SeaTac Community Garden
Table of Contents

END OF TABLE OF CONTENTS

PART 1 - GENERAL

1.01 Section Includes:

A. This Section covers the Scope of Work describing the construction activities that shall take place at the project site as included in the Contract Documents.

1.02 RELATED SECTIONS:

Section 01 35 29 - Health & Safety

Section 01 74 19 - Construction Waste Material & Disposal

Section 01 76 00 - Protection of Existing Facilities

Section 01 78 39 - Record Documents

1.03 SCOPE OF WORK:

A. This contract includes work as described below. The description is summarized and may not include specific reference to all incidental work elements required to complete the contract. Include all labor, materials, equipment and incidentals required for completion of the work as shown on the Drawings and specified herein.

Elements of the work include but are not limited to: Installation and maintenance of temporary erosion and sedimentation controls, earthwork, drainage, utilities, ecology block walls, concrete and asphalt paving, crushed stone paving, wetland markers, chain link fencing, gates, planting, soil preparation, and mulching. The work also includes greenhouse disassembly/reassembly, classroom/kitchen/restroom building construction and shed renovation.

C. The Contract Documents include Bid Items as outlined in Section 01 23 00 Base Bid and Additive Bid Items.

1.04 CONTRACTS:

A. There will be one Contract for the project, which includes the Work described in the Project Manual and Drawings.

B. The Contractor shall provide all items, articles, materials, operations or methods listed, noted or scheduled on the Drawings and/or Project Manual, including all labor, equipment and incidentals necessary and required for proper and timely completion of the Work. The Contractor shall use new materials unless specifically noted or directed.

C. Work not specifically covered in the project manual and or drawings shall be performed in accordance with the current City of SeaTac Standard Specifications and Plans or City, County, State or National reference standards.

1.05 USE OF DOCUMENTS:

A. Technical Specifications are enumerated in the Table of Contents of the Project Manual. The numbering of Sections is for identification only and may not be consecutive. The Contractor shall check his/her copies of the Specifications with the Table of Contents to verify that they are complete. The Contractor shall notify the Engineer of incomplete copies.

1.06 COPIES FURNISHED:

A. The Contractor shall be furnished a minimum of three (3) copies of the Contract Documents without charge. The Contractor may obtain additional partial or complete copies by request at the pre-construction meeting, as the existing supply allows. When that supply is depleted, the Contractor can request additional copies from the Engineer at the cost of reproduction.

1.07 WORK UNDER OTHER CONTRACT AFFECTING WORK: (Reserved)

1.08 FUTURE WORK AFFECTING CONTRACT: (Reserved)

1.09 WORK SEQUENCING: (Reserved)

1.10 ORDERING LONG LEAD EQUIPMENT/MATERIAL ITEMS:

A. The Contractor shall schedule and prioritize the ordering and delivery of material as required insuring that the Work can be completed within the Contract Time.

1.11 ENGINEER FURNISHED WORK, MATERIALS AND OR EQUIPMENT:

A. Irrigation line to site provided by SeaTac.

B. Ecology Blocks-Contractor shall use ecology blocks from the site, provided by SeaTac

1.12 RECORD OF EXISTING IMPROVEMENTS:

A. The Contractor shall provide to the Engineer, a digital recording that thoroughly documents the existing conditions of the entire project site and immediate vicinity, specifically including but not limited to all perimeter edge conditions, driveways, sidewalks, and roads adjacent to the site, all landscape elements and features, utility structures, and structures and surfaces on the site not scheduled for removal or repair. The Contractor shall have a responsible representative perform the recording or hire a digital recording production consultant that specializes in this function, and alert the Engineer as to the scheduled time and date of the recording in the event that the

Engineer exercises the option of being present. One copy of the completed digital record shall be submitted to the Engineer prior to beginning work. One copy of the digital record shall be kept on file with the Contractor.

B. The Contractor shall utilize digital media for the record, as approved by the Engineer. Either voice-over moderated digital video or digital still photos with captions are the required format options. Digital formats requiring proprietary software will not be accepted. Digital media must be submitted to the Engineer on a DVD.

C. During the course of inspection and electronic documentation, the Contractor shall identify existing improvements to remain that, in the opinion of the Contractor, are beyond any reasonable potential for repair. Should those improvements become damaged during the course of this Contract, then during the course of the inspection, the Contractor shall submit in writing for the Engineers concurrence, a list and description of all such existing improvements.

D. Where damage to existing improvements to remain that are not previously documented as described in paragraph 1.12.C above occurs, as a result of the execution of the Contract, the Contractor agrees to provide repair to, or replacement of, the improvement at the Contractor's expense, as described by the City of Seattle Standard Plans and Specifications (most recent edition) and/or the Seattle Department of Parks and Recreation Design Standards, regardless of the condition of the improvement prior to proceeding with the work.

1.13 CONTRACTOR PERSONNEL: ***(Reserved)***

1.14 CONTRACTOR'S USE OF PREMISES:

A. Hours of Work:

The contractor shall limit their work to between the hours of 7 am and 6 pm., Monday through Friday except City Holidays. The Contractor shall plan and schedule Work activities to conform to and allow time for notifications, approvals, reviews and other conditions of the Contract. Any other times of Work shall only be by written approval of the Engineer. The Request to Work Holidays form follows at the end of this section and is available electronically in the contractor forms workbook.

B. Keys:

1. When working inside of a controlled and/or occupied facility, it shall be the Contractor's responsibility to acquire keys for supervisory personnel only. This shall be accomplished in conjunction with the Project Manager coordinate with the Parks Department Security Offices. This requires a deposit, signing for keys and involves a minimum processing time of three

(3) working days. The contractor shall maintain general security of the job site during construction.

C. Access:

1. The Contractor and their subcontractors will be allowed on site only during the established working periods. The Contractor shall only use the designated location for site access.
2. The Contractor shall also address issues such as normal maintenance activities, service truck routes, special events, and other adjacent work that may be taking place.

D. Parking:

1. The Contractor shall use available street parking or facility parking if noted on the contract drawings.
2. Keep all fire lanes clear and store no materials in facility parking areas unless specifically identified for such use on the contract drawings.

E. Staging:

1. The Contractor shall prepare a staging plan to show locations of materials, trailers, and fencing layouts. Staging, parking or impacting activities shall not occur within the wetland or buffer.

F. Existing Facilities: Refer to Section 01 76 00 - Protection of Existing Facilities.

G. Contractor’s additional responsibilities while using the premises may include:

1. Maintaining pedestrian and vehicular access to and around existing facilities.
2. Not unreasonably encumbering site with materials or equipment.
3. Assuming full responsibility for protection and safekeeping of products stored on the premises.
4. Obtaining and paying for use of additional storage or work areas needed for operation.
5. Patching any damaged existing paving on adjacent properties.
6. Keeping roads and other areas clean of dirt and other debris.

1.15 STORAGE AND PROTECTION:

A. Store products in accordance with manufacturer's instruction, seals and labels intact and legible.

1. Store products subject to damage by the elements in weather-tight enclosures.
2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

3. Storage of hazardous materials and wastes shall be in accordance with local, State and Federal fire codes and regulations.
4. Note requirements on Materials Safety Data Sheets (MSDS).

B. Exterior Storage:

1. Store fabricated products above ground. Position on blocking or skids; prevent soiling or staining. Cover products subject to deterioration with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
2. Store loose granular materials in well-drained areas on solid surfaces. Prevent mixing with foreign matter.

C. Do not store materials for other projects on site unless specifically approved by the Engineer.

D. Waste Material Disposal: Refer to Section 01 74 19 - Construction Waste Material and Disposal.

1.16 SALVAGED MATERIALS:

A. Salvage only those items that are noted in the Contract Documents. The Engineer retains first right of refusal to all salvaged materials, equipment, and or products identified or not identified in the Contract Documents that are affected as part of the Contract Work.

1.17 DISPOSAL OF DEBRIS:

A. All disposal of debris resulting from the Contract Work, unless specifically allocated to another scope of work, shall be the responsibility of the Contractor. This includes scheduling, costs and interference in the use of trash collecting, containers, trucks, etc. The Contractor is responsible for awareness of, understanding of, and compliance with all local, state and federal regulation regarding the disposal of any hazardous and non-hazardous wastes.

1.18 SAFETY AND ENVIRONMENTAL CONCERNS:

A. Material Safety Data Sheets (MSDS) for all chemicals (including paints) used in the performance of the contractors duties must be identified in advance to the Engineer, posted on a specified bulletin board at least 10 working days before first using the material, and comply with MSDS recommended practice.

B. The Contractor shall provide barricades, safety guards, temporary fencing, signage and/or other methods to secure trenches, open excavations, and other unsafe conditions resulting from this construction. Contractor shall adhere to all safety regulations.

PART 2 - PRODUCTS: (Not Used).

PART 3 - EXECUTION: (Not Used).

END OF SECTION

Request to Work Holidays form follows:

Activity (WC) No. _____

REQUEST TO WORK LEGAL CONTRACT HOLIDAY, WEEKEND, OR NON-NORMAL WORKING HOURS

Project Name	PW Contract No.
Contractor Name	Contractor Phone

The above-named Contractor hereby requests permission to perform work on the above-named project during a contract holiday, weekend, or other non-normal working hours as described below:

Date(s)	Time(s)

Contractor's Representative	**Name (Printed)**	**Signature**	**Date**
Project Manager's Recommendation	**Name (Printed)**	**Signature**	**Date**

Pursuant to the above request to work on the above listed day(s), permission is hereby given and work shall be done in accordance with Section 1-07.5(4) and 1-08.1(4) of the City Standard Specifications.

This includes reference that the Contractor shall conduct the work consistent with the applicable noise control levels set forth in Seattle Municipal Code Chapter 25.08, or if outside the City limits and in King County, King County Ordinance No. 3139.

Construction Manager's Approval	**Name (Printed)** Chris Jewell	**Signature**	**Date**

cc: Contractor
Project Manager, Seattle Parks and Recreation
Chris Jewell, Construction Manager, Seattle Parks and Recreation
Project File

PART 1 - GENERAL

1.01 SUMMARY:

A. This section includes administrative and procedural requirements for Measurement and Payment including unit prices.

B. Related Sections: The following sections contain requirements that relate to this section:

Section 01 26 00 - Modification Proposals
Section 01 45 00 - Quality Control

1.02 DEFINITIONS:

A. Unit Prices are amounts proposed by bidders, stated on the Bid Form, as prices per unit of measurement for materials or services added to, or deducted from, the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

1.03 PROCEDURES:

A. Measurement and Payment:

1. For lump sum bid item payment procedures, refer to Section 01 29 73.
2. No Unit Prices are associated with the scope of this project.

PART 2 - PRODUCTS: *(Not Used)*

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE: *(Not Used)*

END OF SECTION

4’

PART 1 - GENERAL

1.01 DESCRIPTION:

A. It is the intent of the Engineer to award a Contract for Base Bid construction of the project as shown on the Drawings and specified herein. Should additional budget be available, however, the Additive Bid Items listed in this Section will be considered. They will not necessarily be taken in the numeric order below.

1.02 RELATED SECTIONS:

A. Section 01 11 00 - Summary of Work

1.03 BASE BID:

A. The work to be accomplished by this Contract is that work described on the Drawings with the exception of Additive Alternate items, as clearly delineated on the Contract Documents.

1.04 ADDITIVE ALTERNATE ITEMS:

A. Bid Alternate #1: Entry Trellis: Provide Entry trellis/wood entry gate in lieu of chain link fence and gate.
B. Bid Alternate #2: Site Furnishing: 3 Standard 4’ long In ground mounted park benches with concrete footing.
C. Bid Alternate #3: Tool Storage: Provide 10 x 12 Tuff Shed Tall Pro Shed in SE corner of site. Level base part of base bid
D. Bid Alternate #4: Ecology Block Retaining wall

PART 2 - PRODUCTS: (Not Used)

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS:

A. All general conditions and technical specification references that apply to the rest of the project shall also apply to the work in this section.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. The Contractor shall furnish and install all products specified herein. Substitutions will be considered only after the Award of Contract. The Engineer will review the substitution request as stated in this Section. The required forms for submitting substitution requests are attached to the end of this section. The "Request for Approval of Material Sources and Substitutions" form is also available electronically within the automated Contractor Forms Workbook, a MS Excel application developed by the Owner that integrates several common forms utilized during the life of the Contract. The Contractor Forms Workbooks is available to the Contractor upon request.

1.02 RELATED SECTIONS:

A. Coordinate related requirements specified in other parts of the Project Manual.

1.03 PRODUCTS:

A. Where specified only by reference standards, select any product meeting the standards, by any Manufacturer.

B. Where specified by naming one or more products, but indicating "or approved equal" after specified listing, submit any request for another product substitution on a form provided by the Engineer.

1.04 SUBSTITUTIONS:

A. Within fourteen (14) days after the Award of Contract, submit written substitution requests (on form provided) to the Engineer. Submit two copies of the Substitution Request form for each product substitution being proposed.

B. Indicate one or more of the following reasons for request:

1. Substitution is required for compliance with final Code interpretation requirements or insurance regulations.
2. Specified product is unavailable through no fault of Contractor/Subcontractor.
3. Subsequent information discloses specified product unable to perform properly
4. Manufacturer or fabricator refuses to certify or guarantee performance of specified product, as required.
5. Substitution saves substantial cost, time or other considerations. Show accurate cost data on proposed substitution in comparison with product or method specified or backup documentation from the Manufacturer pertaining to delivery times.

C. In making request for Substitution, Manufacturer/Contractor represents:

1. He/she has personally investigated proposed product, and in his/her opinion, it is equal or superior in all respects to that specified.
2. He/she will coordinate installation of accepted substitution and guarantees to complete it in all respects. He/she has outlined any changes required in accordance with form.
3. He/she will provide an equal or greater guarantee for Substitution as for specified product.
4. He/she waives all claims for additional costs related to Substitution, which consequently become apparent.
5. Cost data is complete and includes all related costs under his/her Contract, but excludes: Cost under separate Contracts. (Show impact on Substitution Request form).

D. Substitutions will not be considered if:

1. They are indicated or implied on Shop Drawings or other project data submittals, without proper notice shown on Substitution Request form.
2. Approval will require substantial revisions of Contract Documents.

E. Approval Process:

1. The Engineer, upon receiving an application for a Substitution shall within ten (10) working days determine if the request is warranted. The Engineer shall approve or disapprove.
2. If the Substitution request is approved by the Engineer and does not involve a cost increase or credit, change in the contact time, or material change to the project drawings and or manual, the approved application will serve as documentation of the change. If any of the prior conditions is changed as a result of the substitution approval the Engineer shall prepare an MP and a subsequent Change Order to officially approve the change.

PART 2 - PRODUCTS: *Not Used*

PART 3 - EXECUTION: *Not Used*

END OF SECTION

Substitution Request form follows on next page

REQUEST FOR APPROVAL OF MATERIAL SOURCES AND SUBSTITUTIONS

PROJECT NAME		PW CONTRACT NO.	
CONTRACTOR	ACTIVITY (WC) NO.	DATE	

MATERIAL SOURCES

Bid Item #	Description of Material	Sources of Supply		Approval Action *
		Local Supplier	Manufacturer or Pit #	

Each substitution listed below must be accompanied by a "Supplemental Information for Substitution Request" form

Bid Item #	Specified Material or Component		Proposed Substitution		Approval Action *
	Manufacturer	Part No. or Make	Manufacturer	Part No. or Make	

SUBMITTED BY	SIGNATURE AND DATE

1.	Source Approved
1A.	Source Approved: Acceptance based upon 'Satisfactory' test report for samples of materials incorporated into project
2.	Source Approved: Submit manufacturer certificate of compliance for 'Approval' prior to use of material
3.	Source Approved: Submit millcerts prior to use of material
4.	Source Approved: Submit catalog cuts and/or shop drawings for 'Approval' prior to use or fabrication of material
5.	Source Approved: Only stamped 'SPR Inspected' material shall be used
6.	Source Approved: Request supplier to provide SPR Pipe Acceptance Report (PAR) with pipe upon delivery
7.	Source Approved: Submit mix design for 'Approval' prior to incorporation of material into project
8.	Approval Withheld: Submit samples for preliminary evaluation
9.	Approval Withheld: Submit brand name, name of manufacturer, treating plant, or WSDOT Pit number
10.	Approval Withheld: Submit catalog cuts and/or shop drawings for approval
11.	Approval Withheld: Submit bid item number
12.	Approval Withheld (see explanation below)
13.	Conditionally Approved (see explanation below)
14.	Rejected (see explanation below)

NOTE: Forms not filled in completely will not be processed. Append supplemental information (catalog cut sheets, shop drawings, etc.) as appropriate. Use multiple forms if more space needed.

Seattle Parks and Recreation Department Use Only

REVIEWED BY (DESIGNER NAME)	SIGNATURE & DATE
EXPLANATION(S) FOR ANY ITEM CODED WITH 12, 13, OR 14	
APPROVED BY	SIGNATURE & DATE
Rebecca Rufin, Park Engineer	

SUPPLEMENTAL INFORMATION FOR SUBSTITUTION REQUEST

TO:

PROJECT NAME: _____

CONTRACT NUMBER: _____

MANUFACTURER:_____

We submit for consideration the following product instead of the specified item.

SECTION	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____

PROPOSED SUBSTITUTION: _____

_____

_____

Attach and submit:

- Complete dimensional information and technical data, including laboratory tests if applicable.
- Complete information on changes to drawings and specifications which the proposed substitution will require for its proper installation.
- All necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance. Indicate differences in quality of materials and construction.

Fill in the blanks below:

1. Does the substitution affect dimensions shown on the Drawings, including details?
   Yes _____ No _____ If yes, clearly indicate changes (attach shop drawings as necessary to clearly illustrate the requested changes.)

2. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?
   Yes _____ No need _____

3. What effect does the substitution have on other trades, other contracts and contract completion date?

4. What effect does the substitution have on Code requirements?

5. Describe the differences between the proposed substitution and specified items:

6. Compare the manufacturer's guarantees of the proposed substitution and specified items.
   Same_____ Different_____ (explain)

CERTIFICATION OF EQUAL PERFORMANCE AND
ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

Signature must be by a person having authority to legally bind his firm to the above terms. Failure to provide legally-binding signature will result in approval retraction.

Submitted by (signature): _____

Name and title (printed):_____

Firm Name: _____

Address: _____

Telephone #: _____ Date: _____

CONCURRENCE BY:

_____
Consultant Date

APPROVED BY:

_____
Parks Engineer Date

PART 1 - GENERAL

1.01 PRE-BID CONFERENCE:

A. Scheduling of conference: If a pre- bid conference is to be held, the date, time, and location will be shown in the advertisement for bid and in the pre-bid information Section 00 11 13.

B. Possible Attendees: The Architect, the Consultant, the Contractor, the Subcontractors, and Suppliers. If the pre-bid conference is mandatory, a representative for all bidding contractors must be present. The Consultant shall be responsible for developing an attendee's list. If the pre-bid conference is mandatory the Consultant shall provide the Architect with an official copy which will be used in verifying and recommending contract award to eligible bidders.

C. Submittals: (None at this time).

D. Agenda: The following topics shall be reviewed by either the Architect and/or Consultant:

1. The Architect: Introduction, general scope, budget, schedule, special permits, requirements, special conditions and/or requirements.
2. The Consultant: Review of project drawings and technical specifications and any special conditions and/or requirement affecting the project.
3. Tour of the Work Site: If feasible, with additional comments from the Architect and/or the Consultant

1.02 PRE-CONSTRUCTION CONFERENCE MEETING:

A. The Architect will establish the date, time and place for the pre-construction conference. The Architect will conduct the meeting to review responsibilities, procedures, personnel assignments and to exchange preliminary submittals. The Consultant shall be responsible for taking and preparing minutes using a format to be provided by the Architect. Copies of the minutes will be distributed by the Consultant at the first progress meeting.

B. Attendees: The Architect, the Consultant, the Contractor and his/her superintendent, major subcontractors, manufacturers, suppliers and other concerned parties.

C. Submittals: The Contractor shall provide a preliminary construction schedule; traffic control plan; schedule of values; mark-up agreement form; list of subcontractors; list of material suppliers, preliminary data submittals, and submittals/shop drawings for long lead material items identified in the project manual.

D. Agenda: The following items shall be reviewed at the meeting using a format provided by the Architect.

1. Lines and methods of communication between the Architect, Consultant and Contractor.
2. Contract Compliance.
3. Coordination of Project.
   a. Architect's inspections.
   b. Construction Inspection Plan.
   c. Special inspections/testing.
   d. Working hours.
   e. Date, time and location for weekly construction meetings.
   f. Safety.
   g. Traffic control.
   h. Sound restrictions – (SMC) 25.08.
   i. Verification of schedule compliance and remaining construction days.
4. Engineer-provided control surveys.
5. Submittals to be provided by Contractor at meeting.
   a. Identification of Contractor's Personnel: Project Manager, Superintendent, other key personnel.
   b. Subcontractor Applications.
   c. Critical Path Schedule (preliminary).
   d. Schedule of values.
   e. List of required submittals/ Shop Drawings from Project Manual.
   f. Subcontractor's List.
   g. Material Suppliers.
   h. Prevailing Wage Reports.
   i. Mark-up Agreement Form
6. Procedures and sample pay request forms with prevailing wage certification.
7. Procedures and examples of Design Clarification, Field Directives, Modification Proposals (MP), and Change Orders.
8. Procedures for submitting submittals/shop drawings and requesting substitutions.
9. Responsibility of contractor to maintain record documents.
10. Emergency Telephone List.
11. Special Items:
    a. MSDS Data.
    b. Work Limits/Security and safety-first aid procedures and confined spaces procedure.
    c. Adjoining Work (if any) in progress.
    d. Permits.
    e. Staging, deliveries, and contractor/employee parking.
12. Verification of Drawings and Project Manual by Contractor.
13. Notice to Proceed date.
14. Other.

1.03 PROGRESS MEETINGS:

A. The Architect will conduct the bi-weekly progress meetings on a day, time and location determined at the pre-construction conference. The Consultant shall be

responsible for taking and preparing weekly project minutes using a format provided by the Architect. Copies of the minutes shall be distributed to attendees at least four calendar days prior to the next meeting. A copy of the minutes shall be provided to the Architect.

B. Attendees: Architect, Consultant, Contractor, Facility Operator, and other concerned parties such as contractor's superintendent, subcontractors, and material suppliers.

C. Agenda: The following items will be reviewed and discussed at each progress meeting using a format provided by the Architect:

1. Review and approve minutes of the previous meeting.
2. Review status, progress, issues related to compliance with construction schedule and identify construction days used and days remaining under the Contract and any request for time extensions. Determine if schedule needs to be updated to reflect any changes. Develop and maintain a work item schedule status report using a format provided by the Architect.
3. Review status/issues/problems of work in progress with needed action items.
4. Review new work that has started prior to the last meeting and/or will be started before the next meeting and identify any issues, concerns, or problems requiring action.
5. Establish and maintain a submittal/shop drawing log showing status for all items identified in the project manual using a format provided by the Architect. Review status of long-lead time items that may require expedited review.
6. Establish and maintain log and status of Design Clarifications, Field Directives, MP, and Change Orders using a format provided by the Architect. Review status of pending actions, degree of completion, and the need for processing change orders.
7. Review status of special testing if required and implementation of inspection schedule.
8. Review changes to record documents.
9. Review status of work in progress and pending pay requests.
10. Review other issues affecting implementation of project.

PART 2 - PRODUCTS: *Not Used*

PART 3 - EXECUTION: *Not Used*

END OF SECTION

PART 1 - CRITICAL PATH SCHEDULE AND SCHEDULE CONSTRAINTS

1.01 CRITICAL PATH SCHEDULE

A. GENERAL REQUIREMENTS: The scheduling of the Work shall be the responsibility of the Contractor. The construction of this project will be planned and tracked by use of a conventional Critical Path Method (CPM) schedule, which shall be prepared, maintained, and regularly updated by the Contractor.

The Engineer's review and acceptance of any critical path schedule shall not transfer any of the Contractor's responsibilities to the Owner or to the Engineer. Acceptance implies only that the Engineer has determined that the Critical Path Schedule submittal with any noted exceptions is within reasonable conformity to the requirements of the Contract. Acceptance of any schedule shall not relieve the Contractor of its responsibility to complete the work within the required Contract Time.

All schedules shall meet these general requirements.

The “critical path” is the series of sequentially-linked activities in a project schedule that will take the longest total amount of time to complete. Therefore, at any point in time, the critical path will be the path with the least amount of total float. The critical path does not have to follow the same logic path from start to finish and does not have to have zero total float. A critical task is a discrete work activity within a critical path. “Total Float” is the number of days that a scheduled activity can be delayed without affecting a given intermediate milestone or Physical Completion Date. A milestone is a zero-duration task marking the completion of a significant body of work or important date/event associated with the Contract.

The baseline CPM Schedule and each Critical Path Schedule update shall conform to the following guidelines:

1. Schedules shall be prepared, viewed, and printed utilizing standard Gantt-chart format.
2. Show all activities necessary to complete the Work.
3. Each task shall have a descriptor sufficiently detailed to understand the scope of work encompassed by that task. Overly broad descriptors (e.g. “grading”, “electrical”, “plumbing”, etc.) may be rejected by the Engineer, especially when in conjunction with long durations.
4. Activities shall be assigned durations consistent with the activity’s scope of work, assuming that work will be done continuously over the entire task duration. Float time shall not be represented as a part of the task duration. Excluding the Preliminary CPM Schedule, the maximum duration for any one activity shall be ten (10) Working Days unless otherwise accepted by the Engineer.
5. Sequential work activities shall be linked logically by precedent/successor activities.

6. Display the Critical Path as a red-colored sequence within the project schedule. Multiple parallel critical paths will not be allowed unless the Contractor can demonstrate that each of the parallel paths has minimal total float time.
7. Comply with all order of Work requirements included in the Contract.
8. Show durations in Working Days.
9. Show Contract milestones including the following:
    a. Notice to Proceed Date,
    b. Substantial Completion Date,
    c. Physical Completion Date,
    d. Any milestones defined in the Special Provisions of this Contract,
    e. Other milestones at the discretion of the Contractor
10. Show required submittals for significant activities. Establish discrete work activities for provision and review of submittals, ensuring durations conform to the time allowed by the Contract.
11. Identify special labor or equipment needs that may constrain or limit the Contractor's ability to perform project tasks simultaneously. These may be shown as "Resources" within the CPM schedule, or described separately in narrative format.
12. Show procurement, manufacture and delivery activities for significant material items of Work that affect the schedule.
13. Show significant Owner activities and/or delivery of Owner-supplied materials that may impact the schedule.
14. Show significant elements of the Construction Stormwater and Pollution Prevention Plans. These elements may include but are not limited to the installation and removal of erosion/sedimentation controls, and stormwater control.
15. Include project close-out items such as punch-list items, provision of O&M manuals and as-built drawings.
16. Unless otherwise specified in the Contract, the Contractor shall allow the Engineer a reasonable amount of time to perform his activities. Reasonable will be defined as "customary or normal" for the type of work involved.
17. Float available in the CPM Schedule, at any time, shall not be considered for the exclusive use of either the Contractor or the Engineer. However, any float used by the Owner that is later needed by the Contractor and results in delay to the critical path will be considered an excusable non-compensable delay.
18. If the Engineer deems that the CPM Schedule is not within reasonable conformity to these specifications, it will be returned to the Contractor for correction and re-submittal.

