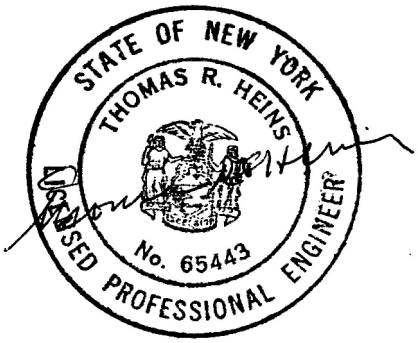
Remedial Construction Work Plan
Former Geneva Foundry Site,
Operable Unit 3,
Geneva, New York

Site Number C835027A

July 2019



Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION
625 Broadway
Albany, New York 12233-7017

Prepared by:

ECOLOGY AND ENVIRONMENT ENGINEERING AND GEOLOGY, P.C.
368 Pleasant View Drive
Lancaster, New York 14086

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1 Introduction

Ecology and Environment Engineering and Geology, P.C. (E & E) prepared this work plan and related Contract Drawings under contract to the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER). The work plan describes remedial construction activities associated with residential properties located within the designated Operable Unit 3 (OU3) boundary of the Former Geneva Foundry site in Geneva, Ontario County, New York. As a result of past foundry activities, off-site areas have been impacted by contaminated deposition from historical air emissions. The primary contaminants of concern are arsenic and lead.

The final remedy is described in NYSDEC's Record of Decision (ROD) issued in January 2017. The final remedy includes remediation of the impacted areas of OUs 1, 2, and 3 (see Figure 1). The primary location for past foundry operations, located at 23 Jackson Street, has been designated as OU1. The former warehouse and operations support facilities for the former foundry, located at 44 Jackson Street, has been designated as OU2. The off-site residential and commercial properties that have been impacted by arsenic and lead contamination associated with historical air emissions from the foundry have been designated as OU3. The OU3 properties are located across several blocks, including Genesee Street, Lewis Street, Geneva Street, Tillman Street, Jackson Street, Exchange Street, State Street, Center Street, Wadsworth Street, and Middle Street.

No Potentially Responsible Parties (PRPs) have been identified as legally liable for the contamination at the site. New York State is acting to implement the remedial actions set forth in the ROD for properties within OU3 using the New York State Superfund. The soil cleanup levels selected in the ROD are 16 parts per million (ppm) of arsenic and 400 ppm of lead based on 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6.8)(b) Residential Use Soil Clean Objectives (SCOs).

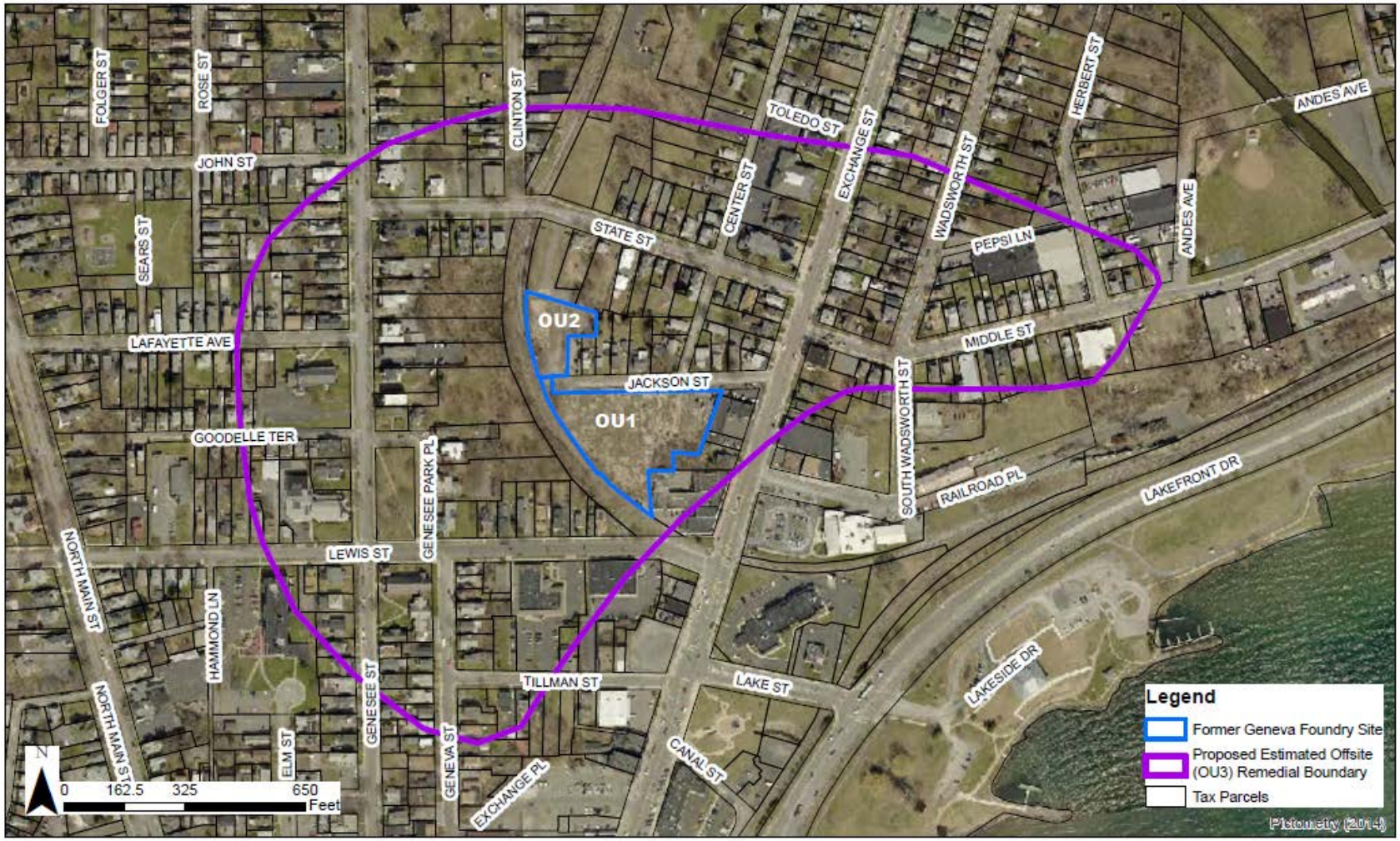

Figure 1 Site Location,
Former Geneva Foundry Site, Site No. C835027A
Geneva, Ontario County, New York

2 Construction Activities

On-Site Activities

To limit disruption to the community and increase the efficiency of remediation activities, a phased remediation approach is being implemented. Where the homeowner has agreed to remediation and provided a signed temporary use and occupancy agreement, the remedial activities for this work generally include:

- Mobilization and demobilization from each parcel;
- Removal of trees and shrubs;
- Selective demolition (e.g., driveways, sidewalks, concrete pads);
- Protection and/or removal and staging of property features for reuse (e.g., fencing, sheds);
- Excavation of selected on-site arsenic and lead-contaminated soils; and
- Transport and off-site disposal of the soil.

The restoration activities at each parcel generally include:

- Placement and compaction of backfill,
- Grading,
- Placement of topsoil and soil amendments,
- Revegetation of disturbed areas,
- Planting of shrubs and trees, and
- Restoration of hardscape and other property features.

Excavation depths for remediation vary for individual properties, as shown in the Contract Drawings. NYSDEC and the New York State Department of Health (NYSDOH) have agreed to an approach where the horizontal and vertical excavation limits will be pre-approved during design, and no post-excavation confirmatory sampling will be required for the excavated areas. Exceptions may apply and will be handled on a case-by-case basis.

The CONTRACTOR shall propose excavation and transport methods for ENGINEER review. All excavated materials shall be disposed of at an approved

waste-disposal facility in accordance with Specification 017419 – Off-site Transportation and Disposal.

Following excavation, backfill and restoration activities shall be performed at each property to replace and restore property features in accordance with this work plan, the technical specifications, and as shown on the Contract Drawings. The ENGINEER will review and confirm restoration plans with each homeowner prior to CONTRACTOR implementation.

Remedial Support Areas and Activities

To facilitate remedial activities, the CONTRACTOR has constructed three material stockpile and equipment staging areas (staging areas), two on city-owned land, and one on privately owned property. New staging areas may be proposed as need arises. The first staging area, located at a city-owned, vacant parcel at 57 State Street, was selected because of its proximity to the work areas. It shall be used primarily for office space and small equipment storage.

The second staging area is located at the intersection of Avenue F and Lehigh Avenue. It shall be used for contaminated material stockpiling, equipment, decontamination, contact water storage, and equipment storage. At this staging area, temporarily stored soils shall be placed in designated material stockpile areas constructed in accordance with the Contract Drawings. Temporary stockpiles shall be covered with plastic sheeting during inclement weather and whenever work is not taking place at the site, to prevent the migration of materials.

The third staging area is located at the vacant lot at 60 Middle Street. Owned by CCMP Plastics at 88 Middle Street, the property shall house equipment, clean aggregate and fill materials, an office trailer and sanitary facilities. The property will be remediated at the completion of its use as a staging area.

Transport vehicles shall be prepared, loaded, and decontaminated in accordance with Specification 017419 – Off-site Transportation and Disposal. Water encountered or generated during excavation activities shall be captured and handled in accordance with the Section 312319 – Dewatering and Contact Water Management.

To confirm that remedial excavation activities do not cause airborne contaminant releases, continuous air monitoring shall be performed by the ENGINEER during the excavation and backfill activities in accordance with a NYSDEC and NYSDOH-approved community air monitoring plan (CAMP, E & E 2018). Air monitoring is further discussed in Section 4 of this plan.

The ENGINEER and CONTRACTOR shall independently implement health and safety plans for their respective personnel working at the site to provide appropriate safety measures for the protection of site workers, and confirm that the work

meets the requirements of the United States Occupational Safety and Health Administration (OSHA). The minimum requirements for health and safety are discussed in Section 4 of this report.

A vibration monitoring plan has been prepared by the ENGINEER (E & E 2017a). Vibration monitoring shall be performed by the ENGINEER during excavation and backfill activities at each property to verify that vibrations from construction activities do not exceed vibration limits, which are based on United States Bureau of Mines criteria. If vibrations are detected at levels exceeding the limits set forth in the plan, the ENGINEER will immediately notify the CONTRACTOR, and the CONTRACTOR shall re-evaluate work activities prior to continuing.

An Infrastructure Protection Plan (E & E 2017b) has been prepared by the ENGINEER with review by NYSDEC. The plan describes procedures for the protection of municipal infrastructure such as roads, curbs, water mains, and sewers within municipal rights-of-way, and procedures for repairs to potential damage caused by remedial activities.

3 Overview of Roles and Responsibilities

The following sections present the roles and responsibilities of the NYSDEC Callout Contractor (CONTRACTOR), E & E (ENGINEER), and NYSDEC for the work.

NYSDEC Callout Contractor (CONTRACTOR)

The CONTRACTOR shall provide all necessary personnel, equipment, supplies, and materials to perform the services as described under the Contractor Work Items, and as follows:

1. Preparation of project submittals as required by the Contractor Work Items and technical specifications;
2. Obtain all permits and bonds required by the city and local utility companies required to complete the work;
3. Pre- and post-construction video surveys of subsurface sewer infrastructure along the truck routes within the city to be used during the remedial action;
4. Provide trained and certified personnel with the means to adhere to and perform work in accordance with the CONTRACTOR's required site-specific Health and Safety Plan;
5. Mobilization to the site and setup of temporary support and exclusion zones for use in remedial site operations;
6. Adherence to the New York State Standards and Specifications for Erosion and Sediment Control (NYSDEC 2016). Installation and maintenance of site stormwater controls and erosion and sediment control practices at each property and the staging areas for the duration of work activities. If any erosion and sediment controls are deemed insufficient by the ENGINEER, the CONTRACTOR shall immediately take whatever steps are necessary to correct the deficiency at his own expense;
7. Establishment of site entry and egress points and installation of temporary utilities and site services for CONTRACTOR operations at staging areas, offsite from the properties to be remediated;
8. Establishment of property-specific site entry and egress points for remediation work performed at each property;

9. Coordination with utility providers if disconnection and plugging, blocking, or capping of utility services is necessary to reduce preferential pathways of contaminant migration off the work areas (including hydrants, post indicator valves, valves, meters, manholes and covers, street signs, and miscellaneous appurtenances; as well as private utility connections such as outdoor electric utilities/water lines to pools, sprinkler systems, hot tubs, sump pump lines, sheds, detached garages, decks, etc.);
10. Clearing and grubbing of designated areas (e.g., trees, shrubs, and plantings) as required to perform the work;
11. Dewatering and contact water management at each property and at the staging areas;
12. Storage, management, pre-treatment, and off-site transportation and disposal of contaminated ground or surface water, dewatering effluent, and decontamination waters generated as a result of the work;
13. Excavation of contaminated site soils to the coordinates and depths as shown on the Contract Drawings;
14. Off-site transportation and disposal of hazardous waste, soils, and debris generated from remedial activities;
15. Off-site transportation and disposal of non-hazardous waste, soils, and debris generated from remedial activities;
16. Backfilling and grading to pre-existing grades and restoration of each property as shown on the Contract Drawings;
17. Restoration activities, including sodding and/or seeding; planting of shrubs and trees; preparation of planting beds; restoration of salvaged or replacement of demolished structures (e.g., sheds, fencing, pools, wood steps); and replacement of concrete sidewalks, walkways, driveways, and pads, and asphalt driveways and driveway aprons disturbed or removed during remedial construction;
18. Repairs to any damages made to structures on residential properties within the work area, and for any damages made to properties adjacent to or near the work area, or to city infrastructure caused by implementing remedial activities;
19. Guarantee the plantings, trees (new and protected in place), sod, and seeded areas throughout a one-year warranty period. At the end of the guarantee period, any dead, unhealthy, or badly impaired plantings shall be replaced in-kind;
20. Clean hardscape surfaces upon completion of work, remove any construction debris or excess backfill remaining on the property, and generally leave each property in good condition;
21. Restoration of any utility disconnections, or plugging, blocking, or capping used to protect utilities, highways, sidewalks, driveways, curbs, etc. during the work, in accordance with utility provider requirements;

22. Reconstruction of disturbed curb ramps as shown on the Contract Drawings;
23. Adherence to the most current Americans with Disabilities Act of 1990 Accessibility Guidelines;
24. Demobilization of CONTRACTOR equipment and disconnection of any temporary utilities or services upon project completion; and
25. Provide to the ENGINEER documentation and records needed for Project Record Documents, including material and disposal tickets and any daily construction reports generated during the work.

E & E (ENGINEER)

The ENGINEER will provide necessary personnel, equipment, supplies, and materials to perform the remedial inspection services described as follows:

1. Surveying: The ENGINEER will subcontract a New York State-Licensed Surveyor to perform the following surveying activities:
    a. Pre-construction topographical surveys;
    b. During remedial activities: provide coordinates of excavation limits, stake out excavation areas and property limits, determine coordinates of sampling locations, install cut stakes to aid in verifying achievement of proper excavation depths by the CONTRACTOR, provide backfill verification surveys, and final grading and topographic surveys.
2. Structural Assessments: The ENGINEER will subcontract a New York State-Licensed Engineer, competent in structural engineering, to perform pre-construction structural condition assessments on properties to be remediated and neighboring properties, pending receipt of access from property owners.
3. The ENGINEER will perform a visual inspection of existing pre-construction aboveground infrastructure conditions, including photo- and video-documentation on city rights-of-way along proposed project truck routes.
4. Sampling and Analysis: The ENGINEER will provide sample collection, documentation, and shipping, and will coordinate with an Environmental Laboratory Approval Program-certified laboratory contracted by NYSDEC for the sampling and analysis necessary to complete the work. Sampling activities include quality assurance/quality control (QA/QC) of sample data, provision of analytical results in NYSDEC Electronic Data Deliverable (EDD) format, and upload to NYSDEC EQuIS environmental database. The following sampling activities will be undertaken:
    a. Borrow source testing of imported fill materials;
    b. Waste characterization of contaminated soil and materials for waste profiling prior to CONTRACTOR disposal. CONTRACTOR shall obtain waste profile approval from disposal facility;
    c. Sampling and analysis of contact water from dewatering and decontamination activities for waste profiling prior to disposal;

d. Any required tree wood sampling for material to be retained by the property owner; and

e. Pre- and post-construction sampling under decontamination pad(s), material stockpile area(s), and construction staging area(s).

5. Provide site representatives to perform daily inspection of the CONTRACTOR's remedial and restorative construction activities for the duration of the work.

   a. Site representatives shall coordinate with the CONTRACTOR on their planned daily activities, shop drawing approvals, requests for information, and coordination with homeowners; and

   b. The site representative will prepare a Daily Inspection Report as described in item 8 below.

6. Provide site representatives to implement community air monitoring in accordance with the CAMP.

7. Prepare a Vibration Monitoring Plan and provide vibration monitoring in accordance with that Vibration Monitoring Plan.

8. Daily Inspection Report: The ENGINEER will provide NYSDEC with Daily Inspection Reports that include the following items, at a minimum:

   a. Summary of work performed;

   b. Date and weather conditions on site;

   c. A summary of dust and vibration monitoring activities;

   d. Safety-related problems and corrective actions implemented;

   e. Times when personnel arrived and departed;

   f. Deviations from the Contract Drawings or this work plan; and

   g. Photographs and figures as needed to supplement the discussion.

9. Erosion and Sediment Control: The ENGINEER will make general daily inspections of erosion and sedimentation controls to verify adequacy of the controls. An inspection and checklist of erosion and sedimentation controls is completed weekly and following wet weather events, as deemed necessary by the ENGINEER. If any of the temporary erosion and sediment control measures employed by the CONTRACTOR fail to produce results that comply with the requirements of NYSDEC, the ENGINEER will notify the CONTRACTOR who shall make corrections to the satisfaction of the ENGINEER. Site inspection records will include:

   a. Date and time of inspection;

   b. Name of inspector;

   c. Description of weather and soil conditions;

   d. Current phase of construction;

e. Description of the condition of runoff;

f. Identification of all erosion and sediment control practices and pollution prevention measures that were improperly installed or damaged and require reinstallation, replacement, repair, or maintenance;

g. Status of corrective actions required by previous inspections;

h. Photos with date stamp clearly showing the condition of deficient erosion and sediment control measures.

10. Prepare project record documents, including property-specific construction completion reports and a final engineering report.

    a. The CONTRACTOR shall provide to the ENGINEER waste material and disposal tickets for materials shipped off-site and any daily construction reports generated during the work to support the preparation of record documents.

    b. Record documents shall consist of:

        i. Property-specific construction completion and final engineering reports;

        ii. Record drawings incorporating final grades and topographical surveys, and the locations of any structures, subsurface features, or utilities impacted by the work;

        iii. Daily construction reports;

        iv. Site photographs;

        v. Approved shop drawings;

        vi. Requests for information and responses;

        vii. Field orders or work directives;

        viii. Work Plan modifications, including any change orders;

        ix. Discussion of any deviations from the design;

        x. Analytical data; and

        xi. Copies of NYSDOH letters of No Further Action for parcels where remediation has been completed.

