MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

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MA ENDANGERED SPECIES ACT (G.L. c.131A)
CONSERVATION AND MANAGEMENT PERMIT

DATE		September 6, 2024
CONSERVATION PERMIT NO.		CMP-87309
NHESP FILE NO.		23-4202, RC-85971
PERMIT HOLDER		Matt Silverman Littleton Electric Light & Water Department 39 Ayer Road Littleton MA 01460
PROJECT		Littleton-Boxborough Water Supply Connection: Trumbull Well

A. Permit Authority

Pursuant to the authority granted in the Massachusetts Endangered Species Act ("MESA") (G.L. c. 131A) and its implementing regulations (321 CMR 10.23), the Director of the Massachusetts Division of Fisheries & Wildlife (the "Division") hereby issues a Conservation and Management Permit (the "Permit") to Littleton Electric Light & Water Department ("LELWD") (the "Permit Holder"). This Permit authorizes the Take of the Blanding's Turtle (*Emydoidea blandingii*), which is State-listed as Threatened, pursuant to the MESA, arising out of the construction of a new municipal groundwater well to supply water to both the Town of Littleton and a portion of the Town of Boxborough (the "Project") on a ±58.4 acre site at 153 Taylor Street located between Beaver Brook and Taylor Street and south of Captain Isaac David Highway (aka Route 2) in the Town of Littleton, Massachusetts (Book 79319, Page 596, Middlesex South County Registry of Deeds; the "Property", Attachment 1).

Work subject to this determination is proposed on the following properties. All pending access agreements will be completed prior to MESA-authorized work.

Phase	Site	Address & Town Parcel ID	Owner Name	Form of Authorization or Ownership Interest
2	Trumbull Well Construction Site	153 Taylor Street Littleton, MA R10 14 0	Littleton Water Department	Permit Holder is the Fee Owner
1 or 2	Sudbury Valley Trustees	0 Whitcomb Avenue Littleton, MA	Same as site	Written agreement (pending)
1 or 2	Campanelli-Trigate Boxborough Sub, LLC	700, 800, 820, 850 Beaver Brook Road	Same as site	Written agreement (pending)
2	Rte-2 ROW	Immediately north of well site	MA DOT	Written agreement (pending)

B. Description of Take

The Project

The Project, as currently proposed, includes the construction of a new drinking water supply well (the Taylor Street Well aka Trumbell Well; PWS ID# 2158000, WMA Permit # 9P-2-13-158.02) for the Littleton Electric Light & Water Department (LELWD), and the connection of the new well to the water treatment plant (WTP) at 15 Whitcomb Avenue. Water currently treated in the WTP is sourced from Spectacle Pond Well (215800-04G) and the Whitcomb Avenue Wells (215800-02G, -08G). The new well will be used to mitigate for per- and polyfluoroalkyl substances (PFAS), sodium, chloride, and perchlorate exceeding acceptable levels in the existing groundwater supply located in Boxborough. After construction, water from the Trumbull Well will be treated along with source water from the other wells to provide redundancy before being distributed to citizens in Littleton and Boxborough.

The Trumbull Well has been approved to pump approximately 0.50 MGD per day from the aquifer. To determine possible impacts to the wetland system, two pumping tests were conducted using an 8-inch test well at half the approved pump rate, 184 gpm (264,907 gpd), for 15- (2022) and 5 days (2024) while monitoring groundwater levels. The pumped water was discharged about 2,000 feet away into Beaver Brook downgradient of the test well to not influence the results.

During the 2022 15-day pumping test of the proposed Trumbull Well, a hydraulic response was observed between the groundwater aquifer being pumped and the water within a nearby ephemeral pool when pumping at ~184 gpm. In 2024, to better understand the relationship between the proposed Trumbull Well and surrounding ephemeral wetland features, the Applicants conducted an additional pumping test at ~184 gpm in consultation with the Division. The Applicant submitted a second pumping test report focused on the observed effects to the groundwater aquifer and the ephemeral pool(s) entitled “Re: Trumbull Well 5-Day Pumping Test Results and Analysis” (dated April 18, 2024, Weston & Sampson). The report included data that confirmed that four (4) of the monitored wetlands showed a response to the proposed pumping rate of the Trumbell Well, with observed drawdowns ranging from less than a quarter of an inch to a maximum of 2.76-inches (dependent on the wetland) during the pumping test. The wetlands observed to have a response to the 2024 pumping test include the three wetlands immediately surrounding the test well and the wetland south of the test well across the finger of the Beaver Brook wetland system. The report also included the “Seasonal Pool Map & Habitat Types” (dated April 17, 2024, Oxbow Associates), showing that these wetlands also provide habitat for the Blanding’s Turtle, with which the Division concurs.

Of these four wetlands, all but the smallest pool has sufficient depth and hydroperiod to provide Blanding's turtle overwintering habitat, courtship/mating habitat, and hydration habitat (variable by year). Alterations to the ephemeral wetland features will impact the species’ movements to and between the ephemeral wetland

features as well as the Beaver Brook system and could impact seasonal nesting movements. Other habitat features on the site, and nearby Beaver Brook system, provide critical habitats for Blanding's Turtle, including nesting, hydration, foraging, courtship and mating, migration/movement, and overwintering. The matrix of habitats within the well site and the surrounding landscape are of critical importance to this population of turtles.

On June 7, 2024, the Division issued a Determination that the project will result in Take, "due to impact to necessary feeding, breeding, migrating, and sheltering, and overwintering habitats resulting from hydraulic impacts of pumping at 50% the requested volume. Construction of the well and water line, as well as routine maintenance will include protective measures to minimize the risk of directly harming or killing individuals of this species."

Work Phasing

a) Phase 1 of the Project will be the implementation of a monitoring program that will precede the well construction and any pumping. Construction of nesting habitats and the wetland feature may proceed as part of Phase 1 or Phase 2.
b) Phase 2 is the construction of the Trumbull Well and raw water lines between the well and Route 2 (Attachment 3; SEE SHEETS C103, C104, C105), and operation of the well at 0.265 MGD (53% of the WMA max permitted rate of 0.5 MGD) for at least three (3) years prior to LELWD requesting an increase.
c) Phase 3 of the Project would be the LELWD requesting additional water withdrawal above 0.265 MGD. For each requested increase, there would be an expected pumping test and report, similar to the test and report produced in 2024. This phase is optional and could occur at any time during the duration of the Permit, but no sooner than after three (3) years of operation at 53% withdrawal rate with associated data collection.

The Project also includes any other on-site activity required by the Division as a condition of this Permit in any phase. All Work shall be confined to the area of the Property within the limits of Work shown on the Project Plan (Attachment 3) or in locations approved by the Division for habitat management or enhancement activities including, but no limited to, the properties listed in the table in Section A of this Permit.

Associated Water Distribution Lines in Littleton, Boxborough, Harvard (RC-60246)
On December 15, 2023, the Division authorized construction of the raw and finished water mains pursuant to MESA, excluding the portion noted above, and directional drilling at Beaver Brook (Rte 2) (RC-60246); Attachment 4). These activities are not subject to this Permit.

C. Permit Performance Standards

Under the authority granted by and in accordance with MGL c131A§3 and 321 CMR 10.23, the Director may permit the Take of a State-listed species for conservation and management purposes provided that there is a long-term Net Benefit to the conservation of the impacted species. If the Director determines that the applicant for a permit has avoided, minimized and mitigated impacts to the State-listed species consistent with the following performance standards, then the Director may issue a conservation and management permit, provided:

(a) the applicant has adequately assessed alternatives to both temporary and permanent impacts to State-listed species;

(b) an insignificant portion of the local population would be impacted by the Project or Activity, and;

(c) the applicant agrees to carry out a conservation and management plan that provides a long-term Net Benefit to the conservation of the State-listed species that has been approved by the Director, as provided in 321 CMR 10.23(5), and shall be carried out by the applicant.

The Director has determined that the applicant for this Permit has met the above noted performance standards and that the conservation and management plan described herein provides a long-term Net Benefit to the conservation of the Blanding's Turtle.

D. Conservation and Management Plan

In order to avoid and minimize impacts to Blanding's Turtle, the Permit Holder has proposed to:

1) Implement a turtle protection plan for the water line and well construction. Construction mortality avoidance will be executed with a three-pronged approach, including contractor education, monitoring construction with turtle biologists, and conventional turtle protection measures including pre-construction searches, radio-telemetry, and time of year restrictions, as well as Unmanned Aerial System (UAS) surveys utilizing a specialized UAS device.
2) Educate construction staff about the likely presence of State-listed species on the Property and appropriate responses to any sightings.

In order to provide a long-term Net Benefit to the conservation of Blanding's Turtle, the Permit Holder has proposed to implement:

3) Long-term monitoring of four (4) onsite ephemeral wetland features.
4) Nesting habitat creation.
5) Creation and long-term monitoring of an ephemeral wetland feature that is suitable for overwintering.
6) Habitat use, movement, and habitat occupancy monitoring of Blanding's turtles through radio-telemetry and drone.
7) Nest protection and head-starting.

Therefore, the Project can be permitted pursuant to the MESA. This Permit is issued to condition the Project and to provide a long-term Net Benefit to the Blanding's Turtle.

E. Related Project Authorizations

- MA Environmental Policy Act (EEA #16736): Expanded Environmental Notification Form (EENF): EENF Certificate issued September 5, 2023.
- MA Environmental Policy Act (EEA #16736) Single Environmental Impact Report (EIR): Final Certificate (Single EIR) issued May 17, 2024.
- Massachusetts Wetland Protection Act Notice of Intent, Littleton Conservation Commission (DEP File #204-0995): pending issuance of MESA CMP.
- Massachusetts Department of Environmental Protection, Wetland Protection Act Notice of Intent, Boxborough Conservation Commission (DEP File #113-0583): Order of Conditions issued October 23, 2023.
- Department of Conservation & Recreation Interbasin Transfer Act: issuance expected September 2024
- Massachusetts Department of Environmental Protection BRPWS17 Approval to site a source and conduct a pumping test for a source greater than 70 gallons per minute: (X289059). MassDEP approved August 15, 2022.
- Massachusetts Department of Environmental Protection BRPWS19 Approval of Pumping Test Report for Source of 70 gallons per minute or greater (X289435): Permit approval is pending MEPA approval.

- Massachusetts Department of Environmental Protection BRPWS20 Approval to Construct a Source of 70 gallons per minute or greater: Submitted February 7, 2024.
- Massachusetts Department of Environmental Protection BRPWS32 Distribution Modifications for Systems that serve more than 3,300 people. Submitted December 6, 2023.
- Massachusetts Department of Environmental Protection BRPWM02 Water Management Act Permit Amendment: (9P-2-13-158.02) Permit amendment submitted on February 3, 2023. Issuance expected summer 2024.

F. Documents and Plans of Records

In accordance with the documents and plans of record submitted to the Division entitled:

- "Conservation and Management Permit Application" (dated 6/7/24; prepared Oxbow Associates, Inc.; the "Permit Application");
- Figure 1 Water Supply Connection Littleton, MA USGS Map (May 14, 2024, MESA Checklist Filing); Attachment 1;
- Figure 2 Town of Littleton, MA Proposed Trumbull Well New Source Approval, SITE MAP (April 2024; Permit Application); Attachment 2;
- Littleton Water Department Trumbull Well and Raw Water Main Town Contract No. IFB-2024 DWSRF No. 12397 – Contract No.1 (dated August 2024, prepared by Weston & Sampson, 18 sheets); the "Plans"; Attachment 3;
- MESA Determination for water distribution lines in Littleton, Harvard and Boxborough (RC-85971); Attachment 4;
- Ephemeral Feature Water Level Monitoring Plan; Attachment 5;
- Blanding's Turtle Mortality Avoidance Plan Trumbull Well; the "Turtle Protection Plan" or "TPP", Attachment 6;
- Nesting Habitat Creation LELWD Trumbull Well; Attachment 7;
- Nesting Habitat Management & Maintenance Trumbull Well; Attachment 8;
- Proposed Replacement Pool (proposed Plan and Profiles, dated June 2024); Attachment 9; and
- Net Benefit Schedule; Attachment 10

Additionally, any other plans and documents referenced herein (collectively, the "Plans of Record"), this Permit is issued with the following General and Special Conditions:

G. General Conditions

GC 1.		The Permit Holder shall comply with all General and Special Conditions of this Permit and complete the Project consistent with all Division-approved plans and supporting documents referenced herein, except as otherwise approved by the Division in writing.
GC 2.		A violation of any General or Special Condition of this Permit may result in an unauthorized Take and may be subject to civil and or criminal penalties pursuant to M.G.L. c. 131A. The Division reserves the right to require an immediate cessation of Work (as defined in Special Condition #1), in whole or in part and at its sole discretion, should the Permit Holder violate any General or Special Condition of this Permit.

GC 3.		The Permit Holder shall submit in writing any documents, plans, reports, or other items required for submission in accordance with this Permit, for review and written approval by the Division, except as otherwise approved by the Division in writing.
GC 4.		Division representatives shall have the right to enter and inspect the Property subject to this Permit at reasonable hours to evaluate Permit compliance, and to require the submittal of additional, reasonable information not otherwise required by this Permit if deemed necessary by the Division to complete its evaluation.
GC 5.		Any land protected to achieve a long-term Net Benefit associated with this Permit shall remain undeveloped and protected as habitat for State-listed species in perpetuity.
GC 6.		This Permit shall not preclude the review of future projects on the Property that are subject to the Wetlands Protection Act Regulations (310 CMR 10.37, 10.58(4)(b), 10.59), as applicable, by the Division.
GC 7.		This Permit does not relieve the Permit Holder of the necessity of complying with all applicable federal, state or local statues, ordinances, bylaws or regulations, including but not limited to those administered by the Town of Littleton, the Town of Boxborough, and the Massachusetts Department of Environmental Protection.
GC 8.		All Work shall be in conformance with the Plans of Record. Any changes, updates, or revisions to the Project, or any additional work beyond that shown on the Plans of Record, shall require additional review and approval by the Division prior to implementation, pursuant to General Condition #9. This Permit prohibits any work not specifically authorized by this Permit, unless otherwise approved by the Division in writing prior to performing the additional work.
GC 9.		Any proposed change to any plan identified in this Permit, or to the State-listed species conservation and management plan required by way of this Permit, shall require the Permit Holder to inquire of the Division, in writing, whether the change is significant enough to require the filing of a new Conservation and Management Permit Application, and/or require additional long-term Net Benefit for the affected State-listed species. The Division retains the right to require the submittal of additional, reasonable information to evaluate the proposed plan change.
GC 10.		This Permit shall apply to, and inure to the benefit of, the Permit Holder and any successor-in-interest of the Permit Holder, or to a subsequent successor-in-control of the Property or portion thereof subject to this Permit should the Permit Holder convey its record ownership of the Property to said successor-in-control, as well as to any contractor or other person performing Work conditioned by this Permit. Within three (3) days of the transfer of an interest in the Property or a portion thereof, any successor-in-interest or subsequent successor-in-control [i.e., subsequent owners or operators] of the Property or a portion thereof shall provide the Division with a letter indicating (1) that the successor is the successor-in-interest of the Permit Holder or the successor-in-control [i.e., current owner or operator] of the Property or a portion thereof, and (2) that said successor will perform the obligations of the Permit Holder as set forth in this Permit.
GC 11.		**Prior to the initiation of Work**, the Permit Holder shall notify the Division in writing of the name, address, email, business and or cell phone numbers of the project supervisor(s) and/or contractor(s) responsible for compliance with this Permit. The Permit Holder shall provide updated

		information in writing to the Division should new or additional project supervisors and/or contractors be hired after Work has commenced. **Prior to the initiation of Work**, said project supervisor(s) and/or contractor(s) shall be provided a copy of the Permit and acknowledge in writing their receipt and understanding of the Permit. Said project supervisor(s) and/or contractor(s) may be held responsible for violations of this Permit performed by said project supervisor(s) and/or contractor(s).
GC 12.		**Prior to the initiation of Work**, the text of this Permit shall be recorded by the Permit Holder in the Registry of Deeds or the Land Court for the district in which the Property is located so as to become a record part of the chain of title of the Property. In the case of recorded land, the Permit shall be noted in the Registry's Grantor Index under the name of the owner of the Property upon which the proposed Work is to be done. In the case of registered land, the Permit shall be noted on the Land Court Certificate of Title of the owner of the Property upon which the proposed Work is done. The Permit Holder shall submit to the Division a date-stamped and signed copy of said recorded Permit showing the date and book and page of recording within five (5) business days after recording and/or filing, as applicable. No Work shall be initiated on the Property until the Permit is recorded and said recorded copy is submitted to the Division, except as otherwise approved by the Division in writing.
GC 13.		**Prior to the initiation of Work**, the Permit Holder shall send a summary report to the Division which: (a) demonstrates compliance with all pre-Work General and Special Conditions of the Permit; and (b) requests permission to initiate the Work authorized by the Permit. Unless otherwise authorized by the Division in writing, **no Work may be initiated on the Property** until the Permit Holder has received written confirmation from the Division confirming compliance with all pre-Work General and Special Conditions and authorizing the initiation of Work. **Within three (3) days of the initiation of Work**, the Permit Holder shall send a letter to the Division confirming the date upon which Work commenced.
GC 14.		**Within (3) months of the completion of Work** the Permit Holder shall submit to the Division a written request for a Certificate of Permit Compliance (the "Certificate"), including as-built plans and other supporting materials demonstrating the completion of Work and compliance with all General and Special Conditions of the Permit. The text of the Division-issued Certificate shall be recorded by the Permit Holder in the Registry of Deeds or the Land Court for the district in which the Property is located so as to become a record part of the chain of title of the Property. Unless an extension is granted in writing by the Division pursuant to General Condition #15, the Permit Holder shall record the Division-issued Certificate **prior to expiration of the Permit**. The Permit Holder shall submit to the Division a date-stamped and signed copy of said recorded Certificate showing the date and book and page of recording **within five (5) business days after recording and or filing**, as applicable.
GC 15.		The Project authorized by this Permit shall be completed within **ten (10) years** from the date of issuance. If needed, the Permit Holder shall submit a written request to the Division for an extension of time to complete said Project, and the Division will review the Project pursuant to MESA for any continuing impacts as described herein and for any new impacts to any State-listed species found subsequent to the issuance date of this Permit.

		Said request shall be submitted to the Division at least sixty (60) days prior to expiration of this Permit and shall include a summary report demonstrating compliance with all General and Special Conditions of this Permit.
GC 16.		This Permit specifically prohibits any activity or work not specifically authorized by this Permit, unless approved in writing by the Division prior to such additional work. All Work shall be in conformance with the Plans of Record as may be amended and approved by the Division. Any changes, updates, or revisions to the proposed Project or any additional work beyond that shown on the Plans of Record shall require additional review and approval by the Division prior to implementation. The Division maintains the right to require an immediate cessation of Work, in whole or in part, should the Plans of Record approved by the Permit (or any sheet, details, schematic, or collar note therein) prove to inaccurately reflect site conditions, standard construction methodologies, or practical construction considerations sufficient to require a change to the Plans of Record.
GC 17.		**Prior to the start of Work**, adequate erosion and sedimentation control measures shall be implemented, including any necessary controls not specifically referenced in the Plans of Record, and be maintained in effect throughout Project construction and until the Property has become stabilized with adequate vegetative cover or via alternate means, as approved by the Division. Structural failure of erosion and sedimentation controls may be subject to enforcement action subject to General Condition #13.
GC 18.		Failure to maintain an appropriate standard of care at any time during the installation or post-installation components of the Plans of Record, including but not limited to failure to restore and adequately control surface hydrology, planting at inappropriate times of year, failures to reach adequate surface hydrology, failure to provide adequate substrate, failure to implement adequate horticultural practices (such as irrigation, disease and pest control), failure to maintain erosion and sedimentation control, failure to adequately control invasive plant species, or the loss of required plantings or seeding, shall be deemed non-compliance with this Permit at the sole discretion of the Division subject to General Condition #13.
GC 19.		Amendment, Water Withdrawal: This Permit explicitly allows the Permit Holder to request amendments to allow for greater water withdrawal over the Phase 2 level of 0.265 MGD provided this Permit remains valid. For each requested increase, the request would require a pump test approved by the Division, and the Permit Holder will produce a pump test report consistent with the 2024 report, as well as a summary report of all habitat management and enhancement activities implemented at the time of the report. This phase is optional and could occur at any time during the duration of the Permit, but no sooner than three (3) years of pumping at the Phase 2 level. The Division will review the information presented and determine, consistent with GC 8 and 9, if additional Net Benefit if required. The Division would also expect that any such request may require a filing of a Notice of Project Change pursuant to the MA Environmental Policy Act and consultation with MA DEP.
GC 20.		Compliance, ITA & WMA: The Project shall comply with all conditions of the Interbasin Transfer Act Permit, Water Management Act Permit Amendment, and WS-19. All water conservation and

		management measures included in these permits are critical to the protection of state-listed wildlife.

H. Special Conditions

SC 1.		Work Authorized by the Permit: This Permit authorizes the construction of a new municipal water supply well at 153 Taylor Street and the raw water pipes from the well to Route 2 in accordance with the Plans of Record (Attachment 3). a) Phase 1 of the Project will be the implementation of a monitoring program that will precede the well construction and any pumping. Construction of nesting habitats and the wetland feature may proceed as part of Phase 1 or Phase 2. b) Phase 2 is the construction of the Trumbull Well and raw water lines between the well and Route 2, and operation of the well at 0.265 MGD. The well will operate at this volume for at least three (3) years prior to LELWD requesting an increase. c) Phase 3 of the Project would be LELWD requesting additional water withdrawal above 0.265 MGD. The Project also includes any other on-site activity required by the Division as a condition of this Permit in any phase. All Work shall be confined to the area of the Property within the limits of Work shown on the Project Plan (Attachment 3) or in locations approved by the Division for habitat management or enhancement activities including, but not limited to, the properties listed in the table in Section A of this Permit and shown in Attachment 7. Related water line work, but outside the scope of this Permit, was authorized on December 15, 2023 (Attachment 4) and will occur during the same time as Phase 1.
SC 2.		Funding/Timing of Net Benefit Actions: The Permit Holder has elected to provide direct funding to the relevant consultants associated with implementation with all Conditions and Special Conditions without limitation. The Permit Holder is responsible to ensure that all actions are fully funded in accordance with the Net Benefit Action schedule, or as may be modified through subsequent review and approval. The schedule of Net Benefit Actions is included as Attachment 10 for Phases 1 and 2 through 2040. Additional actions may be required beyond 2040.
SC 3.		Pump Test for any Volume greater than 0.265 MGD: Prior to implementation of any pump test seeking increased withdrawal, the Permit Holder shall submit a proposed pump-test request to the Division and other relevant permitting agencies for review and approval. The pump test request should detail the timing and duration of the test, monitoring to be conducted during the test, location of outflow (if released) or specification that it will be put into municipal use, and a proposed report outline. Pump tests are expected to generally conform to the 2024 pump test, although the timing and duration of pumping and post-pumping monitoring may be revised after Division review. If a future pump test is approved by the Division, the Permit Holder shall conduct the pump test in accordance with the approved pump test request and the report will be submitted to the Division in writing. The Division will review the result of the pump test relative to potential impacts to Blanding's Turtles and provide a written response to the Permit Holder.

		Pumping at any rate higher than 0.265 MGD outside an approved pump test is not approved until the Division determines that the pumping can be permitted under MESA. The Permit Holder may elect to propose and conduct one or more pump tests consistent with the condition if they wish to test incremental volumes up to the permitted maximum of 0.5 MGD.
SC 4.		Blanding's Turtle Protection Plan, all activities: The Permit Holder shall implement protective measures in accordance with a Division-approved Blanding's Turtle Protection Plan (TPP) during the construction of the well and access road, routine maintenance of the well and access road, and habitat enhancement and creation activities. Protective measure or adherence to a time of year restriction may be required during some aspects of the project's monitoring activities. The Permit Holder has hired Oxbow Associates to implement all turtle-protective measures for this Project. A copy of the current protection plan is attached to this CMP (Attachment 6). In each calendar year of the TPP's implementation, a qualified Division-approved biologist shall submit for a Commercial Scientific Collection Permit and submit a written update to the plan reflecting any changes in methods, timing, or personnel for the work in that year. Any proposed changes shall be submitted to the Division for review and written approval prior to implementation. The biologist shall prepare and deliver an annual report documenting implementation of and compliance with said Plan by December 31 of each year in which Work associated with the Project occurs. The TPP for this project includes construction mortality avoidance including contractor education, monitoring construction with turtle biologists, conventional turtle protection measures including pre-construction searches and radio-telemetry, as well as Unmanned Aerial System (UAS) surveys utilizing a specialized UAS device. During construction, any animals encountered will be equipped with two-stage transmitters to facilitate locational monitoring through the construction window and possibly the duration of the study. When conditionally appropriate, pre-construction UAS flights will be done to locate telemetered animals in or adjacent to work areas. This broad censusing will allow efficient determination of whether animals are within proximity to areas subject to equipment movement or activity for the day. During nesting season (June) any animals believed to be located within 75 meters of work will be monitored in association with the site work. Exclusive of nesting season, animals within 25 meters of the work zones will be monitored for movement into the work area. Standard observational mortality avoidance measures for extant, non-telemetered animals will be employed as well. When impractical to execute aerial surveillance, conventional ground-truthing of animal locations will be done based on the situational plan of the day. If animals are detected in likely hazard zones, and they are not seeking nest sites, they will be displaced from the vicinity of the work, approximately 75 meters from point of capture, in similar habitat. Animals clearly committed to nesting activity will be either displaced outside the current work area or temporarily held in a pen off site. The TPP shall be updated, as needed, based on field conditions and ongoing project activities.
SC 5.		Habitat Enhancement Opportunities: The Project team will work with the developers of the site formerly known as Towermarc (MESA CMP 00-009.DFW) in Boxborough and the Division to address ongoing conservation issues related to Blanding's turtles including relocating/adding gates, controlling invasive plants in nesting areas, establishing and implementing a long-term habitat monitoring program including clearing vegetation, invasive plant control, and scraping away topsoil in select locations to improve nesting habitat (Attachment 7, 10.2 ac site), etc.

		Certain activities may be possible during water-line installation along the road, while others may require additional funding and support from the Division or other parties. The Permit Holder will commit to a good-faith effort to include enhancement measures. Should such measures be implemented with effort or cost of the Permit Holder, such efforts shall be considered part of any future need for Net Benefit for the Blanding's Turtle for Phase 3 or other projects as approved by the Division and implemented by the LELWD.
		Ephemeral Wetland Features, Existing
SC 6.		<u>Existing Ephemeral Wetland Feature Water Level Monitoring:</u> Four onsite wetland features identified as showing a hydraulic response in the form of a drawdown during the 2024 pumping and providing habitat for Blanding's Turtles will be monitored by the Permit Holder. Wetlands A South, A North 1, A North 2 and Wetland C (Attachment 2) will be monitored using nested staff gauge/piezometer pairs that have already been constructed and installed in their corresponding ephemeral wetlands. Monitoring will occur during each phase of the Project and include environmental monitoring beyond the footprint of the wetland features. Phase 3 monitoring will include collection of data during any approved pump-test for a higher pumping amount and, if approved, monitoring post-approval for another minimum 3-year period, or as may be extended by the Division. a) <u>Wetland Monitoring for Phase 1 (no pumping)</u>. Monitoring for Phase 1 is intended to collect baseline data during non-pumping conditions to supplement the data and pumping tests conducted in 2022 and 2024. Monitoring shall include all measures and reporting requirements described in the relevant section of the Phase 1 Ephemeral Feature Water Level Monitoring Plan (Attachment 5), which is approved. b) <u>Wetland Monitoring for Phase 2 (pump at 0.265 MGD).</u> Phase 2 monitoring is intended to build on Phase 1's monitoring and will allow comparison between Phase 1 pre-pumping data to Phase 2's three (3) years of post-pumping data at 0.265 MGD. The data is intended to provide more accurate information about the relationship between well pumping, climatic conditions, and the ephemeral features, and to provide a more detailed relationship of any impacts. i. Prior to initiation of the Phase 2 pumping at 0.265 MGD, the Permit Holder shall update the plan, including any revisions or suggested enhancements based on the Phase 1 results, and submit the plan for review and written approval as the "Phase 2 Ephemeral Feature Water Level Monitoring Plan". ii. The Permit Holder shall implement three (3) years of post-pumping monitoring in accordance with the final, approved Phase 2 Ephemeral Feature Water Level Monitoring Plan. The monitoring is expected to generally comply with the Phase 1 monitoring but may be modified during the monitoring period in coordination with the Division. iii. The Permit Holder shall submit a summary report of the data. iv. The Permit Holder is free to collect additional data during this time provided the Division-approves of any physical work associated with such data collection to protect Blanding's Turtles. v. The Permit Holder or the Division may require additional years post-pumping monitoring.

		c) <u>Wetland Monitoring for Phase 3 (pump at volume > 0.265 MGD)</u>. Should the Permit Holder seek approval from the Division to pump at a volume greater than 0.265 MGD (see SC3), the Permit Holder will need to submit an updated Phase 3 monitoring plan (Phase 3 Ephemeral Feature Water Level Monitoring Plan). If such increased volume is approved by the Division in writing, the Permit Holder will conduct at least three (3) years of post-pumping monitoring in accordance with the approved Plan and Division determinations.
		Blanding's Turtle Monitoring
SC 7.		<u>Turtle Monitoring, Telemetry during Phase 1 (2 years):</u> Prior to the well being pumped, the Permit Holder will conduct two (2) seasons of turtle telemetry. The Permit Holder has hired Oxbow Associates to implement this study. This will provide valuable baseline data on wetland habitat use patterns during dry periods of the summer, overwintering, and turtle nesting locations, timing, and conditions. Additional seasonal studies may be conducted depending on the timing of Phase 2. This study will include data on natural variations in weather, specifically precipitation, as well as surface water and groundwater fluctuations supplemented by the Weston & Sampson monitoring data. The pre-construction study will include radio-telemetry and nesting surveys restricted to the Monarch Drive Site (Littleton; CMP 022-407.DFW), Boxborough sites (in and near Towermarc, CMP 00-009.DFW), and proposed nesting habitats if they are completed prior to the initiation of Phase 2. a. At the end of each calendar year, the telemetry data shall be submitted to the Division using the online Heritage Hub portal, unless otherwise directed by the Division. b. At the end of each calendar year, the Permit Holder shall submit an annual written report with maps and summary information about movements, mortality, nesting, etc. This report can be combined with the annual Wetland Monitoring Report.
SC 8.		<u>Turtle Monitoring & Telemetry during Phase 2 (3 years):</u> After the initiation of pumping from the well for Phase 2, three (3) consecutive years of monitoring of Blanding's turtles will be conducted by Oxbow Associates to determine habitat use of the Beaver Brook wetland and nesting complex. These three (3) years of study will not overlap with the two (2) years described in SC 7. This study will include 15 days of surveys during the turtle nesting season in each of the three (3) years, with up to four (4) qualified turtle biologists to traverse and monitor the newly created nesting areas and known sites off Beaver Brook Road and Towermarc. These surveys will be scheduled for late afternoon to evening when weather conditions are suitable for nesting and include visual encounter surveys, radio-telemetry (see below), flagging and mapping nest attempts or depredated nests, protecting nests of Blanding's turtles with predator excluding screens, headstarting and releasing hatchlings, and collecting data on any Blanding's turtles encountered without a transmitter. A report will be provided at the end of each calendar year including details on the study methods, results, nest locations, turtle data (common and rare), and recommendations (e.g. invasive plants, predators, anthropogenic disturbances, etc.). Annual inspections will minimally include visually inspecting the area for depredated nests of turtles but may also include results from radio-telemetry studies resulting in identifying nests of rare turtles and protecting their eggs from predators with predator-excluding screens, as approved by the Division. Some overlap in effort may occur during years of monitoring (SC 9).

		Blanding's Turtle Nesting Habitat Creation & Monitoring
SC 9.		Nesting Habitat Creation, Timing: Prior to start of construction of the nesting area, written landowner permission must be submitted to the Division. If the land for nest site creation is protected subject to Sections 31-33 of Chapter 184 of the General Laws of Massachusetts or Article 97 of the Amendments to the Massachusetts Constitution, documentation must be provided that the proposed use is compatible or, if necessary, has completed the Article 97 revision process with the Executive Office of Environmental Affairs. The potential nest habitat creation sites are show in Attachment 7. a) NESTING AREA A, TRUMBULL WELL-SITE (~0.6 ac) i. No later than the initiation of pumping of the well at the currently approved 0.265 MGD, the ~0.6 ac area shall be converted to functioning nesting habitat. ii. A split rail fence or the like will be installed between the nesting area and the travel/parking area for the well. A sign shall be placed on the fence to indicate that no activities shall occur in the area beyond the fence without consultation with the project's qualified biologists or the Division. iii. Use of the well may occur once the nesting area is created, and the fence and sign installed and approved by the onsite biologist (Oxbow Associates). b) NESTING AREA B, SUDBURY VALLEY TRUSTEES (~1.6 AC) – No later than one (1) year after the initiation of pumping, a second nesting site shall be constructed. A Nesting Habitat Creation and Maintenance Plan shall be submitted for Division review and approval. c) NESTING AREA C, HARVARD SPORTSMEN'S CLUB (2.2 AC) – As part of the mitigation for Phase 3 and prior to initiation of pumping at the Division-approved rate, a third nesting site shall be constructed. A Nesting Habitat Creation and Maintenance Plan shall be submitted for Division review and approval for the third site. Nesting Area A and B may be substituted with an alternative location with Division review and approval. The Permit Holder may also elect to proposed restoration of the existing nesting habitat associated with the Towermac site (Attachment 7, 10.2 ac area).
SC 10.		Nest Monitoring and Protection during Phase 1 (2 years of effort). Prior to completion of the new nesting areas, monitoring and nest protection will continue at the existing Monarch Drive (Littleton) nest-site-monitoring site for (minimally) two (2) seasons using methods consistent with SC 7. This work will include nest protection and head-starting of hatchlings, both of which will include coordination with the State Herpetologist, Dr. Mike Jones (michael.t.jones@mass.gov).
SC 11.		Nesting Habitat Creation, Methods & Protocol: Several locations have been identified for nesting habitat creation (Attachment 7). Conversion and maintenance of habitat shall be consistent with the Advisory Guidelines for Creating Turtle Nesting Habitat[1], Attachment 8, and as detailed herein. A Division-approved biologist will use a hand-held GPS to flag the approximate limits of the proposed nesting areas at each site. Minor adjustments to nesting enhancement areas should be

[1] https://www.mass.gov/doc/guidelines-for-creating-turtle-nesting-habitat

		expected as each site goes to construction especially the final shape, size, berms, tree removal/chipping, and subsoil characteristics. All vegetation and topsoil will be removed from the nesting site. If the area is forested, the trees must be cut and stumped, then removed from the site. If they are to be chipped, the chips shall not be spread in the nesting area. Certain trees may remain to provide habitat complexity but this must be determined on a site-specific level. Topsoil shall be removed via tracked machines, deposited along the outside edge of the nesting habitat areas, and compacted. Contractors will be directed to create pits, ridges and mounds throughout the nesting areas to create variations in available habitat for suitable nest location selection. Patches of low-growing native vegetation may be left within the nesting area to provide cover for both nesting females and hatchling turtles. Soil amendments (e.g., sand) may be necessary and, if so, shall be spread as directed by the qualified biologist. Construction of the habitat enhancement areas shall adhere to the following sequence. a) The area will be delineated using a hand-held GPS unit to stake out/flag the limits of each habitat restoration area, consistent with the proposed nesting areas identified in Attachment 7, prior to the start of work. b) The contractor removes the topsoil (approximately 5-8 inches and organic matter) using an excavator or dozer to push the organic material to locations along the edge, considering existing topography, nearby wetlands, trees, and drainage unique to each nesting area. c) After topsoil removal, depth of the mineral soil horizons and textures in accordance with standard texture descriptions applied by soil scientists will be characterized. d) Sand will be added (as needed) e) Transplant little bluestem (*Schizachyrium scoparium*) from nearby locations into the nesting areas (if available). If unavailable, seeds from other sites by be applied provided it is a native eco-type.
SC 12.		<u>Nesting Habitat Management & Maintenance Plan:</u> As described in the Habitat Management Plan (Attachment 8). It is anticipated that maintenance of high-quality nesting habitat will require, at minimum, regular mowing, roto-tilling, or scraping of accumulated topsoil to maintain nesting habitats, as well as control of invasive species. All work is subject to the Turtle Protection Plan (SC4, Attachment 6). On an as-needed basis, minor vegetation cutting (e.g., shrubs, saplings, suckers) may occur along the edges of the nesting area to provide escape and cover for hatchlings. Further, the qualified biologist may also use onsite materials to create cover within and near the nesting habitats. **During the first, second, third-, and fifth-year following completion of initial nesting habitat creation, and at five (5) year intervals thereafter until 30 years post-creation**, a qualified, Division-approved wildlife biologist shall prepare and deliver a site evaluation report to the Division and the Permit Holder within thirty (30) days of completing the site evaluation. Said report shall describe: (i) current habitat conditions (including photographs and detailed descriptions of habitat conditions); (ii) management activities conducted during the previous management period and an assessment of the success or failure of said management activities in achieving the desired habitat conditions; (iii) habitat management recommendations for the next management period; and (iv) recommended modifications to the Habitat Management Plan, if necessary.

		The Permit Holder shall take all reasonable measures necessary to implement the recommendations of the biologist to maintain and enhance high quality habitats for the Blanding's Turtle on the Property, provided that said recommendations are approved in writing by the Division. The Permit Holder shall work with the Division, as necessary, to adaptively refine the type and frequency of management activities pursuant to the Habitat Management Plan and long-term habitat monitoring outlined above.
SC 13.		Permanent Demarcation of Nesting Areas and Created Wetland: **Prior to the initiation of Work**, or as otherwise approved by the Division in writing, the boundaries of all created nesting habitats and created wetland habitat shall be permanently monumented and marked with signage. a) The form and wording of the signage shall be submitted to the Division for review and approval. b) Said permanent bounds and signage shall be maintained in good condition by the Permit Holder and repaired or replaced as necessary.
		Created Ephemeral Wetland, Construction & Monitoring
SC 14.		Wetland Creation. The Permit Holder identified an upland location where a seasonal wetland is proposed to be created for the Blanding's Turtle (Attachment 9). Weston & Sampson has determined the groundwater elevations, and the wetland will provide another long hydroperiod pond (semi-permanent) that may be valuable for rehydrating females during nesting, hatchling/juvenile development, and overwintering. Additionally, creation of the wetland may provide amphibian habitat often associated with wetlands used by Blanding's turtles. a) Prior to initiation of work, a creation plan shall be submitted including a construction plan with wetland resource areas and grades shown, and a narrative sequence of proposed work activities that also demonstrates compliance with the Turtle Protection Plan. Additional, smaller features may also be considered as part of the plan. b) Within one (1) year of the initiation of the pumping of the well, the Permit Holder shall initiate construction of the ephemeral feature. Permitting for the activity should occur in advance with enough time for construction initiation to commence. c) The permit holder shall submit an 'as built' plan showing the final depths, contours, extents and other features of the created wetland. The plan should include one or more cross-sections and a plan view. GPS data is sufficient.
SC 15.		Monitoring of the Created Wetland: Prior to construction of the Wetland, a written monitoring plan shall be submitted to the Division for review and approval. The plan shall include the following elements: a) *Vegetation*. A Division-approved botanist will develop a vegetative management monitoring study to study changes in vegetation in the proposed wetland in comparison to existing wetlands (*e.g.*, Pool C) where turtles are known to occur seasonally. Although the details have yet to be established, the concept is to establish transects across wetlands to determine the existing plant community then periodically re-sample over time to detect changes in vegetation sensitive to fluctuations in water table. Monitoring events are expected to occur 1, 2, 3, 5 and 10 years post construction.

		b) *Water Depth/Bathymetry*. During the fifth-, tenth- and fifteenth-year post-construction, a plan and report shall be written. The plan will include the same features as the 'as built' in SC13, including all prior years of data collection to show areas of change. The report shall include an analytic summary of the changes and the qualified biologist shall prepare and deliver a site evaluation report to the Division and the Permit Holder within thirty (30) days of completing the site evaluation. Said report shall describe: (i) current habitat conditions (including photographs and detailed descriptions of habitat conditions); (ii) management activities conducted during the previous management period and an assessment of the success or failure of said management activities in achieving the desired habitat conditions; (iii) habitat management recommendations for the next management period; and (iv) recommended modifications to the Habitat Management Plan, if necessary. The Permit Holder shall take all reasonable measures necessary to implement the recommendations of the biologist to maintain and enhance high quality habitats for the Blanding's Turtle on the Property, provided that said recommendations are approved in writing by the Division. The Permit Holder shall work with the Division, as necessary, to adaptively refine the type and frequency of management activities pursuant to the Habitat Management Plan and long-term habitat monitoring outlined above.
		Onsite Construction BMPs & Education; Well-Site Vegetation Management
SC 16.		<u>Soil Disturbance & Construction BMP:</u> All work shall include the following BMPs. a) Prior to implementing activities, search for and locate invasive plant species infestations consistent with the scale and intensity of operations. b) Based on the degree of invasiveness and risk to nearby natural and created habitat, pre-treatment of invasive plants may be warranted. The use of herbicides, smothering and other measures may be necessary. c) If soils including invasive plants will be disturbed, remove the affected soil from the site and ensure it is disposed of or composted fully prior to re-use. d) Use only native plants in disturbed areas not thereafter maintained as lawn. e) Visually inspect all equipment entering and leaving the site for invasive plant parts, seeds or soil. Remove all materials and dispose offsite. f) Establish staging areas and temporary facilities in locations that are free of invasive species. g) Use soil and aggregate material from sources that are free of invasive species.
SC 17.		<u>Temporary Demarcation of Limits of Work:</u> **Prior to the initiation of Work**, the limits of Work shown on the Project Plan (Attachment 3) shall be monumented and marked with temporary flagging, silt fencing, and or other similar visual marker sufficient to clearly delineate the limits of Work.
SC 18.		<u>Construction Staff Education:</u> All construction, landscaping, and other sub-contractors associated with the Project shall be informed in writing of the likely presence of State-listed species on the Property and what measures should be implemented to minimize direct harm to State-listed species. Further, no wildlife shall be removed from the Property without approval of a qualified,

		Division-approved wildlife biologist or the Division except as necessary to receive veterinary treatment in the case of harm during construction.
SC 19.		Future Maintenance of Well Infrastructure and Vegetation: Unless otherwise approved in writing by the Division, all routine infrastructure maintenance not located entirely within the fenced area of the well and routine vegetation management shall occur during the Blanding's Turtle inactive season (October 15-April 15) or be conducted in compliance with the Blanding's Turtle Protection Plan (SC4).
SC 20.		Observations of State-listed Species: The Division shall be notified, in the form of an NHESP Rare Animal or Plant Observation Form, within ten (10) days of the observation of any State-listed species within or outside the limits of Work. Visit https://www.mass.gov/how-to/report-rare-species-vernal-pool-observations for access to observation reporting forms.

