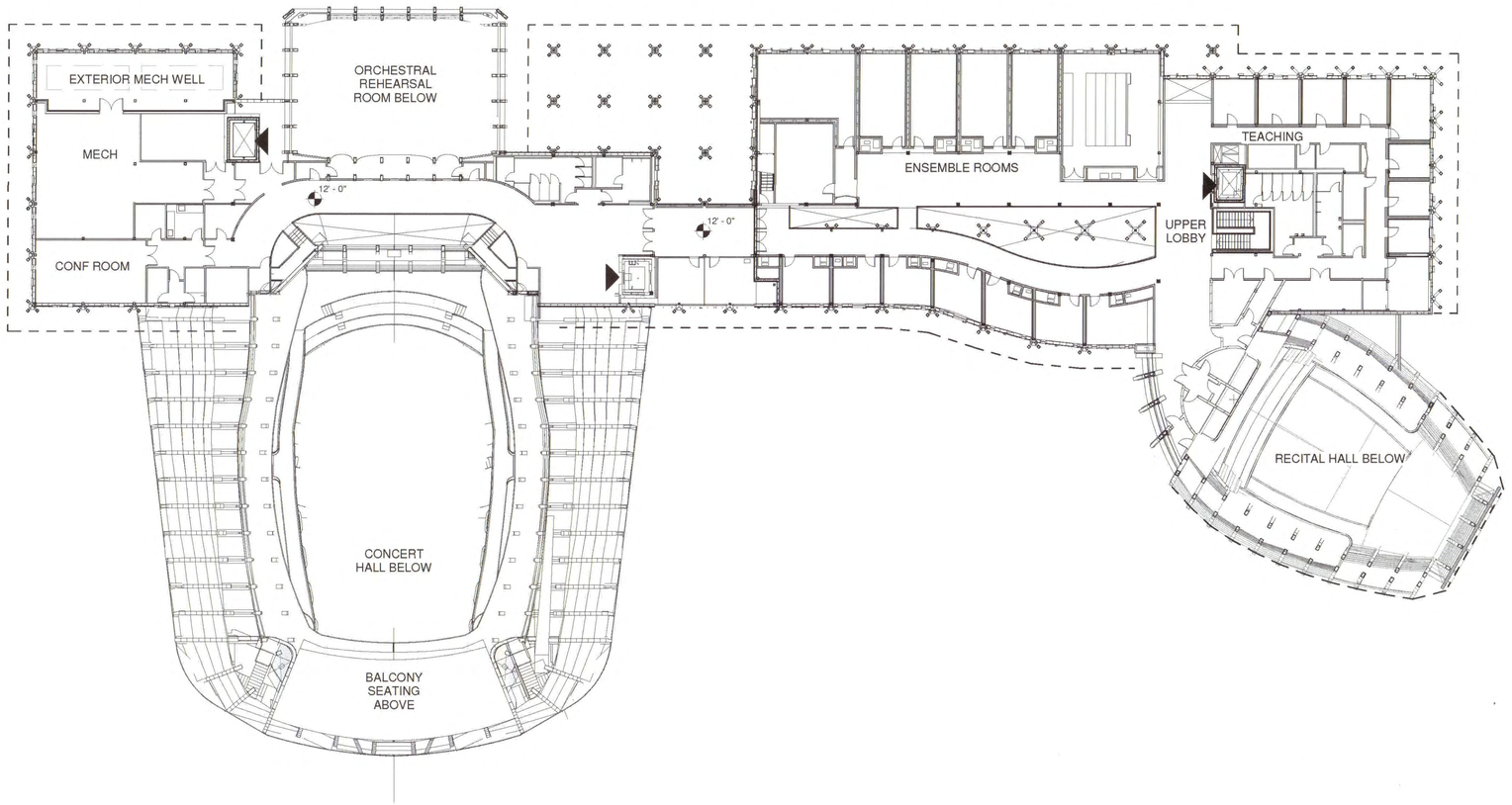

1 Permitting Plan - Second Floor

N

ARCHITECT:
EPSTEIN JOSLIN ARCHITECTS
80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
T: 617 868 1766

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

COMMONWEALTH OF MASSACHUSETTS REGISTERED ARCHITECT ALAN JOSLIN No. 29997 CAMBRIDGE MA

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PERMITTING PLAN - SECOND FLOOR

DRAWING NUMBER:

AP-004

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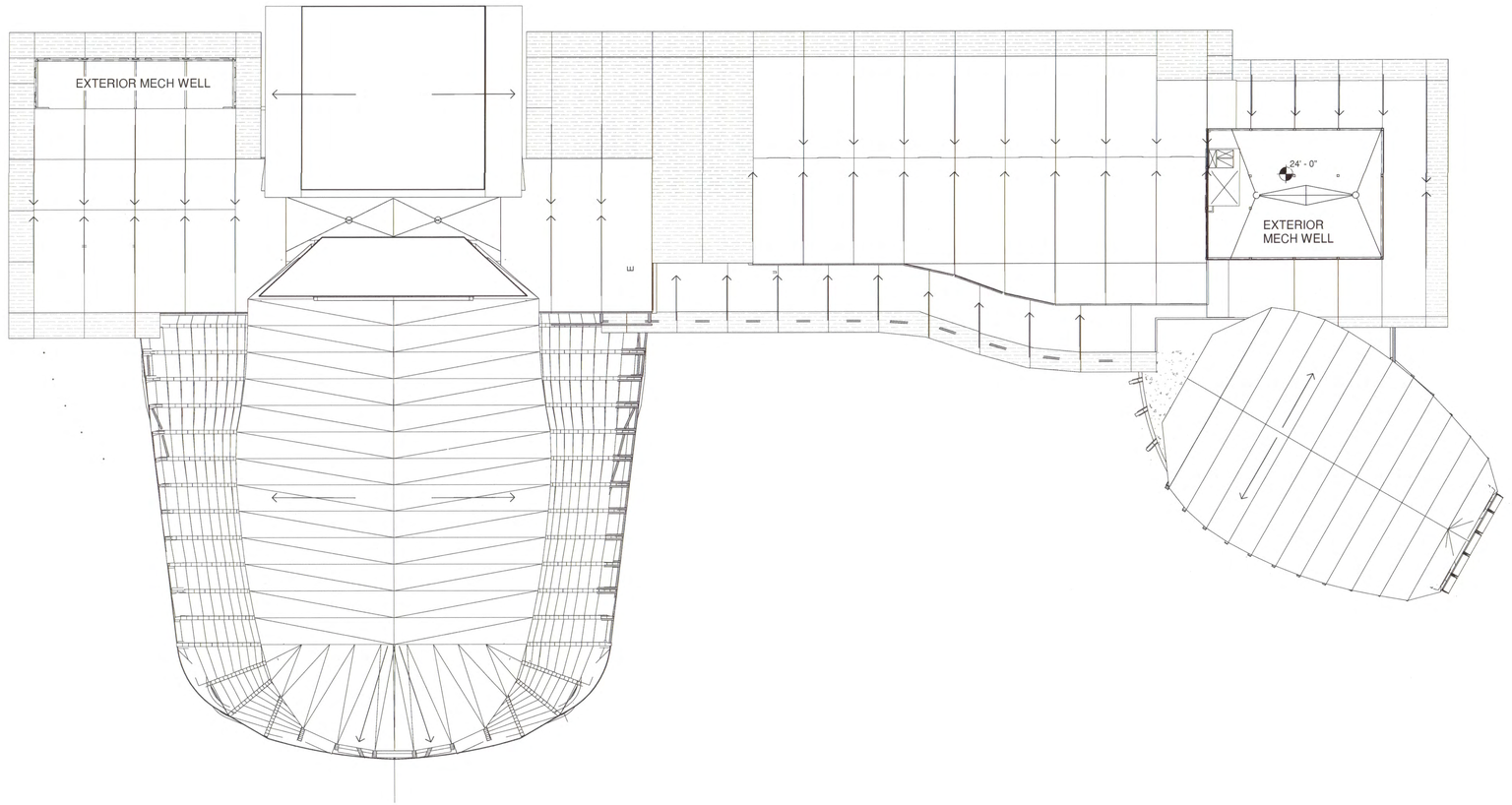