11. Provide a community liaison to assist with outreach and meetings with individual homeowners as necessary to complete the work, and with the preparation and mailing of update flyers to be sent to residents within affected areas as determined by NYSDEC.

    a. The liaison shall be a direct point of contact with the homeowners and shall communicate and coordinate with the ENGINEER's site representative as necessary during the work.

b. The liaison shall work in coordination with the City of Geneva's Communications and Engagement Director and the Neighborhood Resource Center to address comments and concerns that arise during the work.

NYSDEC

NYSDEC shall provide the following services to support remedial activities:

1. Provide review and approval of proposed excavation areas in conjunction with NYSDOH.
2. Obtain homeowner access agreements to perform the remedial work;
3. Coordinate the use of material stockpile and equipment staging areas with respective property owners and other agencies; and
4. Assist as needed with the acquisition of permits.

4 Contractor Work Items

The following items describe the minimum requirements for completion of the work by the CONTRACTOR.

Minimum Requirements for Health and Safety

The CONTRACTOR shall be responsible for performing work required by this work plan and the Contract Drawings in a safe and environmentally acceptable manner, and providing for the safety of project personnel and the community for the duration of the Contract.

The CONTRACTOR and their subcontractors shall, at a minimum, meet the following healthy and safety requirements:

1. Provide a written site-specific Health and Safety Plan (sHASP). The sHASP must comply with all applicable federal and state regulations protecting human health and the environment from the hazards posed by activities during this site remediation. The sHASP shall include, at a minimum, the items addressed under 29 CFR 1910.120(b)(1 and 2). The sHASP is a required deliverable for this project that will be reviewed by the ENGINEER. The CONTRACTOR shall resubmit the sHASP, addressing all review comments from the ENGINEER. The CONTRACTOR shall not initiate on-site work in contaminated areas until an acceptable sHASP addressing all comments has been developed;
2. Employ a Safety Officer (SO) who shall be assigned full-time responsibility for all tasks herein described under the approved sHASP. In the event the SO cannot meet his responsibilities, the CONTRACTOR shall be responsible for obtaining the services of an “alternate” SO meeting the minimum requirements and qualifications contained herein. No work shall proceed on this project in the absence of an approved SO;
3. Be responsible for the pre-job indoctrination of all project personnel with regard to the sHASP and other safety requirements to be observed during work, including but not limited to (a) potential hazards, (b) personal hygiene principles, (c) personal protection equipment, (d) respiratory protection equipment usage and fit testing, and (e) emergency procedures dealing with fire and medical situations;
4. Be responsible for implementation of the sHASP;

5. Provide and confirm that all project personnel are properly clothed and equipped and that all equipment is kept clean and properly maintained in accordance with the manufacturer's recommendations or replaced as necessary;
6. Have sole and complete responsibility for safety conditions for the project, including safety of all persons, including employees and subcontractors;
7. Be responsible for protecting project personnel and the general public from hazards due to the exposure, handling, and transportation of contaminated materials;
    a. Barricades, lanterns, roped-off areas, and proper signs shall be furnished in sufficient amounts and locations to safeguard the project personnel and public at all times.
8. Confirm all OSHA health and safety requirements are met; and
9. Maintain a chronological log of all persons entering and exiting the project site. The log shall include organization, date, and time of entry and exit.

Project Personnel: The CONTRACTOR shall confirm the following:

1. All project personnel have obtained the required physical examination prior to and at the termination of work covered by the contract;
2. All project personnel have been trained in accordance with OSHA 1910.120 regulations;
3. All project personnel are informed of the potential hazards of toxic chemicals and of the health risks associated with working at the project site;
4. Daily safety briefings are held by the SO and mandatory for all project personnel. Safety briefings shall provide refresher information for existing equipment and protocols and examine new site conditions as they are encountered; and
5. The CONTRACTOR shall be responsible for, and guarantee that, personnel not successfully completing the required training are not permitted to enter the project site to perform work.

Levels of Protection and Personal Protective Equipment (PPE): It is planned that Level D PPE shall be required for this remediation. Level D is used for non-intrusive activities or intrusive activities with continuous air monitoring.

Level D PPE at a minimum shall include:

1. Clothing, including gloves, appropriate to the potential chemical hazards to be encountered;
2. Boots, work shoes with reinforced toe and shank meeting the requirements of ANSI Z41-1999;
3. Hard hat; and

4. Safety glasses.

The CONTRACTOR shall provide all project personnel with the necessary safety equipment and protective clothing, taking into consideration the chemical wastes at the site.

Work Areas: The CONTRACTOR shall clearly lay out and identify work areas in the field and limit equipment, operations, and personnel in the areas as defined below:

> Exclusion Zone (EZ): The areas undergoing remediation. PPE must be worn in these areas. The CONTRACTOR shall delineate the EZ at the perimeter of work areas for each property to prevent accidental contamination of adjacent uncontaminated areas and protect the public from physical hazards. Generally, this consists of the entire property parcel during excavation and backfilling. The EZ may be altered as needed by the ENGINEER to accommodate remedial activities while maintaining protection for the property owner, on-site residents, and members of the public. The EZ shall be marked using temporary fencing (high-visibility construction fence or equivalent), other barricades (high-visibility cones, barrels, etc.), and/or signs. The EZ will be extended to the road, blocking public sidewalks, when excavation work is to take place within 15 feet of the sidewalk.
>
> Trucks shall be loaded "clean" to eliminate the need for an on-site Contamination Reduction Zone. However, any equipment leaving the EZ with visible mud or debris shall be decontaminated prior to exiting in accordance with Specification 017419 – Off-site Transportation and Disposal.
>
> Support Zone: An area outside of the EZ accessible for deliveries and visitors, including the temporary equipment staging and soil stockpile area.
>
> Personnel decontamination facilities shall be established in accordance with the sHASP.

Equipment Decontamination: All equipment and materials used in this project shall be decontaminated to the satisfaction of the ENGINEER and in accordance with Section 017419 – Off-site Transportation and Disposal before being removed from the project. With the exception of the excavated materials, all other contaminated debris, clothing, etc. that cannot be decontaminated shall be disposed of at the CONTRACTOR's expense by a method permitted by appropriate regulatory agencies.

CONTRACTOR personnel engaged in vehicle decontamination shall wear protective clothing and equipment in accordance with the sHASP. If the CONTRACTOR cannot or does not satisfactorily decontaminate his tools or equipment at the completion of the project, the CONTRACTOR shall dispose of

any equipment that cannot be decontaminated satisfactorily and shall bear the cost of such tools and equipment and its disposal without any liability to the ENGINEER or NYSDEC. At the completion of the project, the CONTRACTOR shall completely decontaminate and clean the decontamination area.

Property Access during Work: The CONTRACTOR shall provide temporary means of access to property structures as necessary for property owners to safely enter and exit their residences, garages, etc., during the work. Safe access shall be provided for property owners and their visitors to enter and leave the property if walkways and other access paths are subject to excavation. Fire escapes and accessible ramps shall be maintained in use at all times during the work.

The CONTRACTOR shall coordinate with the ENGINEER and property owner regarding temporary relocation of property owner belongings, including, but not limited to, the contents of sheds or other structures that require temporary, off-site, secure storage during remedial activities.

Contractor Logs, Reports, & Record Keeping

Site Security: A daily log of security incidents and visitors shall be maintained, as well as a log of all project personnel entering and exiting the site, in accordance with the Site Security section of this Work Plan.

Emergency or Accident Report: Any emergency or accident shall be reported immediately to the SO and the ENGINEER. The CONTRACTOR shall submit a written report as soon as practicable, but no more than 24 hours after its occurrence. The report shall include, but not be limited to: the nature of the problem; the time and location of the occurrence; the areas affected; the manner and methods used to control the emergency; sampling and/or monitoring data; impact, if any, to the surrounding community; and the corrective actions the CONTRACTOR shall institute to minimize future occurrences. All spills shall be treated as emergencies.

Daily Work Report: The CONTRACTOR shall maintain a daily work report in accordance with NYSDEC contractual requirements.

Green Remediation

The CONTRACTOR shall, to the extent practicable, implement green remediation practices in the performance of the requirements of the work to maximize sustainability, reduce energy and water usage, promote carbon neutrality, promote industrial materials reuse and recycling, and protect and preserve land resources.

The CONTRACTOR shall implement practices and procedures to meet the environmental performance goals of NYSDEC consistent with NYSDEC Program Policy DER-31/Green Remediation. The CONTRACTOR shall, to the extent practicable:

1. Set up an on-site recycling program for CONTRACTOR-generated wastes;

2. Minimize equipment engine idling and emissions during site work;
3. Practice engine maintenance in accordance with manufacturers' standards and properly train operators to run equipment efficiently;
4. Sequence work to minimize double-handling of materials;
5. Provide locally made materials that are composed of recovered materials to the maximum amount practicable;
6. Provide materials that generate the least amount of pollution during mining, manufacturing, transport, installation, use, and disposal;
7. Maintain office trailer heating and cooling systems at efficient set points;
8. Avoid materials that contain ozone-depleting chemicals (e.g., chlorofluorocarbons [CFCs] or hydrochlorofluorocarbons [HCFCs]) and that emit potentially harmful volatile organic compounds (VOCs);
9. Employ construction practices that minimize the generation of excessive dust and combustion by-products;
10. Minimize use of scarce, irreplaceable, or endangered resources;
11. Contain and reuse water on-site, to the extent practicable, as approved by NYSDEC; and
12. Recycle concrete and asphalt, to the extent possible, that is removed from properties during work and visually free of contaminated material.

Project Submittals

The CONTRACTOR shall prepare and submit project submittals, including work plans and shop drawings, for review by the ENGINEER and NYSDEC. Submittals shall be provided for the items listed in the project specifications. The CONTRACTOR shall furnish required submittals with complete information and accuracy in order to achieve required approval of an item within two submittals.

It is the CONTRACTOR's responsibility to review submittals made by his suppliers and subcontractors before transmitting them to the ENGINEER to provide proper coordination with the work and to determine that each submittal is adequate and that there is sufficient information about materials and equipment for the ENGINEER to determine compliance with this work plan and the Contract Drawings. Incomplete or inadequate submittals will be returned for revision without review.

Submittal Procedures: A letter of transmittal shall accompany each submittal and shall include the Project Name, Date, Contract Number, Submittal Number, Work Item, and if applicable, Property Number and Address. All Shop Drawings submitted for approval shall have a title block with complete identifying information satisfactory to the ENGINEER, including the specification number, section, and subsection. A number shall be assigned to each submittal by the CONTRACTOR starting with No. 1 and thence numbered consecutively. Resubmittals shall be

identified by the original submittal number followed by the suffix "A" for the first resubmittal, the suffix "B" for the second resubmittal, etc.

All Shop Drawings submitted shall be signed and dated by the CONTRACTOR as evidence that they have been prepared or reviewed by the CONTRACTOR in order to certify that all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto have been reviewed; and that each Shop Drawing or sample has been coordinated with other Shop Drawings and samples and with the requirements of the Contractor Work Items and the Contract Drawings.

After the ENGINEER completes review of submittals, Shop Drawings shall be marked with one of the following notations:

1. Approved
2. Approved as Noted
3. Resubmit with Revisions
4. Not Approved

Upon return of a submittal marked "Approved" or "Approved as Noted", the CONTRACTOR may order, ship, or fabricate the materials included on the submittal, provided it is in accordance with the corrections indicated.

If a Shop Drawing marked "Approved as Noted" has extensive correction or corrections affecting other Drawings or Work, the ENGINEER may require that the CONTRACTOR make the corrections indicated thereon and resubmit the Shop Drawings for record purposes. Such drawings will have the notation, "Approved as Noted - Resubmit."

If a submittal is unacceptable, it will be returned to the CONTRACTOR with either "Resubmit with Revisions" or "Not Approved." Upon return of a submittal marked "Resubmit with Revisions," the CONTRACTOR shall make the corrections indicated and repeat the initial approval procedures. The "Not Approved" notation shall be used to indicate material or equipment that is not acceptable. Upon return of a submittal so marked, the CONTRACTOR shall repeat the initial approval procedure utilizing acceptable material or equipment.

Any work performed or equipment installed without an "Approved" or "Approved as Noted" Shop Drawing shall be at the sole responsibility of the CONTRACTOR.

Project Coordination

Subcontractors: The CONTRACTOR shall submit a complete list of proposed subcontractors (including disposal facilities) identifying their name, address, telephone number, contact, type of work to be subcontracted, dollar amount, and M/WBE status to NYSDEC.

Staging Areas: The CONTRACTOR shall locate equipment, trailers, decontamination pads, stockpiles, construction materials, water storage tanks, etc., at the locations shown in the CONTRACTOR's approved Shop Drawings.

Site Access and Project Phasing: NYSDEC will be responsible for coordinating access rights with property owners for all work performed within the Project work limits. The CONTRACTOR shall coordinate daily access with the ENGINEER.

The work area exists within and around a residential neighborhood that also includes commercial properties and community facilities. The CONTRACTOR shall confirm that construction activities and/or CONTRACTOR equipment does not impede or otherwise interfere with existing access to the roads, properties, driveways, utilities, etc., within the work area.

Damage to properties, roads, lawns, foliage, driveways, and sidewalks outside of the work areas due to construction activities shall be repaired and replaced in kind by the CONTRACTOR at no additional cost to NYSDEC. The CONTRACTOR shall also protect completed work areas and repair damage to completed areas (if caused by the CONTRACTOR's operations) at no additional cost to NYSDEC or ENGINEER.

Schedule: The CONTRACTOR shall be solely responsible for the coordination of schedules for all site activities and for his/her subcontractors' schedules. The CONTRACTOR shall inform the ENGINEER and NYSDEC if a conflict or deviation arises from the anticipated project schedule. The CONTRACTOR shall coordinate with the ENGINEER to make appropriate changes to the schedule.

Surveys

The CONTRACTOR shall perform pre-construction video surveys of sub-surface sanitary and storm sewers along city-owned roads prior to the start of each phase of work. The surveying work and deliverables shall include:

1. Review of any existing infrastructure mapping available from the city.
2. Video inspection and conditions assessment of sewer mains, manholes, and any related appurtenances. Inspection shall be performed for all roads to be utilized during the work, including roads used during on-site construction and those within the city used as trucking routes for delivery and off-site disposal of materials.
3. Documentation of subsurface conditions, including invert depth below ground surface, length of pipe segment inspected, pipe diameter and material, description of overall conditions, mapped locations of areas of concern, photo images of areas of concern, and description of areas of concern (including damage, cracks, leaks, infiltration/inflow, corrosion, etc.)
4. The CONTRACTOR shall provide all video footage to the ENGINEER, NYSDEC, and the city of Geneva Roads, Grounds and Sewer Supervisor.

Quality Control

The CONTRACTOR shall provide quality control of suppliers, manufacturers, products, services, subcontractors, site conditions and workmanship to verify products and workmanship are of specified quality. The CONTRACTOR shall:

1. Comply fully with manufacturers' instructions, including performing each step in sequence;
2. Perform work by persons qualified to produce workmanship of specified quality; and
3. Verify that field measurements and testing are as indicated on shop drawings or as instructed by the manufacturer.

If manufacturers' instructions conflict with the Contractor Work Items or Contract Drawings, the CONTRACTOR shall request clarification from the ENGINEER in writing before proceeding. If a property owner questions CONTRACTOR's work, methods, choice of materials, or raises any questions or concerns, the CONTRACTOR shall request clarification from the ENGINEER before proceeding.

References and Standards: Conform to reference standards by most current date of issue, except where a specific date is established by code. For products or workmanship specified by association, trades, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes. If specified reference standards conflict with the Contractor Work Items, Technical Specifications, or Contract Drawings, the CONTRACTOR shall request clarification in writing from the ENGINEER before proceeding.

Tolerances: The CONTRACTOR shall monitor fabrication and installation tolerance control of products to produce acceptable work. The CONTRACTOR shall not permit tolerances to accumulate. The CONTRACTOR shall comply with manufacturers' tolerances. If manufacturers' tolerances conflict with the Contractor Work Items, Technical Specifications, or Contract Drawings, the CONTRACTOR shall request clarification in writing from the ENGINEER before proceeding. The CONTRACTOR shall adjust products to appropriate dimensions and position before securing products in place.

Repair and Protection: On completion of testing, inspecting, sample taking, and similar services to be performed by the ENGINEER, the CONTRACTOR shall repair damaged construction and restore substrates and finishes as needed to comply with Work Items and Contract Drawings. The CONTRACTOR shall provide materials and comply with installation requirements specified in this Work Plan and Contract Drawings. Restore areas with materials, structures, sod/seeding, or plantings of similar type and quality. Repair and protection are the

CONTRACTOR's responsibility, regardless of the assignment of responsibility for quality-control services.

Temporary Facilities, Controls, and Decontamination

The CONTRACTOR shall provide temporary facilities and equipment as required to properly carry out the scope of work.

General:

1. Locate facilities where they shall serve the project adequately and result in minimum interference with performance of the work. Relocate and modify facilities as required by progress of the work;
2. Provide each facility ready for use when needed to avoid delay. Do not remove until instructed by the ENGINEER;
3. Use qualified tradesmen for installation of temporary utilities, facilities, and constructions. Provide utility services as required to perform the work for the duration of the project;
4. Install temporary utilities in accordance with the servicing utility's requirements; and
5. Provide all temporary utilities and connections required, including electric and water. Remove temporary utilities and connections when instructed by the ENGINEER. Obtain all necessary permits and permissions prior to installation or connection.

Temporary Utilities:

1. The CONTRACTOR shall engage the local utility company to install temporary service or make connections to existing service, if available. The CONTRACTOR shall obtain and pay for permits, construction, and usage fees required to supply temporary utilities to the CONTRACTOR'S/ENGINEER'S/NYSDEC'S field offices;
2. Electric Power Service: Comply with applicable requirements of the National Electrical Manufacturers Association (NEMA), National Electrical Contractors Association (NECA), and UL standards and governing regulations; and
3. The CONTRACTOR shall provide temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work. Minimum light shall be 5 foot-candles. Wiring in the work area shall be in UL-approved cable and located in such a manner that visual surveillance is easily accomplished.