19. The Contractor, or its Subcontractor(s), shall not deviate from the projected start and completion times for major phase(s) of the Work shown on the accepted CPM Schedule without providing at least fourteen (14) Days advance notice to the Engineer. Failure to notify the Engineer of a deviation from projected start and completion times for a major phase of the Work shown on the schedule may impact costs to the Owner, including the cost of additional community outreach to communicate changes in schedule to the public. Resulting costs due to this "failure to notify" shall be the responsibility of the Contractor. The Owner will deduct these costs from any payment due or to become due to the Contractor.

B. SCHEDULE TYPES

1. BASELINE CPM SCHEDULE: The Contractor shall submit for Engineer's review and acceptance a baseline CPM Schedule no later than seven (7) days after receipt of the Notice to Proceed. The baseline schedule will not be accepted unless it satisfies Section 1-08.3(1)A General Requirements.

   Within seven (7) days of the Engineer receiving the submittal, the Engineer and the Contractor shall meet for joint review, correction, and adjustment of the initial baseline CPM schedule. Within seven (7) days, the baseline schedule shall be resubmitted to the Engineer showing the agreed upon adjustments. Adjusted baseline CPM schedules submitted by the Contractor will be reviewed by the Engineer and returned to the Contractor within seven (7) Days of the Engineer's receiving the submittal. If necessary, the joint review and adjusted schedule submittal process shall be repeated. However, the schedule shall be finalized within 30 Days after Notice to Proceed.

2. CPM SCHEDULE UPDATE: The Contractor shall submit monthly Critical Path Schedule updates and whenever changes occur that have potential to delay substantial or physical completion by 5 or more working days. When required, a written narrative describing the project schedule status, the critical path and any revisions to the schedule shall be included with the updates.

   At the discretion of the Engineer, progress meetings may be held monthly for the purpose of updating the critical path schedule. Progress will be reviewed to verify actual start and finish dates, remaining duration and percent complete of uncompleted activities, and any proposed revisions to the schedule. It is the Contractor's responsibility to provide the Engineer with the status of activities at this progress meeting and prepare schedule updates based on this information once it has been verified and agreed upon. If the work is in accordance with the last accepted critical path schedule, the Engineer may waive the monthly update or the final as-built CPM schedule.

   The updated critical path schedule shall contain the agreed upon revisions or be resubmitted.

   The Contractor shall submit a supplemental Critical Path Schedule update within seven (7) Days of a request by the Engineer and of Substantial Completion. The CPM Schedule updates shall conform to the following additional requirements:

a. Schedule updates shall be presented in a "Tracking Gantt" format, showing two sets of Gantt-style progress bars consisting of 1) the latest approved Baseline CPM versus 2) a combination of the actual start/finish progress of completed tasks and projected start/finish dates of uncompleted tasks.

b. Include columns showing actual or projected start and finish dates of all activities. Identify changes to activity precedents, successors, and/or constraints that have altered the critical path.

c. Highlight any new activities or additional activities resulting from the restructuring/splitting of existing baseline activity(ies).

d. Identify the current critical path, which could vary from the baseline critical path due to actual Work progress, additional work, or changed conditions.

e. Unresolved issues or disputes with asserted time effects may be reflected in a schedule update by comparing the Baseline critical path to the revised critical path shown in an updated schedule. If Work cannot be completed within the Contract Time, the updated schedule shall reflect the earliest completion date practicable, and a narrative shall be provided by the Contractor addressing the reason(s) behind the delay. Acceptance of late completion schedules will be at the discretion of the Engineer and shall not relieve the Contractor from Liquidated Damages.

C. SUBMITTALS: The Contractor shall submit an electronic version CPM schedule (in Gantt chart format, with columns displayed to show predecessors and successors of each activity), and any narrative.

The Gantt chart format is a standard method of presenting schedule information. The following standard requirements apply:

1. The schedule shall include a horizontal time scale consistent with the project calendar.

2. Each activity/task/milestone shall be listed in order of start date in a tabular grid to the left of the time scale. The tabular grid shall include the task number, description, start date, finish date, predecessors, successors, and float. Baseline schedules shall show the baseline-planned start and finish dates. Update schedules shall show the actual/projected start and finish dates.

3. Each activity shall be provided with a corresponding task bar in the horizontal time scale, with a plotted length conforming to its duration and dates.

4. Linked activities shall be indicated by logic arrows in the timescale portion of the Gantt chart, as needed to clearly show the sequence and interdependence of all activities required for complete performance of all items of Work under the Contract.

5. Activities on the critical path shall be highlighted using red task bars.

The electronic copy of the Critical Path Schedule shall be compatible with Microsoft Project or other Engineer approved software. The Contractor shall submit a functional and complete CPM schedule electronically via email, on compact disk (CD), or other medium accepted by the Engineer.

D. EARLY COMPLETION: The Engineer allocates resources to a Contract based on the Contract Time. The Engineer will review and accept a Critical Path Schedule indicating an early Physical Completion Date but cannot guarantee Owner resources will be available to meet the accelerated schedule. No additional compensation or time will be allowed if the Contractor is not able to meet its accelerated schedule due to the unavailability of Owner resources or for other reasons beyond the Engineer's control.

E. PAYMENT: Compensation for the cost necessary to complete the Work described in this section is considered incidental to and included in all Bid items of Work. No separate payment will be made for the work required in this section.

1.02 SCHEDULED WORK ITEMS:

A. None at this time.

1.03 SCHEDULE CONSTRAINTS

A. The Contractor’s CPM schedule shall reflect constraints imposed by applicable laws and regulations, and those specified in the Contract. Constraints include but are not limited to the following:

1. Submittal requirements and review durations (see Section 1-05.3)
2. Traffic Control restrictions (see Section 1-10.2(5))
3. Environmental restrictions (see Sections 1-07.5, 1-07.15 and permits)
4. Safety restrictions (see regulations and permits)
5. Holiday Construction Moratorium (see Section 1-10.2(5)C)

PART 2 - PRODUCTS: (Not Used)

PART 3 - EXECUTION: (Not Used)

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. This Section covers the requirements for compliance with health and safety precautions and controls for projects without hazardous waste operations.

1.02 RELATED SECTIONS:

A. Section 01 33 10 - Submittals

B. Section 31 00 00 - Earthwork

1.03 HEALTH AND SAFETY PLAN:

A. Within Five (5) days after receipt of Notice to Proceed, the Contractor shall submit a site specific Health and Safety Plan addressing health and safety management methods specific to the project. The Plan shall, at a minimum, include:

1. The name of the individual at the jobsite responsible for implementation and compliance with this Plan.

a. Submitted with the plan shall be a "Competent Person Evaluation" (see Section 00 84 00) if the project involves excavations covered by WAC 296-155.

b. If applicable, the Plan shall include the name and qualifications of any electrical safety observer to be provided by the Contractor.

2. Protection of the public.

3. A description of tasks to be undertaken, and equipment mobilized for this project.

4. A list of all known safety or health hazards, problems, and proposed control mechanisms.

5. Material Safety Data Sheets (MSDS) of and procedures for using, disposing of, or storing for all chemicals, products, or materials regulated by WAC 296-62 to be used by the Contractor.

6. A list of personal protective equipment, monitoring devices, and hazard-specific plans or permits as appropriate and required by State and Federal regulations.

7. A description of emergency response measures, equipment available for emergency response to address accidents and releases of materials, including, but not limited to, first aid, eye wash/showers, and fire extinguishing equipment, and location of this equipment at the jobsite.

8. Emergency phone numbers contacts, and location of the nearest medical facility.

9. A monitoring and inspection plan and record keeping measures to ensure that equipment and work practices comply with this Plan.

10. Personnel names, training and notification procedures as appropriate to ensure that all jobsite personnel are familiar with the Plan elements. Include copies of training certificates.

11. Procedures for safe storage and handling of flammable liquids, in accordance with WAC 296-24-330.

12. If applicable the Contractor shall include procedures for safe storage and handling of compressed gasses in accordance with WAC 296-24-295, Compressed Gas General Requirement.

13. Other issues which the Contractor determines are appropriate and necessary to protect worker safety and health.

1.04 ACCIDENT REPORTING:

A. Serious accidents such as those resulting in treatment of an injury at a medical facility, response to the site by emergency medical personnel or damage to property other than that of the Contractor shall be reported to the Engineer within twenty-four (24) hours of the occurrence.

B. A copy of each accident report, which the Contractor or subcontractors have submitted to their insurance carriers, shall be forwarded to the Engineer as soon as possible, but in no event later than seven (7) calendar days after the accident occurred.

1.05 HEALTH AND SAFETY REPRESENTATIVE:

A. The Contractor shall designate a Health and Safety Representative and shall ensure that each Subcontractor designates a Subcontractor's Health and Safety Representative. The Health and Safety Representative shall be capable of identifying all hazards and have the authority to stop work and take immediate action to correct the hazard.

B. The Contractor shall authorize each such Health and Safety Representative to resolve safety-related issues raised by the Owner or any of its employees, including the City Light Safety Observer.

C. The Contractor shall ensure that such Health and Safety Representative is present on the Project Site whenever the Owner Safety Observer is present on the Project Site.

D. Each Contractor's or Subcontractor's Health and Safety Representative shall identify himself or herself to the Engineer and the Owner Safety Observer at the briefing/tailgate conference.

E. The Health and Safety Representative shall verify that all work is performed in accordance with the Health and Safety Plan.

F. At the daily job briefing and/or tailgate conference, Contractor shall provide the Owner's representative in attendance at the meeting all relevant information on the Work to be performed, its location, and the equipment to be used.

G. The Contractor shall provide all safety equipment required for the Work.

H. At a minimum, Contractor and Subcontractor personnel directly involved in the Work shall have training in:

1. First aid, for each Contractor's and Subcontractor's Health and Safety Representative;

2. Confined space work, if the employees will be working in or around confined spaces;

3. Shoring and trenching, if work will be in excavations; and

4. The Contractor's procedures for confined space rescues.

I. Nothing in this Contract shall be construed as imposing any duty upon the Owner or any of its employees with regard to, or as constituting any express or implied assumption of control or responsibility over, Project Site safety, or over any other safety conditions relating to employees or agents of Contractor or any of its Subcontractors, or the public.

1.06 CITY LIGHT SAFETY OBSERVER:

A. Specified in Section 00 72 00 - General Conditions, subparagraph 1.03.B.2.

PART 2 – PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY OF WORK:

A. All workmanship and materials shall be subjected to inspection by the Architect, who may select samples of materials in such number and quantities as he/she may deem necessary to determine their conformance with the specifications and project intent.

B. All rejected materials and work shall be promptly removed by the Contractor from the premises and adjacent surroundings.

C. All rejected work or materials shall be promptly replaced to the satisfaction of the Architect.

D. The Architect reserves the right to inspect any component of the work at any time. The items of work are being reviewed for conformance with the design intent as well as workmanship and quality of materials. The Contractor shall cooperate with the Architect's inspections. When identified in Technical Specifications, notification shall be provided to the Architect 48 hours in advance of the time the inspections are needed.

PART 2 - PRODUCTS: (Not Used)

PART 3 - EXECUTION

3.01 INSPECTION AND TESTING:

A. The Contractor shall furnish samples of materials for testing, if requested by the Architect, at no additional cost. Tests by the Architect will be made in accordance with commonly recognized standards of national materials testing organizations and any such other special methods as deemed necessary.

B. Any and all materials necessary for the construction of any part of the work and associated improvements not specified shall be of the best available quality acceptable to the Architect.

3.02 SAMPLES:

A. The Contractor shall prepare and submit such samples as are required elsewhere in these specifications at such time as is necessary to allow sufficient time for retesting or modification of the work, at the Architects discretion, based on evaluation of the samples.

3.03 FINAL INSPECTION:

A. Final inspection shall take place after all requirements for Substantial Completion have been completed, including all punch list items outlined in other Sections of these specifications. Final inspection of the work by the Architect will be made no later than five (5) Working Days after receipt of Contractor's written request for final inspection.

B. Before Final Payment will be made, defects or omissions noted on the final inspection must be corrected by the Contractor without additional cost to the Owner. See Section 01 77 19 - Contract Closeout.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. This work includes furnishing, installing, operating, maintaining, and removal of temporary construction facilities.

1.02 TEMPORARY FACILITIES:

A. Meals and Lodging: The Owner will not provide meal and lodging facilities for the Contractor's personnel.

B. The Contractor shall make all necessary arrangements for temporary water service. All costs thereof shall be borne by the Contractor.

C. Electric Power: The Contractor shall make all necessary arrangements for temporary electrical service. All costs thereof shall be borne by the Contractor.

D. Toilet Facilities

1. The Contractor shall provide and maintain adequate chemical toilet facilities for all individuals connected with the work, with separate facilities for men and women.

2. The Contractor shall keep the toilet facilities in sanitary condition in accordance with the King County Health Department.

3. The Contractor shall remove the toilet facilities at completion of the contract and shall disinfect the premises.

E. Telephone Service: The Contractor shall make arrangements for temporary telephone service. All costs thereof shall be borne by the Contractor.

F. The Contractor shall maintain the construction area in a neat and orderly condition throughout the contract. Food and garbage shall be stored properly to prevent attracting animals. Remove food and garbage from the site during non-work hours. Practice controls to stop rodent infestation of temporary facilities and the job site.

G. Staging and stockpiling areas will be determined in the pre-construction conference.

H. Temporary Buildings: The Contractor may construct or provide temporary buildings, at an approved or designated location, as may be necessary for the performance of the work. At the completion of the work, the Contractor shall remove all temporary buildings.

I. Hydrant Use Permits: The Contractor shall obtain required hydrant use permits from the Water Utility having control over fire hydrants. All costs thereof shall be borne by the Contractor.

J. After completion of Work the Contractor shall remove all temporary facilities and shall restore the temporary facilities area to its original state.

1.03 MATERIAL DELIVERY AND STORAGE:

A. Delivery of materials shall be made only during the Contractor's working hours and at such times as they have a representative available.

B. The Contractor shall store materials within the work site area at an area determined in pre-construction conference or designated by the Engineer.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

PART 1 - GENERAL

1.01 Description:

A. This Section includes all Temporary Fencing Work as indicated in the Contract Documents. Work includes but is not limited to the following:

1. Temporary Security Fencing.
2. Installation, Continuous Maintenance, and final Removal of each element included in this Section.

1.02 Related Sections: In addition to the Sections listed below, all work of the Contract shall be performed in compliance with the requirements of this Section.

A. Section 01 56 39 - Temporary Tree & Plant Protection

B. Section 01 57 13 - Construction Stormwater Control

C. Section 02 41 13 - Selective Site Demolition

1.03 References:

A. City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most recent edition).

B. SMC Title 22.800, Stormwater, Grading, & Drainage Control Code, Volume 2 "Construction Stormwater Control Technical Requirements Manual" (most recent edition).

1.04 Submittals:

A. Submit the following product information for approval prior to delivery or installation;

1. Shop drawing of portable temporary fencing panels and connection hardware for approval.

PART 2 - PRODUCTS

2.01 Temporary Chain Link Fencing: Prefabricated portable galvanized chain link fence panels including fabric, posts, top and bottom rails, and driven posts with rolled fabric & wire ties for areas of uneven terrain.

A. Prefabricated portable fence panels shall be a minimum of 6 feet high by maximum 10 feet wide. Post bases shall be minimum 16 inches by 8 inches by 8 inches high

concrete pier with sleeve for post, or as approved. Prefabricated portable temporary fence panels shall be constructed to industry standards for fixed chain link fencing.

1. Posts - minimum 1-1/2" OD Schedule 40 galvanized steel pipe.
2. Fabric - minimum 11 gauge galvanized two-inch diamond mesh steel wire interwoven. Knuckled or twisted selvage is acceptable.

B. Bracing: Provide additional panels or outriggers as necessary to provide a rigid, stable run of fence.

C. Driven Post Fencing:

1. Posts - Schedule 40 galvanized steel pipe.
2. Fabric - minimum 11 gauge galvanized two-inch diamond mesh steel wire interwoven. Knuckled or twisted selvage is acceptable.
3. Wire Ties – minimum 9-gauge aluminum wire.

D. Gates shall be 20 feet wide (two prefabricated panels) with double padlocks to allow Contractor and Owner forces entry. Hinged sides of each operating panel shall include double bracketing. Owner will provide 1 lock keyed for City personnel for each entry. Contractor shall provide a lock keyed for Contractor and Subcontractor for each entry.

E. Signage: Provide warning signage every 50' of running fence line. Signage shall be a minimum of 18" square, brightly colored with contrasting lettering as follows:

WARNING
CONSTRUCTION
KEEP OUT

Or, as approved by the Engineer.

F. Barbed wire will not be allowed.

2.02 Temporary PVC Fencing:

A. 4' wide rolls Orange PVC Web Fencing for low security and approved tree protection applications.

B. 6' lengths of #5 deformed steel reinforcing bar.

C. Safety caps for #5 steel reinforcing bar.

PART 3 - EXECUTION

3.01 Authorization to Commence:

A. The Engineer will issue a formal Notice to Proceed authorizing commencement of the work. No work shall begin until the date specified on this notice.

B. Obtain required permits and permission from local governing authorities and Engineer prior to commencing work.

3.02 Temporary Security Fence: Secure the project site from trespass or unintentional entrance by unauthorized personnel.

A. Temporary chain link fence panels shall be connected mechanically by means of pre-fabricated, bolted bracket manufactured specifically for the purpose. Fencing shall not be wired together. Where long straight runs result in an unstable condition, sufficient out-rigging shall be incorporated to maintain fencing upright. Use only pre-manufactured outriggers or additional fence panels. Out-riggers shall be placed on the interior side of the fence unless approved by the Engineer. Alternatively, and where appropriate, a "zig-zag" arrangement of panels for stability may be used.

B. Uneven Terrain: Where uneven terrain will not allow the use of pre-manufactured portable fence panels, or where otherwise directed by the Engineer, drive posts directly into the earth plumb and 8' on center along the approved alignment. It is the Contractors responsibility to perform a complete locates for underground utilities in any area to receive driven posts. Drive posts to sufficient depth to assure stability and durability for the life of the installation, maintain a minimum of 6' above grade. Reset loose posts at the direction of the Engineer. Secure chain link fabric to posts using approved wire ties within 6" of the top and bottom of each post, and a minimum of 18" on center between. Provide posts at each end of each driven post installation at a point that is sufficiently level to clamp prefabricated portable fence panels directly to the driven post installation.

C. Where approved for short-term, low security applications, use 4' high orange PVC web fencing wired to #5 reinforcing bar "posts" set 5' on center or as appropriate. Cap each bar with a safety cap manufactured specifically for #5 reinforcing steel.

3.03 Removal: All materials and debris associated with the work of this Section shall be removed at the appropriate time as follows;

A. Following establishment of the work as Substantially Complete and removal by the Contractor of all temporary fencing.

B. All removal shall include complete site restoration as directed by the Engineer.

END OF SECTION

PART 1 - GENERAL

1.01 Summary: This section includes the administrative and procedural requirements for the protection of trees, shrubs, and plant material not designated for removal. Such trees, shrubs, and plant materials shall be left in place and protected from damage or injury by the Contractor during construction, using full and adequate methods of protection as described herein or as directed by the Owner's Representative.

PART 2 - PRODUCTS

2.01 Rigid Tree Protection Fencing:

A. Rigid tree protection fencing shall be comprised of the following:

1. Chain link fencing materials including posts, rails, braces and mesh, 6' in height.
2. Posts and rails shall be a minimum of 1-1/2" OD steel pipe.
3. Mesh shall be 2"x 2" x 11ga. minimum woven chain link fabric.
4. Post bases shall be minimum 16"x 8" x 8" high concrete piers with sleeves for posts, or approved equal.

PART 3 - EXECUTION

3.01 Protection within the Drip-Line:

A. Where existing trees are within the area of work, or where existing trees outside the area of work have drip-lines extending into the area of work, the Contractor shall employ all methods to minimize adverse impact to these existing trees including limbs and roots. The Contractor shall notify the Owner's Representative of any construction work within the drip-line of trees at least one (1) Working Day before the scheduled activity. These methods may include but not be limited to:

1. Temporary chain link construction fencing.
2. Temporary tie-up of low limbs.
3. Application of an 8- to 12-inch thick layer of arborist's mulch (or wood chips salvaged from clearing and grubbing operations) within the drip-line of trees.
4. Timber or steel planking for protection of surface roots from Equipment.
5. Tree root pruning or other tree root treatment as directed by the Owner's Representative.

B. No storage of equipment or materials shall be allowed within the drip-line of trees not designated for removal. Only as approved by Owner's Representative, Steel planking, or timber planking made of 4-inch thick material, each plank covering a minimum of 8 square feet, shall be used to support backhoe and other Equipment stabilizers when set within the drip-line of a tree or sodded planting strip.

C. Where sidewalk, curb, and pavement removal and placement operations occur that impact tree roots 2-inches or greater in diameter, the Owner's Representative will determine how these tree roots are to be handled.

3.02 Above-grade Work:

A. Tree removal or tree trimming within 10 feet of any overhead utility lines require the Contractor shall make the notifications specified in City of SeaTac Standard Specifications (most recent edition).

B. When the Contractor anticipates construction operations that will unavoidably affect tree limbs, the Contractor shall notify the Owner's Representative at least five (5) Working Days in advance of commencing such operations.

1. Before trimming any trees, the Contractor shall notify the Owner's Representative of the proposed method and the amount of trimming anticipated.
2. Trimming shall be done by a professional tree service company whose past and current performance is in accordance with National Arborist Association tree-pruning standards.

3.03 Trenching and Tunneling within the Drip-Line:

A. Trenching and tunneling within the drip-line of existing trees not designated for removal shall be in accordance with the City of SeaTac Standard Plans & Specifications (most recent edition), and defined zone clearance requirements.

C. Excavation or tunneling of any kind within the "critical root zone," as defined by the Standard Plans, will not be allowed unless the Contractor requests permission to do so at least two (2) Working Days in advance and receives approval of the Owner's Representative.

B. Treatment of Roots: Excavation around roots 2-inches in diameter and greater requires handwork.

1. Individual tree roots 2-inches or greater in diameter shall not be cut, but rather protected when within the drip-line of the tree.
2. Tree roots smaller than 2-inches in diameter shall be cleanly cut flush with a saw along the edge of the trench or tunnel.
3. Ripping or tearing of tree roots will not be allowed.

3.04 Repair, Replacement and Payment for Damage:

A. Trees or other plant material not ordered or designated to be removed but that are destroyed or irreparably damaged by Contractor operations as determined by the Owner's Representative, shall be repaired or replaced by the Contractor in accordance with the Owner's Representative's recommendations (at least 2 replacement trees for every 1 tree removed).

1. Replacements shall be of the same species and as nearly as possible of the same size as the trees to be replaced (minimum of 2" caliper).
2. The Contractor shall allow one (1) Working Day advance notice for inspection of nursery stock replacements by the Owner's Representative.

B. Payment: In addition to the Contractor's restoration approved by the Owner's Representative, the Contractor will be assessed damages for the difference in the dollar value of the damaged tree, shrub, or other plant material, and the dollar value of the replacement.

1. The dollar value will be determined by the Owner's Representative from the "Guide for Establishing Values of Trees and Other Plants," prepared by the Council of Tree and Landscape Appraisers, current edition. Damages assessed will be deducted from moneys due or that may become due to the Contractor.

C. Planting of replacement stock shall be done in accordance with the requirements of the Contract Documents during the first fall or spring planting period, whichever comes first.

END OF
SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. This Section describes work consisting of the furnishing, installing, maintaining, removing, and disposing of Construction Stormwater Controls (CSC, referred to the TESC in the General Conditions).

B. The CSC shall be designed and implemented to prevent erosion and scour, to treat sediment laden water for acceptable discharge, and to prevent the conveyance of sediment into surface waters, drainage systems, and environmentally critical areas.

1.02 GENERAL:

A. During construction, the Contractor shall incorporate practices that prevent erosion, or control erosion when prevention is unavoidable, and shall make every effort to maintain effective erosion and sediment controls throughout the Work including implementing timely corrective actions as may be necessary. Sediment shall be prevented from entering any surface water, drainage facility, and natural drainage system, and shall be prevented from transport to beyond the Project Site. Work shall comply with codes addressing grading, stormwater control, ground water control, and other construction controls.

B. The Contractor shall submit to the Engineer for review a Construction Stormwater Control Plan prepared in accordance with the above regulations and as specified in this Section. The CSC Plan shall name and confirm qualifications for the Contractor's Certified On-Site Construction Erosion Control Lead. The plan shall be compatible with and shall be coordinated with the Work and Work phasing ensuring a continuance of protection.

1.03 SUBMITTALS:

A. Construction Stormwater Control (CSC):

1. At the preconstruction conference, the Contractor shall be prepared to discuss temporary erosion and sedimentation controls. Following the outcome of these discussions, the Certified On-Site Construction Erosion Control Lead (ECL) shall prepare and submit a CSC Plan as indicated in the subparagraph 3 table following, or unless agreed to otherwise at the preconstruction conference.

2. In the subparagraph 3 Table, NTPD = Notice to Proceed Date.

3 Content of CSC Plan:

a. The CSC Plan shall show, as it relates to the Contractor's critical path schedule, the scheduling of installation, maintenance, phasing, and removal of erosion and sedimentation controls as it relates to the Work. Work areas to be addressed in this plan include as applicable:

1) The Project Site identifying staging, storage, stockpiling, non-Work boundaries, and other construction related areas;

2) Areas beyond the Project Site;

3) Transportation facilities including construction traffic routes and access/exit control areas on and off the Project Site;

4) Inlets, catch basins, ditches and channels whether dry or water filled, and other surface drainage facilities;

5) Identify areas of erodible soil not being worked that may be exposed that may exceed 4,000 square feet, or may be unprotected or uncovered for more than 2 calendar days.

b. The CSC Plan submittal shall include, but not be limited to, one or more of the following as the Contract may require, as the Work may require, and as the Work is scheduled:

1) Describe with Shop Drawings of sufficient scale and detail showing the Project Site, and the locations and types of temporary erosion and sediment controls;

2) Describe how non-work areas will be identified and protected;

3) Describe the details and continuing maintenance of entrance and exit equipment wash areas;

4) Describe treatment processes for, controls of, and the disposal of waters resulting from dewatering, surfacing groundwater, and rainfall;

5) Describe protections and covering practices for stockpile, muck, and related deposits;

6) Describe the controls to prevent sediment, debris, and other pollutants from entering surface waters and drainage features;

7) A schedule of typical inspections ensuring timely maintenance and repair;

8) Identify and provide timelines for submitting permit required or related documentation;

9) Provide details of seed mix, amendment, mulch, and protections for placing and establishing temporary seeded erosion control areas;

10) In areas where exposed erodible soil exceeds 4000 square feet or that may be unprotected for more than 2 calendar days, describe the controls and the proposed monitoring ensuring erosion and sedimentation shall not become non-compliant; and

11) Provide details of other CSC measures indicated in this Section as may be used in the Work.

c. The Contractor shall have at a designated location at the Project Site, and the ECL shall have immediately available, copies of the current CSC Plan.