I. Notice of Appeal of Rights

This Permit is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.23. Any person aggrieved by this decision shall have the right to an adjudicatory hearing at the Division pursuant to M.G.L. c. 30A, s.11 in accordance with the procedures for informal hearings set forth in 801 CMR 1.02 and 1.03.

Any notice of claim for an adjudicatory hearing shall be made in writing and be accompanied by a filing fee in the amount of $500.00. The notice of claim shall be sent to the Division by certified mail, hand delivered or postmarked within twenty-one (21) days of the date of issuance of this Permit to:

Mark S. Tisa, Director
Massachusetts Division of Fisheries and Wildlife
Field Headquarters
One Rabbit Hill Road
Westborough, MA 01581

Any notice of claim for an adjudicatory hearing shall include the following information:

1. The file number for the project;
2. The complete name, address and telephone number of the person filing the request, and the name, address and telephone number of any authorized representative;
3. The specific facts that demonstrate that a party filing a notice of claim satisfies the requirements of an "aggrieved person," including but not limited to (a) how they have a definite interest in the matters in contention within the scope of interests or area of concern of M.G.L. c. 131A or the regulations at 321 CMR 10.00 and (b) have suffered an actual injury which is special and different from that of the public and which has resulted from violation of a duty owed to them by the Division;
4. A clear statement that an adjudicatory hearing is being requested;
5. A clear and concise statement of facts which are grounds for the proceeding, the specific objections to the actions of the Division and the basis for those objections; and the relief sought through the adjudicatory hearing; and a statement that a copy of the request has been sent by certified mail or hand delivered to the applicant and the record owner, if different from the applicant.

Everose Schluter, Deputy Director
MA Division of Fisheries and Wildlife

On this 6th day of September, 2024 before me, the undersigned notary public, personally appeared Everose Schluter, Deputy Director, proved to me through satisfactory evidence of identification, which was personal knowledge, to be the person whose name is signed on the preceding or attached document, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his/her knowledge and belief.

MELANY CHEESEMAN
Notary Public
Commonwealth of Massachusetts
My Commission Expires
January 24, 2025

Melany Cheeseman, Notary Public
My Commission expires: January 24, 2025

Conservation and Management Permit CMP-87309
Issued: September 6, 2024
Expires: September 6, 2034

Acknowledgement and Acceptance of all Terms of this Permit

The undersigned below agrees that commencement of any work authorized by and described in this Permit constitutes acknowledgement and acceptance of all terms of this Permit.

Signatory 1 Organization

COMMONWEALTH OF MASSACHUSETTS

On this _____day of _____, 20___, before me, the undersigned notary public, personally appeared _____, proved to me through satisfactory evidence of identification which was _____ to be the person whose name is signed on the preceding or attached document, and who swore or affirmed to me that the contents of the document are truthful and accurate to the best of his/her/their knowledge and belief.

Notary Public:

_____

SEAL

_____

My Commission Expires:

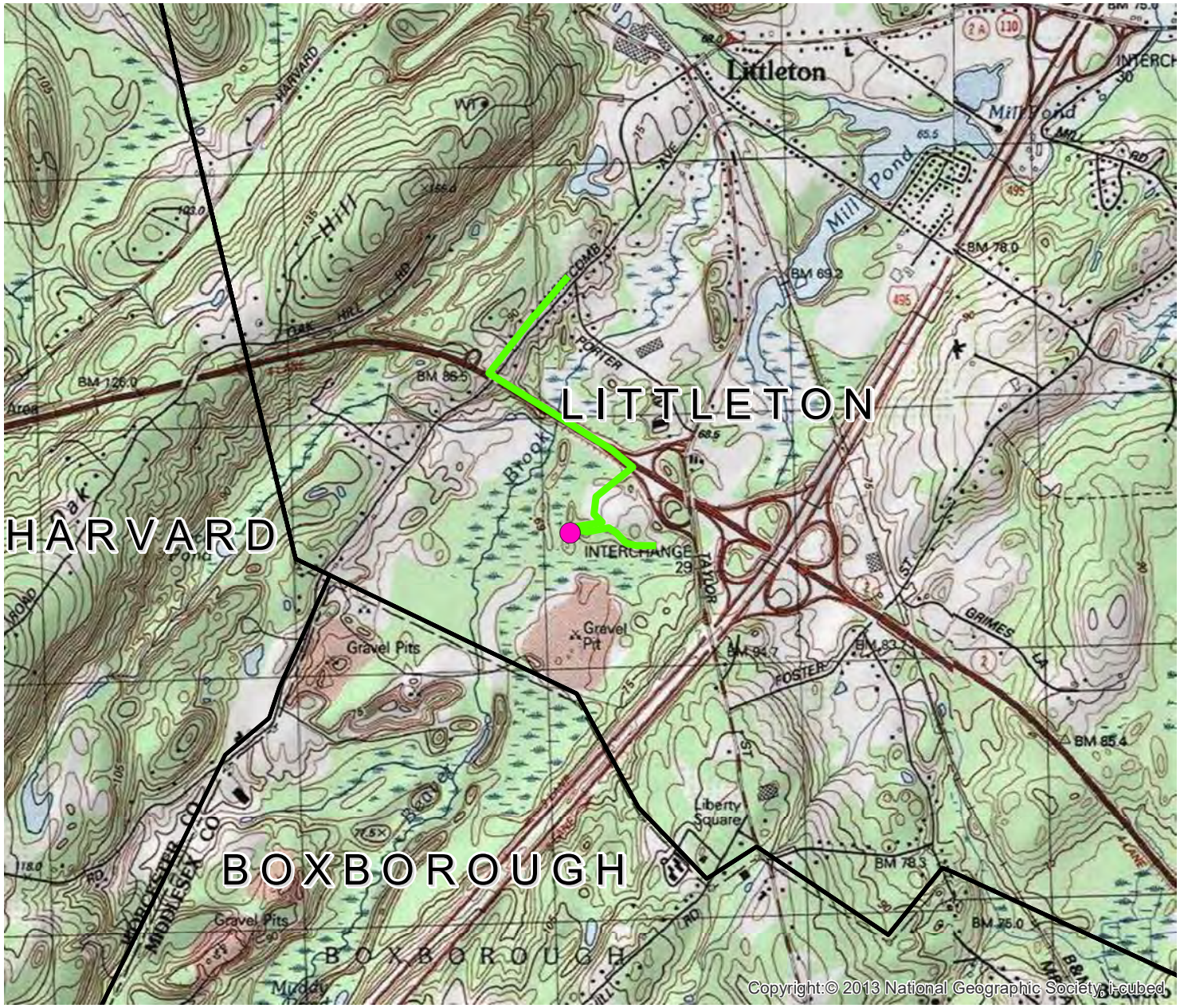
Distribution List

Littleton Board of Selectmen
Littleton Conservation Commission
Littleton Planning Board
Duane LeVangie, MassDEP
Kathleen Baskin, MassDEP
Vanessa Curran, MassDCR
Scott Smyers, Oxbow Associates
Kevin McKinnon, Weston & Sampson
Tara McManus, Weston & Sampson

Attachment 1

Figure 1 Water Supply Connection Littleton, MA USGS Map (May 14, 2024, MESA Checklist Filing)

Path: \\wse03.local\WSE\Depts\Water\Water Resources Group\GIS - Constraints Mapping\Littleton\Pipeline Ext\Environmental Receptor - new source raw main only.mxd **User:** GasparA **Saved:** 7/10/2023 1:29:36 PM **Opened:** 5/14/2024 2:54:12 PM



N
W E
S

2,000 1,000 0 2,000 Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Well Site
- Limit of Work

FIGURE 1

Water Supply Connection
Littleton, MA

USGS Map

Weston & Sampson

Attachment 2

Figure 2 Town of Littleton, MA Proposed Trumbull Well New Source Approval, SITE MAP (April 2024; Permit Application)

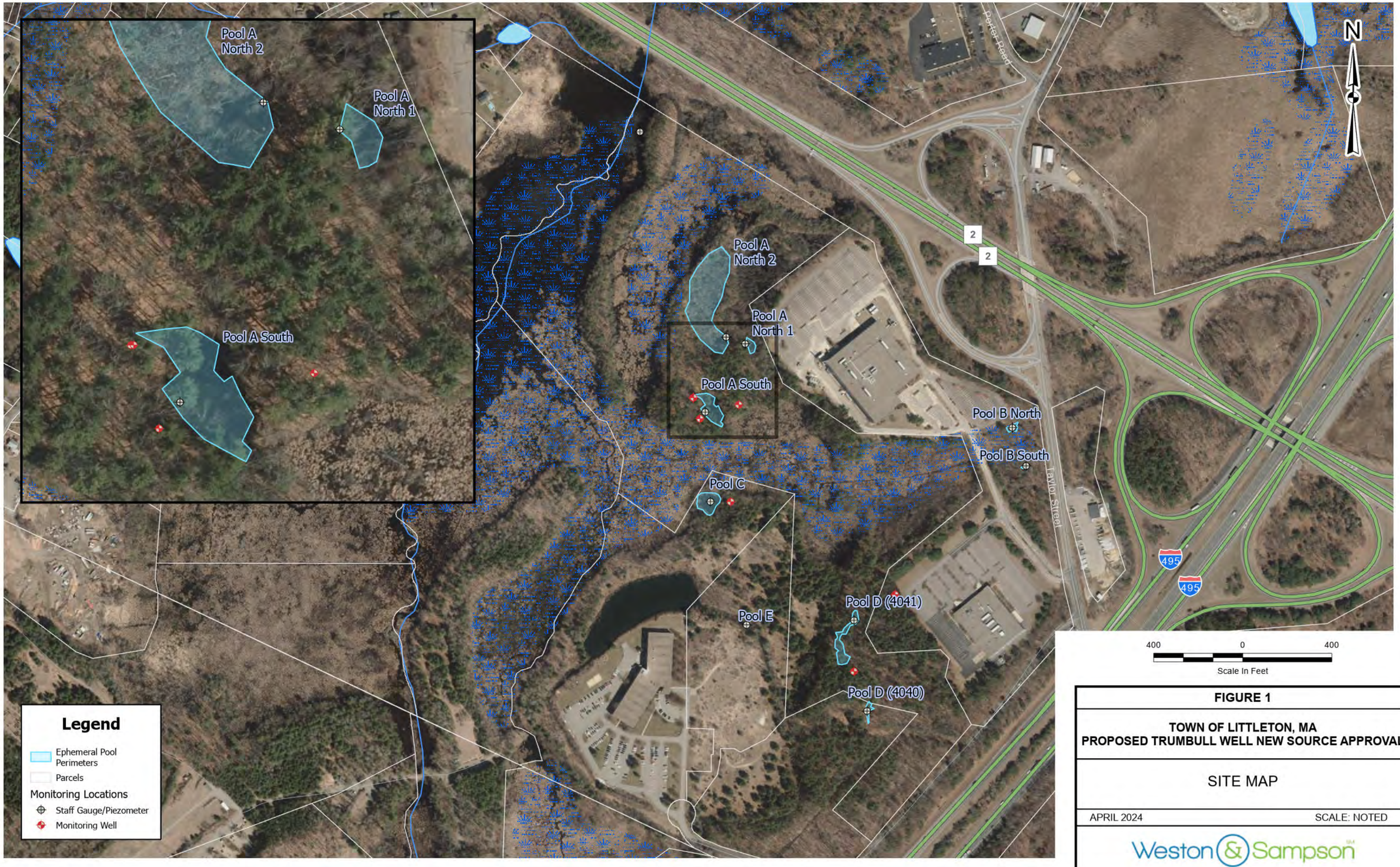


FIGURE 1

TOWN OF LITTLETON, MA
PROPOSED TRUMBULL WELL NEW SOURCE APPROVAL

SITE MAP

APRIL 2024 SCALE: NOTED

Weston & Sampson

Attachment 3

Littleton Water Department Trumbull Well and Raw Water Main Town Contract No. IFB-2024 DWSRF No. 12397 – Contract No.1 (dated August 2024, prepared by Weston & Sampson, 18 sheets); the "Plans"

LITTLETON WATER DEPARTMENT

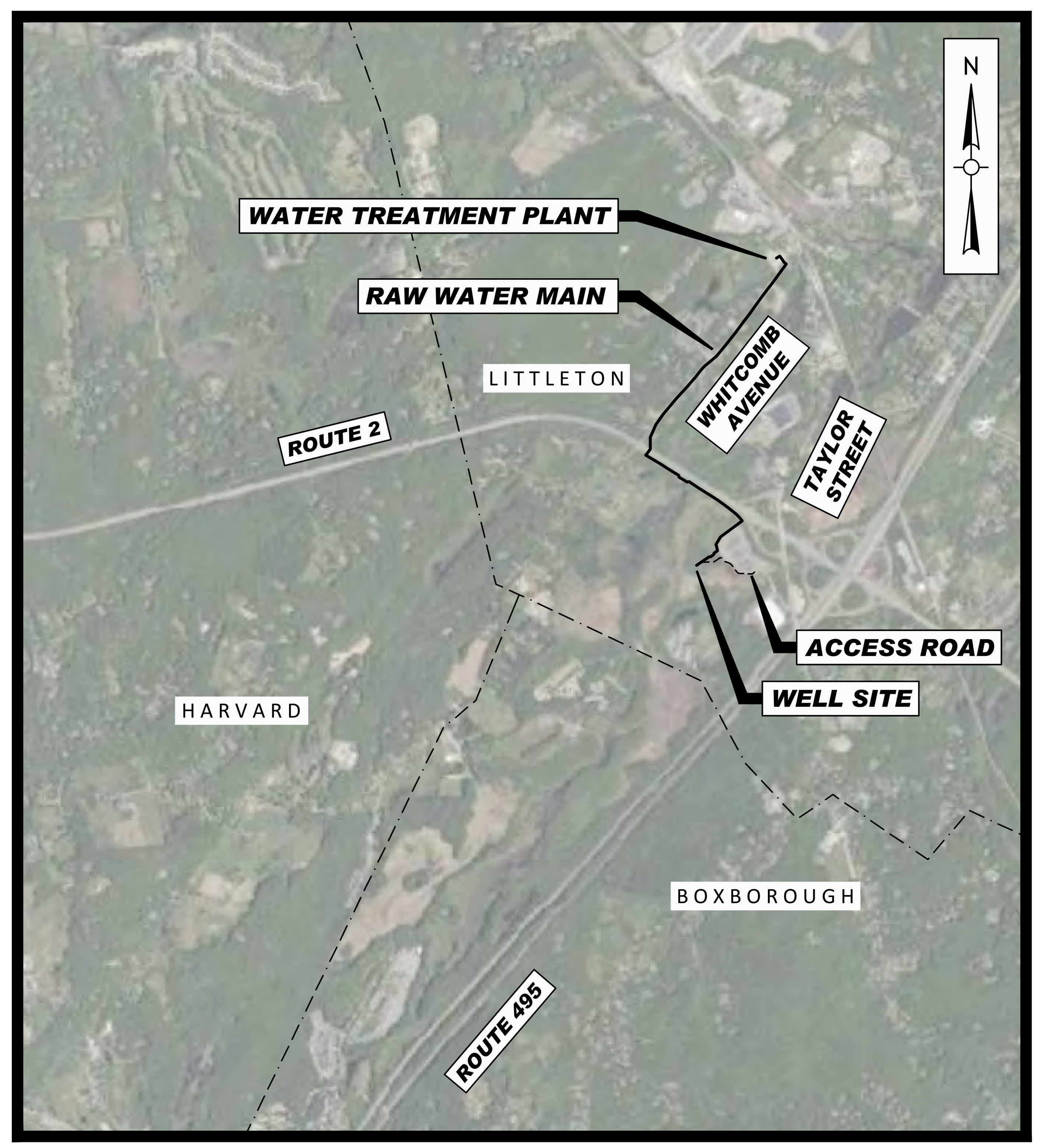
LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

DRAWING INDEX

SHEET	TITLE
G000	COVER AND SHEET LIST
G001	ABBREVIATIONS, NOTES, AND LEGEND
C101	RAW WATER PLAN WHITCOMB AVENUE
C102	RAW WATER PLAN WHITCOMB AVENUE
C103	RAW WATER PLAN CROSS COUNTRY
C104	RAW WATER PLAN CROSS COUNTRY
C105	RAW WATER PLAN CROSS COUNTRY
C106	ACCESS ROAD GRADING & DRAINAGE PLAN
C107	ACCESS ROAD GRADING & DRAINAGE PLAN
C108	CONSTRUCTION ZONE SAFETY PLAN I
C109	CONSTRUCTION ZONE SAFETY PLAN II
C501	DETAILS I
C502	DETAILS II
C503	DETAILS III
C504	DETAILS IV
L001	PLANTING PLAN
L002	PLANTING PLAN
L003	PLANTING PLAN
L501	PLANTING PLAN DETAILS
G101	CODE SUMMARY
A011	ABBREVIATIONS, SYMBOLS, LEGEND AND GENERAL NOTES
A021	GENERAL NOTES
A101	OVERALL FLOOR, REFLECTED CEILING & ROOF PLANS
A201	OVERALL ELEVATIONS / 3D VIEWS
A301	BUILDING & WALL SECTIONS
A501	LARGE SCALE STAIR PLANS / SECTIONS
A601	DETAILS
A602	ROOF DETAILS
A801	DOOR SCHEDULE, TYPES & DETAILS
A831	FENESTRATION TYPES & DETAILS
S001	GENERAL NOTES
S002	TYPICAL DETAILS I
S101	FOUNDATION PLAN, SLAB PLAN, ROOF FRAMING PLAN
S201	ELEVATIONS
S301	FOUNDATION SECTIONS & DETAILS I
S901	3D VIEWS
I001	INSTRUMENTATION AND CONTROLS ABBREVIATIONS, NOTES & LEGEND
I100	INSTRUMENTATION AND CONTROLS DETAILS - I
I101	INSTRUMENTATION AND CONTROLS DETAILS - II
M101	PROCESS PIPING PLAN
M301	PROCESS PIPING SECTIONS
M501	PROCESS DETAILS
M502	TRUMBULL WELL PUMP DETAIL
H000	LEGENDS, NOTES, AND ABBREVIATIONS
H101	FIRST FLOOR NEW WORK DUCT PLAN
H501	DETAILS
H601	SCHEDULES
H701	AUTOMATIC TEMPERATURE CONTROLS
E001	ELECTRICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES
E002	ELECTRICAL SITE PLAN
E101	WELL BUILDING ELECTRICAL PLAN
E501	ELECTRICAL DETAILS I
E502	ELECTRICAL DETAILS II
E601	ELECTRICAL DIAGRAMS AND SCHEDULES

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
DWSRF NO. 12397 - CONTRACT NO.1

NICK LAWLER - GENERAL MANAGER
DAVE KETCHEN - ASSISTANT GENERAL MANAGER
MATT SILVERMAN - WATER SUPERINTENDENT



LOCUS MAP
SCALE : 1"=2000'

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Issued Date:

AUGUST 2024

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

Seal: COMMONWEALTH OF MASSACHUSETTS TARA E MCMANUS No. 57127 REGISTERED PROFESSIONAL ENGINEER

Issued For:

BIDDING

LEGEND

DESCRIPTION	EXISTING	PROPOSED
SANITARY SEWER	S	S
FORCE MAIN	FM	FM
WATER MAIN	W	W
TEMPORARY WATER		TW
STORM DRAIN	D	D
GAS	G	G
ELECTRIC	E	E
OVERHEAD WIRE	OHW	OHW
TELEPHONE	T	T
CABLE TELEVISION	CATV	CATV
GRINDER PUMP		GP
SANITARY SEWER MANHOLE		SMH
STORM DRAIN MANHOLE		DMH
ELECTRICAL MANHOLE		EMH
TELEPHONE MANHOLE		TMH
AIR RELEASE VALVE MANHOLE		ARMH
FORCE MAIN CLEANOUT MANHOLE		FMCO
CLEANOUT		CO
CATCH BASIN		CB
HYDRANT		
TEMPORARY HYDRANT		
GATE VALVE		
CHECK VALVE		
CURB STOP		
BUTTERFLY VALVE		
BALL VALVE		
REDUCER		
CAP OR PLUG		
GAS GATE VALVE		
UTILITY POLE		
GUY POLE		
LIGHT POST		
EDGE OF PAVEMENT		
EDGE OF UNPAVED ROAD		
CURB		
SIDEWALK		
STONE WALL		
RETAINING WALL	RET WALL	RET WALL
FENCE	x	
GUARD RAIL		
DECIDUOUS TREE		
CONIFEROUS TREE		
TREE LINE		
STONE BOUND		
PROPERTY LINE		
EASEMENT LINE		
LIMIT OF WORK		
APPROX. LIMIT OF REFUSE		
SPOT ELEVATIONS	x100.5	x100.5
CONTOUR LINES	56	56
HOUSE NUMBER	#35	
FLOOR ELEVATION	FL=56.7	
SILL ELEVATION	S=56.7	
WETLAND FLAGS	WF-7 WF-8	
100-FT WETLAND BUFFER		
FEMA 100-YR FLOOD PLAIN		
CRUSHED STONE / RIP-RAP		
CRUSHED STONE INFILTRATION TRENCH		
DRAINAGE DITCH / SWALE		
STATION NUMBERING	10	10
GUARD POST		
BOLLARD	B	
SIGN		
BENCH MARK		
PERCOLATION TEST	PT 1	PT-1
TEST PIT	TP 1	TP-1
BORING	B-1	B-1
PROBE	P-1	P-1
GROUNDWATER MONITORING WELL	WS-1	WS-1
GAS MONITORING WELL	GMW-1	GMW-1
WATER WELL / OBSERVATION WELL	W	
GAS VENT	GV	GV
COMPOST FILTER TUBE		
COMPOST FILTER TUBE & SILT FENCE		X
CATCH BASIN FILTER BAG		
ROCK OUTCROP		

NOTE: ITEMS SHOWN IN THE LEGEND MAY NOT BE PRESENT IN THESE PLANS

ABBREVIATIONS

AC	ASBESTOS CEMENT PIPE
ACCMP	ASPHALT COATED CORRUGATED METAL PIPE
ARV	AIR RELEASE VALVE
ASTM	ASTM INTERNATIONAL
BC	BITUMINOUS CONCRETE
BIT	BITUMINOUS
BLDG	BUILDING
BM	BENCH MARK
BO	BLOW OFF
BV	BUTTERFLY VALVE
CATV	CABLE TELEVISION
CB	CATCH BASIN
CC	CONCRETE CURB
CI	CAST IRON
℄	CENTERLINE
CL	CEMENT LINED
CMP	CORRUGATED METAL PIPE
CONC	CONCRETE
CU FT	CUBIC FEET
CY	CUBIC YARD
D	STORM DRAIN, DEPTH FROM RIM TO INVERT
DI	DROP INLET, DUCTILE IRON
DIA	DIAMETER
DMH	DRAIN MANHOLE
DWG	DRAWING
E	EAST, ELECTRIC
EA	EACH
EF	EACH FACE
ELEV	ELEVATION
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EXIST	EXISTING
FLG	FLANGE
FT	FEET, FOOT
G	NATURAL GAS
GALV	GALVANIZED
GC	GRANITE CURB
GR	GRANITE
HC	HOUSE CONNECTION
HORIZ	HORIZONTAL
HP	HIGH PRESSURE
HYD	FIRE HYDRANT
I	INVERT
INV	INVERT
ID	INSIDE DIAMETER
IP	IRON PIPE
LB	POUND
LF	LINEAR FEET
LS	LUMP SUM
MAX	MAXIMUM
MB	MAIL BOX
MECH	MECHANICAL
MH	MANHOLE
MassDOT	MASSACHUSETTS DEPARTMENT OF TRANSPORTATION
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MWRA	MASSACHUSETTS WATER RESOURCES AUTHORITY
N	NORTH
NE	NORTH EAST
NW	NORTH WEST
NF	NOT FOUND
NO OR #	NUMBER
OD	OUTSIDE DIAMETER
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PE	PLAIN END, POLYETHYLENE
ℙ	PROPERTY LINE
PL	PLATE
PVC	POLYVINYL CHLORIDE
PVCO	MOLECULARLY ORIENTED POLYVINYL CHLORIDE
PVMT	PAVEMENT
RCP	REINFORCED CONCRETE PIPE
ROW	RIGHT-OF-WAY
RQD	ROCK QUALITY
S	SEWER, SOUTH
SE	SOUTH EAST
SECT	SECTION
SF	SQUARE FEET
SHT	SHEET
SPEC	SPECIFICATIONS
SQ FT	SQUARE FEET
SS	SEWER SERVICE, STAINLESS STEEL
STA	STATION
STL	STEEL
SW	SIDEWALK, SOUTH WEST
T	HYDROSTATIC THRUST, TELEPHONE
TBM	TEMPORARY BENCH MARK
THK	THICK (NESS)
TYP	TYPICAL
UP	UTILITY POLE
VC	VITRIFIED CLAY
VERT	VERTICAL
W	WATER, WEST
W/	WITH
W/O	WITHOUT

CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL CALL DIGSAFE AT 1-888-344-7233 AND CITY/TOWN DEPARTMENTS AS APPROPRIATE AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIGSAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN SHOWN.
3. TEST PITS TO LOCATE EXISTING UTILITIES MAY BE ORDERED BY THE ENGINEER TO DETERMINE WHETHER TO RAISE OR LOWER THE PROPOSED WATER MAIN TO CLEAR EXISTING UTILITIES OR VERIFY EXISTING UTILITY LOCATION, SIZE AND TYPE.
4. STONE WALLS, FENCES, MAIL BOXES, SIGNS, CURBS, LIGHT POLES, ETC. SHALL BE REMOVED AS NECESSARY TO PERFORM THE WORK AND REPLACED TO A CONDITION AT LEAST EQUAL TO THAT BEFORE CONSTRUCTION BEGAN. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
5. ALL PAVEMENT DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS.
6. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND PAYMENT LIMITS SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
7. UNLESS OTHERWISE INDICATED, CONCRETE USED FOR PIPE ANCHOR BLOCKS, BACKING, PIPE CRADLES, ARCHES, AND FILL SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS.
8. APPROVED JOINT RESTRAINT METHODS SHALL BE PROVIDED FOR WATER MAINS WHERE ANY BENDS, TEES, PLUGS, OR WYES ARE INSTALLED. CONCRETE THRUST BLOCKS, ANCHOR BLOCKS AND TIE RODS MAY BE USED FOR 6-INCH AND 8-INCH PIPE WHERE JOINT RESTRAINT IS NOT FEASIBLE UPON APPROVAL OF THE ENGINEER. SEE TABLE 1 DETAIL FOR REQUIRED RESTRAINING LENGTHS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
9. THE CONTRACTOR SHALL NOT STORE ANY APPARATUS, MATERIALS, SUPPLIES, OR EQUIPMENT ON DRAINAGE STRUCTURES OR WITHIN 100 FEET OF WETLANDS.
10. NEW WATER MAINS AND SERVICES SHALL BE INSTALLED AT THE MINIMUM DEPTH FROM FINISH GRADE TO TOP OF PIPE AS SHOWN ON THE DRAWINGS. WHERE NECESSARY, NEW WATER MAINS SHALL BE INSTALLED AT A GREATER DEPTH TO CLEAR OBSTACLES SHOWN ON THE DRAWINGS AT NO ADDITIONAL COST TO THE OWNER. MINIMUM CLEARANCES TO UTILITIES, AS SHOWN ON THE DRAWINGS SHALL BE MAINTAINED.
11. EXISTING SERVICES SHALL NOT BE CONNECTED TO THE PROPOSED WATER MAIN UNTIL THAT MAIN HAS PASSED PRESSURE TEST AND DISINFECTION REQUIREMENTS.
12. EXISTING WATER MAINS OR SERVICES SHALL NOT BE ABANDONED WITHOUT THE APPROVAL OF THE OWNER. WATER SERVICE SHALL NOT BE INTERRUPTED MORE THAN 4 HOURS WITHOUT PRIOR APPROVAL OF THE OWNER. THE OWNER SHALL BE NOTIFIED OF ANY INTERUPTION IN SERVICE.
13. PROPOSED SERVICES AND HYDRANT LOCATIONS ARE APPROXIMATE. SERVICE AND HYDRANT LOCATIONS SHALL BE DETERMINED IN THE FIELD BY THE OWNER.
14. LITTLETON ELECTRIC LIGHT AND WATER DEPARTMENT (LELWD) TO EVALUATE GATE BOXES AND HYDRANTS ONSITE AND DETERMINE WHETHER CONTRACTOR SHALL DELIVER TO LELWD OR DISPOSE OF GATE BOXES AND HYDRANTS.
15. ANY HYDRANT WHICH IS NOT IN SERVICE SHALL BE COVERED WITH A SECURELY FASTENED AND APPROVED BAG.
16. THE LOCATION OF PIPES, CAPS, REDUCERS, BENDS, AND OTHER FITTINGS AT POINTS OF CONNECTIONS TO EXISTING MAINS IS APPROXIMATE. CONTRACTOR SHALL DIG A TEST PIT AT EACH LOCATION TO DETERMINE THE DIAMETER AND MATERIAL OF THE EXISTING PIPE AND THE LOCATION OF THE TIE-IN POINT.
17. ALL CATCH BASINS WITHIN PROJECT LIMITS SHALL BE PROTECTED AS SHOWN ON DETAIL SHEET.
18. THE CONTRACTOR SHALL NOTIFY THE MassDOT DISTRICT PERMITS ENGINEER AT 857-368-3000 TWO (2) DAYS PRIOR TO THE START OF WORK IN A STATE ROADWAY.
19. ALL STREET EXCAVATIONS SHALL BE COMPLETELY CLOSED AT THE END OF EACH WORKING DAY BY BACKFILLING. COVERING WITH STEEL PLATES MAY BE ALLOWED IF APPROVED BY THE ENGINEER.
20. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF MASSACHUSETTS GENERAL LAW CHAPTER 82A, TRENCH EXCAVATION AND SAFETY REQUIREMENTS, TO PREVENT THE GENERAL PUBLIC FROM UNAUTHORIZED ACCESS TO UNATTENDED TRENCHES.
21. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY VALVES WHICH HOLD WATER IN THE SYSTEM. THE OWNER WILL, ON 72 HOURS NOTICE FROM THE CONTRACTOR, OPEN AND/OR CLOSE ANY VALVES REQUIRED FOR DRAINING OR ADMITTING WATER TO THE VARIOUS SECTIONS OF THE WATER MAINS. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY IN WRITING 48 HOURS IN ADVANCE, ANY OCCUPANT THAT WILL BE WITHOUT WATER DUE TO A SHUTDOWN.
22. SOME WATER SERVICE CONNECTIONS MAY NOT BE SHOWN ON THE DRAWINGS. THE OWNER WILL MARK THE LOCATION OF SUCH CONNECTIONS, PROVIDED THE CONTRACTOR GIVES THE OWNER AT LEAST 72 HOURS ADVANCE NOTICE.
23. ALL NEW WATER SERVICES SHALL BE THE SAME SIZE AS THE EXISTING WATER SERVICE, EXCEPT THAT NO SERVICE SHALL BE LESS THAN 1" DIAMETER. COORDINATE THIS WORK WITH THE WATER DEPARTMENT.
24. ELEVATIONS REFERENCED ARE NAD83 MASSACHUSETTS STATE PLANES, MAINLAND ZONE, US FOOT.
25. EXISTING UTILITY INFORMATION, TOPOGRAPHIC INFORMATION, EDGE OF PAVEMENT, UTILITY POLE LOCATIONS, AND LOCATIONS OF EXISTING ABOVE GROUND STRUCTURES WERE TAKEN FROM PLANS PREPARED BY BEALS AND THOMAS, INC., KELLY ENGINEERING GROUP, GIS DATA, AND GROUND SURVEY CONDUCTED BY WESTON & SAMPSON.
26. ASSESSORS INFORMATION REPRESENTED ON THESE DRAWINGS IS TAKEN FROM THE CITY/TOWN ASSESSOR'S PARCEL MAPS, MASS GIS DATA AND IS INCLUDED FOR ILLUSTRATIVE PURPOSES ONLY. ASSESSORS INFORMATION IS NOT INTENDED TO BE AN AUTHORITATIVE RECORD OF PROPERTY BOUNDARIES OR A SOURCE OF INFORMATION FOR AN ACTUAL SURVEY OR LEGAL DESCRIPTION OF THE PROPERTY. NO WORK HAS BEEN PERFORMED TO DETERMINE THE DEPICTED PROPERTY LINES AND THEREFORE, THESE DRAWINGS ARE NOT INTENDED TO BE USED TO DELINEATE ANY EXISTING OR PROPOSED STRUCTURES, FEATURES OR BOUNDARIES RELATIVE TO PROPERTY LINES. AUTHORITATIVE RECORDS OF PROPERTY LINES MAY BE LOCATED AT THE STATE OR MUNICIPAL AGENCY RESPONSIBLE FOR MAINTAINING PUBLIC RECORDS IN WHICH THE PARCEL IS LOCATED. LEGALLY AUTHORITATIVE MAPS OF PROPERTY LINES MAY ONLY BE PRODUCED BY A PROFESSIONAL LAND SURVEYOR.

Project:
LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
DWSRF NO. 12397
CONTRACT NO.1

Weston & Sampson
Weston & Sampson Engineers, Inc.
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Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

COA:

Seal: COMMONWEALTH OF MASSACHUSETTS TARA E MCMANUS No. 57127 REGISTERED PROFESSIONAL ENGINEER

Issued For: BIDDING

Scale: AS NOTED

Date: AUGUST 2024
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Reviewed By: BAR
Approved By: TEM
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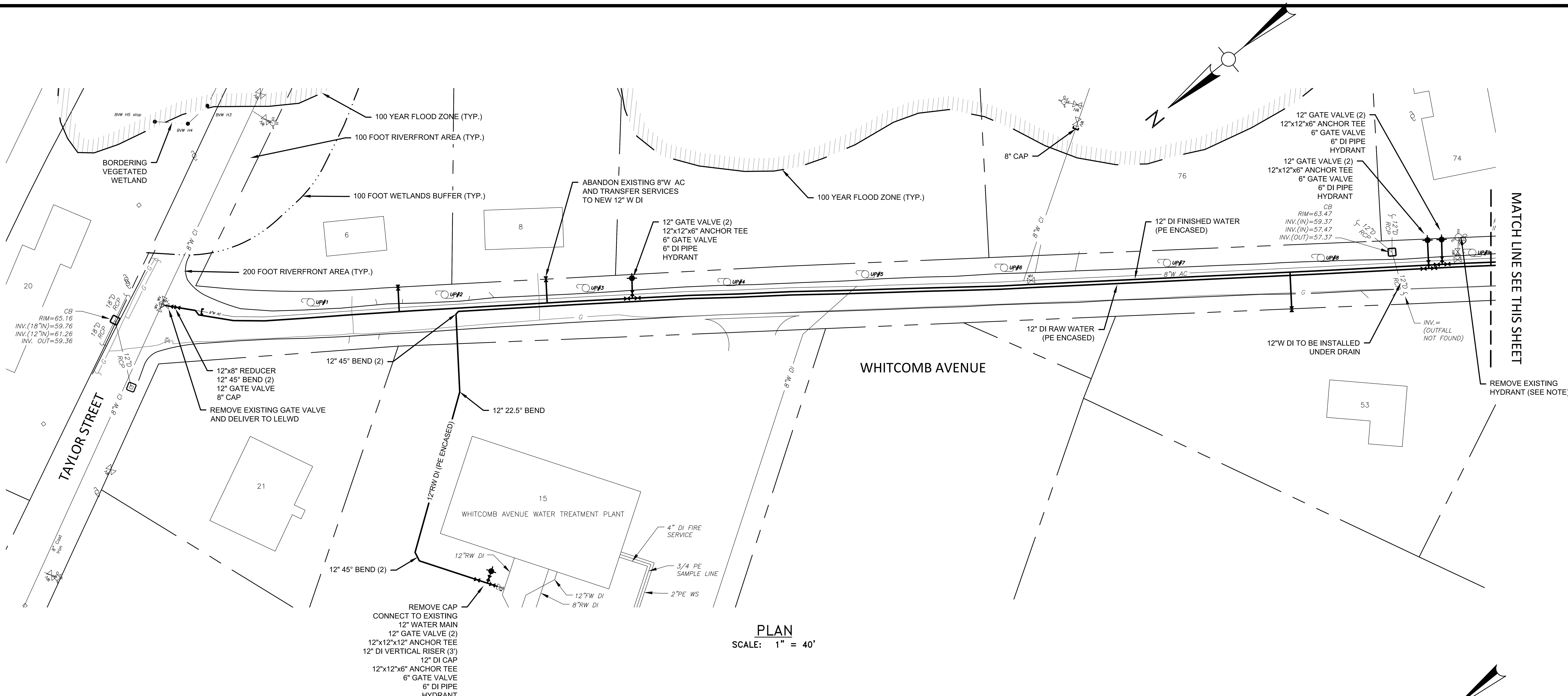
Drawing Title:
ABBREVIATIONS, NOTES, AND LEGEND

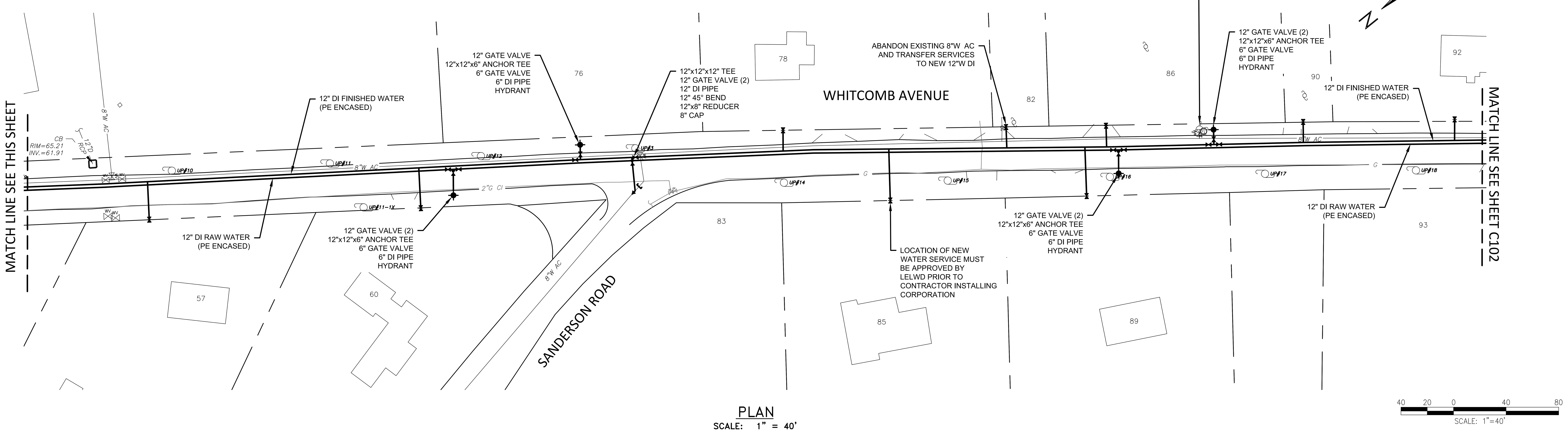
Sheet Number:
G001



PLAN
SCALE: 1" = 40'

NOTE:

1. LITTLETON ELECTRIC LIGHT AND WATER DEPARTMENT (LELWD) TO EVALUATE GATE BOXES AND HYDRANTS ONSITE AND DETERMINE WHETHER CONTRACTOR SHALL DELIVER TO LELWD OR DISPOSE OF GATE BOXES AND HYDRANTS.
2. CONTRACTOR SHALL INSTALL CATCH BASIN PROTECTION FOR ALL CATCH BASINS SHOWN ON THE PLAN OR AS REQUIRED BY THE ENGINEER.
3. PAVEMENT MARKINGS SHALL BE REPLACED IF REMOVED DURING CONSTRUCTION.
4. WETLAND DELINEATION CONDUCTED IN DECEMBER 2022 AND JANUARY 2023 BY WESTON & SAMPSON ENGINEERS, INC.