Potable and Non-Potable Water Service:

1. The CONTRACTOR shall provide an adequate supply of potable or non-potable water for use in dust control, watering of seed/sod, and plantings at each individual property to be restored, and for decontamination; and
2. The CONTRACTOR shall obtain the necessary permission, appropriate permits, and backflow prevention devices, etc., for the source of water used and make all connections and remove same at completion of the work. Any damage to existing systems shall be repaired by the CONTRACTOR at no additional cost to the ENGINEER or NYSDEC.

Temporary Facilities:
All temporary facilities used to store contaminated materials or equipment shall be lined and provided with secondary containment and erosion control, as shown in the Contract Drawings.

Material Stockpile Areas:

1. The CONTRACTOR shall submit shop drawings for all proposed material stockpile areas for ENGINEER review and approval prior to mobilization;
2. The contaminated materials stockpile pad shall be constructed with a 40-mil HDPE liner at a minimum and approved by the ENGINEER to prevent migration of contaminated materials to the existing soils.
3. Stockpile areas shall be constructed to prevent the spread of any contamination to the surrounding soils, surfaces, and/or groundwater, and to minimize cross-contamination between other stockpiles;
4. Water spray or equivalent shall be used as necessary to prevent dust generation. Staging area perimeter dust monitoring will be provided by the ENGINEER; and
5. The CONTRACTOR shall remove all stockpile construction materials when the stockpile area is no longer needed, as determined by the ENGINEER, and dispose of said materials off-site in accordance with all applicable regulations.

Decontamination Station and Pad: The CONTRACTOR shall construct a decontamination station and pad at the staging area for larger equipment and vehicles. The decontamination station shall be used to clean all vehicles and equipment that have come into contact with potentially contaminated soil before leaving the site. The pad shall have adequate dimensions to contain wash water and debris from the largest sized vehicles that contact potentially contaminated materials. Shop drawings of the decontamination pad shall be submitted to the ENGINEER for review and approval.

The decontamination station and pad shall be equipped with the following:

1. A drain system and holding tank on an area graded to provide adequate drainage;
2. Curbed perimeter with splash guards;
3. Adequate sumps, pumping facilities, and temporary storage facilities for anticipated use;
4. Temporary water storage facilities, which may be provided by mobile tankers or suitable fixed tanks; and
5. Sidewall panels on at least two sides at a height suitable to prevent over spray;

The CONTRACTOR shall clean the decontamination pad after daily use. No contamination shall be left behind. The CONTRACTOR shall be required to dismantle, remove, and properly dispose of the pad upon completion of the work.

Sanitary Facilities:

1. The CONTRACTOR shall provide self-contained chemical toilet units in an amount based on the total number of workers employed on the project in accordance with the provisions of the Health and Sanitary Codes of the State of New York;
2. Provide adequate, separate sanitary facilities for both male and female on-site personnel, including a handwashing station; and
3. Self-contained chemical toilets shall be located at the material stockpile area and equipment staging area, and shall not be located on any residential properties. Units shall be maintained by cleaning weekly or more frequently, if necessary, throughout the project work period. Include provisions for pest control and elimination of odors as necessary.

Fencing: Temporary fencing around staging areas shall be a minimum of 6 feet high and constructed in accordance with the Contract Drawings. The Contractor shall eliminate or minimize to the extent practicable the need to auger soil for fence-post installation at all potentially contaminated areas.

Flagpoles: Flagpoles salvaged for reinstallation shall be installed in accordance with the original manufacturer's specifications based on the model and dimensions of the flagpole being reinstalled. The foundation of the flagpole shall extend below the local frost line unless otherwise specified by the manufacturer.

Vibration Control and Limits:

1. The planned remediation activities have the potential to generate vibrations. The ENGINEER will monitor the work area with vibration sensors during the

work. The ENGINEER will alert the CONTRACTOR if vibration sensors indicate readings above the limits listed in the ENGINEER's Vibration Monitoring Plan;

2. If the vibration limits are exceeded, CONTRACTOR shall immediately suspend construction activities;
3. If damage to adjacent property occurs due to construction activities, the CONTRACTOR shall immediately suspend construction activities;
4. Before resuming operations, the CONTRACTOR shall take appropriate measures to control the effects of vibration from demolition, excavation, and restoration activities and submit to the ENGINEER a complete description of proposed changes for reducing the potential for future damage;
5. Do not resume operations until approved by the ENGINEER; and
6. Property Structural Conditions: The CONTRACTOR shall be responsible for repairing any damage to structures within the excavation limits or in the vicinity of the excavation limits resulting from remedial activities.

Dust Control:

1. The Contractor shall conduct operations to limit impacts on residents in the vicinity of the work and comply with applicable local ordinances.
2. The ENGINEER will monitor the work area with dust monitors during the work. The ENGINEER will alert the CONTRACTOR immediately if monitor recordings indicate readings above safe limits, as determined in the ENGINEER's CAMP.
3. Provide staging areas and any areas undergoing remediation activities with water treatment to minimize dust. No visible dust, as determined by the ENGINEER, shall be permitted beyond the limits of a property's EZ or the limits of the construction staging area.
4. Particulate concentrations shall be monitored at the upwind and downwind perimeters of the exclusion zone in accordance with the ENGINEER's CAMP. Additionally, one monitoring unit shall be placed adjacent or near a residence entrance point within the EZ for monitoring of particulate concentrations.
5. Apply water or dust suppressants to exposed soil, unpaved roads, haul roads or routes, and other areas disturbed by operations as needed to mitigate the migration of visible dust.
6. Provide a means of removing dirt or mud from vehicle wheels before they are permitted to exit a staging area or any property undergoing remediation or restoration.
7. Dry power brooming shall not be permitted.
8. Only wet cutting of concrete shall be permitted.

9. Do not unnecessarily shake bags of dry product such as cement, concrete mortar, or fertilizer.

Traffic Control:

1. Roads in the city are narrow and subject to weight and parking restrictions. The CONTRACTOR shall comply with all applicable requirements of City Code §335-28 unless otherwise permitted by the City.
2. Trucking routes shall comply with the restrictions set forth in City Code §335-28 (Truck route systems) and the Infrastructure Protection Plan dated March 2017.
3. The CONTRACTOR shall be responsible for adhering to parking regulations and/or restrictions on local roads at all times.
4. Do not close or obstruct streets, roads, or sidewalks, without permission from authorities having jurisdiction.
5. Flag persons shall be used to direct traffic while construction vehicles are entering or exiting work areas.
6. The CONTRACTOR shall provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
7. To minimize congestion on local roads and to maximize the safety of residents, truck traffic shall be minimized to the extent practicable when school buses are actively picking up and dropping off students near work zones.
8. The CONTRACTOR shall implement traffic controls as required by regulations of the Federal Highway Administration (FHWA) Manual on Uniform Traffic Control Devices (FHWA 2010) and the New York State Supplement (17 NYCRR Chapter V), when applicable. This includes the placement of cones and signs to divert and warn oncoming traffic. Depending on the type of work and length of time needed, traffic controllers and observers may be required. A spotter shall be required to confirm an area to be clear anytime vehicles are to cross walkways.
9. The CONTRACTOR shall provide temporary construction signs to warn approaching motorists and pedestrians of the work.
10. The CONTRACTOR shall repair damage caused by their work activities to paved roads and other municipal infrastructure along the access/haul route in the areas surrounding the site in accordance with the Infrastructure Protection Plan.

Homeowner Access during Work:

1. The CONTRACTOR shall conduct work activities to limit interference with the homeowner's ingress to/egress from their residence. The CONTRACTOR shall not interfere with or block access to other properties or residences.

2. Daily start and finish times for work at each property shall be discussed with the homeowner prior to starting work.
3. Means of ingress to/egress from their residence shall be available to the homeowner at all times. Temporary means of ingress/egress shall be erected by the CONTRACTOR and available to the homeowner during all times that work activities are impeding access to residential entranceways.
4. Ingress/egress routes shall be safe and stable routes for the protection of residents and their visitors. Boards shall be laid down for residents to walk on if sidewalks are removed during work. Temporary platforms shall be installed to maintain safe step heights if backfilling around stairs is not performed immediately. The determination of the need for these measures to maintain safe ingress/egress will be made by the ENGINEER.
5. No excavation pits or trenches are to be left open and unattended. If an excavated area poses a slip/trip/ fall hazard and needs to remain open and unattended, the area shall be fenced with temporary construction fence to reduce the physical hazard.
6. Any equipment left within the work area overnight shall only be done with the property owner's verbal approval and the equipment shall be locked and the keys removed from the site.
7. The CONTRACTOR shall coordinate with the ENGINEER regarding the temporary relocation of personal vehicles present on the property, prior to commencing work.

Erosion Control:

1. The CONTRACTOR shall comply with the substantive requirements for erosion control identified in NYSDEC's SPDES General Permit for Stormwater Discharges from Construction Activity, Permit No. GP-0-15-002 (January 2015).
2. The CONTRACTOR is responsible for controlling erosion and sedimentation during construction in the work zone and at soil stockpile areas, as well as protecting the work included in this Work Plan. Temporary erosion control shall be installed and maintained at each residence and at the soil stockpile area for the duration of the work.
3. Temporary erosion controls may include, but are not limited to, silt fence installation, erosion control matting (rolled erosion control mats), or other methods approved by the ENGINEER.
4. Temporary sedimentation controls may include, but are not limited to, silt fences, traps, temporary earthen diversion berms and ditches, rock dams, and stabilized construction entrances and appurtenances at the foot of sloped surfaces. The CONTRACTOR is responsible for preventing the migration of sediment onto adjacent properties during construction. The performance of the CONTRACTOR'S sedimentation controls is subject to approval by the ENGINEER.

5. The CONTRACTOR shall be responsible for maintaining all temporary and existing permanent erosion control structures within the work areas. Maintenance shall include but not be limited to making all repairs necessary to maintain the structures as well as removing all accumulated sediment as necessary to maintain the structures in proper working condition.

Pollution Control:

1. Maintain work areas on and off site free from further environmental pollution that would be in violation of any federal, state, or local regulations.
2. Minimize air pollution by wetting down bare soils with clean water, requiring use of properly operating combustion emission control devices on construction vehicles and equipment used by the CONTRACTOR, and encouraging shutdown of motorized equipment not actually in use.
3. Chemicals used, whether herbicide, pesticide, disinfectant, polymer, reactant, or other classification, must be approved by either the U.S. Environmental Protection Agency or U.S. Department of Agriculture or any other applicable regulatory agency and the ENGINEER and be used in a manner as their original purpose was intended.
4. Hazardous waste (if any) generated from the project shall be transported, manifested, and disposed of in accordance with current regulations and Section 02940 – Off-site Transportation and Disposal.

Rubbish Control (Not Contaminated):

1. Clean up all debris resulting from the work, including food wrappers, bottles, and cans, at the end of each day and leave work areas clean.
2. Remove debris from the site at least once a week or more often if it presents a fire hazard or becomes excessive. Burning of waste material shall not be permitted.
3. Containers shall have secure tops.

Removal:

1. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work as determined by the ENGINEER.
2. Remove all temporary facilities and controls as soon as safe progress of the work permits as determined by the ENGINEER.

Site Security

The CONTRACTOR is responsible for the security of the ENGINEER's and CONTRACTOR's work areas, equipment, materials, and supplies provided under this contract. The CONTRACTOR is responsible for ensuring site visitors related

to this contract are escorted as necessary (to get where they are going) and do not enter contaminated areas without authorization.

The CONTRACTOR shall be responsible for securing all work areas, 24 hours per day, seven days per week, including holidays, for the duration of the contract, including the protection of excavations and soil stockpiles, equipment, materials, and supplies. The security requirements specified herein are only minimum requirements. The CONTRACTOR has the option to provide additional security as desired, at his/her own expense.

The CONTRACTOR shall be responsible for the control of all persons and vehicles entering and leaving project staging areas and exclusion zones. The CONTRACTOR's security personnel shall:

1. Require display of proper identification by each person;
2. Require personnel to print full name and employer, to sign in upon entering the project site, to sign out when leaving, and also maintain the logs;
3. Maintain a log of project-related vehicles and equipment entering and leaving the work areas;
4. Persons not associated with the project shall require the ENGINEER's approval to be admitted onto project staging areas and into exclusion zones;
5. Maintain a log of visitors, separate from the project personnel log;
6. Maintain a log of all security incidents. The ENGINEER shall be informed immediately of any incident of vandalism or breaches in site security in the work areas;
7. Maintain a current list of authorized persons, which shall be furnished to the ENGINEER upon request; and
8. Confirm that all temporary fences around work areas are closed and any breaks or gaps are attended to immediately.

Construction Entrances and Access Roads

The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals required to construct stabilized construction entrances and access roads, as needed and as shown on the Contract Drawings. The preparation of stabilized construction entrances and access roads is not anticipated at residential property work areas; however, a single construction entrance at each residential property (e.g., existing driveway) shall be maintained and controlled during excavation and restoration by the CONTRACTOR. The CONTRACTOR shall perform all general unclassified excavation, rough or overall grading, borrow and fill, to the subgrades of the road, road shoulders and slopes to match the existing grades. Finished excavation and grading shall be uniformly smooth, well compacted, and free from irregular surface changes. The degree of finish shall be that obtainable from either blade-grader or scraper operations. The finished surface shall not be more than 0.10 foot above or below the proposed grade.

Field Offices

The CONTRACTOR shall furnish and install field offices for the duration of each phase of the work. Two field offices, one for the CONTRACTOR and one for the ENGINEER/NYSDEC representatives, shall be provided during each phase of work. The CONTRACTOR shall provide and mobilize the office(s) at least 1 week prior to the start of excavation activities. Field offices shall have individually keyed front door locks, and the CONTRACTOR shall provide at least two keys or otherwise arrange for direct access to keys by the ENGINEER.

Allocate a minimum of at least two reserved parking spaces for use of the ENGINEER and NYSDEC.

Services: Provide minimum services of:

1. Interior lighting of 50 foot-candles at desktop height;
2. Exterior light at entrance;
3. Heating to maintain minimum 65 degrees Fahrenheit (°F) in fall/winter;
4. Furnish and pay for all fuel;
5. Air conditioning to maintain maximum 75 °F in summer;
6. Electric service, including payment of all charges; and
7. Four electric wall outlets, minimum.

Installed electric service shall be required unless otherwise approved by the ENGINEER.

Furnishings: Provide minimum furnishings of:

1. One desk;
2. Two swivel desk chairs;
3. Two folding guest chairs;
4. Two 30-inch by 6-foot folding tables;
5. One interior waste basket and exterior trash can;
6. Fire extinguisher;
7. First-aid kit;
8. Three hard hats, safety vests, and protective eyewear for use by NYSDEC and authorized visitors; and
9. One battery-operated smoke detector per each 1,200-square-foot coverage.

Project Record Documents

The CONTRACTOR shall provide the following documentation to support the ENGINEER's development of Project Record Documents:

1. One hard copy of Record Documents - Cleanly marked up (in red ink) Contract Documents to show deviations to this work plan and the Contract Drawings. Red-line mark ups shall also be kept current and available on the project site at all times during the work;
2. All changes made in the work or additional information that might be uncovered in the course of construction, accurately and neatly recorded by means of details and notes;
3. Recycled Materials Records;
4. Waste Disposal Records, including Hazardous and Non-Hazardous Material Manifests;
5. Other documents pertinent to the CONTRACTOR's work, including daily activity logs, security logs, work plans, accident logs, public complaints, etc.

Demolition and Removal

CONTRACTOR shall provide and coordinate all equipment, materials, and personnel necessary to demolish or salvage, and remove structures as shown on the Contract Drawings (sheds, fences, pools, sidewalks, driveways, decks, etc.) within the remedial limits. The CONTRACTOR shall coordinate demolition operations in accordance with applicable local, state, and federal laws and regulations, and shall be responsible for the payment and procurement of all permits required to perform demolition and utility disconnection, and any required bonds.

The CONTRACTOR shall remove and salvage or dispose of all materials and debris generated from demolition activities. The CONTRACTOR shall obtain approval from the ENGINEER that an item is in suitable condition prior to salvaging. Salvaged items shall be stored and protected from damage until reinstallation.

The CONTRACTOR shall identify and mark locations of all underground storm, sanitary, gas, water, and electrical utilities at each work area and protect all utilities from damage or interruption.

The CONTRACTOR shall coordinate with the homeowner to confirm that personal items have been removed from within demolition areas prior to demolition activities taking place. The CONTRACTOR, in the presence of the homeowner, shall inventory all items to be stored and provide secure storage for each individual property for the duration of the work before any demolition work begins. Storage shall be located at a designated area within the city, as nearby as possible, and the homeowner shall be provided with the sole key or entry code to the storage unit.

The CONTRACTOR shall protect and support existing structures remaining in place from damage by using sufficient bracing, shoring, or lateral support to prevent collapse or failure.

Protection of the Work and Property

The CONTRACTOR shall be responsible for taking all precautions, providing all programs, and taking all actions necessary to protect the work and all public and private property and facilities from damage.
In order to prevent damage, injury, or loss, the CONTRACTOR's actions shall include, but not be limited to, the following:

1. Store apparatus, materials, supplies, and equipment in an orderly, safe manner that shall not unduly interfere with the progress of the work or the work of any other CONTRACTOR or utility service company.
2. Store and protect any miscellaneous and/or salvaged materials from the work area until time of restoration.
3. Provide suitable storage facilities for all materials that are subject to injury by exposure to weather, theft, breakage, or otherwise.
4. Place upon the work or any part thereof only such loads as are consistent with the safety and agreements of that portion of the work.
5. Clean up all refuse, rubbish, scrap materials, and debris generated by the CONTRACTOR frequently during execution of the work. Present a safe and orderly site appearance.
6. Provide barricades around excavations and other hazardous or potentially unsafe areas.
7. Protect existing structures outside of the excavation limits, which may include, but are not limited to, buildings, sheds, porches, decks, stairs, driveways, poles, wires, cables, posts, signs, markers, curbs, walks, and all other facilities that are visible above the ground surface.
8. Protect all underground structures, which may include sewer, water, gas, and other piping, and manholes, culverts, chambers, electrical conduits, tunnels, and other existing subsurface work located within or adjacent to the limits of work.
9. Protect air conditioning units existing within excavation limits in-place for the duration of construction. Soil below air conditioning ground units shall not be excavated.

The CONTRACTOR shall inform the ENGINEER immediately upon encountering unanticipated conditions during the work.

The CONTRACTOR shall inform the ENGINEER immediately upon damage to any items, including landscaping, structures, utilities, etc., that are intended to be protected during the work or that exist outside of the limits of excavation. The

CONTRACTOR shall resume work activities upon such encounters in accordance with directions from the ENGINEER.

In accordance with city of Geneva code, Section 350-24, the CONTRACTOR shall ensure that all accessory structures encountered and restored are set back a minimum of 4 feet from the property line, 12 feet from the principal structure, and shall not be placed in front of the principal structure.