5. Maintaining CSC Plan Current:

a. During the course of the Work, the Contractor and Certified On-Site ECL shall be prepared to discuss with the Engineer the status of CSC controls in-progress and to come as they relate to the Work, to the progress schedule, to permits, to Change Order, and as may be required in the Contract.

b. When revisions to the current CSC Plan are required by the Engineer, the Contractor and ECL shall be prepared to update the CSC Plan as discussed and shall submit the updated CSC Plan to the Engineer within 5 Working Days unless the Engineer agrees to other arrangements.

PART 2 - PRODUCTS

2.01 RIPRAP AND QUARRY SPALLS:

A. General:

1. The stone for riprap and quarry spalls shall be hard, sound and durable. It shall be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather.

2. Loose riprap shall be free of rock fines, soil, or other extraneous material.

3. Should the riprap contain insufficient 4" to 8" spalls, as defined in Paragraph 2.01.F, the Contractor shall furnish and place supplementary spall material from a source approved by the Engineer, at the Contractor's sole expense.

4. The grading of the riprap will be determined by the Engineer by visual inspection of the load before it is dumped into place, or, if so ordered by the Engineer, by dumping individual loads on a flat surface and sorting and measuring the individual rocks contained in the load.

B. Quarry Spalls:

1. The spall shall be hard, sound, and durable. It shall be free from fracture, seams, cracks, and other discontinuities tending to adversely impact its resistance to weathering.

2. The quarry spall shall meet the following test requirements:

Specific Gravity	ASTM C 127	Minimum 2.65
Soundness	AASHTO T 104 (section 5.2.2)	Not greater than 5 % loss
Accelerated Expansion	CRD-C-148	Not greater than 15% breakdown
Absorption	ASTM C 127	Not greater than 2%
L. A. Abrasion	ASTM C 131	Maximum 20% loss @ 500 revolutions

3. Quarry spalls shall meet the following gradation requirements:

a. 2 Inch to 4 Inch Quarry Spalls

Sieve Size	Percent Passing
4 inch	100
2 inch	40 max.
1-1/4 inch	5 max.

b. 4 Inch to 8 Inch Quarry Spalls

Sieve Size	Percent Passing
8 inch	100
4 inch	40 max.
2 inch	5 max.

2.02 EROSION CONTROL MATERIALS:

A. Mulches and Amendments:

1. Straw Mulch:

a. All straw mulch Material shall be in an air-dried condition free of noxious weeds and other materials detrimental to plant life. Straw shall be seasoned before baling or loading and shall be suitable for spreading with mulch blower Equipment.

2. Arborist's Wood Chip Mulch:

a.. Wood chips salvaged from clearing and grubbing activity may be approved as a substitute for bark mulch, if found acceptable by the Engineer prior to application.

3 Compost Amendments:

a. Composted Organic Material (Compost), shall be comprised entirely of recycled organic Materials that have been sorted, ground, aerated and aged for a minimum of one year and of which 100% passes a 7/16 inch sieve. The mulch shall have a pH between 5.5 and 7.0 and shall have a carbon to nitrogen (C:N) ratio between 20:1 and 40:1 with a maximum electrical conductivity of 3 ohms/cm. The product shall be tested by a Contractor provided accredited laboratory acceptable to the Engineer. The Contractor shall submit at least 2 Working Days in advance, a Manufacturer's Certificate of Compliance stating all test requirements meet the specified requirements. The product shall be certified free of all plant parasitic organisms, viable weed seeds, heavy metals or parasitic residues.

b. Decomposed organic mulch quantities for Projects requiring more than 35 cubic yards shall be tested before incorporation per Seattle Standard Specifications Section 8-02.3(4) with testing procedure and correction of deficiencies as described in sub-item C. of either Seattle Standard

Specifications Sections 9-14.1(4)A or 9-14.1(4)B as applicable to the plants needs.

c. Decomposed organic mulch for Projects requiring 35 cubic yards or less (of the mulch) shall be delivered to the Project Site with a soil fertility and micronutrient analysis from an approved independent laboratory. Amendments shall be incorporated at the Project Site to provide optimum conditions for plant establishment and early growth. The planting area preparation, if applicable to this project, shall conform to the requirements of Seattle Standard Specifications Section 8-02.3 (4).

4. Other Composted Materials:

a. Composted material shall be derived from a Type 1 feedstock and produced by a facility in compliance with WAC 173-350-220. The compost shall meet Grade AA Compost as defined by the Washington State Department of Ecology's Interim Guidelines for Compost Quality (Publication #94-38, Revised November 1994). Compost material shall have 100 % passing a ½-inch screen. The carbon to nitrogen ratio (C:N) of the compost shall be in the range of 20:1 to 35:1. Organic matter of the composted Material shall be in the range 4% and 10%, and the moisture content shall be in the range of 35% to 50% as determined by ASTM D 2974. The pH of the compost shall be within the range of 5.5 to 7.0 as determined by ASTM D 2976. The maximum electrical conductivity of composted Material shall be 6 ohms/cm. Decomposed Organic Compost shall be mature as determined by US Composting Council stability test ratings referred to in the Ch 173-350 WAC.

b. The product shall be tested within 6 months of proposed use, and the test results shall ensure compliance with subparagraph 2.02.D.9 requirements. The Contractor shall submit a Manufacturer's certificate of Compliance indicating the test results, a one-gallon sample, the Supplier's name and contact information, to the Engineer a minimum of 5 Working Days in advance of use.

c. The compost shall have a Solvita Compost Maturity Test performed at the Project Site, and shall score a number 6 or above to be accepted.

B. Matting and Stakes:

1. Jute Matting:

a. Jute Matting For Non-Stream Applications:

1) Jute matting shall be of a uniform open plain weave of unbleached, single jute yarn treated with a fire retardant chemical. The yarn shall be of a loosely twisted construction and shall not vary in thickness by more than 1/2 of its nominal diameter. Jute matting shall be furnished in rolled strips approximately 50 yards in length. Matting width shall be 48 inches with an average weight of 0.92 pound per square yard. A tolerance of ±1 inch in roll width and ±5 percent in weight per square yard will be allowed.

PART 3 - EXECUTION

3.01 GENERAL CONSTRUCTION REQUIREMENTS:

A. Guiding Regulations, Codes, and Rules:

1. In general, Work involving erosion and sedimentation control within The City of Seattle limits shall comply with Article 1.02 of this Section 01 57 13.

2. Work involving erosion and sedimentation control within Seattle's Rights-of-Way not within The City of Seattle limits shall also comply with the requirements of the local jurisdiction.

B. General Guidelines and Measures for Doing the Work:

1. In general, in doing the Work, the Contractor shall address measures that:

a. Prevent and control erosion and sedimentation processes,

b. Prevent and control scour and scour processes in water bearing channels,

c. Prevent transport of sediment,

d. Protect surface waters and drainage systems from entry of sediment and other construction byproduct,

e. Prevent erosion and sedimentation impacts to areas not designated for Work and

f. Coordinate erosion and sedimentation controls with scheduling of the Work.

2. Such measures may include, but not be limited to, one or more of the following:

a. Installing temporary ditches, berms, culverts, and other measures to control and redirect surface waters;

b. Installing temporary dams, settling basins, energy dissipaters, and other measures to detain water, prevent scour, and allow for sediment drop and controlled removal;

c. Installing measures controlling surfacing groundwater and dewatering discharges;

d. Installing temporary covers or otherwise protecting slopes, stockpiles, and exposed or disturbed soils from erosion and sediment producing processes;

e. Installing temporary work area perimeter and sediment transport prevention measures, such as silt fence, wattle, filter, and berm;

f. Treating sediment laden waters, and removing and disposing of sediment,

g. Installing sediment and debris removal controls for equipment entering and leaving designated Work areas, and

h. Installing temporary fencing, flagging, and other markings at boundaries of areas identified as not part of the Work.

3.02 EROSION CONTROL MULCHING:

A. General:

1. When the CSC Plan indicates a separate mulch application for an area in addition to seeding, this mulching shall immediately follow the seeding.

2. Areas not accessible by mulching Equipment shall be mulched by approved hand methods.

B. Straw Mulch:

1. Straw mulch erosion control application shall be with a forced air mulch spreader. In spreading straw mulch, the spreader shall not cut or break the straw stalks into lengths less than 2 inches. Straw mulch coverage shall have a minimum thickness of 2 inches. Where a forced air Equipment mulch application is indicated as providing unacceptable results, the Contractor shall employ manual or other application methods such as hand spreading and raking.

2. Should the straw mulch coverage expose at any time bare ground of more than 50% in any 100 square foot area, then the Contractor shall promptly remulch the exposed area to full coverage of the thickness required.

C. Wood Chip Mulch:

1. Wood chip mulch erosion control application shall be with a forced air mulch spreader and provide a 2 inch minimum thickness coverage. Where a forced air Equipment mulch application is indicated as providing unacceptable results, the Contractor shall employ manual or other application methods such as hand spreading and raking.

2. Should the wood chip mulch coverage expose at any time bare ground of more than 50% in any 100 square foot area, then the Contractor shall promptly remulch the exposed area to full coverage of the thickness required.

D. Compost:

1. Compost erosion control application shall be with a forced air mulch spreader. Coverage applications shall have a minimum thickness of one and one half inches (1-1/2 inches). Where a forced air mulch spreader application is indicated as providing unacceptable results, the Contractor shall employ manual or other methods such as hand spreading and raking.

2. Should the Compost coverage expose bare ground of more than 50% in any 100 square foot area, and then the Contractor shall promptly remulch the exposed area to full coverage of the thickness required.

3.03 EROSION CONTROL MATTING:

A. General:

1. Erosion control matting may consist of one or more applications of coir, jute, or excelsior matting.

2. Erosion control matting shall be installed and secured in accordance with the manufacturer’s recommendations.

3. Unless the matting manufacturer recommends otherwise, seeding, with or without amendment or mulch, shall be applied before the placement of matting.

4. Staking shall be driven flush with grade and shall penetrate the earth by a minimum 12 inches.

5. The Contractor shall timely maintain the integrity of the matting by repairing or replacing as necessary all improperly anchored, torn, uplifted, and missing matting. Torn or missing matting shall be covered with additional matting overlapping the tear or the exposed area with a minimum 24-inch overlap of all surrounding matting. This patch shall be staked at each corner 3 inches from the edge of patch and along all edges with a spacing not exceeding 12 inches. Uplifted and improperly anchored matting shall be repaired by replacing failed anchors, or by increasing the density of anchors as applicable.

6. Temporary matting and stakes shall be completely removed at the time of permanent restoration.

B. Non-Ditch and Non-Channel Matting Installation:

1. In general, the matting shall be placed flush with the soil surface with the first matting installed at the lowest elevation. Additional upper elevation matting shall be installed over lower elevation matting with a minimum 6 inch overlap. Matting shall be installed with the long axis of matting parallel to the contour. Overlap of matting ends installed along a contour shall be with the "upstream" matting being installed over the "downstream" matting with a minimum 6 inch overlap with the "upstream" direction indicated by the grade in the swale at the base of the slope.

2. Unless the matting manufacturer recommends otherwise, the higher elevation edge of matting shall be buried in an anchor trench 6-inches-deep by 12-inches wide with soil firmly tamped against the matting. Upper elevation matting shall be installed over lower elevation matting with an overlap the full width of anchor trench. Before backfilling the anchor trench, staking shall penetrate the matting in the center of the anchor trench. Spacing of staking within the trench shall not exceed three (3) feet except that at each end of the matting strip, a stake shall be placed through the mat fabric six (6) inches from edges at the corner including if overlapped by another mat. Backfill in the trench shall be tamped firm.

3. When placing matting within the drip line area of tree, anchor trench shall not be constructed. Rather, the upper elevation edge of the upmost matting shall be staked approximately 3 inches from the edge. Spacing of the stakes shall not exceed three (3) feet, except at ends where the stake shall be installed through the mat fabric 6 inches from all edges including when overlapped. Upper elevation fabric installed over lower elevation fabric shall have a minimum 12 inch overlap with staking placed in the overlapping area 3 inches from the upper edge of fabric.

4. For all width matting fabrics, spacing of stakes within a row shall not be less than three feet and spacing between rows of stakes shall not be less than three (3) feet. Each long edge of the matting fabric, whether overlapped or not, shall be staked three (3) inches from the long edge with stake spacing not exceeding three (3) feet. The fabric ends, the short edge, shall be staked three (3) inches from the end whether overlapped or not, with a minimum 3 stakes along the short edge.

C. Ditch and Channel Matting Installation:

1. Matting installed in ditches and channels shall have the long axis of the matting parallel to the direction of water flow. The first matting installation shall be at the invert of the ditch or channel. Additional matting installation shall be installed overlapping the upper edge of previously placed fabric by at least 12 inches. In the direction of flow, upstream matting shall overlap downstream matting by 12 inches. Matting shall be held in place with ballast by other means capable of withstanding peak flows.

3.04 PLASTIC COVERING:

A. Stockpiles, areas with no vegetative growth, areas where vegetative growth is to inhibited, and areas with disturbed soil may be covered with black plastic covering. Sandbag or similar ballast shall be placed on the cover in a grid with no less than 5 foot spacing in two right angle directions. At all ends without overlap, ballast shall be placed within 12 inches of the edge and spaced no more than 5 feet along the perimeter.

B. Clear plastic covering shall cover areas where the growth of vegetation is not to be inhibited.

C. With the exception of stockpiles, plastic covering sheets shall be installed with the long axis parallel with slope contours. The upper edge of the fabric shall be placed into a 12-inch wide by 6-inch deep anchor trench and backfilled with native soils tamped into place. Upper slope fabric shall overlap down slope fabric in the anchor trench a minimum of 12 inches. Along the same contour, the ends of new fabric shall overlap in-place fabric a minimum of 24 inches.

D. In general, ballast shall be placed on the cover using sandbags or similar ballast distributed over the cover in a manner to prevent uplift, slippage, and any other movement of the cover. Spacing of ballast shall be not more than a 10-foot grid in line with and against the long axis of the sheet. All overlaps, edges, and corners shall be ballasted.

E. On steep slopes and where slippage of ballast or ballasted fabric is indicated, the ballast shall be secured in-place by rope tied to upslope anchors firmly set in the earth.

F. Within the drip line of trees, excavation of anchor trenches will not be allowed. Rather, ballast shall be placed on the fabric and on the overlaps secured by rope tied to anchor stakes upslope of the drip line area.

G. Rips and tears shall be timely repaired by placing additional covering over the defect with a minimum 24 inch overlap in all directions from the defect. The repair shall be ballasted with spacing in any direction of no more than 5 feet and along all edges and at all corners. Ballast shall be anchored to upslope stakes.

H. Uplifted areas shall receive additional ballast resulting in reduced ballast spacing.

I. Areas where covering has slipped and the underlying surface becomes exposed shall be timely repaired in the same manner as rips and tears.

J. Clear plastic covering intended to cover a vegetated surface without long term inhibiting effects shall require frequent monitoring ensuring permanent damage is not occurring. Should vegetative degradation be indicated, the Contractor shall amend the cover practice to a condition not detrimental to the vegetation.

3.05 STRUCTURAL AND BIOMECHANICAL EROSION CONTROLS:

A. Road Stabilization:

1. Temporary road stabilization measures may be required in areas within and beyond the Project Site, such as access roads, haul roads, subdivision roads, parking areas, staging areas, and other vehicular and Equipment traffic routes. The stabilization required shall be adequate for the Equipment and vehicular traffic and for the Project Site local conditions, local climate, and weather typical for the Contract Time.

2. Temporary road stabilization measures may consist of placing and compacting a thickness of quarry spall, a thickness of Mineral Aggregate Type 2 or Type 13 (See Seattle Standard Specifications Section 9-03.16, if applicable), other aggregate, or a combination of these and other Material.

3. Where temporary road construction cannot be aligned to avoid areas within the dripline of trees not identified for removal, the Contractor shall comply with the requirements of Article 1.05 of Section 01 76 00 - Protecting Existing Facilities.

4. Temporary road stabilization measures shall be maintained by repairing ruts, tracks, settling, and other failing areas. Such repairs may include placing and compacting additional aggregate. Settled, broken, rutted, and otherwise damaged timber, mulch, and other material within the drip lines of trees shall be repaired by increasing the thickness of material.

5. Upon completion of the Work, or as may be required to accommodate the Work, temporary road stabilization measures shall be removed and disposed of. Within the dripline of tree, the removal shall be conducted to prevent damage to feeder and surface roots and minimize compaction of soils.

3.06 TEMPORARY SEDIMENT CONTROLS:

A. Silt Fence (Sediment Fence or Filter Fence):

1. Silt fences shall act as a filter to both allow the passage of water through the fence and also to prevent the passage of sediment through, under, or over the fence. Silt fences shall be either in-place before the area is disturbed, or shall be coordinated with beginning soil disturbance activity.

2. Silt fence(s) shall be constructed at locations downstream or down slope of surface runoff areas and upstream or upslope of surface bodies of waters. Silt fences shall be spaced to account for grade of slope, runoff flow rate and velocity, sheeting and rilling, type and relative density of soil(s), rate of sediment loading, expected maintenance type and frequency, and other factors as the site and Work require. Silt fences shall not be placed across or in streams, channels and ditches.

3. Silt fences shall be located along contours with the ends turned uphill to capture runoff and prevent flow around the end of the fence. Where the installation requires crossing of contours in areas other than at the ends, gravel check dams shall be placed perpendicular to the uphill face of the fence to minimize concentrated flow and erosion along the fence. The gravel check dams shall be approximately 1 foot deep at the fence and shall continue perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface. The gravel check dams

shall consist of crushed surfacing base course gravel backfill for walls, or shoulder ballast. The gravel check dams shall be spaced at intervals not exceeding 10 feet along the fence where the fence crosses contours. The slope of the fence line where contours are crossed shall not be steeper than 3H: 1V.

4. The height of the fence fabric, the geo-textile, above ground surface shall be 30 inches minimum and 36 inches maximum.

5. Posts shall be of a length to be installed to a depth and with a spacing to withstand maximum loading for the durations estimated between sediment removals. Unless the Contractor can justify otherwise to the Engineer, posts shall be installed to a minimum 30 inch depth, except as specified below within the drip line of tree, and shall be spaced within a fence line of not greater than six (6) feet. Where required post depth penetration cannot be obtained, the posts shall be adequately secured on the upslope side by bracing or guying to an adequately installed anchor to prevent overturning. Posts shall be either wood or steel. Wood posts shall have minimum dimensions of 1-1/4 inches by 1-1/4 inches and shall be white oak or other hardwood resistant to rot, and with no defects. Steel posts shall consist of U, T, L, or C shape posts with a minimum weight of 1.33 pounds per foot, or other steel posts having equivalent or greater strength and bending resistance than those listed in this paragraph.

6. The fence fabric and support backing systems shall be attached on the up-slope side of the posts with staples, wire, hog rings, or other connection device as recommended by the manufacturer, in a manner that does not tear or damage the fabric. At the bottom of the fence, the fabric and support backing system shall be buried at least 6 inches below the ground surface, and then backfilled with native soils compacted by tamping or other appropriate compaction methods.

7. Excavation for installation of silt fence within the drip line of trees, and around other vegetation to be retained, shall be without damage to roots. Roots that are exposed shall not be damaged and shall be promptly covered with earth. Where the bottom of fabric and support backing cannot be installed to a 6 inch depth due to interference with roots, the fabric and backing shall be placed flat on the upside of fence for a minimum 12 inch width and then covered with a minimum 6 inch depth of large size aggregate ballast. In non-trench fabric bottom installations, post penetrations into the earth shall be increased and the height of fence above the top of ballast shall not exceed three (3) feet.

8. Fence support backing system, in the form of wire or plastic mesh with maximum mesh spacing of 2 inches by 4 inches and of adequate strength to withstand maximum loading, shall be attached to posts and fabric as recommended by the Supplier. Plastic mesh shall have the same or greater ultraviolet (UV) resistance as the geo-textile fabric. All geo-textile fabric shall have backing whether exposed or buried.

9. Fence fabric shall be continuous along any single length of filter fence. Continuous fence is defined as follows:

    a. The geo-textile fabric may be sewn together at the point of manufacture or by the Supplier to form a single length of geo-textile for a continuous fence application. All sewn seams shall be located at a support post.

b. Separate geo-textile fabric may installed across posts with a minimum 10 foot overlap where the overlap is supported by no less than three (3) posts with spacing between any posts not greater than 4 feet. Overlapped fabric shall always be secured to support backing.

c. The Contractor may place 2 posts, one on each side of the overlapped fabric and backing, and twist the overlapped fabric at least 2 complete revolutions before driving the posts into the earth. The overlaps shall extend a minimum one (1) foot beyond the 2 posts before twisting.

10. Lapped or twisted fabric and backing that slip shall be considered defective and shall be replaced with sewn geo-textile. For pre-staked silt fence, laps may be performed in accordance with the manufacturer's written recommendations.

B. Sediment Removal:

1. Sediment shall be removed and disposed of when the sediment build-up reaches a height of 10 inches to 12 inches, and in no case shall exceed one third (1/3) the height of fence.

C. Damaged Fence Repair:

1. Damaged or improperly functioning silt fence shall be promptly repaired or replaced.

2. Rips, tears, holes, and other defects in the geo-textile fabric or the backing or both shall be promptly repaired by placing new material(s) over the damaged materials the full width and height of fence including buried or covered fabric and backing, and shall overlap existing fence material(s) a minimum 5 feet each side of the defect. The repaired fence shall be supported by and securely tied to 5 evenly spaced posts.

3. Broken posts shall be replaced with 2 posts spaced 1 foot on each side of the broken post driven to 30 inches into the soil, or braced to upslope anchors. The fabric and backing shall be securely tied to each new post.

4. Posts that lean greater than 1H: 4V shall be replumbed and shall be supported at the top with bracing or guying to an adequately installed upslope anchor.

5. Water or sediment escaping beneath the silt fence shall be repaired by installing new fabric and backing over the existing material extending 3 feet upslope with a minimum 3 foot overlap on both sides. Ballast shall be placed over the on- surface repair with a minimum 6 inch depth large aggregate ballast. A new post or posts shall be installed along the leak with spacing not exceeding 2 feet.

6. Any other conditions that reduce the effectiveness of the silt fence shall require immediate repair and/or replacement.

3.07 DRAINAGE AND SEWER SYSTEM PROTECTION:

A. The Contractor shall take measures to prevent the introduction of pollutants, contaminants, sediment, and other material from entering Storm Drain, combined Sewer, and other drainage system via any entrance vehicle. Sediment prevention for drainage Structures may require one or more of a sediment sump, a cover filter, or an outlet pipe cover filter.

B. Filters shall allow the passage of water into or from the drainage Structure without unreasonable backup or ponding, and shall prevent the passage of sediment and other debris.

C. Filters shall be secured to the opening being protected to withstand all loadings and to resist movement including sediment and debris build-up, flows typical for the drainage Structure and the local drainage conditions, and the potential for disturbance from construction and traffic activity.

D. Filters covering large areas not having adequate structural support shall be reinforced with and secured to a plastic or wire mesh support backing system.

E. Where filters are expected to be in place for a considerable period of exposure, UV resistance and other climate and environmental strengths shall be adequate.

F. Frequency of maintenance shall include removal of sediment and other debris when either the sump build-up reaches approximately 1/3 capacity, or when obstructed filtration or the allowance for the passage of water is causing water back up.

G. Sediment and debris removal shall require additional care to prevent the escape of these materials into the drainage system.

3.08 CONSTRUCTION STORMWATER CONTROL MAINTENANCE:

A. The Contractor shall keep a record of the CSC-BMP measures using the forms attached to the end of this section during the entire duration of the Work. Construction Stormwater Control measures shall also be inspected at regular intervals and immediately following significant runoff producing rainfall events. The individual functions and the whole shall be verified performing acceptably and shall be maintained until they are no longer needed, or are to be converted as part of a permanent erosion and sediment control when specified in the Contract. The various devices shall be inspected for damage, bypass, undercutting, and non- performance, and shall be promptly repaired. Sediment buildup shall be removed as specified or more frequent intervals when performance becomes questionable. Debris and contaminated sediment shall be properly disposed of. Clean sediments may be stabilized on-site as the CSC plan indicates.

3.09 REMOVAL AND REUSE OF CONSTRUCTION STORMWATER CONTROLS:

A. When a temporary erosion or sediment control feature is no longer required, the Contractor shall remove the measure or measures.

B. Reuse of a control measure may be acceptable if:

1. The measure or device has been thoroughly cleaned of all debris;
2. The measure or device is free of tears, holes, or other damage; and
3. The measure is verified it can perform as intended.

3.13 SWEEPING AND WASHING:

A. The Contractor shall ensure that soil, debris, or other material tracked and deposited are removed by sweeping or by washing and properly disposed of. In particular, when wet weather is forecast, the Certified On-Site ECL shall verify that all measures are in-place and are functioning effectively and acceptably.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. This section covers the requirements for compliance with environmental precautions and controls.

1.02 RELATED SECTIONS:

A. Section 01 32 13 - Progress Schedules

B. Section 01 33 10 - Submittals

C. Section 01 57 13 - Construction Stormwater Control

1.03 SUBMITTALS:

A. Within 10 days of Notice to Proceed, the Contractor shall submit an Environmental Pollution Control Plan. The Plan shall include:

1. Water quality

2. Air quality, including dust control

3. Noise pollution

4. Temporary water pollution/erosion control

5. 'Oil, Fuel, and Chemical Storage, Handling, Spill Prevention, and Control'.

1.04 NOTIFICATIONS RELATIVE TO CONTRACTOR'S ACTIVITIES:

A. The Contractor shall plan and schedule Contractor work activities to conform to and allow time for notifications, approvals, reviews, and other conditions of the Contract Documents. The following notifications required for spills or discharges are specified in Section 00 72 00, 1.04.BB:

1. Sanitary Sewer Spills

2. Chemical, Oil, Hazardous Substance, or other Contaminant Spill or Discharge

1.05 PREVENTION OF ENVIRONMENTAL POLLUTION AND PRESERVATION OF PUBLIC NATURAL RESOURCES:

A. General:

1. During the life of the Contract, the Contractor shall comply with all provisions of federal, State and local statutes, ordinances and regulations pertaining to the prevention of environmental pollution and the preservation of public natural resources. Pursuant to RCW 39.04.120 such provisions as are reasonably obtainable are set forth below. Further, if the Contractor must undertake extra work not contemplated by the Contract, due to the enactment of new, or the amendment of existing, statutes, ordinances, rules, or regulations occurring after the submission of the successful Bid, the Engineer

will issue a Change Order setting forth the extra work that must be undertaken, which shall not invalidate the Contract.