1 Permitting Plan - Roof

ARCHITECT:
EPSTEIN JOSLIN ARCHITECTS
80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
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DATE:

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ALAN JOSLIN
No. 08997
CAMBRIDGE MA
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PERMITTING PLAN - ROOF

DRAWING NUMBER:

AP-005

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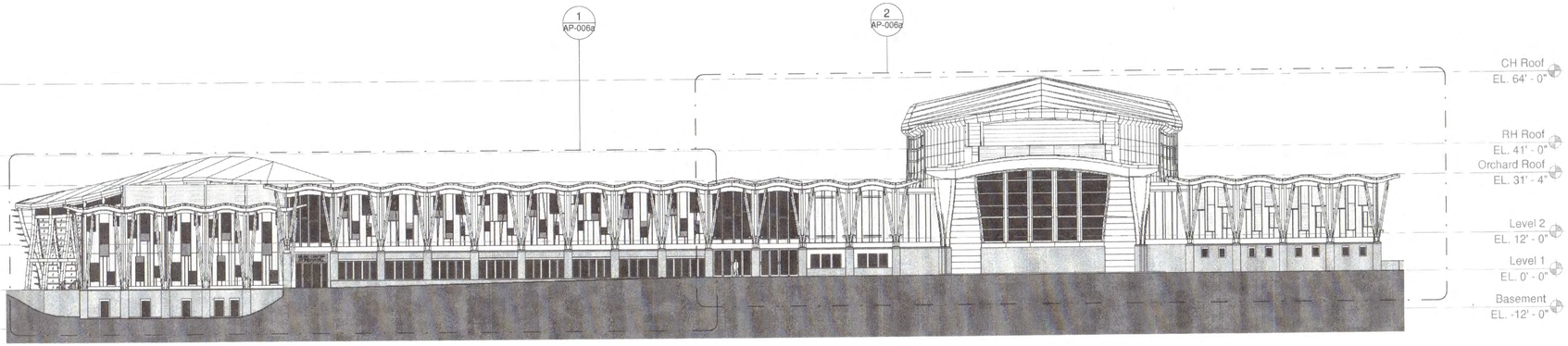
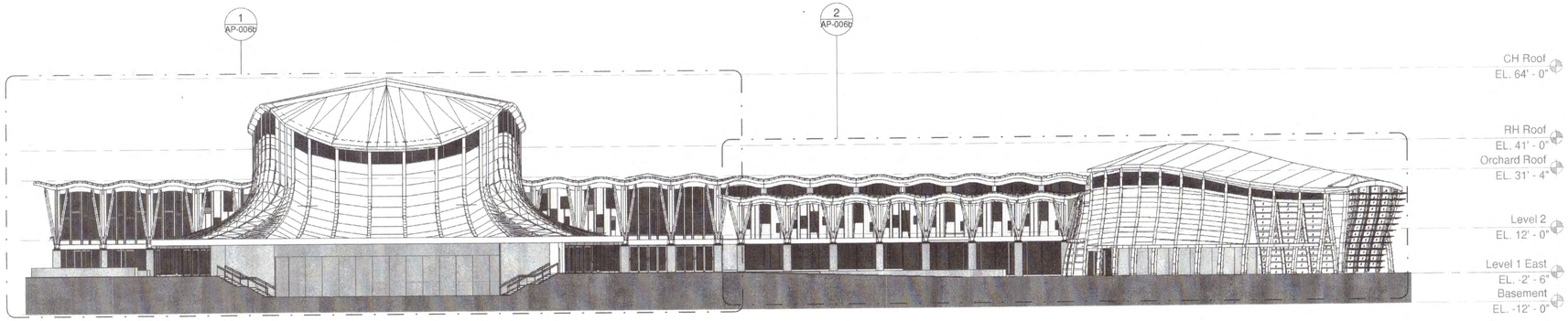
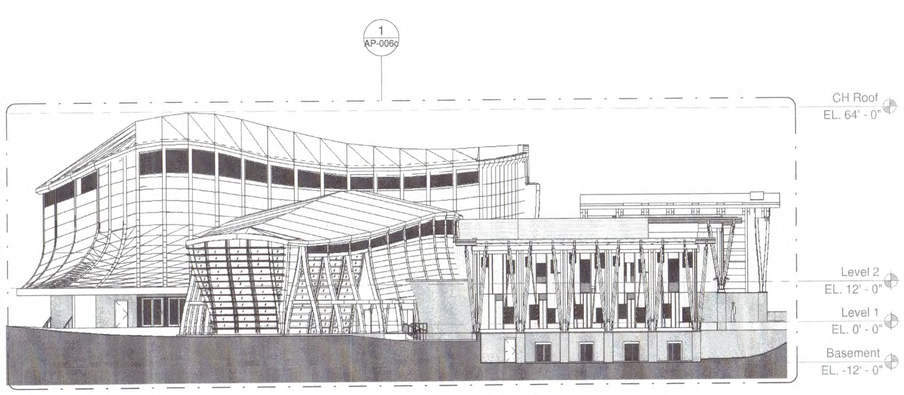


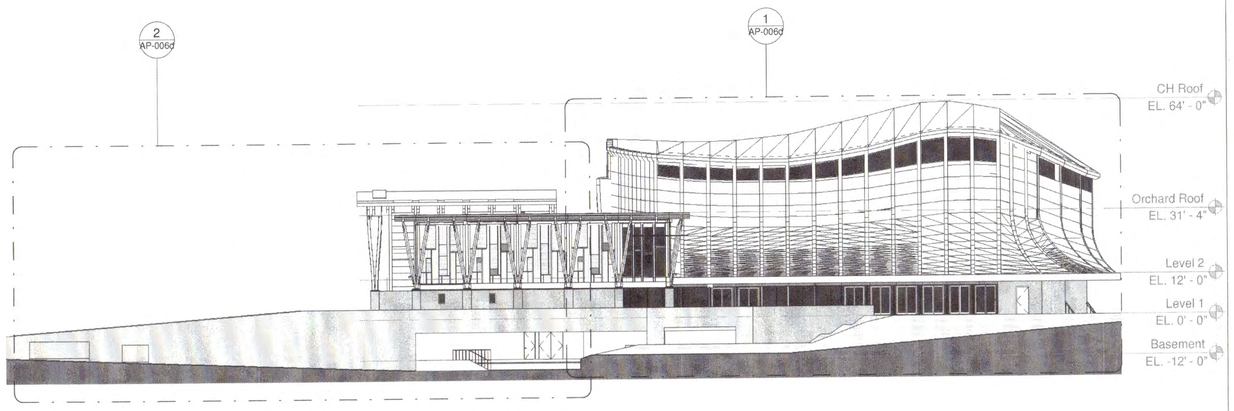
1 North Elevation



2 South Elevation



3 East Elevation



4 West Elevation

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CAMBRIDGE, MASSACHUSETTS 02138
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Old Ayer Road
Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT
ALAN JOSLIN
No. 06067
CAMBRIDGE, MASS.
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