Accessory uses not enclosed in a building such as swimming pools and tennis courts, shall be located no closer than 10 feet to any rear or side property line, and shall not be constructed in the front yard of any lot.

Hazardous Materials Management

The CONTRACTOR shall excavate areas indicated on the Contract Drawings to contain potentially hazardous materials prior to excavating surrounding materials. Excavated hazardous materials shall be segregated from other wastes and placed in a roll-off box double-lined with poly sheeting and covered. Equipment handling hazardous waste shall be decontaminated following excavation and decontamination waste placed in the double-lined roll-off box. All handling of hazardous materials prior to characterization shall be performed by a licensed hauler and in accordance with federal and state regulations for hazardous waste transportation, and in accordance with Section 017419 – Off-site Transportation and Disposal.

The CONTRACTOR shall prepare procedures describing appropriate management and handling of hazardous soils, which shall be reviewed by the ENGINEER prior to performing the work. The excavation, characterization, and disposal of hazardous soils shall be completed in accordance with Section 017419 – Off-site Transportation and Disposal. Characterization of excavated materials will be performed by the ENGINEER.

5 Restoration Specifications and Procedures

Sheds

General: The CONTRACTOR shall provide all labor, materials, equipment, and incidentals to furnish and install sheds as shown on the Contract Drawings. Salvage and reinstallation of existing sheds shall be at the approval of the ENGINEER. The CONTRACTOR is responsible for the proper salvaging, handling, and re-installation of sheds and their contents.

Execution: Handle and store existing shed contents in such a manner as to avoid damage and be protected from weather and contact with damp or wet surfaces. Shed contents shall be securely stored during the work, and the homeowner shall be provided with the sole key or entry code to the storage unit.

Contractor shall install new sheds in locations shown on Contract Drawings, and in accordance with manufacturer's standards. Sheds shall be installed on a 6-inch thick compacted subbase, New York State Department of Transportation (NYSDOT) Section 733-04, Type 2, unless otherwise indicated on the Contract Drawings. Sheds shall be installed according to local codes, a minimum of 4 feet from property lines. Sheds larger than 144 square feet may require a city of Geneva building permit.

Pools

General: The CONTRACTOR shall provide all labor, materials, equipment, and incidentals to furnish and install pools as shown on the Contract Drawings. CONTRACTOR shall obtain a building permit from the City of Geneva's Superintendent of Building and Zoning prior to each new pool installation. All pools with a finished height of less than 42 inches above surrounding grade shall be enclosed by a barrier of at least 48 inches in height as specified in City of Geneva code §350-66. All electrical components of pools shall meet the latest revision of the National Electrical Code and New York State Uniform Fire Prevention and Building Code (Uniform Code) for permanently installed swimming pools. All pools shall be equipped with an approved pool alarm in accordance with the latest revision of the New York State Uniform Code.

Installation: The CONTRACTOR shall install each new pool as per the manufacturer's instructions. Pools shall be installed by qualified personnel or subcontractor. In accordance with city of Geneva code, section 350-24, swimming pools shall be located no closer than 10 feet to any rear or side property line and shall not be constructed in the front yard of any lot, unless approved by a variance from the city of Geneva. Pool foundation shall be level, with high points excavated to meet the level of low ground. Low ground shall not be filled to match high ground. A uniform layer of clean sand at least 2 inches deep shall be used as subbase.

A beveled cove comprised of sand shall be installed on the inner perimeter of the pool wall at a 45° angle, with the top of the cove 6 to 8 inches high as measured from the base of the pool wall and framework to the top of the angled cove. Premanufactured coves meeting dimension requirements are acceptable alternatives. New liners shall be of the same thickness as previously installed. If previous thickness cannot be determined, new liner is to be at least 20-mil thick. After pool installation, any depressions along the outer edge of the pool remaining from subbase excavation shall be filled to grade of surrounding soil.

Decks surrounding pools shall be protected in place, salvaged and re-installed, or removed and replaced in-kind as shown in the Contract Drawings.

Testing: Following pool installation, the CONTRACTOR shall test pool components, including liners, pumps, filtration equipment, and electrical connections, to verify there are no leaks and that all equipment is in good working order.

Specifications

Specifications associated with the work described here and on the drawings have been attached to this Work Plan (see Attachment 1) regarding specific work items to be performed by the CONTRACTOR.

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Attachment 1
Specifications

Section 017419 – Off-Site Transportation and Disposal
Section 311000 – Clearing and Grubbing
Section 312000 – Excavation and Backfill
Section 312319 – Dewatering and Contact Water Management
Section 321216 – Asphalt Paving
Section 321313 – Concrete
Section 323113 – Fencing
Section 329200 – Turf and Grasses
Section 329300 – Landscaping and Plants
Section 332413 – Well Abandonment

SECTION 017419 – OFF SITE TRANSPORTATION AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes procedures for off-site disposal or recycling of wastes and procedures to transport all items specified for off-site treatment and disposal or recycling.

1.2 SUBMITTALS

A. Valid New York State 6 NYCRR Part 364 Waste Transporter Permit and USEPA transporter identification numbers.

B. Disposal facility information, including name, address, contact, and permit information.

C. Recycling facility information, including name, address, contact, and permit information.

D. Submit the following as part of the project record documents:

1. Signed waste profile information submitted to disposal facility and letter indicating acceptability of the waste.
2. Certificates of Disposal/Hazardous Waste Manifests for all material disposed of off-site.
3. Signed bills of lading for salvaged or recycled materials.
4. Certified weight tickets, manifests, bills of lading, etc. for all waste streams disposed off-site.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

1. U.S. Code of Federal Regulations (CFR)

a. 40 CFR 262 1993 Standards Applicable to Generators of Hazardous Waste
b. 49 CFR 172 Tables, Hazardous Material Communication Requirements, and Emergency Response Information Requirements

2. State of New York Codes, Rules, and Regulations (NYCRR)

a. 6 NYCRR Part 364 Waste Transportation Permits
b. 6 NYCRR Part 371 Identification and Listing of Hazardous Wastes
c. 6 NYCRR Part 372 Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities
d. 6 NYCRR Part 375 Environmental Remediation Programs

B. For this site, Environmental Protection Agency (EPA) Hazardous Waste Generator I.D. information is as follows:

EPA I.D. Number	NYD002216794
Installation Address	43 Jackson Street Geneva, NY 14456

1.4 DISPOSAL FACILITIES

A. Hazardous and Non-Hazardous Waste

1. Facilities must have valid federal/state permits appropriate for the waste being disposed. Permits must be valid during the entire project period.
2. Facilities must be in good legal standing with no significant violations, corrective actions, or other environmental conditions that could affect satisfactory operation.
3. The disposal facility must comply with policies adopted by the DEPARTMENT, or with applicable regulations.

B. Recycling/Salvage Facilities

1. Facilities must have valid federal/state permits appropriate for the waste being disposed. Permits must be valid during the entire project period.
2. Facilities must be in good legal standing with no significant violations, corrective actions, or other environmental conditions that could affect satisfactory operation.
3. The facility must comply with policies adopted by the DEPARTMENT and with applicable regulations.

1.5 TRANSPORTATION PROCEDURES

A. Transportation procedures shall include at a minimum:

1. Type, condition, and average daily number of vehicles to be used.
2. Travel routes and time and weight restrictions.
3. Decontamination methods for vehicles, equipment, and containers.
4. Emergency response plans.
5. A list of all shippers and their federal and state transporter ID numbers.
6. Proposed method of measurement (i.e., certified scale location).

1.6 PERMITS AND REGULATIONS

A. Comply with all municipal, county, state, and federal regulations regarding transportation and disposal of hazardous and nonhazardous materials. These include but are not limited to:

1. Trucks used for transportation of material for disposal off site shall be permitted pursuant to 6 NYCRR Part 364.
2. Vehicle operator possession of a commercial driver's license with hazardous materials endorsement (if applicable).
3. Registration of vehicle as a hazardous waste carrier (if applicable).

4. Utilization of shipping papers or hazardous waste manifests (40 CFR 262 and 6 NYCRR Part 372).
5. Proper marking and placarding of vehicles in accordance with 49 CFR 172.
6. Placement of emergency response procedures and emergency telephone numbers in vehicle, and operator familiarity with emergency response procedures.
7. Compliance with load, height, and weight regulations.
8. Compliance with requirements associated with EPA Hazardous Waste Generator I.D. number.

1.7 MEASUREMENT

A. Each transport vehicle shall be weighed to determine the amount of material being removed from the site.

B. A printed ticket with the time, date, vehicle number, and tare weight and a separate ticket with the same information except with total vehicle weight and net weight of material being transported for disposal shall be obtained from the disposal facility. A copy of both tickets shall be given directly to ENGINEER as they are produced.

1.8 SPECIAL PROJECT PROCEDURES

A. CONTRACTOR shall be responsible for all special use taxes for in-state and out-of-state waste disposal or recycling, including but not limited to host municipality fees and special district user or local taxes.

PART 2 - PRODUCTS

2.1 GENERAL

A. All equipment supplied shall be in good working condition. Equipment and machinery delivered to the site, including haul trucks that have visible oil or hydraulic fluid leaks, will not be allowed on site until satisfactorily repaired. The CONTRACTOR is responsible for the cleanup of any oil or hydraulic fluid spills at the CONTRACTOR's expense.

B. The CONTRACTOR shall not allow soil to be tracked off site at any time during the Project. Visible soil tracks on streets will not be allowed. The CONTRACTOR shall take sufficient precautions to prevent loose soils from adhering to tire treads, wheel wells, etc. Any loose soil spread shall be cleaned up immediately at the CONTRACTOR’s expense.

C. Trucks used for transportation of material for off-site disposal shall be watertight and permitted pursuant to 6 NYCRR Part 364. All trucks shall be covered prior to leaving the site (full) as well as while returning empty to the site.

2.2 TRAFFIC CONTROL DEVICES

A. All equipment items, if used during the construction of Project, shall conform to NYSDOT Section 619-2 and MUTCD requirements:

1. Flashing barricade lights
2. Construction and maintenance signs
3. Channelizing devices
4. Arrow boards
5. Barricades
6. Traffic Cones

2.3 MISCELLANEOUS EQUIPMENT

A. Other items which include orange safety vests, flags or signs for flagmen, and communication devices, shall be standard and adequate for their intended function. They shall be in accordance with the NYSDOT-MUTCD where applicable or as required by NYSDOT Work Permit.

PART 3 - EXECUTION

3.1 DISPOSAL REQUIREMENTS

A. Materials deemed nonhazardous will be disposed of by CONTRACTOR in the most economical manner that meets applicable regulations acceptable to the DEPARTMENT and satisfies the project deadline.

B. CONTRACTOR shall be responsible for confirming that the waste meets the approved disposal facility's acceptance criteria, including but not limited to the absence of free liquids. Soil may be amended with lime or other appropriate material as necessary. Use of amending materials shall be minimized to limit the addition of weight to the excavated soils.

C. CONTRACTOR shall be responsible for all costs involved in the handling of all wastes deemed unacceptable by the approved disposal facility.

3.2 ACCEPTABLE FACILITIES

A. Resource Conservation and Recovery Act (RCRA) Wastes

1. The facility must have a current and valid state permit, if applicable.
2. The facility must have a RCRA Permit or RCRA Interim Status for RCRA wastes.
3. The facility must not have any significant RCRA violations or other environmental conditions that could affect its satisfactory operation.
4. Significant violations include Class 1 RCRA violations as defined in EPA's RCRA Enforcement Response Policy dated October 1, 1988, including but not limited to groundwater, closure, post closure, and financial violations.
5. Environmental conditions include those conditions affecting the satisfactory operation of the facility and violations of state and/or federal laws other than RCRA.
6. Under limited circumstances, EPA Administrator may allow disposal of hazardous substances at a RCRA facility having significant RCRA violations or other environmental conditions affecting satisfactory operation, providing that the facility owner or operator has entered into a consent order or decree to correct the problems, and disposal only occurs within the facility at a new or existing unit that is in compliance with RCRA requirements.

7. Landfill disposal must be in a unit meeting applicable RCRA minimum technical requirements.
8. Current RCRA minimum technical requirements for land disposal include the use of a double liner system.
9. Under limited circumstances (low waste toxicity, mobility, and persistence), EPA may approve the use of a single-lined land disposal unit for RCRA wastes where use of such a unit adequately protects public health and the environment.
10. As approved by the DEPARTMENT after review and audit of the facility.

B. Non-hazardous Wastes

1. The facility must have a current and valid state permit, if applicable.
2. The facility must be permitted in good legal standing with applicable agency regulatory requirements.
3. As approved by the DEPARTMENT after review and audit of the facility.

C. Recycling/Salvage

1. The facility must have a current and valid state permit, if applicable.
2. The facility must be permitted in good legal standing with applicable agency regulatory requirements.
3. As approved by the DEPARTMENT after review and audit of the facility.

3.3 PREPARATION AND SECUREMENT OF TRANSPORT VEHICLES/CONTAINERS

A. Comply with applicable federal, state, and local regulations concerning packaging and shipping of materials.

B. Secure materials in transport vehicles/containers in accordance with regulations governing transportation of these materials.

C. Vehicles hauling contaminated soils shall be lined, watertight, and covered to prevent soils from spilling out of the vehicle or potentially fugitive particulate matter from becoming airborne.

3.4 VEHICLE LOADING AND DECONTAMINATION

A. Provide all equipment, personnel, and facilities necessary to load waste materials in accordance with the regulatory requirements listed herein, and in accordance with the regulations of those states through which CONTRACTOR plans to transport materials.

B. Vehicle operators shall be trained in conformance with federal and state regulations for waste haulers (hazardous, special, and nonhazardous).

C. All vehicles hauling waste materials shall be decontaminated to the satisfaction of the ENGINEER prior to leaving the site. Decontamination shall be considered complete when:

1. No soil or other material is adhering to the vehicle body, tires or undercarriage
2. The vehicle is not leaking or dripping liquids
3. The contents of the vehicle are covered or completely enclosed.

D. Vehicles leaking materials or dripping liquids in any amount will not be permitted to leave the site until provisions are made to eliminate the leaking material. CONTRACTOR shall amend or dry soils as necessary to ensure vehicles do not leak.

E. All waste materials, debris, and contaminated materials shall be completely covered with a solid tarpaulin, or otherwise completely enclosed to protect material from precipitation and prevent loss of material or dust during transportation. Mesh covers or mesh tarpaulins will not be allowed. Cover shall be appropriately secured before the vehicle leaves the decontamination station.

F. Decontaminate transport vehicles and containers that have been loaded with non-hazardous materials for off-site disposal/treatment at an on-site equipment decontamination pad after loading and prior to leaving site. Remove material on the tires and axles of trucks and material on the vehicle resulting from loading operation.

G. Decontaminate all equipment that has come into contact with the contaminated soil/waste materials prior to the equipment leaving the contamination zone. Remove material from tracks, axles, buckets, tires, and equipment bodies as appropriate.

3.5 MANIFESTING

A. Generate and complete all pre-printed manifest forms and bill of lading forms required for DEPARTMENT for proper transportation and disposal of all materials.

B. Comply with 40 CFR 262 in completion and submittal of the Hazardous Waste Manifests. The Hazardous Waste Manifests for the transportation and disposal of waste removed from the site shall include all information in accordance with 49 CFR 172.101.

C. DEPARTMENT or ENGINEER will sign the special waste or hazardous waste manifest for DEPARTMENT, which is the generator.

D. Place on the manifest all information and data required by both the waste generator and transporter.

E. Provide ENGINEER with two fully executed copies of each shipment manifested prior to shipping wastes off site.

F. CONTRACTOR is responsible for proper distribution of manifests and bills of lading.

3.6 TRANSPORTATION

A. CONTRACTOR shall be responsible for all actions to remediate spills in transit.

B. All non-hazardous excavated soils/waste will be transported offsite for disposal at an appropriate facility. The waste should be sampled and segregated in the field prior to transport, as needed.

C. Transport and dispose of off-site any CONTRACTOR-generated Construction & Demolition (C&D), and refuse, as required.

D. Hazardous waste shall be contained in an approved roll-off container and stored in a segregated location from all non-hazardous waste. The waste shall be sampled as needed, to determine the appropriate transport and disposal procedures required if material meets hazardous waste criteria.

E. Prior to shipment of hazardous wastes off the project area, CONTRACTOR shall confirm by written communication from the designated transporter(s) that they are authorized to deliver the manifested waste to the designated TSDF or Solid Waste Municipal Facility (SWMF) or other receiving facility.

F. CONTRACTOR shall be responsible for obtaining permits and authorizations necessary to use the selected shipping routes. Comply with restrictions imposed by local governmental agencies regarding use of the routes.

G. CONTRACTOR shall minimize truck idling and truck traffic to the greatest extent practicable.

H. The CONTRACTOR shall observe the Local and State (NYSDOT) Route weight limits and speed limits.

I. Materials shall be transported only at the times and by the routes indicated in the approved Transportation Plan, unless written permission is received from DEPARTMENT to do otherwise. Drivers deviating from the approved route or otherwise not complying with Transportation Plan requirements will not be allowed to return to the project site.

J. Do not allow soil to be tracked off site at any time during the project. The CONTRACTOR shall inspect the streets and roads near the project site each day for soil tracks and spills. Visible soil tracks on streets will not be allowed. Take sufficient precautions to prevent loose soils from adhering to tire treads, wheel wells, and undercarriages of vehicles leaving the site. CONTRACTOR shall be responsible for complete removal of visible soil tracks from streets caused by vehicles entering and leaving the site to the satisfaction of the ENGINEER.

3.7 WASTE PROFILE

A. The CONTRACTOR shall obtain a waste profile approval from the designated disposal facility prior to disposing of waste materials.

B. Toxicity characteristic leaching procedure (TCLP) testing may be required by the designated disposal facility. The ENGINEER shall obtain samples and coordinate with the DEPARTMENT's call-out laboratory to obtain test results. If TCLP concentrations are exceeded, the material shall be handled and transported in accordance with applicable regulations for hazardous waste.

3.8 REPORTING

A. Manifests

1. After the waste has been permanently disposed, the Hazardous Waste Manifests shall be completed in accordance with 6 NYCRR Part 372 and submitted by CONTRACTOR to ENGINEER with a copy to be forwarded to DEPARTMENT.

2. CONTRACTOR shall be responsible for providing the generator with the information needed to complete exception reports.

B. Certificates of Disposal

1. Provide Certificates of Disposal for all waste streams shipped off site.

a. The Certificates of Disposal shall be submitted to ENGINEER within 30 calendar days of the shipment of wastes off site.

C. Bill of Lading

1. Items and materials that have been recycled or salvaged shall only require a signed bill of lading or receipt of materials and quantity received.

D. For waste materials not considered hazardous waste, provide certificates of disposal from a properly permitted disposal facility, as accepted by the DEPARTMENT.