1.06 WATER QUALITY:

A. The Environmental Pollution Control Plan shall identify the onsite individual responsible for water quality, and specific activities and locations and specific means and methods to prevent and/or control impacts to water quality.

B. The Contractor shall comply with city ordinances, State, and federal laws and other regulations or rules applicable to water pollution occurring in waters of the State and in interstate waters. The Contractor shall:

1. Exercise precautions throughout the life of the Contract to prevent pollution, erosion, siltation, and damage to property.

2. Provide for the flow of all watercourses, including but not limited to streams, ditches, sewers, and drains intercepted during the progress of the Work.

3. Completely restore disturbed watercourses in as good condition as the Contractor found them, or make such final provisions for them as the Engineer may direct.

4. Not obstruct the gutter of any Street.

5. Use all proper measures to provide for the free passage of surface water.

6. Remove and dispose of all surplus water, mud, silt, slicking, or other run-offs pumped from excavations or resulting from sluicing or pavement cleaning or other operations.

7. Make all applicable notifications required by Section 00 72 00, 1.04.BB.

C. The Contractor shall comply with the water quality criteria required by the Department of Ecology and regulations of:

1. The Washington State Department of Fish and Wildlife.

2. Those federal statutes on oil spills enacted under the federal Water Pollution Control Act Amendments of 1972 (a copy of which may be obtained from the U.S. Environmental Protection Agency).

3. The water quality standards of the State of Washington as set forth in Chapter 173-201A WAC.

4. Any local statutes, regulations, ordinances, or rules, which stipulate the various types of discharge prohibited in public sewer systems or any drainage ditch in the local jurisdiction.

D. State statutes on water pollution covering liability of the Contractor, penalty for violation, liability and damages for injury or death of fish, animals or vegetation are set forth in Chapter 90.48 RCW. As an aid to the Contractor, some though not all, of the rules set forth by the various State departments are summarized below. The Contractor is cautioned, however, that each Department of the State may add other restrictions, as they deem necessary, to protect fish and to prevent air or water pollution:

1. State Department of Fish and Wildlife: In doing the Work the Contractor shall:

    a. Not degrade water quality in a way that would harm fish. (The Washington State Water Quality Regulations will serve as water quality criteria for the Work.)

    b. Release into a flowing stream or open water any fish stranded by the Work.

    c. Replant any stream bank or shoreline areas if the Work has disturbed the vegetative cover. (Any trees, brush, and grasses used in replanting shall resemble the type and concentration of surrounding vegetation, unless the Contract provides otherwise.)

    d. Provide an open water channel at the lowest level of any isolated pothole remaining when the Work is complete.

    e. Protect fish by preventing harmful siltation on the bed or bottom of any body of water.

    f. Not block stream flow or fish passage.

    g. Keep all Equipment out of any flowing stream or other body of water (except as the Contract may permit).

    h. Not remove gravel or other bottom material from within the high-water flow channel bed of any stream nor from the bottom of any other body of water (except as the Contract may permit).

    i. Dispose of any Project debris beyond high-water flows.

2. State Department of Ecology: In doing the Work, the Contractor shall:

    a. Obtain a waste discharge permit from the Department of Ecology before:

        1) Washing aggregate, and

        2) Discharging water into a ground or surface waterway from pit sites or excavations when the water contains turbidity, silt, or foreign materials.

    b. Provide the Engineer with a copy of each waste discharge permit before starting the Work.

    c. Control drainage and erosion to minimize the pollution of any waterway.

    d. Dispose of all toxicants (including creosote, oil, cement, concrete, and water used to wash Equipment) in ways that will prevent them from entering State waters.

    e. Dispose of all debris, overburden, and other waste materials in ways that will prevent them from entering State waters.

E. The Contractor shall perform such temporary work as may be necessary to effectively control water pollution, erosion, and related damage within the Project

Site or which might be necessary at work areas located outside the Project Site. These outside areas may include, but are not limited to, equipment, material and other storage sites. When temporary control facilities or measures are no longer needed, they shall be removed and the areas restored or finished as designated by the Engineer.

F. If Work is suspended for an extended period of time, the Contractor shall be responsible for controlling erosion, pollution, sedimentation, and runoff during the shutdown period.

G. In addition to other requirements in the Contract, this temporary work shall include, but is not limited to, the following water quality considerations:

1. Diversion of Storm Water: Storm water shall be diverted around the Project to prevent pickup of silt. This may be accomplished by pumping; improvising ditches; lining channels or by placing metal, plastic or concrete gravity pipe; constructing ditches, berms, Culverts, etc., to control surface water; or constructing dams, settling basins, or energy dissipaters to control down stream flows.

2. Intercepting Ground Water: Surfacing ground water shall be intercepted and routed around the construction site to prevent silt erosion by the use of gravel trenches, French drain tiles, well points, or interceptor ditch. The Contractor shall provide means of controlling underground water that may be encountered during the Work.

3. Turbid Water Treatment Before Discharge: Determination of turbidity in surface waters shall be at the discretion of the Engineer; for Lake Class Receiving Waters, turbidity shall not exceed 5 NTU (Nephelometric Turbidity Units) over background conditions; for Class AA and Class A Waters, turbidity shall not exceed 5 NTU over background turbidity when the background turbidity is 50 NTU or less, or have more than a 10 percent increase in turbidity when the background turbidity is more than 50 NTU; for other classes of waters, refer to WAC 173-201-045 and WAC 173-201A-030.

   a. The term turbidity means the optical property of sample demonstrating the scattering and absorption of light caused by suspended material as expressed in Nephelometric Turbidity Units and measured with a calibrated turbidimeter.

   b. Discharges to a State waterway caused by aggregate washing, drainage from aggregate pit sites, and stockpiles or dewatering of pits and excavations shall not increase the existing turbidity of the receiving waters.

   c. Turbid water from the Project Site shall be treated before being discharged into stream or other State waters. Turbidity may be removed by the use of lagoons or holding ponds, settling basins, overflow weir, polymer water treatment, discharging to ground surface, by percolation, evaporation or by passing through gravel, sand or fiber filters.

4. Temporary Erosion and Sediment Control (TESC): TESC shall be exercised by minimizing exposed areas and slopes until permanent measures are effective. Plastic sheet covering shall be placed over exposed ground areas to protect from rain erosion. Other alternative methods for erosion control under certain situations may include netting, mulching with binder, and seeding. Should rutting and erosion occur the Contractor shall be responsible for restoring damaged areas and for cleanup of eroded material including that in ditches, catch basins, manholes, and Culverts and other pipes. See Specification 01 57 13 for additional requirements.

5. Chlorine Residual: Water containing chlorine residual shall not be discharged directly into Storm Drains, streams, or State waters. Chlorine water may be discharged into sanitary sewers or disposed on land for percolation. Chlorine residual may be reduced chemically with a reducing agent such as sodium thiosulphate or vitamin C. Water shall be periodically tested for chlorine residual.

1.07 AIR QUALITY:

A. The Contractor shall identify those portions of the Work that have the greatest potential to impact air quality.

1. Specific means and methods to prevent and/or control impacts to air shall be described for each such portion of work.

B. The Contractor shall not cause or allow the discharge of particulate matter, the emission of any air contaminants or odor bearing gases in excess of the limits specified under Regulation I of the Puget Sound Clean Air Agency, Article 9 - Emission Standards.

C. The Contractor shall maintain air quality within the National Emission Standards for Hazardous Air Pollutants. Air pollutants are defined as that part of the atmosphere to which no ambient air quality standard is applicable, and which, in the judgment of the Administrator of the Environmental Protection Agency Clean Air Act, may cause or contribute to an increase in mortality or an increase in serious irreversible or incapacitating reversible illness.

D. The Contractor shall minimize the potential for air pollution by the use of emission control devices on Contractor operated equipment and by the shut-down of motorized equipment when not in use.

E. The Contractor shall control dust throughout the project.

F. No burning, including trash or vegetation, will be permitted.

G. Refer to Regulation III Puget Sound Clean Air Agency Article 4, Asbestos Control Standard, in the event the Contractor damages an existing duct, asbestos cement pipe, or any other facility that may contain asbestos.

1.08 NOISE POLLUTION:

A. The Contractor shall take all reasonable measures for the suppression of noise resulting from Work operations. Mobile engine driven cranes, loaders and similar material handling Equipment; engines used in stationary service for standby power;

air compressors for high and low pressure service; and other similar Equipment shall be equipped with exhaust and air intake silencers designed for the maximum degree of silencing. The type of silencer required is that for use in critical noise problem locations such as high density residential, hotel, and hospital areas.

B The Contractor shall conduct performance of the Work consistent with the applicable noise control levels set forth in SMC Chapter 25.08 or, if outside the City limits and in King County, Chapters 12.86 through 12.100, King County Code.

1.09 LIABILITY AND PAYMENT:

A. The Contractor shall be liable for the payment of all fines and penalties resulting from failure to comply with the Federal, State and local pollution control regulations even though the Engineer is on the job at the time of the violation.

B. Except as may be otherwise provided for in the Contract, costs pertaining to the prevention of environmental pollution and the preservation of public natural resources as outlined in the Contract shall be considered as incidental to the Work and such costs shall be included in the Lump Sum Bid.

1.10 ARCHAEOLOGICAL AND HISTORIC PRESERVATION:

A. Should the Contractor discover during any construction activity or in any other way discover any artifacts, skeletal remains, or other archaeological resources (as defined under RCW 27.53.040) at the Project Site, it shall be the responsibility of the Contractor to both immediately cease construction activity at the discovery site and surrounding area, and promptly notify the Engineer. If ordered by the Engineer, the Contractor shall suspend construction activity that, in the opinion of the Engineer, would be in violation of Chapter 27.53 RCW. Suspension of this construction activity shall remain in effect until the Engineer has obtained permission to proceed from the State Historic Preservation Officer or from other authority.

1.11 TEMPORARY EROSION AND SEDIMENTATION CONTROL:

A. Temporary erosion and sedimentation control (TESC) work shall comply with the Construction Stormwater Control Technical Requirements Manual (based on SMC Chapter 22.800 Stormwater, Grading & Drainage Code), Specification 01 57 13, and Best Management Practices which consist of temporary measures that may be indicated in the Contract, that may be proposed by the Contractor and approved by the Engineer, or may be ordered by the Engineer during performance of the Work. This temporary work is intended to provide prevention, control, and abatement of water pollution/erosion/sedimentation within the limits of the Project, and to minimize damage to the Work, adjacent property, streams, and other bodies of water. See Specification 01 57 13 for additional requirements.

B. TESC shall be the Contractor’s responsibility. Costs for implementing and maintaining TESC best management practices will be considered incidental to the Work and such costs shall be included in the Lump Sum Bid.

1.12 DEWATERING:

A. The Contractor shall operate and maintain all pumps, tanks and other equipment necessary for the environmentally safe removal and disposal of water from the various parts of the work. The method proposed by the Contractor for removal of water from excavations shall be subject to the approval of the Engineer. The Engineer has the right and authority to disapprove any method proposed for discharge of water from excavations.

B. When discharge of water from the site is subject to approval of any Federal, State or local agency, the Contractor shall be responsible for obtaining such approval before commencing any pumping or de-watering operation.

C. The Contractor shall include a plan to control and treat any wastewater created from dewatering activities in the Environmental Pollution Control Plan.

1.13 DUST CONTROL:

A. Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with all local regulations.

PART 2 PRODUCTS

Not applicable.

PART 3 EXECUTION

Not applicable.

END OF SECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES:

A. This Section includes the procedures and requirements for the disposal of wastes, other than dangerous and contaminated waste, generated by the construction activities.

B. Effective June 1, 1991 and in accordance with SMC 21.36 as amended by Ordinance 115589, no Waste generated within the City of Seattle shall be deposited in a Waste disposal facility owned and operated by King County.

C. Waste that is Unacceptable Waste must be disposed of in accordance with all applicable local, State and federal regulations. Waste that appears to be an Unacceptable Waste must obtain a Waste Clearance through the Seattle-King County Department of Public Health (SKCDPH). Copies of the forms or information regarding the forms may be obtained by calling SKCDPH at 296-4633.

1.02 GENERAL REQUIREMENTS:

A. All Wastes generated during the course of the project shall be disposed of in accordance with all applicable local, State and federal regulations.

B. Disposal of Unacceptable Waste or Hazardous Wastes will be paid as "Extra Work".

1.03 RELATED WORK:

A. 02 41 13 Selective Site Demolition

1.04 DEFINITIONS:

A. The following terms used in this Section are defined in local, state, or federal regulations, including but not limited to: Chapter 173-303 WAC, King County Solid Waste Regulations 10.08.185, and SMC 21.36. The Contractor is responsible for determining the current construction and true content of the laws, statutes, resolutions, ordinances, or regulations applicable to the Work of the Contract.

1. Contaminated Soils
2. Construction, Demolition and Land Clearing Waste (CDL Waste)
3. Dangerous Waste
4. Small Quality Generator Hazardous Waste
5. Solid Waste
6. Special Category Wastes
7. Special Waste
8. Unacceptable Waste
9. Waste or City Waste

1.05 SUBMITTALS:

A. At the Pre-Construction Conference, the Contractor shall submit to the Engineer a list of wastes that will be generated by the project. A proposed recycling facility or disposal site shall be identified for each waste stream. The list shall identify:

1. Each location.

2. Estimated quantities.

3. Type of material to be wasted at each site or removed from each site.

B. Should additional or alternate sites become necessary during the life of the Contract, the locations and information for each site shall be submitted to the Engineer for approval at least 10 Working Days prior to their use.

C. Furnish copies of permits for waste sites.

D. All wastes shall be transported in accordance with federal, state and local transportation requirements, including driver training, placarding and use of shipping papers or waste manifests.

E. The Owner may request to review or approve all shipping papers prior to wastes leaving the project site.

F. When required by law, waste shipping papers shall be returned to the Owner within the legally specified time.

G. Furnish copies of residential property owner agreements.

H. Upon completion of operations at any site for which a written agreement with a property owner has been made, obtain and submit a release from all damages, duly executed by the property owner, stating that the restoration of the property has been satisfactorily accomplished.

I. Submit HD Waste Clearance Program forms directly to SKCDPH. Provide a copy to the Engineer.

1.06 REQUIREMENTS FOR WASTE DISPOSAL SITES:

A. Waste sites shall be provided by the Contractor.

B. Waste sites shall meet the environmental, grading, safety and health requirements of the State, county and local political subdivision where located.

1. If the waste site is not legally licensed and permitted, the Contractor shall obtain required permits for the site.

2. Sites, operations, or results of operations, which create a definite nuisance problem, or which result in damage to public or private properties will not be permitted.

C. The selection of Waste and borrow sites and their operation shall at all times be subject to the approval of the Engineer.

1. No waste or borrow site shall be utilized by the Contractor until the proper grading permits and property owner agreements have been obtained by the Contractor and copies submitted to the Engineer.

2. Utilization of a site without a legal grading permit, a consent Agreement from the property owner, and approval of the Engineer will be considered unauthorized.

D. Disposal of excess material within a wetland area will not be allowed without a Section 404 permit issued by the U.S. Corps of Engineers and approval by the local agency with jurisdiction over the wetland.

1. The Contractor shall notify the Engineer prior to submittal of an application for this or any other environmental permit.

E. Waste sites located within the City limits of SeaTac are subject to the rules and regulations set forth in SeaTac's Municipal Code.

F. Waste sites located outside the City limits of SeaTac but within unincorporated King County, shall be subject to the rules and regulations set forth in the King County Grading Ordinance (Ordinance No. 1488). Sites may also be subject to rules and regulations of a local governmental authority if located within its jurisdiction.

G. Surplus material shall not be wasted within the public rights of way without a grading permit .

H. Final cleanup shall be in accordance with the requirements specified in the Grading Ordinance, permits, property owner agreements and other Contract Documents.

I. When operations are complete, a release from all damages, duly executed by the waste site property owner and stating that the restoration of the property is satisfactory, is required.

1. Retainage withheld from the Contractor's payments will not be released until all such property owner releases have been furnished to the Engineer.

J. Should the release be, in the opinion of the Owner, arbitrarily withheld, and then the Owner may, at its sole discretion, accept that portion of the work involved and cause final payment to be made.

1.07 WASTE MANAGEMENT GOALS:

A. The Owner has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

C. With regard to these goals the Contractor shall develop, for the Engineer's review, a Waste Management Plan for this Project.

1.08 WASTE MANAGEMENT PLAN:

A. Draft Waste Management Plan: Within 10 calendar days after receipt of Notice of Award of Bid, or prior to any waste removal, whichever occurs sooner, the

Contractor shall submit to the Engineer a Draft Waste Management Plan. The Draft Plan shall contain the following:

1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
2. Landfill options:
    a. The name of the landfill(s) where trash will be disposed of.
    b. The applicable landfill tipping fee(s).
    c. The projected cost of disposing of all Project waste in the landfill(s).
3. Alternatives to Landfilling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed on-site use or the proposed local market for each material, and the estimated net cost savings or additional costs resulting from separating and recycling (versus landfilling) each material. "Net" means that the following have been subtracted from the cost of separating and recycling:
    a. Revenue from the sale of recycled or salvaged materials.
    b. Landfill tipping fees saved due to diversion of materials from the landfill.
4. The following list of materials, at minimum, shall be included:
    a. Cardboard
    b. Clean dimensional wood
    c. Beverage containers
    d. Logs and timbers
    e. Site milled lumber
    f. Salvageable plants: trees, shrubs and groundcovers
    g. Land clearing debris
    h. Concrete—include delivery overage, truck cleanout, etc.
    i. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.
    j. Plastics

B. Resources for Development of Waste Management Plan: The following sources may be useful in developing the Draft Waste Management Plan:

    1. King County Solid Waste Division (See King County Web Site).
    2. Washington State Department of Ecology (See Washington State Web Site).

C. Final Waste Management Plan: Once the Owner has determined which of the recycling options addressed in the draft Waste Management Plan are acceptable, the

Contractor shall submit, within 10 calendar days a Final Waste Management Plan. The Final Waste Management Plan shall contain the following:

1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
2. Landfill options: The name of the landfill(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Project waste in the landfill(s).
3. Alternatives to Landfilling: A list of the waste materials from the Project that will be separated for reuse, salvage, or recycling.
4. Meetings: A description of the regular meetings to be held to address waste management. Refer to Section 01 32 13 – Progress Schedules.
5. Materials Handling Procedures: A description of the means by which any waste materials identified in item (3) above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
6. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

1.09 WASTE MANAGEMENT PLAN IMPLEMENTATION:

A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.

B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Engineer, and the Consultant.

C. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

D. Separation facilities: The Contractor shall layout and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

E. Hazardous wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations.

F. Application for Progress Payments: The Contractor shall submit with each Application for Progress Payment a Summary of Waste Generated by the Project. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment. The Summary shall be submitted on a form acceptable to the Engineer and shall contain the following information:

1. The amount (in tons or cubic yards) of material landfilled from the Project, the identity of the landfill, the total amount of tipping fees paid at the landfill, and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.
2. For each material recycled, reused, or salvaged from the Project, the amount (in tons or cubic yards), the date removed from the jobsite, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling each material. Attach manifests, weight tickets, receipts, and invoices.

PART 2 - PRODUCTS

Not applicable.

PART 3 – EXECUTION

3.01 GENERAL:

A. Use only approved waste sites.

B. Take the protective measures required for the type of waste being handled.

C. After disposal, perform all operations necessary to put the waste sites in a neat, clean and orderly condition.

D. Final cleanup shall be in accordance with Paragraph 1.02.K of Section 00700 and the requirements of the Grading Ordinance, permits, and residential property agreements.

3.02 SITE MAINTENANCE:

A. Keep work area, site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris resulting from Contractor's operations.

B. Provide on-site containers for collection of waste materials, debris, and rubbish. Periodically remove waste from the site.

C. Do not use the Owner's waste containers for construction waste.

D. Dispose daily of all flammable, hazardous, and toxic waste materials. Dispose of trash and debris in compliance with governing codes, ordinances, regulations, and anti-pollution laws.

E. Locate dumpster(s) inside the staging area or at a site designated by the Engineer.

3.03 DISPOSAL OF SURPLUS MATERIAL:

A. Material obtained from all excavation within the Project boundary shall not be wasted unless the excavated material is designated by the Engineer as unsuitable for use in embankment construction, trench backfill, or for other purposes.

1. All excavated material not required for backfill shall be removed from the site as the work progresses.

B. Material which is surplus to the needs of the Project or determined to be unsuitable by the Engineer shall be disposed of in accordance with the requirements noted herein.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY:

A. This section includes administrative and procedural requirements for final cleaning of the Work prior to Substantial Completion, including but not limited to:

1. Cleaning procedures
2. Inspection

B. Do not use cleaning materials that may damage finished surfaces.

C. Do not use cleaning materials hazardous to health or property.

D. Use only cleaning materials and methods recommended by manufacturer of item or material to be cleaned.

PART 2 - PRODUCTS: *Not Used*

PART 3 - EXECUTION

3.01 FINAL CLEANING:

A. Cleaning: The Contractor shall employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a typical commercial building/site cleaning and maintenance program. Comply with manufacturer's instructions. Final cleaning includes but is not limited to the following procedures:

a) Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances. Sweep paved areas to a broom-clean condition. Remove stains, petrol-chemical spills and other foreign deposits. Rake grounds which are neither planted nor paved to a smooth, even-textured surface.

B. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Work of rodents, insects, and other pests.

C. Removal of Protection: Except as otherwise indicated or requested by the Consultant or the Engineer, remove temporary protection devices and facilities installed to protect previously completed work during the remainder of the construction period.

D. Extra Materials: Where excess materials of value remain after completion of associated work, these materials become the property of the Engineer. If declined by

the Engineer, the Contractor shall dispose of these materials as directed by the Engineer.

3.02 INSPECTION:

A. Prior to requesting inspection for certification of Substantial Completion, inspect exposed surfaces. Verify entire Work is clean.

B. Prior to certifying Substantial Completion, the Engineer will make a detailed inspection of buildings and site, and will prepare a check list of cleaning and debris removal remaining to be completed before certification of Substantial Completion. Complete items on the Engineer's check list, so that entire Project is clean and ready for occupancy by staff and public.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Supplemental requirements to the Conditions of the Contract and Specifications for administrative procedures in closing out the Work.

1.02 REQUIREMENTS FOR ACHIEVING SUBSTANTIAL COMPLETION:

A. Prior to requesting Architect's inspection for certification of Substantial Completion, the Contractor must meet the following requirements:

1. The facility shall be sufficiently complete and cleaned with all construction material removed, to allow the unrestricted use of the facility including installation of permanent cores in locks, and transmittal of keys to Architect.
2. Submittal of pay request for all items completed in order to satisfy the requirements of Substantial Completion.
3. Complete and submit a release, granting the Architect's staff and facility users' full and unrestricted use of the Work and access to services and utilities including final building permit inspection and occupancy or temporary occupancy permits as required.
4. Complete start-up of systems and provide copies of initial balancing reports.
5. Record Documents have been submitted to and approved by the Consultant in accordance with the requirements of Section 01 78 39 - Record Documents.
6. Operating and Maintenance Manuals have been submitted to and approved by the Consultant in accordance with the requirements of Section 01 78 23 - Operating and Maintenance Manual.
7. Warranties and Bonds Manual, including but not limited to special guarantees, workmanship, final certifications and similar documents have been provided and warranties inserted into the O & M Manuals in accordance with the requirements of Section 01 78 36 - Warranties and Bonds.
8. Write a letter to the Architect on the attached form requesting that a Substantial Completion Date be established.

B. Process to achieve Substantial Completion:

1. Upon receipt of Contractor's request, Architect shall request that the Consultant conduct a preliminary inspection to verify if the project meets the requirements for substantial completion. If the Consultant concurs that substantial completion has been met, the Architect will be so notified and a punch list inspection will scheduled within ten (10) working days of the notification. If the Consultant determines that the project is not Substantially Complete, the Architect will be so notified and the Architect will notify the Contractor of the portions of the Work that must be completed before a punch list inspection can be scheduled.
2. The Consultant shall be responsible for preparing the punch list based upon the results of the inspection. The Architect's designated representative will

also inspect the project and provide a written punch list to the Consultant. These lists will be compiled into a single list by the Consultant and issued to the Contractor. If the inspection reveals that the Work is not Substantially Complete, the process in 1.02.B.1 shall be repeated.

3. After inspection confirms that the Work is Substantially Complete, the Architect shall prepare certificate of Substantial Completion establishing the date of Substantial Completion and provide a copy to the Contractor with a copy of the punch list. The date of Substantial Completion shall be used to determine the cut-off date for liquidated damages.
4. Re-inspection Fees: When inspection shows that the Work has not attained the completion status claimed, the Contractor shall compensate the Architect for additional time expended in subsequent inspections at the Architect's standard hourly billing rate.

1.03 REQUIREMENTS FOR ACHIEVING PHYSICAL COMPLETION:

A. The Contractor shall show evidence of compliance with requirements of the following:

1. All permits required by regulatory agencies that have been issued.
2. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock-ups, and similar elements.
3. Testing of the operations of all systems has been completed and copies of the final balancing report submitted to the Architect.
4. All deficiencies identified on the punch list have been corrected.
5. Upon correction of all punch list items, the Contractor shall notify the Architect on the attached form that physical completion has been achieved and request scheduling of the a final punch list inspection.

B. Process to Achieve Physical Completion:

1. Upon receipt of the Contractor's request for final inspection, the Architect shall request that the Consultant verify that all punch list items have been corrected. If the Consultant concurs, the Architect will be so notified and a final punch list inspection will be scheduled within five (5) working days of the notification. If the Consultant determines that the punch list items remain to be corrected, the Architect will be notified and the Architect will notify the Contractor of the items that must be corrected before a final punch list inspection can be scheduled.
2. The Consultant shall prepare the final punch list inspection report based upon the results of the inspection. If the final inspection reveals that punch list items remain to be corrected, the process in 1.03.B.1 shall be repeated.
3. After inspection shows that all punch list items have been corrected, the Architect shall prepare the certificate of Physical Completion establishing the Physical Completion Date and provide a copy to the Contractor. The date of

Physical Completion shall be used to determine the start of the one-year and extended warranties period.

4. Re-inspection Fees: When inspection reveals that the Work has not attained the completion status claimed, the Contractor shall compensate Architect for additional time expended in subsequent inspections at Architect's standard hourly billing rate.