ELEVATIONS

DRAWING NUMBER:

AP-006

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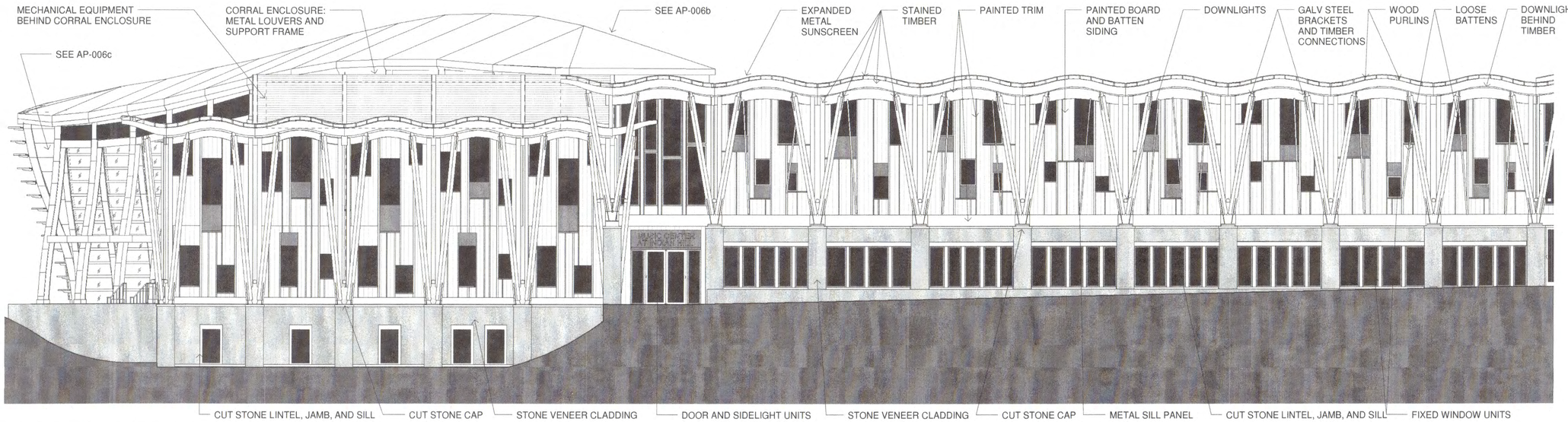

1 North Elevation Left

SCALE: 1/8" = 1'-0" REF SHEET: AP-006 / 1



2 North Elevation Right

SCALE: 1/8" = 1'-0" REF SHEET: AP-006 / 1

GRAPHICAL SCALE:

1' 3'
0' 2' 4' 6' 8' 10' 15' 20'

ARCHITECT:
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Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT ALAN JOSLIN No. 06997 CAMBRIDGE MA COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

NORTH ELEVATIONS
(1/8" = 1' - 0")

DRAWING NUMBER:

AP-006a

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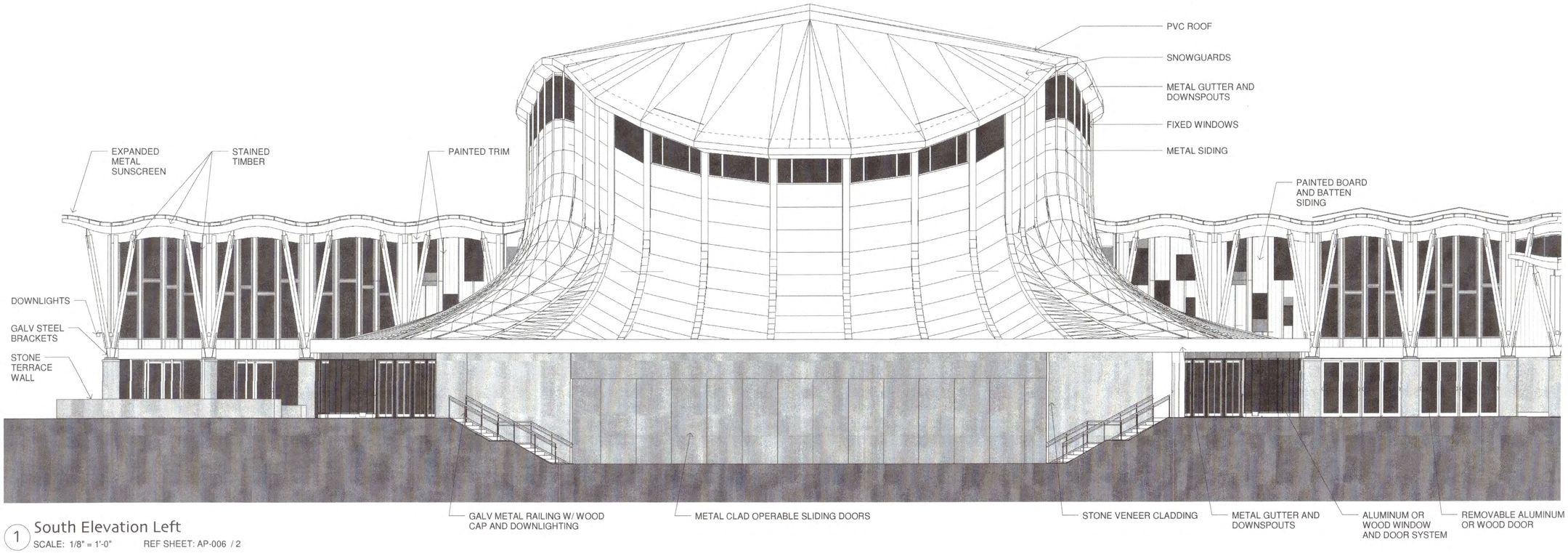
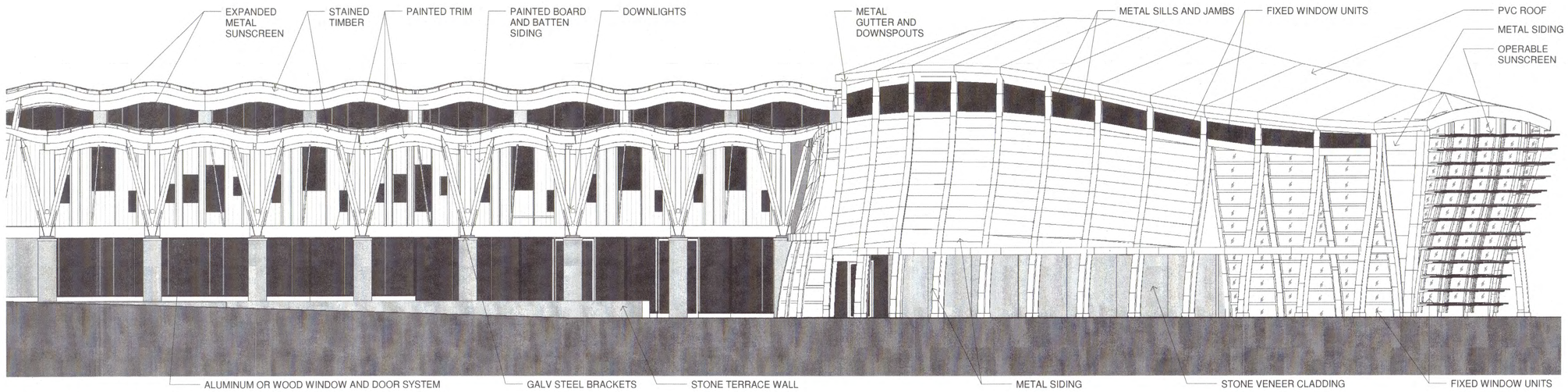