E. Weight tickets must be obtained from the disposal facility and submitted to ENGINEER after disposal.

END OF SECTION 017419

SECTION 311000 - SITE PREPARATION, CLEARING, AND GRUBBING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Removing above- and below-grade site improvements.
5. Temporary erosion and sedimentation control.

1.2 DEFINITIONS

A. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

B. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction.

C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.3 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become CONTRACTOR’S property and shall be removed from Project site.

1.4 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the ENGINEER.
2. Provide alternate routes around closed or obstructed trafficways if required by the ENGINEER.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises or at the Staging Area as necessary.

C. Utility Locator Service: Notify Dig Safely, New York for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Tree- and Plant-Protection Zones: Protect in accordance with this specification and the Contract Drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed according to requirements in the Tree Protection and Preservation Plan and as indicated on the Contract Drawings

C. Protect existing site improvements to remain from damage during construction.

1. Restore damaged improvements to their original condition, as acceptable to the ENGINEER.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Tree Preservation

1. Protect trees and plants remaining on-site according to requirements of this specification, the Contract Drawings, and in consultation with the ENGINEER.
2. For each tree to be protected, the ENGINEER will provide the CONTRACTOR with a designated root protection zone (RPZ), a radius around the base of the tree that shall be delineated and protected from construction activities, prior to the start of excavation.
3. Specific trees may require stem, branch, and root paddings or wraps, as directed by the ENGINEER.

4. Where tree roots must be cut, sharp, clean cuts shall be made to promote root regeneration.
5. Activities that shall be avoided within the TPZ include storage of construction materials, concrete wash-out operations, stockpiling of demolition debris or soil, parking of any vehicles or heavy equipment, trenching, and any activity that would compact the soil and root zone.
6. Existing ash trees (Fraxinus species) identified for preservation shall be treated to prevent or slow the infestation of Emerald Ash Borer. Ash trees shall be treated by a NYSDEC-licensed Commercial Pesticide Applicator with a trunk-injectable pesticide commercially available to professional applicators such as TREE-äge® (Emamectin benzoate), or equivalent approved by a Certified Arborist.

B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

3.4 EXISTING UTILITIES

A. The existence and location of underground and other utilities and construction indicated as existing on the Contract Drawings are not guaranteed. The CONTRACTOR shall investigate and verify the existence and location of underground utilities and other construction affecting the Work prior to beginning site work.

B. Before construction the CONTRACTOR shall verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.

C. Furnish location data for work related to the Project that must be performed by public utilities serving the work areas.

3.5 CLEARING AND GRUBBING

A. Remove debris, rubbish, obstructions, trees, shrubs, and other vegetation within the excavation limits specified on the Contract Drawings unless otherwise indicated.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 3 inches in diameter, obstructions, and debris to a depth of 18 inches below exposed subgrade.
3. Grubbed materials including stumps, roots, root balls and other subsurface vegetation in contaminated areas shall be excavated and handled in the same manner as the contaminated soils, in accordance with Section 017419 - Off-Site Transportation and Disposal.
4. Conduct grubbing operations in a manner to prevent soils in tree or vegetative roots from entering utilities.

B. Fill depressions caused by clearing and grubbing operations with common fill and topsoil in accordance with Section 312000 – Excavation and Backfill.

C. Raised shrub beds and/or planting beds encountered within excavation areas shall be cut to surrounding grade prior to beginning excavation to design depth. Excavated bed material shall be handled in the same manner as that of contaminated soils.

D. The CONTRACTOR shall dispose of cleared trees, shrubs, and plantings off-site unless otherwise directed by the ENGINEER.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.

1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. The CONTRACTOR shall dispose of cleared trees, shrubs, and plantings off-site unless otherwise directed by the ENGINEER.

B. Concrete, asphalt, brick, etc. removed from the surface of the work area with no visible soil shall be recycled to the maximum extent practicable.

END OF SECTION 311000

SECTION 312000 – EXCAVATION AND BACKFILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Requirements for the excavation of arsenic and lead contaminated soils and backfilling with imported materials.
2. Preparing subgrades for walks, pavements, turfs and grasses, and plants.
3. Subbase course for concrete walks and pavements.
4. Subbase course for asphalt paving.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

B. The CONTRACTOR shall provide and coordinate all equipment, materials, and personnel necessary to excavate, handle, and provide off-site disposal of contaminated soils within the excavation limits shown on the Contract Drawings.

C. The CONTRACTOR shall provide and coordinate all equipment, materials, and personnel necessary to place, handle, grade, and compact common fill, topsoil, and coarse aggregate to the limits and elevations shown on the Contract Drawings.

D. The CONTRACTOR is responsible for supplying, stockpiling, and placement of clean suitable imported backfill materials that comply with 6NYCRR Part 375-6.7(d).

E. Stockpiled materials shall be segregated and protected from all off and on-site sources of contamination. Material deliveries to equipment staging areas and/or stockpiling shall be coordinated with ongoing site operations.

F. The CONTRACTOR is required to create a dry working environment for backfill placement.

G. The CONTRACTOR is responsible for protecting all partially and fully completed Work.

1.2 SUBMITTALS

A. Excavation Procedures

1. The CONTRACTOR shall submit Excavation procedures to the ENGINEER for review and approval prior to the start of the work.

B. Dewatering Procedures

1. The CONTRACTOR shall submit procedures describing the planned management of rain and surface water for completing excavation work to the ENGINEER for review and approval prior to the start of work in accordance with Specification 312319 Dewatering and Contact Water Management.

C. Manufacturer's Data

1. Plastic sheeting/cover material to be used for excavation protection and material stockpile protection
2. 40-mil HDPE liner shall be used for the contaminated materials stockpile pad to protect existing soils.

PART 2 - PRODUCTS

2.1 GEOTEXTILE: Mirafi FW500, WINFab 2x2HF, or ENGINEER APPROVED EQUAL.

2.2 IMPORTED COMMON FILL

A. Common fill shall be as similar to the native soil removed as practicable and be granular material obtained from approved natural deposits and unprocessed except for the removal of unacceptable material and stones larger than 3-inches. It shall be substantially free from loam, other organic matter, and harmful substances. Common fill shall not be delivered to the site or used while in a frozen or muddy condition.

B. Common fill shall meet the following gradation:

Sieve Size	**Percent Passing (by weight)**
3 inch	100
No. 40	70-100
No. 200	50-90

C. The CONTRACTOR shall notify the ENGINEER of proposed sources of common fill at least 10 days prior to importation.

1. Proposed supplier of common fill shall have a current Mined Land Permit issued by the New York State Department of Environmental Conservation (NYSDEC) Division of Mineral Resources in accordance with the Mined Land Reclamation Law.
2. *Chemical Testing:* Common fill shall meet the chemical requirements of New York State Department of Environmental Conservation (NYSDEC) DER-10 Section 5.4(e)2 and Appendix 5 for residential use. The ENGINEER shall obtain samples at the frequency specified by DER-10 and coordinate with a NYSDEC call-out laboratory to obtain test results. Common fill shall also be tested for NYSDECs full Perfluoroalkyl substances (PFAS) analyte list. The ENGINEER shall obtain PFAS samples as required in accordance with NYSDECs *Collection of Shallow Soil Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) Protocol*, dated June 29, 2016. All common fill incorporated into the site work shall match the sample(s) approved by the ENGINEER following laboratory testing.
3. *Physical Testing*: the ENGINEER shall obtain samples for classification according to ASTM D 2487 and laboratory compaction curve determination (Proctor test) by ASTM D1557 at a frequency of not less than one sample per 5,000 cubic yards.

D. Any material containing vegetative or organic matter, such as peat, organic silt, sod, ice, snow, or other deleterious material is not acceptable. Material that contains large voids when placed, which will allow migration of the overlying and surrounding materials and soil is also not acceptable.

2.3 TOPSOIL

A. Topsoil shall be imported, well drained, naturally formed soil from off-site sources of homogeneous texture and of uniform grade, without the admixture of subsoil materials, and entirely free of vegetative debris, dense material, hardpan, sod or any other objectionable foreign material.

B. Topsoil shall contain not less than 6 percent or more than 20 percent organic material as determined by loss-on-ignition testing of oven-dried samples.

C. Topsoil shall have a pH value within the range of 5.5 to 7.6 or within a ± 1.0 range of the typical pH value for native soil of the local area identified by the material supplier and approved by the ENGINEER and NYSDEC for use.

D. The CONTRACTOR shall notify the ENGINEER of proposed sources of topsoil at least 10 days prior to importation.

1. Topsoil shall meet the chemical requirements of DER-10 Section 5.4(e)2 and Appendix 5 for residential use. The ENGINEER shall obtain samples as required by NYSDEC DER-10 and coordinate with a NYSDEC call-out laboratory to obtain test results. Topsoil shall also be tested for NYSDECs full Perfluoroalkyl substances (PFAS) analyte list. The ENGINEER shall obtain PFAS samples as required in accordance with NYSDECs *Collection of Shallow Soil Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) Protocol*, dated June 29, 2016. All topsoil incorporated in the site work shall match the sample(s) approved by the ENGINEER following laboratory testing.
2. Topsoil shall meet the size requirements of NYSDOT Specification 713-01 Topsoil, Type A, with 100% of material passing through a 2-inch sieve.

E. The contractor may amend topsoil with approved materials and by approved methods to meet the specifications of this section. Materials used to amend the organic content of topsoil shall conform with the requirements of NYSDOT Specification 713-15 Organic Material. Amendments shall not contain any material that is deleterious to soil structure, plant growth or seed germination.

2.4 COARSE AGGREGATE

A. The proposed supplier of coarse aggregate shall have a current Mined Land Permit issued by the NYSDEC Division of Mineral Resources in accordance with the Mined land Reclamation Law.

B. The CONTRACTOR shall notify the ENGINEER of proposed sources of coarse aggregate at least 10 days prior to importation.

1. Crusher run shall meet the chemical requirements of DER-10 Section 5.4(e)2 and Appendix 5 for residential use. The ENGINEER shall obtain samples as required by NYSDEC DER-10 and coordinate with a NYSDEC call-out laboratory to obtain test results. Crusher run shall also be tested for NYSDECs full Perfluoroalkyl substances (PFAS) analyte list. The ENGINEER shall obtain PFAS samples as required in accordance with NYSDECs *Collection of Shallow Soil Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) Protocol*, dated June 29, 2016. All aggregate incorporated in the site work shall match the sample(s) approved by the ENGINEER following laboratory testing.

C. Construction Entrance: NYSDOT No. 3 crushed stone or crushed gravel, thoroughly washed, conforming to the requirements of NYSDOT Standard Specifications Table 703-4 and described in Section 703-02:

D.

Sieve	Percent by Weight Passing
2.5”	100
2’’	90-100
1.5”	35-70
1”	0-15
No. 200	0 – 0.7

E. Bedding and Pipe Encasement: NYSDOT No. 2 crushed stone or crushed gravel, thoroughly washed, conforming to the requirements of NYSDOT Standard Specifications Table 703-4 and described in Section 703-02:

F.

Sieve	Percent by Weight Passing
1.5”	100
1’’	90-100
0.5”	0-15
No. 200	0 - 1.0

G. Finish Course: NYSDOT No. 1A crusher run stone or crusher run gravel, meeting the gradation in NYSDOT Standard Specifications Table 703-4 and described in Section 703-02:

H.

Sieve	Percent by Weight Passing
0.5”	100
0.25’’	90-100
0.125”	0-15
No. 200	0 - 1.0

I. Subbase Course: NYSDOT Subbase Type 2 crusher run stone or crusher run gravel meeting the gradation identified in NYSDOT Standard Specifications Table 733-04A and described in Section 733-04:

J.

Sieve	Percent by Weight Passing
2”	100
0.25”	25-60
No. 40	5-40
No. 200	0 – 10

2.5 PLANTING SOIL

A. Planting beds shall be prepared using a planting soil mix consisting of topsoil meeting the material requirements of this specification blended with the following soil amendments and fertilizers in the following quantities:

1. Ratio of compost to topsoil by volume: 1:4;
2. Peat shall be used in place of compost, if necessary; and
3. Lime or sulfur shall be added to adjust the pH as required for specific plantings.

2.6 SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter free of substances toxic to plantings. Compost shall be a dark brown to black color and be capable of supporting plant growth with appropriate management practices in conjunction with addition of fertilizer and other amendments as applicable, with no visible free water or dust, with no unpleasant odor, and meeting the following criteria. Inert material such as metal, glass, plastic, wood (other than residual chips), asphalt or masonry shall not be visible and shall be less than 1.0 percent by weight. The organic matter content shall be 50 to 60 percent of the dry weight (ASTM F 1647, Method 1). The ratio of carbon to nitrogen shall be between 10:1 and 25:1. One hundred percent of the material shall pass a 1-inch screen. The pH shall be within the range of 5.5 to 8.0. Imported compost material shall meet the chemical requirements of DER-10 Section 5.4(e)2 and Appendix 5 for residential use, unless otherwise approved by the ENGINEER. Compost shall also be tested for NYSDECs full Perfluoroalkyl substances (PFAS) analyte list. The ENGINEER shall obtain PFAS samples as required in accordance with NYSDECs *Collection of Shallow Soil Samples for Perfluorooctanoic Acid (PFOA) and Perfluorinated Compounds (PFCs) Protocol*, dated June 29, 2016. All compost incorporated in the site work shall match the sample(s) approved by the ENGINEER following laboratory testing.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing a ½-inch sieve. The pH shall be in the range of 3.4 to 4.8. The soluble-salt content measured by electrical conductivity shall be 2.0 to 3.5 milliSiemens per centimeter.

C. Lime: ASTM C 602, Class T agricultural liming material containing a minimum of 80 percent calcium carbonate with a minimum of 99 percent passing through a No. 9 sieve and a minimum of 75 percent pasting through a No. 60 sieve.

D. Sulfur: Manufacturer’s data of proposed material shall be submitted to the ENGINEER for review and approval prior to use.

PART 3 - EXECUTION

3.1 GENERAL

A. The horizontal and vertical limits for the excavation of contaminated soils are indicated on the Contract Drawings.

1. To the extent practical, the CONTRACTOR shall confine excavation activities to within the excavation limits indicated on the Contract Drawings.
2. The CONTRACTOR shall maintain at least one point of ingress/egress for use by the homeowner during active work. Two points of ingress/egress shall be maintained for use by the homeowner at all other times, including nights and weekends when no work is taking place.

B. The CONTRACTOR shall be responsible for protection of all public and private structures, utilities, sidewalks, pavements, and other facilities not to be removed as part of the work from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by excavation and backfill operations.

C. The CONTRACTOR shall coordinate excavation and backfill operations in accordance with the New York Specifications for Erosion and Sediment Control (NYSESC), OSHA Excavation and Trenching Safety Regulations (29 CFR 1926.650), and all applicable local, state, and federal laws and regulations.

D. The CONTRACTOR shall reduce the potential for cross-contamination of uncontaminated areas with contaminated soils by phasing the work and using appropriate decontamination protocols prior to moving equipment between areas of contamination and minimizing double moving of materials.

E. The ENGINEER may require the CONTRACTOR to leave in place at any time during the progress of work, any structures or subsurface features that are not indicated to be left in place on the Contract Drawings.

F. If the CONTRACTOR encounters unanticipated subsurface features during excavation activities (i.e. utilities, drainage, structures, etc.), the CONTRACTOR shall halt excavation activities and immediately notify the ENGINEER. Excavation activities shall resume in accordance with the ENGINEER's recommendations.

G. Unsatisfactory material encountered during excavation shall be removed as required by the ENGINEER.

H. Excavated materials may be "clean loaded" directly into a haul truck, without any stockpiling of excavated materials, provided they are adequately dewatered.

I. Excavated materials shall be transported and disposed of off-site in accordance with Section 017419 – Off-Site Transportation and Disposal.

J. The CONTRACTOR shall not load excavated materials into the transport vehicles when it is raining without prior approval from the ENGINEER. All exposed excavations shall be covered during rain.

K. The CONTRACTOR shall use water spray to provide dust suppression as necessary. All water spray runoff shall be controlled, collected, and handled in accordance with the CONTRACTOR's approved Dewatering Procedures.

L. Groundwater or standing water in excavations shall be removed and properly handled prior to the placement of backfill in accordance with the approved Dewatering Procedures.

M. Material stockpiles shall be covered daily with approved plastic sheeting when not being worked by the CONTRACTOR. Covered material stockpile areas shall be routinely monitored by the CONTRACTOR to confirm that plastic sheeting is secure, and that rainwater is not infiltrating the stockpile.

N. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

O. The CONTRACTOR shall secure open excavations with fully enclosed fencing or protective barriers to prevent unauthorized entry into the exclusion zone.

P. The CONTRACTOR shall prevent excavated soils from being tracked off-site. All materials observed to be tracked off the material stockpile area or off any property shall be immediately cleaned up and captured for off-site disposal. Small amounts of excess materials shall be vacuumed so that all materials tracked off-site are completely removed and contained.

Q. The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the materials, lines, grades, and cross-sections or elevations shown on the Contract Drawings.

R. The storage or stockpiling of contaminated materials within a completed excavation area shall not be permitted.

S. The CONTRACTOR shall backfill all excavated areas in accordance with this specification and the Contract Drawings.

3.2 UTILITIES

A. Verify the location of all public and private utilities and coordinate any disconnection of utilities, as necessary, with the utility company, homeowner, and ENGINEER prior to performing excavation.

1. Excavation in the vicinity of marked utilities shall be completed as required by the utility company.
2. The CONTRACTOR shall mark the locations of public and private utilities including electric, gas, Geneva water, Storm sewer, and sanitary sewer lines on properties to be remediated prior to excavation.

B. Permits or approvals shall be obtained by the CONTRACTOR for the disconnection and restoration of utilities from the utility company having jurisdiction prior to performing work.

3.3 PROTECTION OF STRUCTURES AND TREES

A. Protect all structures and trees indicated on the Contract Drawings to remain in place during excavation activities.

B. Excavations adjacent to or near structures, utilities, or trees shall be performed in accordance with the Protection of Structures Notes provided on the Contract Drawings.

C. For trees to be preserved, excavation shall not be permitted within the Tree Protection Zone, as defined by the ENGINEER.

3.4 EXCAVATION

A. Excavate to the vertical and horizontal limits as shown on the Contract Drawings.

B. Excavation includes excavating soils, pavements and walks, utilities and other items indicated to be removed.

C. Excavation at Edges of Tree and Plant Protection Zones

1. Excavated by hand or with an air spade to indicated lines, elevations, and subgrades. If excavating by hand, use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.

3.5 SUBGRADE PREPARATION

A. Notify the ENGINEER when excavations have reached required subgrade.

B. If the ENGINEER observes that unsatisfactory soil is present, continue excavation and replace with compacted backfill as directed.