1.04 ARCHITECT'S RECOMMENDATION FOR CONTRACT COMPLETION DATE:

A. The Architect's written recommendation for Contract Completion Date initiates the contract completion approval process. The Architect will issue the written recommendation for contract completion date to the Owner upon the Architect's determination that the following requirements have been fulfilled:

1. Terms and requirements of all permits issued by regulatory agencies have been satisfied.
2. All required special testing has been completed and approved.
3. All changes to the Work have been completed and approved by Change Order, with associated changes to contract price, time, and bonding requirements incorporated in the final pay request.
4. Dates for Substantial and Physical Completion have been established in writing by the Architect.
5. Contractor's performance evaluation by the Architect has been filed.
6. Requirements for training of Architect's personnel and final testing of operating systems have been satisfied.

PART 2 - PRODUCTS: *Not Used*

PART 3 - EXECUTION: *Not Used*

END OF SECTION

(Substantial Completion and Physical Completion form letters follow)

SUBSTANTIAL COMPLETION

Date:

Re: *Project Name*

The Work performed under this Contract has been substantially completed. The Contractor, *(Name)*, hereby requests a Punch List Inspection of Substantial Completion and establishment of the date of Substantial Completion.

The Contractor will complete or correct the Work on the punch list within (# of days) working days from the date of Substantial Completion established by the Architect.

_____	_____	_____
Contractor	By	Date
_____	_____	_____
Seatac Project Manager	By	Date

PHYSICAL COMPLETION

Date: _____

Re: *Project Name*

The Work items identified in the inspection punch list have been completed. The Contractor, _____, hereby requests certification of Physical Completion and establishment of the date of Physical Completion and the beginning of the warranty period.

The Contractor understands that the Seattle Department of Parks and Recreation will assume all maintenance of the facility upon Physical Completion.

_____	_____	_____
Contractor	By	Date
_____	_____	_____
Seatac Project Manager	By	Date

PART 1 - GENERAL

1.01 RELATED DOCUMENTS: Drawings and general provisions of contract, including General Conditions and other Division 01 Specifications, apply to work in this Section.

1.02 WORK IN OTHER SECTIONS: Coordinate related work specified in other parts of the project manual

1.03 DESCRIPTION OF WORK: The O & M Manual shall contain: all operating and maintenance data relevant to all landscape and irrigation components; architectural products, finishes and furnishings; mechanical equipment and components; electrical equipment and components; and any other special equipment and components as required for the project. Note: An itemized indexed list of all warranted items and products and their warranty term shall be placed at the beginning of the O & M Manual for easy reference.

1.04 MANUAL FORM:

A. Organization - the Manual shall be organized in accordance with the 48 Division CSI (The Construction Specifications Institute) numbering system. Divisions shall be flagged with tabs.

B. Size - shall be 8-1/2" x 11"

C. Paper - provide 20 pound minimum; white for typed pages.

D. Text - provide Manufacturer's printed data, or neatly typewritten information.

E. Drawings - accordion fold all oversize drawings to 8-1/2" x 11" size for binding.

F. Flyleaf - provide for each separate product and major component parts of equipment followed by typed descriptions. Provide indexed tabs for each CSI Division.

G. Tabs- shall be typewritten, plastic coated, reinforced, and indexed to match the names and order listed in the Table of Contents.

H. Binders - provide:

1. Commercial quality three-ring hard cover binders with durable and cleanable plastic covers for inserting required cover and spine information.
2. Maximum ring size: As suitable to content, 3 inch maximum. Minimum ring size: one inch.
3. When multiple binders are used, correlate data into related groupings.

I. Cover - identify the front cover (and each volume in case of multi-volume manual) with typed title: "Operating and Maintenance Manual". Label volumes as 1 of 4, 2 of 4, 3 of 4, etc. The front cover shall show: Title of Project, names of the Consultant, Contractor, appropriate Mechanical, Electrical or other prime Subcontractor(s), and the date of Physical Completion. Show the CIP Project number, Public Works Contract

number, and other information as needed. The spine shall show: Name of the project, identity of the volume if more then one and the general subject matter covered in the Manual, and the year the project was completed.

1.05 CONTENTS:

A. Title Page - provide the title of the Project, name of the Project Manager, names addresses, telephone numbers of the, Consultant, major sub-consultants, General Contractor, major sub-contractors, and date of Physical Completion.

B. Table of Contents - provide a complete table of contents listing major sections of the Manual and clearly identifying categories of information in each section.

C. Letter of Physical Completion

D. Warranty List noted in 1.03 listed above.

E. Preventative Maintenance Schedule- provided by the Consultant.

F Body of Manual - shall be in the Construction Specification Institute (CSI) Format.

1. Divisions 02 through 48:
Bind all product data, product maintenance data, and warranty information together for each product listed. All products and systems that could require replacement during the 40-year life of this project must be covered in this manual.

Product Data:

a. Product Data - submit original product literature only. Mark each sheet to clearly identify specific products and component parts and data applicable to installation. Modify product data as required to accurately represent completed installation. Delete inapplicable information.
b. Products, Applied Materials and Finishes- include all product data with catalog number, size, composition, and color and texture designations. Provide all necessary information for re-ordering custom manufactured items. Note: For all painting work, provide a complete finish schedule of products, color names and numbers, formulas, and gloss used. Provide a drawing showing all paint and color locations.
c. Moisture Protection and Weather Exposed Products- include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
d. For each product or finish, list names, addresses and telephone numbers of suppliers, including local source of supplies and replacement parts.
e. Drawings - supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Document as maintenance drawings.

f. Additional Requirements- as specified in individual specification sections and such data that becomes apparent during instruction of Parks' personnel.

2. Product Maintenance:
   a. Preventative Maintenance Instruction- prepares Preventative Maintenance Instructions. Include for each piece of equipment or system furnished requiring periodic inspections, lubrication, adjustment and the like, to ensure optimum and continued performance as originally specified.
   b. Instructions for Care and Maintenance- include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommend schedule for cleaning and maintenance.
   c. Provide a table showing maintenance schedules and what is to be done to all equipment, i.e. scheduled maintenance spreadsheet.

Product Warranties: Include copies of all Extended Warranties with products that have them. See individual Project Manual sections for requirements. Add item to the itemized list at the beginning of the Manual.

G. Warranties and Bonds:

1. Bind in copy of each warranty with each product or system. One original of each warranty shall be bound in a separate labeled hard cover binder and submitted with the Approved O & M Manuals. See section 01 78 36 - Warranties and Bonds.

1.06 SUBMITTAL SCHEDULE:

A. Submit one copy of preliminary draft of proposed formats and outlines of contents to the Consultant for review and approval. After review, the copy will be returned to the contractor with accompanying comments.

B. Submit one copy of completed data in approved final form to the Consultant for final review. This copy will be required prior to Contractor training of Parks' personnel

C. Submit three (3) copies of approved Manuals in final form prior to Substantial Completion.

PART 2- PRODUCTS: (Not Used)

PART 3- EXECUTION: (Not Used)

END OF SECTION

PART 1 – GENERAL

1.01 GENERAL:

A. This section addresses the need, if required, to either extend the bonded warranty for the Contractor and/or obtain extended warranties from subcontractors, suppliers and or manufacturers for materials, equipment, and installation as identified in the technical specifications of the Project Manual, and warranty inspections.

B. The general guaranty and warranty for the entire project shall be provided per Section 00 72 00, paragraph 1.03. J.

1.02 EXTENSION OF STANDARD CONTRACTOR-BONDED WARRANTY:

A. If, as part of developing the technical specification, it is determined that the standard one year warranty period from date of Physical Completion should be extended, it shall be so noted in the technical specification.

1.03 EXTENDED WARRANTY FOR MATERIALS, EQUIPMENT, AND INSTALLATION:

A. Individual technical sections may require specific warranties beyond the standard one-year bonded warranty.

B. Subcontractors, manufactures and suppliers shall provide limited or full warranties for products that they provide as specified later in this document.

C. Extended warranties shall start at Physical Completion and cover the warranty period specified in the technical specifications or the time period provided by the subcontractor, supplier and or manufacturer, whichever is longer. Warranties shall cover material and or equipment replacement, costs of installation, and costs associated with repair of damages caused by the removal and replacement of the defective product.

D. Form of extended Warranty:

"I (We), (insert the name of Contractor), certify (insert name of trade or portion of work being guaranteed) installed by (insert name of appropriate subcontractor) on (insert name of job) located at (street address or location), is performed in strict accordance with the contract documents. Further, I (we) guarantee this work to be free of defects in materials and workmanship, for (fill in specific required guarantee period) years from (date of Physical Completion), and will repair, or replace, without delay, any defects in materials or workmanship, and associated damage discovered within the warranty period by replacing the defective material and or equipment at no cost to the Project Manager.

Sincerely,
(Name of Contractor/responsible principal/address/telephone number):

Signed by Principal, Partner, or other person authorized to commit firm.

1.04 SUBMITTAL REQUIREMENTS:

A. Submit one (1) hard cover binder with originals of each extended warranty specified in respective specification sections of the Project Manual to the Consultant for their review and approval. Binder shall match the O&M Manual binders in Section 01 78 23. Submit Approved binder and contents with the Approved O&M Manuals prior to Substantial Completion.

1.05 WARRANTY PROVISIONS:

A. The bonded warranty period for the Contractor extends for one year from the date of Physical Completion.

B. In the event of failure of any part of the Work during the warranty period, repair or remove and replace the defective components, including repair/replacement of any overlying or dependent construction, at no additional charge to the Project Manager.

C. Repair and replacements shall be completed in accordance with all the requirements of the Contract Documents. Repaired or replaced work shall be an exact match for original work unless otherwise approved in writing by the Project Manager.

D. In the event of repeated failure of any repaired component, or if the Project Manager is not satisfied that the quality of repairs meets the requirements of the Contract Documents, the Project Manager may order defective work completely removed and replaced with new.

E. The Project Manager shall schedule a warranty inspection of all work completed under the Contract within one year of the date of Physical Completion. The Project Manager shall establish the date, time and place for the warranty inspection and notify the Contractor and Consultant to send representatives. Working with the Project Manager and the Contractor, the Consultant shall identify valid warranty defects and prepare a warranty inspection list of items to be corrected. The Consultant shall provide a copy of the warranty inspection list to the Project Manager and the Contractor. The Contractor shall correct and/or replace defective items or defective workmanship in a reasonable time, not to exceed two months. Failure of the Contractor to correct identified warranty deficiencies may result in the Project Manager referring the matter for corrective action in accordance with Section 00 72 00.

PART 2 - PRODUCTS: *Not Used*

PART 3 - EXECUTION: *Not Used*

END OF SECTION

PART 1 - GENERAL

1.01 AS-BUILT DRAWINGS:

A. The Contractor shall maintain a clean, undamaged set of bond copies of the Contract Drawings. Clearly identify the set as "AS-BUILT DRAWINGS". Mark the set to show the actual installation of materials and systems wherever the installation varies substantially from the Work as originally shown in the contract documents. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings and affix the shop drawings to the prints. Clearly mark and number the work in each Change Order. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1.02 USE AND PROTECTION:

A. Do not use Record Documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Consultant’s reference during normal working hours.

1.03 QUALITY ASSURANCE:

A. Delegate the responsibility for maintenance of record prints to one person on the Contractor's staff, as approved by the Engineer.

B. Make entries on the record prints clearly showing as-built conditions within 24 hours after completing any element of work.

C. Accuracy of records:

1. Coordinate changes and additions within the record prints, making adequate and proper entries on each page of specifications and each sheet of drawings and other documents where such entry is required to show the change properly.
2. Accuracy of records shall be such that future search for items shown in the contract documents may rely reasonably on information obtained from the approved project record documents,

1.04 MAINTENANCE OF RECORD DOCUMENTS:

A. Maintain and store in field office apart from documents used for construction, the following documents:

1. Permit drawings, bearing building permit approval from DPD and/or other regulatory agency having jurisdiction, if any.
2. Project Manual, bearing building permit approval from DPD and/or other regulatory agency having jurisdiction, if any.

3. The Signed Contract, Bonds, Insurance, Addenda, Design Clarifications, Field Directives, Modification Proposals, Change Orders, and approved Substitutions.
4. Approved shop drawings and all other submittals.
5. Field test records.

B. Provide files and racks for storage of documents

C. File documents in accordance with Project Manual table of contents.

D. Maintain documents in orderly, clean and legible conditions. **Do not use record documents for construction purposes.**

E. Make documents available for weekly progress meeting and at all times for inspection by Consultant.

F. In the event of loss of recorded data, the Contractor shall use all means necessary to again secure the data to the Engineer's satisfaction.

G. Payment may be withheld or pay requests modified for incomplete recording of as-built data.

H. The Engineer may request confirmation of recorded work by independent survey. If inaccuracies are found, Engineer may order hidden elements to be exposed for recording. All costs associated with this work may be deducted from the Contractor's contract amount if the information has either not been recorded or has been recorded incorrectly.

1.05 SUBMITTALS:

A. Before Substantial Completion, the Contractor shall deliver a complete set of Record Documents to the Consultant for review and approval. The Record Documents will consist of one black line As-built Drawing set; annotated Project Manual; Change Orders; and approved shop drawings, product data, and samples which clearly and legibly show all deviations from the Contract Documents with colored pencil. The Record Documents must be approved by the Consultant prior to the Contractor requesting a Substantially Completion date from the Engineer.

PART 2 - PRODUCTS: *Not Used*

PART 3 - EXECUTION

3.01 RECORDING:

A. Mark Record Documents with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

B. Mark new information that was not shown on Contract Drawings or Shop Drawings, and as directed by the Engineer.

C. Indicate changes to the work and/or the project site that were not known prior to beginning the work but were visible as part of the project implementation that did not result in a change order.

D. Note all changes resulting from Modification Proposals by MP# and including approved substitutions.

E. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

F. The Contractor and its subcontractors shall coordinate recording of information as follows:

1. Each subcontractor is responsible for making record notations for his/her own work and forwarding these not less than weekly to the general Contractor. The general Contractor will transfer each subcontractor's notations as well as record its own notations of the general Work to a single set of record documents.
2. Legibly mark record set of drawings and addenda to show the following:
   a) Accurate measurements and locations of underground services and utilities, referenced to the building or other permanent construction as directed by the Engineer.
   b) Note changes of direction and locations, by horizontal dimension and vertical elevations, as utilities are actually installed.
   c) Note deviations from the contract documents, and reference reason for change (e.g., construction meeting minutes, telephone call report, field order, etc).
   d) Show details and locations not on original contract drawings.
   e) Indicate field changes of dimensions and details.

G. Specifications and addenda: Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and supplier of each equipment item actually installed; and
2. Changes made by field order or by change order.

H. Shop drawings, product data sheets and samples: Maintain one complete set as Record Documents and legibly annotate to record all approved changes.

3.02 ORGANIZATION OF RECORD DOCUMENTS:

A. Organize all Record Documents into a manageable set, and print suitable titles, dates and other identification on the cover sheet.

END OF SECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Work includes but is not limited to following:

1. Install and maintain clearing limits and temporary erosion and sedimentation control.
2. Demolition and Removal of site features, landscaping and vegetation as required to install new improvements.
3. Remove fencing, vegetation and miscellaneous items as required to install new improvements.
4. Grubbing work consisting of removing and disposing of organic materials from below the ground surface.
5. Remove and legally dispose of materials from site.
6. Protect from harm any site features selected to remain.

1.02 RELATED SECTIONS

Section 32 91 13 – Soil Preparation

1.03 SUBMITTALS

A. Submit:

1. Site Demolition procedures and operational sequence for review and acceptance by Landscape Architect. Include permits for hauling, transport and disposal of debris as required.
2. Submit as-built plans to Landscape Architect so that Landscape Architect can generate mylar reproducible record drawings indicating locations of new and remaining utility lines and related appurtenances.

1.04 DESCRIPTION

A. Construct erosion and sedimentation control in accordance with drawings, SeaTac requirements. Clear and grub site as required for all improvements. Protect from all harm any site features selected to remain. Remove fencing and vegetation as directed by Landscape Architect or Engineer.

1.05 EXISTING CONDITIONS

A. Protection of existing Improvements: Provide, erect and maintain barricades, coverings, or other types of protection necessary to prevent damage to existing improvements. Restore any site improvements, including but not limited to landscaping, pavement, walks, structures, fences and planters, damaged by this work to their original condition, as acceptable to Owner.

B. Contact utility companies and request meter readings, utility cutoffs, and meter and line removals. Verify that all appropriate services have been disconnected. Contractor shall pay for all fees and costs associated with utility disconnects, capping, line and meter removals.

C. Do not shut off or cap utilities without prior notice. Site utilities shall remain in service unless otherwise directed. Coordinate work with Division 1 requirements. Construct temporary erosion and sedimentation control. Maintain drains and sewers open for free drainage.

D. Objectionable Noises: Limit use of air hammers and other noisy equipment while school programs are in session. Conform to local governing requirements regarding Noise Control.

E. Maintain vehicular and pedestrian traffic routes:

1. Ensure minimum interference with roads, streets, alleys, sidewalks, and adjacent facilities.
2. Do not close or obstruct streets, fire lanes, sidewalks, alleys or passageways without permission from authorities having jurisdiction.
3. If required by governing authorities, provide alternate routes around closed or obstructed traffic ways.

PART 2 – PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify clearing and grubbing and site improvement removal may safely and appropriately begin.

B. Obtain required permits and permission from local governing authorities and Owner prior to commencing work.

C. Prior to beginning site clearing, meet with Landscape Architect and review all proposed utility layouts on site. Indicate all existing trees, shrubs and landscaping as well as site improvements that will be affected by construction. Coordinate removals of landscape materials with Owner.

3.02 EROSION CONTROL

A. Contractor shall construct and maintain the erosion control system in accordance with the drawings and the approved Construction SWPPP. Contractor shall pay for

all costs associated with the construction, maintenance and upgrading of the erosion control system throughout project duration, and removal of system when construction is complete. Coordinate Erosion Control with pertinent sections of the specifications and project manual and the DOE and City of SeaTac requirements.

B. Access Streets and Roadways: Provide wheel cleaning stations to clean wheels and undercarriage of trucks before leaving site, as necessary to prevent dirt from being carried onto public streets. If streets are fouled, clean immediately in conformance with City of SeaTac and all governing requirements and regulations.

C. Provide filter fabric between frame and grate of existing catch basins in and adjacent to work area. Provide filter fabric between frame and grate of new catch basins and area drains following installation, until site paving is completed.

3.03 TREE AND SHRUB PROTECTION - NOT USED

3.04 PRUNING, REPAIR AND REPLACEMENT - NOT USED

3.05 CLEARING

A. Remove plant and grass growth within the clearing limits as required for new construction and as indicated. Perform removal operations in a manner to protect property.

3.06 GRUBBING

A. General: Grub or otherwise prepare areas where clearing has occurred to receive construction or other improvements.

1. Excavate and remove roots larger than 1-1/2 inches in diameter, rocks, boulders, any remaining paving, and the like, as well as other unsuitable materials.
   a. Areas to be occupied by new pavement: Excavate these materials to not less than 4” below proposed subgrade.
   b. Other areas:
      i Not less than 4" below proposed subgrade at asphalt paving.
      ii Not less than 3" below proposed subgrade at shrub areas.

3.07 SITE IMPROVEMENT REMOVALS

A. Completely remove and dispose of fences and other obstructions in areas to be cleared. Take care in removing pavement and all other items that damage does not occur to the existing pavement which is to remain in place. Make a neat vertical saw cut at the boundaries of all areas to be removed. Replace adjacent materials designated to remain that are damaged due to Contractor's operations at no additional cost to the Owner.

B. Sprinkle excavated material and access roads as necessary to limit dust to lowest practicable level. Do not use water to extent causing flooding, contaminated runoff or icing.

C. Utilities: Cap and remove all piping designated for removal, including underground piping and exposed piping.
   1. Piping:
      a. Repair damage to existing utilities to remain at Contractor's expense.
      b. In the event the Contractor encounters utility lines not shown on the site plan or otherwise indicated to be saved, removed or abandoned, the location of such lines shall be marked in the field and the Engineer/Engineer notified.

3.08 DRAINAGE

A. Keep street and site drains open for drainage at all times. Mud/sediment build-up shall be removed and not flushed into the downstream system.

B. Keep open pits and holes caused as a result of demolition work free of standing water.

3.09 FILLING DEPRESSIONS

A. Fill depressions caused by clearing, grubbing and utility operations with structural fill material unless further excavation or earthwork is indicated. Structural fill shall be in accordance with Section 02200.

3.10 DISPOSAL OF MATERIALS

A. Dispose of refuse resulting from work in a manner consistent with all government regulations. In no case shall refuse material be left on the project site, shoved onto abutting private properties, or be buried in embankments or trenches on the project site. Do not deposit debris in any stream or body of water, or in any street or alley, or upon any private property except by written consent of the private property owner. Maintain hauling routes clean and free of any debris resulting from work of this Section.

END OF SECTION

~~***NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).***~~

PART 1 - GENERAL

1.01 Description: Construct all formwork systems to provide only those lines and delineations indicated, unless otherwise approved by the Engineer, construct formwork to allow erection in proper sequence and to permit removal without damage to the finished concrete surfaces. Construct all formwork to the shapes, lines and dimensions of concrete members with specified tolerances.

1.02 Regulations: Conform to requirements of the IBC ~~and the Seattle Building Code~~ as it pertains to structural cast-in-place concrete, except as supplemented and modified herein.

1.03 Reference Standards: Conform to requirements of the following Reference Standards as the Engineer judges them applicable and as modified and supplemented herein.

~~A. ACI Specifications for Structural Concrete for Buildings, ACI 301.~~

~~B~~A. ACI Recommended Practice for Concrete Formwork, ACI 347.

Formatted: Tab stops: Not at -0.5"

1.04 Related Sections:

Section 03 20 00 - Concrete Reinforcement
Section 03 30 00 - Cast in Place Concrete
Section 03 35 00 - Concrete Finishing
Section 32 13 13 - Concrete Paving

1.05 Quality Assurance:

A. Special Inspection: Notify the Engineer at least 48 hours before inspection of forms will be required.

B. Inspection by Other Trades: Where items, such as anchors, fastenings, conduit, piping and other items are supplied by other trades and specified elsewhere in these specifications, in the forms, obtain approval of their placement prior to placing any concrete.

1.06 Handling:

A. Protection of Forms: Design, construct, and erect all forms for reuse; withdraw projecting nails or other objects from contact surfaces before reusing; clean and completely recondition all forms prior to reuse; repair any damage to forming surfacing cause during previous usage. Obtain approval for each reuse; formwork with patches or repairs affecting appearance of the concrete surfaces will not be permitted.

B. In order that reused forms will not contain patches resulting from alterations, reuse forms on identical sections only; reuse no forms showing excessive surface wear or other imperfections impairing quality of finish of concrete surface.

C. Precautions: Contractor is responsible for the strength and suitability of the formwork.

PART 2 - PRODUCTS

2.01 Forms: For Footings and Concrete Slabs: Fabricate forms of MDO plywood, metal or plastic as judged best suited for shapes. Construct with a minimum of joints, sufficiently tight to prevent leakage.

2.02 Inserts/Sleeves: As required by Manufacturer's specifications.

2.03 Form Release Agents: Release agent with non-staining and non-interference characteristic with bonding capabilities of paints, plasters, adhesives, other surface coatings or materials. Contractor shall guarantee proper bonding of such subsequent coatings or materials applied over concrete.

PART 3 - EXECUTION

3.01 Design and Construction:

A. Erect forms to conform accurately to the shapes, dimensions, locations and profiles indicated; fit joints between adjacent assembled panels and components tightly and seal with gasket material. Inspect all contact surfaces prior to concrete placement; verify that surfaces are clean, smooth, and free from foreign matter or imperfections affecting appearance of finished concrete.

B. Camber: Design and erect formwork for anticipated deflection due to weight and pressure of fresh concrete. Provide positive means for adjustment of shores and struts to take up settlement during placement.

3.02 Form Treatments: Before erection of forming, plug and seal all cracks, holes, slits, gaps and other "telegraphing" imperfections in contact surfaces. Apply bond-breaking coating in amounts that will leave surfaces in proper condition to receive subsequent material application. Contractor shall be responsible for being certain that bond release coatings are applied only in amounts that will leave surfaces in proper condition to receive subsequent material application.

3.03 Form Removal:

A. Formwork designed for easy removal without damaging or marring finished surfaces of the concrete. Prying against face of concrete will not be permitted; where

mechanical means are necessary to release forms, use wood wedges only and then only if approved by the Engineer.

B. Removal Strength: Formwork for footings shall remain in place until concrete has hardened sufficiently to resist damage from the removal operations. Determine concrete removal strength based on test cylinders, field cured under the most unfavorable conditions prevailing for any portion of the work represented, or as approved by the Engineer.

END OF SECTION

~~***NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).***~~

PART 1 - GENERAL

1.01 Regulations: Conform to requirement of the IBC ~~and the Seattle Building Code~~ for concrete reinforcement, as supplemented and modified on drawings or herein.

1.02 Reference Standards: Conform to requirements of the following Reference Standards as the Engineer judges them applicable and as modified and supplanted herein.

A. American Concrete Institute (ACI) Building Code Requirements for Reinforced Concrete, ACI 318.

B. ACI Specifications for Structural Concrete for Buildings, ACI 301.

C. ACI Detailing Manual, ACI 315.

1.03 Related Sections:

Section 03 10 00 - Concrete Formwork
Section 03 30 00 - Cast in Place Concrete
Section 03 35 00 - Concrete Finishing
Section 32 13 13 - Concrete Paving

1.04 Quality Assurance: Special Inspection: Notify the Engineer at least 48 hours before placing any concrete.
~~Call the **SPR Inspection Request Line @ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov** to make arrangements for inspection.~~

1.05 Submittals: Product Data - Submit manufacturers' published literature for specified products and accessories as applicable, including manufacturers' specifications, physical characteristics and performance data. Submit as a supplement, manufacturers' instructions and directions for application if not included in manufacturers' published literature.

PART 2 - PRODUCTS

2.01 Materials:

A. Bars: ASTM A615; types, sizes and grades as indicated and noted on drawings; all bars free from rust and loose scale at time of delivery.

B. Tie wire: 16-gauge double annealed wire. Provide galvanized tie wire for exposed concrete.

PART 3- EXECUTION

3.01 Fabrication and Detailing:

A. Fabricate steel bar reinforcement to shapes and dimensions as shown and placed as indicated.

B. Bending and Straightening: Form bars accurately to detail, other kinks or bends will not be permitted; conform to requirements of ACI 318. Make bends cold around pin with diameter at least 6 times bar dimension; heating of reinforcement will be permitted only if entire operation is approved. No bending of reinforcement after partial embedment in concrete will be permitted, except for Grade 40 dowels.