1 South Elevation Left

SCALE: 1/8" = 1'-0" REF SHEET: AP-006 / 2



2 South Elevation Right

SCALE: 1/8" = 1'-0" REF SHEET: AP-006 / 2

GRAPHICAL SCALE:

1' 3'
0' 2' 4' 6' 8' 10' 15' 20'

ARCHITECT:
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80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
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The Music Center at Indian Hill

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Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT ALAN JOSLIN No. 06997 CAMBRIDGE MA COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

SOUTH ELEVATIONS (1/8" = 1' - 0")

DRAWING NUMBER:

AP-006b

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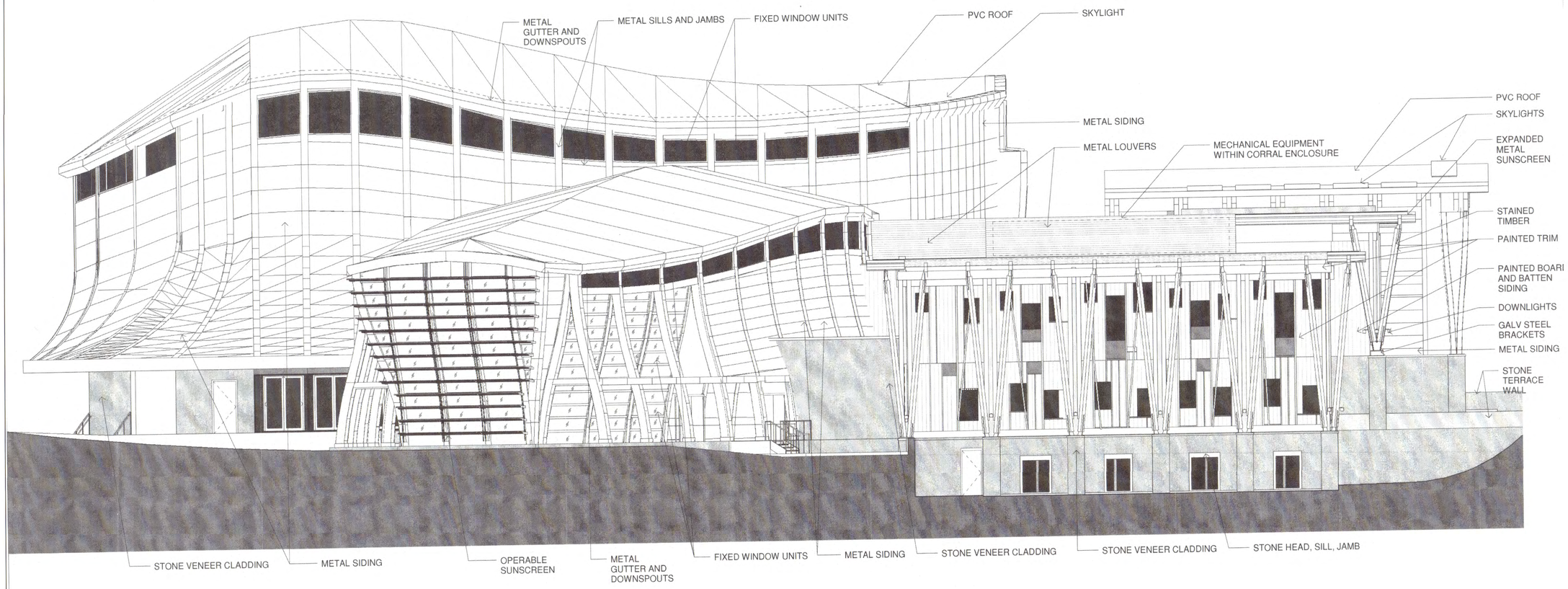

GRAPHICAL SCALE:

1' 3'
0' 2' 4' 6' 8' 10' 15' 20'

ARCHITECT:
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CAMBRIDGE, MASSACHUSETTS 02138
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DATE:

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PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

EAST ELEVATION
(1/8" = 1' - 0")

DRAWING NUMBER:

AP-006c

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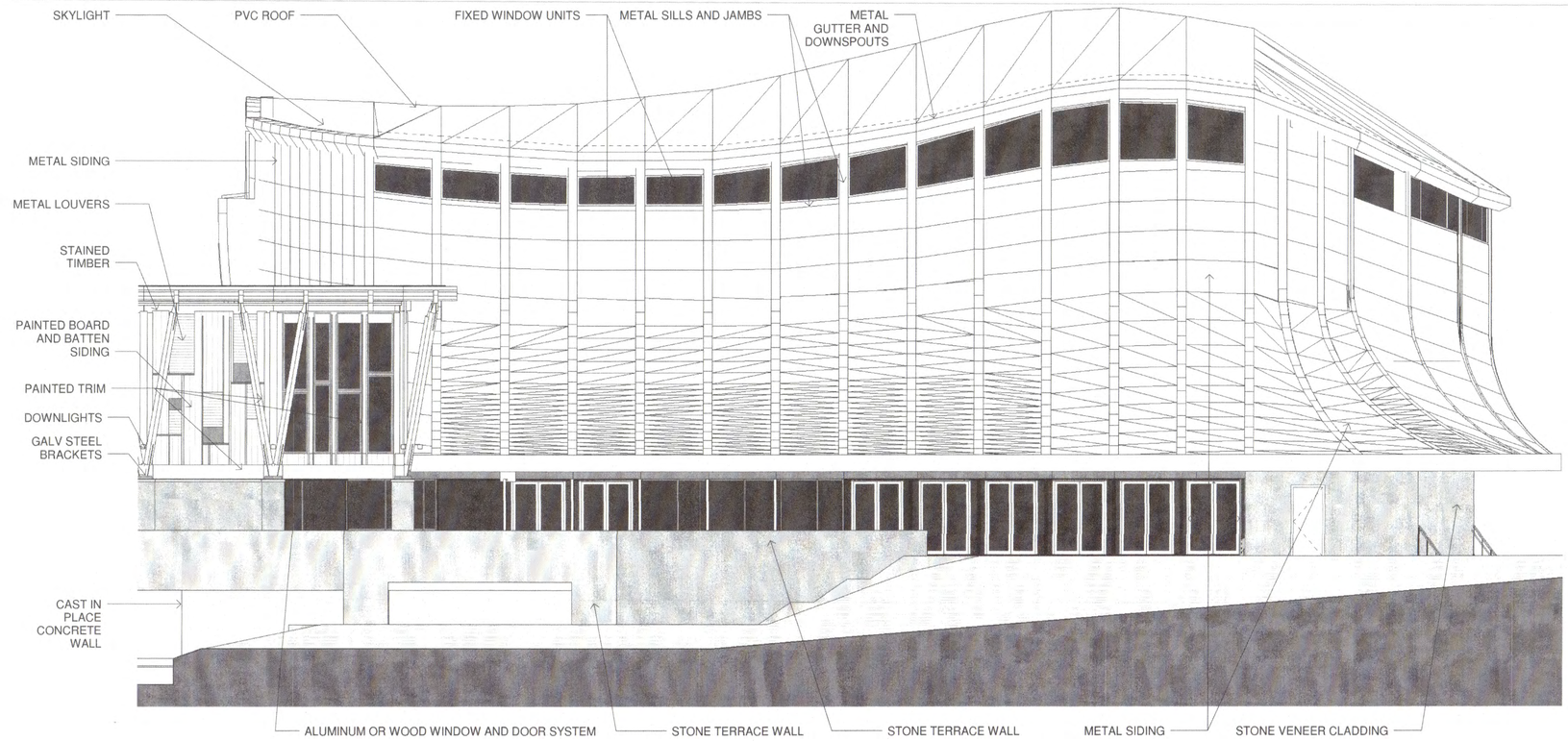
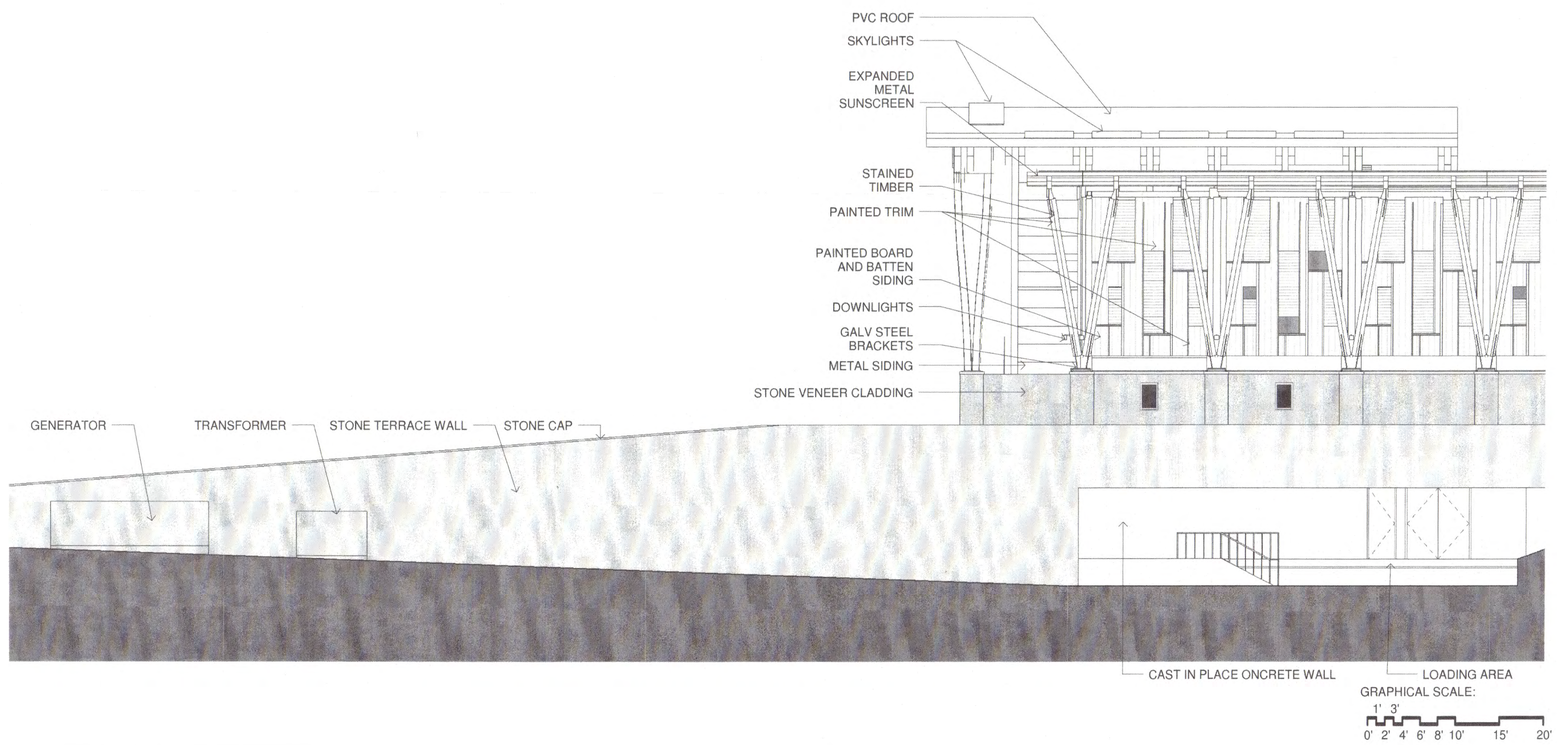


1 West Elevation - Permitting - Right

SCALE: 1/8" = 1'-0" REF SHEET: AP-006 / 4



2 West Elevation - Permitting - Left

SCALE: 1/8" = 1'-0" REF SHEET: AP-006 / 4

ARCHITECT:
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80 TROWBRIDGE STREET
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Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT
ALAN JOSLIN
No. 00997
CAMBRIDGE
MA
STATE OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

WEST ELEVATION
(1/8" = 1' - 0")

DRAWING NUMBER:

AP-006d

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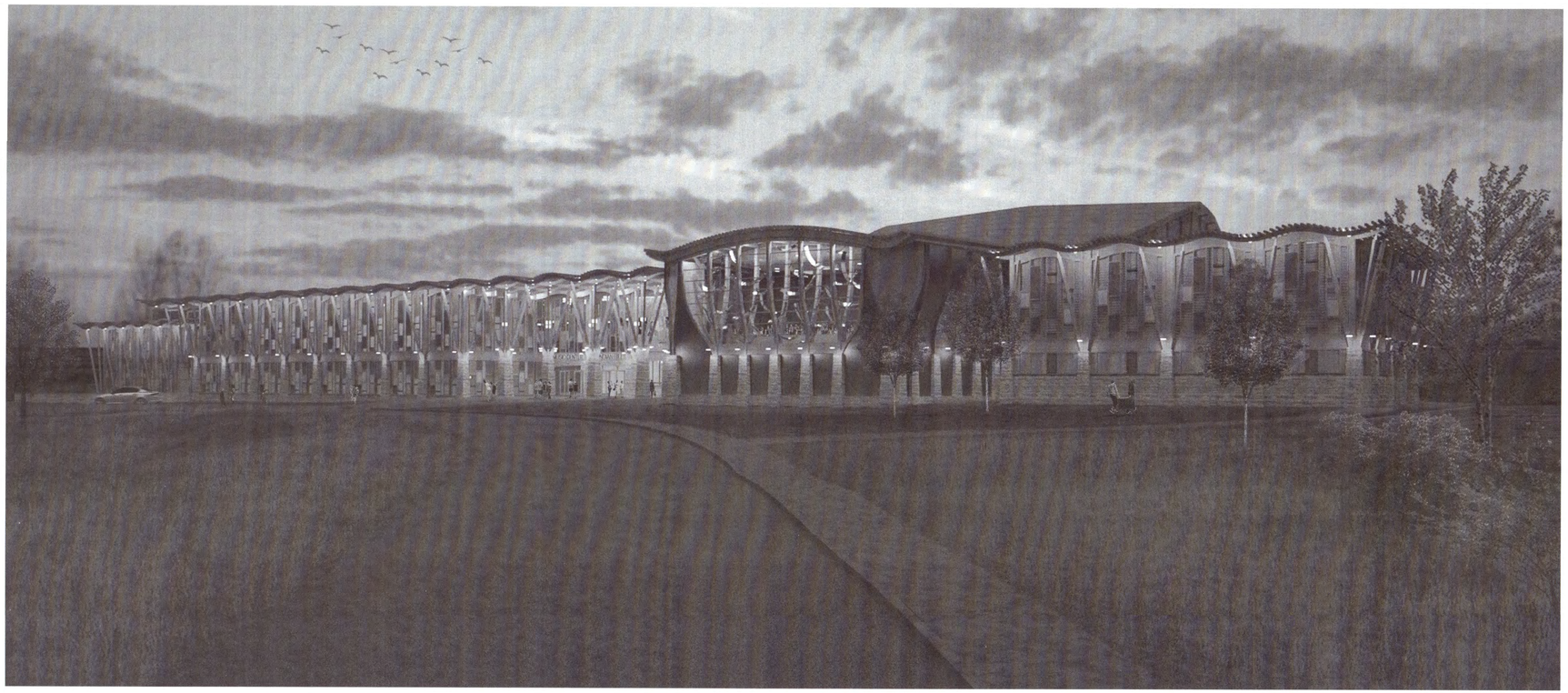