C. Proof-roll subgrade below driveways with pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in at least one direction. Limit vehicle speed to 3 mph.
2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the ENGINEER, and replace with compacted backfill as directed by the ENGINEER.

3.6 GENERAL PLACEMENT REQUIREMENTS FOR COMMON FILL MATERIALS

A. The ENGINEER shall approve each excavation or area as final before the CONTRACTOR is allowed to place backfill. All excavations shall be fully dewatered in accordance with Section 312319 -Dewatering and Contact Water Management prior to backfill placement.

B. Following excavation, smoothly grade the exposed subgrade uniformly to accept common fill material. Subgrade shall be free of standing water prior to placement of common fill.

C. Where the finished cut face of an excavation area adjoins an area that will not be excavated, place a demarcation barrier along the vertical cut face of the excavation. The demarcation barrier material shall be high visibility material approved by the ENGINEER. Place the top of the demarcation barrier within 1 to 2 inches of the finished grade.

D. Place common fill, as specified on the Contract Drawings, in designated areas to lines and grades shown on the drawings, and to create positive drainage away from foundations, unless otherwise indicated or directed by the ENGINEER.

E. Common fill depth shall vary in order to achieve the final grade elevations as shown on the Contract Drawings.

F. Compact each lift (maximum 8-inch lifts) of the material to not less than the following percentages of maximum dry unit weight according to ASTM D1557, except where otherwise noted.

1. Under structures, building slabs, steps, and pavements at a minimum of 95 percent.
2. Under walkways at a minimum of 92 percent.
3. Under turf or unpaved areas at a minimum of 85 percent except for the final lift which shall be compacted to a minimum of 80 percent but no greater than 85 percent.
4. Backfill placed around exposed and replaced utilities (i.e. gas lines, underground electric, water, storm and sanitary sewer) shall be performed in accordance with the utility owner recommendations.

G. The CONTRACTOR shall cover the working surface at the close of each day's operation and when practical prior to rainfall. Control and replacement of any loss of common fill due to erosion to be the responsibility of CONTRACTOR.

H. Fill material may be stockpiled on-site in an uncontaminated area with approval from the ENGINEER and consent from the homeowner. Adequately cover the stockpiled fill materials to prevent rain and wind erosion.

3.7 PLACING TOPSOIL MATERIALS

A. General: Topsoil shall be amended as necessary to meet pH and organic matter content prior to placement. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet. Topsoil shall be placed in a minimum 6-inch thick layer above common fill and used as final grade material.

B. Subgrade Preparation: Till subgrade to a minimum depth of 4 inches. Remove stones larger than 3 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.

1. Apply half the thickness of topsoil over prepared, loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of topsoil. The minimum thickness of topsoil shall be 6 inches, but not less than required to meet finish grades after natural settlement.

C. Compaction: Compact topsoil layer to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 and tested in-place.

D. Finish Grading: Grade topsoil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

E. Following the completion of topsoil placement, all areas not seeded or sodded within two days shall receive erosion protection.

3.8 PLACING STONE/GRAVEL FILL

A. The ENGINEER shall approve each gravel/stone source prior to CONTRACTOR bringing the material to the site.

B. Place stone/gravel fill in designated areas to lines and grades as shown on the Contract Drawings, unless otherwise indicated or directed by the ENGINEER.

C. Compact each lift (maximum 8-inch lifts) of the material to not less than the following percentages of maximum dry unit weight according to ASTM D1557, except where otherwise noted.

1. Under structures, building slabs, steps, and pavements at a minimum of 95 percent.
2. Under walkways at a minimum of 92 percent.

D. The CONTRACTOR shall cover the working surface at the close of each day's operation and when practical prior to rainfall. Control and replacement of any loss of gravel/stone fill due to erosion shall be the responsibility of CONTRACTOR.

E. Fill material may be stockpiled on-site in a location approved by the ENGINEER.

3.9 GRADING

A. The surface of excavations, embankments, and subgrades shall be finished to a smooth and compact surface in accordance with the materials, lines, grades, and elevations shown in the Contract Drawings.

B. Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to lines and elevations indicated on the Contract Drawings.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

C. Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve elevations as indicated on the Contract Drawings. The degree of finish for graded areas shall be within plus or minus 1 inch of the grades and elevations indicated in the Contract Drawings. Settlement or washing that occurs in graded, topsoiled, or backfilled areas prior to acceptance of the Work shall be repaired and grades re-established to the required elevations and slopes.

D. During construction, embankments and excavations shall be kept shaped and drained. Ditches and drains along the subgrade shall be maintained to drain effectively at all times. The finished subgrade shall not be disturbed by traffic or other operations and shall be protected and

maintained by the CONTRACTOR in a satisfactory condition. The storage or stockpiling of materials on the finished subgrades will not be permitted.

3.10 FIELD QUALITY CONTROL

A. Field density tests on placed backfill shall be performed by the ENGINEER in accordance with ASTM D2167, ASTM D2937, or ASTM D6938.

B. Field density testing shall be performed at the frequency of at least one test per 2,000 square feet, and at least once per property in paved areas and once per property in unpaved areas.

END OF SECTION 312000

SECTION 312319 – DEWATERING AND CONTACT WATER MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes construction dewatering and management of contact water.

B. The CONTRACTOR shall furnish all labor, tools, materials, equipment, and incidentals necessary for the proper dewatering, as needed, of work areas during excavation and backfill, and all related work as specified. Excavation is expected to be above groundwater levels.

1.2 INFORMATIONAL SUBMITTALS

A. The CONTRACTOR shall submit methods for restricting run-on sources, dewatering, and contact water storage and disposal for approval by the ENGINEER.

B. Shop Drawings: The CONTRACTOR shall submit shop drawings of dewatering details (i.e., sumps, well points, pump system, drain construction, containment tanks, and other equipment necessary to complete the work).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or groundwater from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

B. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the ENGINEER. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Provide temporary grading to facilitate dewatering and control of surface water.

3.2 OPERATION

A. Perform dewatering as necessary to maintain dry excavation and backfill areas, prevent ponding of water in open excavations, and to prevent ponding of water on materials staging areas.

B. Contact water from decontamination of equipment both at the excavation areas and at the staging area shall be containerized for disposal.

C. The CONTRACTOR shall be responsible for providing pretreatment of contact water as necessary.

3.3 DISPOSAL

A. The CONTRACTOR shall be responsible for off-site disposal of construction water from dewatering and decontamination procedures. Water generated during construction and decontamination activities shall be disposed of at the city of Geneva Marsh Creek Wastewater Treatment Plant (WWTP), and shall not be discharged into the ground, waterways, or local storm drains or sewers.

B. Accumulated stormwater in clean and completed excavation areas may be discharged to city catch basins provided it is filtered through a fabric of #40 - #80 sieve size and is visibly clear exiting the filter.

C. The CONTRACTOR shall notify the ENGINEER at least 5 days prior to disposal, of the quantity and location of decontamination and contact water. The ENGINEER will perform required sampling and submit the sample(s) to a qualified laboratory for testing. Results must be received and reviewed by the ENGINEER and accepted by the Director of the Department of Public Works or the chief Operator of the Publicly Operated Treatment Works prior to disposal. Testing and discharge limits are as follows:

Parameter	**Analytical Method**	**Discharge Limit (milligrams per Liter)**
Arsenic	EPA 200.8	0.10
Cadmium	EPA 200.8	0.20
Cyanide-complex	SM 4500-CN E	0.80
Chromium, hexavalent	SW-846 7196A	0.10
Chromium, total	EPA 200.8	1.00
Copper	EPA 200.8	1.00
Iron	EPA 200.8	10.0
Lead	EPA 200.8	0.10
Mercury	EPA 1631E	0.001
Nickel	EPA 200.8	2.00
Selenium	EPA 200.8	0.05
Silver	EPA 200.8	0.10
Zinc	EPA 200.8	0.60
pH	SM 4500-H^+	6.0 – 9.0 SU
Phenolic compounds	SW-846 9065	5.00
Oil and grease	EPA 1664A	100.0
Sulfide, Total and Dissolved	SM 4500-S^2 F	3.00
Hydrogen Sulfide	SM 4500-S^2 H	3.00

Parameter	Analytical Method	Discharge Limit (milligrams per Liter)
BOD_5	SM 5210B	200
Total suspended solids	SM 2540D	200
Total organic carbon	SM 5310C	100
Chemical oxygen demand	EPA 410.4	400
Total Kjeldahl Nitrogen	EPA 351.2	Monitor
Ammonia as N	SM 45500-NH3 H	Monitor
Total Phosphorus	SM 4500-P E	1.0
Bromodichloromethane	EPA 624	17
Dibromochloromethane	EPA 624	26
1,1,1-Trichloroethane	EPA 624	17
Benzene	EPA 624	0.008
Ethyl Benzene	EPA 624	0.020
Dichlorobenzene	EPA 624	0.017
Bromoform	EPA 624	0.071
Xylenes	EPA 624	0.120
Chloroform	EPA 624	0.014
Methyl chloride	EPA 624	0.034
Toluene	EPA 624	0.015
Acetone	EPA 624	8.2
Ethyl acetate	EPA 1666	8.2
Isopropyl acetate	EPA 1666	8.2
n-Amyl acetate	EPA 1666	8.2

D. Upon notification by the ENGINEER that water has been approved for disposal, the CONTRACTOR shall be responsible for disposal of the water at the Marsh Creek WWTP located at 45 Doran Avenue, Geneva, New York. The specific discharge location must be coordinated with the Director of the Department of Public Works.

3.4 REPORTING

A. The CONTRACTOR shall provide contact water disposal reports for each batch of water disposed including the total cumulative volume collected, total cumulative off-site disposal volume, and totals collected during the reporting period.

END OF SECTION 312319

SECTION 321216 – ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This section applies to areas of the site that will require replacement of asphalt pavement or patching to the lines and grades shown on the Contract Drawings during site restoration activities.

B. Asphalt tack coat, binder and top course materials and placement reference NYSDOT Standard Specifications dated September 1, 2011. All other items, including subbase material and placement reference NYSDOT Standard Specifications dated September 15, 2015.

1.2 SUBMITTALS

A. Supplier

1. Submit name and qualification data of asphalt supplier to be used on the project prior to placement of any asphalt on the project.

B. Product and Design Data

1. Submit asphalt mix design for each asphalt type to be used.
2. Submit manufacturer's information on each product used.
3. Submit the theoretical maximum specific density value for the asphalt to be used.
4. Geotextile
5. Stone Sub-Base
6. Tack Coat
7. Joint Adhesive
8. Asphaltic Binder
9. Asphaltic Top
10. Seal Coat

1.3 REFERENCES

A. AI MS-2 - Mix Design Methods, 2014 or latest revision.

B. AASHTO Hot-Mix Asphalt Paving Manual, 2nd Edition.

C. ASTM D242 – Standard Specification for Mineral Filler for Bituminous Paving Mixtures, latest revision.

D. ASTM D546 – Standard Test Method for Sieve Analysis of Mineral Filler for Bituminous Paving Mixtures, latest revision.

E. NYSDOT Standard Specifications Sections 203-3.03C, 304, 400, 702, 703, and 733-04.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by NYSDOT.

B. Obtain materials from the same supplier throughout the duration of the project.

C. Do not alter from mix design requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. All containers must be cleaned of all foreign materials prior to loading.

B. Lightly lubricate the inside surface of the container with a thin oil or soap solution before loading asphalt.

C. Deliver asphalt in sealed, metal containers covered with suitable material to protect the asphalt from the elements.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when base surface temperature is less than 45 degrees Fahrenheit, or if surface is wet or frozen.

B. Do not place asphalt when precipitation is occurring.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Geotextile

1. Mirafi FW 500 or ENGINEER approved equal.

B. Stone Sub-base

1. NYSDOT Section 733-04 Type 2 Sub-Base.

C. Tack Coat

1. NYSDOT (2011) Section 702, Table 702-10 Tack Coat.

D. Joint Adhesive

1. Pavement Joint Adhesive, Crafco Inc., Chandler, AZ;
2. Cold-Applied Rubberized-Asphalt Sealer #158, W.R. Meadows Inc., Hampshire, IL; or
3. ENGINEER approved equal.

E. Asphaltic Binder

1. NYSDOT (2011) Section 403 Type 3 Binder.

F. Asphaltic Top

1. NYSDOT (2011) Section 403 Type 7F Top Course.

G. Seal Coat

1. Black-Jack Ultra Maxx, 1000, Gardner-Gibson, Tampa, FL;
2. Latex-ite Ultra Shield, Dalton Enterprises, Inc, Cheshire, CT; or
3. ENGINEER approved Equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions and substrate.

B. Verify that compacted substrate is dry and ready to receive work of this section.

C. Verify that all castings are properly installed and are at the correct elevations.

3.2 INSTALLATION AND COMPACTION

A. For small areas (less than 10 SF), CONTRACTOR shall patch holes using 2-inches of binder course material and 1-inch of asphalt top course, matching grades with existing material.

1. Install asphaltic binder in accordance with NYSDOT Section 401-3.
2. Verify that the gradients and final elevations of the binder course are correct.
3. Place asphalt only when the pavement surface is equal to or greater than 45 degrees Fahrenheit.
4. Apply tack coat between the binder and top course in accordance with NYSDOT Section 407.
5. Install asphalt top course accordance with NYSDOT Section 402.
6. Maintain asphalt temperature between 250- and 325-degrees Fahrenheit during placement.
7. Place asphaltic top within 24 hours of applying tack coat.
8. Compact pavement by rolling.

    a. Do not displace or extrude pavement from position.
    b. Hand compact in areas inaccessible to rolling equipment.

9. Compact the pavement to achieve pavement densities in a range of 92% to 97%, expressed as a percentage of the mixture’s maximum theoretical density (MMTD). Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks or creases.

B. For large areas (equal to or greater than 10 SF), CONTRACTOR shall place a minimum of 6-inches of stone subbase, followed by 2-inches of binder course material and 1-inch of asphalt top course.

1. Install NYSDOT Type 2 stone sub-base in accordance with NYSDOT Section 304.

    a. Verify that the gradients and final elevations of the sub-base are correct, and sub-base is graded such that surface runoff drains away from foundations and garages.
    b. Verify that sub-base is compacted in accordance with Section 312000 – Excavation and Backfill, with a minimum of 95% of standard proctor maximum density.

2. Subgrade beneath new asphalt shall be proof-rolled prior to placement of subbase in accordance with Section 312000 – Excavation and Backfill.
3. Install geotextile on subgrade.
4. Install asphaltic binder in accordance with NYSDOT Section 401-3.
5. Verify that the gradients and final elevations of the binder course are correct.
6. Apply tack coat between the binder and top course in accordance with NYSDOT Section 407.
7. Install asphalt paving in accordance with NYSDOT Section 402-3.
8. Place asphalt only when the pavement surface is equal to or greater than 45 degrees Fahrenheit.
9. Asphalt paving shall be graded such that surface runoff drains away from foundations and garages.
10. Maintain asphalt temperature between 250- and 325-degrees Fahrenheit during placement.
11. Apply joint adhesive in accordance with manufacturer instructions.

    a. Joints to be sealed must be dry and cleaned of dust, dirt, or any foreign material.
    b. Clean joints with compressed air immediately prior to application.

12. Utilize the vibratory device on the paver at all times.
13. Compact pavement by rolling.

    a. Do not displace or extrude pavement from position.
    b. Hand compact in areas inaccessible to rolling equipment.

14. Compact the pavement to achieve pavement densities in a range of 92% to 97%, expressed as a percentage of the mixture's maximum theoretical density (MMTD). Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks or creases.

C. Joints: Place the courses as continuously as possible to limit the number of joints in accordance with NYSDOT Section 402-3.09. The finished pavement at all joints must comply with the surface smoothness requirements and exhibit the same uniformity of texture and compaction as other sections of the course.

D. There shall be no visible defects, such as shallow ruts, ridges, roller marks, cracking, tearing, segregation, or any other irregularities, as determined by the Engineer, in the pavement when placement and compaction is complete.

3.3 TOLERANCES

A. Maximum Variation from Flatness: 1/4 inch measured with 10-foot straight edge.

B. Maximum Variation from Scheduled Compacted Thickness: 1/8 inch.

C. Maximum Variation from True Elevation: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. Provide an asphalt thermometer for determining the asphalt temperature during paving operations.

1. Frequency of Tests: One test for every 1,000 square feet of each pavement course.

B. Field density of in-place compacted pavement shall be measured by the ENGINEER using nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726. Prior to the start of asphalt paving, the CONTRACTOR shall provide the theoretical maximum specific density value for the asphalt to be utilized to the ENGINEER.

C. Field density testing shall be performed at the frequency of at least one per 1,000 square feet.

D. The ENGINEER will inspect all placed asphalt for visual irregularities or deficiencies, to confirm asphalt paving surface to be smooth and uniform, and to identify problem areas that fail to meet quality standards of practice. The ENGINEER may reject unacceptable work or materials, based on field test results or visual inspection.

3.5 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury or vehicular use for a minimum of 14 days. Restrict foot traffic for a minimum of 24 hours.

B. Driveways shall be seal coated by the CONTRACTOR on a property-specific basis, as directed by the ENGINEER, no less than 90 days after placement.

END OF SECTION 321216

SECTION 321313 - CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall furnish all labor, materials, equipment, and incidentals needed for cast-in-place concrete walks, pads, driveways, and slabs as required by the Remediation Work Plan and Contract Drawings and as herein specified.

1.2 SUBMITTALS

A. Cast-in-place concrete.

1. Submittals package: Submit product data for design mix(es), materials, samples, and performance certifications for concrete specified below at the same time as a package.
2. Mix Design: Submit proposed concrete design mix(es) together with name and location of batching plant prior to the start of concrete work.

    a. Determine proportions of cement, aggregates, and water to obtain required strengths by water-to-cement ratio in accordance with ACI 301-05, Section 4.
    b. Include test results of proposed concrete proportions based on previous field experience or laboratory trial batches in accordance with ACI 301, Section 4.
    c. Indicate amounts of mixing water if any to be withheld for later addition at the project site.

3. Portland Cement: Brand and manufacturer’s name
4. Fly Ash: Name and location of source, and New York State DOT test numbers.
5. Air-entraining admixtures: Brand and manufacturer’ name.
6. Water-reducing for High Range Water-reducing Admixture: Brand and manufacturer’ name.
7. Curing and Anti-Spalling Compound: Manufacturer’s specifications and application instructions.
8. Bonding Agent (Adhesive): Brand and manufacturer’ name, preparation and application instructions.
9. Expansion joint fillers: Brand and manufacturer’ name.
10. Performance Criteria Submittals:

    a. Written certification from the product manufacturers to verify all product information supplied.
    b. Written certification to verify the amount of recycled material, by weight included in the concrete design mix
    c. Product Data Sheets: Written certification that the materials meet the criteria specified in article 2.3 Cast-in-Place Concrete, below. Stamp each Product Data Sheet and initial or sign the stamp to verify that the submitted products are the products to be installed in the project.

d. Material Safety Data Sheets for all applicable products. If they do not include the VOC content in grams per liter, then other manufacturer certification of VOC content must be provided.