C. Splices: Obtain approval of all splices not indicated on drawings. In general avoid splices at points of maximum stress. Saw, shear or flame-cut bar ends; straighten ends of sheared bars; chip and wire brush ends of flame-cut bars. Wire brush splice area to remove burrs, paint, oil, and other foreign matter before splicing. Splice overlap shall be at least 50 times the diameter of the bars or per ACI 318 02 Code.

3.02 Placement:

A. Unless specified otherwise, all steel reinforcement shall be centered within the forms and approved by the Engineer prior to placement of concrete. No reinforcement shall be closer than 2” from any concrete surface.

B. Clean reinforcing bars free from loose rust, mud, oil and other foreign matter affecting or reducing bond using approved portable sandblasting equipment. Accurately position bars in accordance with approved placement drawings and secure against displacement. Lap at intersections as indicated or as directed; extend reinforcement through, and lap beyond, construction joints.

C. Displacement: If bars are displaced, or if it is necessary to move bars to avoid interference with other reinforcing or embedded items, and if bars are moved to exceed tolerances, obtain the Engineer’s approval of resulting arrangement prior to placing concrete.

D. Miscellaneous: After cutting tie-wire, turn wires to the inside of the section and bend in such manner that concrete placement will not force ends to exposed concrete surfaces.

END OF SECTION

~~***NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).***~~

PART 1 - GENERAL

1.01 Regulations: Conform to requirements of the IBC ~~and the Seattle Building Code~~ as it pertains to structural cast-in-place concrete, except as supplemented and modified herein. The items of work to be performed shall include but are not necessarily limited to:

A. Walls, steps, foundations or footings and associated work.

1.02 Reference Standards: Conform to requirements of the following Reference Standards or as modified and supplemented hereinafter:

A. American Concrete Institute (ACI) Specifications for Structural Concrete for Buildings, ACI 301.

B. ACI Recommended Practice for Selecting Proportions for Concrete, ACI 613.

C. ACI Recommended practices for Cold Weather Concreting, ACI 306.

D. ACI Recommended Practice for Hot Weather Concreting, ACI 605.

1.03 Related Sections:

Section 03 10 00 - Concrete Formwork
Section 03 20 00 - Concrete Reinforcement
Section 03 35 00 - Concrete Finishing
Section 32 13 13 - Concrete Paving

1.04 Quality Assurance:

A. Special Inspection: Inspection shall be required immediately prior to any intended pours or placement of concrete. Notify the Engineer at least 48 hours before inspection. Call the ~~SPR~~ Inspection Request Line at 206.973.4764 ~~@ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov,~~ to make arrangements for inspection.

B. Concrete Work: Concrete work, where indicated, shall be exposed, as finished. Special care must be taken to provide specified, finished surfaces without gravel pockets, and other defacements.

1.05 Submittals:

A. Submit, for approval, all layout drawings for all cast-in-place concrete work. Show joint locations and other pertinent information. Refer to Section 01 33 10 – Submittals, for additional requirements.

Formatted: Font: Not Bold
Formatted: Font: Not Bold
Formatted: Default Paragraph Font, Font: CG Times, Not Bold
Formatted: Font: Not Bold, No underline, Font color: Auto
Formatted: No underline, Font color: Auto

B. Records: Maintain records of all concrete placements; indicate exact mix proportions, list time, date, location in the project, weather conditions at the time of placement, and the source of the concrete supply. Make records available to Engineer at any time during the course of construction and submit at end of concrete placement phase of project for the purposes of preparing record documents.

C. Certificates: Submit certification of previously tested mix designs.

PART 2 - PRODUCTS

2.01 Concrete Materials:

A. Aggregates: Standard: ASTM C33-86.

B. Cements:

1. Provide cements obtained from same source or of same brand for concrete in same element or portion of the work.
2. Standard Portland Cement: Columbia, Ideal, Kaiser, Lone Star, or approved equal. Standard gray Portland cement, ASTM C150-86; uses type I or type III.

C. Cementious Materials: Fly ash, ASTM C618 type F, except that the maximum allowable loss on ignition shall be 0.75%. Use for all concrete.

D. Admixtures:

1. Use only one brand of admixtures.
2. Water-Reducing Admixture: Master Builders Pozzolith 300-N. Chemical admixture conforming to requirements of ASTM C494-86, Type A.
3. Retarder-Densifying Admixture: Master Builders Retarding Pozzolith, or approved equal: Conforming to requirements of ASTM C494-86, Type B.
4. Accelerator: Chemical admixture designed to accelerate set on concrete but not corrode reinforcing steel; ASTM C494-86, Type C.
5. Air Entraining Agent: Conforming to requirements of ASTM C260-86.
6. ~~Color additive: Lampblack per Section 32 13 13 - Concrete Paving.~~

E. Other Ingredients: Provide other ingredients as indicated or as required by Code or Reference Standards.

2.02 Concrete Mix: Concrete mix shall be Class 5 (3/4), per City of Seattle Standard Specifications (most recent edition), and have characteristics as follows:

28 day compressive strength	2,8~~3~~00, psi
Sacks Cement	(6~~5~~) per CY - (see "Cement", below)
Fine Aggregate (Type 1)	(291 lbs.) per Sack. - (see "Aggregates", below)

Coarse Aggregate (Type 5)	(387 lbs.) per Sack, - (see "Aggregates", below)
Max. Water	(6.5 bags) per Sack
~~*Fibrous Reinforcing*~~	~~*(1.5 lbs.) per CY*~~
Slump (inches)	(2 - 3.5) per ASTM C143-78

2.03 Portland Cement: Use only Type II Portland Cement, as specified in City of Seattle Standard Specifications (most recent edition), and AASHTO M 85.

2.04 Aggregates:

A. Fine Aggregates: Mineral Aggregate (Type 1), per City of Seattle Standard Specifications (most recent edition), Fine Aggregates shall consist of sand or other inert materials, or combinations thereof, having hard, strong, durable particles free from an adherent coating. Fine Aggregate shall be washed thoroughly to remove clay, loam, alkali, organic matter, or other deleterious matter. Mineral Aggregate Type 1, particle gradation is as follows:

Sieve Size	% Passing
#4	95 - 100
#8	68 - 86
#16	47 - 65
#30	27 - 42
#50	9 - 20
#100	0 - 7
#200 (wet)	0 - 2

B. Coarse Aggregates: Course Aggregate (Type 5), per City of Seattle Standard Specifications (most recent edition), Coarse Aggregate shall consist of gravel, crushed stone, or other inert material or combination thereof having hard, strong, and durable pieces free from adherent coatings. Coarse Aggregate shall be washed to thoroughly remove clay, silt, bark, sticks, alkali, organic matter, or other deleterious material. Mineral Aggregate (Type 5) particle gradation is as follows:

Sieve Size	% Passing
1-1/2" Square	100
3/4" Square	80 - 100
3/8" Square	10 - 40
#4	0 - 4
#200	0 - 0.5

2.05 Bonding Agents and Adhesives:

A. Bonding Agents as required.

B. Primers and Sealers: As recommended by the adhesive and bonding agent manufacturers.

2.06 Expansion Joints in Slabs:

A. Joint Filler: Pre-formed, non-extruding asphalt impregnated resilient material; ASTM D1752, Type I, 3/8" wide by depth required to bring top surface within 1/2" of slab surface.

B. Joint Sealer: Self-leveling polyurethane; ASTM C920, Type M, Grade SL, Class 25. Color: gray.

2.07 Concrete Mixes:

A. Quality of Concrete: Assumed compressive strengths and locations of same are noted on drawings.

B. The fly ash content shall not exceed 7% by weight of the total cementious material.

C. Admixtures:

1. Add in accordance with manufacturer's directions.
2. If approved, water-reducing retardant may be used when the temperature of the concrete, as placed, exceeds 65 degrees F.
3. If approved, accelerator may be used when temperature of concrete is less than 40 degrees F.
4. No calcium chloride or other water-soluble chloride ion admixtures will be permitted, unless otherwise approved by Engineer.
5. Use retarder/densifier when placing other concrete in warm weather conditions or when ambient temperature exceeds 65 degrees F.
6. Use air-entraining agent in concrete subjected to freezing temperatures after curing. Total air content shall be in accordance with Table 26-B of the IBC.
7. For colored/weathered concrete use Lampblack per Section 32 13 13 - Concrete Paving and as noted on the drawings.

D. Mix Design:

1. Determine mixes as noted on the drawings.
2. If the Contractor elects not to use the approved design mix, Contractor shall pay for special batch plant inspection costs.

2.08 Mixing Concrete: Standard Concrete - Ready-Mixed Concrete: Mix and transport in accordance with ASTM C94-86.

PART 3 - EXECUTION

3.01 Concrete Placement:

A. Inspection: Before placing concrete, inspect and complete any unfinished formwork, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work. Call the Inspection Request Line at 206.973.4764 to make arrangements for inspection.

~~. Call the **SPR Inspection Request Line @ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov** to make arrangements for inspection~~

B. General: Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location.

D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers no deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

E. Cold Weather Placement: Comply with provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing action, or low temperatures.

F. When air temperature has fallen to or is expected to fall below, 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing, to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C) and not more than 80 degrees F (27 degrees C), at point of placement.

1. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen sub-grade or on sub-grade containing frozen materials.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.

G. Hot Weather Placement: When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 degrees F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
3. Fog spray forms, reinforcing steel, and sub-grade just before placing concrete. Keep sub-grade moisture uniform without puddles or dry areas.
4. Use water reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to the Engineer.

3.02 Construction Joints:

A. Form all joints perpendicular to main reinforcement. Continue reinforcing across joints, unless otherwise indicated; provide longitudinal keys at least 1-1/2 inch deep at all joints in walls between walls and slabs or footings. Remove key forming wood inserts and thoroughly clean surface of concrete at all joints before placing next lift.

B. Roughen surface of concrete at joints and remove laitance to obtain bond before placing next lift; if use of keys is impractical due to congestion or inaccessibility or if it is inadvisable to disturb surface before it has hardened, use only wet sandblast method for preparing surface.

C. Dampen hardened concrete of joints between footings and walls, joints in unexposed walls, and all others not specifically mentioned here in after and roughen by air water cutting.

D. Dampen hardened concrete joints in exposed work and roughens by air/water cutting. Thoroughly cover joint surfaces with neat cement mortar of similar proportions to mortar in concrete; apply mortar as thick as practicable on vertical surfaces and a minimum of 1/2 inch thick on horizontal surfaces; place next lift before mortar has reached its initial set.

E. For bonding new concrete to existing concrete use bonding agent. For grouting dowels and reinforcing bars use specified adhesives in accordance with manufacturer's instructions.

F. Provide key forming wood inserts strips in walls; pour concrete to 1/2 inch above lower edge or strip.

3.03 Control Joints: In slabs on grade, tool or saw-cut control joints to true, straight lines, maximum variance from true line of 1/4 inch in 10 feet and no irregularities across joint in excess of 1/8 inch; extend reinforcing steel through and lap beyond joints.

3.04 Expansion Joints:

A. Provide pre-molded 3/8" joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.

B. Locate expansion joints as noted on drawings.

C. Extend joint fillers full width and depth of joint and not less than 1/2 inch or more than 1 inch below finished surface where joint sealer is indicated. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together. Protect top edge of joint filler during concrete placement with a metal or plastic temporary strip. Remove protection after concrete has been placed on both sides of joint before sealant is applied.

D. Fillers and Sealants: Install polyurethane sealant in a continuous, smooth joint, wiping excess sealant from adjacent concrete.

E. Provide expansion joints not more than 30 feet apart in footings. Run no reinforcement or other metal trim continuously through joints, unless otherwise indicated.

3.05 Non-Shrinking Grout: Apply in accordance with manufacturer's direction; protect adjacent finished surfaces from defacement. Provide for sleeves, and where indicated.

3.06 Cleaning: Leave premises completely clean and free of residue from work of this section.

END OF SECTION

~~***NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).***~~

PART 1 - GENERAL

1.01 Description:

A. Manage work site and materials to eliminate potential contamination of surrounding site with screws, nails, scrap metal, wood splinters, paints or solvents, or other detrimental materials used for this work.

B. ~~Construct *xxxxxx* ***Structure*** of dimensional lumber and galvanized steel hardware.~~

C. Apply specified finishes to approved work.

1.02 Related Sections:

Section 03 30 00 - Cast-in-Place Concrete
~~***Section 06 10 00 - Rough Carpentry - Natural Select Supplement***~~
~~***Section 06 10 53 - Dugout Roofs for Ballfields***~~

1.03 Quality Assurance:

A. Conform to requirements of the following Reference Standards or as modified and supplemented within this specification.

1. International Building Code (IBC)
~~2. City of Seattle Building Codes and Regulations (SBC)~~

B. Conformance with Standards and Tests: Materials and handling shall conform to the following organizations' standards for materials testing and handling. Each standard is hereafter referred to by its organizational designation only. All materials and handling techniques shall conform to the appropriate standard.

1. ASTM A 123 - American Society for Testing and Materials Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strips.
2. ASTM A 153 - American Society for Testing and Materials Zinc Coating (Hot-Dip) on Iron and Steel Hardware
3. ASTM A 307 - American Society for Testing and Materials Carbon Steel Externally Threaded Standard Fasteners
4. ASTM A 563 - American Society for Testing and Materials Carbon and Alloy Steel Nuts
5. C2 - American Wood Preservers Association Lumber, Timbers, Bridge Ties, and Mine Ties Preservative Treatment by Pressure Process

6. M4 - American Wood Preservers Association Standard for the Care of Pressure Treated Wood Products

1.04 Submittals: Shop Drawings: Submit for approval shop drawings, details of fabrication with dimensions and connections shown. Indicate a complete list of wood members and hardware with complete dimensions and quantities. Provide Name and Address of suppliers for wood and metal products.

1.05 Delivery, Storage and Handling: Ship, store, and handle all items so as to protect all components from damage on site. Store in a safe location, out of pedestrian and vehicular traffic and protected from weather. Repair or replace any damaged components before installation. Do not store materials directly in contact with the ground.

1.06 Safety Requirements: Commencement of the work of this Section implies an absolute commitment to managing the materials used in the execution of the work to avoid loss into the surrounding site. Contamination of the surrounding landscape with loose nails, screws, wood and metal scraps, splinters, and spilled paints or solvents will be avoided by covering adjacent areas with protective tarps or other approved means. Loose materials will be collected on a daily basis to avoid unintentional loss.

PART 2 - PRODUCTS

2.01 Structural Wood Members: All wood used shall be Hem-Fir, Select Structural or better, unincised, Pressure Treated to AWPA Quality Standard C2, retaining a minimum of 0.25 lbs / cf ACQ or CBA preservative. ***Where higher Stress Grades are called for in "General Structural Notes," the more stringent requirement shall govern.***

Formatted: Font: Bold, Italic

2.02 Hardware and Fasteners:

A. Bolts, Nuts, Washers shall be galvanized steel, SAE, sized per the Contract Drawings.

B. Steel Plate connectors shall be 3 gauge with 7 gauge strap anchors where applicable, galvanized after fabrication, factory primed finish gray, Strong-Tie Connectors as manufactured by Simpson Strong-Tie Company, Inc., (800) 999-5099, or approved equal.

2.03 Finishes:

A. Wood Finishes: Following acceptance of all wood construction, an approved water-based commercial sealer shall be applied to the manufacturer's written specifications.

B. Metal Finishes: All fabricated steel plate components shall receive the following finishes:

1. Zinc chromate primer, or, approved equal.
2. Field cold galvanization, "Galvacon", or, approved equal.
3. Alkyd enamel, black or dark green semi-gloss, Parker Paints, or, approved equal.

2.04 Glue: Ordinary wood glue for general carpentry, "Elmer's" wood glue, or, approved equal.

2.05 Plywood wall sheathing: As indicated in "General Structural Notes" on structural drawings

Formatted: Font: Bold, Italic

PART 3 - EXECUTION

3.01 Verification: Prior to commencing the work of this Section, verify the accuracy and completion of the installation of pre-engineered steel structures installed under Section 13 34 19 - Pre-engineered Metal Structures and cast-in-place concrete footings and foundations with embedded post bases installed under Section 03 30 00 - Cast in Place Concrete for Site Work. Report any discrepancies to the Engineer immediately.

3.02 Installation:

A. Assemble ~~Arbor~~ structures in conformance with the Contract Drawings.

B. All shop fabricated and field cuts and borings shall be treated with waterborne ACQ or CBA to APWA C2 quality standards. ***Treat penetration damage per APWA M-4.***

Formatted: Font: Bold, Italic

C. All vertical supports shall be installed plumb unless otherwise noted. Allow additional height for adjustment of horizontal members in the event that post bases are not installed at exact, equal elevations.

D. Install all horizontal members to true level unless otherwise specifically noted by an indication of intended slope. Prior to making final connection, trim added height from vertical members to achieve the intent of the drawings. ***At structures where structural framing is exposed to view or is covered by transparent or translucent sheathing or finishes, intermediate horizontal framing and blocking to be installed true and level and to align vertically with adjacent blocking.***

Formatted: Font: Bold, Italic

E. Mechanical Connections

1. Securely clamp and brace wood members to be connected to establish precise location and true level in bolt holes and lag screw pilot holes. Protect surfaces of permanent wood members from compression damage with scrap 1"x material. Do not use temporary nailing.

2. Machine or Carriage Bolt connections shall be pre-drilled to 1/16" larger diameter than the specified connector.
3. Lag Screw connections shall be pre-drilled to ¼" minimum under size of specified connector.
4. Make countersink borings to accept washers ¼" over diameter of specified washer and depth to allow bolt or screw head to tighten to between flush and ¼" beneath lumber surface. Do not allow bolt heads or ends to protrude beyond wood surface, and do not reduce the thickness of the structural connection by over-boring.
5. Make all connections tight without overly distorting or compressing wood surfaces or countersink borings.
6. Wood-to-Steel connections shall be separated by standard, medium weight roofing felt. Trim excess as directed.

F. Screw Connections

1. Pre-drill all screwed connections to a 3/32" diameter pilot hole with an integral counter-sink bit.
2. Apply standard wood glue to pilot holes prior to making connection.
3. Counter-sink simple screwed connections so that screw-head is 1/8" to ¼" below surface.
4. Fill all counter-sunk screw holes with weatherproof filler.

3.03 Finishes:

A. Moisture Testing on Exterior Wood Surfaces: Prior to painting, moisture reading shall be taken with an approved professional grade moisture meter. This reading shall not exceed 19%. If environmental conditions are not favorable and wood tested regularly over a period of days does not show a drying trend, finishing operations may, at the discretion of the Engineer, be suspended until such time as conditions become appropriate.

B. Following acceptance of moisture testing, apply sealer to approved manufacturers specifications.

C. All fabricated steel components shall arrive at the work site pre-galvanized and pre-primed. Following installation the Engineer may direct additional field galvanization or priming as necessary to correct damage that may have occurred during installation. Following acceptance of the prepared surface, apply 2 coats of approved Alkyd Enamel, following manufacturer's written specification for cure time between coats.

D. Immediately clean all surfaces that receive incidental and/or unspecified finishes.

3.04 Clean Up: Remove all construction debris including loose nails, screws, sawdust, wood and metal scraps, splinters, and spilled paints or solvents from all adjacent and surrounding

surfaces and landscape areas. Use magnets or metal detectors to verify for the Engineer than no loose nails or screws remain in surrounding soils.

3.05 Acceptance: Upon completion of the fabrication, assembly and finish work, and cleanup, the Engineer may require spot-tightening of various connection hardware. During the scheduled final inspection insure that all of the tools and equipment necessary for this task are on hand. Following this final adjustment the Engineer will consider the work complete.

END OF SECTION

PART 1- GENERAL

1.01 Description: Provide all labor, materials, and equipment to perform the following work of the Contract, including incidentals related to that work and coordination and support of other work specified elsewhere in the Contract Documents:

A. Safety Monitoring & Response.
B. Protection of Existing Features and Work in Progress.
C. Survey for horizontal and vertical control of all work of the Contract.
D. Grading and compaction as required achieving lines and grades on Drawings.
E. Excavation and backfill of trenches for Utilities, including; Irrigation Systems, Potable Water Systems, Storm/Sub-surface Drainage Systems to lines and grades as shown on the Drawings.
F. Grading & Compaction of sub-grade and base aggregates for Concrete, Concrete Masonry Unit and Asphalt Paving.
G. Import and placement of Playfield and Planting Soils for Lawn Areas and Landscape Plantings.
H. Removing materials from the site which are in excess of that which is required.

1.02 References:

A. R.C.W. - Chapter 39.04.180 Public Works/Trench Excavations - Safety Systems Required.
B. R.C.W. - Chapter 49.17 WISHA. WAC 296-155 - Safety Standards for Construction Work.

1.03 Related Sections: Coordinate related work specified in other parts of the Project Manual, including but not limited to following:

Section 01 56 00 - Temporary Fencing
Section 01 56 39 - Temporary Tree & Plant Protection
Section 01 57 13 - Construction Stormwater Control
Section 02 41 13 - Selective Site Demolition
Section 31 11 00 - Clearing and Grubbing
Section 32 11 23 - Mineral Aggregates
Section 32 15 40 - Crushed Rock Paving
Section 32 80 00 - Irrigation Systems
Section 33 10 00 - Water Distribution Systems
Section 33 34 00 - Storm Drainage Utilities

1.04 Quality Assurance:

A. The Contractor is responsible for verifying the quality of the work and shall perform compaction and density tests on request of the Engineer to check compliance with these specifications. A copy of the test reports shall be furnished to the Engineer.

B. The Engineer's Testing Agency may perform compaction and density tests to verify compliance with these specifications.

C. The Engineer may require that an independent testing laboratory test imported materials at any time. If the material is found to be non-compliant with the Contract, the Contractor shall bear the cost of testing, removal of all non-compliant materials from the Project Site, and replacement of the materials with materials meeting the requirements of the Contract. If the materials tested are found to be compliant with the requirements of the Contract, the Owner will reimburse the Contractor for costs incurred by testing plus mark-ups as allowed for elsewhere in the Contract.

D. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

E. Submittals:

1. Safety Products:
   a. Submit for the Engineer’s approval manufacturers product data for each worker safety product specified.
   b. Provide current calibration certificates for each piece of mechanical monitoring equipment to be used in the work. Perform field testing of equipment for the Engineers approval prior to commencing excavation.
2. Bulk Materials: The Engineer shall approve in principle all products used in the execution of this section prior to their importation to the Project Site. Submit a particle gradation analysis in graph and table form for each product specified. Approval of the Engineer of an analysis does not constitute approval of the actual product, which may be subject to additional testing at any time per paragraph 1.04.C above.

1.05 Manufacturer’s Qualifications: The Contractor shall cause the materials that are to be furnished under this section to be the product of firms that are experienced in the manufacture of the specified materials.

PART 2 - PRODUCTS

2.01 General:

A. During the course of importation of materials, the Contractor shall be responsible for continually checking the materials to insure that they continue to meet the Specifications.

2.02 Safety, Monitoring, & Response Products and Equipment: The Contractor shall provide barricades, safety guards, temporary fencing, signage and/or other methods to secure

trenches, open excavations, and other unsafe conditions resulting from this construction. Undertake work in full compliance with all applicable regulatory requirements.

2.03 Utility Backfill:

A. Perforated Drain Pipe (Non-rigid PVC Pipe):

1. Pipe Bedding & Backfill shall be Type 4 Mineral Aggregate (aka 1½" Washed Gravel). Perforated pipe bedding shall consist of well-graded mineral aggregate with no fractured surfaces, meeting a particle gradation as follows:

Sieve Size	Percent Passing
1-1/2" square sieve	100
1-1/4" square sieve	90-100
3/4" square sieve	0-20
3/8" square sieve	0-2

2. Pipe Bedding and backfill for solid piped drainage shall be of native soils occurring on-site, only if those soils meet or exceed the gradation standards per the City of Seattle Standard Specifications (most recent edition) and/or Section 32 11 23 - Mineral Aggregates., for Type 4 Mineral Aggregate (aka 1½" Washed Gravel), or as approved by the Engineer.

B. Solid Water, Sewer, or Drain Pipe/Tight Line (Non-rigid PVC or HDPE Pipe):

1. Bedding in solid pipe storm drainage trenches, shall be Type 22 Mineral Aggregate (aka 5/8" crushed rock, bearing no naturally occurring or worn surfaces), meeting the following particle gradation:

Sieve Size	Percent Passing
5/8" square sieve	100
1/2" square sieve	75-100
1/4" square sieve	0-25

2. Backfill for solid piped drainage shall be of native soils occurring on-site, only if those soils meet or exceed the gradation standards for Type 17 Mineral Aggregate (aka Bank Run Gravel), per the City of Seattle Standard Specifications (most recent edition) and/or Section 32 11 23 - Mineral Aggregates, or as approved by the Engineer.

3. Bedding for water and sewer utility pipes shall be gravel and sand backfill for pipe zone bedding, meeting requirements of Section 9-03.12(3) of the City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction.

4. Backfill for solid water and sewer utility pipes shall be of native soils occurring on-site, only if those soils meet or exceed the gradation standards for Type 17 Mineral Aggregate (aka Bank Run Gravel), per the City of Seattle Standard Specifications (most recent edition) and/or Section 32 11 23 - Mineral

Aggregates, or as approved by the Engineer. Native soils shall be free from debris, delitrious material, and rocks greater than 3 inches in diameter.

2.04 Electrical Conduit Backfill:

A. Sand for pipe bedding and backfill around all irrigation heads shall be building sand that meets the following sieve gradation:

Sieve Size	Percent Passing
No. 6 sieve	95-100
No. 8 sieve	85-95
No. 50 sieve	15-30
No. 200 sieve	0-2

B. Suitable backfill material for use around all conduit, hand holes and equipment as shown on the drawings, shall be native topsoil with no rocks or other debris more than 1/2 inch diameter or Pea Gravel or "Builders" Sand. Provide proper screening of materials prior to backfilling.

C. Electrical conduit trench backfill shall comply with Section 26 00 00 - Electrical.

2.06 Selected Backfill (Common Fill): Where on-site soils prove to be insufficient in quantity or quality to achieve design sub-grades and compaction levels, imported fills may be accepted upon approval of the Engineer. Selected Backfill (Common Fill) shall be Type 17 (Bank Run Gravel), available from a recognized commercial source meeting the following sieve gradation, per the City of Seattle Standard Specifications (most recent edition) and/or Section 32 11 23 - Mineral Aggregates.

Sieve Size	Percent Passing
3" square sieve	95 - 100
1/4" square sieve	25 - 75
No. 200 sieve wet	0 - 5

A. Organic content shall be no greater than 8% dry weight.

B. Variations to this particle gradation may be considered dependant on the application.

C. Submit to the Engineer a written request to import Selected Backfill (Common Fill) including the total volume of import anticipated (or range) and the source including name, address, and phone number of supplier, and geographic source of the material proposed to be imported.

2.07 Structural Backfill: For use as imported base course for Ecology block walls, green house foundations, and other structures.