PLAN
SCALE: 1" = 40'

Project:
LITTLETON WATER DEPARTMENT

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
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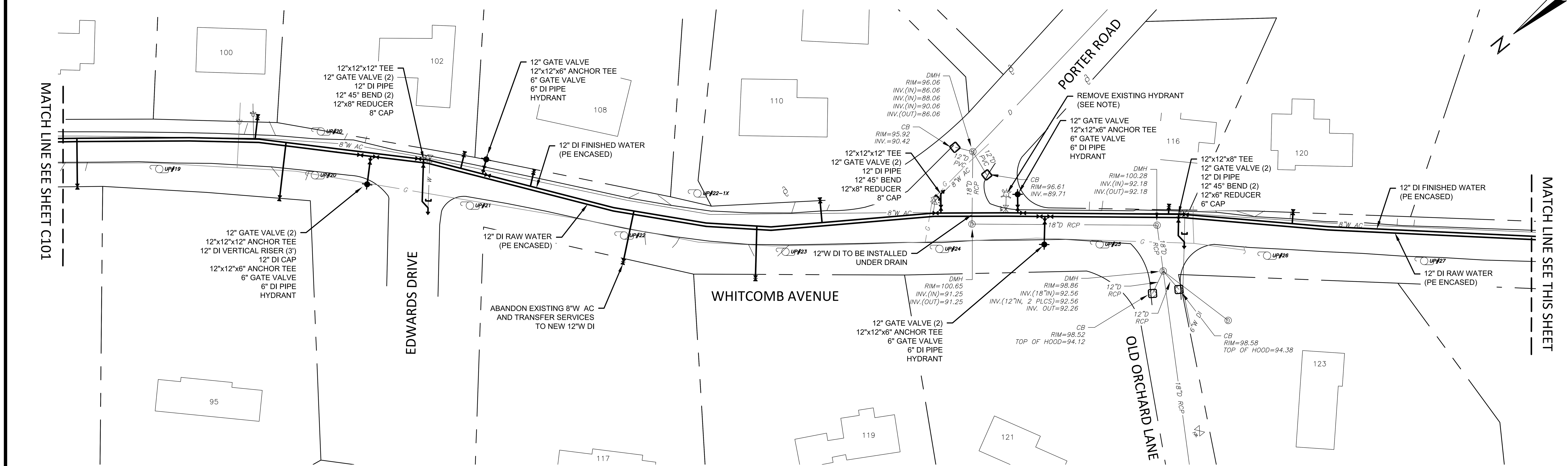
W&S File No.:

Drawing Title:
RAW WATER PLAN
WHITCOMB AVENUE

Sheet Number:
C101



PLAN
SCALE: 1" = 40'

NOTE:

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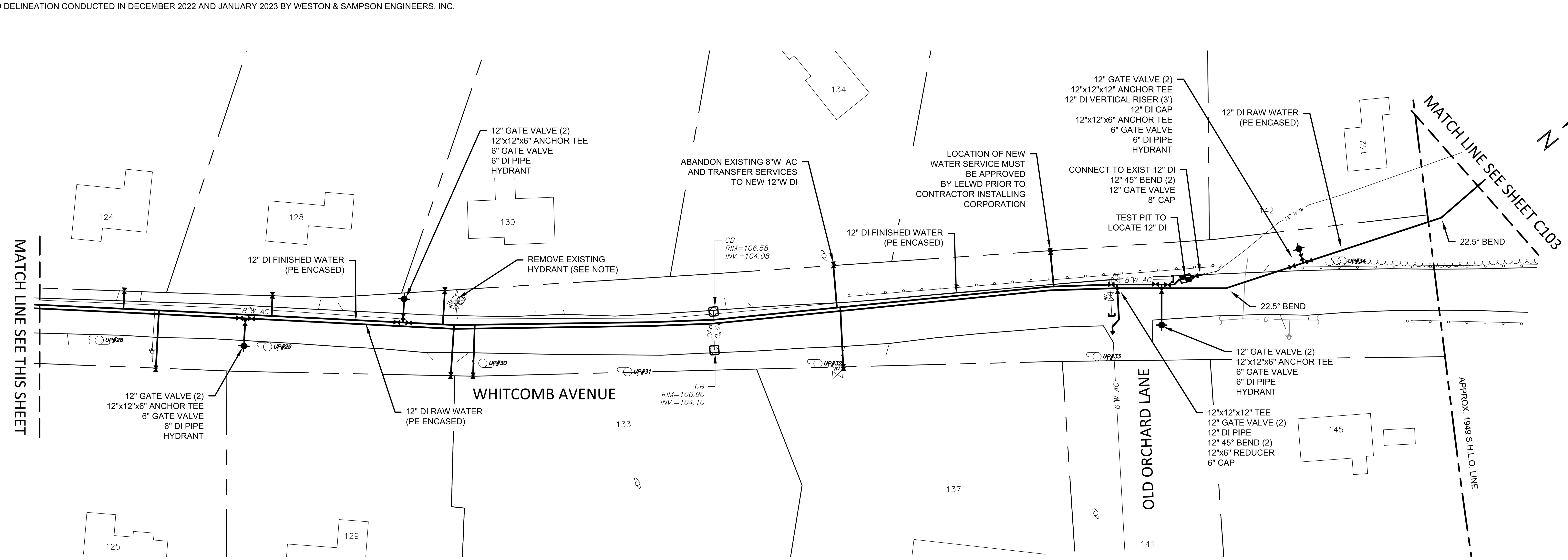

PLAN
SCALE: 1" = 40'

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

Project:

LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
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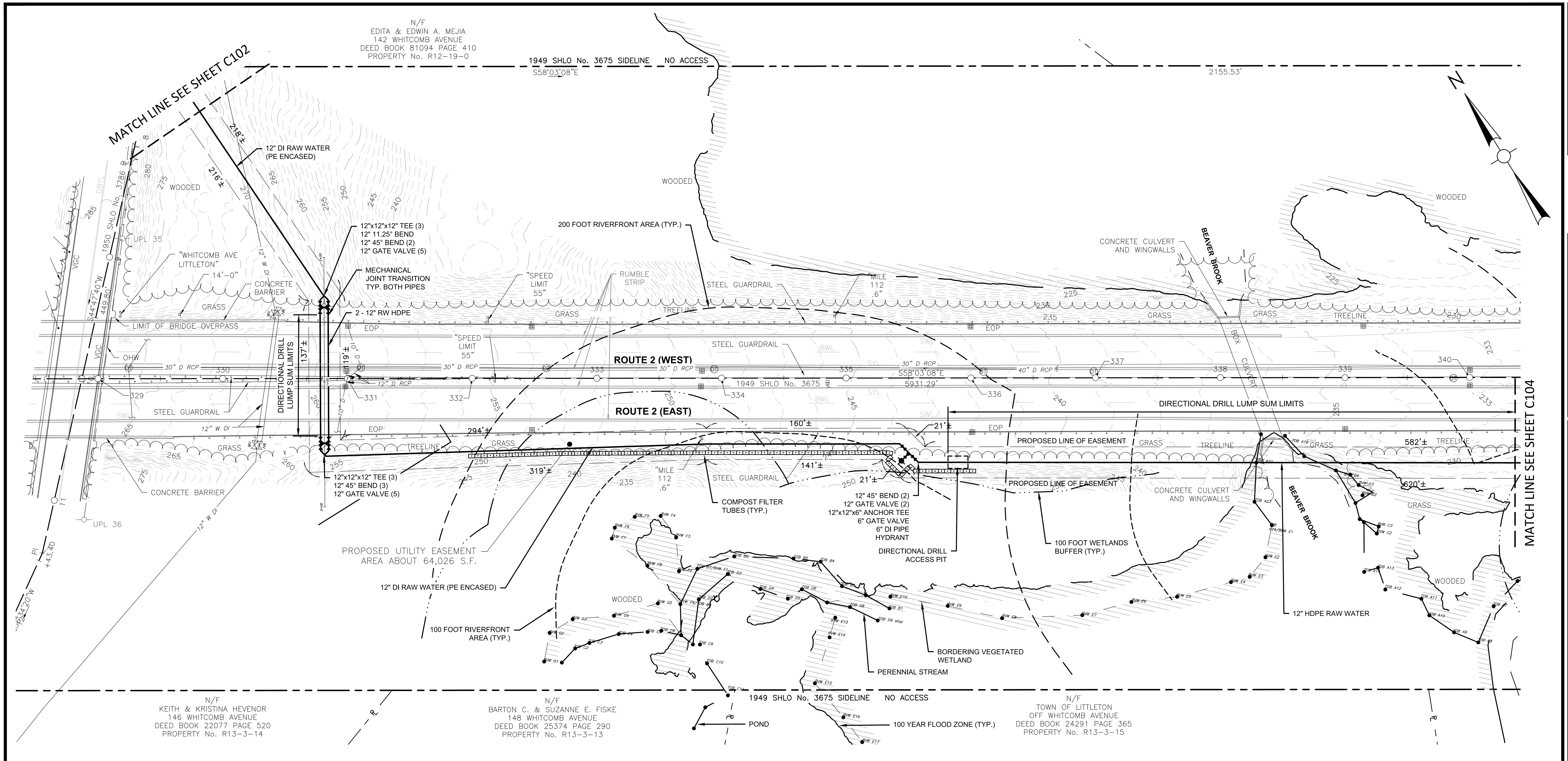
W&S Project No.:	ENG23-0679
W&S File No.:	

Drawing Title:

RAW WATER PLAN WHITCOMB AVENUE

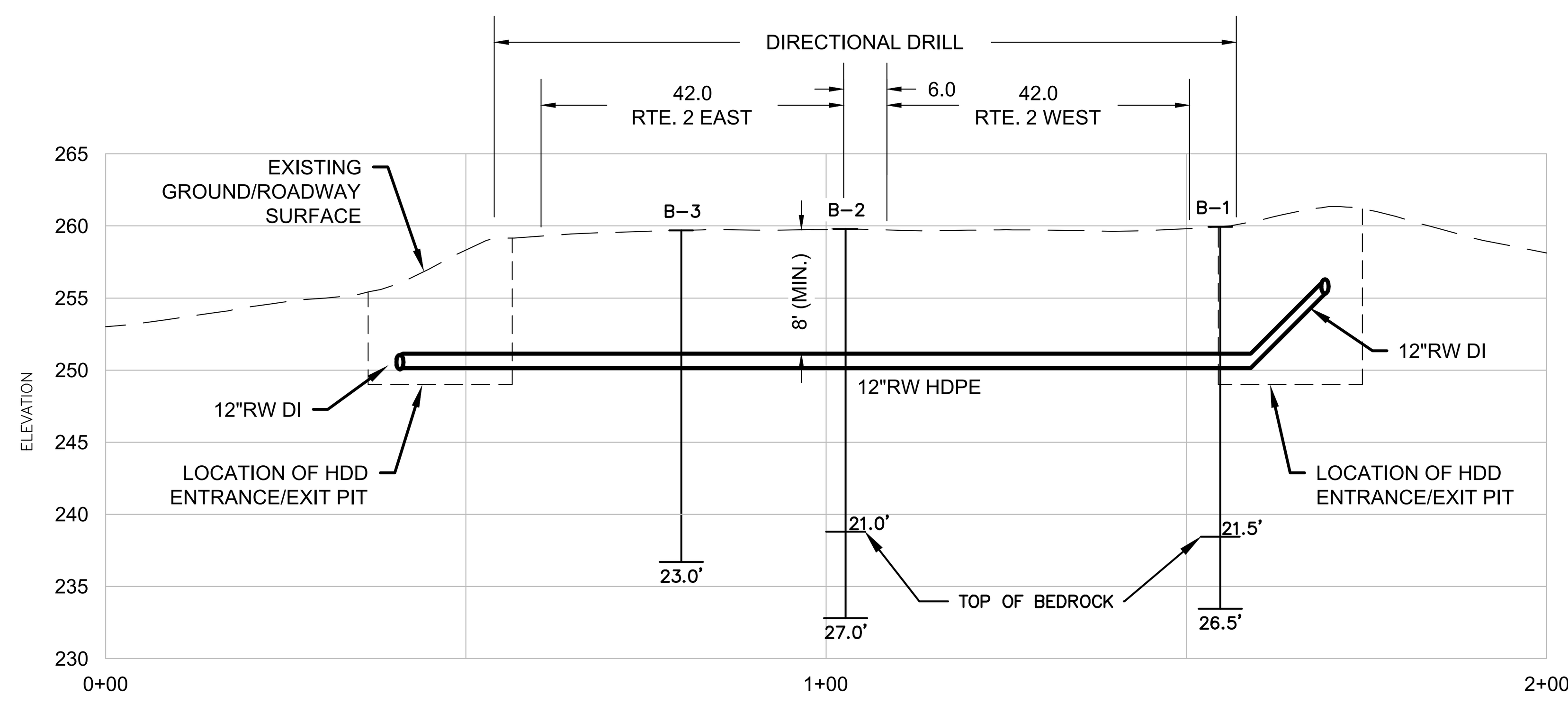
Sheet Number:

C102



PLAN

SCALE: 1" = 40'



ROUTE 2 DIRECTIONAL DRILL PROFILE

NOTES:

1. THE SURVEY BASEPLAN USED FOR THE PRODUCTION OF THIS PROPOSED EASEMENT PLAN WAS PREPARED BY GCG ASSOCIATES, INC. IN JULY, 2024. UTILITY DATA AND WETLAND FLAG DATA WAS SUPPLEMENTED BY WESTON & SAMPSON.
2. THE MOST RECENT SITE VISIT WAS COMPLETED IN JULY, 2024 TO VERIFY THAT THE EXISTING CONDITIONS SHOWN ON THE PLAN ARE THE CURRENT CONDITIONS IN THE FIELD.
3. THE LAYOUT AND PROPERTY LINES SHOWN ON THE PLAN WERE COMPILED FROM RECORD DEEDS AND PLANS AND CERTIFIED BY HAVELOCK PURSEGLOVE, A PLS IN DIRECT CHARGE AND SUPERVISION OF THE SURVEY BASEPLAN.
4. THE OWNERS HAVE BEEN CHECKED AND UPDATED PER THE REGISTRY OF DEEDS AS OF JULY, 2024.
5. THE SURVEYOR IS PARTICIPATING IN THE DEVELOPMENT OF THE PROPOSED EASEMENT PLANS. HAVELOCK PURSEGLOVE, GCG ASSOCIATES, INC, HAS VERIFIED HIGHWAY LAYOUT BASELINES AND SIDELINES, VERIFIED MUNICIPAL LAYOUTS, VERIFIED THAT ABUTTERS PROPERTY LINES ARE CREATED BASED ON RECORD DEEDS AND PLANS, VERIFIED CURRENT ABUTTERS OWNERSHIP INFORMATION, VERIFIED EXISTING PERMANENT EASEMENTS, AND VERIFIED ANY OTHER ELEMENTS IN THE SURVEY BASEPLAN THAT AFFECTS DISPOSITIONS AND LAND ACQUISITIONS.
6. WETLAND DELINEATION CONDUCTED IN DECEMBER 2022, JANUARY 2023, AND AUGUST 2023 BY WESTON & SAMPSON ENGINEERS, INC.

PROFILE NOTES:

1. AT LEAST 90 DAYS BEFORE THE START OF WORK, THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER THE FOLLOWING SUBMITTALS AS NOTES BELOW:

- DESCRIPTION OF THE DEWATERING SYSTEM, WITH THE LOCATION OF THE DEWATERING POINT(S), DISCHARGE POINT(S), AND OBSERVATION WELLS PLOTTED ON THE PROJECT PLAN.
- DESCRIPTION OF THE MONITORING PROGRAM FOR SURFACE SETTLEMENT.
- DESCRIPTION OF THE GROUTING PROGRAM AND GROUT SPECIFICATIONS.
- MA PE-STAMPED DESCRIPTION AND DETAILS OF THE CASING, CARRIER PIPE, AND BULKHEADS.
- MA PE-STAMPED DESCRIPTION OF THE PROPOSED PIPE INSTALLATION METHOD AND APPLICABLE DETAILS.
- MA PE-STAMPED DESCRIPTION AND DETAILS FOR THE ENTRANCE AND EXIT PITS, INCLUDING ANY REQUIRED PIT BRACING OR SHEETING. THIS ITEM MUST INCLUDE PE-STAMPED DESIGN CALCULATIONS FOR SLOPE STABILITY, SHEETING STABILITY, AND BRACING STRENGTH.
- UPON REVIEW AND COMMENT, ENGINEER SHALL PROVIDE THE ABOVE INFORMATION TO MASSDOT ALONG WITH AN ORIGINAL, SIGNED LETTER STATING THAT ALL ASSUMPTIONS, DESIGNS, DESCRIPTIONS, AND DETAILS SUBMITTED TO MASSDOT ARE IN CONFORMANCE WITH ACCEPTED ENGINEERING PRACTICE.

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

Project:
LITTLETON WATER DEPARTMENT

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
DWSRF NO. 12397
CONTRACT NO.1

Weston & Sampson Engineers, Inc.
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www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

COA:

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Issued For: BIDDING

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W&S File No.:	

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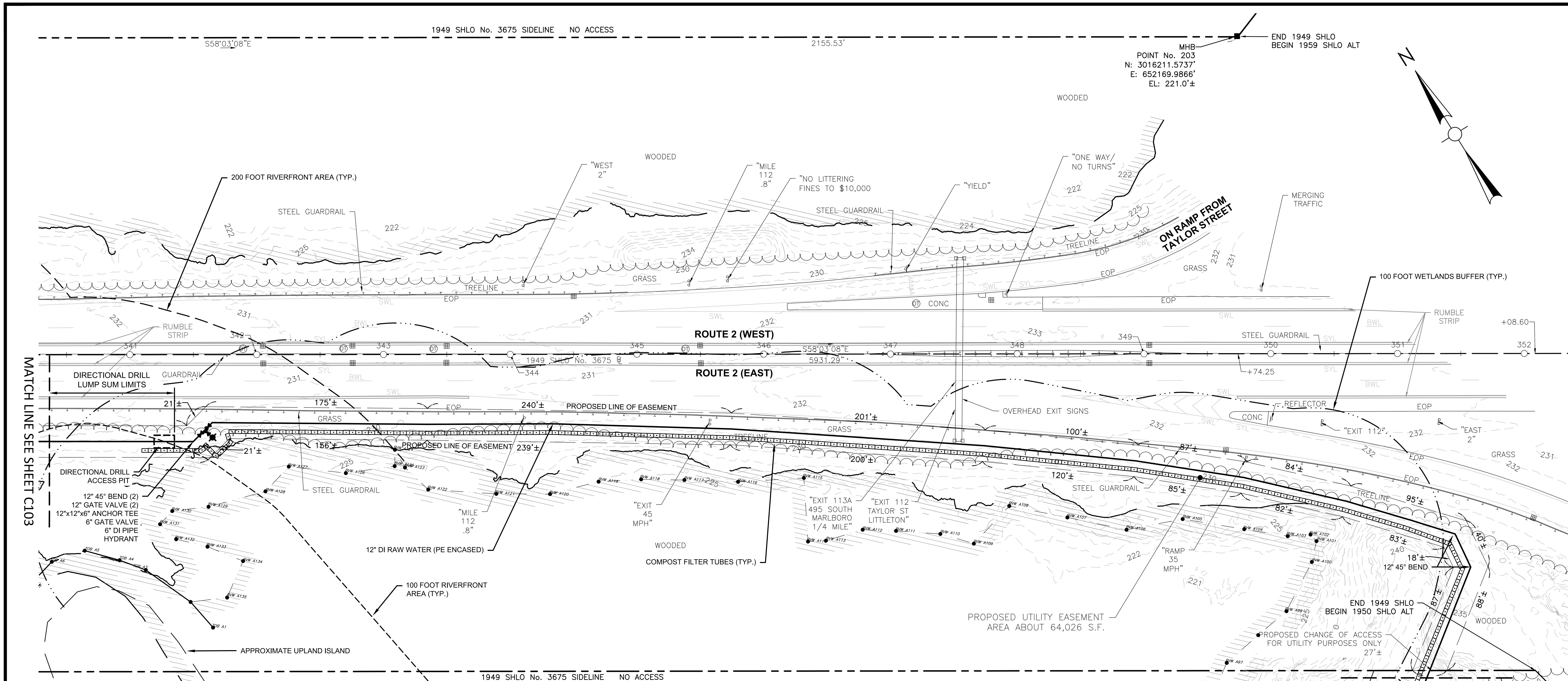
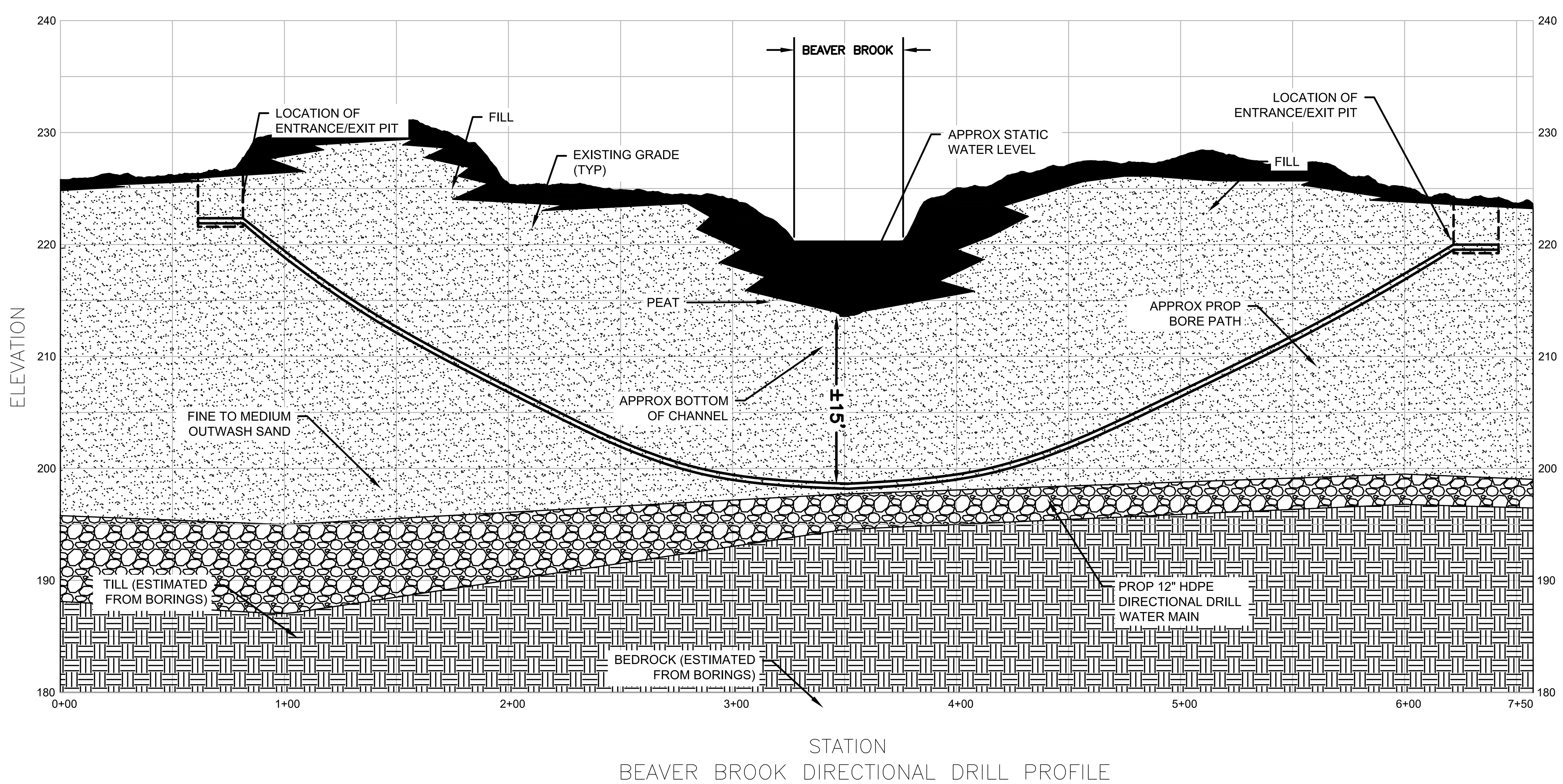
RAW WATER PLAN CROSS COUNTRY

Sheet Number:
C103



PLAN

SCALE: 1" = 40'



BEAVER BROOK DIRECTIONAL DRILL PROFILE

PLAN NOTES:

1. THE SURVEY BASEPLAN USED FOR THE PRODUCTION OF THIS PROPOSED EASEMENT PLAN WAS PREPARED BY GCG ASSOCIATES, INC. IN JULY, 2024. UTILITY DATA AND WETLAND FLAG DATA WAS SUPPLEMENTED BY WESTON & SAMPSON.
2. THE MOST RECENT SITE VISIT WAS COMPLETED IN JULY, 2024 TO VERIFY THAT THE EXISTING CONDITIONS SHOWN ON THE PLAN ARE THE CURRENT CONDITIONS IN THE FIELD.
3. THE LAYOUT AND PROPERTY LINES SHOWN ON THE PLAN WERE COMPILED FROM RECORD DEEDS AND PLANS AND CERTIFIED BY HAVELOCK PURSEGLOVE, A PLS IN DIRECT CHARGE AND SUPERVISION OF THE SURVEY BASEPLAN.
4. THE OWNERS HAVE BEEN CHECKED AND UPDATED PER THE REGISTRY OF DEEDS AS OF JULY, 2024.
5. THE SURVEYOR IS PARTICIPATING IN THE DEVELOPMENT OF THE PROPOSED EASEMENT PLANS. HAVELOCK PURSEGLOVE, GCG ASSOCIATES, INC, HAS VERIFIED HIGHWAY LAYOUT BASELINES AND SIDELINES, VERIFIED MUNICIPAL LAYOUTS, VERIFIED THAT ABUTTERS PROPERTY LINES ARE CREATED BASED ON RECORD DEEDS AND PLANS, VERIFIED CURRENT ABUTTERS OWNERSHIP INFORMATION, VERIFIED EXISTING PERMANENT EASEMENTS, AND VERIFIED ANY OTHER ELEMENTS IN THE SURVEY BASEPLAN THAT AFFECTS DISPOSITIONS AND LAND ACQUISITIONS.
6. WETLAND DELINEATION CONDUCTED IN DECEMBER 2022, JANUARY 2023, AND AUGUST 2023 BY WESTON & SAMPSON ENGINEERS, INC.

PROFILE NOTES:

1. AT LEAST 90 DAYS BEFORE THE START OF WORK, THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER THE FOLLOWING SUBMITTALS AS NOTES BELOW:

- DESCRIPTION OF THE DEWATERING SYSTEM, WITH THE LOCATION OF THE DEWATERING POINT(S), DISCHARGE POINT(S), AND OBSERVATION WELLS PLOTTED ON THE PROJECT PLAN.
- DESCRIPTION OF THE MONITORING PROGRAM FOR SURFACE SETTLEMENT.
- DESCRIPTION OF THE GROUTING PROGRAM AND GROUT SPECIFICATIONS.
- MA PE-STAMPED DESCRIPTION AND DETAILS OF THE CASING, CARRIER PIPE, AND BULKHEADS.
- MA PE-STAMPED DESCRIPTION OF THE PROPOSED PIPE INSTALLATION METHOD AND APPLICABLE DETAILS.
- MA PE-STAMPED DESCRIPTION AND DETAILS FOR THE ENTRANCE AND EXIT PITS, INCLUDING ANY REQUIRED PIT BRACING OR SHEETING. THIS ITEM MUST INCLUDE PE-STAMPED DESIGN CALCULATIONS FOR SLOPE STABILITY, SHEETING STABILITY, AND BRACING STRENGTH.
- UPON REVIEW AND COMMENT, ENGINEER SHALL PROVIDE THE ABOVE INFORMATION TO MASSDOT ALONG WITH AN ORIGINAL, SIGNED LETTER STATING THAT ALL ASSUMPTIONS, DESIGNS, DESCRIPTIONS, AND DETAILS SUBMITTED TO MASSDOT ARE IN CONFORMANCE WITH ACCEPTED ENGINEERING PRACTICE.

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

Project:
LITTLETON WATER DEPARTMENT

TRUMBULL WELL AND RAW WATER MAIN
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DWSRF NO. 12397
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Consultants:

Revisions:

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Drawing Title:
RAW WATER PLAN CROSS COUNTRY

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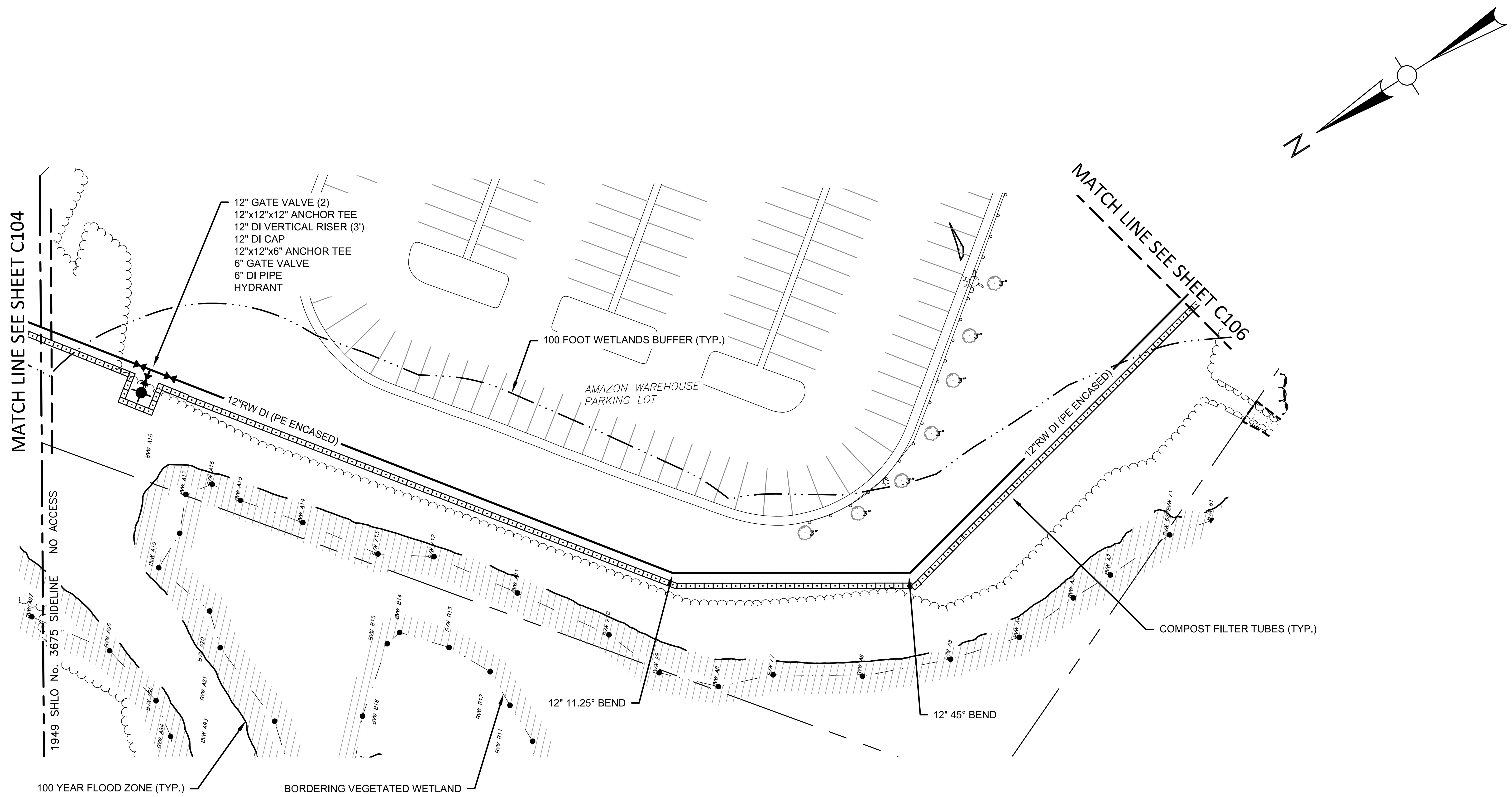
C104



PLAN
SCALE: 1" = 40'

NOTE:

1. WETLAND DELINEATION CONDUCTED IN DECEMBER 2022, JANUARY 2023, AND AUGUST 2023 BY WESTON & SAMPSON ENGINEERS, INC.

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

Project:
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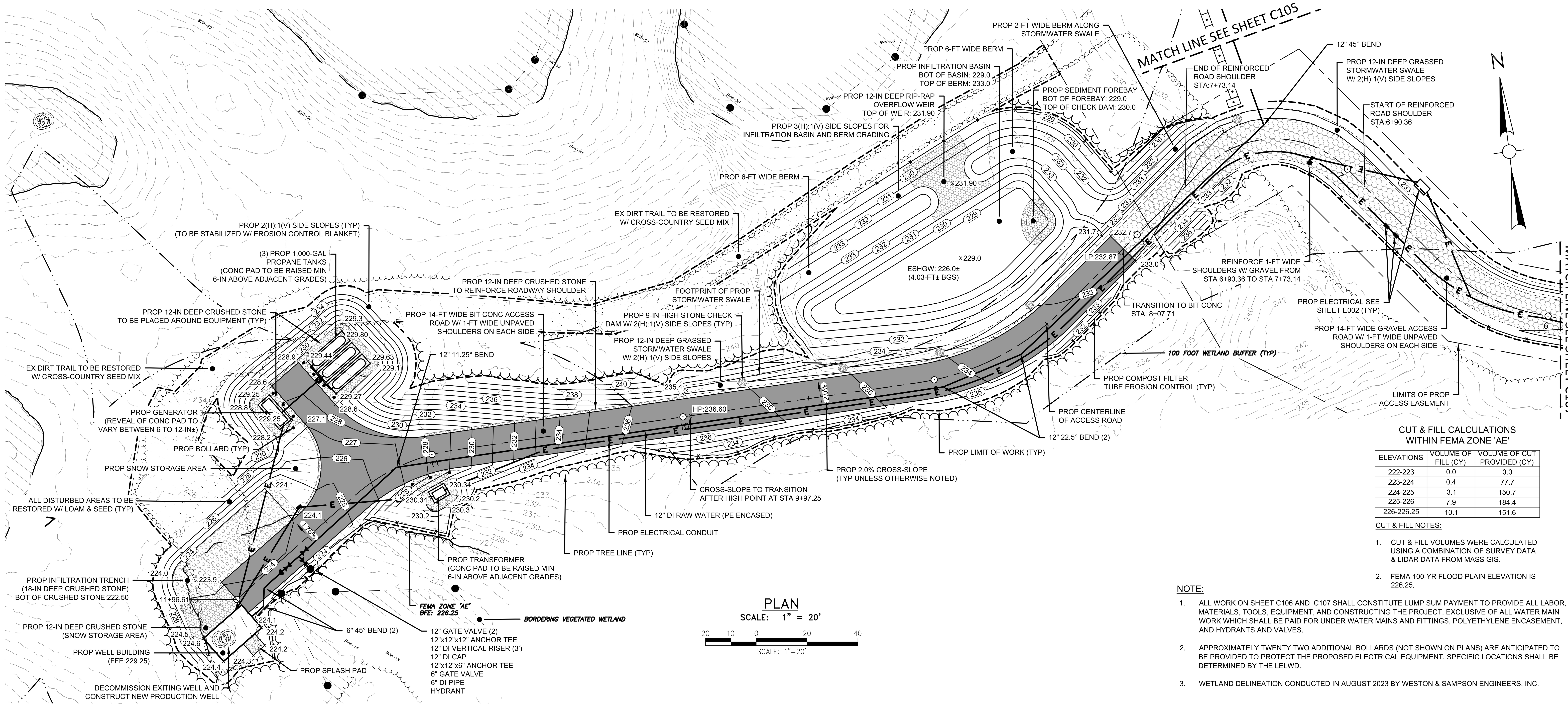
Drawing Title:
RAW WATER PLAN CROSS COUNTRY

Sheet Number:
C105



PLAN

SCALE: 1" = 20'

CUT & FILL CALCULATIONS WITHIN FEMA ZONE 'AE'

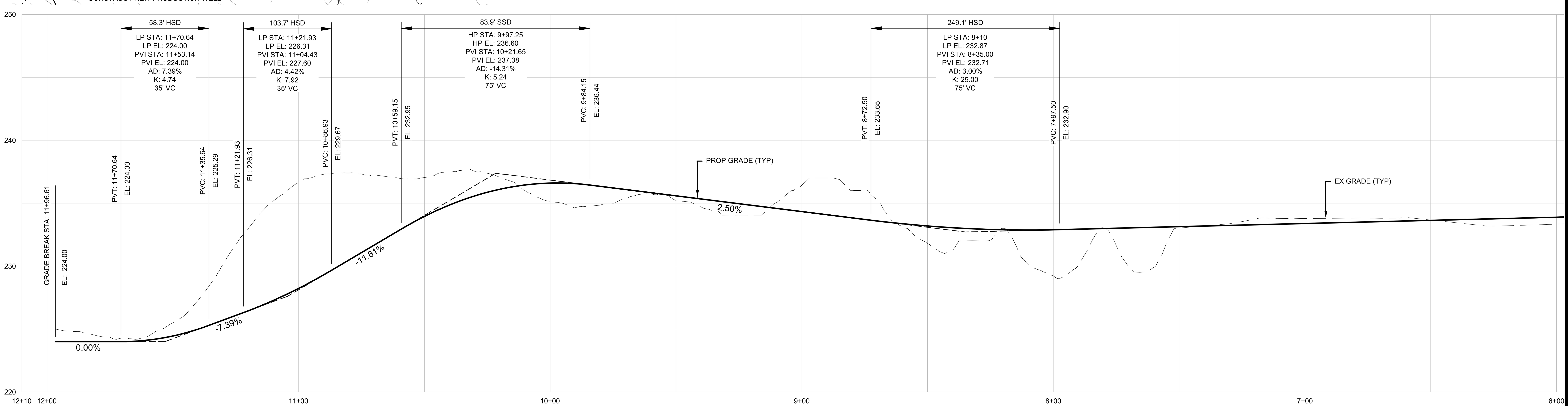
ELEVATIONS	VOLUME OF FILL (CY)	VOLUME OF CUT PROVIDED (CY)
222-223	0.0	0.0
223-224	0.4	77.7
224-225	3.1	150.7
225-226	7.9	184.4
226-226.25	10.1	151.6

CUT & FILL NOTES:

1. CUT & FILL VOLUMES WERE CALCULATED USING A COMBINATION OF SURVEY DATA & LIDAR DATA FROM MASS GIS.
2. FEMA 100-YR FLOOD PLAIN ELEVATION IS 226.25.

NOTE:

1. ALL WORK ON SHEET C106 AND C107 SHALL CONSTITUTE LUMP SUM PAYMENT TO PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND CONSTRUCTING THE PROJECT, EXCLUSIVE OF ALL WATER MAIN WORK WHICH SHALL BE PAID FOR UNDER WATER MAINS AND FITTINGS, POLYETHYLENE ENCASEMENT, AND HYDRANTS AND VALVES.
2. APPROXIMATELY TWENTY TWO ADDITIONAL BOLLARDS (NOT SHOWN ON PLANS) ARE ANTICIPATED TO BE PROVIDED TO PROTECT THE PROPOSED ELECTRICAL EQUIPMENT. SPECIFIC LOCATIONS SHALL BE DETERMINED BY THE LELWD.
3. WETLAND DELINEATION CONDUCTED IN AUGUST 2023 BY WESTON & SAMPSON ENGINEERS, INC.



PROFILE

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

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'

Project:

LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
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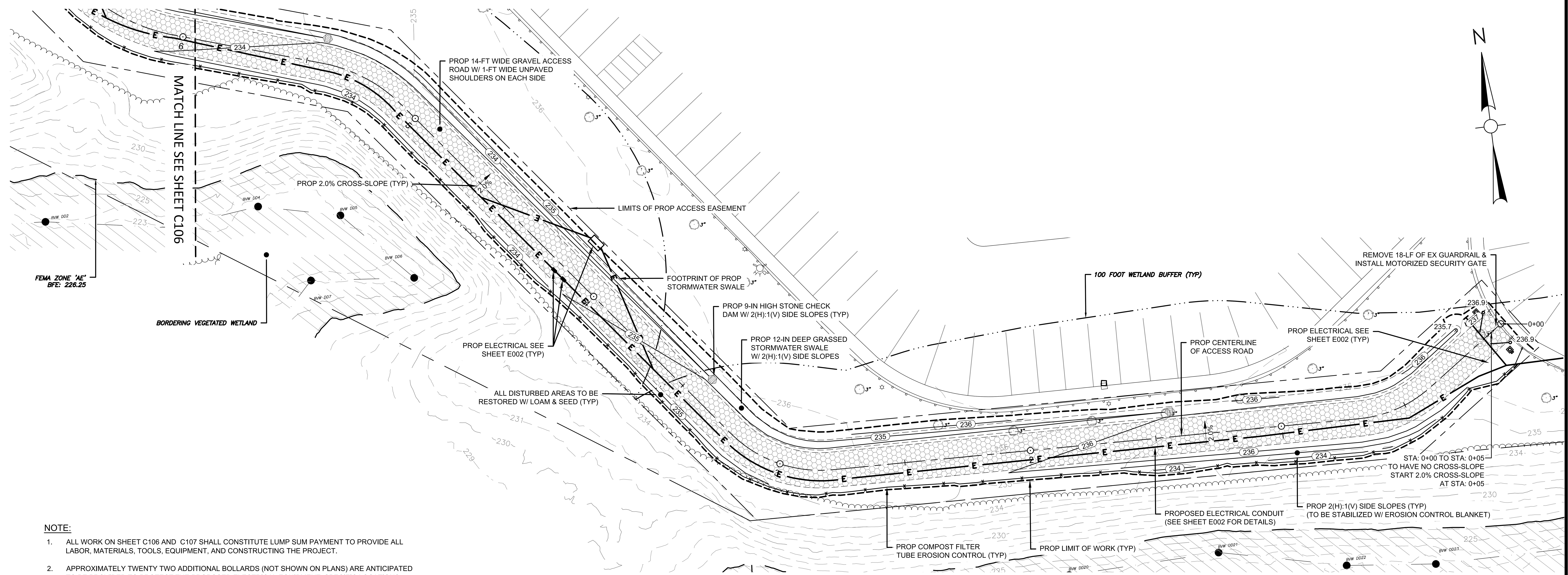
W&S File No.:	

Drawing Title:

ACCESS ROAD GRADING & DRAINAGE PLAN

Sheet Number: C106

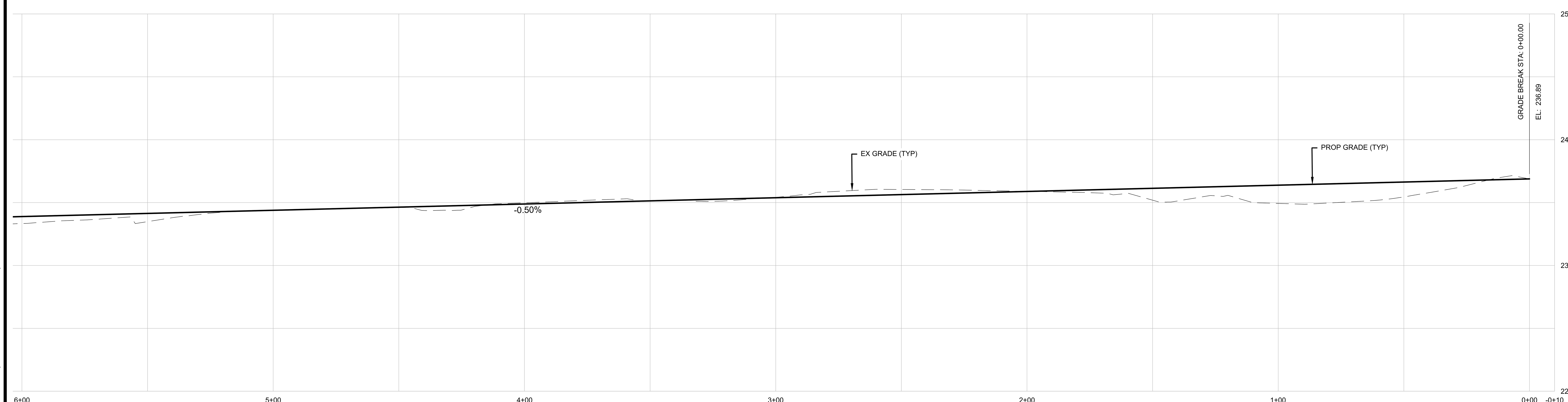


PLAN

SCALE: 1" = 20'

NOTE:

1. ALL WORK ON SHEET C106 AND C107 SHALL CONSTITUTE LUMP SUM PAYMENT TO PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, AND CONSTRUCTING THE PROJECT.
2. APPROXIMATELY TWENTY TWO ADDITIONAL BOLLARDS (NOT SHOWN ON PLANS) ARE ANTICIPATED TO BE PROVIDED TO PROTECT THE PROPOSED ELECTRICAL EQUIPMENT. SPECIFIC LOCATIONS SHALL BE DETERMINED BY THE LELWD.
3. WETLAND DELINEATION CONDUCTED IN AUGUST 2023 BY WESTON & SAMPSON ENGINEERS, INC.