1.3 QUALITY ASSURANCE

A. Codes and Standards: Work shall conform to the provisions of the following codes and standards, except as otherwise shown or specified:

1. Concrete formwork:

a. ACI (American Concrete Institute) 301-05: Specifications for Structural Concrete for Buildings.
b. ACI 347-04: Guide to Formwork for Concrete.

2. Concrete Reinforcement:

a. ACI 301-10: Specifications for Structural Concrete.
b. MSP-1-01: Manual of Standard Practice (Concrete Reinforcing Steel Institute).

B. Cast-in-place concrete: Comply with the provisions of the following codes and standards, except as otherwise shown or specified

1. ACI 301-05: Specifications for Structural Concrete for Buildings.
2. ACI 305R-10: Guide to Hot Weather Concreting.
3. ACI 306R-10: Guide to Cold Weather Concreting.
4. ACI 308.1-11: Standard Specification for Curing Concrete.
5. ACI 318 - Building Code Requirements for Reinforced Concrete.
6. ASTM C 94/C 94M – 13a: Standard Specification for Ready-Mixed Concrete.
7. ASTM C 494C/ 494M – 13: Standard Specification for Chemical Admixtures to Concrete

C. Where provisions of the above codes and standards are in conflict with the building code in force for the project, the more stringent code shall apply.

D. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.

PART 2 - PRODUCTS

2.1 CONCRETE REINFORCEMENT

A. Fabric Reinforcement: Welded Wire Fabric - ASTM A185, 4-inch by 4-inch - W2.0 by W2.0 (4x4-W2.0xW2.0), fabricated into flat sheets unless otherwise indicated.

B. Fabric Reinforcement Supports:

1. Continuous Support, “CS” by Dayton Superior, 721 Richard Street, Miamisburg, OH 45342.
2. Continuous Support “Zig Zag” by MeadowBurke, 2835 Overpass Road, Tampa, FL 33619.

C. Bar Reinforcement: ASTM A 615, Grade 60, deformed steel bars.

1. Bar Supports: Galvanized steel or AISI Type 430 stainless steel, and without plastic tips.
2. Tie Wire: Black annealed wire, 16 ½ gauge or heavier.

2.2 CAST-IN-PLACE CONCRETE

A. Normal weight, air-entrained concrete with a minimum compressive strength of 4,000 psi at the end of 28 days for sidewalks, walkways, pads, and driveways.

B. Portland Cement: ASTM C 150, Type I.

C. Ground Granulated Blast Furnace Slag shall not be used.

D. Fly Ash shall not be used.

E. Air-entraining Admixture: ASTM C 260, and on the New York State Department of Transportation's current "Approved List".

F. Water-reducing Admixture: ASTM C 494/494M, Type A, and on the New York State Department of Transportation's current "Approved List".

G. High Range Water-reducing Admixture: ASTM C 494/494M, Type F, and on the New York State Department of Transportation's current "Approved List".

H. Retarding Admixture: ASTM C 494, Type D, water-reducing and retarding, for use in hot weather concreting, and on the New York State Department of Transportation's current "Approved List".

I. Design Air Content: ASTM C 260, and on the New York State Department of the New York State Department of Transportation's current "Approved List"; 6 percent by volume.

J. Aggregates: Aggregates shall be taken from storage silos of approved locations that have been tested and approved by the New York State Department of Transportation.

1. Fine Aggregate: ASTM C 33,clean, sharp, natural sand free of dune sand, bank run sand, manufactured sand, loam, clay, etc.
2. Coarse Aggregate: Crushed stone or crushed gravel in accordance with New York State Department of Transportation Standard Specifications, 703-02 and ASTM C 33.
3. Gradation of coarse aggregates shall meet NYSDOT 703-02, Table 703-4 Size 1.

Sieve Size	Percent Passing
1"	100
1/2"	90-100
1/4"	0-15
#200	0-1.0

K. Water: Clean, fresh, free of all oils, acids organics, etc.

L. Slump: Maximum 4 inches; minimum 2 inches before the addition of any water-reducing admixtures or high-range water reducing admixtures. Maximum slump of 6 inches when a water-reducing admixture is used, and maximum slump of 8 inches when a high range water reducing admixture is used. The slump range shall not exceed 2 ½ inches ±1 inch at point of discharge.

M. Chemical Curing and Anti-Spalling Compound: Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A. No thinning of material allowed. The volatile organic compound (VOC) content of concrete curing compounds shall meet the requirements of the United States Environmental Protection Agency (USEPA) national Architectural and Industrial Maintenance (AIM) VOC regulations.

1. Cure & Seal, Dayton Superior Corp., 721 Richards St., Miamisburg, OH 45342, (800-745-3700.
2. MasterKure, BASF Construction Chemicals, 23700 Chagrin Blvd., Beechwood, OH 44122 (216) 839-7500.
3. Seal Cure, W.R. Meadows, 2100 Monroe Street, York, PA 17404, (717)792-2627
4. Or ENGINEER approved equal

N. Moisture Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

O. Expansion Joint Dowels: Smooth steel expansion joint dowel with minimum 5-inch long steel dowel cap, unless otherwise indicated.

P. Joint sealants: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

1. Single-Component, Self-Leveling, Silicone Joint Sealant: ASTM D 5893/D 5893M, Type SL.
2. Single or Multicomponent, Pourable, Urethane, Elastomeric Joint Sealant: ASTM C 920, Type M, Grade P, Class 25.
3. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated.

Q. Joint sealant backer materials: Non-staining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by joint-sealant manufacturer, based on field experience and laboratory testing.

1. Round backer rods ASTM 5249 Type 1 or 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

R. Joint filler strips: ASTM D 994 or 1751, preformed bituminous type.

1. Asphalt Expansion Joint, WR Meadows, PO Box 338, Hampshire, IL, (847) 214-2100, 3/8 inch wide.
2. Or ENGINEER approved equal.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Preparation of Form Surfaces: Apply form coating material in accordance with manufacturer's specifications. If no coating material is specified, forms shall be thoroughly wetted before placing the concrete.

B. Provide chamfer on all exposed external corners of concrete.

C. Construct formwork so concrete members are of size, shape, alignment, elevation, and position indicated within tolerance limits of ACI 117.

D. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual for Class A, 1/8" for smooth formed finished surfaces.

E. Construct forms tight enough to prevent loss of concrete.

F. Set forms true to line and grade and anchor rigidly in position.

G. Elevations and widths of new concrete features shall be in accordance with the Contract Drawings.

3.2 REINFORCEMENT INSTALLATION

A. Place, support, and fasten reinforcement as shown on the Contract Drawings or approved shop drawing submittal.

B. At the time concrete is placed, reinforcement shall be free of dirt, loose rust, and loose mill scale.

C. Offset end laps in adjacent fabric sheets to prevent continuous joints at ends of sheets.

D. Provide fabric reinforcement supports tied to fabric at 18 inches o.c and spaced at 36-inch intervals.

3.3 PREPARATION

A. Do not use items of aluminum for mixing, chuting, conveying, forming, or finishing concrete. Magnesium alloy tools may be used for finishing.

B. Hardened concrete, reinforcement, forms, and earth which will be in contact with fresh concrete shall be free from frost at the time of placement.

C. Do not deposit concrete in water. Keep excavations free of water.

D. Prior to placement of concrete, remove all hardened concrete spillage and foreign materials from the space to be occupied by the concrete.

E. Subgrade beneath new driveways shall be proof-rolled prior to placement of subbase in accordance with Section 312000 – Excavation and Backfill.

3.4 ADMIXTURE ADDITIONS AT THE SITE

A. Site additions shall be limited to high-range water reducers, non-chloride accelerators, and corrosion inhibitors. Comply with manufacturer's printed instructions for admixtures.

B. All concrete with admixtures shall mix a minimum of 70 revolutions or 5 minutes to assure a consistent mixture.

C. High-range Water Reducers:

1. Concrete shall arrive at a slump of 2 to 4 inches. Water additions at the site shall be limited to comply with water-to-cementitious ratio requirements.

D. Water shall be added to the mix at the site no more than 10 minutes prior to discharging.

3.5 CONCRETE PLACEMENT

A. General - Place concrete in compliance with the practices and recommendations of ACI-304, and as herein specified.

B. Only transit mixers may be used.

C. Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is complete.

D. Consolidate concrete by spading, rodding, forking, or using an approved vibrator, eliminating all air pockets, stone pockets, and honey combing. Work and float concrete surface to produce a uniform texture.

E. Locate construction joints, if any, at expansion joints.

F. Finish patched areas to match the texture of the surrounding surface.

G. Any valve boxes, curb boxes, manhole covers, etc., encountered in the concrete areas shall be adjusted such that the top is flush with the finished surface of the concrete. Valve boxes, curb boxes, etc., shall be left in such a way that the covers are easily removed, and the boxes are fully operational.

H. Pitch sidewalks laterally at ¼ inch per foot such that runoff drains appropriately.

3.6 MONOLITHIC SLAB FINISH

A. Provide monolithic finishes on concrete slabs without the addition of mortar or other filler material.

B. Finish surfaces in true planes, true to line, with particular care taken during screeding to maintain and excess of concrete in front of the screed to prevent low spots. Screed and darby concrete to true planes while plastic and before free water rises to the surface. Do not perform finishing operations during the time free water (bleeding) is on the surface.

C. Begin float finishing when surface water has disappeared or when concrete has stiffened sufficiently to permit the operation of a power-driven float. Check surface plane to a tolerance not to exceed 1/4 inch in 10 feet, with uniform slopes to drains.

D. Begin the final troweling when the surface produces a ringing sound as the trowel is moved over the surface.

E. Sidewalk surfaces shall have a fine broomed finish.

3.7 COLD WEATHER PLACING

A. Protect all concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures.

B. When air temperature has fallen to or is expected to fall below 40 degrees Fahrenheit for more than 3 successive days, deliver concrete to meet the temperatures indicated in Section 4.2.2.5 of ACI 301.

C. Protect concrete from freezing for a minimum of 24 hours after placement.

D. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators.

E. Do not use frozen materials or materials containing ice or snow.

3.8 HOT WEATHER PLACING

A. Cool ingredients before mixing to maintain concrete temperature below 90 degrees Fahrenheit at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water.

B. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

C. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.9 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by the ENGINEER.

C. Obtain bond at construction joints by the use of bonding agent (adhesive) or the use of cement grout.

D. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one fourth of concrete thickness, as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

E. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.

3.10 JOINT SEALANTS

A. Surface Cleaning of Joints: Before installing joint sealants, clean out joints immediately to comply with joint-sealant manufacturer's written instructions.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces

C. Joint-Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions.

D. Install joint-sealant backings to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of joint-sealant backings.
2. Do not stretch, twist, puncture, or tear joint-sealant backings.
3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install joint sealants immediately following backing installation, using proven techniques that comply with the following:

1. Place joint sealants so they fully contact joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

3.11 CONCRETE CURING AND PROTECTION

A. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

B. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

E. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

F. Keep placed concrete protected from impact for a minimum of 72 hours following placement surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

3.12 CONCRETE SEALER

A. Concrete shall be fully cured and cleaned for the number of days recommended in the manufacturer’s instructions.

B. Apply sealer as recommended by manufacturer or as specified in the Contract Documents.

3.13 FIELD QUALITY CONTROL

A. Testing: ENGINEER will engage a qualified testing agency to perform field tests and prepare test reports.

B. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

3. Compressive-Strength Tests: ASTM C 39/C 39M: test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

4. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
5. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
6. Test results shall be reported by testing agency in writing to ENGINEER and CONTRACTOR within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

END OF SECTION 321313

SECTION 323113 – FENCING

PART 1 - GENERAL

1.1 SUMMARY

A. Scope

1. This section includes requirements for the installation of permanent chain-link, wood, and vinyl fences and gates at locations identified in the Contract Drawings. This section does not apply to temporary security fencing.
2. Provide all labor, materials, equipment and incidentals as shown, specified, and required to furnish and install fencing.
3. Reuse of salvaged fencing shall be at the approval of the ENGINEER.
4. The CONTRACTOR is responsible for the proper salvage, handling, storage, and installation of these components.

B. Substitutions

1. The CONTRACTOR, at the approval of the ENGINEER, may substitute new fencing materials as specified in this section.
2. Fence heights and materials may be customized on a per-residence basis if specifications deviate from previously installed fencing, subject to approval by the ENGINEER, and the building requirements of the City of Geneva.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include construction details, material descriptions, dimensions of individual components and profiles, and finishes for all fence and gate types at the request of the ENGINEER.

1. Fence and gateposts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Vinyl fencing material and attachments.
4. Gates and hardware.

B. Material samples, upon request by ENGINEER.

1.3 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

1. Chain-link Fencing

a. American Society for Testing and Materials (ASTM)

1) ASTM A 53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
2) ASTM A 153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
3) ASTM A 392 – Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
4) ASTM F 567 – Standard Practice for Installation of Chain-Link Fence
5) Federal Specification RR-F-191 (latest revision), Fencing, Wire and Post, Metal (Chain-Link Fence Fabric)

2. Vinyl Fencing

a. American Society for Testing and Materials (ASTM)

1) ASTM D1784 – 14344B Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds
2) ASTM D6638 – Standard Test Methods for Tensile Properties of Plastics
3) ASTM D256 – Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics

3. Wood Fencing

a. American Lumber Standard Committee (ALSC)

1) ALSC PS 20 – Voluntary Product Standard PS 20, American Softwood Lumber Standard

b. American Society for Testing and Materials (ASTM)

1) ASTM F537 – Standard Specification for Design, Fabrication, and Installation of Fences Constructed of Wood and Related Materials

1.4 DEFINITIONS

A. Boards: Lumber of less than 2 inches nominal in thickness and 2 inches nominal or greater in width.

B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

C. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NeLMA: Northeastern Lumber Manufacturers' Association
2. NLGA: National Lumber Grades Authority
3. RIS: Redwood Inspection Service
4. SPIB: The Southern Pine Inspection Bureau
5. WCLIB: West Coast Lumber Inspection Bureau
6. WWPA: Western Wood Products Association

1.5 QUALITY ASSURANCE

A. Erector Qualifications: Erector must be a firm experienced in the erection of fencing of the type specified.

B. Source Quality Control: Provide each type of fence and gate produced by a single manufacturer.

C. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified:

1. Federal Specification RR-F-19l (latest revision), Fencing, Wire and Post, Metal (Chain-Link Fence Fabric).

D. Vinyl Fencing: Tensile strength shall be at least 6,500 psi with a tensile modulus of 435,000 psi, a deflection temperature of 67°Celsius, and thermal expansion of 3 x 10.5 in/in F.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials: Deliver material in manufacturer’s original packaging with all tags and labels intact and legible.

B. Handling of Materials: Handle and store material in such manner as to avoid damage.

C. Store wood materials under cover and protected from weather and contact with damp or wet surfaces. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 METAL/PVC, GENERAL

A. Pipe sizes specified are commercial pipe sizes.

B. Tube sizes specified are nominal outside dimension.

C. Roll-formed section sizes are the nominal outside dimensions.

D. Finish for Framework and Appurtenances: Furnish the following finishes for steel framework and appurtenances:

1. Galvanized finish with minimum weights of zinc as follows:

a. Pipe: ASTM A 53, Schedule 40, 1.8 ounces of zinc per square foot.
b. Hardware and Accessories: ASTM A 153, zinc weight per Table I, Federal Specification RR-F- 191 (latest revision).

2.2 LUMBER, GENERAL

A. Comply with ALSC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.

1. Factory mark each item with grade stamp of grading agency on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
3. Provide dressed lumber, S4S, unless otherwise indicated.

2.3 LUMBER

A. Boards of greater or equal quality to original boards and of the same wood type.

B. Boards shall be inspected prior to construction of wood fencing. The Engineer may reject wood for fencing with characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

2.4 NEW POSTS, RAILS, AND BRACES FOR CHAIN-LINK FENCING

A. End, Corner, and Pull Posts: Furnish end, corner, and pull posts of the minimum sizes as follows:

1. 2.25-inch-OD pipe.

B. Line Posts:

1. Furnish line posts of the minimum sizes as follows.

a. 1.5-inch-OD pipe.

2. Space posts evenly, 10 feet on centers maximum, unless otherwise shown.

C. Top Rails: Furnish top rails complying with ASTM F 1043, unless otherwise shown, of the following:

1. 1.660-inch-OD pipe.
2. Furnish in manufacturer's longest lengths, with expansion type couplings, approximately 6 inches long, for each joint. Provide means for attaching the top rail securely to each gate, corner, pull, and end post.

D. Brace Rails and Truss rods: for corner, end and pull sections shall comply with ASTM F 1043.

E. Metallic Coating for Steel Framing:

1. Type A, consisting of not less than minimum 2.0 ounces per square foot average zinc coating per ASTM A 123/A 123M or 4.0 ounces per square foot zinc coating per ASTM A 653/A 653M.

2.5 NEW POSTS, RAILS, AND BRACES FOR WOOD FENCING

A. Dimension Lumber Posts: Construction, Stud, or No. 2 grade and any of the following species:

1. Hem-fir or hem-fir (North); NLGA, WCLIB, or WWPA.
2. Douglas fir-larch, Douglas fir-larch (North), or Douglas fir-south; NLGA, WCLIB, or WWPA.
3. Mixed southern pine; SPIB.
4. Spruce-pine-fir or spruce-pine-fir (South); NeLMA, NLGA, WCLIB, or WWPA.
5. Northern species; NLGA.
6. Eastern softwoods; NeLMA.
7. Western woods; WCLIB or WWPA.

2.6 PRESERVATIVE TREATMENT FOR LUMBER

A. Provide pressure treated boards and dimensional lumber with waterborne preservative according to AWPA U1; Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Do not use chemicals containing arsenic or chromium.

B. Mark treated wood with treatment quality mark of an inspection agency approved by ALSC's Board of Review.

1. For items indicated to receive a stained or natural finish, mark each piece on surface that will not be exposed or omit marking and provide certificates of treatment compliance issued by inspection agency.
2. Application: All exterior wood fencing shall be pressure treated.