A. Shall be Type 2 Mineral Aggregate (1 1/4" minus crushed rock), bearing no naturally occurring or worn surfaces and/or Section 32 11 23 - Mineral Aggregates. Gradation of the base course shall be:

Sieve Size	Percent Passing
1 1/4" square sieve	100
1" square sieve	80-100
5/8" square sieve	50-80
No. 4 sieve	25-45
No. 40 sieve	3-18
No. 200 sieve wet	0-7.5

2.09 Utility Pipe Tracer Tape: Shall be detectable below ground surface and color coded, with utility name printed on the tape. Conductive Warning Tape is required over all water, sewer, drainage, irrigation pipe and electrical conduit. Tape shall be manufacturer's standard permanent, bright-colored, continuous printed plastic tape, aluminum backed, intended for direct-burial service. Tape shall be not less than 3" wide x 4 mils thick.

Tape Schedule:	Piping	Color	Wording
	Sanitary Sewer	Green	Caution - Sanitary Sewer
	Storm Drain	Green	Caution - Storm Drain
	Irrigation Systems	Blue	Caution - Irrigation
	Domestic Water	Blue	Caution - Water
	Electrical Conduit	Red	Caution - Electrical

2.10 Ecology Block Wall: Shall consist of solid precast concerete blocks, referred to as Ecology blocks. Ecology blocks shall be placed over clean, compacted, structural fill to the lines and grades shown on the Drawings.

PART 3- EXECUTION

3.01 Safety Monitoring & Response: In addition to all current State and Local Safety Requirements;

A. Maintain conformance to the Contractors Health and Safety Plan.

B. When working in the presence of landfill materials (exposed refuse), the Contractor shall conform to all appropriate WAC codes and practices.

3.02 Protection of Existing Facilities:

A. Refer to Division 1 Specifications, for information pertinent to the protection of all existing facilities.

B. It is understood that there will be interfering utilities, service laterals and other underground pipes, drains or structures encountered that are not shown, or areas shown incorrectly on the plans, or have not been previously discovered in the field. Contractor agrees this is a normal and usual occurrence in the construction of underground improvements. Furthermore, Contractor understands and agrees that work in some cases must be done in close proximity to said utilities and underground pipes, drains and structures not shown or shown incorrectly on the plans, which may require a change in operations and may cause sloughing of the trench, additional traffic control, additional pavement and backfill costs and time. The Contractor agrees that these occurrences are usual and ordinary, and are reflected in the bid and plan of operation.

C. Contractor agrees to provide for these conflicts and interferences and agrees to provide for a reasonable amount of time for design changes and/or utility relocations due to said interferences.

D. Repair and or replacement of damaged facilities to the Engineer's satisfaction will be accomplished at the Contractor's expense.

3.03 Protection of Work In Progress: It is the responsibility of the Contractor to protect all work in progress from damage due to extremes of cold, moisture, or drying, or mechanical damage from equipment traffic or foot traffic. Alert the Engineer to the presence or likelihood of conditions that may adversely affect the quality of the work, the physical structure of soils, or transport of site soils off-site.

A. Do not work frozen soils.

B. Protect soils from excessive moisture. During periods of prolonged precipitation, take aggressive steps to avoid over-saturation, erosion, or homogenization of soils by covering with protective plastic sheeting, collection and controlled dewatering, detention for sediment removal, and allowing excessively wetted soils to remain fallow until approved by the Engineer as appropriate for continued work. It shall be the Contractor's sole responsibility for soils that are contaminated by the weather and/or by his/her construction activities.

C. Apply supplemental moisture to overly dry soils.

D. Do not operate heavy equipment near excavations where trench wall or cut-slope failure may result.

3.04 Earthwork - General:

A. Removal of materials beyond indicated sub-grade elevations or dimensions without specific direction of the Engineer is not authorized. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

B. Stability of excavations:

1. Sides of excavations to be vertical as shown on the Drawings. Maintain sides of excavations in a clean and safe condition until completion of back filling.
2. Shoring and bracing are required at excavations deeper than 4 feet below adjacent existing grade. All shoring and bracing shall conform to the requirements of the Seattle Standard Specifications (most recent edition) and requirements of the Washington Industrial Safety and Health Act.

C. Dewatering: Prevent surface and subsurface water from flowing into excavations and from flooding project site. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. If required, line ditches and sumps with coarse-grained material that acts as a filter. Do not use trench excavations as temporary drainage ditches. All dewatering shall conform to the requirements of the City of Seattle Standard Specifications (most recent edition) and Title 22.802 of the City of Seattle Stormwater, Grading, and Drainage Control Code (most recent edition).

D. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape all stockpiles for proper drainage.

E. Locate and retain soil materials away from edge of excavations and drip lines of trees to remain.

F. Dispose of excess soil material and waste materials as herein specified.

3.05 Grading:

A. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Finish surfaces free from irregular surface changes.

B. Landscape planting, lawns, and other landscape repair areas finish grade to be minus 1/2 inch from adjacent paving surfaces with smooth transition to adjacent grades.

3.06 Excavation:

A. Layout: All work shall be surveyed and staked by the Contractor as required to complete earthwork. Maintain all benchmarks, control monuments and stakes, whether newly established or previously existing. Protect from damage and dislocation. If necessary to disturb existing benchmarks, re-establish in a safe place. Notify Engineer a minimum of 3 days prior to excavation of work areas. Engineer shall inspect staking and layout of work.

B. Excavation for Trenches: Provide neat trenches to the depth, slope (where appropriate) and width as indicated in the Contract Drawings. Allow for import of

surfacing materials and bedding. Provide clean, smooth trench walls and trench floors.

3.07 Excavation Safety Systems: Provide all trench excavation in excess of 4 feet in depth with a safety system conforming to the referenced requirements.

3.08 Compaction:

A. General: Control soil compaction during construction providing minimum percentage of density specified for area classification. Do not allow equipment traffic to overly compact areas beyond specified percentages. Remediate over-compaction as directed by the Engineer including ripping, re-grading and re-compaction or over-excavation and in-kind replacement per plan.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages for maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D698; and not less than the following percentages of relative density; determined in accordance with ASTM 4253, for soils which will not exhibit a well defined moisture density relationship (cohesionless soils).

1. Backfill:
   a. Bedding under solid utility pipe- 95%
   b. Bedding over solid utility pipe - 95%
   c. Backfill over solid utility pipe - 95%
   d. Perforated Drain Pipe Bedding and Top Lift, water settle - 75%.
   e. Over excavation Backfill of Existing Sub-grade to remain - 95%
   f. Structural Backfill – 95%
2. Sub-grades:
   a. Sub-grade soils in lawn areas (outside Playfield) - 75%
   b. Sub-grade soils in landscape planting areas - 70%
   c. Import aggregate base material in paving areas - 95%
3. Surface Fills:
   a. Planting Soils - 70%
   b. Fills on slopes exceeding 3:1, to prevent erosion – shall be determined on a project by project basis based on recommendations by the Engineer and the Geo-technical Engineer of Record for the project.
   c. Import aggregate material for crushed surface paving – 95%

C. Moisture Control:

1. Where sub-grade or lift of soil material must be moisture conditioned before compaction, uniformly apply water to surface of sub-grade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Before compaction, moisten or aerate each layer as necessary to provide optimum content. Compact each layer to required percentages of maximum dry density or relative dry density for each area classification.

3. Do not perform compaction operations on excessively wetted soils.

3.09 Trench Backfill:

A. Place fill materials in specified lifts to required sub-grade elevations, for each area classification as described in this Section.

B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Inspection, testing, approval, and recording locations of underground utilities.
2. Removal of shoring and bracing, and back filling of voids with satisfactory materials.
3. Removal of trash and debris.

C. Placement and Compaction: Place backfill and fill materials in layers of 2' maximum loose depth for material compacted by heavy compaction equipment and 1' maximum loose depth for material compacted by hand operated tampers. All compaction shall be by mechanical methods. Water settling may be used for Perforated Piped Drainage aggregates only. Do not place backfill for fill material on surfaces that are overly wet or dry, frozen, or graded inconsistently.

D. Solid Utility Pipe Trench Backfill:

1. Provide a single, consistent 4" compacted lift of Solid Utility PipeTrench Bedding.
2. Coordinate the installation of Solid Utility Pipes per the requirements of Section 33 10 00 – Water Distribution Systems, Section 33 33 00 – Sanitary Sewerage Utilities, and Section 33 34 00 - Storm Drainage Utilities.
3. Upon approval of the Engineer of installation of Solid Piped Utilities, install an additional single lift of Solid Piped Utility Bedding in a thickness allowing a minimum 4" compacted cover over crown of Solid Pipe.
4. Complete installation with specified native soils or approved Common Fill compacted to design sub-grade.

3.11 Backfill of Over-excavations: Backfill over-excavations with approved excess native soils or approved Common Fill true to the design elevations per the Contract Drawings unless otherwise directed. Install and compact to specified rates in lifts not exceeding 8" of loose material.

3.12 Ecology Block Wall Soil Preparation:

A. Structural Backfill shall be graded such that upon approval of compaction, the surface of the Backfill is at the correct elevation and sufficiently level for placement of Ecology block or other structure foundation material.

B. The geotechnical engineer or special inspector may require modifications to the excavation, subgrade soil preparation, and placement and compaction of structural fill and backfill.

3.15 Disposal of Excess and Waste Materials: Remove from the Owner's property, all waste materials, including unacceptable excavated material, trash and debris, and dispose of it off site in a legal and timely manner. Provide dump receipts from an approved dumpsite if directed.

END OF SECTION

PART 1 – GENERAL

1.01 Summary:

A. This Section includes specifications for clearing, grubbing, and disposing of vegetation, including bushes, brush, trees, stumps, roots, rubbish, refuse, trash, and debris within the indicated site limits.

B. Related Sections: The work of the following Sections is related to the work of this Section. Other Sections, not referenced below, may also be related to the proper performance of this work:

Section 01 56 39 - Temporary Tree & Plant Protection
Section 02 41 00 - Site Demolition
Section 31 00 00 - Earthwork

1.02 Existing Conditions:

A. By submitting a bid, the Contractor represents that it has visited the site to become familiar with the quantity and character of all materials to be cleared, and agrees that the premises were made available prior to the deadline for submission of bids for whatever inspection and tests the Contractor deemed appropriate.

PART 2 – PRODUCTS

2.01 Materials & Equipment:

A. Furnish materials, tools, equipment, facilities, and services as required for performing site clearing, grubbing.

PART 3 – EXECUTION

3.01 Preparation:

A. For sites that are identified possible Archaeological Sites or possible landfills or historic “dump” sites, prior to clearing and grubbing operations, the Contractor shall notify the Engineer at least one week in advance of planned activities and make work sites available to SPR’s Consulting Archaeologist for observation. Notify the Engineer in the event artifacts are discovered during clearing work.

B. Dispose of cleared, grubbed, and removed material away from the site. Burying and burning of materials at the site is not permitted. Stockpile salvaged material in a secured location.

C. Clear and restore areas used for the Contractor's convenience; restore areas to original condition providing mulching, seeding, and planting as required.

D. Protect survey markers and monuments, existing improvements, existing observation wells and piezometers, and adjacent properties from removal and damage.

E. Protect all trees, lawns, and planted areas that are not in direct conflict with the work shown on the Contract Documents. Restore all on-surface disturbed areas to a condition satisfactory to the Engineer.

F. Review with the Resident Engineer the location, limits, and methods to be used before clearing work. Perform clearing and grubbing in compliance with all local, state, and federal laws and requirements pertaining to clearing and grubbing.

G. Care of Existing Trees: Protect trees and plants indicated in the Contract Documents to remain and to be preserved as specified in Section 01 56 39 - Temporary Tree & Plant Protection.

3.02 Clearing and Grubbing:

A. Clear the site within the limits indicated on the Contract Documents and remove cleared materials and debris from the site. Unless otherwise indicated, clearing and grubbing includes removal of all roots, grass and debris from the existing ground.

B. Remove stumps and roots completely in excavation areas and under embankments where the original ground level is within 3-1/2 feet of sub-grade or slope of embankments. In embankment areas, where the original ground level is more than 3-1/2 feet below the sub-grade or slope of embankment, cut off trees, stumps, and brush to within 6 inches of the ground.

C. Do not start earthwork operations in areas where clearing and grubbing are not complete. Stumps and large roots may be removed concurrently with excavation.

1. Where the work includes requirements for wood chip mulch, acceptable material from clearing and grubbing activities may be used to produce such mulch.

D. Demolition/Removal:

1. Coordinate the work of this Section with the work of Section 02 41 00, Demolition, as required to remove existing pavements, curbs, structures, and site improvements which interfere with new construction and where demolition is not indicated.

E. Disposal of Cleared Vegetation, Grubbed Material and Waste:

1. Dispose of in a safe, acceptable manner, in accordance with applicable laws and ordinances.
   a. Do not bury or burn trash and/or debris on the site.
   b. Remove cleared vegetation, grubbed material and waste from the site at frequent intervals so that its presence will not delay the progress of the Work or cause hazardous conditions for workers and the public.
   c. Removed materials, waste, trash, and debris shall become the property of the Contractor. Remove such materials from the Site and dispose of in a legal manner. It is the responsibility of the Contractor to locate disposal sites and determine length of haul route.
2. Backfill: Backfill excavations resulting from work under this Section in accordance with applicable requirements of Section 31 00 00 - Earthwork.

END OF SECTION

PART 1 – GENERAL

1.01 Description: The work of this section shall consist of clearing, grubbing, removing and disposing of all vegetation and debris which are within work limits as designated on the contract drawings except such objects as are designated to remain or are to be removed in accordance with other sections of these specifications. This work shall also include the preservation from injury or defacement of all vegetation and objects designated to remain.

1.02 Related Sections:

Section 01 56 26 - Temporary Fencing
Section 01 56 39 - Tree and Plant Protection
Section 02 41 13 - Selective Site Demolition

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

2.01 Trees shall be felled and removed in such a manner as to avoid injury to other trees or other objects designated to remain. Clearing and grubbing and related work shall be accomplished only in the areas as designated on the contract drawings.

A. Clearing: Shall include the cutting and removal of all trees, brush and other designated unwanted growth and the removal and disposal of logs, rubbish piles, refuse, and other objectionable or unwanted matter.

B. Grubbing/Stump Grinding: Shall include the removal of all stumps, roots and other objectionable or unwanted matter, lying wholly or in part below the surface of the ground to a minimum depth of 3 feet below grade.

2.02 Protection: Objects designated to remain shall be carefully protected during construction operations in accordance with Section 01 56 39 - Tree & Plant Protection.

2.03 Disturbance: In case of injury to the bark, limbs or roots of vegetation designated to remain, the Contractor shall repair such damage by corrective pruning or other methods, to be approved by the Engineer and/or SPR's Senior Urban Forester. Low hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed as directed. All trimming shall be done by an ISA Certified Arborist and in accordance with good tree surgery practices.

2.04 Holes from which designated vegetation is removed: All holes or depressions shall be backfilled with Structural Soil and compacted as specified in other sections (refer to Section 31 00 00 - Earthwork) of these specifications.

2.05 Disposal: All cleared and grubbed materials shall be recycled and/or disposed of by the Contractor as specified or directed by the Engineer. Unless otherwise specified, all merchantable timber shall become the property of Seattle Parks and Recreation. The Contractor shall deliver merchantable timber to SPR facility as directed by the Engineer.

2.06 Replacement: All trees that are designated for removal by the Engineer and SPR's Senior Urban Forester shall be replaced at a two to one (2:1) ratio.

END OF SECTION

~~***NOTE TO CONSULTANTS: Edit with Track Changes turned on, any text in this section that appears in bold and italics then turn off the bold and italics for the final approved version. (Remove this Note).***~~

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide all labor, materials, and equipment to construct ADA accessible crushed rock paths and surfaces as shown in the Contract documents, including incidentals related to that work and other work specified elsewhere in the Contract Documents:

1. Survey for horizontal and vertical control of all work of the Contract.
2. Protection of Existing Features and Work in Progress.
3. Construction of crushed rock pathways, including application of water/stabilizer product mixture and compaction.
4. Removing materials from the site which are in excess of that required.

1.02 RELATED SECTIONS:

~~***Section 03 30 00 - Cast in Place Concrete***~~

~~Section 32 12 16.13 - Asphalt Paving~~

~~Section 32 13 13 - Concrete Paving~~

~~***Section 32 13 13.13 - Porous Concrete Paving***~~

~~***Section 32 14 13.13 - Precast Concrete Masonry Unit Paving***~~

~~***Section 32 14 13.19 - Precast Concrete Reinforced Turf Paving***~~

~~***Section 32 14 40 - Granite Stone Paving***~~

~~***Section 32 14 43 - Plastic Reinforced Turf Paving***~~

Section 32 15 40 – Crushed Rock Surfacing with Binder

~~SECTION 33 30 00 - SANITARY SEWERAGE UTILITIES~~

~~SECTION 33 34 00 - STORM DRAINAGE UTILITIES~~

Formatted: Font: Not Bold, Not Italic

Formatted: Font: Not Bold, Not Italic

Formatted: Font: Not Bold, Not Italic

Formatted: Font: Not Bold, Not Italic

Formatted: Font: Not Italic

1.03 REFERENCES:

A. WSDOT standard specifications (Current Edition) for road, bridge, and municipal construction. WSDOT Standards apply only to performance and materials and how they are to be incorporated into the work. The legal/contractual relationship sections and the measurement and payment sections do not apply to this document. In the event of a conflict with WSDOT M41-10, these specifications and plans shall prevail.

1.04 QUALITY ASSURANCE:

A. The Contractor is responsible for verifying the quality of the work and shall perform compaction and density tests on request of the Owner's representative to check compliance with these specifications. A copy of the test reports shall be furnished to the Owner's representative.

B. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

C. Submittals: The Owner's Representative shall review in principle all products used in the execution of this section prior to their importation to the Project Site. Submit a particle gradation analysis in graph and table form for each product specified. Review of the Owner's representative of an analysis does not constitute approval of the actual product, which may be subject to additional testing at any time.

PART 2 – PRODUCTS

2.01 GENERAL

A. Prior to the importation of any materials, the Contractor shall provide the Owner's representative with a certified test lab report of the sieve analysis of the product. The Owner's representative shall be the final determining factor in establishing compliance with sieve requirements. No material shall be brought onto the job site until the initial sieve analysis has been approved in writing.

B. During the course of importation of materials, the Contractor shall be responsible for continually checking the materials to ensure that they continue to meet the Specifications.

2.02 CRUSHED ROCK PATH BASE AGGREGATE: FOR USE AS IMPORTED BASE COURSE FOR GRAVEL PATH

Mineral Aggregate Type 1 (5/8" minus crushed rock), bearing no naturally occurring or worn surfaces per WSDOT Standard Specification (most recent edition). Graduation of the base course shall be:

Sieve Size	**Percent Passing**
5/8" square sieve	100
¼" square sieve	50 – 75
No. 40 sieve	8 – 24
No. 200 sieve	10.0 maximum

2.03 CRUSHED ROCK PATH TOP COURSE, STABILIZED ¼" MINUS CRUSHED ROCK (#4 TO DUST)

A. ¼" Minus Crushed Rock (#4 to Dust), shall consist of crushed ledge rock or talus bearing no naturally occurring or worn surfaces. Graduation of the top course shall be:

Sieve Size	**Percent Passing**
3/8" square sieve	100
No. 4 sieve	95 - 100
No. 8 sieve	75 - 80
No. 16 sieve	55 - 65
No. 30 sieve	40 - 50
No. 50 sieve	25 - 35
No. 100 sieve	20 - 25
No. 200 sieve	5 - 15

2.04 STABILIZER/BINDER

A. Stabilizer/Binder shall be Polyfirm-CPX 2900 Series Generic Copolymer Resin Soil-stabilizer Solution, or approved equal. Stablilizer binder shall be a water-based, non-toxic, organic binder that is a colorless and odorless blend of aqueous polymer emulsions that bind the ¼" minus crushed rock together to produce a firm, stable surface, applied to specification for ADA-compliant surface.

B. Stabilizer Binder, Polyfirm-CPX 2900, as supplied by A.R. Smith Distributing Co., LLC, 303 33rd Avenue, Seattle, Washington 98122, Ph. 206-650-0832, FAX: 206 219-4149, e-mail: alexander.r.smith@gmail.com, or approved equal.

PART 3 – EXECUTION

3.01 PROTECTION OF EXISTING FACILITIES

A. Utilities: The Contractor shall protect from damage private and public utilities. Verify the locations of underground utilities minimum 48 hours prior to excavation.

B. Pavement: The Contractor shall protect from damage all pavement or paved areas including curbs and walks intended to remain. The Contractor shall be responsible for replacement if damage occurs to pavement or curbs.

C. It is the responsibility of the Contractor to protect all work in progress from damage due to extremes of cold, moisture, or drying, or mechanical damage from equipment traffic or foot traffic. Alert the Owner's representative to the presence or likelihood of conditions that may adversely affect the quality of the work, the physical structure of soils, or transport of site soils off-site.

3.02 PREPARATION

A. Do not work frozen soils.

B. Protect soils from excessive moisture.

C. Apply supplemental moisture to overly dry soils. Dust will not be allowed to leave site.

D. Binder shall be applied per manufacturer's specifications. Contacting representative for guidance, at the onset of the project is highly recommended. Extra care shall be taken to track project schedule and installation schedule for binder to coordinate installation with an extended period of warm, dry weather. Appropriate oil temperature, weather, moisture protection, proper compaction, protection from foot traffic, and correct application rate are all necessary for achieving an ADA accessible installation.

3.03 GRADING

A. Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Owner's representative is not authorized. Unauthorized excavation, as well as remedial work directed by the Owner's representative shall be at the Contractor's expense.

B. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified areas. Compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Finish surfaces free from irregular surface changes.

C. Material Storage: Stockpile satisfactory excavated materials as shown or described by O.R., until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.

D. Locate and retain soil materials away from edge of excavations and drip lines of trees to remain.

E. Dispose of excess soil material and waste materials as herein specified.

3.04 COMPACTION

A. General: Control soil compaction during construction providing minimum percentage of density specified for area classification. Do not allow equipment traffic to overly compact areas beyond specified percentages. Remediate over compaction as directed by

the Owner's representative including ripping, regrading and re-compaction or over-excavation and in-kind replacement per plan.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages for maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D1557; and not less than the following percentages of relative density; determined in accordance with ASTM 2049, for soils which will not exhibit a well-defined moisture density relationship (cohesionless soils).

1. Import aggregate base material for Crushed Rock Path - 95%.
2. Crushed Rock Path Top Course - 95%

C. Moisture Control:

1. Where sub-grade or lift of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Before compaction, moisten or aerate each layer as necessary to provide optimum content. Compact each layer to required percentages of maximum dry density or relative dry density for each area classification.
3. Do not perform compaction operations on excessively wetted soils.

3.05 CRUSHED ROCK PATH BASE BACKFILL

A. Provide a minimum 4" compacted lift of specified Crushed Rock Path Base Aggregate true to the elevations either described or implied in the Contract Drawings or as required to match adjacent existing pavements, and a minimum of 4" beyond the horizontal layout lines of pavement as indicated on the Contract Drawings.

3.06 CRUSHED ROCK PATH TOP COURSE

A. Provide a 2" compacted lift of specified Crushed Rock Path Top Course Stabilized Crushed Rock true to the elevations either described or implied by the Contract Drawings or as required by the Owner's representative.

B. Shape the trail or pathway to the desired grades and shape before applying the stabilizer product. As usual, slightly crown the surface so as to provide natural runoff and drainage.

C. Apply water/stabilizer product mixture and compact for a semi-permeable but stabilized pathway with loose top material per manufacturer's recommendations.

3.07 STABILIZEER/BINDER

A. Stabilizer/Binder shall be installed per manufacturer's recommended procedures, which are temperature and moisture sensitive. It is critical for acceptance of the crushed rock surfacing that the contractor comply with proper procedures or the contractor will be required to re-apply the binder.

3.08 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove from the Owner's property all waste materials, including unacceptable excavated material, trash and debris, and dispose of it off site in a legal manner. Provide dump receipts from an approved dumpsite.

END OF SECTION

PART 1 - GENERAL

1.01 Description: Provide all labor, materials, and equipment to perform the following work of the Contract, including incidentals related to that work and other work specified elsewhere in the Contract Documents:

A. Survey for horizontal and vertical control of all work of the Contract.

B. Protection of Existing Features and Work in Progress.

C. Construction of crushed rock pathways.

D. Construction of crushed rock roadways.

E. Removing materials from the site which are in excess of that required.

1.02 Related Sections: Coordinate related work specified in other parts of the Project Manual, including but not limited to the following:

Section 31 00 00 - Earthwork
Section 32 11 23 - Mineral Aggregates

1.03 References: This section references the latest revisions of the following documents. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

1.04 Quality Assurance:

A. The Contractor is responsible for verifying the quality of the work and shall perform compaction and density tests on request of the Engineer to check compliance with these specifications. A copy of the test reports shall be furnished to the Engineer.

B. The Engineer's Testing Agency may perform compaction and density tests to check compliance with these specifications.

C. The Engineer may require that an independent testing laboratory test imported materials at any time. If the material is found to be non-compliant with the Contract, the Contractor shall bear the cost of testing, removal of all non-compliant materials from the Project Site, and replacement of the materials with materials meeting the requirements of the Contract. If the materials tested are found to be compliant with the requirements of the Contract, the Owner will reimburse the Contractor for costs incurred for testing plus mark-ups as allowed for elsewhere in the Contract.

D. It is the responsibility of the Contractor to verify the accuracy of all survey information provided by the Owner prior to commencing excavations or filling

operations. Commencement of these operations constitutes acceptance of the survey information as appropriate to meet the intent of the Contract.

E. Submittals: The Engineer shall approve in principle all products used in the execution of this section prior to their importation to the Project Site. Submit a particle gradation analysis in graph and table form for each product specified. Approval of the Engineer of an analysis does not constitute approval of the actual product, which may be subject to additional testing at any time per paragraph 1.04.C above.

PART 2 - PRODUCTS

2.01 General:

A. Prior to the importation of any materials, the Contractor shall provide the Engineer with a certified test lab report of the sieve analysis of the product. The Engineer shall be the final determining factor in establishing compliance with sieve requirements. No material shall be brought onto the job site until the initial sieve analysis has been approved in writing.

B. During the course of importation of materials, the Contractor shall be responsible for continually checking the materials to insure that they continue to meet the Specifications.