PROFILE

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

HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=4'

Project:
LITTLETON WATER DEPARTMENT

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
DWSRF NO. 12397
CONTRACT NO.1

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

COA:

Seal: COMMONWEALTH OF MASSACHUSETTS TARA E MCMANUS No. 57127 REGISTERED PROFESSIONAL ENGINEER

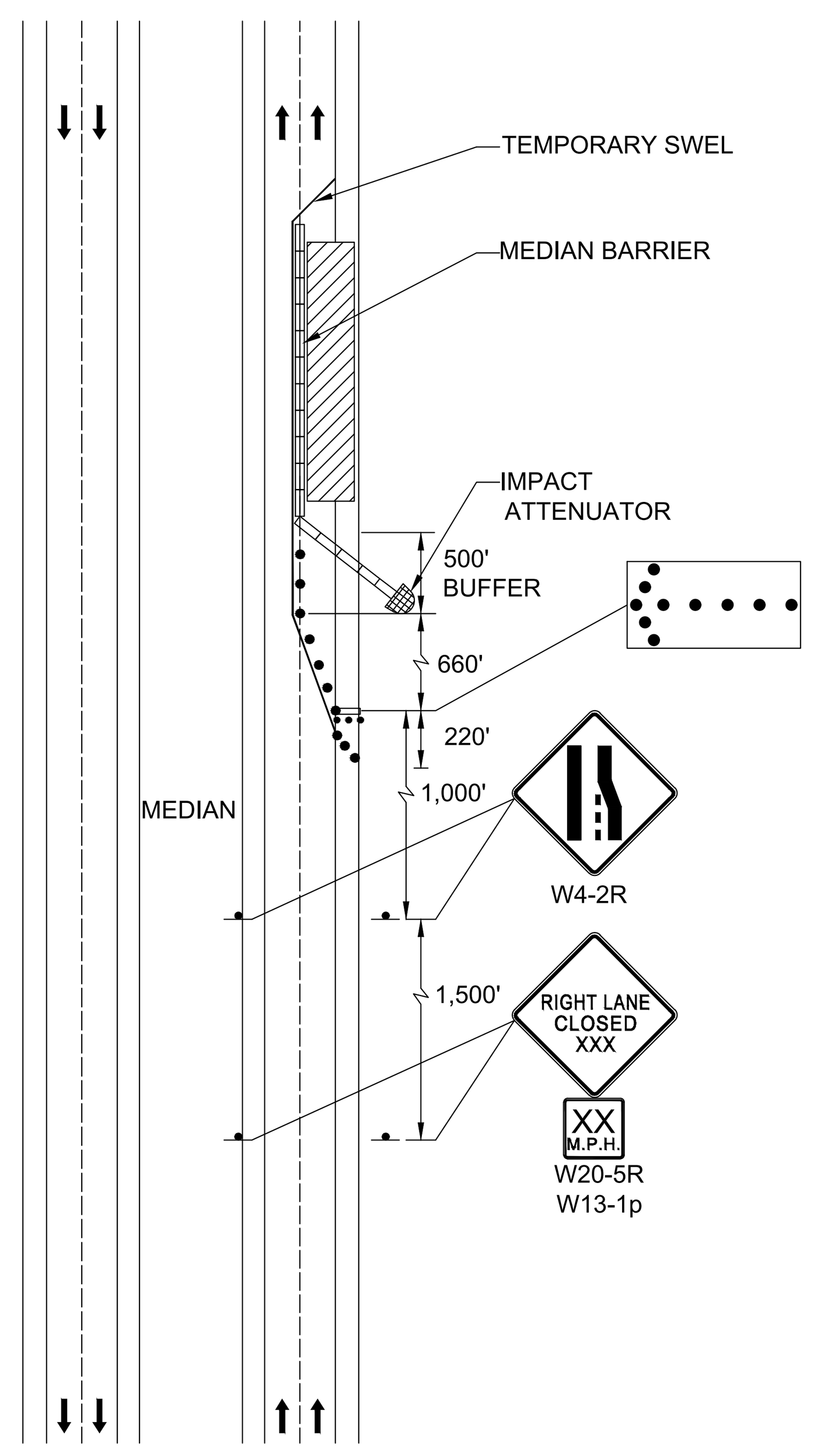
Issued For: BIDDING

Scale: AS NOTED

Date: AUGUST 2024
Drawn By: AKG
Reviewed By: JIP
Approved By: TEM
W&S Project No.: ENG23-0679
W&S File No.:

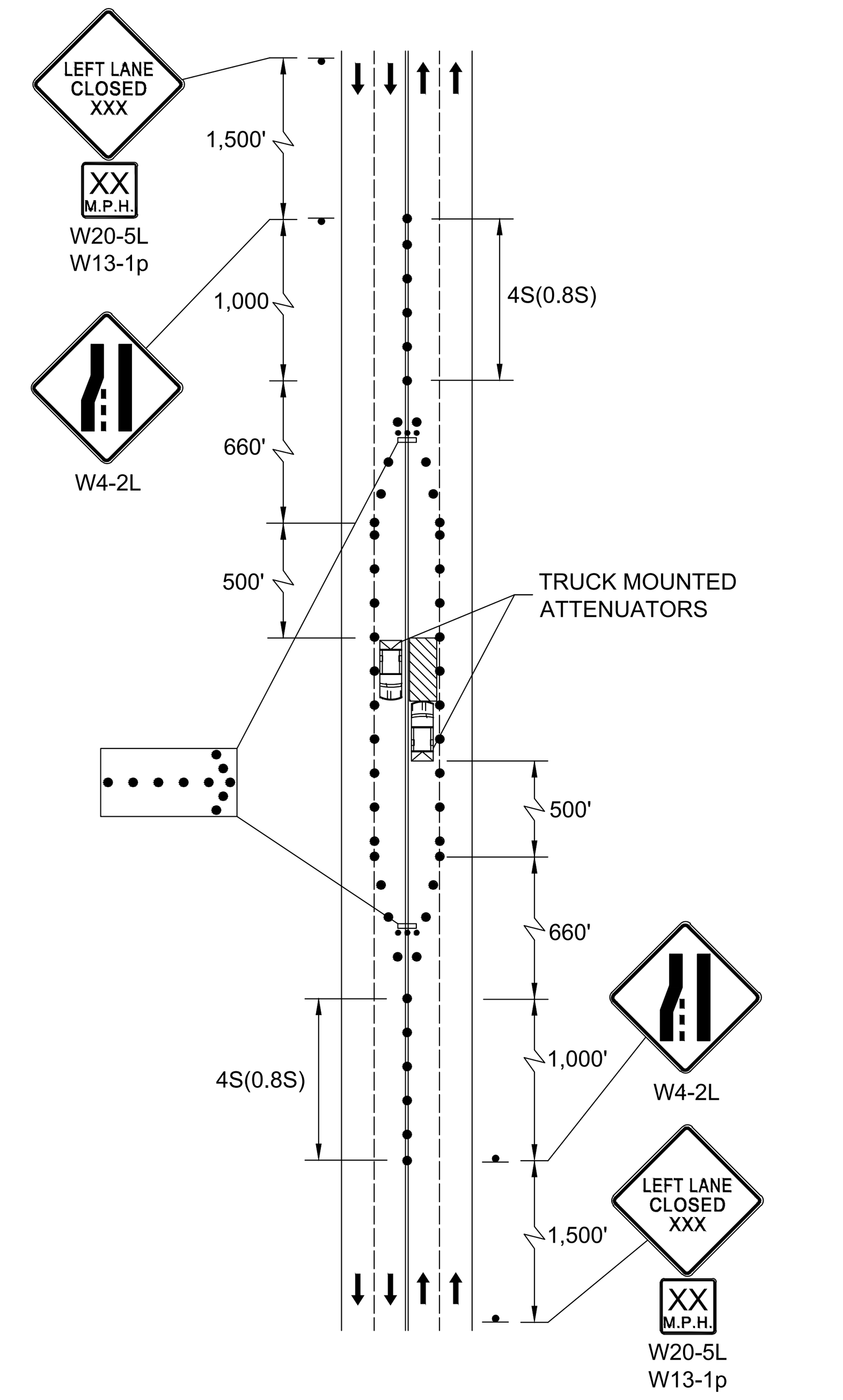
Drawing Title:
ACCESS ROAD GRADING & DRAINAGE PLAN

Sheet Number: C107



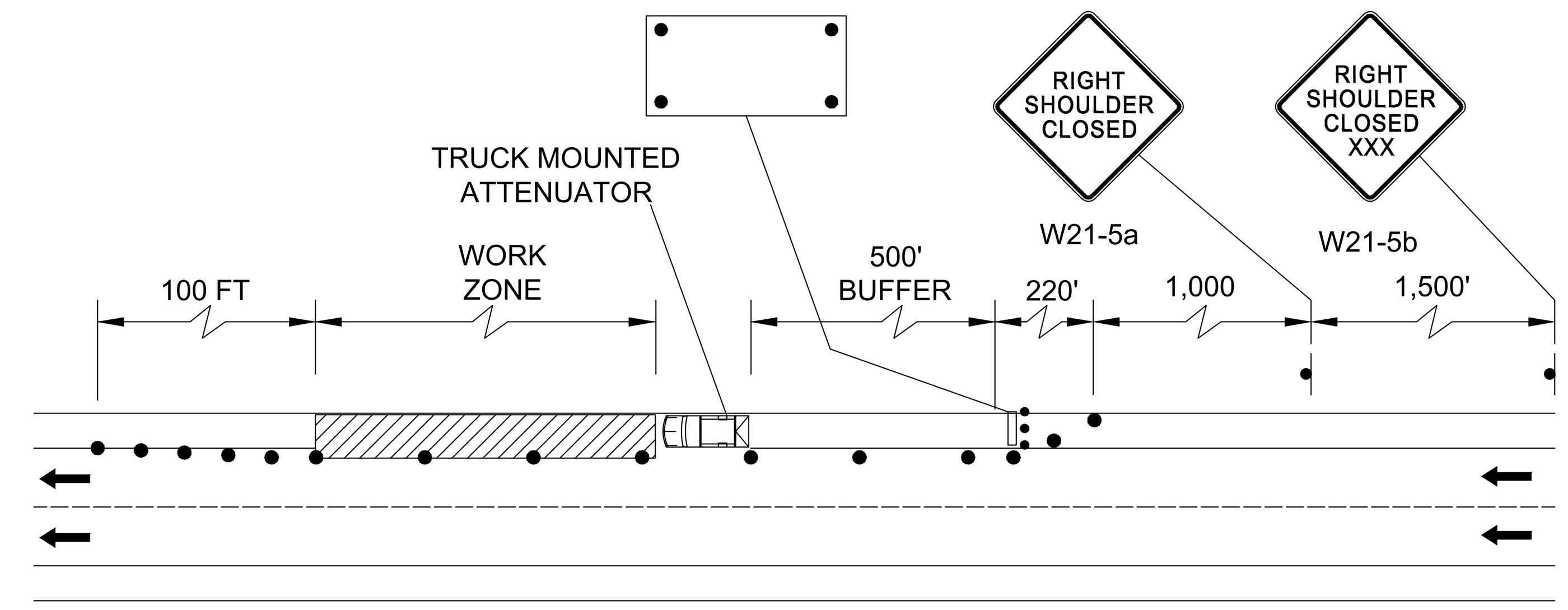
ROUTE 2 DIVIDED HIGHWAY ONE LANE CLOSED WITH BARRIER

NOT TO SCALE



ROUTE 2 MULTIPLE LANE ROAD INTERIOR LANE CLOSURE

NOT TO SCALE



ROUTE 2 DIVIDED HIGHWAY SHOULDER CLOSED

NOT TO SCALE

LEGEND:

- REFLECTORIZED PLASTIC DRUM OR 36" CONE
- P/F — POLICE/FLAGGER DETAIL
- TYPE III BARRICADE
- CHANGEABLE MESSAGE SIGN
- ARROW BOARD
- WORK ZONE
- DIRECTION OF TRAFFIC
- IMPACT ATTENUATOR
- MEDIAN BARRIER
- MEDIAN BARRIER WITH WARNING LIGHTS
- WORK VEHICLE
- TRUCK MOUNTED ATTENUATOR
- TRAFFIC OR PEDESTRIAN SIGNAL
- SIGN

Project:

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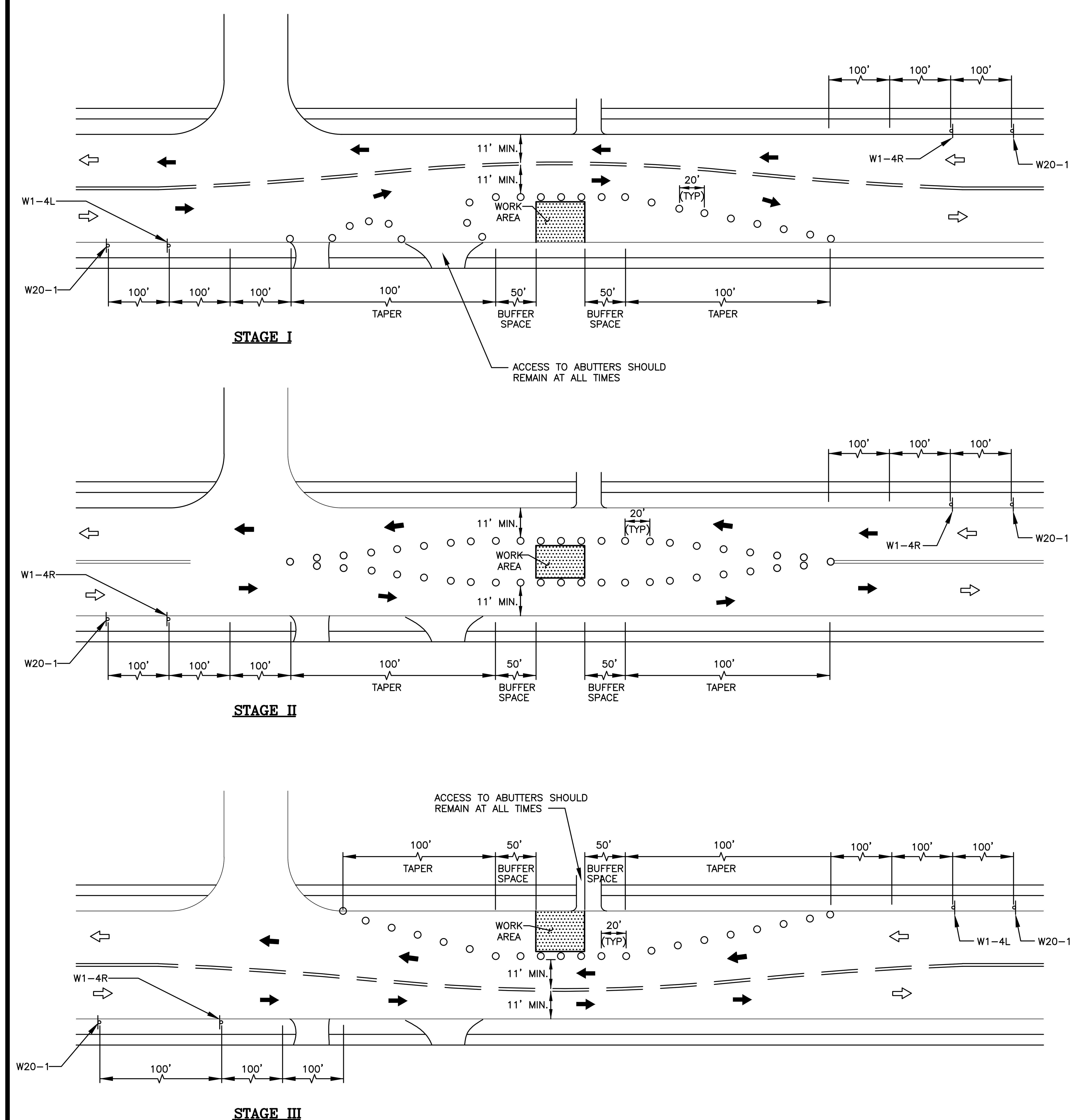
W&S File No.:	

Drawing Title:

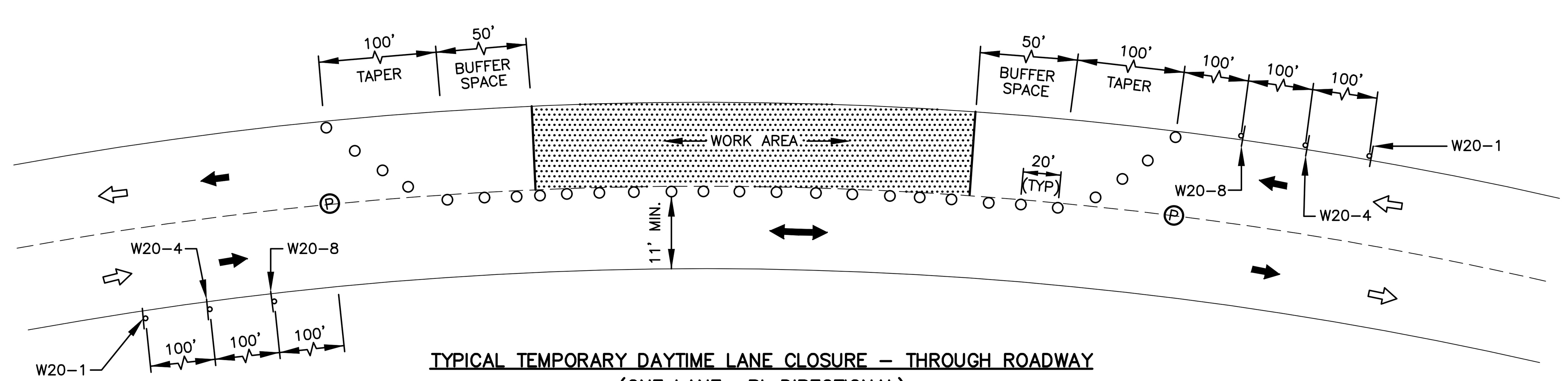
CONSTRUCTION ZONE SAFETY PLAN I

Sheet Number:

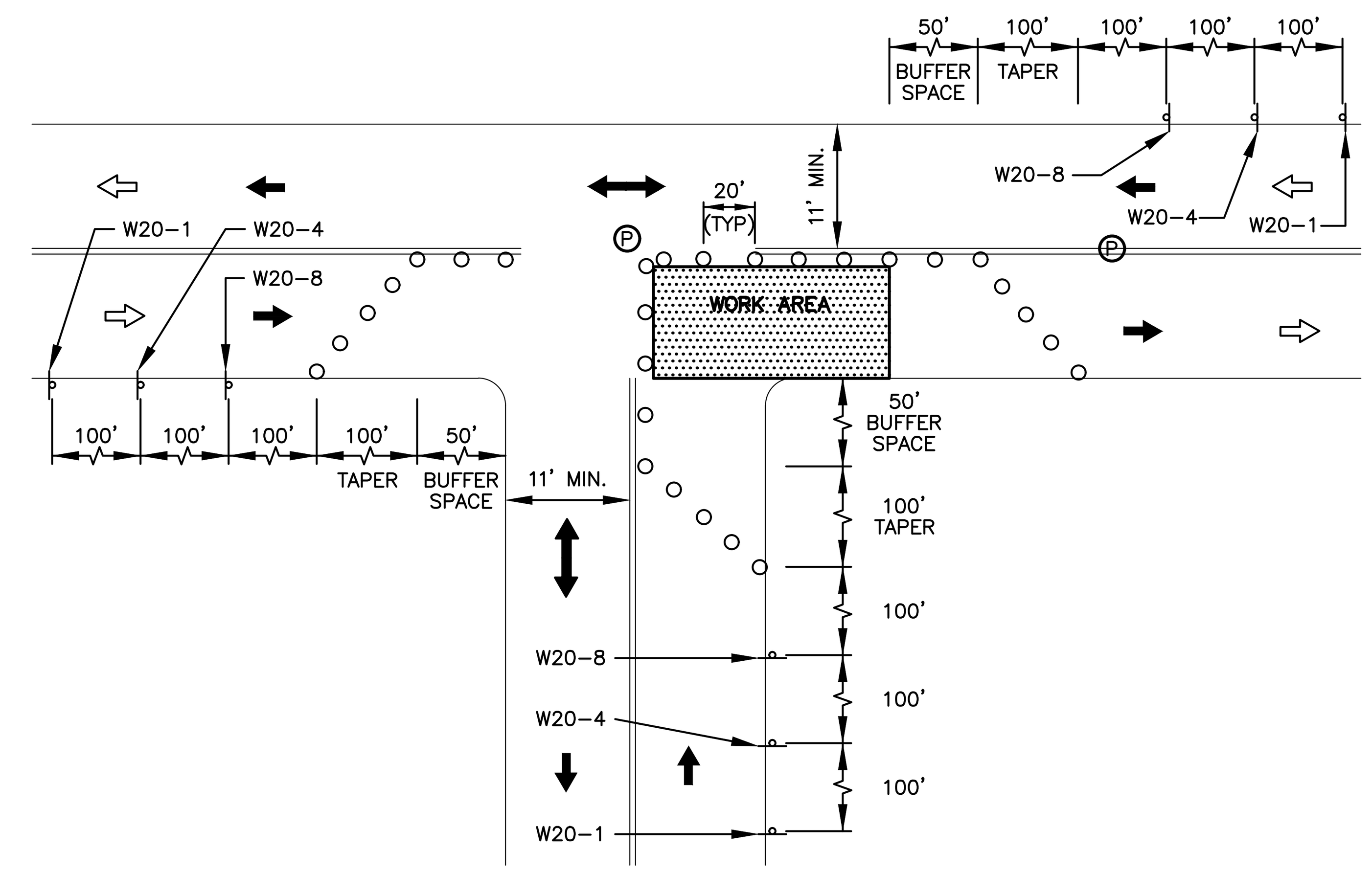
C108



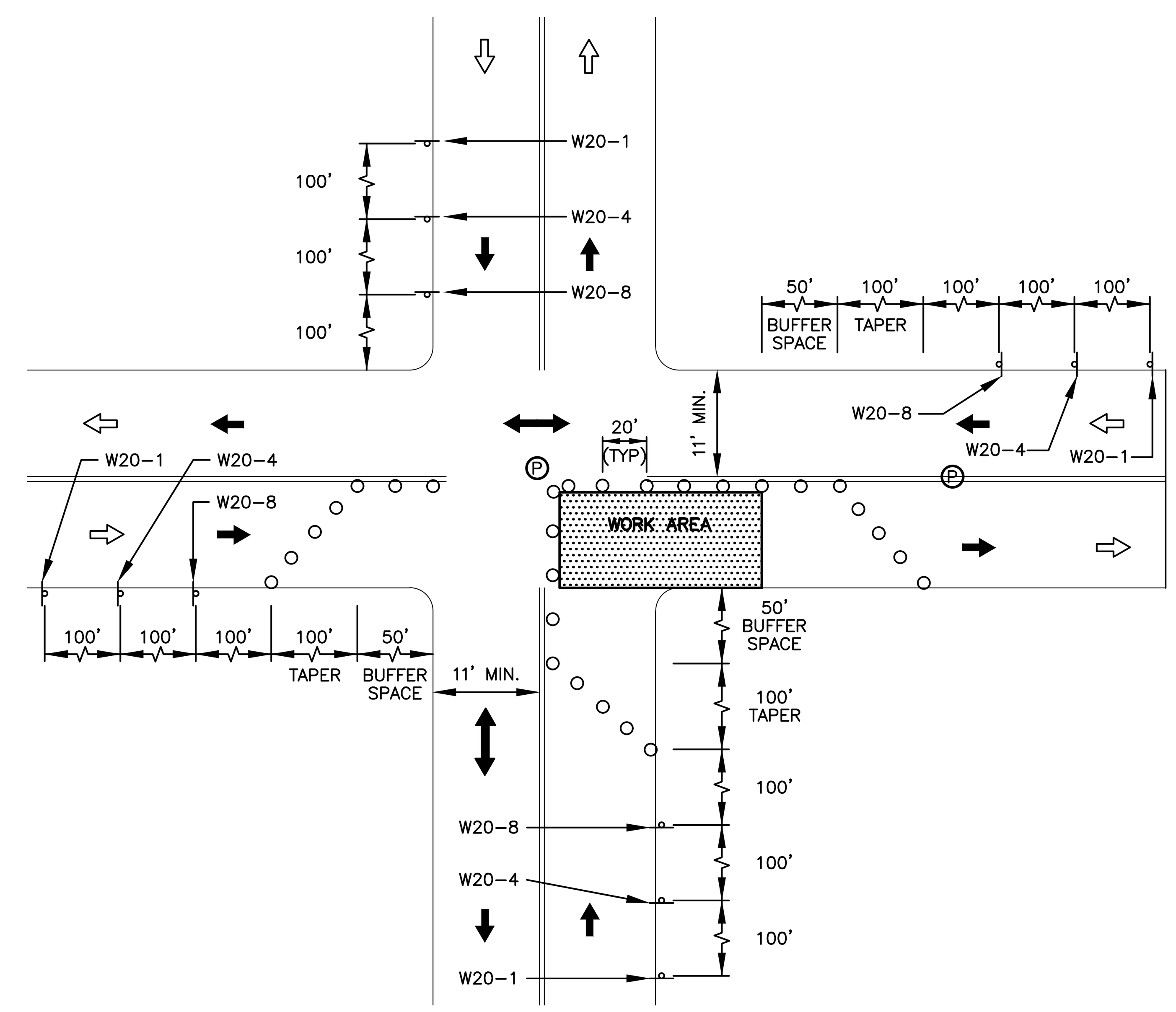
TRAFFIC OPERATION STAGES
N.T.S.



TYPICAL TEMPORARY DAYTIME LANE CLOSURE – THROUGH ROADWAY
(ONE LANE– BI–DIRECTIONAL)
N.T.S.



"T" INTERSECTION LANE CLOSURE
N.T.S.



CLOSURE AT SIDE OF INTERSECTION
N.T.S.

TEMPORARY TRAFFIC SIGN SUMMARY

MUTCD CODE	SIZE OF SIGN WIDTH	SIZE OF SIGN HEIGHT	SIGN
W1-4L	30"	30"	
W1-4R	30"	30"	
W20-1	36"	36"	ROAD WORK AHEAD
W20-4	36"	36"	ONE LANE ROAD AHEAD
W20-8	36"	36"	POLICE OFFICER AHEAD
G20-2	36"	18"	END CONSTRUCTION

NOTE:

1. FOR THE LATEST SPECIFICATION ON TEXT DIMENSIONS AND COLOR, CONTRACTOR SHALL REFER TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CURRENT EDITION).

LEGEND:

- REFLECTORIZED DRUM
- TRAFFIC FLOW DURING CONSTRUCTION
- NORMAL TRAFFIC FLOW
- POLICE DETAIL OFFICER
- CONSTRUCTION SIGN
- WORK AREA

GENERAL NOTES:

1. PLACEMENT OF ALL CONSTRUCTION SIGNS, DRUMS, BARRICADES, TRAFFIC DEVICES AND THE SHAPE, SIZE & COLOR OF ALL TEMPORARY TRAFFIC SIGNS SHALL CONFORM WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2. ADVANCE WARNING SIGN PLACEMENT AND TAPER LENGTH TO BE ADJUSTED ACCORDING TO STREET CONDITIONS AND DRIVEWAY OPENINGS.
3. ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES.
4. THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
5. NONESSENTIAL TRAFFIC CONTROL DEVICES SHALL BE COVERED OR REMOVED DURING NON–WORKING HOURS.
6. PEDESTRIANS SHALL BE PROVIDED WITH ACCESS AND SAFE PASSAGE THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE AT ALL TIMES.
7. W20–8 SHALL BE TAKEN DOWN OR COVERED AFTER EACH WORKING DAY OR WHEN OTHERWISE NOT APPLICABLE, OR WHEN POLICE OFFICERS ARE NOT PRESENT TO DIRECT TRAFFIC.
8. ADVISORY SPEED PLATES (W13–1 – SEE CURRENT EDITION OF MUTCD) SHALL BE USED IF APPLICABLE AND AS REQUIRED BY THE ENGINEER.
9. NO DIFFERENCE IN ROADWAY LANE ELEVATION WILL BE ALLOWED AT THE END OF THE WORK DAY.
10. SAMPLE TRAFFIC PLANS INCLUDED ON THIS PLAN SHEET ARE BASED ON AN URBAN (LOW SPEED) ROAD TYPE FROM THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
11. DASHED LINES SHOW LANE DESIGNATIONS TO BE USED DURING CONSTRUCTION.
12. THE CONTRACTOR SHALL SUBMIT ANY REVISIONS TO THE CONSTRUCTION ZONE SAFETY PLAN TO THE ENGINEER FOR APPROVAL.
13. THIS CONSTRUCTION ZONE SAFETY PLAN SHALL NOT RELIEVE THE CONTRACTOR OF HIS SOLE RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY.

Project:
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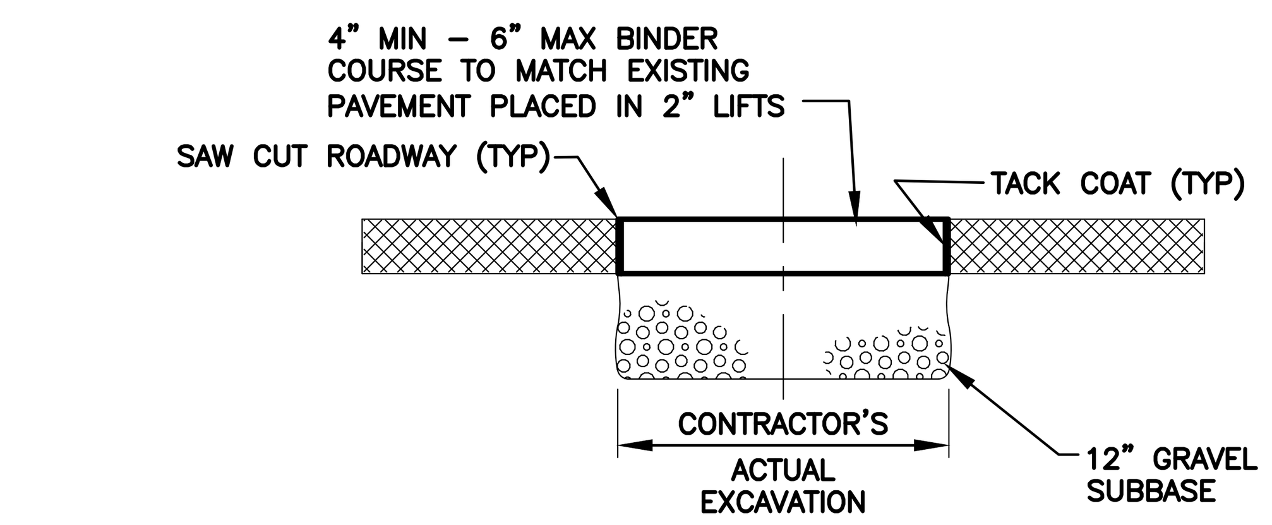
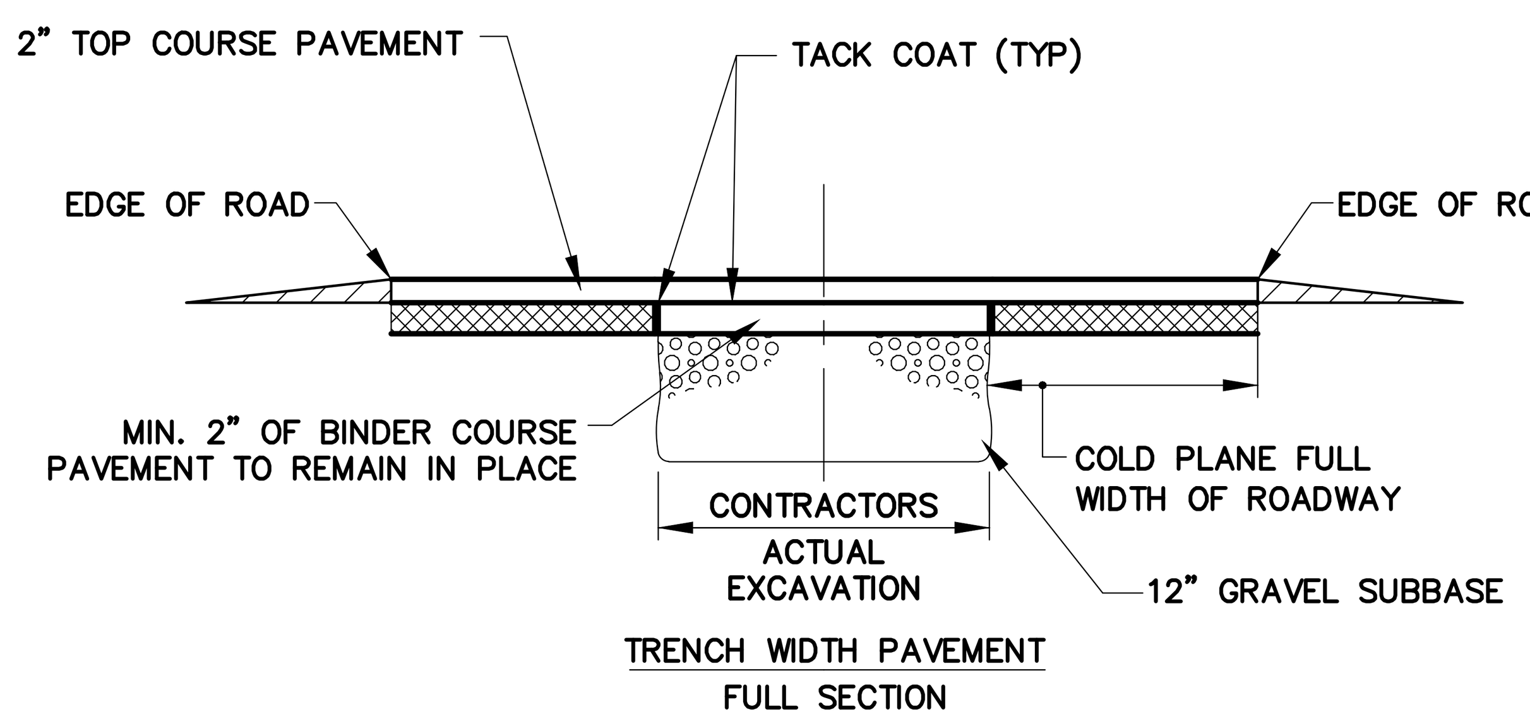
W&S File No.:

Drawing Title:
CONSTRUCTION ZONE SAFETY PLAN II

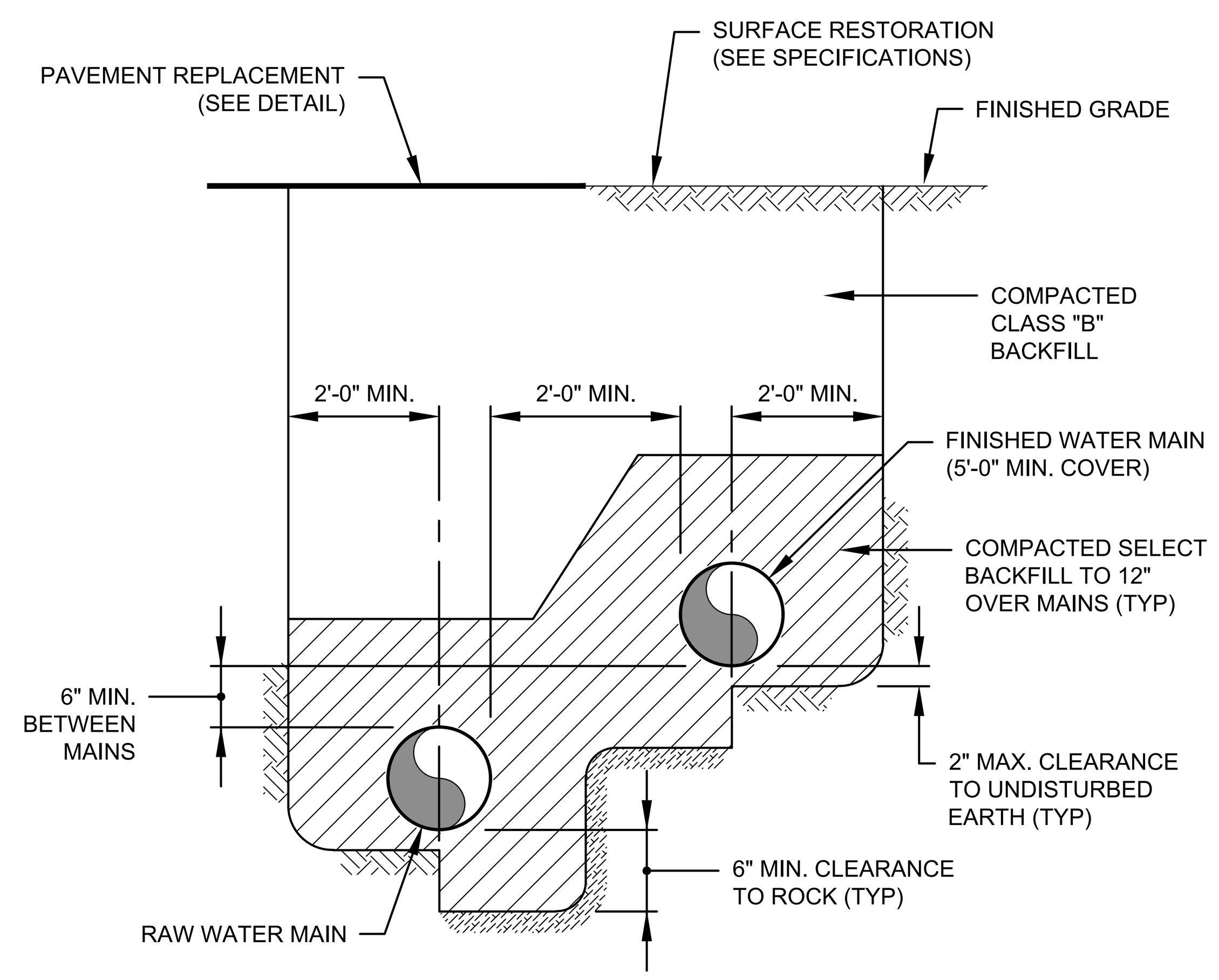
Sheet Number:
C109



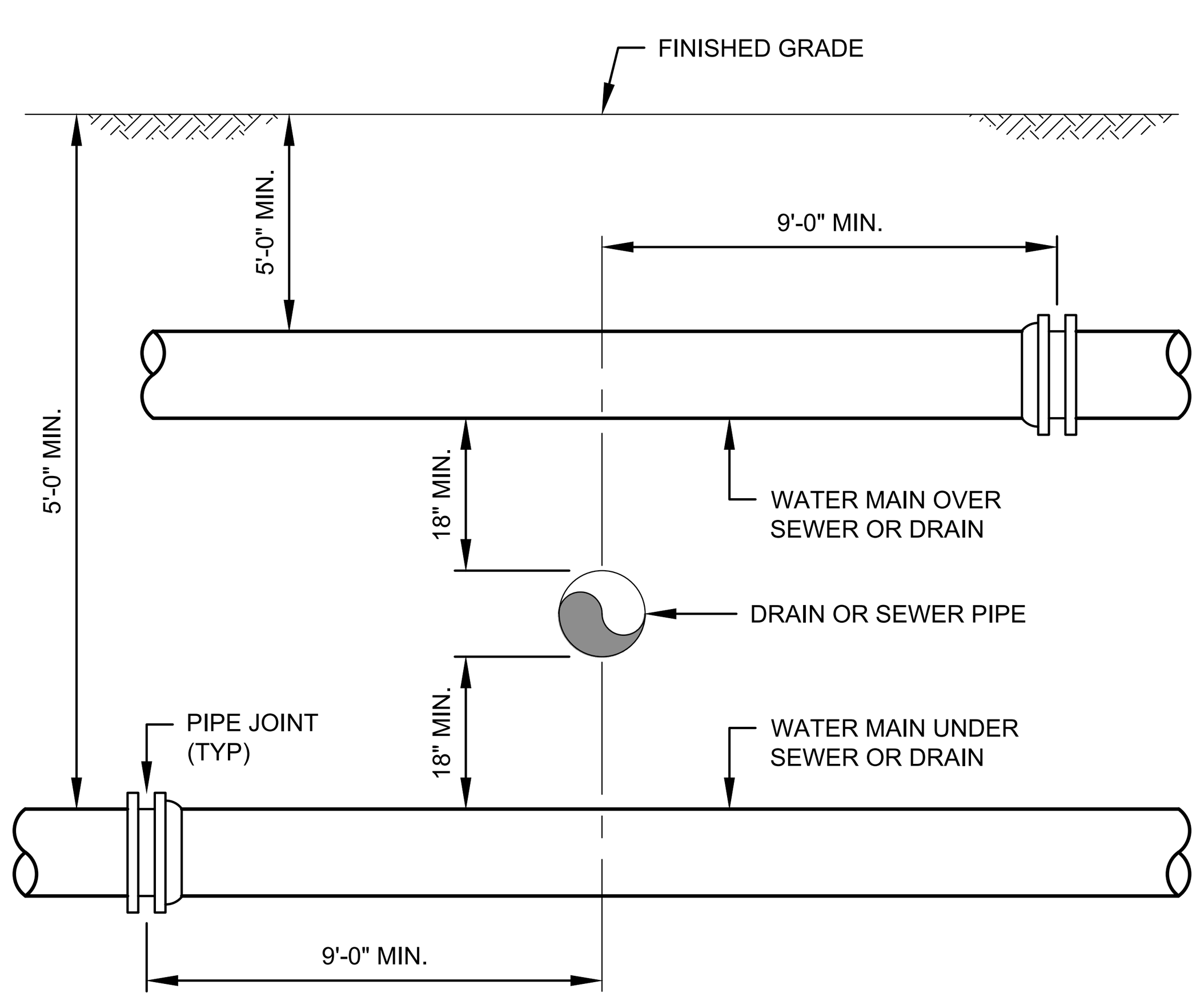
TYPE 1:
TEMPORARY TRENCH PAVEMENT
N.T.S.