2.7 CHAIN LINK FENCE SWING GATES

A. General: Comply with ASTM F 900 for gate posts and double-swing gate types.

1. Gate Leaf Width: As directed by ENGINEER.

B. Pipe and Tubing:

1. Zinc-coated Steel: Comply with ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framing
2. Gate Posts: Round tubular steel
3. Gate Frames and Bracing: Round tubular steel

C. Frame Corner Construction: Welded

D. Hardware:

1. Hinges: 360-degree inward and outward swing.
2. Latches permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.

2.8 WOOD FASTENERS

A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than 1-1/2 inches into wood substrate.

1. Use stainless steel or fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M or ASTM F 2329 unless otherwise indicated.
2. For pressure-preservative-treated wood, use stainless-steel fasteners.

2.9 FITTINGS/CHAIN-LINK

A. General: Comply with ASTM F 626.

B. Post Caps: Provide for each post.

1. Provide line post caps with loop to receive top rail.

C. Rail and Brace Ends: For each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:

1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.

E. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.

F. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:

a. Hot-Dip Galvanized Steel: 0.148-inch-diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

2.10 ANCHORING CEMENT

A. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure

without needing protection by a sealer or waterproof coating, and that is recommended in writing by manufacturer for exterior applications.

PART 3 - EXECUTION

3.1 GENERAL

A. Fences shall be installed facing out. Fences shall not be placed in front of the principal structure of a property.

B. CONTRACTOR shall obtain building permits as necessary from the City of Geneva's Superintendent of Building and Zoning prior to fence installations.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 50 feet or the line of sight between stakes. Indicate locations of utilities, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION/VINYL

A. Install vinyl fencing in accordance with manufacturer's instructions.

3.4 INSTALLATION/CHAIN-LINK

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacing indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Bottom of posts shall be set at a minimum of 36 inches below grade.
2. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
3. Concrete Fill: Place concrete around posts to a depth of 6 inches below bottom of post and at a radius of 4 times post diameter. Vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.

C. Concrete Strength: 4,000 PSI minimum.

D. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 45 degrees or more.

E. Line Posts: Space line posts uniformly, spaced no more than 10 feet on center.

F. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

H. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

I. Bottom Rails: Secure to posts with fittings

J. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches on center, and to braces at 24 inches.

3.5 INSTALLATION/LUMBER

A. Set work to required levels and lines, with members plumb, true to line, cut, and fitted. Fit work to other construction; scribe and cope as needed for accurate fit.

B. Post Setting: Set bottom of posts at 48 inches below grade in post hole at least 4 inches larger in diameter than largest dimension or diameter of post. Install cast-in-place concrete collar footing around fence post to 6 inches below final grade. Place 6 inches of topsoil above concrete collar. Do not use wood preservative on any cut surfaces to be set below grade.

C. Framing Standard: Comply with AF&PA WCD1 unless otherwise indicated.

D. Install metal framing anchors to comply with manufacturer’s written instructions.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of members or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Apply copper naphthenate field treatment, to comply with AWPA M4, to cut surfaces of preservative-treated lumber. Do not apply to cut surfaces to be set below grade.

I. Use common wire nails suitable for use in the fencing lumber. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.

3.6 ADJUSTMENT AND CLEANING

A. Adjust all fencing and leave in good working condition.

B. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

C. Lubricate hardware gate operator and other moving parts.

D. Repair or replace broken or bent components as directed by the ENGINEER.

E. Protect installed fencing from damage and construction traffic.

END OF SECTION 323113

SECTION 329200 - TURF AND GRASSES

PART 1 - GENERAL

A. Section Includes:

1. Sodding: The CONTRACTOR shall furnish all labor, material, and equipment necessary to establish sod after excavation and backfill at each property.
2. Seeding: The CONTRACTOR shall furnish all labor, material, and equipment necessary to establish seed in areas of restored properties that cannot be sodded.
3. The CONTRACTOR shall guarantee all work related to seeding and sod installation for the duration of one year following the completion date of restoration activities completed at each individual property. At the end of the guarantee period, any dead, unhealthy or impaired areas as indicated by the ENGINEER shall be replaced in-kind by the CONTRACTOR.

1.1 INFORMATIONAL SUBMITTALS

A. Product Data:

1. The CONTRACTOR shall submit sod variety, thickness of cut, pad size, strength of sod sections, moisture content, and mowing height. Certification of each seed mixture for turfgrass sod, identifying source, including name and telephone number of supplier.
2. The CONTRACTOR shall submit proposed seed mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested, state certification, and proposed methods for applying seed.

1.2 DELIVERY, STORAGE, AND HANDLING

A. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" sections in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod within 24 hours of harvesting and in time for planting promptly. Protect sod from breakage and drying.

B. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.

C. Fertilizer: Shall be delivered to the site in original unopened containers each showing the manufacturer’s guaranteed analysis conforming to applicable state fertilizer laws.

1.3 FIELD CONDITIONS

A. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SEED

A. Grass-Seed Mix: Proprietary seed mix as follows:

1. Products: Seed mixture shall be Preferred Seed's "Cornell Classic" or approved equal.

    a. 65% blend of Kentucky bluegrasses
    b. 20% blend of perennial ryegrasses
    c. 15% firefly hard fescue

2.2 TURFGRASS SOD

A. Turfgrass Sod: Approved, complying with the National Turf Grass Evaluation Program standards. Furnish viable sod of uniform density, color, and texture that is strongly rooted and capable of vigorous growth and development when planted.

B. Turfgrass Species: Sod of grass species as follows, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:

1. Sod mixture shall contain at least three cultivars, e.g., Premium Kentucky Bluegrass Mix by Lakeside Sod or approved equal.
2. Sod shall meet the chemical requirements of NYSDEC DER-10 Section 5.4(e)2 and Appendix 5 for unrestricted use.

2.3 FERTILIZERS

A. Commercial Fertilizer: Commercial mixed free flowing granules or pelleted fertilizer, 21-17-7 (N-P2O5-K2O) grade for lawn and naturalized areas. At least 40 percent of the nitrogen in the fertilizer shall be in slowly available (organic) form. Application rates shall be in accordance with manufacturer's specifications or as recommended by seed/sod provider.

2.4 MULCHES

A. Hardwood Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs and landscaped areas, consisting of ground or shredded hardwood and be brown or black in color, unless otherwise specified by the ENGINEER.

B. Straw mulch: Shall consist of oat, wheat, rye, or barley straw, or tame hay, and shall be light in color, air dry, and not musty, moldy, caked or otherwise poor quality. Weight shall be based on 15 percent moisture content.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as concrete slurry, concrete layers or chunks, cement, oils, gasoline, or diesel fuel has been deposited in soil within a planting area.
2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
3. Uniformly moisten excessively dry soil that is not workable or that is dusty.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by ENGINEER and replace with new planting soil.

3.2 PREPARATION

A. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

3.3 TURF AREA PREPARATION

A. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

B. Before planting, obtain ENGINEER’s acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 SEEDING

A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.

1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
2. Do not use wet seed or seed that is moldy or otherwise damaged.
3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.

B. Sow seed at a total rate of 2 lb/1,000 sq. ft.

C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.

D. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

3.5 SODDING

A. Lay sod within 24 hours of harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to soil or sod during installation. Tamp and roll lightly to ensure contact with soil, eliminate air pockets, and form a smooth surface. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

C. The CONTRACTOR shall provide new sod with at least 1 inch of water within 30 minutes of installation.

3.6 TURF MAINTENANCE

A. The CONTRACTOR shall be responsible for the initial care of new sod until sod is firmly rooted (approximately 4 weeks).

B. Initial care of sod shall be performed as per manufacturer's maintenance and water instructions, including daily watering at a frequency required to keep sod thoroughly saturated.

C. The ENGINEER shall provide the homeowner's with manufacturer's maintenance and watering instructions following the completion of initial rooting period, approximately 4 weeks post-installation, at which time the homeowner will assume responsibility of sod care.

3.7 SATISFACTORY TURF

A. Turf installations shall meet the following criteria as determined by ENGINEER:

1. Satisfactory Sodded Turf: At end of maintenance period, a healthy, well-rooted, even-colored, viable turf has been established, free of open joints, bare areas, and surface irregularities.
2. The CONTRACTOR shall be responsible for replacement of any and all grassed areas that do not grow adequately during the guarantee period, including:

    a. Seeded areas: for areas that have been seeded, the CONTRACTOR shall reestablish as specified herein, eroded, damaged, or barren areas. Mulch shall be repaired or replaced as required.
    b. Sodded areas: for areas that have been sodded, the CONTRACTOR shall replace and re-establish as specified herein, eroded, damaged, barren, dead, or dying areas.
    c. Additional areas identified as impaired by the ENGINEER.
    d. Damaged mulch shall be repaired or replaced as required.

e. A satisfactory stand of vegetative cover from the seeding operation is defined as a minimum of 10 grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded areas. Each bare spot shall not be larger than 1 square foot.

f. Sod shall be in thriving and vigorous condition exhibiting a healthy green color. Bare spots or brown spots will not be accepted.

3.8 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, and legally dispose of them.

END OF SECTION 329200

SECTION 329300 – LANDSCAPING AND PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plants.
2. Tree stabilization.
3. Landscape edgings.

B. The CONTRACTOR shall furnish all labor, material, and equipment to install trees, shrubs, and plantings.

C. Planting species, sizes, and locations shall be in accordance with the Contract Drawings or as directed by the Engineer.

1.2 COORDINATION

A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.

1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.3 QUALITY ASSURANCE

A. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1, with healthy root systems developed by transplanting or root pruning.

B. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

C. Trees and shrubs of alternate sizes may be used if acceptable to the ENGINEER.

D. Plant Material Observation: Engineer may observe plant material at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Engineer may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.

1.4 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Planting Restrictions: It is recommended that planting be completed within the following periods.

1. Spring Planting: April 1 – July 1.
2. Fall Planting: September 1 – November 31 (or until soil temperatures drop below 50 degrees Fahrenheit).

C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.5 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization and edgings.

2. Warranty Periods: From date of planting completion.

a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.

3. Include the following remedial actions as a minimum:

a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
c. A limit of one replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List indicated on the Contract Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Engineer, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

2.2 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of one of the following:

1. Type: Shredded hardwood.
2. Size Range: 3 inches maximum, 1/2 inch minimum.
3. Color: Natural, unless otherwise specified by the Engineer.

2.3 WEED-CONTROL BARRIERS

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3 oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

2.4 TREE-STABILIZATION MATERIALS

A. Trunk-Stabilization Materials:

1. Upright and Guy Stakes: Rough-sawn, sound, new hardwood, free of knots, holes, cross grain, and other defects, 2-by-2-inch nominal by length indicated, pointed at one end.
2. Flexible Ties: Wide rubber or elastic bands or straps of length required to reach stakes.
3. Guys and Tie Wires: ASTM A 641/A 641M, Class 1, galvanized-steel wire, two-strand, twisted, 0.106 inch in diameter.
4. Tree-Tie Webbing: UV-resistant polypropylene or nylon webbing with brass grommets.

2.5 LANDSCAPE EDGINGS

A. Plastic Edging: Standard black polyethylene or vinyl edging, extruded in standard lengths, with 9-inch plastic stakes.

1. Edging Size: 0.07 – 0.1-inch-thick by 5 inches deep.
2. Top Profile: Round top, 1/2 inch - 1 inch in diameter.
3. Accessories: Manufacturer's standard alignment clips or plugs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.

1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
4. Uniformly moisten excessively dry soil that is not workable, or that is dusty.

B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Engineer and replace with new planting soil.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Engineer’s acceptance of layout before excavating or planting. Make minor adjustments as required.

3.3 PLANTING AREA ESTABLISHMENT

A. Placing Planting Soil: Blend planting soil in place. Planting beds shall consist of a minimum of 12-inch thickness of planting soil. Planting soil shall consist of topsoil and amendments as described in Section 312000 – Excavation and Backfill.

B. Before planting, obtain Engineer’s acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.

1. Excavate planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
2. Excavate approximately three times as wide as ball diameter for balled and burlapped stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Engineer if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch - 2 inches above adjacent finish grades.

1. Backfill: For trees, use excavated soil for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove

from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.

3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Balled and Potted and Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1 inch - 2 inches above adjacent finish grades.

1. Backfill: Planting soil as indicated in Section 312000 “Excavation and Backfill”. For trees, use excavated soil for backfill.
2. Carefully remove root ball from container without damaging root ball or plant.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

F. Trunk Stabilization by Upright Staking and Tying: Install trunk stabilization as follows unless otherwise indicated:

1. Upright Staking and Tying: Stake trees of 2- through 5-inch caliper. Stake trees of less than 2-inch caliper only as required to prevent wind tip out. Use a minimum of two stakes of length required to penetrate at least 18 inches below bottom of backfilled excavation and to extend at least 72 inches above grade. Set vertical stakes and space to avoid penetrating root balls or root masses.
2. Upright Staking and Tying: Stake trees with two stakes for trees up to 12 feet high and 2-1/2 inches or less in caliper; three stakes for trees up to 14 feet high and 4 inches in caliper. Space stakes equally around trees.
3. Support trees with bands of flexible ties or two strands of tie wire encased in hose sections at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.

G. Trunk Stabilization by Staking and Guying: Install trunk stabilization as follows unless otherwise indicated on Drawings. Stake and guy trees more than 14 feet in height and more than 3 inches in caliper unless otherwise indicated.

1. Site-Fabricated, Staking-and-Guying Method: Install no fewer than three guys spaced equally around tree.

    a. Securely attach guys to stakes 30 inches long, driven to grade. Adjust spacing to avoid penetrating root balls or root masses.
    b. Support trees with bands of flexible ties or two strands of tie wire encased in hose sections at contact points with tree trunk. Allow enough slack to avoid rigid restraint of tree.
    c. Attach flags to each guy wire, 30 inches above finish grade.

3.6 GROUND COVER AND PLANT PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated on Drawings in even rows with triangular spacing.

B. Use planting soil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.7 STREET TREES

A. Street trees are trees to be planted within the municipal right-of-way (treelawns), owned and regulated by the city.

B. Trees shall be planted with minimum spacing as indicated in Geneva City Code §327-8 as follows:

1. Small trees (under 25 feet) – 15 feet.
2. Medium trees (25 to 45 feet) – 25 feet.
3. Large trees (over 45 feet) – 35 feet.

C. Street trees shall be planted a minimum of 35 feet from the street corner.

D. Street trees shall not be planted within 10 feet of a fire hydrant or utility pole.

E. The right-of-way (ROW) must be at least 4-feet wide for the planting of small trees, and 6-feet wide for planting of medium or large trees.

F. Only trees designated as “small trees” may be planted beneath or within 10 horizontal feet of an overhanging utility wire.

G. New locations proposed for replacement street trees shall be determined in consultation with the Shade Tree Committee and the ENGINEER if unable to meet the criteria provided above.

3.8 PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions as directed by the Engineer. Completely cover area to be mulched, overlapping edges a minimum of 3 inches and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Treelike Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with at least 24-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of organic mulch extending at least 12 inches beyond edge of individual planting and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.9 EDGING INSTALLATION

A. Plastic Edging: Install plastic edging where indicated according to manufacturer's written instructions. Anchor with steel stakes spaced approximately 36 inches - 48 inches apart, driven through upper base grooves or V-lip of edging.

B. Shovel-Cut Edging: Separate mulched areas from turf areas, curbs, and paving with a 45-degree, 4- to 6-inch- deep, shovel-cut edge.

3.10 REPAIR AND REPLACEMENT

A. Planted areas will be subject to an initial acceptance inspection at completion of installation and accepted subject to compliance with specified materials and installation requirements. Inspection to determine Initial Acceptance of planted areas shall be made by the Engineer at the Contractor’s request. The Contractor shall provide notification of at least 10 working days before requested inspection date.

1. Where inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until re-inspected by the Engineer and found to be acceptable. Remove rejected plants and materials promptly from project site.

B. Remove and replace trees, shrubs, and plants that are more than 25 percent dead or in an unhealthy condition before the end of the one-year guarantee period or are damaged during construction operations that Engineer determines are incapable of restoring to normal growth pattern. The Contractor shall be responsible for replacement of trees, shrubs, and plantings that do not grow adequately during the guarantee period.

3.11 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris.

END OF SECTION 329300

SECTION 332413 –WELL ABANDONMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes criteria for abandonment of water supply and historical wells.

B. The Contractor shall furnish all labor, tools, materials, equipment, and incidentals necessary to perform well abandonment on properties as directed by the Engineer.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 WELL ABANDONMENT

A. Disinfection

1. Prior to abandonment, wells that contain standing water shall be disinfected with a sodium hypochlorite solution to achieve 200 milligrams per liter (mg/L) of chlorine concentration.
2. Sodium hypochlorite shall be completed dissolved in solution before being added to the well.

B. Drilled Wells

1. Wells shall be abandoned in accordance with NYSDOH Appendix 5-A Section 3.2.5.14 “Well Abandonment” and NYSDEC Policy CP-43 “Groundwater monitoring Well Decommissioning Policy”.
2. The Contractor shall remove any surface coverings (e.g., concrete pads) and well caps and gauge the well depth.
3. Wells that are greater than 20 feet deep shall be abandoned by grouting in place.

    a. The standard grout mixture shall consist of Portland type I cement and 4% bentonite by weight with a maximum ratio of 8.3 gallons of water per 100 pounds of cement.
    b. Grout shall be placed via tremie pipe to a depth of 48 inches below grade.
    c. The well casing shall be cut and removed to a depth of 48 inches below grade.
    d. The remainder of the hole to grade shall be backfilled and restored in accordance with Section 312000 – Excavation and Backfill.

4. Wells that are less than 20 feet deep (including wells that appear to have debris or a blockage in the casing) shall be drilled out using a bit with a diameter equivalent to the casing diameter to a minimum depth of 20 feet below grade. The open portion of the

well shall then be grouted in placed as described above. Completion of the abandonment shall be as described above.

C. Dug Wells

1. Hand dug wells that contain standing water shall be abandoned by the Contractor in accordance with the following procedure.

    a. Remove any surface coverings and gauge the well depth and depth to water.
    b. Knock down the top 4-feet of well wall material and let it fall inside the well.
    c. Fill the well with NYSDOT Type 2 washed stone or equivalent coarse aggregate to 2-feet above the water level, but no higher than 6-feet below grade.
    d. Fill remaining open space above the stone to a depth of 5-feet below grade with common fill (Section 312000 – Excavation and Backfill). Compact common fill to the extent practicable.
    e. Use cement/bentonite grout to fill the well from 5-feet to 4-feet below ground surface. The grout mixture shall contain Type I Portland cement with approximately 4% of powdered bentonite by weight and no more than 8 gallons of water per 100 pounds of cement.
    f. After allowing sufficient time for grout to cure (minimum 12 hours), backfill the remainder of the well with common fill and topsoil in accordance with Section 312000 – Excavation and Backfill.

END OF SECTION 332413