1 Music Center Entry from North Vehicular Approach

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80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
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The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

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DATE:

REGISTERED ARCHITECT
ALAN JOSLIN
No. 08697
CAMBRIDGE, MA
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

EXTERIOR VIEW

DRAWING NUMBER:

AP-007

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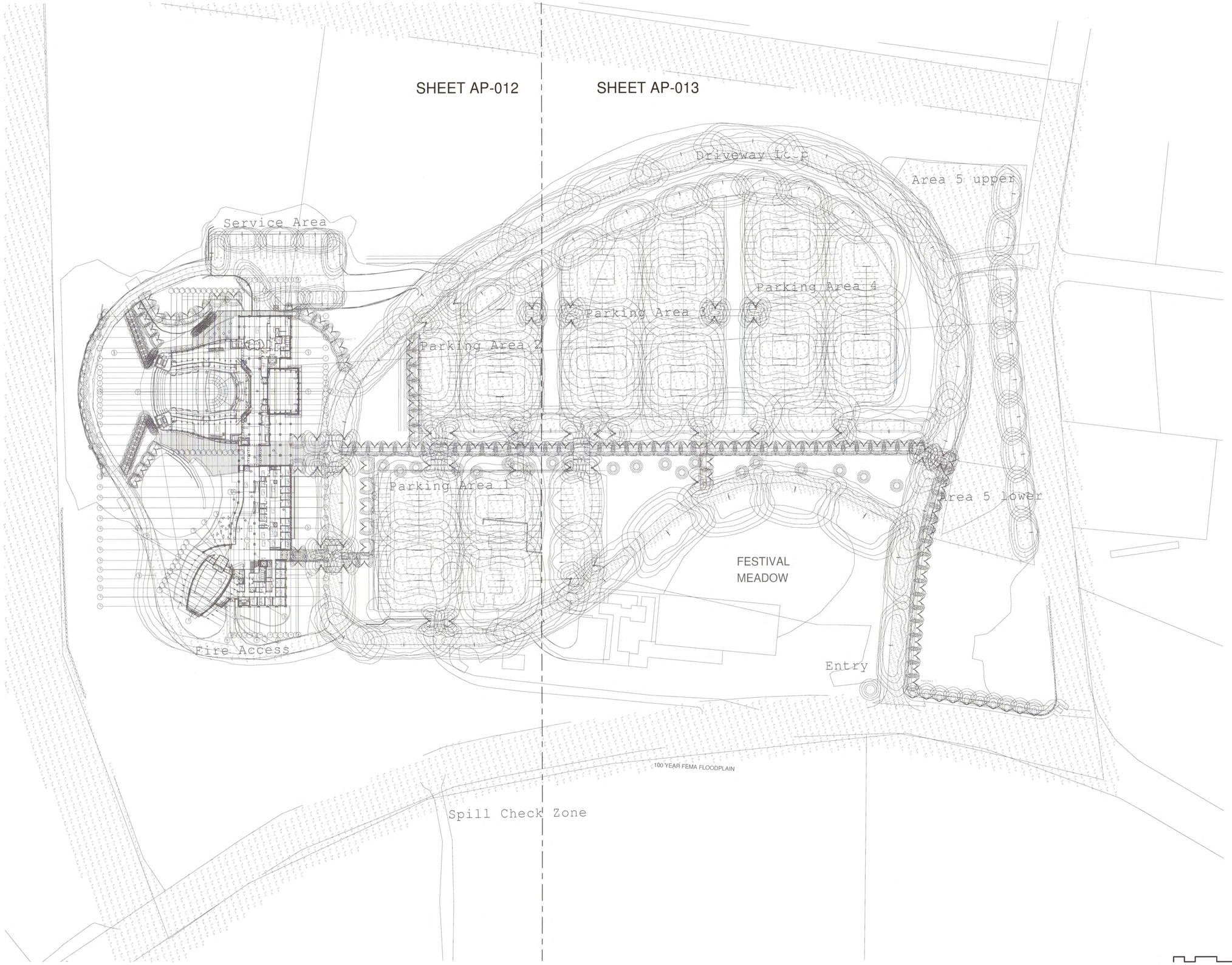
SHEET AP-012

SHEET AP-013



ARCHITECT:
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DATE:

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ALAN JOSLIN
No. 06997
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PHOTOMETRICS - OVERALL PLAN

DRAWING NUMBER:

AP-011

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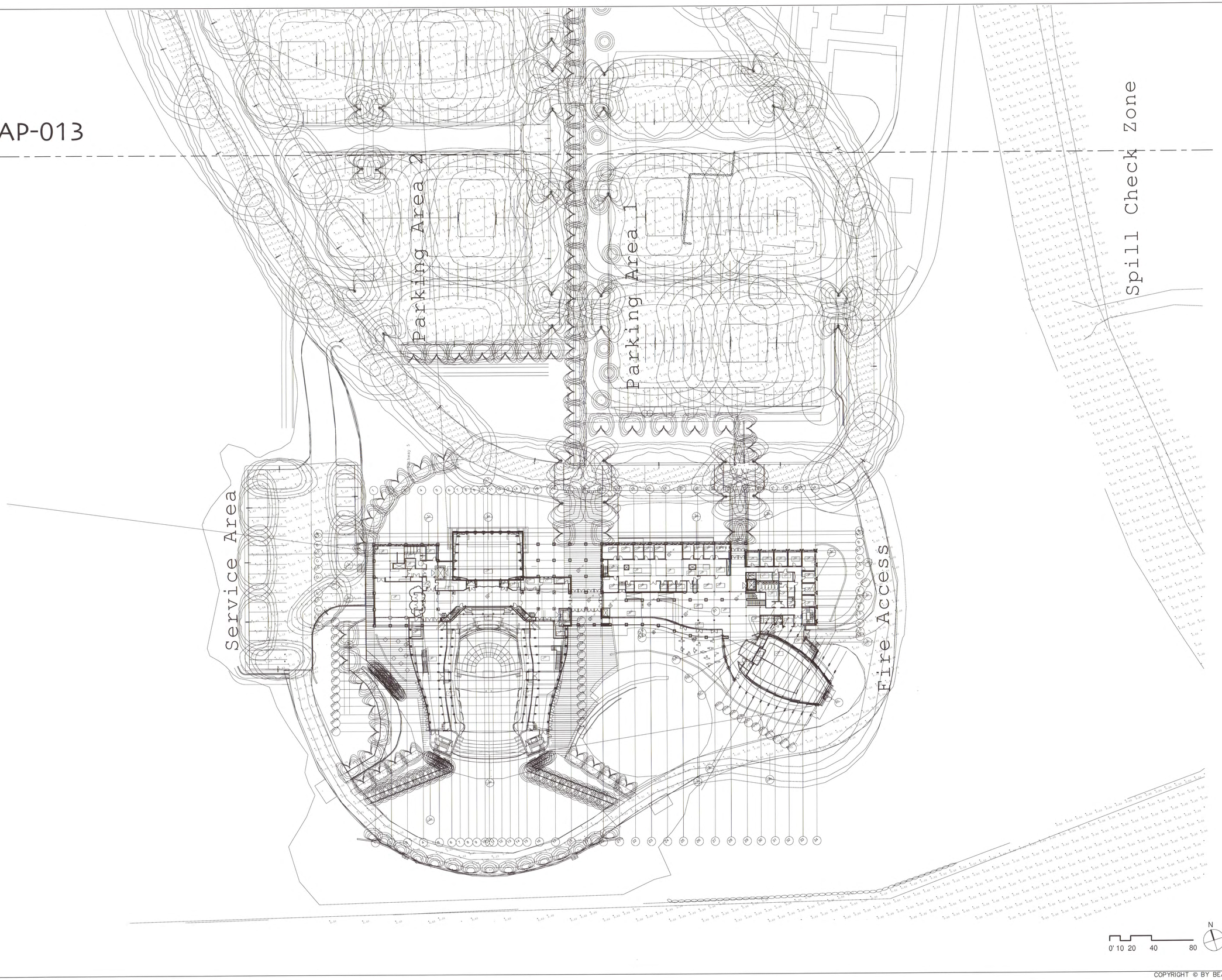
AP-013



0' 10 20 40 80

N

ARCHITECT:
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CAMBRIDGE, MASSACHUSETTS 02138
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No. 08997
COMMONWEALTH OF MASSACHUSETTS

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NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PHOTOMETICS - SOUTH

DRAWING NUMBER:

AP-012

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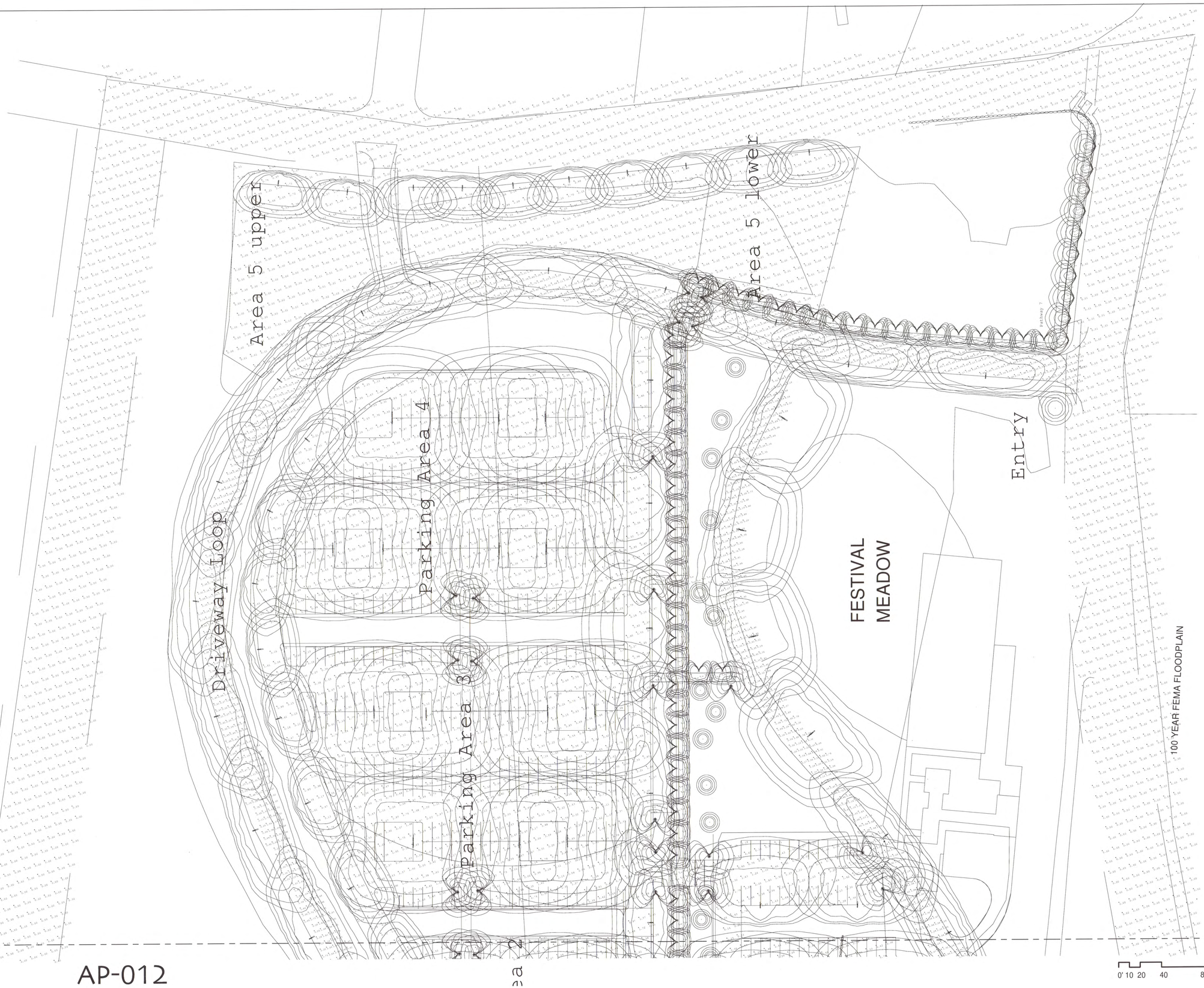

AP-012

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DATE:

REGISTERED ARCHITECT
ALAN JOSLIN
No. 06897
CAMBRIDGE
MA
COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PHOTOMETRICS - NORTH

DRAWING NUMBER:

AP-013

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PARKING | ENTRY DRIVE | SERVICE | SERVICE | PARKING, ENTRIES, ORIENTATION POINTS | PEDESTRIAN PATHS | LANDSCAPE FEATURES