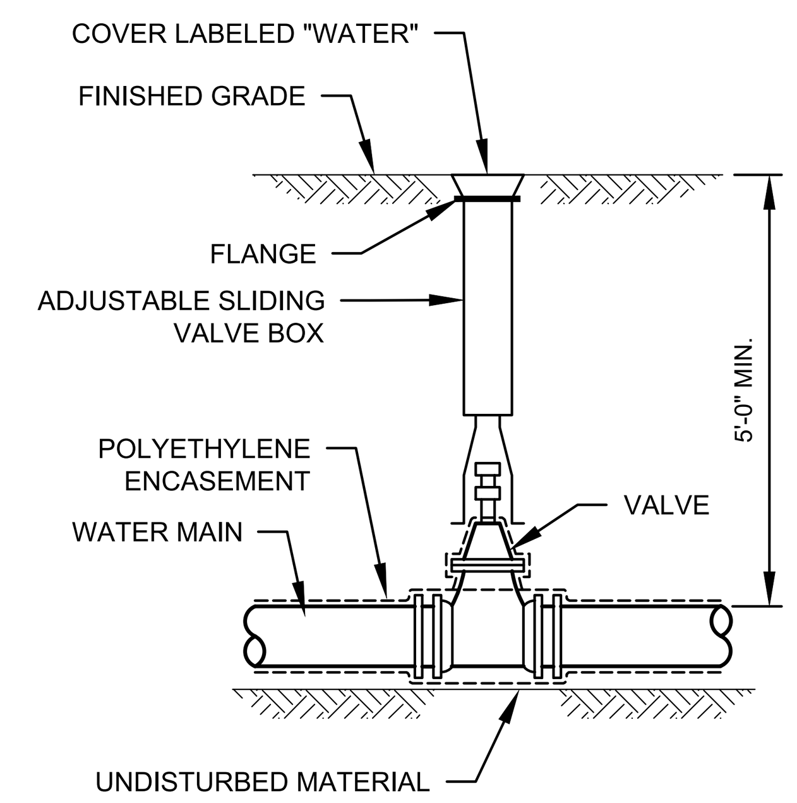
TYPE 2: LITTLETON PERMANENT
FULL WIDTH AND OVERLAY PAVEMENT DETAIL
N.T.S.



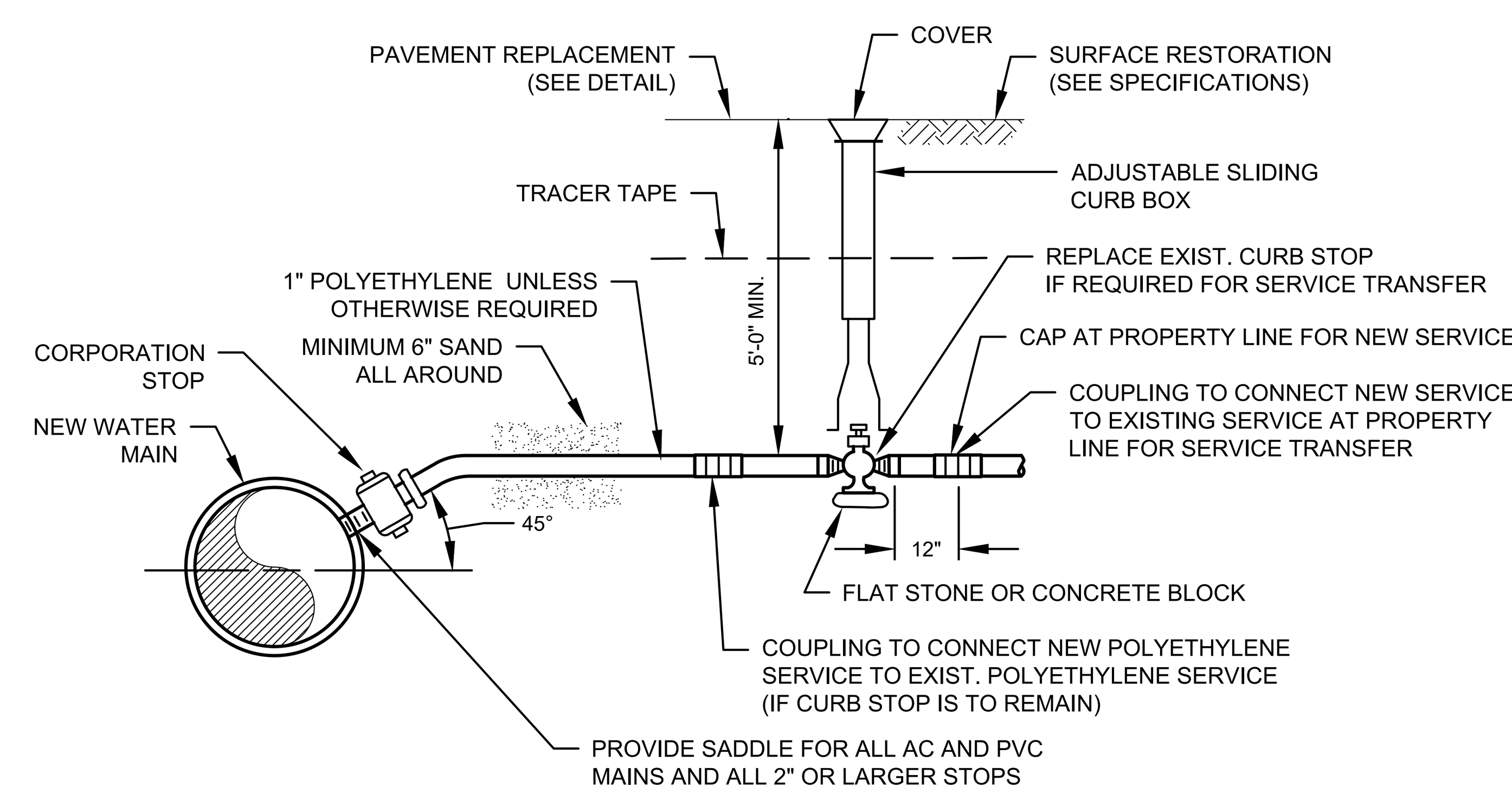
DUAL WATER MAIN TRENCH DETAIL
N.T.S.



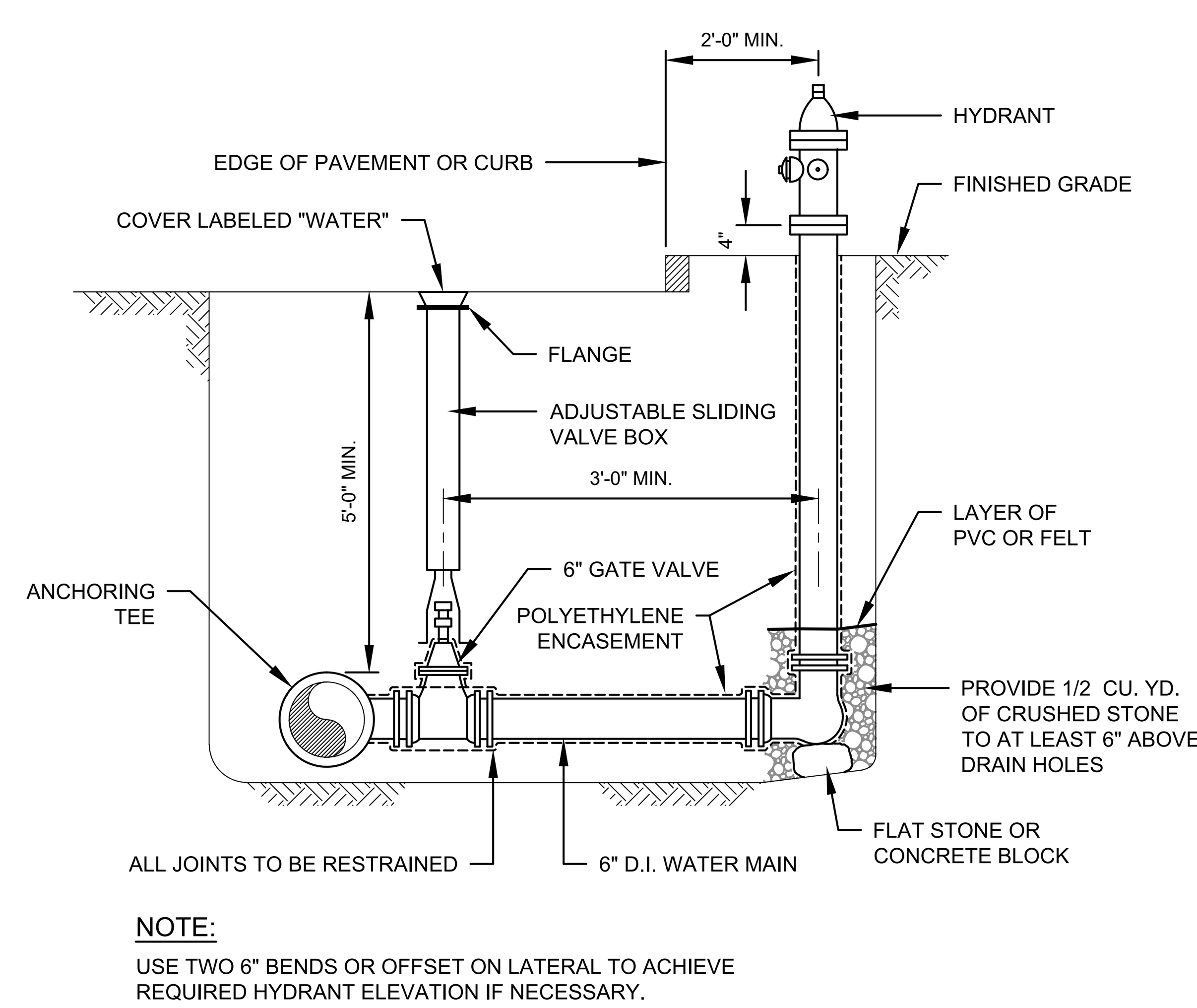
SEWER OR DRAIN CROSSING DETAIL
N.T.S.



VALVE AND BOX DETAIL
N.T.S.



WATER SERVICE DETAIL
N.T.S.



NOTE:

USE TWO 6" BENDS OR OFFSET ON LATERAL TO ACHIEVE
REQUIRED HYDRANT ELEVATION IF NECESSARY.

HYDRANT AND VALVE DETAIL
N.T.S.

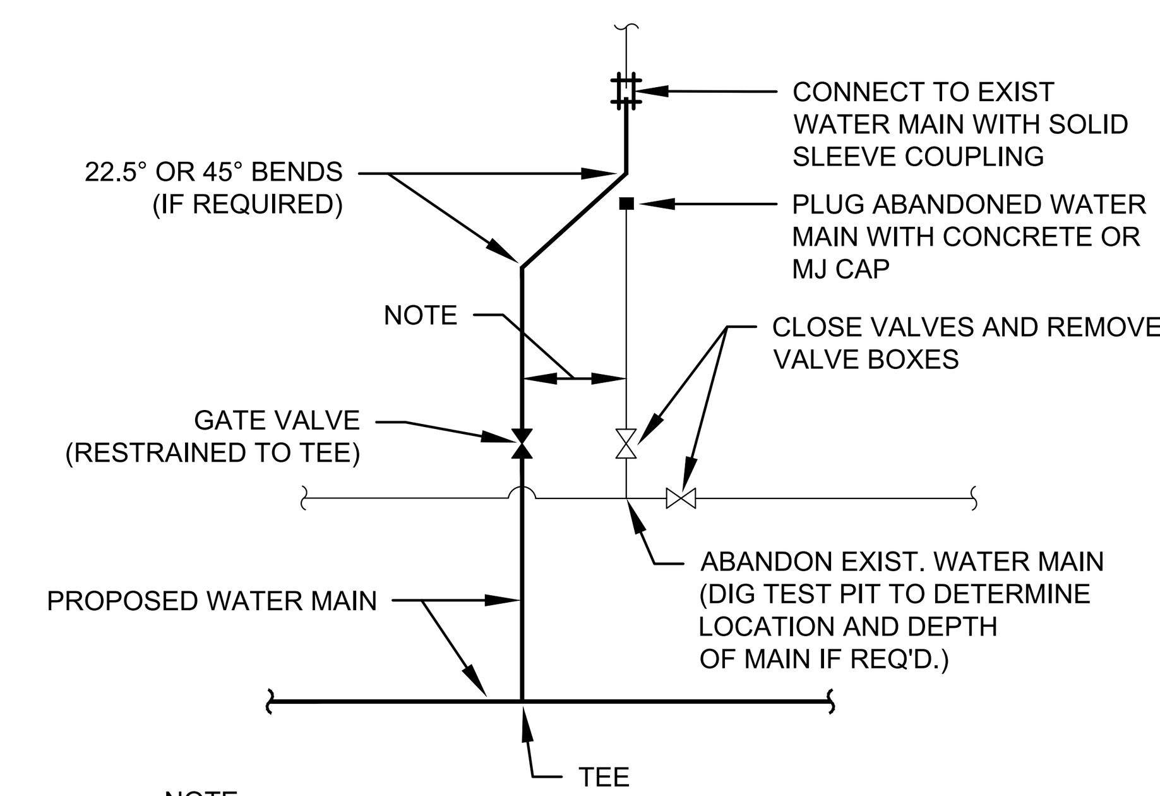
REQUIRED LENGTH OF RESTRAINED JOINTS FROM FITTINGS (FEET)

PIPE SIZE	90° BEND	45° BEND OR WYE BRANCH	22 1/2° BEND	11 1/4° BEND	PLUG, CAP OR IN-LINE VALVE	TEE (BRANCH)
6"	25 (30.5)	10.5 (12.5)	5 (6)	2.5 (3)	43 (64)	34 (51)
8"	33 (40)	13.5 (16.5)	6.5 (8)	3 (4)	55 (82)	47 (70)
10"	40 (48.5)	16.5 (20)	8 (9.5)	4 (5)	67 (100)	58 (87)
12"	47 (56.5)	19.5 (23.5)	9.5 (11.5)	4.5 (5.5)	79 (118)	70 (105)
16"	59.5 (72)	24.5 (30)	12 (14.5)	6 (7)	101 (152)	92 (139)
20"	72 (86.5)	30 (36)	14.5 (17)	7 (8.5)	123 (184)	114 (171)
24"	84 (100)	35 (41)	16.5 (20)	8 (10)	144 (216)	134 (202)
30"	100 (120)	41 (50)	20 (24)	10 (12)	174 (261)	165 (247)

NOTES:

1. RESTRAINED LENGTHS LISTED IN PARENTHESES ARE FOR PIPE WRAPPED IN POLYETHYLENE. THE OTHER ASSOCIATED LENGTHS ARE FOR PLAIN UNWRAPPED DUCTILE IRON PIPE.
2. THE CONTRACTOR SHALL USE THIS TABLE IN CONJUNCTION WITH THE APPROPRIATE PIPE SPECIFICATION SECTION.

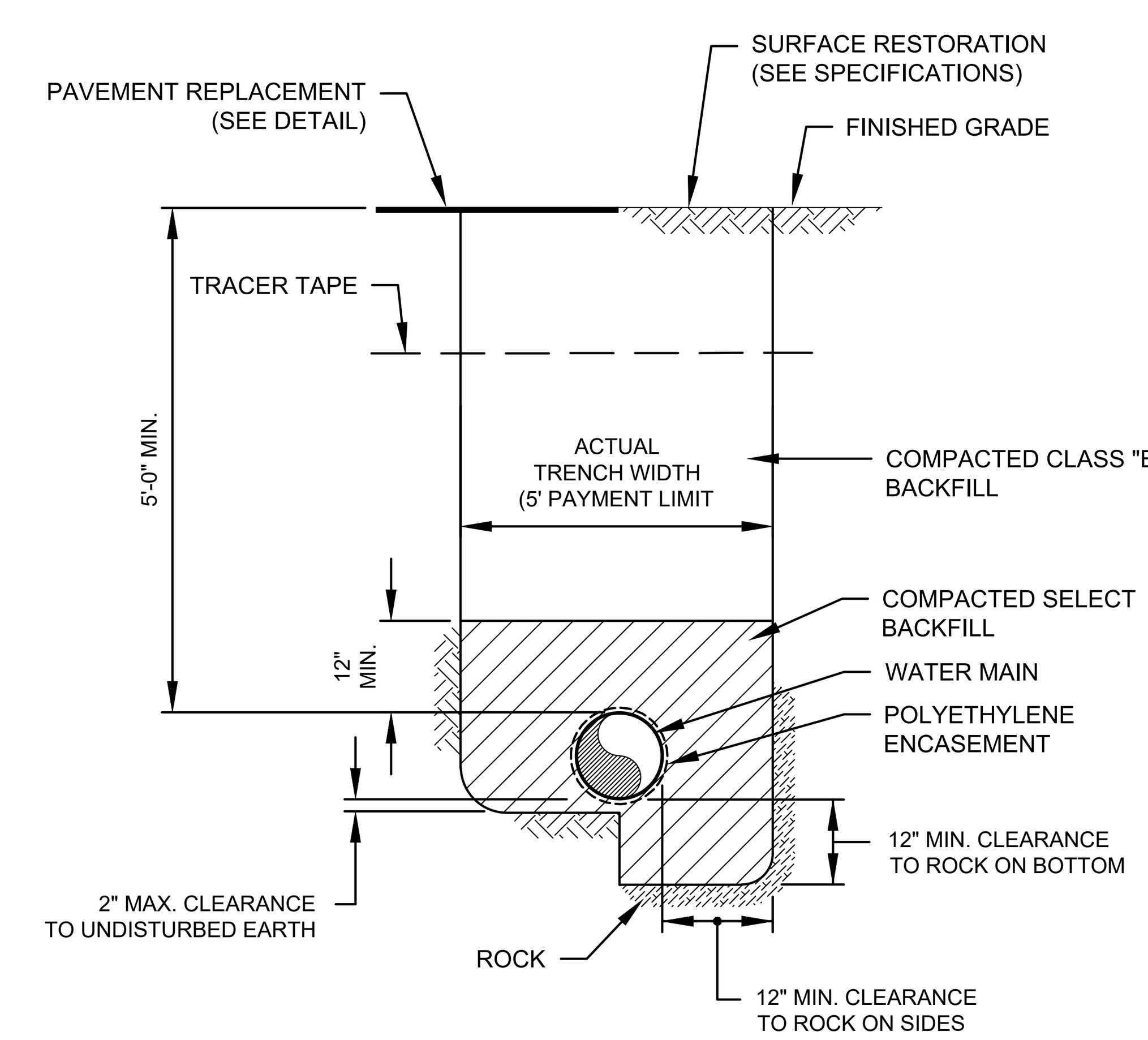
RESTRAINED JOINT TABLE



NOTE :

MINIMUM PRACTICAL DISTANCE - GENERALLY NO MORE THAN 2 FT.

WATER MAIN LATERAL CONNECTION
N.T.S.



WATER MAIN TRENCH DETAIL
N.T.S.

Project:
LITTLETON WATER
DEPARTMENT

LITTLETON
LELWD
ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND
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TARA E
MCMANUS
No. 57127
REGISTERED
PROFESSIONAL ENGINEER

Issued For:
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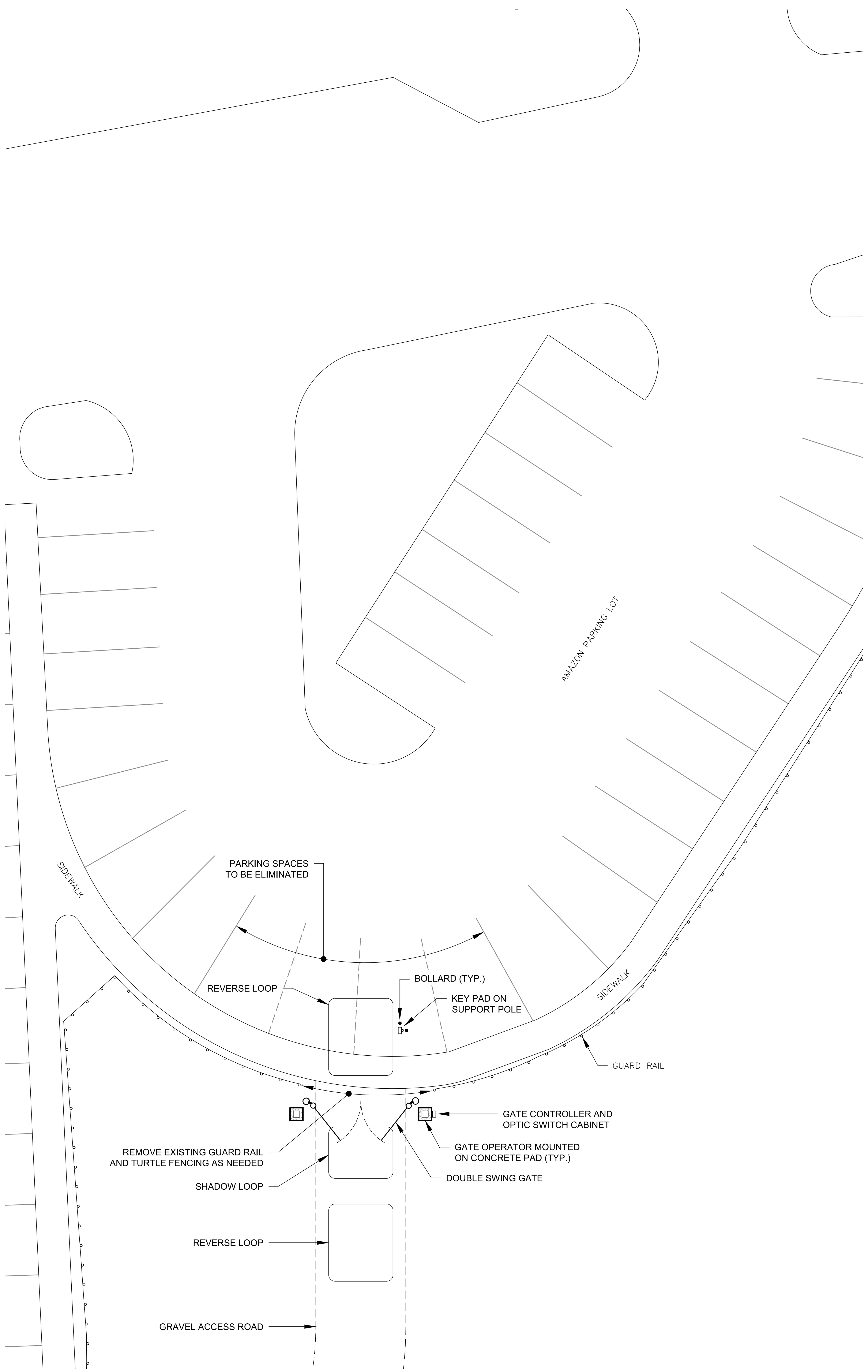
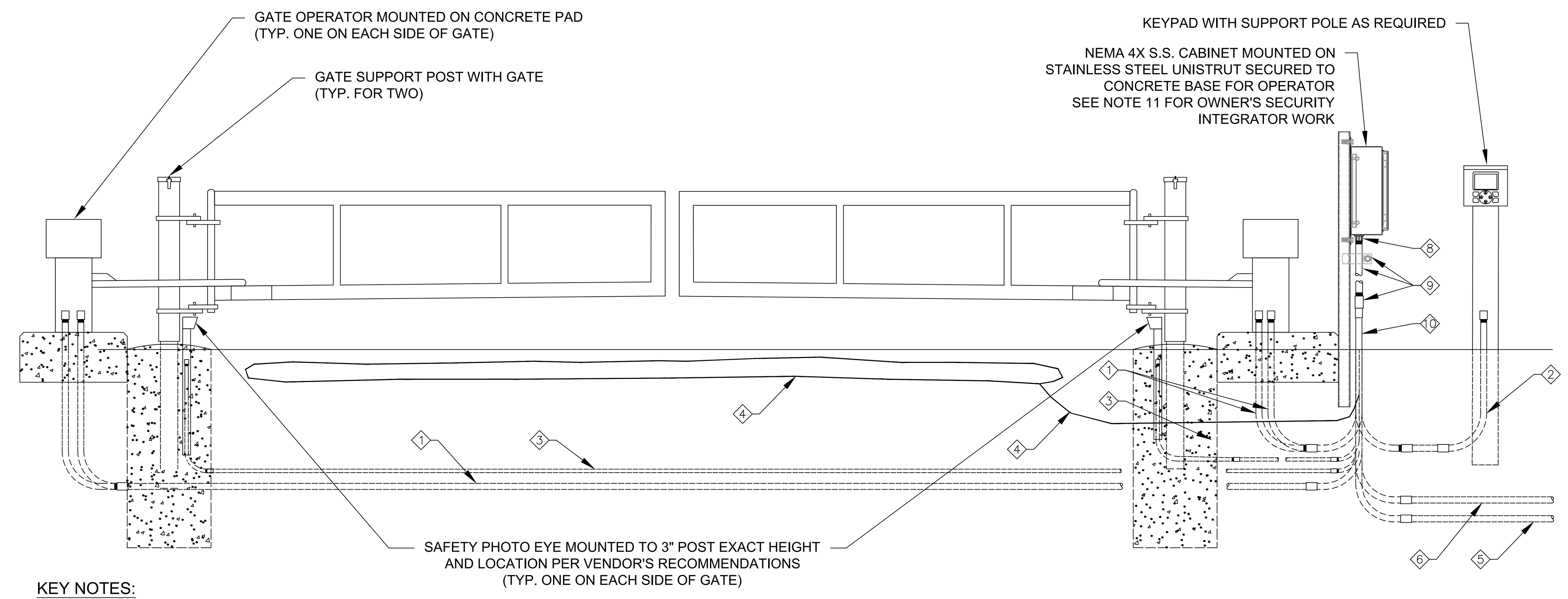
DETAILS I

Sheet Number:
C501



MOTORIZED SECURITY GATE PLAN

SCALE: 1"=10'-0"

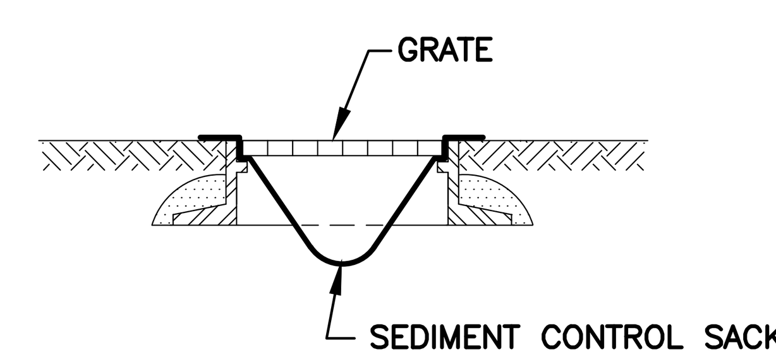


KEY NOTES:

1. (1) 1" U.G. CONDUIT WITH 3#10, 1#10G AND (1) 1" U.G. CONDUIT WITH VENDOR CONTROL CABLES FROM GATE OPERATOR TO NEMA 4X CABINET W/ GATE CONTROLLER.
2. (1) 1" U.G. CONDUIT WITH VENDOR CONTROL CABLE FROM KEYPAD TO NEMA 4X CABINET W/ GATE CONTROLLER, AS REQUIRED.
3. (1) 3/4" U.G. CONDUIT WITH 4#14 FROM SAFETY PHOTO EYE TO NEMA 4X CABINET W/ GATE CONTROLLER.
4. (1) MAGNETIC LOOP DETECTOR CABLE IMBEDDED UNDER PAVEMENT IN ONE (1) LOCATION AND UNDER GRAVEL IN TWO (2) LOCATIONS TO NEMA 4X CABINET W/ GATE CONTROLLER.
5. (1) 1 1/2" U.G. FEEDER CONDUIT WITH 3#6, 1#8G FROM MAIN CONTROL PANEL (RTU-TW) INSIDE WELL #6 BUILDING. SEE SITE PLANS FOR ROUTING. FURNISHED AND INSTALLED BY CONTRACTOR. STUB UP AND CAP 12" ABOVE GROUND FOR GATE VENDOR CONNECTION.
6. (1) 1 1/2" U.G. SIGNAL CONDUIT WITH FIBER OPTIC CABLE FROM FIBER OPTIC PATCH PANEL INSIDE WELL #6 BUILDING. SEE SITE PLAN FOR ROUTING. FURNISHED AND INSTALLED BY CONTRACTOR. STUB UP AND CAP 12" ABOVE GROUND FOR GATE VENDOR CONNECTION.
7. CONTRACTOR TO CAREFULLY COORDINATE EXACT LOCATION OF ALL GATE EQUIPMENT WITH OWNER AND ENGINEER IN FIELD PRIOR TO INSTALLATION. REFER TO SPECIFICATIONS FOR EXACT WIRING PER GATE VENDOR'S REQUIREMENTS.
8. PROVIDE MYERS TYPE THREADED GASKETED CONDUIT HUBS INTO BOXES/ENCLOSURES AS REQUIRED (TYP.)
9. RGS SLIP FITTING, RGS CONDUIT ABOVE TO CABINET WITH S.S. UNISTRUT CLIPS (TYP.)
10. PVC COATED RGS CONDUIT 12" ABOVE GROUND (TYP.)
11. COORDINATE WITH OWNER'S SECURITY INTEGRATOR. OWNER'S SECURITY INTEGRATOR WILL MOUNT GATE CONTROLLER AND FIBER OPTIC SWITCH INSIDE NEMA 4X S.S. CABINET.
12. EQUIPMENT & MATERIALS ARE FURNISHED AND INSTALLED BY GATE VENDOR UNLESS NOTED.

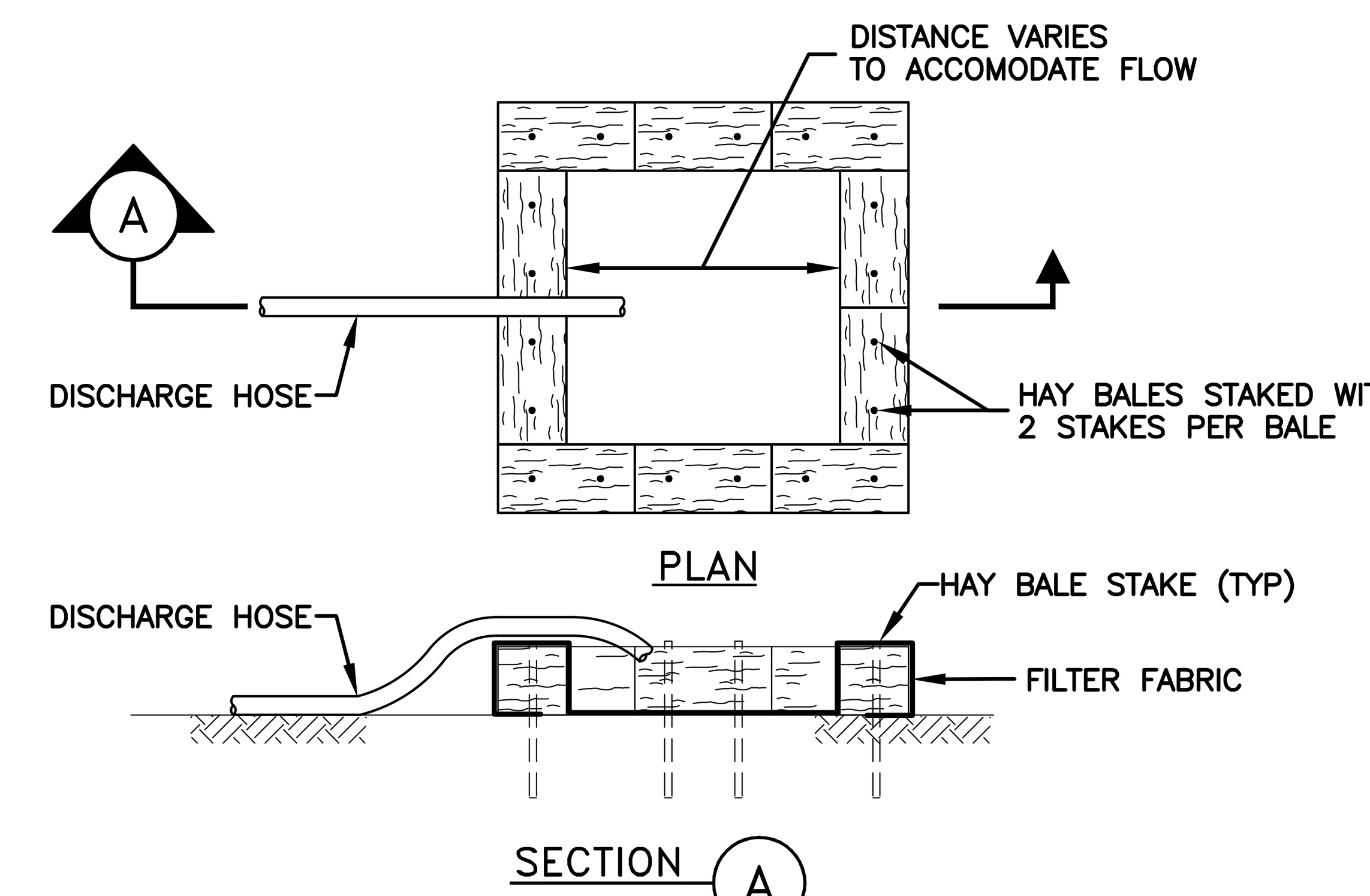
MOTOR OPERATED GATE DETAIL

N.T.S.



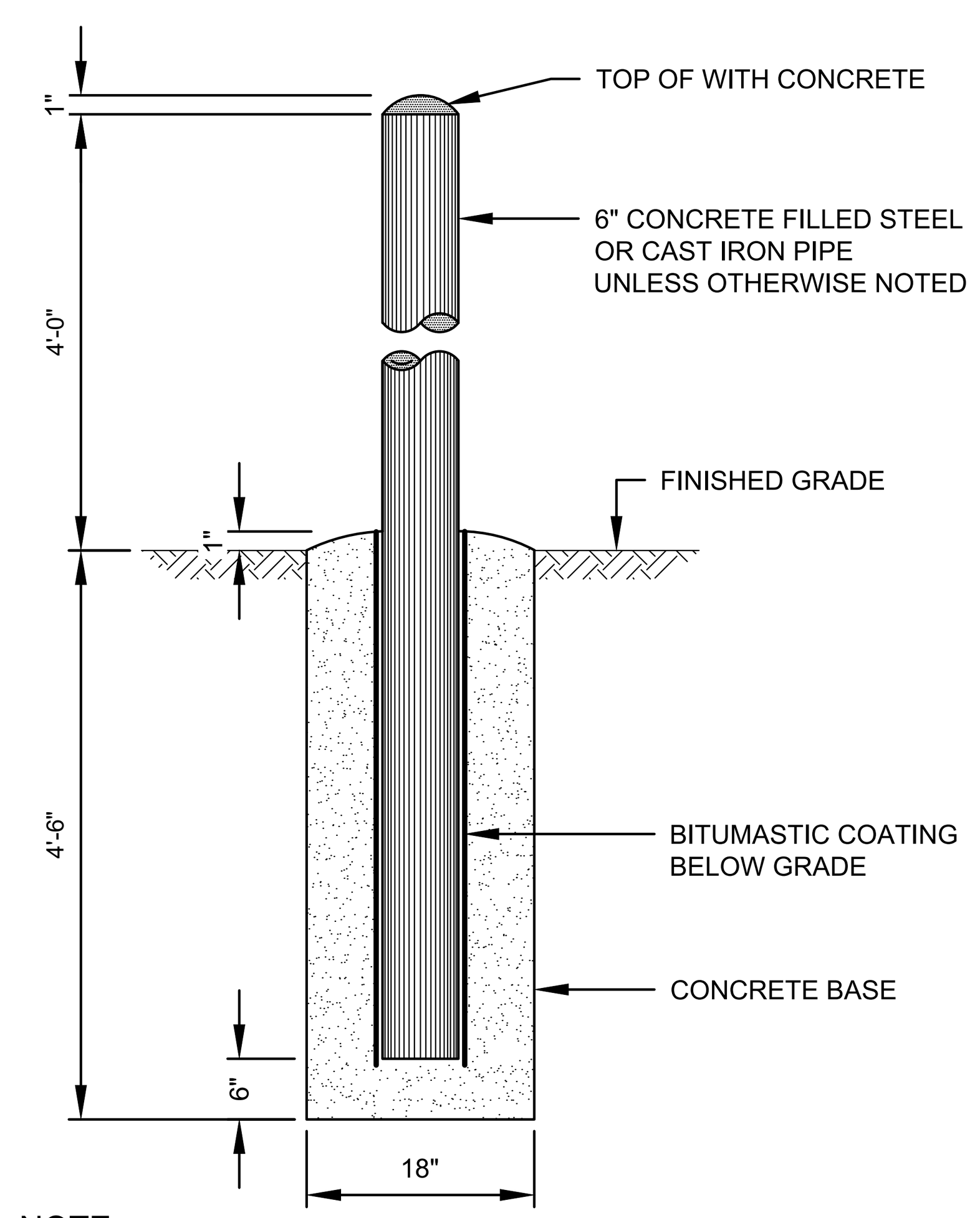
CATCH BASIN PROTECTION DETAIL

N.T.S.



DEWATERING DISCHARGE DISPOSAL DETAIL

N.T.S.

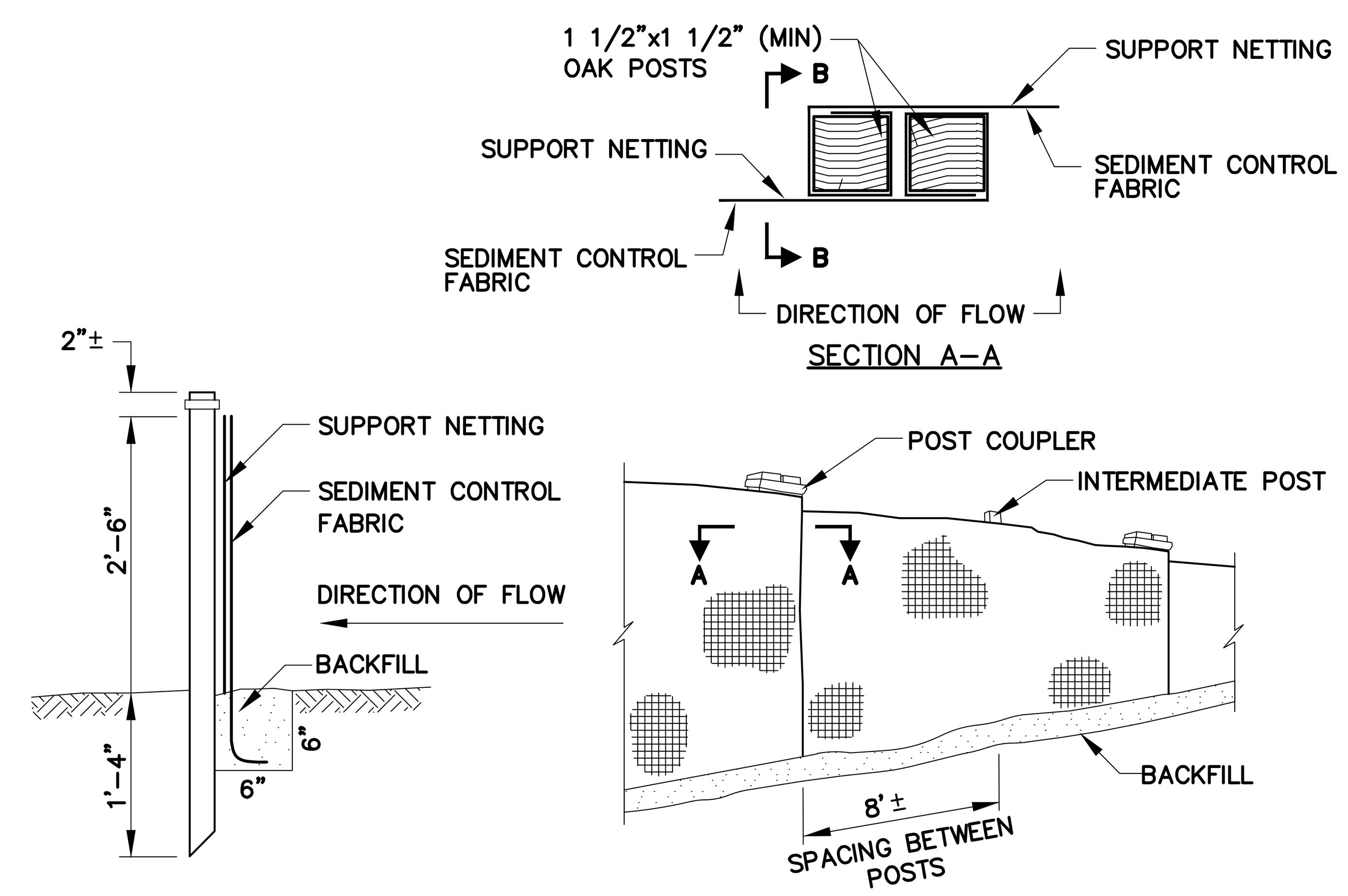


NOTE:

PIPE SHALL BE PAINTED SAFETY YELLOW WITH CATALIZED EPOXY PAINT.

BOLLARD DETAIL

N.T.S.



SILT FENCE DETAIL

N.T.S.

Project:
LITTLETON WATER
DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

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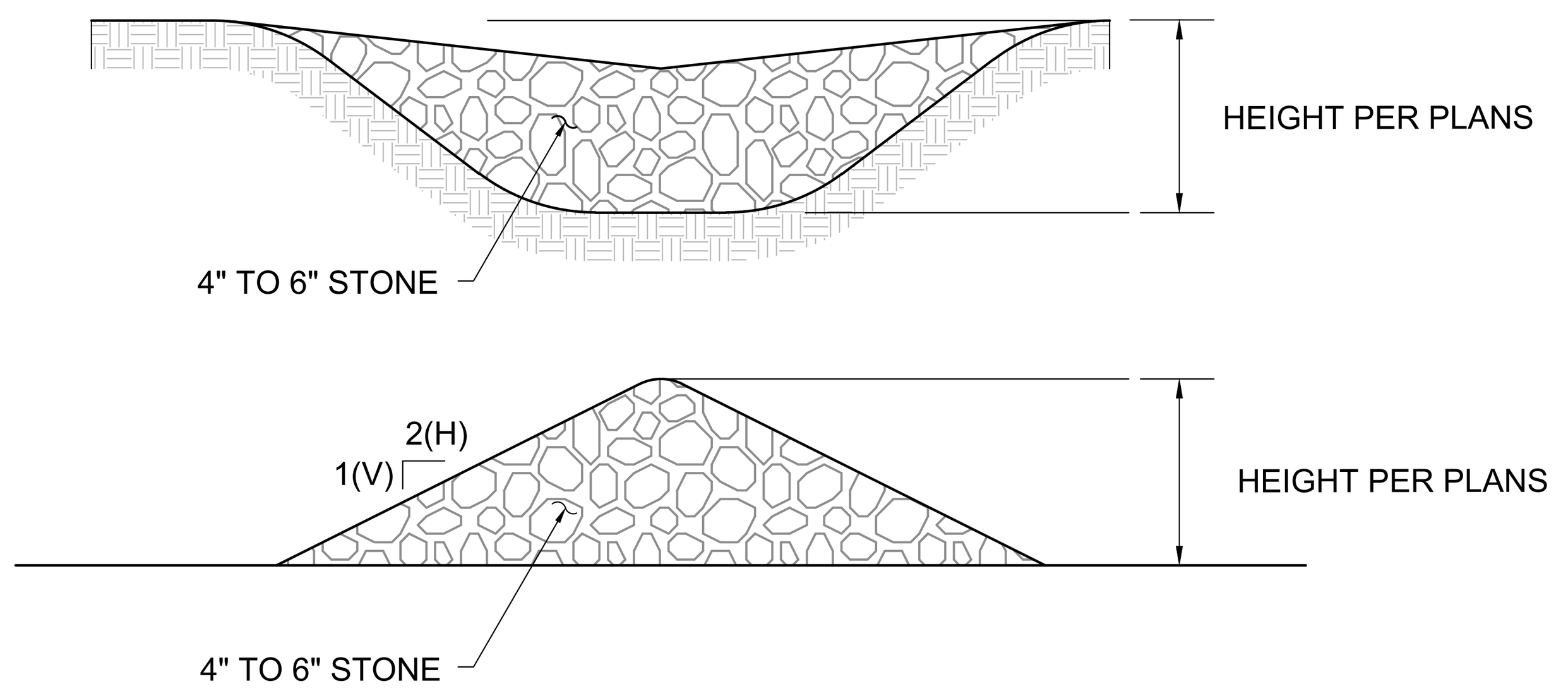
DETAILS II

Sheet Number:
C502

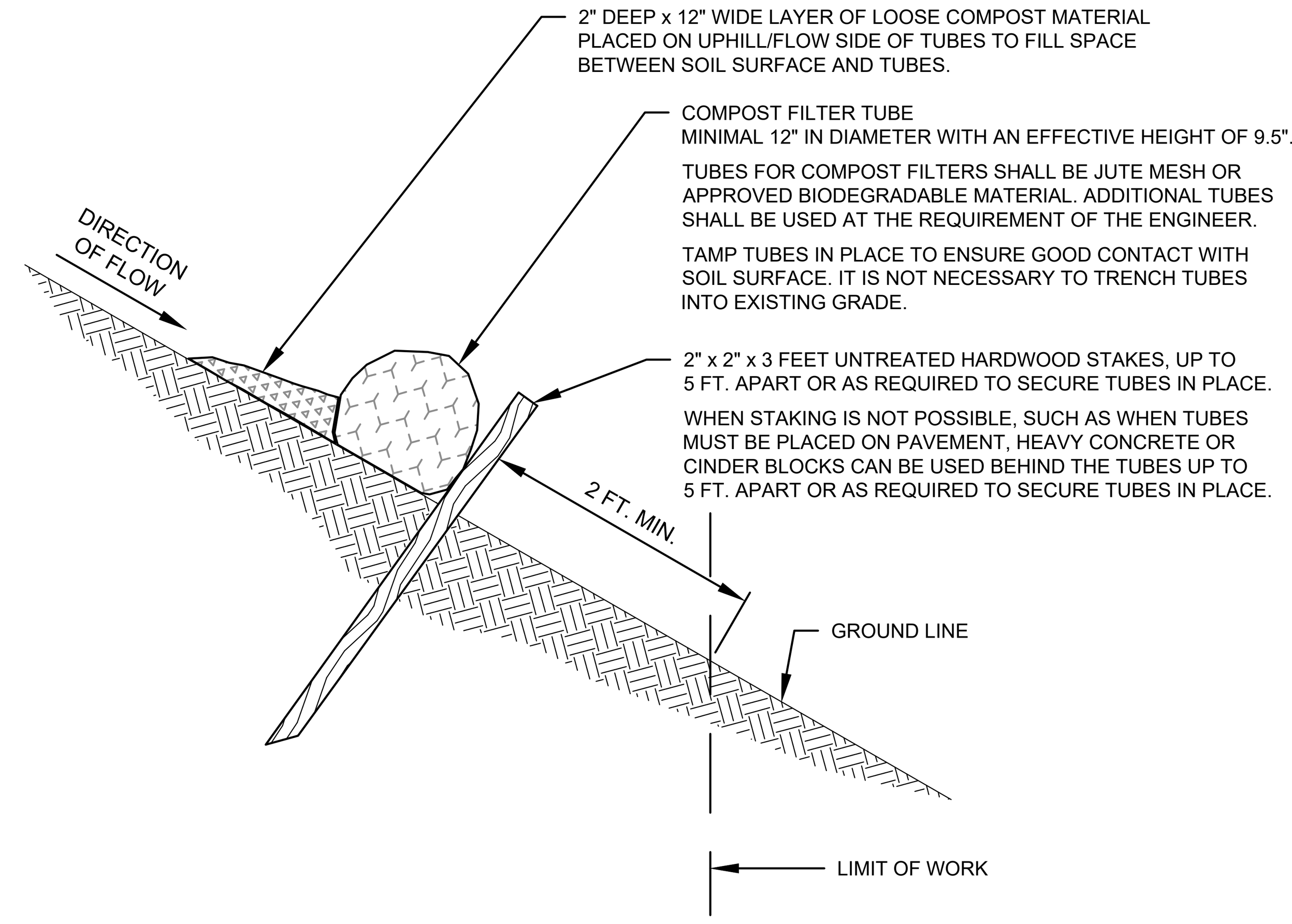


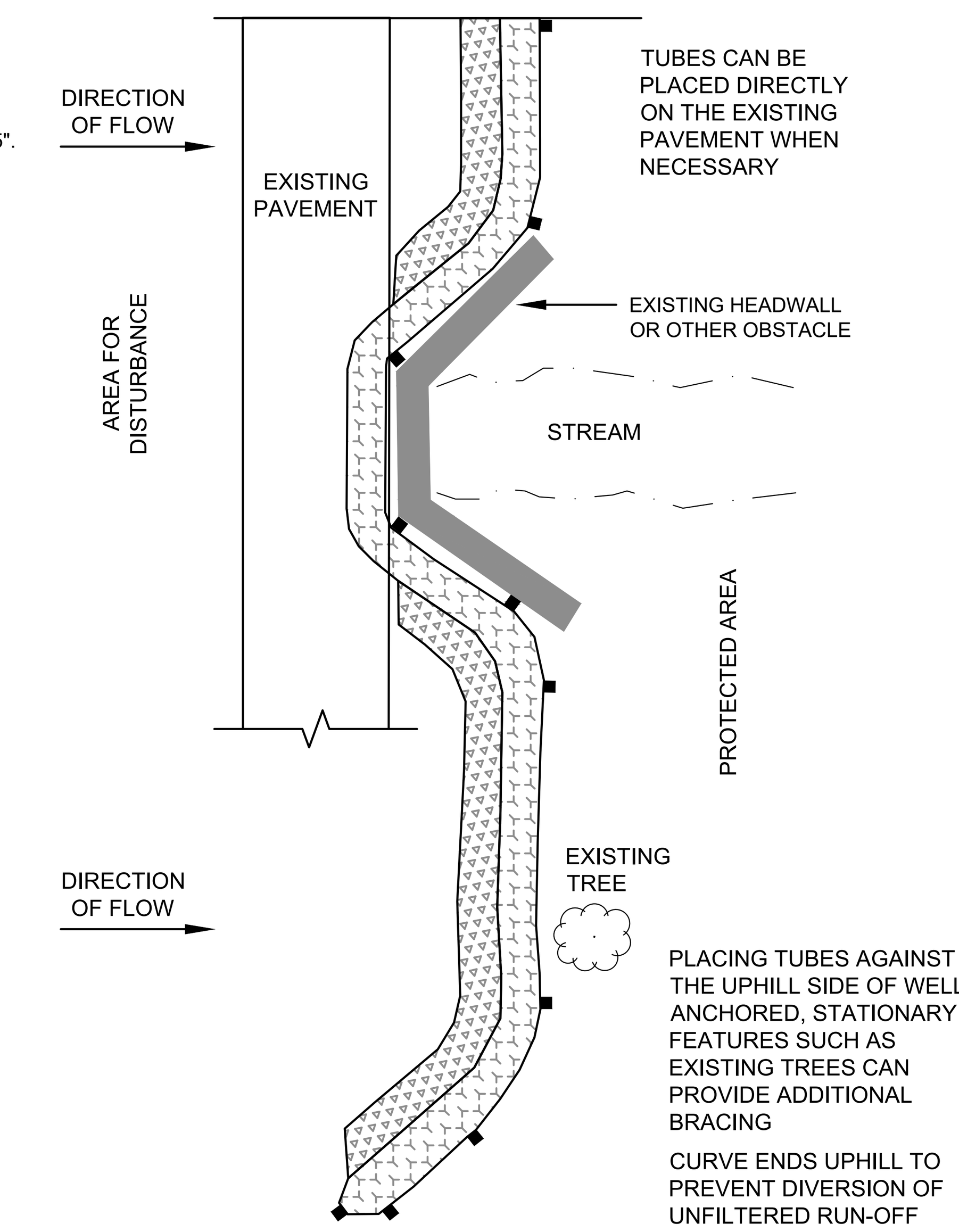
NOTE:

1. STRUCTURES SHALL BE INSTALLED ACCORDING TO THE DIMENSIONS SHOWN ON THE PLANS WHERE SEDIMENT FOREBAYS OR STONE CHECK DAMS ARE LOCATED.

SEDIMENT FOREBAY / STONE CHECKDAM DETAIL

N.T.S.

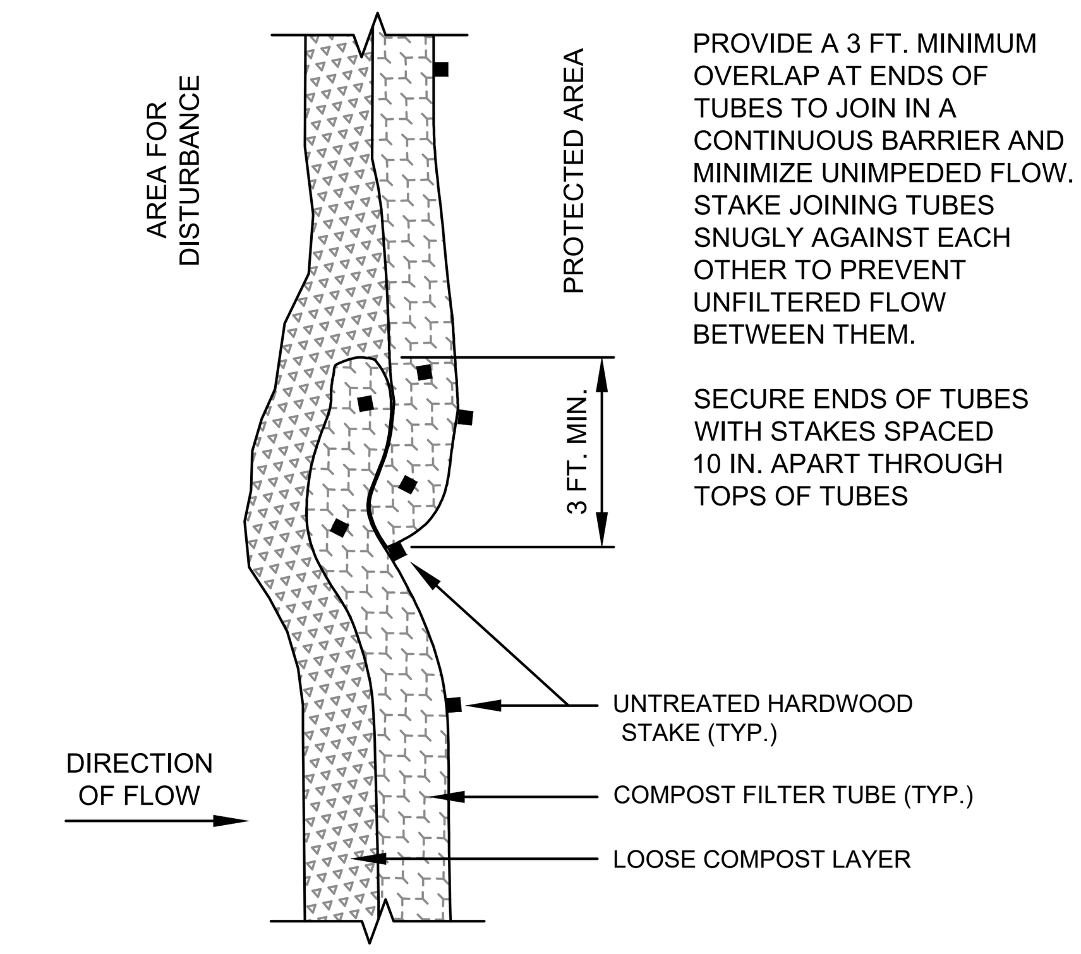




PLAN VIEW

GENERAL NOTES:

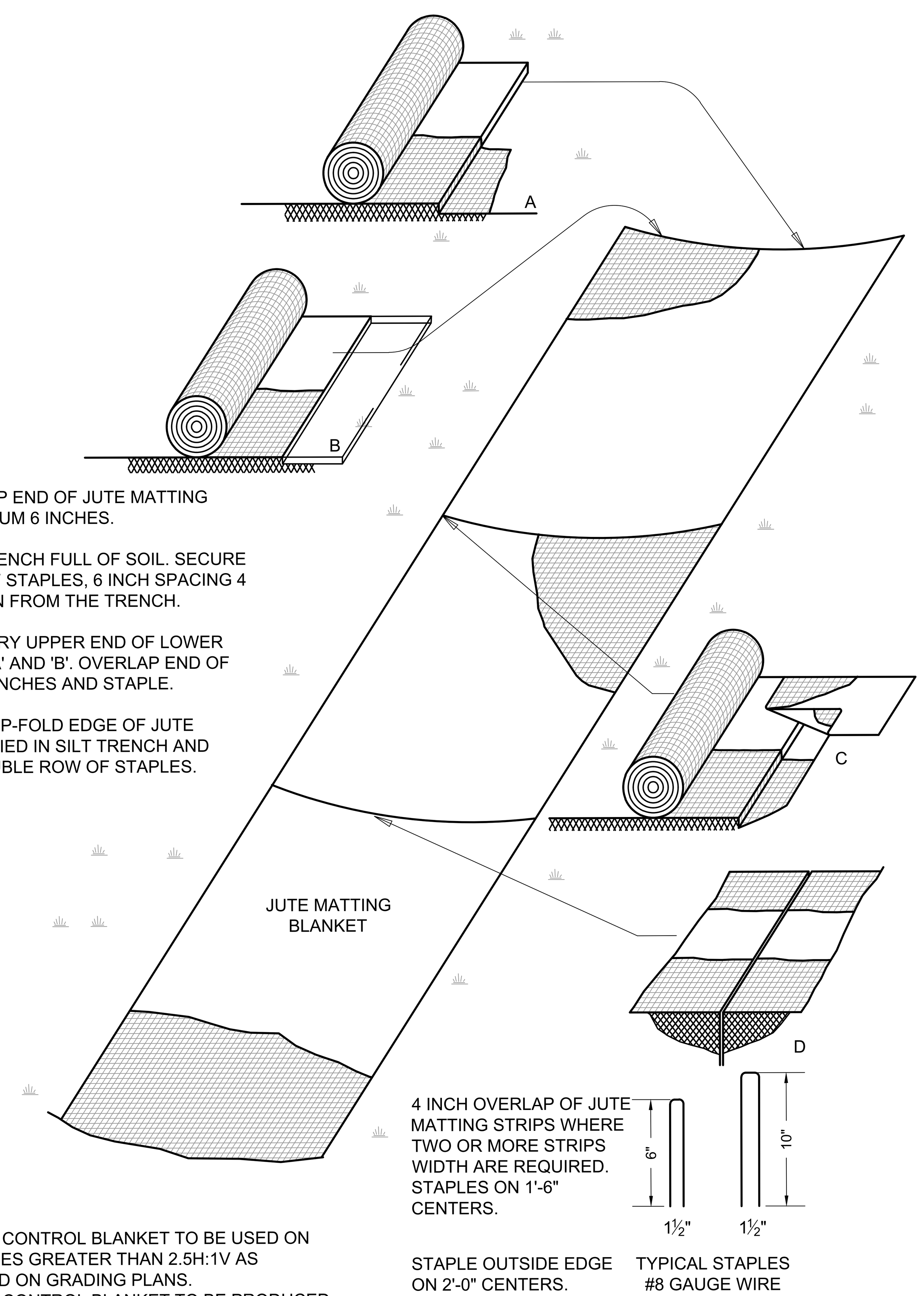
1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORM WATER RUN-OFF.



PLAN VIEW - OVERLAP DETAIL

SINGLE COMPOST FILTER TUBE DETAIL

N.T.S.



A. BURY THE TOP END OF JUTE MATTING STRIPS MINIMUM 6 INCHES.

B. TAMP THE TRENCH FULL OF SOIL. SECURE WITH ROW OF STAPLES, 6 INCH SPACING 4 INCHES DOWN FROM THE TRENCH.

C. OVERLAP- BURY UPPER END OF LOWER STRIP AS IN 'A' AND 'B'. OVERLAP END OF TOP STRIP 4 INCHES AND STAPLE.

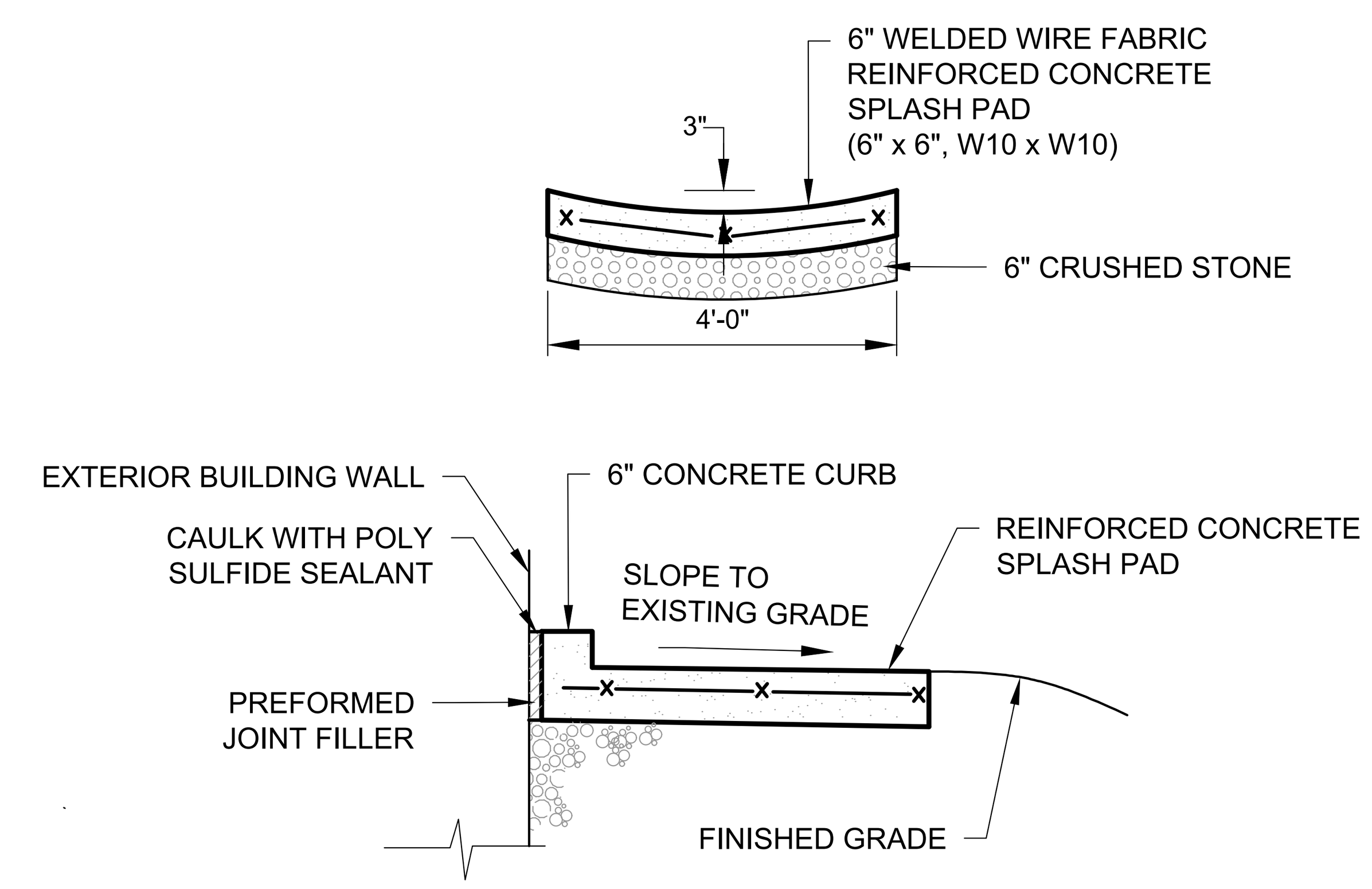
D. EROSION STOP-FOLD EDGE OF JUTE MATTING BURIED IN SILT TRENCH AND TAMPED; DOUBLE ROW OF STAPLES.

NOTES:

1. EROSION CONTROL BLANKET TO BE USED ON ALL SLOPES GREATER THAN 2.5H:1V AS INDICATED ON GRADING PLANS.
2. EROSION CONTROL BLANKET TO BE PRODUCED FROM BIODEGRADABLE JUTE OR COIR MATTING AND IS NOT TO CONTAIN PLASTICS.

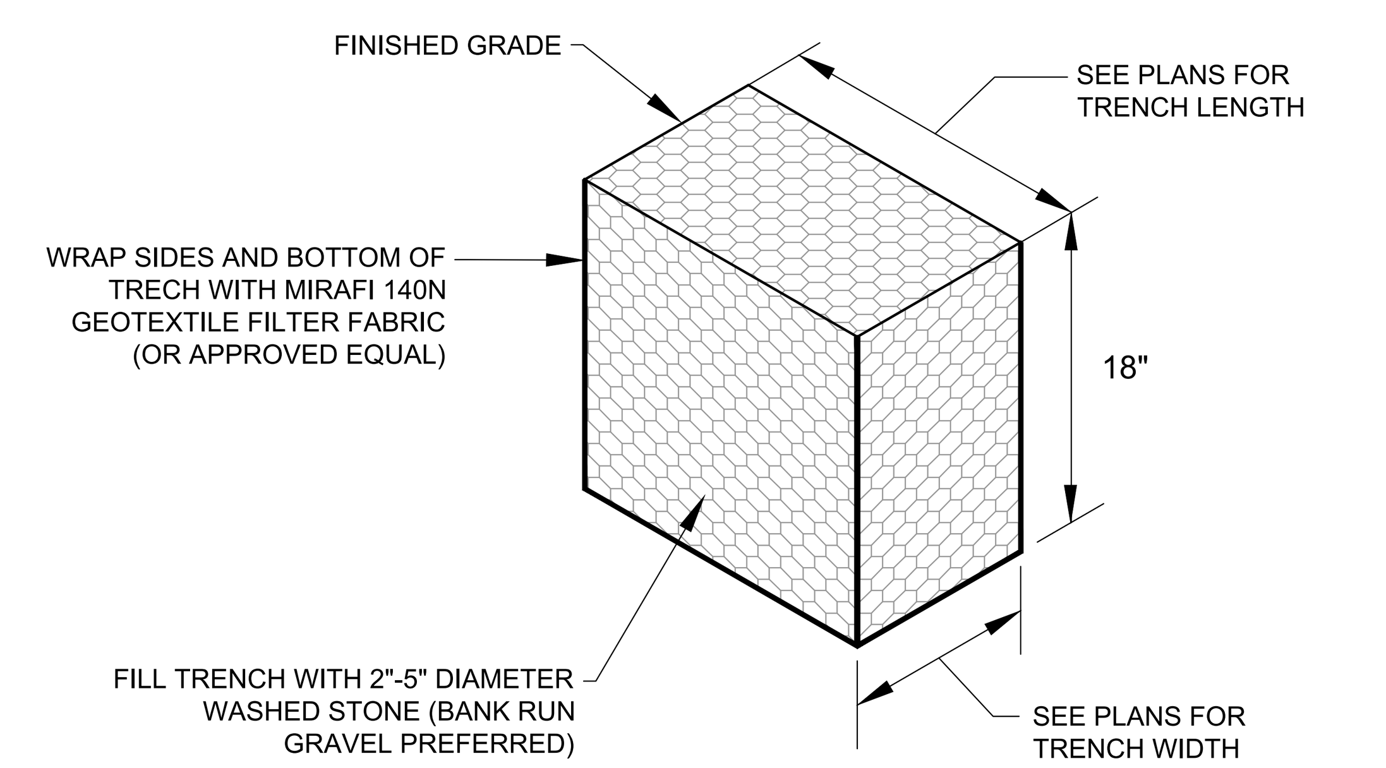
EROSION CONTROL BLANKET DETAIL

N.T.S.



REINFORCED CONCRETE SPLASH PAD DETAIL

N.T.S.

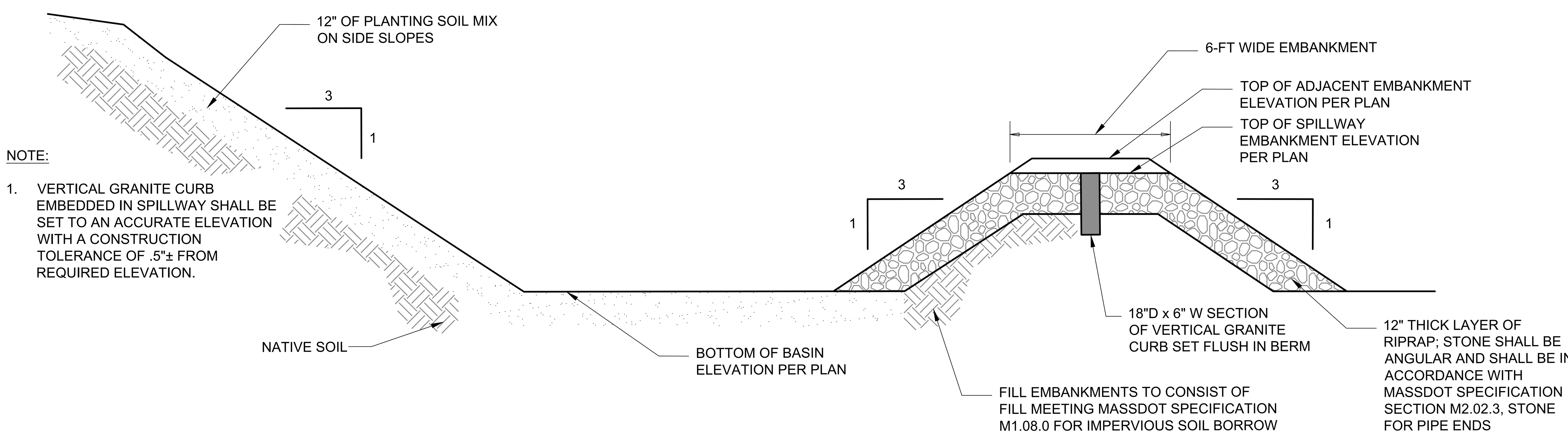


STORMWATER INFILTRATION TRENCH

N.T.S.

NOTE:

1. VERTICAL GRANITE CURB EMBEDDED IN SPILLWAY SHALL BE SET TO AN ACCURATE ELEVATION WITH A CONSTRUCTION TOLERANCE OF .5"± FROM REQUIRED ELEVATION.



INFILTRATION BASIN DETAIL

N.T.S.

Project:

LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
DWSRF NO. 12397
CONTRACT NO.1

Weston & Sampson

Weston & Sampson Engineers, Inc.
55 Walkers Brook Drive, Suite 100
Reading, MA 01867
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:

Revisions:

No.	Date	Description

COA:

Seal: COMMONWEALTH OF MASSACHUSETTS, TARA E MCMANUS, No. 57127, REGISTERED PROFESSIONAL ENGINEER

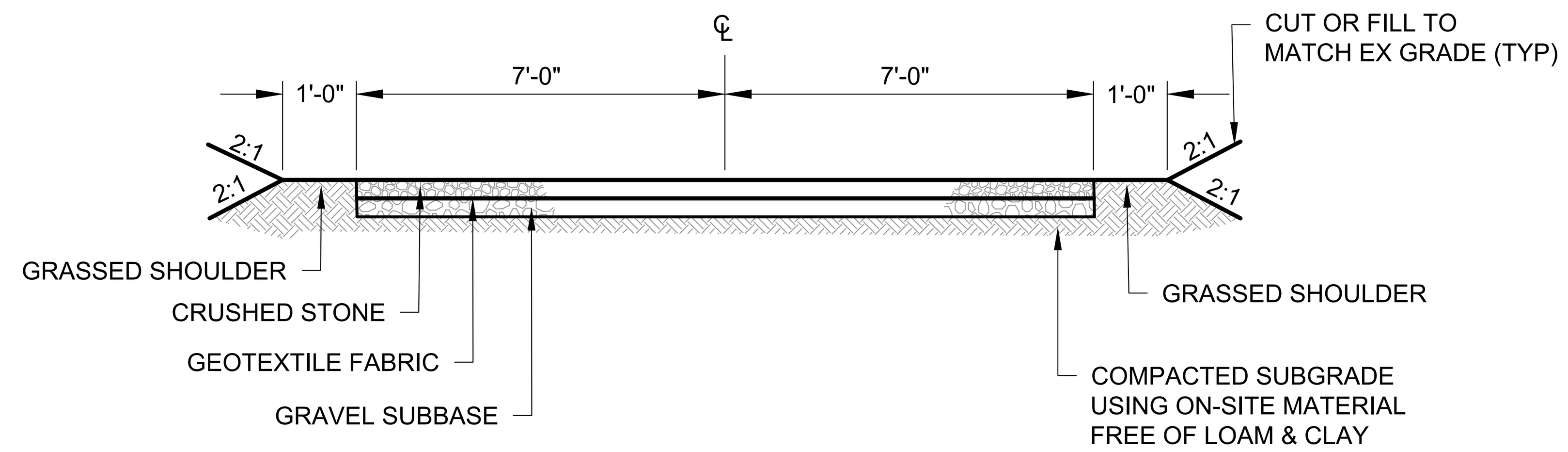
Issued For: BIDDING

Scale: AS NOTED

Date:	AUGUST 2024
Drawn By:	GJK/RWS
Reviewed By:	SBR
Approved By:	TEM
W&S Project No.:	ENG23-0679
W&S File No.:	

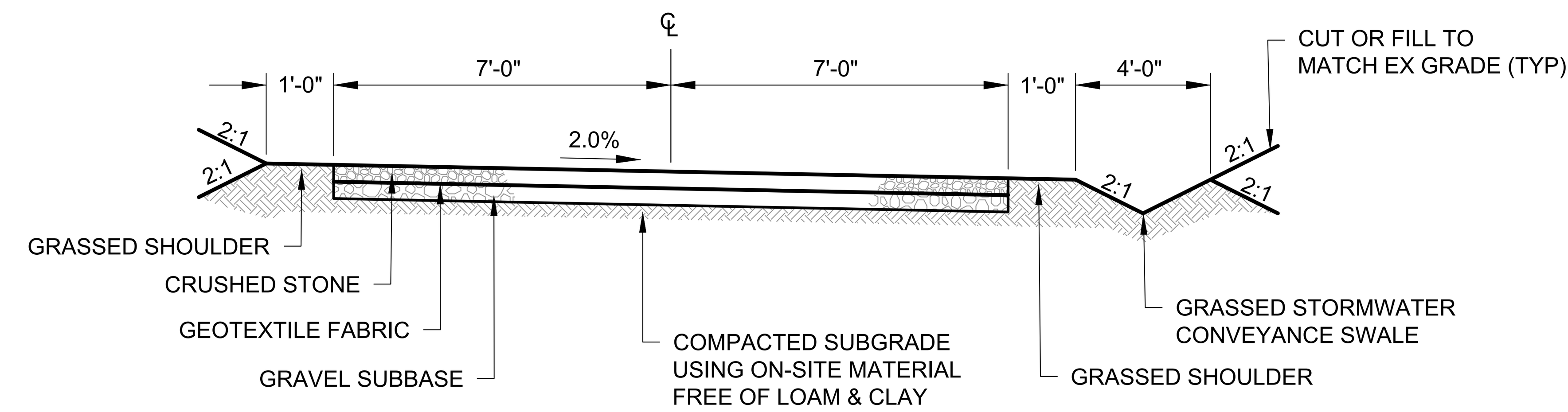
Drawing Title: DETAILS III

Sheet Number: C503



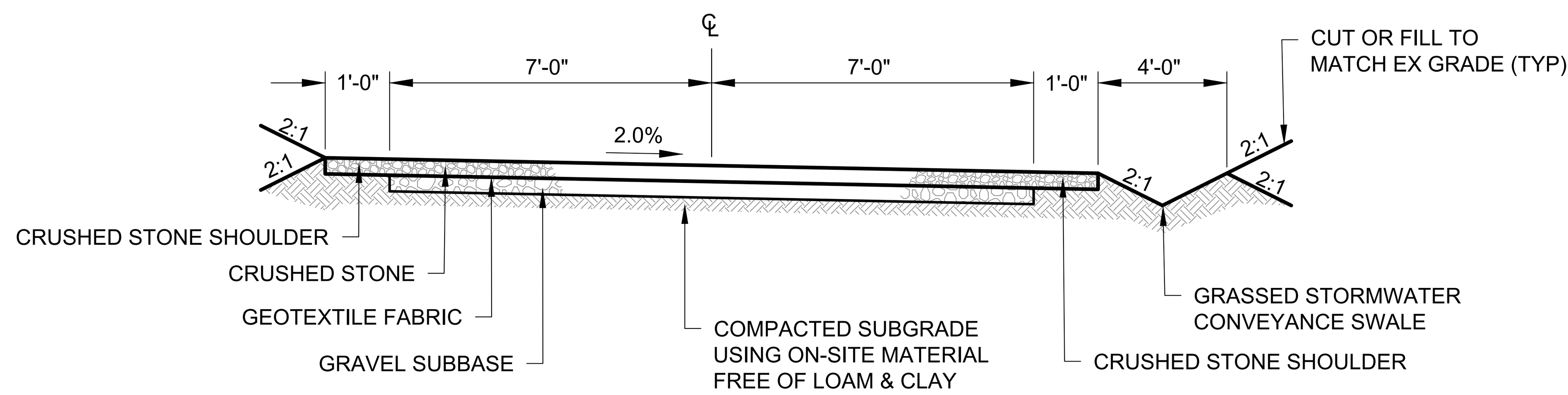
GRAVEL ROAD - TYPICAL SECTION 'A'

STA 0+00.00 - 0+05.00



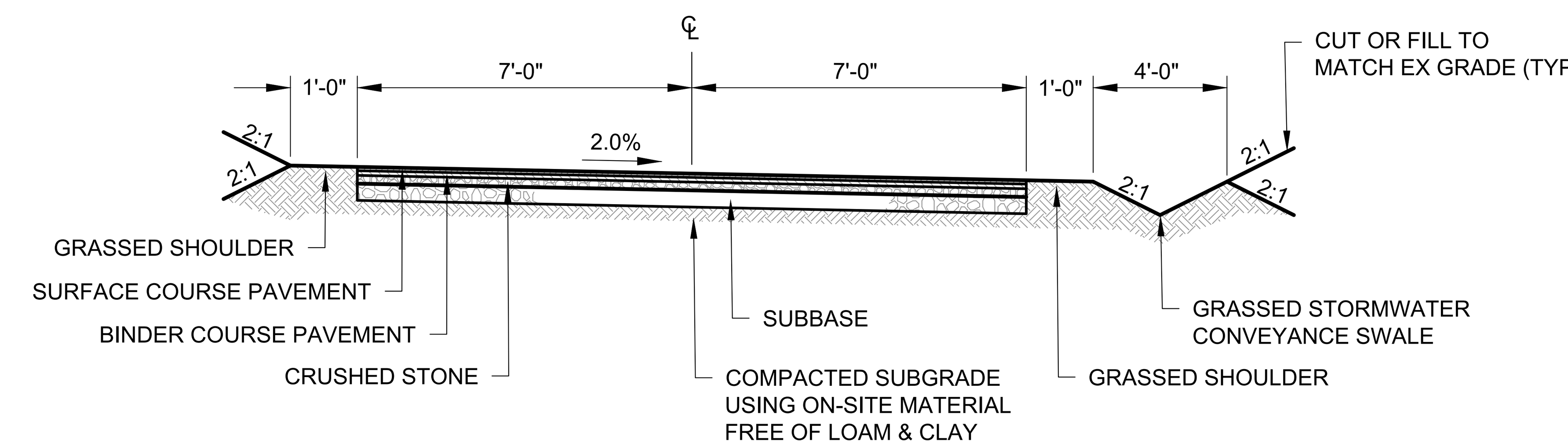
GRAVEL ROAD - TYPICAL SECTION 'B'

STA 0+05.00 - 6+90.36
STA 7+73.14 - 8+07.71



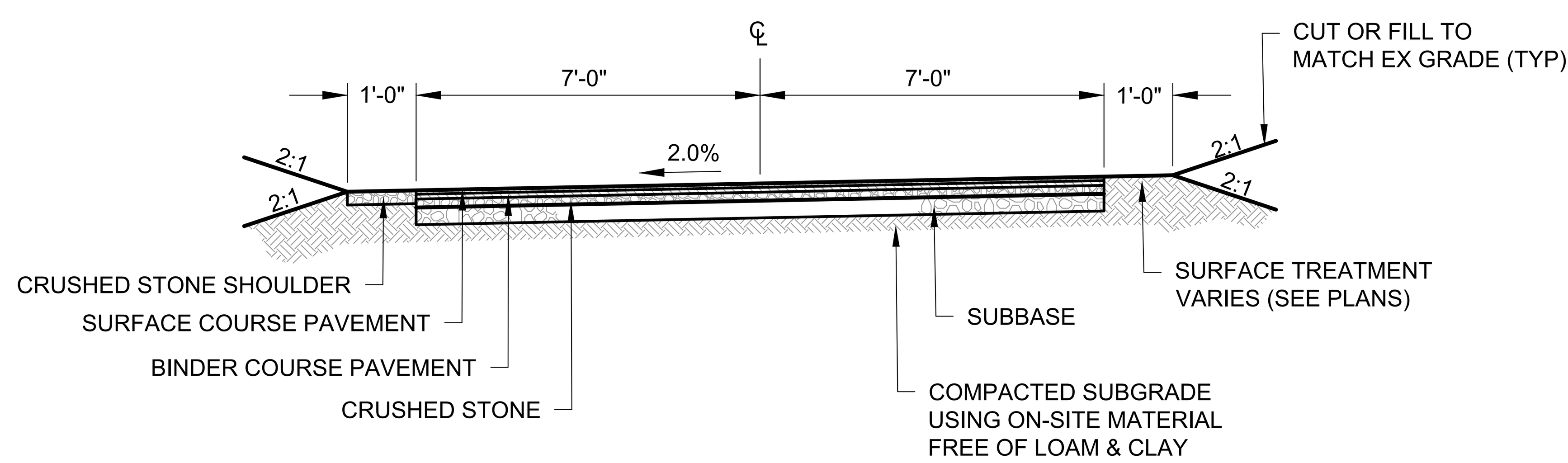
GRAVEL ROAD - TYPICAL SECTION 'C'

STA 6+90.36 - 7+73.14



PAVED ROAD - TYPICAL SECTION 'D'

STA 8+07.71 - 9+97.25



PAVED ROAD - TYPICAL SECTION 'E'

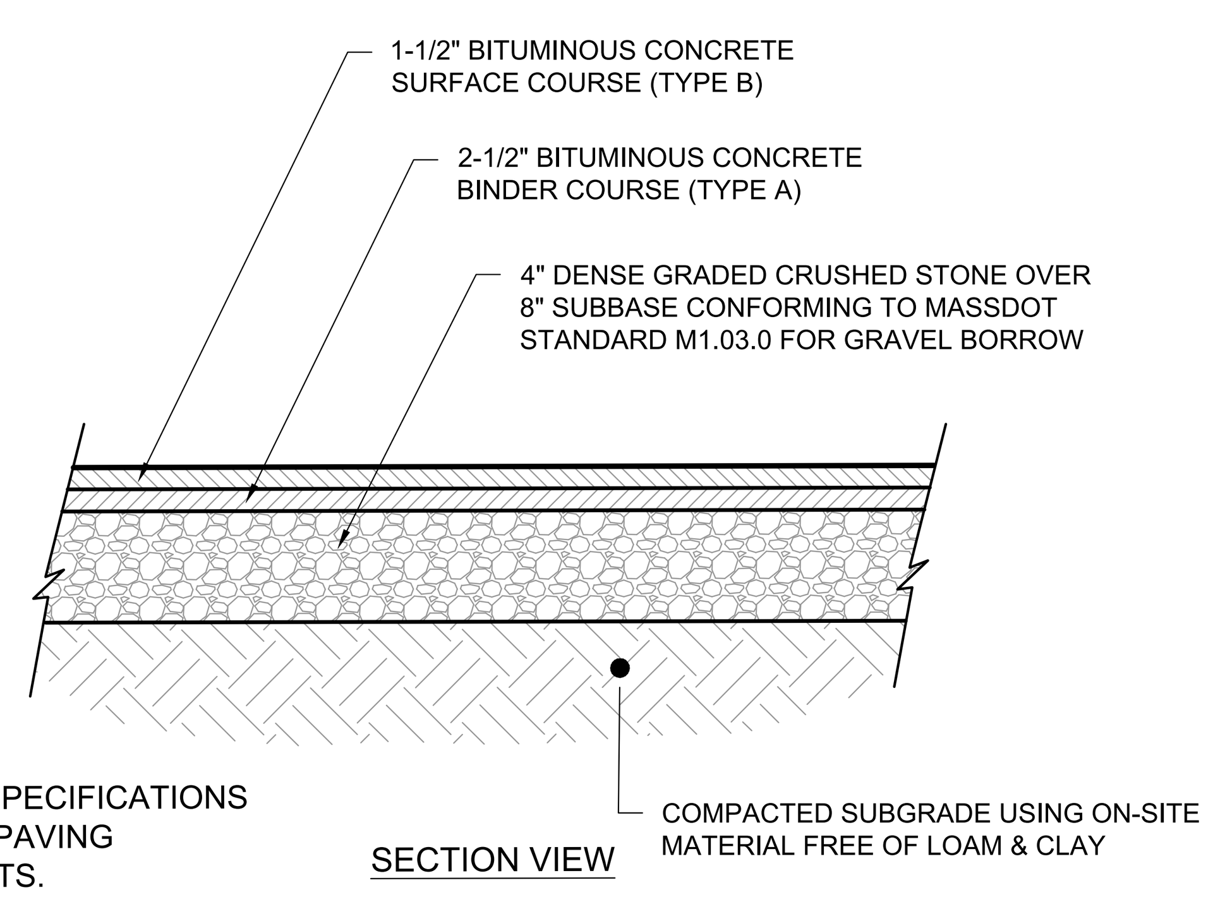
STA 9+97.25 - 11+96.61

NOTE:

1. SEE BITUMINOUS CONCRETE AND GRAVEL ACCESS ROADWAY CROSS-SECTIONS FOR INFORMATION ON MATERIAL DEPTHS AND ADDITIONAL REQUIREMENTS.