1 Site Lighting Vocabulary (Not To Scale)

LUMINAIRE SCHEDULE

QTY	LABEL	ARRANGEMENT	LLF	DESCRIPTION / LOCATION	
45	RW1	SINGLE	0.90	COLE LIGHTING L612-2700K (OR EQ)	(FULL CUTOFF STEPLIGHTS ON SITE STAIRS)
111	SG1	SINGLE	0.90	DESIGNPLAN LINEAR 4.3 # CL4410-F-F-AR-MOD 3 SIDES (OR EQ) , 4'-0" OAH ON 48" CEDAR POST	(PEDESTRIAN PATHS)
1	SG2SC06DB	SINGLE	0.90	AAL # K4XT4-5030 (OR EQ),OAH 12'-0", ON WALL, ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(STAFF PARKING)
9	SG2SA12DB	SINGLE	0.90	AAL # K4XT4-5030 (OR EQ),OAH 12'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(WEST PARKING ROAD)
17	SG2SC12DB	SINGLE	0.90	AAL # K4XT4-5030 (OR EQ),OAH 12'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(STAFF + OVERFLOW PARKING)
41	SG3	SINGLE	0.90	DESIGNPLAN LINEAR 4.3 # CL4410-F-F-AR-MOD 3 SIDES (OR EQ) , 10'-0" OAH ON 48" CEDAR POST	(NODES, ORIENTATION)
4	SG4MA25DB	SINGLE	0.90	AAL # K5XT2-MO-12030 (OR EQ),OAH 12'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(PARKING LOTS)
5	SG4MC25DB	SINGLE	0.90	AAL # K5XT4-MO-12030 (OR EQ),OAH 12'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(PARKING LOTS)
23	SG5MC25AB	BACK-TO-BACK	0.90	AAL # K5XT4-MO-12030-DOUBLE 180 (OR EQ), OAH 12'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(PARKING LOTS)
1	SG6	BACK-TO-BACK	0.90	(2) LED LINEAR "KALYPSO HYDRA" # HD10W930-1264-30-IP67-13000165-16-154 (OR EQ)	(FULL CUTOFF SITE SIGN DOWNLIGHT)
20	SG7	SINGLE	0.90	VISION3 # PA12A-MOD CORTEN-SM-R2-C3-S1-MOD CROOK 30x8 RADIUS-SN-125-L3-MOD 277v (OR EQ)	(LANDSCAPE FEATURE DOWNLIGHT)
23	SG9MA20DB	SINGLE	0.90	AAL # K5XT2-MO-12030 (OR EQ),OAH 20'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(LOOP ROADWAY, ENTRY DRIVE)
1	SG9MB20AB	SINGLE	0.90	AAL # K5XT3-MO-12030 (OR EQ),OAH 20'-0", ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(LOOP ROADWAY)
4	SG10MX20AB	BACK-TO-BACK	0.90	AAL # K5X-T4 AND -T2 (OR EQ) , 20'-0" OAH, ON CAVAWOOD ROUND CEDAR POLE w/ TENON	(RING ROAD, FESTIVAL MEADOW)
21	SG11	SINGLE	0.90	COLE ILLUMINATED HANDRAIL # LRSP-LED-SS-1.5-REM-RE-DIM (OR EQ) 48" SECTION	(LAWN SEATING RAMPS)

CALCULATION SUMMARY

CALCULATION GRID LABEL	CALC TYPE	UNITS	AVG	MAX	MIN
FIRE LANE	ILLUMINANCE	HOR FC	0.32	6.52	0.00
PARKING LOT 1	ILLUMINANCE	HOR FC			
PARKING LOT 2	ILLUMINANCE	HOR FC	1.65	7.64	0.22
PARKING LOT 3	ILLUMINANCE	HOR FC	1.53	8.78	0.12
PARKING LOT 4	ILLUMINANCE	HOR FC	1.57	8.81	0.26
PARKING LOT 5 LOWER	ILLUMINANCE	HOR FC	0.38	4.63	0.00
PARKING LOT 5 UPPER	ILLUMINANCE	HOR FC	0.76	12.23	0.00
PEDESTRIAN PATHWAYS	ILLUMINANCE	HOR FC	1.72	16.55	0.07
PENEDTRIAN PATH	ILLUMINANCE	HOR FC	2.12	14.53	0.18
ROADWAY LOOP + ENTRY DRIVE	ILLUMINANCE	HOR FC	1.57	9.53	0.04
STAFF LOT	ILLUMINANCE	HOR FC	1.37	8.60	0.01
OVERSPILL CHECK ZONE	ILLUMINANCE	HOR FC	0.00	0.00	0.00

- *ALL FIXTURES ARE IES FULL CUTOFF AND CONFORM WITH IDSA REQUIREMENTS.*
- *OVERSPILL ZONE DEFINED AS GRID 50' WIDE AROUND SITE BOUNDARY ON ALL SIDES.*
- *SEE FIXTURE SCHEDULE FOR DETAILED FIXTURE + POLE DESCRIPTIONS, IES DISTRIBUTIUON TYPES, MOUNTING, BASES, ETC.*

OPERATIONS SCHEDULES

	DUSK-CLOSING SCHOOL ONLY	DUSK-CLOSING RH EVENT	DUSK-CLOSING CH EVENT	DUSK-CLOSING RH + CH EVENT	DUSK-CLOSING FESTIVAL	CLOSING-DAWN
FIRE ACCESS	0%	0%	0%	100%	0%	0%
PARKING AREA 1	100%	100%	100%	100%	100%	0%
PARKING AREA 2	100%	100%	100%	100%	100%	0%
PARKING AREA 3	0%	100%	100%	100%	100%	0%
PARKING AREA 4	0%	0%	100%	100%	100%	0%
AREA 5 LOWER	0%	0%	0%	100%	100%	0%
AREA 5 UPPER	0%	0%	0%	100%	100%	0%
PEDESTRIAN PATHWAYS	100%	100%	100%	100%	100%	50%
PEDESTRIAN SPINE	100%	100%	100%	100%	100%	50%
ENTRY + DRIVEWAY LOOP	100%	100%	100%	100%	100%	25%
SERVICE AREA	0%	100%	100%	100%	100%	0%
SITE SIGN	100%	100%	100%	100%	100%	50%
LANDSCAPE FEATURES	0%	100%	100%	100%	100%	0%

- *SCHOOL LIGHTING: 10PM* *EVENT LIGHTING: 11:30PM* *FESTIVAL LIGHTING: MIDNIGHT*

NOTE: The Planning Board has allowed the Applicant to exercise discretion to reduce light level to 0% for the Entry and Driveway Loop subject to Groton Police Department approval.

2 Luminaire Schedule, Calculation Summary, and Operations Schedules

ARCHITECT:
EPSTEIN JOSLIN ARCHITECTS
80 TROWBRIDGE STREET
CAMBRIDGE, MASSACHUSETTS 02138
T: 617 868 1766

The Music Center at Indian Hill

Old Ayer Road
Groton, Massacusetts

THIS SITE PLAN APPROVAL DOES NOT NECESSARILY INDICATE COMPLIANCE WITH THE GROTON ZONING BYLAW.
DATE:

REGISTERED ARCHITECT ALAN JOSLIN No. 28997 CAMBRIDGE MA COMMONWEALTH OF MASSACHUSETTS

PERMIT DOCUMENTS

NOT FOR CONSTRUCTION

PROJECT NUMBER: C-880

SEPTEMBER 9, 2016

REVISIONS:

1	REVISED STORMWATER SYSTEM	11.18.16
2	CONTROL PLANS	1.12.17

SCALE:

DRAWING NAME:

PHOTOMETRICS - ELEVATIONS AND SCHEDULES

DRAWING NUMBER:

AP-014

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