ACCESS ROADWAY CROSS-SECTIONS

N.T.S.

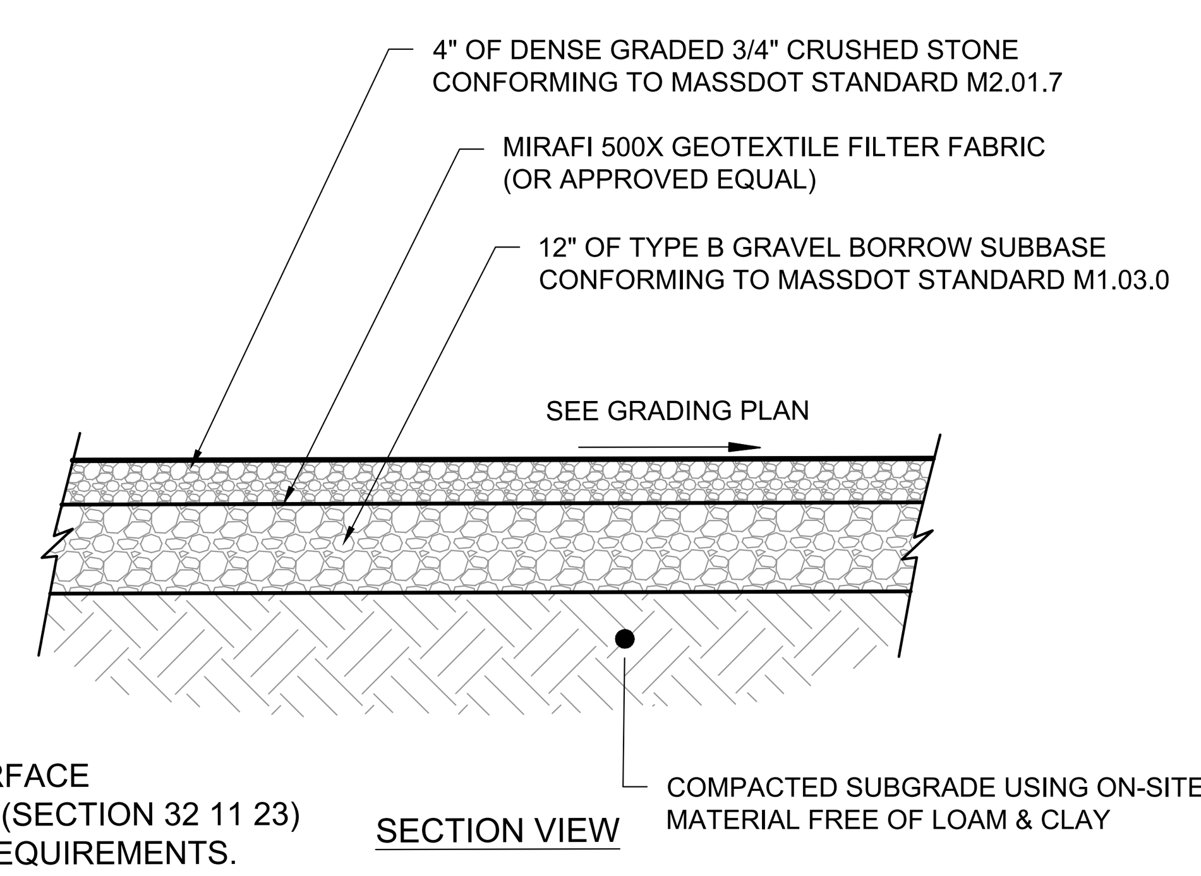


NOTE:

1. SEE HOT MIX ASPHALT SPECIFICATIONS (SECTION 32 12 00) FOR PAVING MATERIAL REQUIREMENTS.

BITUMINOUS CONCRETE ACCESS ROADWAY CROSS-SECTION

N.T.S.

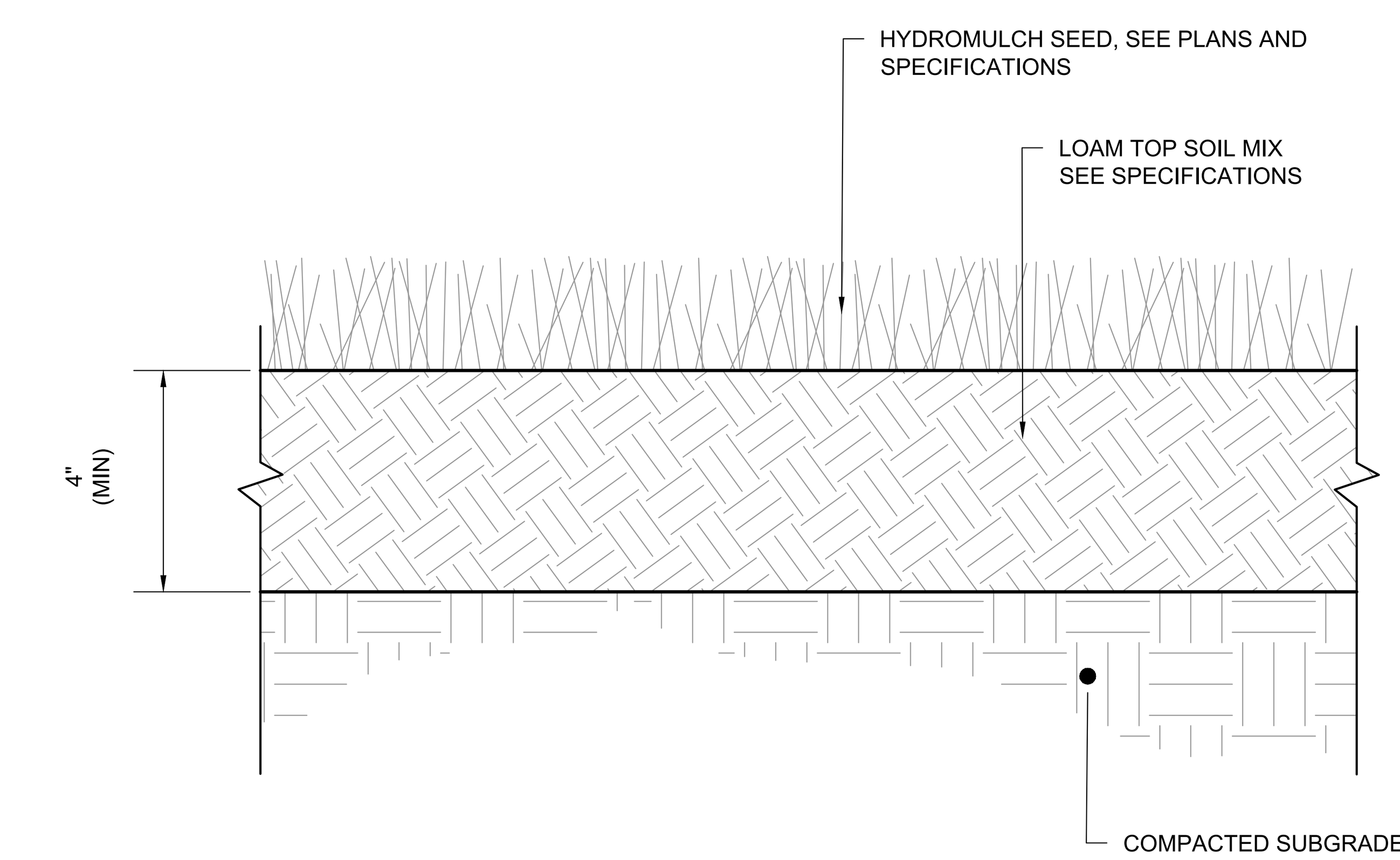


NOTE:

1. SEE GRAVEL SURFACE SPECIFICATIONS (SECTION 32 11 23) FOR MATERIAL REQUIREMENTS.

GRAVEL ACCESS ROADWAY CROSS-SECTION

N.T.S.



LOAM & SEED DETAIL

N.T.S.

Project:
LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
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Consultants:

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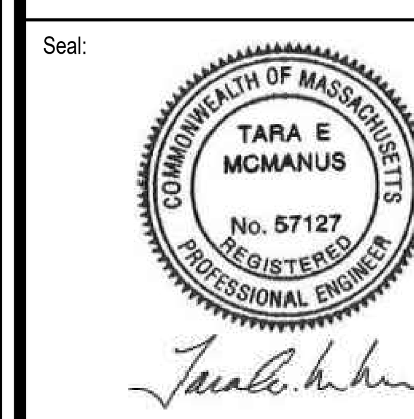

Issued For: BIDDING

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Reviewed By:	SBR
Approved By:	TEM
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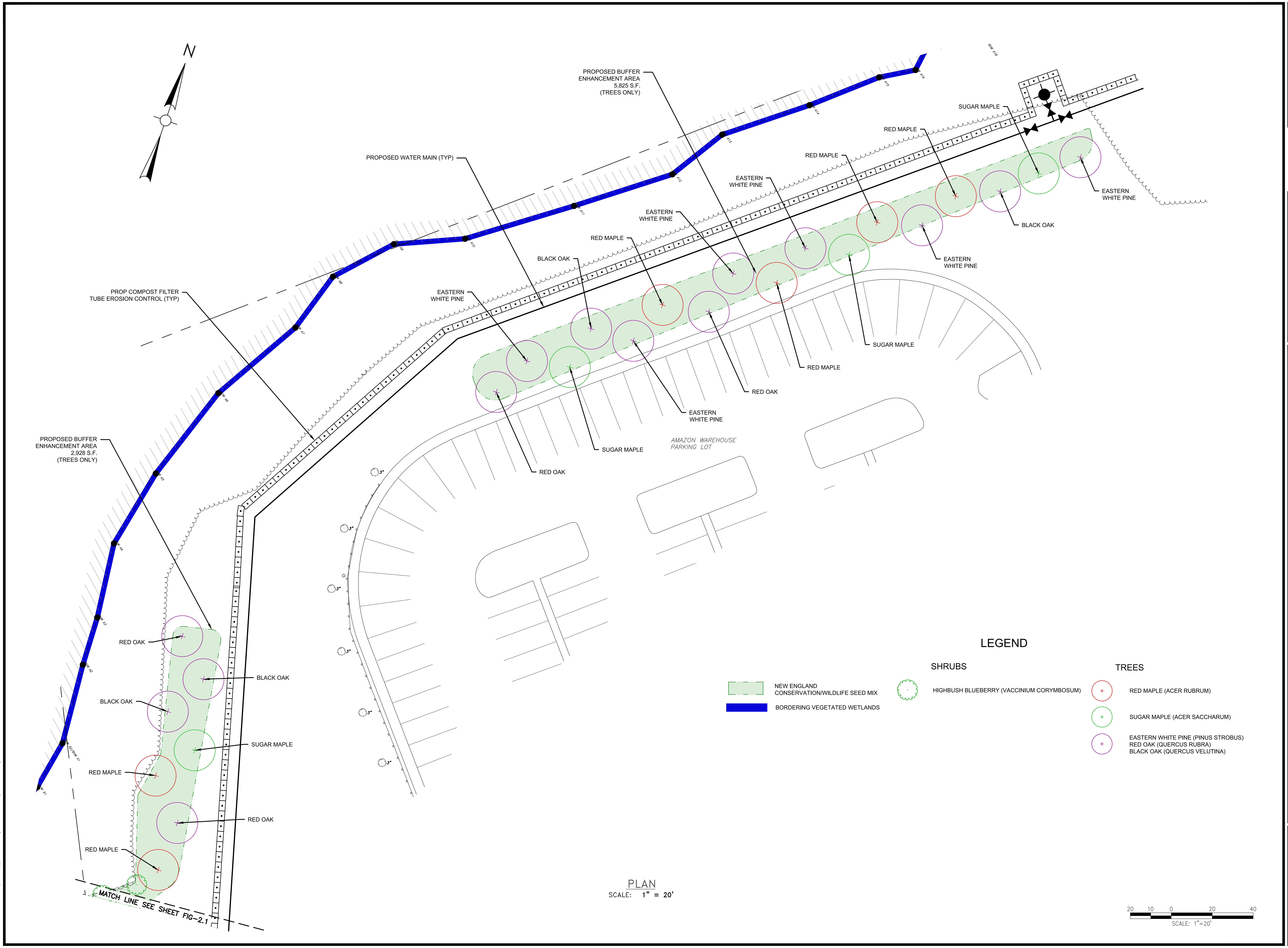
W&S File No.:	

Drawing Title: DETAILS IV

Sheet Number: C504



PLAN
SCALE: 1" = 20'

Project:

LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
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Issued For:

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Scale: AS NOTED

Date: AUGUST 2024
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Approved By: TEM

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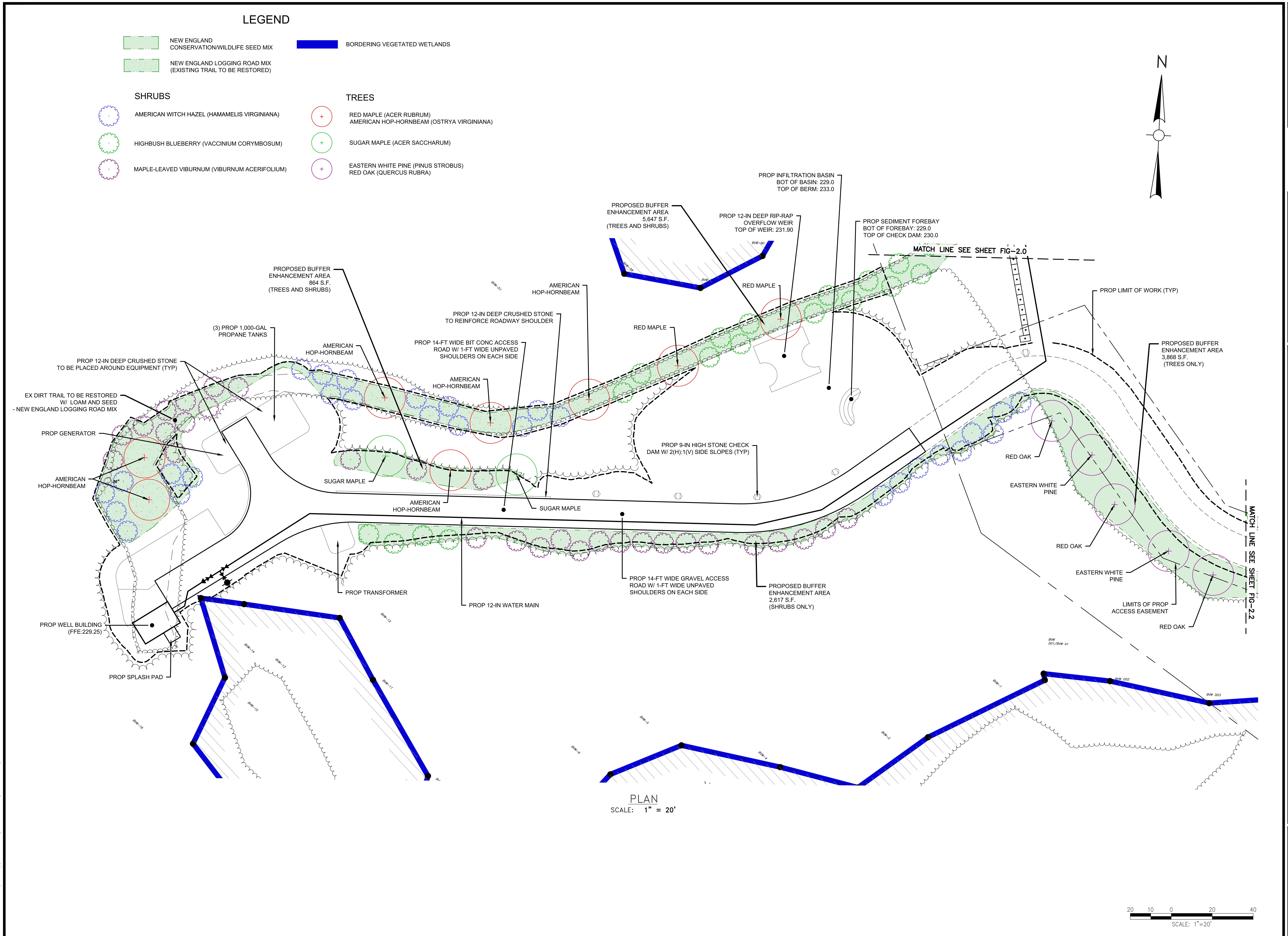
W&S File No.:

Drawing Title:

PLANTING PLAN

Sheet Number:

L001



Project:
LITTLETON WATER DEPARTMENT

LITTLETON LELWD ELECTRIC LIGHT & WATER DEPARTMENTS

TRUMBULL WELL AND RAW WATER MAIN
TOWN CONTRACT NO. IFB-2024
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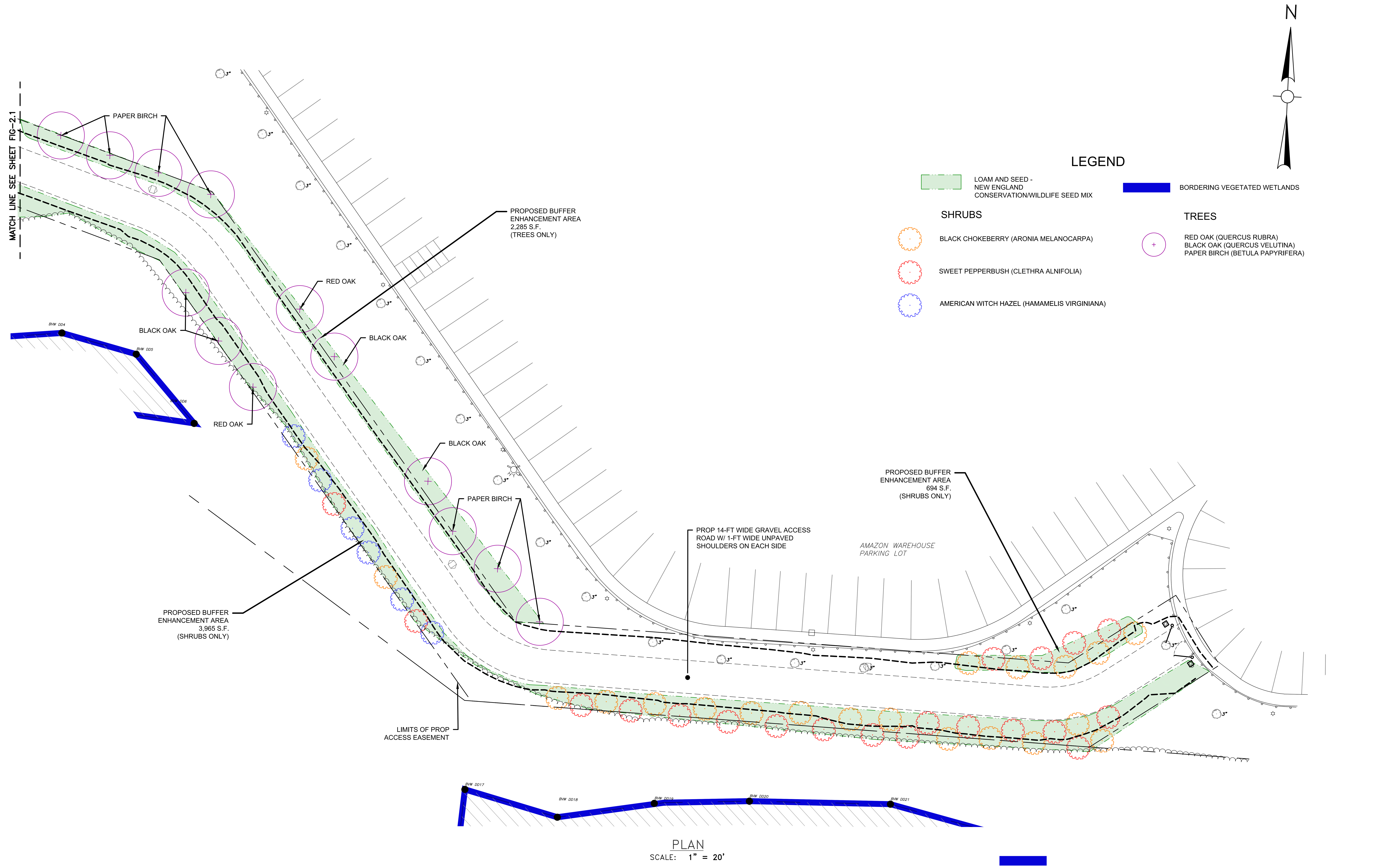
W&S Project No.:	ENG23-0679
W&S File No.:	

Drawing Title:
PLANTING PLAN

Sheet Number:
L002



Project:

LITTLETON WATER DEPARTMENT

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TRUMBULL WELL AND RAW WATER MAIN
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W&S File No.:

Drawing Title:

PLANTING PLAN

Sheet Number:

L003

Restoration and Enhancement Plantings

Species	Plant Size	Plant Quantity	Planting Notes
Red Oak (Quercus *rubra*)	2-3" caliper saplings, bare root or 20 gallon min.	10	Red oak provides good cover for mammal and bird species and nesting sites for songbirds. Deer browse the leaves, and acorns are eaten by a variety of mammals. Adds important leaf litter.
Black Oak (Quercus *velutina*)	2-3" caliper saplings, bare root or 20 gallon min.	8	Black oak provides cover for mammal and bird species and nesting sites for songbirds. Acorns provide a food source for numerous species including small mammals, deer, and wild turkey.
Eastern White Pine (Pinus strobus)	2-3" caliper saplings, bare root or 20 gallon min.	8	Songbirds and small mammals eat eastern white pine seeds. Deer and rabbits browse the foliage. Several mammal species feed on the bark.
White Birch (Betula *papyrifera*)	2-3" caliper saplings, bare root or 20 gallon min.	6	Some small mammals eat the twigs and bark. Birds feed on the catkins.
American Hop-Hornbeam (Ostrya *virginiana*)	2-3" caliper saplings, bare root or 20 gallon min.	6	Excellent pollinator habitat. Nutlets are eaten by songbirds, turkeys, and small mammals.
Red Maple (Acer *rubrum*)	2-3" caliper saplings, bare root or 20 gallon min.	8	Red maple flowers early in the spring. The leaves and shoots are browsed by deer. Rodents feed on the fruits. Adds important leaf litter.
Sugar Maple (Acer *saccharum*)	2-3" caliper saplings, bare root or 20 gallon min.	6	Deer, porcupine, and rodents eat the bark, twigs, or fruit. Songbirds and woodpeckers nest in the branches.
	Tree Total	*52*	
Highbush Blueberry (Vaccinium *corymbosum*)	2-3'	17	Berries provide a food source for birds and small mammals. Foliage is browsed by deer and rabbits. Plant attracts many pollinators.
Sweet Pepperbush (Clethra alnifolia)	2-3'	20	A medium-sized shrub found in coastal and inland wetlands. Sweet-smelling flowers in July. Provides food and cover for birds.
Maple-leaved Viburnum (Viburnum *acerifolium*)	2-3'	30	Deer, rabbits, and beavers eat the twigs, bark and leaves.
American Witch Hazel (Hamamelis *virginiana*)	2-3'	35	Fruit is eaten by deer and rabbits.
Black Chokeberry (Aronia *melanocarpa*)	2-3'	20	Host plant for pollinators. Provides shelter and nesting sites for birds. Browsed by deer and rabbits.
	Shrub Total	*122*	
New England Conservation/Wildlife Seed Mix			The New England Conservation/Wildlife MixTM (or equivalent) contains a variety of grasses, wildflowers, and legumes. This seed mix enhances wildlife habitat value.
New England Logging Road Mix (for use within the former access road)			The New England Logging Road Seed MixTM provides native plant cover in low fertility and compacted soils.

NEW ENGLAND WETLAND PLANTS, INC

820 WEST STREET, AMHERST, MA 01002

PHONE: 413-548-8000 FAX 413-549-4000
EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

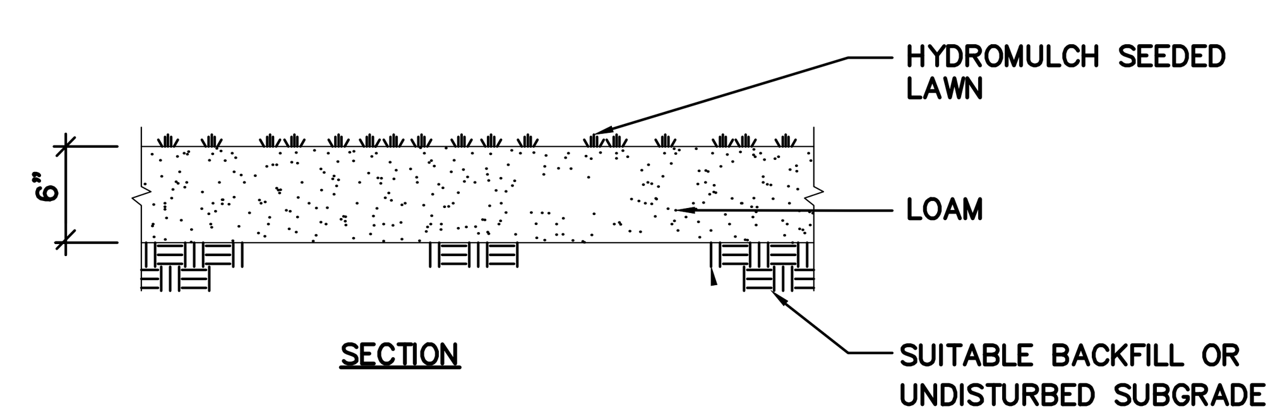
New England Logging Road Mix

Botanical Name	Common Name	Indicator
Festuca rubra	Red Fescue	FACU
Schizachyrium scoparium	Little Bluestem	FACU
Panicum virgatum	Switch Grass	FAC
Elymus virginicus	Virginia Wild Rye	FACW-Andropogon
gerardii	Big Bluestem	FAC
Sorghastrum nutans	Indian Grass	UPL
Chamaecrista fasciculata	Partridge Pea	FACU
Agrostis perennans	Upland Bentgrass	FACU
Juncus tenuis	Path Rush	FAC
Juncus effusus	Soft Rush	FACW+

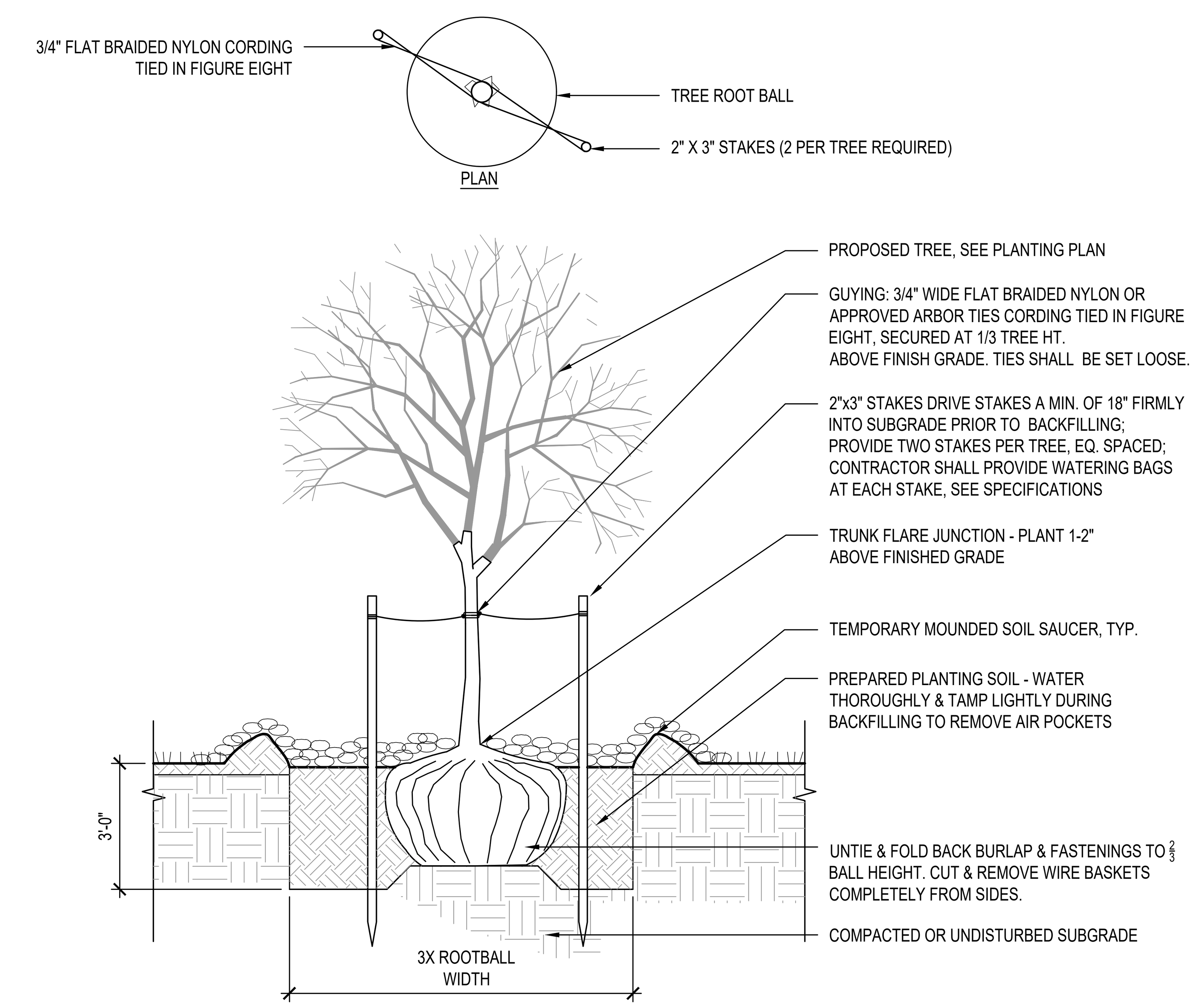
PRICE PER LB. $26.00 MIN. QUANITY 3LBS.TOTAL: $78.00 APPLY: 20 LBS/ACRE :2200 sq ft/lb

The New England Logging Road Seed Mix was originally designed for restoring Maine logging roads, but has application on other types of restoration sites. Provides native plant cover in low fertility and compacted soils. Always apply on clean bare soil. The mix may be applied by hydro-seeding, by mechanical spreader, or on small sites it can be spread by hand. Lightly rake, or roll to ensure proper seed to soil contact. Best results are obtained with a Spring or late Summer seeding. Late Spring and early Summer seeding will benefit from a light mulching of weed-free straw to conserve moisture. If conditions are drier than usual, watering may be required. Late Fall and Winter dormant seeding require an increase in the seeding rate. Fertilization is not required unless the soils are particularly infertile. Preparation of a clean weed free soil surface is necessary for optimal results.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is $/bulk pound, FOB warehouse, Plus SH and applicable taxes.



LOAM & SEED
SECTION — NO SCALE



TREE STAKING & PLANTING
PLAN & SECTION — NO SCALE

NEW ENGLAND WETLAND PLANTS, INC

820 WEST STREET, AMHERST, MA 01002

PHONE: 413-548-8000 FAX 413-549-4000
EMAIL: INFO@NEWP.COM WEB ADDRESS: WWW.NEWP.COM

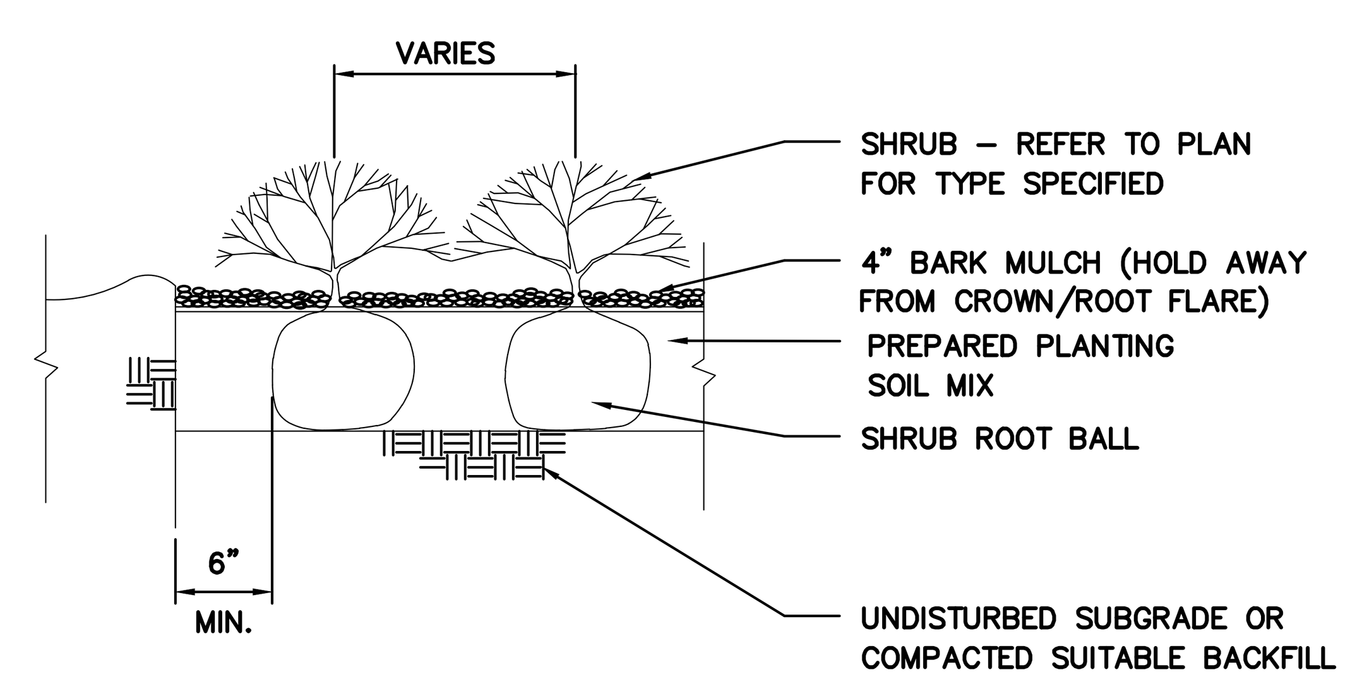
New England Conservation/Wildlife Mix

Botanical Name	Common Name	Indicator
Elymus virginicus	Virginia Wild Rye	FACW-Schizachyrium
scoparium	Little Bluestem	FACU
Andropogon gerardii	Big Bluestem	FAC
Festuca rubra	Red Fescue	FACU
Sorghastrum nutans	Indian Grass	UPL
Panicum virgatum	Switch Grass	FAC
Chamaecrista fasciculata	Partridge Pea	FACU
Desmodium canadense	Showy Tick Trefoil	FAC
Asclepias tuberosa	Butterfly Milkweed	NI
Bidens frondosa	Beggar Ticks	FACW
Eupatorium purpureum (Eutrochium maculatum)	Purple Joe Pye Weed	FAC
Rudbeckia hirta	Black Eyed Susan	FACU-Aster
pilosus (Symphyotrichum pilosum)	Heath (or Hairy) Aster	UPL
Solidago juncea	Early Goldenrod	

PRICE PER LB. $39.50 MIN. QUANITY 2LBS. **TOTAL:** $79.00 APPLY: 25 LBS/ACRE :1750 sq ft/lb

The New England Conservation/Wildlife Mix provides a permanent cover of grasses, wildflowers, and legumes
For both good erosion control and wildlife habitat value. The mix is designed to be a no maintenance seeding, and is appropriate for cut and fill slopes, detention basin side slopes, and disturbed areas adjacent to commercial and residential projects.

New England Wetland Plants, Inc. may modify seed mixes at any time depending upon seed availability. The design criteria and ecological function of the mix will remain unchanged. Price is $/bulk pound, FOB warehouse, Plus SH and applicable taxes.



SHRUB PLANTING
SECTION — NO SCALE

MISCELLANEOUS PLANTING REQUIREMENTS:

1. THE WETLAND SPECIALIST (WS) OR ARBORIST MAY PROPOSE SUBSTITUTIONS RELATIVE TO SPECIES, SIZE, AND QUANTITIES IF THERE IS LIMITED AVAILABILITY OF PLANT STOCK AT THE TIME OF PLANTING. ANY SUBSTITUTIONS MUST BE APPROVED BY THE ENGINEER/WS AND THE LITTLETON CONSERVATION COMMISSION. ALL PLANT MATERIAL SHALL BE PURCHASED FROM A NEW ENGLAND NURSERY AND GUARANTEED BY THE SITE CONTRACTOR TO BE IN VIGOROUS GROWING CONDITION.
2. ANY SUBSTITUTIONS MUST BE APPROVED BY THE ENGINEER/WS AND THE LITTLETON CONSERVATION COMMISSION.
3. INSOFAR AS IT IS PRACTICABLE, PLANT MATERIAL SHALL BE PLANTED ON THE DAY OF DELIVERY. IN THE EVENT THAT THIS IS NOT PRACTICABLE, THE SITE CONTRACTOR SHALL PROTECT, AND WATER STOCK NOT PLANTED IN CONSULTATION WITH THE WS AND NURSERY. PLANTS SHALL NOT REMAIN UNPLANTED FOR LONGER THAN A 3-DAY PERIOD AFTER DELIVERY TO THE SITE. ANY PLANTS NOT INSTALLED DURING THIS 3-DAY PERIOD MAY BE REJECTED BY THE WS.
4. QUALITY AND SIZE OF PLANTS AND SPREAD OF ROOTS SHALL BE IN ACCORDANCE WITH ANSI 260 (REV.1980) "AMERICAN STANDARD FOR NURSERY STOCK" AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
5. ALL PLANTS SHALL BE PLANTED IN TRANSPORTED TOPSOIL THAT IS THOROUGHLY WATERED. RAISE AND REPLANT ANY PLANT WHICH SETTLES MORE THAN 2 INCHES AFTER PLANTING AND WATERING.
6. PLANTS SHALL NOT BE BOUND WITH WIRE OR ROPE AT ANY TIME TO DAMAGE THE BARK OR BREAK BRANCHES. PLANTS SHALL BE HANDLED FROM THE BOTTOM OF CONTAINER ONLY.
7. PLANTING OPERATIONS SHALL BE PERFORMED DURING PERIODS WITHIN THE PLANTING SEASON WHEN WEATHER AND SOIL CONDITIONS ARE SUITABLE AS DETERMINED BY THE SUPERVISING WS. THIS IS TYPICALLY BETWEEN APRIL 15 AND JUNE 15 AND SEPTEMBER 15 AND NOVEMBER 15. PLANTS SHALL NOT BE INSTALLED IN TOPSOIL THAT IS MUDDY OR FROZEN. THE SITE CONTRACTOR SHALL BE RESPONSIBLE FOR RE-SETTING ANY PLANTS THAT BECOME DISLODGED OR UPROOTED BECAUSE OF FROST HEAVES OR OTHER ENVIRONMENTAL FACTORS DURING THE FIRST TWO GROWING SEASONS.
8. SET ALL PLANTS PLUMB AND STRAIGHT. LOCATED PLANT IN THE CENTER OF THE PIT.
9. THE SEED MIXES SHALL BE SOWN ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
10. CONTRACTOR WILL BE RESPONSIBLE FOR TREE MAINTENANCE FOR ONE YEAR AFTER PLANTING. ANY TREE THAT IS IN POOR HEALTH AFTER ONE YEAR SHALL BE REPLACED BY THE CONTRACTOR, FREE OF CHARGE.
11. PLANTED TREES SHALL RECEIVE PROTECTION FROM DEER AND RODENT BROWSE THROUGH A TRUNK WRAP OR SIMILAR.
12. APPROXIMATELY 5% OF THE RESTORATION AREA SHALL BE COVERED IN COARSE WOODY DEBRIS CONSISTING OF TREE BRANCHES OR LOGS THAT WILL PROVIDE COVER FOR AMPHIBIANS, SNAKES, AND SMALL MAMMALS. THREE TO FIVE BRUSH PILES SHALL BE PLACED IN THE BUFFER ZONE RESTORATION AREAS FOR THE SAME PURPOSE.
13. FOR THE TREE PLANTINGS, 2"X3" WOODEN STAKES SHOULD BE DRIVEN INTO THE GROUND A MINIMUM OF 18" INTO THE SUBGRADE PRIOR TO BACKFILLING. TWO STAKES SHOULD BE PROVIDED FOR EACH TREE. ADDITIONALLY, 3/4" FLAT BRAIDED NYLON OR APPROVED ARBOR TIES SHALL BE USED TO SECURE THE TREE TO THE STAKES. TIES SHALL BE SET LOOSE.

Project:
LITTLETON WATER DEPARTMENT

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Consultants:

Revisions:		
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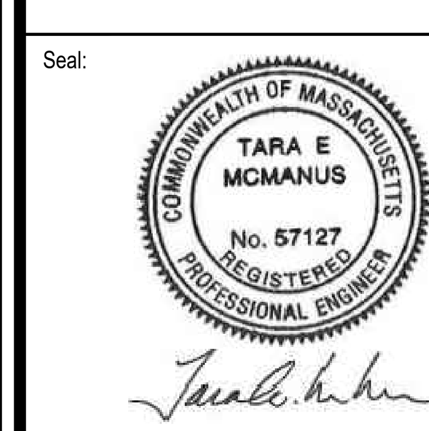
Seal:



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Reviewed By:	RNS
Approved By:	TEM
W&S Project No.:	ENG23-0679
W&S File No.:	

Drawing Title: PLANTING PLAN DETAILS

Sheet Number: L501

Attachment 4

MESA Determination for water distribution lines in Littleton, Harvard and Boxborough (RC-85971)

DIVISION OF
FISHERIES & WILDLIFE
1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

MASSWILDLIFE

June 07, 2024

Corey Godfrey
Littleton Electric Light and Water Department
39 Ayer Road
Littleton, Massachusetts 01460

RE: Applicant: Corey Godfrey, Littleton Electric Light and Water Department
Project Location: off Whitcomb Avenue, 153 Taylor Street
Project Description: Littleton water supply connection- Taylor Street Well
NHESP File No.: 23-4202
Heritage Hub Form ID: RC-85971
Add'l Permits: PWS ID# 2158000, WMA Permit # 9P-2-13-158.02

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist and supporting documentation for review pursuant to the Massachusetts Endangered Species Act (MGL. c. 131A) and its implementing regulations (321 CMR 10.00) (MESA). Plans submitted are entitled TAYLOR STREET WELL AND RAW WATER MAIN TOWN CONTRACT NO. IFB-2024 (dated December 2023, prepared by Weston & Sampson). The Plans include work associated with the raw and finished water main, which the Division determined would not result in a Take of state-listed species provided certain conditions were implemented (Division determination dated December 15, 2023 RC-60246). Work subject to this determination is the waterline from Route 2 to the new well, operation of the well and routine maintenance of the well infrastructure at the well site.

The MESA is administered by the Division and prohibits the Take of state-listed species, which includes actions that "in reference to animals, means to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity or attempt to engage in any such conduct, or to assist such conduct… Disruption of nesting, breeding, feeding or migratory activity may result from, but is not limited to, the modification, degradation or destruction of habitat of state-listed wildlife species" (321 CMR 10.02).

<u>The Project</u>

The Project, as currently proposed, includes the construction of a new water supply well (the Taylor Street Well aka Trumbell Well; PWS ID# 2158000, WMA Permit # 9P-2-13-158.02) for the Littleton Electric Light & Water Department and the connection of the new well to the water treatment plant (WTP) at 15 Whitcomb Avenue from Route 2. Water currently treated in the WTP is sourced from Spectacle Pond Well (215800-04G) and the Whitcomb Avenue Wells (215800-02G, -08G). After construction, water from the Taylor Street Well will be mixed with water from the other wells to provide redundancy. The Taylor Street Well has requested to be permitted at 0.5 mgd (529,900 gpd). The two pump-tests were conducted using the 8-inch test well at a rate of approximately 184 gpm

(264,907 gpd) for 15 (2022) and 5 days (2024). Water was discharged about 2,000 feet away into Beaver Brook downgradient of the test well.

MA Endangered Species Act

During the 2022 15-day pump test of the proposed Taylor Street Well, a hydraulic connection was observed between the pumping and a nearby ephemeral pool when pumping at ~184 gpm. In 2024, to better understand the hydraulic connection between the proposed Taylor Street Well and surrounding ephemeral wetland features, the Applicants conducted an additional pump test at ~184 gpm in consultation with the Division. The Applicant submitted a report analyzing the results entitled “Re: Trumbull Well 5-Day Pumping Test Results and Analysis” (dated April 18, 2024, Weston & Sampson). The report included data that affirmed that four of the monitored pools, provide habitat for the Blanding’s Turtle and showed a hydraulic connection to the pumping, with effects ranging from minor to more significant drawdowns of several inches during the pump tests. The pools with a hydraulic connection during the 2024 pump test include the three pools immediately surrounding the test well and the pool south of the test well across the finger of the Beaver Brook wetland system. The report also included the “Seasonal Pool Map & Habitat Types” (dated April 17, 2024, Oxbow Associates), with which the Division concurs.

Of these four pools, all but smallest pool has sufficient depth and hydroperiod to provide Blanding's turtle overwintering habitat, courtship/mating habitat, and hydration habitat (variable by year). Alterations to the ephemeral wetland features will impact the species’ movements to and between the ephemeral wetland features as well as the Beaver Brook system, and could impact seasonal nesting movements. Other habitat features on the site, and nearby Beaver Brook system, provide critical habitats for Blanding's Turtle, including nesting, hydration, foraging, courtship and mating, migration/movement, and overwintering. The matrix of habitats within the well site and the surrounding landscape are of critical importance to this population of turtles.

Based on a review of the information that was provided and the information that is currently contained in our database, the Division has determined that this Project, as currently proposed, will occur **within** the actual habitat and **result in a Take (321 CMR 10.18 (2)(b))** of the following species:

Scientific Name	Common Name	Taxonomic Group	State Status
Emydoidea blandingii	Blanding's Turtle	Reptile	Threatened

due to impact to necessary feeding, breeding, migrating, and sheltering, and overwintering habitats resulting from hydraulic impacts of pumping at 50% the requested volume. Construction of the well and water line, as well as routine maintenance will include protective measures to minimize the risk of directly harming or killing individuals of this species.

Projects resulting in a Take of state-listed species may only be permitted if they meet the performance standards for a Conservation and Management Permit (CMP; 321 CMR 10.23). In order for a project to qualify for a CMP, the Applicant must demonstrate that the project has avoided, minimized and mitigated impacts to state-listed species consistent with the following performance standards: (a) adequately assess alternatives to both temporary and permanent impacts to the state-listed species, (b) demonstrate that an insignificant portion of the local population will be impacted, and (c) develop and agree to carry out a conservation and management plan that provides a long-term net benefit to the conservation of the state-listed species.

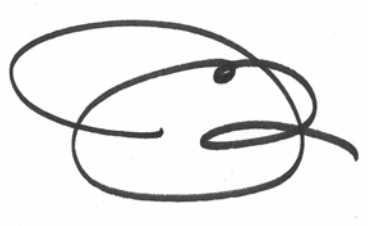
This Determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any person aggrieved by this decision shall have the right to an adjudicatory hearing at the Division pursuant to M.G.L. c. 30A, s.11 in accordance with the procedures for informal hearings set forth in 801 CMR 1.02 and 1.03. Any

notice of claim for an adjudicatory hearing shall be made in writing, accompanied by a filing fee in the amount of $500.00 and the information specified in 321 CMR 10.25 (3). The notice of claim shall be sent to the Division's Director, Mark S. Tisa, by certified mail, hand delivered or postmarked within twenty-one (21) days of the date of the Division's Determination.

Projects resulting in a Take of two (2) or more acres within Priority Habitat must file an Environmental Notification Form with the Massachusetts Environmental Policy Act ("MEPA") Office and complete all MEPA actions prior to completing the MESA permitting process, per 301 CMR 11.03 (2)(b).

No soil or vegetation disturbance, work, clearing, grading or other activities related to the subject filing shall be conducted anywhere on the project site until the MESA permitting process is complete. If you have any questions regarding this letter, please contact please contact Misty-Anne Marold, Senior Endangered Species Review Biologist, at (508) 389-6356 or misty-anne.marold@mass.gov.

Sincerely,



Jesse Leddick
Assistant Director

cc:

Attachment 5

Ephemeral Feature Water Level Monitoring Plan

Attachment 5: Ephemeral Feature Water Level Monitoring Plan

Introduction

A monitoring plan has been compiled in response to MA DFW concerns over potential impacts from the proposed Trumbull Well water withdrawal within Blanding's turtle habitat in the upgradient watershed. A 15-day pumping test was initially conducted in August/September 2022 in accordance with MassDEP permitting requirements, and in March 2024, an additional 5-day pumping test was conducted on the proposed Trumbull Well (8-inch test well) to evaluate the impacts to the ephemeral pools and wetlands delineated by the DFW and Oxbow Associates (Figure 2). Based on the results of the pumping test, the following locations require additional long-term monitoring:

- Wetland A South
- Wetland A North 1
- Wetland A North 2
- Wetland C

Methods

The above listed wetlands will be monitored using nested staff gauge/piezometer pairs that have already been constructed and installed in their corresponding ephemeral wetlands. All piezometers were constructed of 1.65-inch diameter galvanized steel piping affixed to 1.25-inch diameter by 24-inch-long perforated stainless-steel screens with connected steel drive points. Screened intervals were installed two feet below the bottom of the peat layer into the shallow aquifer. Staff gauges were constructed of slotted 2-inch diameter PVC pipe placed on bottom sediments and secured to the piezometers, forming piezometer/staff gauge couplets.

The proposed monitoring program was developed to allow for three phases of data collection. The three phases will allow for 1) data collection activities to begin under non-pumping conditions to assess natural fluctuations and develop a baseline, 2) data collection under a 50% (of the) permitted withdrawal rate condition, and finally if monitoring and prediction modeling support an increase in the withdrawal rate 3) continued monitoring at 100% of the permitted withdrawal rate. These collection efforts will be conducted in the three "A" wetlands as well as wetland C.

Phase I: Pre-Pumping Monitoring

Phase I will consist of water level monitoring prior to withdrawal from the proposed Trumbull Well. This monitoring will be expected to start as soon as possible (August/September 2024) and will continue during the construction of the final production well. This phase of monitoring will serve as a baseline dataset (non-pumping conditions).

Accurate records of 1) weather conditions, 2) surface water/groundwater levels in the staff gauges/piezometers of the pools listed above (Figure 2), and 3) pumping well groundwater elevation (a nearby observation well will be used while construction is

ongoing) will be maintained during this phase of monitoring. All readings will be recorded to the nearest 0.01-foot. Water levels and temperature will also be measured at a frequency of 15-minute intervals using pressure transducer/data loggers (PTDL). Periodic measurements will be made monthly with an electronic water level meter in each location equipped with data loggers to verify the results. If freezing or dry conditions prevent data collection using the PTDLs, weekly hand level measurements or observations of dry conditions will be conducted instead.

Phase II: 50% Permitted Withdrawal Rate Monitoring

Phase II will consist of water level monitoring during pumping of the Trumbull Well at 50% of MassDEP approved withdrawal, 184 gallons per minute (gpm). Per DFW recommendation, monitoring during this phase will continue for at least three (3) years at the approved pumping rate. For each year, climatological data and water levels from a nearby USGS MA-WWW 160 WESTFORD monitoring well will be evaluated with respect to annual weather conditions (i.e. dry, average, and wet) to determine if the monitoring period of this phase should be extended.

Accurate records of Trumbull Well pumping rates, weather conditions, and surface water/groundwater levels in the staff gauges, piezometers of the wetlands listed above and pumping well, will be maintained during this phase of monitoring. All readings will be recorded to the nearest 0.01-foot. Water levels and temperature will also be measured at a frequency of 15-minute intervals using PTDLs. Monthly measurements will be made with an electronic water level meter in each location equipped with data loggers to verify the results. If freezing or dry conditions prevent data collection using the PTDLs, weekly hand level measurements or observations of dry conditions will be conducted instead. The pumping data (Phase II) will be compared to the non-pumping data (Phase I) and presented in graphical and tabular form for each monitoring location and submitted to DFW. The data will subsequently be used to calibrate mass balance models for each of the four individual pools that are monitored. The calibrated, validated models provide a useful tool with which to evaluate temporal changes in each wetland size and depth in response to the proposed pumping well. Ultimately, the mass balance models will be used to simulate an acceptable maximum withdrawal rate from the Trumbull Well.

Phase III: Increase Withdrawal Rate Monitoring

At the conclusion of Phase II and associated modeling efforts, LELWD will likely request to increase the withdrawal rate at the Trumbull Well. Phase III will consist of water level monitoring during the (potentially) increased pumping rate at the Trumbull Well. Similar to Phase II, records of pumping rates, weather conditions and surface water/groundwater levels in the staff gauges, piezometers of the wetlands listed above and pumping well, will be maintained during this phase of monitoring. The duration of this phase of monitoring will be contingent upon the impact results from Phase II. All readings will be recorded to the nearest 0.01-foot. Water levels and temperature will also be measured at a frequency of 15-minute intervals using PTDLs. Monthly measurements will be made with an electronic water level meter in each location equipped with data loggers to verify the results. If freezing or dry conditions prevent data collection using the PTDLs, weekly hand level measurements or observations of dry conditions will be conducted instead.

Once this phase is complete, Phase III data will be evaluated to determine the impacts to wetlands and turtles and determine if even more water can be withdrawn while maintaining compliance with the CMP.

Attachment 6

Blanding's Turtle Mortality Avoidance Plan Trumbull Well; the "Turtle Protection Plan" or "TPP"

Blanding's Turtle Mortality Avoidance Plan

Trumbull Well
153 Taylor Street
Littleton, MA
NHESP File No. 23-4202

Oxbow Associates, Inc. (OA) has prepared this Turtle Protection Plan to avoid incidental mortality to Blanding's turtle (*Emydoidea blandingii*) at the subject site during site work for the construction of a municipal water supply well at 153 Taylor Street within the Beaver Brook watershed in Littleton, MA as well as the proposed nesting areas west and south of Beaver Brook.

This protection plan is comparable to similar measures required by NHESP for analogous projects in the Commonwealth. OA will obtain a Scientific Collecting Permit from Massachusetts Division of Fisheries and Wildlife (MDFW) prior to implementation of this plan (2024 season) and will renew the Collecting Permit for each year that work is anticipated at the project site.

It is estimated that site construction will commence during the active season for Blanding's turtle in early 2026, as soon as is practicable. Baseline population monitoring has already begun in 2024 under a separate permit. Protection measures are therefore proposed after work is approved and permitted, and prior to any mobilization or construction.

Site "clearing" (site surveys of Blanding's turtles) is proposed if work will start within the period of turtle active season (April 15-October 31) prior to excavation or site work. Prior to surveys, the site will be isolated with an exclusion barrier before being surveyed by qualified individuals at a rate of four staff hours per acre.

Turtle Protective Measures

All proposed activity at the site is within terrestrial habitat; most of the site work for the well is within forest dominated by white pine (*Pinus strobus*). The project consists of five distinct components as currently proposed: 1. Drilling and construction of a new groundwater well and associated pump station; 2. Construction of two-three new nesting habitat and enhancement of the Beaver Brook nesting area; 3. Construction of a new raw water main to convey water from the well to the water treatment plant; 4. Construction of the new wetland; 5. Construction of a finished water main.

The mortality avoidance plan, or "Turtle Protection Plan" to be implemented to preempt injury to Blanding's turtles in the course of project construction consists of five general components:

1. **Administration of Contractor Education**
   Prior to construction work conducted during the active season for Blanding's turtles (April 15-October 31), the construction crew, project foreman, and site engineers will be provided a brief (est. 15-20 minutes) introductory session on Blanding's turtle biology, behavior and conservation as well as BMPs and regulatory compliance issues. A laminated poster with images of turtles, contact information for a qualified biologist and instructions regarding proper protocol if a Blanding's turtle is encountered, in or adjacent

to the project area, will be provided. These posters will be given to the construction supervisor and available for review by all workers. When new contractors are scheduled to provide specialized services, they will also be provided Contractor Education.

2. **Installation of a Turtle Barrier Fence**
   Prior to the commencement of work executed in the activity season for Blanding's turtles and when determined necessary by NHESP, the area will be sequestered with siltation fencing to function as turtle exclusion barriers at the limit of work as indicated on the project site plans accompanying the CMP application and referenced in the CMP.

   Once installed, OA will confirm the barrier is installed properly (trenched-in, secure and taut. If haybales or wattles are required for erosion control, they must be on the work side of the fence) During the active season, the fence will be inspected weekly by the contractor for the duration of the project. Temporary gates (*e.g.*, PVC Half-Culverts or functional equivalent) will be fitted to each construction access point and closed at the end of each work-day. Any turtles found during the fence installation shall be reported to the turtle biologist then relocated outside the barrier to a safe location with suitable habitat.

   The barrier will consist of a standard; 36-inch, 300 lb. burst, silt fence trenched-in the ground approximately 6 inches, staked approximately every 8 feet, and will be installed around the limit of work. Use of a Ditch-Witch and chain saws will allow the turtle barrier (silt fence) to be installed with very low probability of injuring or killing individual animals. Any other methods using larger machinery during the active season must be approved by the NHESP. Moveable gates made with corrugated PVC 18-inch or larger, half-cut culverts, or wooden gates will be used at the construction access locations (See Photos).

PVC Culvert "Gate"

Wooden "Gate"

3. **Maintenance of Turtle Barrier Fence**
   The fence will be inspected weekly by the contractor for the duration of the project, and the construction access point (*e.g.*, wooden barriers/half culverts) must be closed at the end of each workday. If any damage occurs to the turtle barrier or gates, it must be repaired immediately, and the turtle biologist notified. If the turtle barrier is breached for a significant period of time without repair, additional clearing surveys may be required.

4. **Clearing surveys immediately prior to initiating upland work****

   Applicable only if work commences after April 15, or if barrier is compromised during active season.

Upon confirmation that the barrier is installed correctly, and all construction access roads are equipped with moveable turtle barriers (gates), visual surveys shall be conducted by qualified turtle biologists at a rate of 2 (open habitat) to 4 (wooded/scrub habitat) person-hours per acre under suitable field conditions.

NOTE ON SEAONAL RESTRICTION: If the work is delayed until after October 31 and before April 15 (winter), surveys for turtles and the turtle barrier may be avoided depending on the estimated duration and location of construction. Turtles have been observed using nearby ephemeral wetlands for overwintering. If work continues to April, an exclusion barrier must be installed prior to April 15 of that year.

5. **Turtle observations, relocations, and reporting**
   Any turtles encountered (state-listed or common) by contractors will be reported to the turtle biologist, and the turtle biologist shall relocate the turtle to a nearby location outside of the work area with similar conditions. This will be completed under guidelines specified in the Scientific Collecting Permit issued by MDFW. Documentation will include standard morphometric data (mass, carapace length and depth), age as determined by annuli count, determination of sex, description of behavior and local environment at time of capture, and photographs taken of the animal. Turtle encounter locations will be recorded using a hand-held GPS receiver with sub-meter accuracy. Naïve Observational data of the target species will be uploaded to Heritage Hub within 10 days of the observation.

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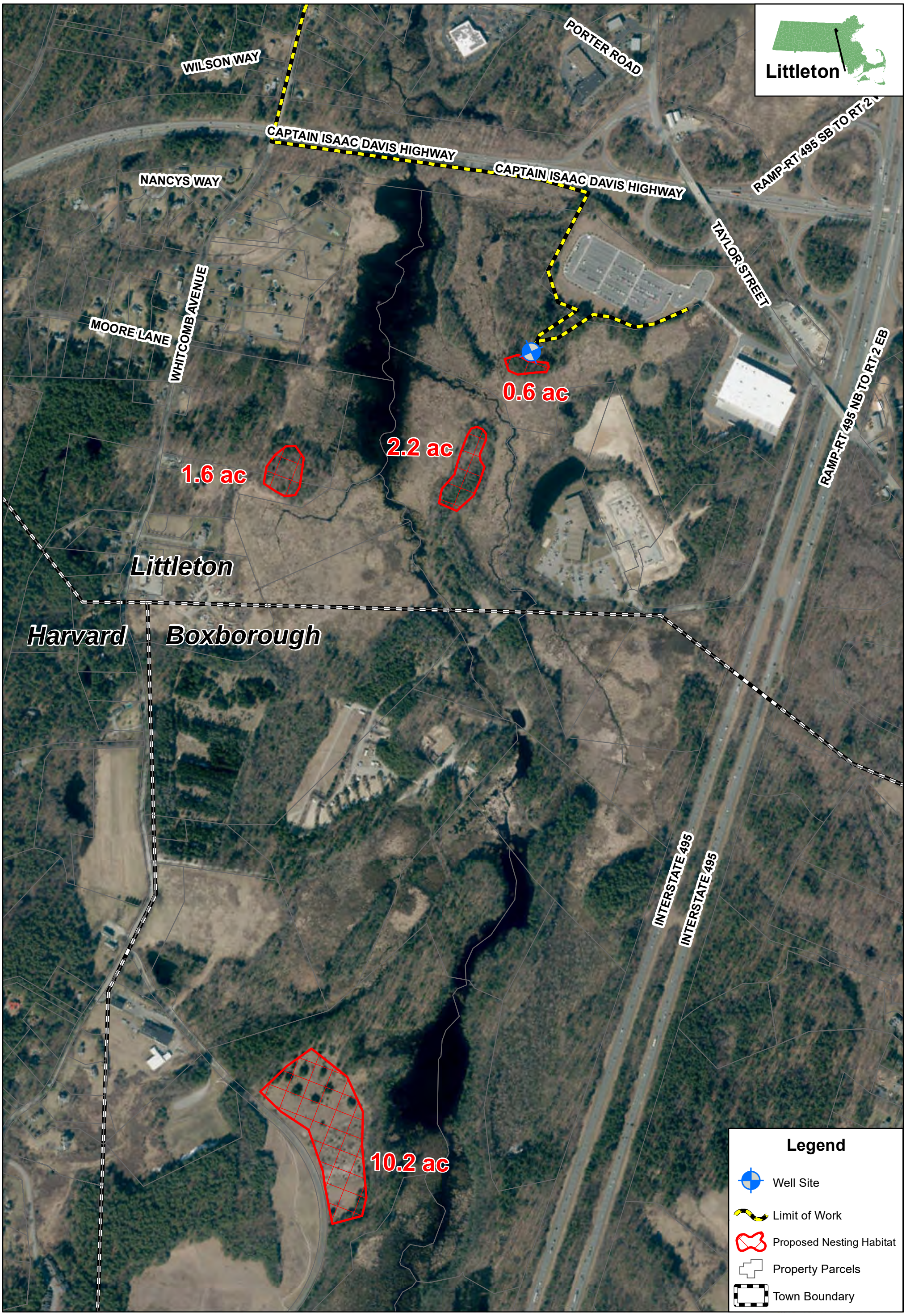
Attachment 7

Nesting Habitat Creation LELWD Trumbull Well



OXBOW ASSOCIATES, INC.

1:7,200

1 inch = 600 feet

0 600 1,200
Feet

Attachment 7.
Nesting Habitat Creation
LELWD Trumbull Well
Conservation & Management Permit
Littleton & Boxboro, MA

Attachment 8

Nesting Habitat Management & Maintenance Trumbull Well

Nesting Habitat Management and Maintenance Plan
Trumbull Well
153 Taylor Street
Littleton, MA
NHESP File No. 23-4202

1.1 Habitat Restoration and Monitoring Plan

OA has worked with the Project Team to identify areas that provide suitable nesting habitat where rare turtles have nested or attempted to nest. In addition, as discussed with NHESP, there are areas that are not currently likely to serve as nesting habitat but could be enhanced to provide high quality habitat due to existing sand and proximity to wetlands (Attachment 7, Nesting Habitat Creation). Upon final selection of sites, including approval by all stakeholders, these areas would be created by clearing trees, stripping topsoil and shaping the landscape to provide small ridges and mounds of unvegetated, exposed sandy soil.

Created or restored nesting habitat, intended to replace, in part, the historically available local post-gravel extraction substrate, should be in suitable proximity to wetland habitat suitable for both adult and hatchling turtles. will be created in the Beaver Brook watershed. The prescription for the creation of nesting habitat will be moderately iterative in the field but will be based on the following guidelines. The objective is simply to provide an early seral stage habitat, underlain by mineral soils and with sparse structural and vegetative elements; in essence mimicking an abandoned gravel pit, optimally in the five-to-fifteen-year post-abandonment condition.

Our experience with nest site creation, both deliberate and fortuitous, clearly indicates that habitats with sparse mineral soils, with light to moderate disruptive features (tussocks, boulders, woody debris) provide optimal insolation and drainage for nests and micro-refugia for emerged hatchlings. Indisputable examples for this species include: Devens Reserve Forces Training Area, Oxbow National Wildlife Refuge (NWR), created nest habitat at Assabet River NWR, created habitat at Sewell Street, Groveland, MA, *et al.* All proposed nesting sites depicted in Attachment 7 have shallow topsoil and a mix of fine sand, sand, and coarse sand/gravel.

The creation of nesting habitat will follow the procedures outlined below.

1.1.1. Nesting Habitat Reclamation and Creation

1. Once the stakeholders decide on site-specific limitations on areas, configuration, distance to wetlands or other resources, OA can flag and GPS the approximate limits of the proposed nesting areas at each site using a hand-held GPS. Minor adjustments to nesting enhancement areas should be expected as each site goes to construction especially the final shape, size, berms, tree removal/chipping, and subsoil characteristics.

2. Following isolation of the nesting habitat with a turtle exclusion barrier, white pines, and other tree and shrub species will be removed and stumps extracted and removed. If they are to be chipped, the chips shall not be spread in the nesting area. Certain trees may remain but must be determined on a site-specific level.

3. Herbaceous and groundcover vegetation will be bladed into windrows or removed from the Site and expose pure, mineral, gravel soils. Topsoil shall be removed via tracked machines, deposited along the outside edge of the nesting habitat areas, and compacted.

4. Contractors will be directed to create pits, ridges and mounds two-three feet high throughout the nesting areas to create variations in available habitat for suitable nest location selection. If possible, the area will be subtly graded for drainage. The intent is to have somewhat undulating topography, without depressions where water could collect. The prepared surface will be similar to a freshly abandoned gravel pit.

5. Whereas bare, featureless soil is less desirable than early successional stages, the habitat will be "advanced" by the placement of sparse plantings and coarse woody or stone debris. Opportunistic patches of low-growing vegetation may be left within the nesting area during excavation if exhibiting favorable post-construction conditions.

6. Approximately twenty (20) objects per acre will be more or less randomly distributed on the finished soil surface. These will consist of a combination of boulders of 1-foot or greater diameter as well as tree trunks of approximately four-foot lengths (8-inch+ diameter). It is expected that these materials will be salvaged from the Site during site work.

7. A final amenity to provide microhabitat features is the transplantation of Little Bluestem (*Schizachyrium scoparium*) tussocks, ideally salvaged from the Site vs. nursery stock. These will be planted very sparsely, 40-50'± on-center. These can be removed from a donor site, placed in pots and transplanted to the nesting area from anywhere in the Project area. The bluestem transplants should not be fertilized or provided with organic soil. In fact, if some or many of the transplants perish after transplanting this is acceptable; they will serve as nucleation areas for the growth of encrusting mosses and lichens (desirable) and provide cover features for emerged hatchlings as was found to be an important component of sparsely vegetated nesting habitat for Blanding's turtles.

8. The nesting habitat will be monitored and maintained in perpetuity by the fee holder, and/or permit holder in accordance with the maintenance plan below.

9. A report documenting the location, extent, and photographs of the finished nesting area will be provided to the NHESP within 30 days of the creation of each area.

1.1.2. Long-term Monitoring and Maintenance of Nesting Habitat

Following the initial three years of site monitoring and reporting the habitat may be relatively persistent due to the impoverished soils belying it. Normal, gradual succession can be expected, and invasive eruptions cannot be ruled out (e.g., spotted knapweed, stitchworts, etc.), which may require dedicated response.

The long-term monitoring will necessarily focus on the nesting habitat, with concurrent monitoring of habitat use by Blanding's turtle population. We anticipate a five-year periodicity to dedicated inspections and adaptive responses; this cycle may be compressed if unexpected occurrences (invasives eruption, etc.) manifest.

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Monitoring on the 5-year cycle will occur in July or August by the Biologist; remedial work will occur after October 1 of any year to minimize potential disturbance or destruction of nests. Some selective work may be approved in September.

General, annual inspections of the nesting habitat will be the responsibility of the fee holder or their designee. For example, The Sudbury Valley Trustees conducts regular inspections of CR holdings and can report any problems or defects to the fee holder independent of the regular inspection cycle.

Any actions to improve or modify the habitat must be approved, in memorandum or similar format by NHESP and Littleton, Harvard and Boxborough Conservation Commissions, as needed.

1.1.2.1 Vegetative Cover Monitoring

Although standard measurements of vegetation using quadrats or transects may be useful, OA has found that the use of UAS combined with on-the-ground photographs provides more accurate and comprehensive vegetative coverage data and the default monitoring methodology should be standardized photographic aerial documentation of vegetation on the 5-year cycle.

Standardized flights (e.g., July-August, @ 150-foot elevation) will be used to document ground cover. Imagery will be mosaiced, and a GIS will be used to quantify the extent and qualitative characters of vegetation; with ground-truthing. In this manner a continuous record of successional trends can be obtained, archived and assessed visually and quantitatively.

1.1.2.2 Management Goals

The objective of the creation and management of nesting habitat is to provide a zone that is encumbered by less than 50% native vegetation coverage. When native coverage approaches or exceeds this value, ground action will be undertaken to establish a less developed seral condition across the nesting habitat.

If invasives erupt and displace bare ground control should be applied immediately to limit the severity, and the level of effort ultimately required to mitigate it.

1.2.1. Management Methods

All vegetation management should be applied after October 1, or before May 15 of any treatment year unless by arrangement with NHESP. Mechanical and chemical methods may be used provided all activities are done in a lawfully compliant manner. Mechanical raking for vegetation control and soil scarification is an acceptable technique. Pry-bar, chaining or mowing are also acceptable. Foliar application, cut and paint, and bark application of suitable herbicides, applied by a licensed herbicide applicator in accordance with manufacturer specifications (the label) and Massachusetts Regulations are similarly acceptable, with consent of NHESP and the local Conservation Commission. Similarly, approval under an RDA or NOI may be required for work within buffer zones to resource areas.

1.2.2 Reporting

Reporting for years 1 and 2 will be provided to NHESP by December 1 following the monitoring period. Reports may be redacted prior to delivery to local Conservation Commissions if required by NHESP to protect the specific locality information for a collectible species in documents that may be publicly available.

Reporting on the subsequent, 5-year cycle will be provided to NHESP, to include coverage quantification and remedial actions undertaken or recommended will be provided by December 1 of any year of site monitoring.

No management, remediation or modification will be executed within the nesting habitat, without endorsement of NHESP and local Conservation Commission.

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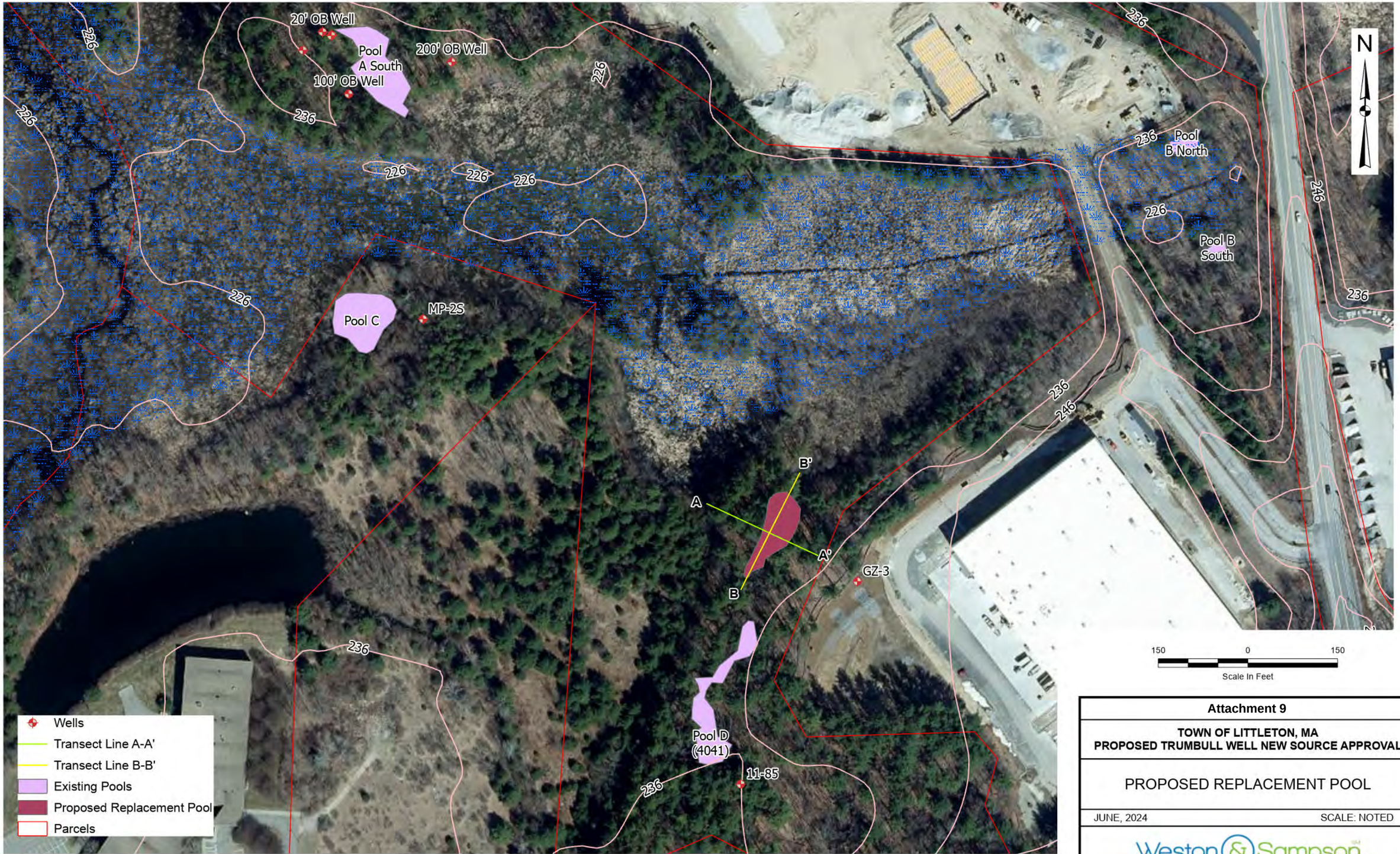
Attachment 9

Proposed Replacement Pool (proposed Plan and Profiles, dated June 2024)



Attachment 9

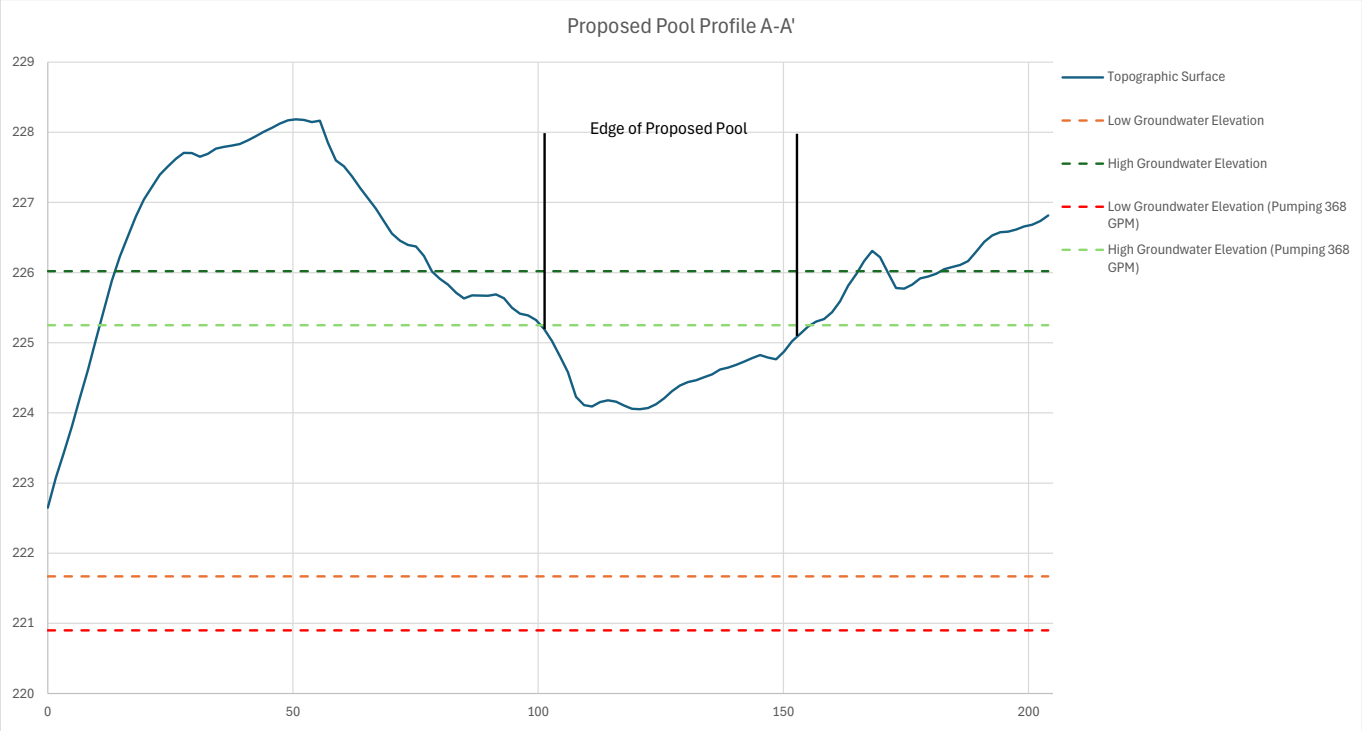
TOWN OF LITTLETON, MA
PROPOSED TRUMBULL WELL NEW SOURCE APPROVAL

PROPOSED REPLACEMENT POOL

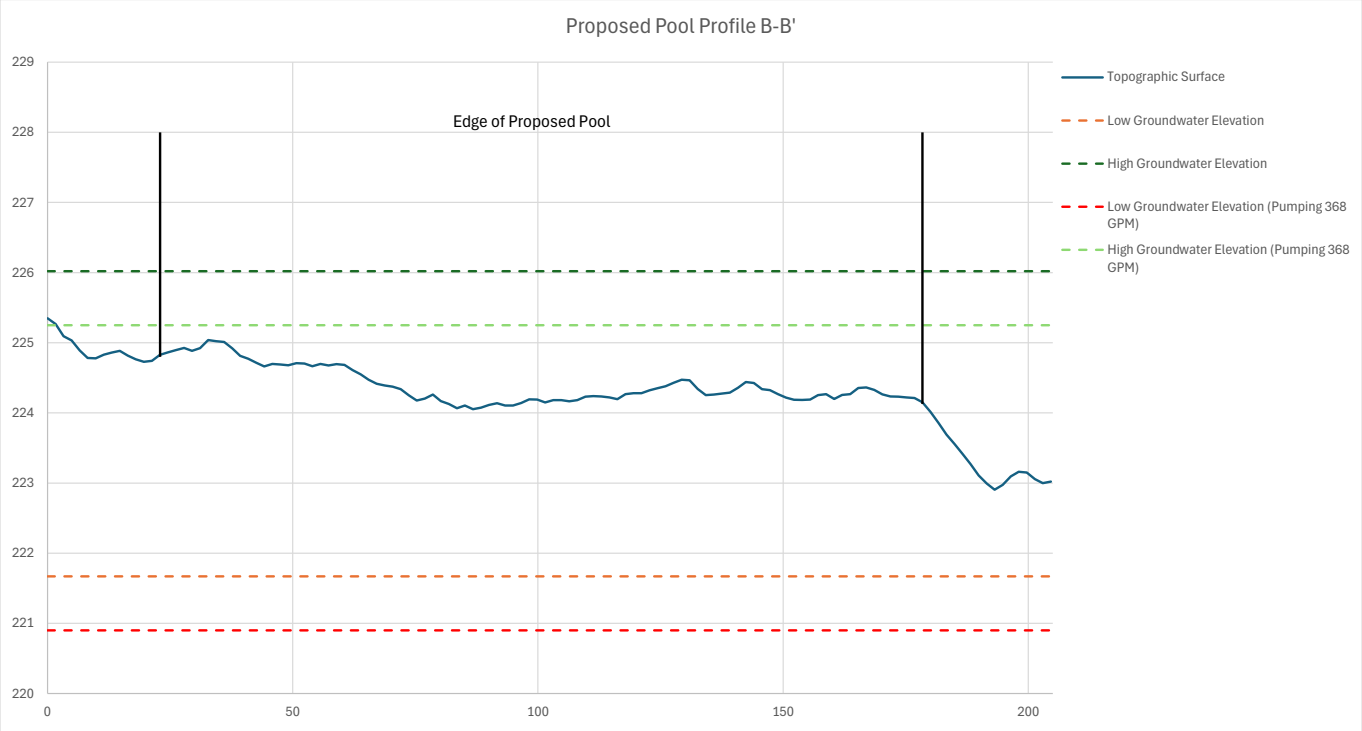
JUNE, 2024 SCALE: NOTED

Weston & Sampson

Attachment 9



Attachment 9



Attachment 10

Net Benefit Schedule

Attachment 10 - Net Benefit Mitigation Schedule For Phases 1 and 2 (2024 - 2040)

Special Condition From MESA CMP	Description	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
SC6	Monitor Existing Ephemeral Wetland Features (Phase 1)	X	X	X	X	X	X	as needed into future										
SC7	Phase 1 Telemetry	X	X															
SC10	Existing Nesting at Monarch Drive Site - Monitor, Nest Protection, Head-starting	X	X	X	X	X												
	Construct Trumbull Well (Phase 2)			X														
SC9, SC11	Trumbell Well - Nest Site - Construct	X	X	X				X					X					X
SC10, SC12	Well Nest Site - Monitor & Routine Maintenance			X	X	X					X					X		
SC9, SC11	Second Nest Site - Construct		X	X				X					X					X
SC10, SC12	Second Nest Site - Monitor & Routine Maintence			X	X	X					X					X		
SC8	Phase 2 Telemetry			X	X	X												
SC14	Constructed Wetland - Construct		X	X														
SC15	Constructed Wetland -Monitor, Bathymetry		X	X														
SC15	Constructed Wetland - Monitor, Vegetation			X	X	X		X					X					X