2.02 Crushed Rock Base and Top Course Aggregates:

A. Use as Base Course for ADA Accessible (or as Top Course for non-ADA accessible) pathways or trails, as directed by the Engineer through the design review process: 5/8" Minus Crushed Rock (Mineral Aggregate Type 1 – "Ledge Rock" Top Course Keystone), bearing no naturally occurring or worn surfaces per Section 32 11 23 – Mineral Aggregates, or per the City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most recent edition). Gradation of the base course shall be:

Sieve Size	Percent Passing
5/8" square sieve	100%
1/4" square sieve	55 - 75%
U.S. No. 40 sieve	8 - 24%
U.S. No. 200 sieve (wet)	10% Max. (wet)

B. Use as Top Course for ADA Accessible (less than 5% grades) pathways in formal park settings, with Optional Stabilizer/Binder, as directed by the Engineer through the design review process: 1/4" Minus Crushed Rock (#4 to Dust) ("Seattle Parks Mix") shall consist of crushed ledge rock or talus bearing no naturally occurring or worn surfaces as produced by Glacier Northwest, or approved equal.

Sieve Size	Percent Passing
1/2” square sieve	100%
3/8" square sieve	96-100%
U.S. No. 10 sieve	45-65%
U.S. No.40 sieve	15-25%
U.S. No.80 sieve	10-20%
U.S. No. 100 sieve	10-18%
U.S. No. 200 sieve (wet)	12% Min. (wet)
% Fracture	75% Min.
Sand Equivalent	40% Min.

2.03 (Optional) Stabilizer/Binder:

A. Stabilizer/Binder shall be used in conjunction with pathway and trail construction where grades are steeper than 2% and/or as directed by the Engineer through the design review process and shall be one of the following products:

1. “Generic-CPX 2900 Series Generic Copolymer Resin Soil-Stabilizer Solution”, as supplied by A.R. Smith Distributing Co., LLC, 303 33rd Avenue, Seattle, WA 98122, Ph. 206-650-0832, FAX: 206 219-4149, or arsmith30333@comcast.net or alex@arsmithcompany.com.
2. “Stabilizer”, as supplied by Stabilizer Solutions, Inc., 33 South 28th Street, Phoenix, AZ 85034, Ph 800-336-2468, or www.stabilizersolutions.com.
3. “PolyPavement”, as supplied by PolyPavement, P.O. Box 36339, Los Angeles, CA 90036, Ph. 323-954-2240 or www.polypavement.com.
4. “NaturalPAVE”, as supplied by Soil Stabilization Products Company, Inc., 806 West 22nd Street, Merced, CA 95344, Ph. 209-383-7849 or www.sspco.com.
5. Or, approved equal.

PART 3 - EXECUTION

3.01 Protection of Existing Facilities

A. Utilities: The Contractor shall protect from damage private and public utilities. Verify the locations of underground utilities minimum 48 hours prior to excavation.

B. Pavement: The Contractor shall protect from damage all pavement or paved areas including curbs and walks intended to remain. The Contractor shall be responsible for replacement if damage occurs to pavement or curbs.

C. It is the responsibility of the Contractor to protect all work in progress from damage due to extremes of cold, moisture, or drying, or mechanical damage from equipment traffic or foot traffic. Alert the Engineer to the presence or likelihood of conditions that may adversely affect the quality of the work, the physical structure of soils, or transport of site soils off-site.

3.02 Preparation:

A. Establish sub-grades to a neat, smooth surface of uniform slope according to the plans.

B. Protect soils from excessive moisture.

C. Apply supplemental moisture to overly dry soils.

D. Do not work frozen soils.

3.03 Grading:

A. Removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer is not authorized. Unauthorized excavation, as well as remedial work directed by the Engineer shall be at the Contractor's expense.

B. Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified areas. Compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades. Finish surfaces free from irregular surface changes.

C. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place the material, then grade and shape stockpiles to allow for proper drainage.

D. Locate and retain soil materials away from edge of excavations and drip lines of trees to remain.

E. Dispose of excess soil material and waste materials as herein specified.

3.04 Compaction:

A. General: Control soil compaction during construction providing minimum percentage of density specified for area classification. Do not allow equipment traffic to overly compact areas beyond specified percentages. Remediate over compaction as directed by the Engineer including ripping, regrading and re-compaction or over-excavation and in-kind replacement per plan.

B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages for maximum density for soils which exhibit a well-defined moisture density relationship (cohesive soils) determined in accordance with ASTM D1557; and not less than the following percentages of relative density; determined in accordance with ASTM 2049, for soils which will not exhibit a well defined moisture density relationship (cohesionless soils).

1. Import aggregate base material for Crushed Rock Path - 95%.

2. Crushed Rock Path Top Course - 95%

C. Moisture Control:

1. Where sub-grade or lift of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations.
2. Before compaction, moisten or aerate each layer as necessary to provide optimum content. Compact each layer to required percentages of maximum dry density or relative dry density for each area classification.
3. Do not perform compaction operations on excessively wetted soils.

3.05 Crushed Rock Base Course:

A. Provide a minimum 4" compacted lift of specified Crushed Rock Base Aggregate true to the elevations either described or implied in the Contract Drawings or as required to match adjacent existing pavements, and a minimum of 4" beyond the horizontal layout lines of pavement as indicated on the Contract Drawings.

3.06 Crushed Rock Top Course:

A. Provide a (2" compacted) lift of specified Crushed Rock Top Course Stabilized Crushed Rock true to the elevations either described or implied by the Contract Drawings or as required by the Engineer.

B. Shape the pathway or trail to the desired width and grades and shape before applying the stabilizer product. For both base and surfacing courses, slightly crown or pitch the surface (2% max. cross-slope) so as to provide natural runoff and drainage. Compact until surface is hard and dense. Repair or replace soft spots, ruts or other damage that may occur prior to the final acceptance by the Engineer at no additional cost to the Owner. Depth as shown on the plans and details is always compacted depth.

C. For ¼" or3/8" top course, after placement, water in the surface, then compact by rolling or using plate compacter. Repeat as needed to provide uniform thickness, compacted surface to meet ADA requirements.

D. Apply stabilizer product mixture and compact for a semi-permeable but stabilized pathway or trail with loose top material per manufacturer's recommendations.

3.07 Disposal of Excess and Waste Materials: Remove from the Owner's property all waste materials, including unacceptable excavated material, trash and debris, and dispose of it off site in a legal manner. Provide dump receipts from an approved dumpsite.

END OF SECTION

PART 1 - GENERAL

1.01 Description: Furnish all labor, materials, and equipment required to construct Fencing and Gate(s) System(s) as indicated on the drawings or specified herein. Said work shall include any incidentals required to provide a finished job.

1.02 Existing Conditions: The Contractor/Installer shall examine the site to determine existing conditions, extent of work and clearing operations required. Failure of the Contractor/Installer to visit the site and familiarize themselves with the existing conditions shall in no way relieve them from obligations with respect to their bid or contract.

1.03 Related Sections:

Section 01 25 00 - Substitution & Product Option
Section 01 33 10 - Submittals
Section 03 30 00 - Cast in Place Concrete
Section 31 00 00 - Earthwork

1.04 Quality Assurance:

A. The Contractor/Installer must be experienced in color-coated chain link fencing installations. The Contractor shall provide three representative local fencing projects that have been completed by them within the last three years for the Engineer's review.

B. The Contractor/Installer shall provide a warranty stating that the fencing is secure and stable, tight, corrosion-fee, in proper alignment, complete in detail and finish, and free of hazardous conditions. Any defects that develop within one year from the date of Physical Completion shall be replaced at the expense of the Contractor/Installer.

C. Standard Specifications: All work shall conform to all applicable requirements of the following Specifications, whether specifically referred to or not, except as specifically modified herein.

1. Comply with the requirements of the American Society for Testing and Materials (ASTM) especially the ASTM Committee F-14 Standards on Fences (latest edition).
2. Perform all shop and field welding in accordance with the pertinent recommendations of the American Welding Society.
3. Pipe ASTM A 53.
4. ASTM A 392.
5. ASTM F 626-89a.
6. ASTM F 668-88

1.05 Submittals:

A. The Contractor shall make all product submittals and submit Shop Drawings, for approval, prior to manufacturing, describing and detailing typical line post, terminal post, gate, fabric, materials, hardware assemblies, and all proposed fence/gate alignment sections in accordance with Division 01 Specifications.

B. The Contractor shall provide certified letters from manufacturers indicating conformance with specifications, manufacturing date and lot number for all materials used on the site.

1.06 Substitutions and Product Options: (Note: Comply with this paragraph, unless specified otherwise in Division 1 of the Project Manual).

A. During bidding, all bidders shall bid on the specified products.

B. Refer to Division 1 for information about substitutions.

1.07 Product Handling: All materials shall be new and delivered to the site in an undamaged condition. Store materials off the ground and protect from damage. In the event of damage, immediately make repairs and/or replace as necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 - MATERIALS

2.01 General:

A. All piping for fence and gates shall be Schedule 40, hot-dipped galvanized steel, or approved equal, for size, finish, material composition, strength, appearance, performance and ease of maintainability.

B. Galvanizing shall be in accordance with ASTM F 668-88. All fence fittings shall comply with ASTM F 626-89a.

2.02 Chain Link Fence Fabric: Chain link fabric shall be constructed of woven 9-guage for fencing & gates. All fabric shall be W & M steel wire as specified on plans and details, in a continuous 2 inch mesh. Mesh shall be as specified on plans and details, with knuckled top and bottom selvage. Fabric shall not be hot-dipped galvanized after weaving, per ASTM A-392. Weight of the coating shall be 1.2 oz. per square foot of actual surface. Coating shall be smooth, of uniform thickness, and free from dross, uncoated spots and adhered particles of foreign material. Height of fabric shall be as shown on the drawings. Fabric shall be installed on playing side of posts (except on dugouts outside fencing which is installed on the outside of the dugouts). Lower edge of fabric shall be no greater than 1-1/2" above finished grade as specified on plans and details.

2.03 Fencing & Gates: All system components shall be galvanized steel. Sizes shall be as specified in the following table for perimeter fencing and backstop and wing fencing.

For Galvanized Site Fencing & Gates:

Type	4' Ht.	6' - 8' Ht.	10' Ht.	>10'Ht.	20' or Higher

Terminal / Corner Posts	2-3/8" O.D.	2-7/8" O.D.	2-7/8" O.D.	4" O.D.	4" O.D. or larger
Line Posts	1-7/8" O.D.	2-3/8" O.D.	2-3/8" O.D.	2-7/8" O.D.	2-7/8" O.D.
Top Rails	1-5/8" O.D.	1-5/8" O.D.	1-5/8" O.D.	1-5/8" O.D.	1-5/8" O.D.
Intermediate Rails	N/A[3]	1-5/8" O.D.[1]	1-5/8" O.D.	1-5/8" O.D.	1-5/8" O.D.
Bottom Rails	N/A[3]	N/A[3]	1-5/8" O.D.	1-5/8" O.D.	1-5/8" O.D.
Post Footing Size for Terminal / Corner Posts	12" W 30" D	12" W 36" D	18" W 36" D	18" W 48" D	24" W 60" D
Post Footing Size for Line Posts	12" W 24" D	12"W 36"D	18" W 36" D	18" W 48" D	24" W 48" D
Fabric, Mesh Size	2"	2"	2"	2"	2"
Fabric, Finished[2] Size[3]	9-gauge	9-gauge	9-gauge	9-gauge	9-gauge

[1] All 6' and 8' height fencing shall have an intermediate rail.
[2] All chain link fabric shall be galvanized before weaving.
[3] Bottom rails are not required for 6' and 8' height fencing unless otherwise specified on the plans.

2.04 Gates and Gate Posts:

A. General: Gateposts, frames, and hardware shall be hot-dipped galvanized, as noted, for framework. All fittings shall be galvanized as specified in Section 2.01. Gate frames shall be galvanized after welding or painted with "Galvicon" or other zinc enriched paint, as approved equal. Gate fabric shall match fencing fabric. Gates shall maintain a gap no greater than two (2) inches between gateposts and frames or ground.

B. Gates:

1. Gate Posts: Shall be 2-7/8 inches O.D. (min.) schedule 40 steel pipes (or larger, depending upon the size of the gate opening).
2. Gate Frames: Shall be 1-7/8 inch O.D. steel pipe with joints knotched and welded to form a rigid frame. Welds shall be coated with cold galvanized coating. Frames shall be filled with same fabric as fence and fastened in the frame by means of tension bars and tension bands at 1 foot O.C.
3. Diagonal Bracing: Shall be 3/8-inch O.D. adjustable truss rod to ensure frame rigidity without sag or twist.
4. Hinges: Shall be pressed steel to suit gate size, non-lift-off type, offset to permit 180-degree gate opening. Provide 2 hinges for each leaf. Drill, tap, and set screw or weld to frame and post to prevent rotation. Hinges shall be Bulldog Industrial hinge, or approved equal.

5. Single Gate Latch: Provide heavy-duty gate fork latch of correct size malleable iron to permit operation from either side of gate, with padlock eye as integral part of latch.
6. On the ten foot (10') high backstop wing fences, all dugout gates shall be seven feet (7') high with a three foot high panel of fence (transom) above it.

2.05 Fittings: Fittings shall be hot-dipped galvanized pressed steel in accordance with ASTM F 626-89a. All fittings shall be industrial quality.

2.06 Accessories:

A. Post tops shall be pressed steel and designed as a weather tight closure cap for tubular posts.

B. Tension bars shall be of one piece lengths equal to full height of fabric with a minimum cross section of 3/16" x 3/4". Provide a tension bar for each gate, end post, corner and pull posts

C. Tension bar bands (vinyl or powder coated), shall be pressed steel per ASTM F 626-89a spaced not over 12 inches O.C. to secure tension bars to end, corner, pull, and gate posts.

D. Tension Wire: Contractor shall provide a No. 7 W & M gauge galvanized high carbon coiled tension wire (when bottom rail is not specified) stretched along the bottom of fabric and fastened to the fabric at intervals of not more than two feet (2') using steel hog rings. Tension wire shall be attached with brace band, and nut and bolt. Tension wire shall be terminated around the bolt to itself with a minimum of three complete wraps.

E. Wire Ties: 9-guage aluminum wire ties, spaced at 12 inches O.C. (typ.). Tie fabric to tension wire with 9 gauge hog rings at 18 inches O.C. (typ.).

F. Touch-up Paint: Paint all exposed holes and welds, with a base coat of zinc enriched paint followed by two coats of silver (aluminum) matte finish paint, typical. Zinc enriched paint shall meet ASTM A780 A2 and be epoxy based with 94% minimum pure zinc dust by weight. Zinc enriched paint shall dry with a bright finish of hot-dipped-galvanizing. Zinc enriched paint shall be Devcon Z, Krylon Galvanizing Paint, Galvicon, or approved equal. Silver top coat paint shall be silver (aluminum) matte finish. Silver top coat paint shall be "COROTHANE 1, Mio-Aluminum"; Aluminum Hammerite; or approved equal.

2.07 Concrete Footings: Refer to Section 2.03 above for dimensions of all concrete post footings. Concrete for post footings shall conform to the City of Seattle Standard Specifications for Road, Bridge, and Municipal Construction (most recent edition), and shall be Class "C" concrete. Concrete footings shall be neatly and evenly crowned slightly above finished grades and all concrete shall be cleaned from all posts.

PART 3 - EXECUTION

3.01 Site Preparation:

A. Pre-construction on-site conference: Do not work until a site meeting with the Engineer and the SPR Facilities Maintenance Fence Crew is held.

B. The Contractor is responsible for all temporary barricades, enclosures, and protection of adjacent property and existing work. These are to be in place before operations are started. Coordinate this work with other work and trades. Complete clearing and site preparation work is required prior to excavation.

3.02 Fence Construction:

A. Posts:

1. Auger holes for post footings in firm, undisturbed or compacted soil. Holes for new line post footings shall be sized as shown on plans and standard details. Holes for terminal posts and gateposts shall be sized as shown on plans and standard details.
2. Over excavate hole depths to 6 inches deeper than post bottoms.
3. Place concrete around posts in a continuous placement, tamp for consolidation, checking each post for vertical and top alignment. Support posts plumb until concrete has cured. Set and secure keepers, stops, sleeves, and other accessories into concrete as required.
4. Tops of post footings shall be flush with finished grade, trowled and sloped outward to drain. Top of footing shall appear true and circular in shape with post at center of circle.
5. Post shall be 10 feet O.C. maximum.

B. Sleeved Posts:

1. Insert posts into sleeves provided in concrete footing for tops of walls and hoop-style backstops as specified on plans and details. Check each post for vertical (plumb) and top alignment.
2. Posts shall be 10' O.C. maximum.

C. Rails:

1. Top rail shall be securely fastened to terminal posts and pass through tops of line post fittings, forming a continuous rail for the full length of fence. Top rail shall be furnished in lengths approximately 21 feet long with standard hot dip galvanized steel expansion couplings not less than 6" in length. Lengths less than 10 feet shall not be used adjacent to terminal posts.
2. Intermediate and bottom (when specified) rails shall conform to the same specification as top rail and be joined at line posts with double-end socket clamps or brace bands and rail ends, with one inverted to maintain smooth line.

D. Brace Assemblies: All corner, terminal, and gate posts shall be furnished with complete brace assembly, including brace of same material and finish as top rail, and adjustable tightener for 3/8 inch truss rod. Corner and terminal posts shall have two brace assemblies, one in each direction. The diagonal 3/8 inch adjustable truss rod shall be attached to the first ensuing line post. Install braces so that posts are plumb and true when diagonal rod is under proper tension. No truss rod is required if the intermediate rail is continuous.

E. Fabric: Pull fabric taut and tie to posts and rails. Install fabric on interior side of fences and anchor to framework so that the fabric remains in tension after pulling force is released. Lower edge of fabric shall be set level with finished grades (1-1/2" above grade typ.) except as specified on plans and details.

F. Wire Ties: Tie fabric to line posts, rails, and braces with 9-guage aluminum wire ties, spaced at 12 inches O.C. (typ.). Tie fabric to tension wire with 7-gauge hog rings at 18 inches O.C. (typical). Attach all wire ties per accepted industry standards and as described as follows: Attach hooked end of tie to fabric above and close to the top or side of the rail or post and wrap the end of tie under so that the wire tie locks into place and will not come loose under normal use. Then wrap the wire tie around the rail snugly and affix to fabric below and close to the rail and twist the end of the wire tie at least one full revolution around the fabric so that the tie will not come loose under normal use. Refer to the SPR Standard Details for visual description of a proper wire tie installation. To access the information refer to SPR Design Standards website at www.cityofseattle.gov/parks/projects/standards

G. Tension Bars: Fabric shall be attached to the terminal posts by means of single piece tension bars. Thread through fabric and secure to posts with metal bands spaced not over 12 inches O.C. (typ.).

H. Welding: All field welds shall be fully filled, ground flush and smooth, and cold galvanized by brushing on "zinc enriched" paint, followed by two coats of Silver (aluminum) matte finish paint.

3.03 Gates:

A. Install gates as shown on the Details and Drawings. Openings between frame or gate members shall not exceed two (2) inches. Gaps between bottom rail and finish grade shall not exceed one and one half (1-1/2) inches.

B. Install gates plumb, level, and secure for full opening without interference. Adjust hardware for smooth operation and lubricate where necessary. After the Engineer's approval of operation, drill, tap, and setscrew or spot-weld all hinges and latch hardware to prevent rotation.

C. Set gatepost same as terminal posts.

3.04 Cleanup: Job site shall be cleared of all excess material (concrete, wire, rails, pipe, etc.). All areas impacted by construction shall be leveled with infield on field side or paving or topsoil on outside graded flush with concrete mow strip or dugout floors and free of all debris and rocks, and restored to as good as or better than original condition, as approved by the Engineer.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:

A. The work includes the furnishing and installation of soil and/or amendments ornamental planting areas, garden plots and raised beds.

1.02 REFERENCE SECTIONS:

Section 32 93 00 - Landscape Planting

1.03 QUALITY ASSURANCE:

A. All products supplied shall comply with applicable state and local codes.

1.04 SUBMITTALS:

A. Submittal Procedure

At least 10 Working Days prior to placement of any soils specified in this Section, the Contractor shall submit to the Engineer the following. All test results shall be from samples sampled and tested less than 90 days prior to date of submittal.

1. Aggregate and Loam Analysis. Grain size analysis results of the Mineral Aggregate or Sandy Loam portion of each soil mix, performed by an accredited laboratory in accordance with ASTM D 422, Standard Test Method for Particle Size Analysis of Soils.
2. Compost Analysis. Quality analysis results for the compost portion of each soil mix performed in accordance with STA standards, as specified in this Section.
3. Mix Analysis. Test results from an accredited soil laboratory, including the following parameters:
    a. Total Nitrogen and Soluble Nitrogen (NO3 + NH3)
    b. Phosphorous
    c. Potassium
    d. pH
    e. Organic Matter % (Loss on Ignition method)
    f. Conductivity
    g. Calcium
    h. Sulfur
    i. Boron
    j. Weed seed (for General Turf Area Soil and High Performance Turf Mixes)
4. Recommendations. Fertilizer and amendment recommendations for the specified plant type (turf, shrubs/groundcovers, or annuals: with special provisions for Bioretention applications) and soil application depth; from the accredited laboratory, an accredited Soil Scientist or Agronomist.
5. Mix Samples (see below)

6. Manufacturer. The Manufacturer's Certificate(s) of Compliance from the Supplier of the soil mix, and (if different) the Suppliers of the compost, including their name(s) and address(es).
7. Laboratory Information. Include the following information about the testing laboratories:
    a. name of laboratory(ies) including contact person(s),
    b. address(es),
    c. phone contact(s),
    d. e-mail address(es),
    e. qualifications of laboratory and personnel including date of current certification by STA, ASTM, AASHTO, or approved equal.

Note: Soil analysis tests shall be current (no more than 90 days old), shall be performed by a local (Puget Sound Region) testing lab and shall be done for the final soil mix, not individual components. Soil mix samples shall meet or exceed the Specifications prior to delivery to the job site and shall not require on-site mixing or substantial chemical alteration after delivery unless otherwise approved by the Engineer.

B. Sample submittals:

1. One ten (10) pound bag of each soil mix or one five (5) gallon container of each soil type used on the project.
2. One ten (10) pound bag or five (5) gallon of compost sample.

C. Acceptance:

1. Acceptance of Soils Prior to Placement. The Contractor shall not place any soils or soil mixes specified in this Section until the Engineer has reviewed and confirmed the following:
2. Soil mix delivery ticket(s). Delivery tickets shall show that the full delivered amount of soil matches the product type, volume and Manufacturer named in the submittals.
3. Visual match with submitted samples. Delivered product will be compared to the submitted sample, to verify that it matches the submitted sample. The Engineer may inspect any loads of soil on delivery and stop placement if it is determined that the delivered soil does not appear to match the submittals; and require sampling and testing of the delivered soil, before authorizing soil placement. All testing costs shall be the responsibility of the Contractor.

1.05 PROJECT CONDITIONS:

A. The existing site soils shall be amended for ornamental beds, garden beds and raised beds or as otherwise shown on the drawings.

B. Keep streets, sidewalks and site clean, free from debris and affected drains open and free flowing at all times. Protect drains with filter fabric covers during construction. Appropriate erosion control measures shall be employed.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS:

The following soils and soil mixes are specified on the Drawings or by the Engineer, according to project needs, and are all subject to the General Testing and Submittal Requirements of the City of SeaTac Standards:

A. Reused Amended Site Soil from the Project Site that is either, amended in place, or moved/stockpiled during grading operations and then amended with compost as needed to meet minimum organic matter content requirements.

1. Source. Reused Amended Site Soil shall be native topsoil taken from within the Project Site, either from areas where construction excavation is to be performed; from borrow, pit, or quarry sites strippings; or other designated sources. The general limits of the Material to be utilized for topsoil will be indicated in the Contract. The Engineer will make the final determination of the areas where the most suitable Material exists within these general limits, and depth of excavation. The Contractor shall reserve this Material for the specified use.
2. Unwanted Vegetation. In the production of Reused Amended Site Soil, all vegetative matter shall become a part of the topsoil, except large brush and trees over 4 feet in height, Prior to removal, the Contractor shall mow or otherwise reduce the height of the native vegetation such to a height not exceeding 1 foot. Plants on the King County Noxious Weed Lists or invasive root-propagating plants including but not limited to horsetail, ivy, clematis, knotweed, etc., shall not be incorporated in the topsoil. Such plants shall be removed and disposed.
3. Organic content. The final Reused Amended Site Soil shall have a minimum organic matter content by dry weight of 5% for areas where turf will be installed, and 10% for all other landscape areas. Organic matter shall be determined by Loss-on-Ignition test (ASTM D2974, or TMECC 05.07A). Native site topsoil shall be amended with Compost if more organic content is needed to meet these requirements. Compost amendment requirements may be added at default rates of 22% by volume for turf or 38% for planting beds (1.75” amendment tilled to 8” depth for turf, 3” amendment tilled to 8” depth for beds); or calculated based on tests of the soil and compost, using the Soil Amendment Rate Calculator at http://your.kingcounty.gov/solidwaste/compost-calculator.htm or similar calculator available at http://www.soilsforsalmon.org/excel/Compost_Calculator.xls.
4. Stockpiling. Designated Material shall be placed at locations approved by the Engineer that do not interfere with the construction of the Project. The Contractor shall take all precautions to avoid disturbing the existing ground beyond the Project Site or other areas designated by the Engineer.
5. Testing and Submittals. Testing and submittals shall comply with all provisions of this Section.

1. Mix. Planting soil shall consist of a mix of 2 to 3 parts Sandy Loam soil and 1 part compost by volume. The resulting mix shall contain approximately 8-15% organic matter by weight, tested by the Loss on Ignition method.
2. Sandy Loam. Shall be imported and shall be as defined by the United States Department of Agriculture Classification System, and documented by a Particle Size Analysis performed by an accredited laboratory. The sandy loam fraction of mix shall be screened through a ½" mesh, to remove all rocks, plant parts and other debris.
3. Compost. Compost used shall meet the definition of Compost in this Section.
4. Contaminants. Sandy Loam shall be free from: Materials toxic to plant growth; visible seeds, rhizomes or roots; for any King County-listed noxious weeds, or invasive root-propagating plants including but not limited to horsetail, ivy, clematis, knotweed, etc.
5. Testing and Submittals. Testing and submittals shall comply with all provisions of this Section.

2.02 COMPOST

A. General

1. Procurement. For Project Sites located within the City limits of SeaTac; the Contractor shall procure compost Materials from only approved sources as specified by the City of SeaTac, City Purchasing and Contracting Services.
2. Quality. Compost production and quality shall comply with Chapter 173-350 WAC, and meet the criteria below:
3. Regulatory Standards. Compost products shall be the result of the biological degradation and transformation of feedstocks as specified below, under controlled conditions designed to promote aerobic decomposition, per WAC 173-350-220, which is available at http://apps.leg.wa.gov/wac/default.aspx?cite=173-350-220

B. Submittals: The Contractor shall submit the following information to the Engineer for approval:

1. A copy of the Solid Waste Handling Permit issued to the supplier by the Jurisdictional Health Department as per WAC 173-350 (Minimum Functional Standards for Solid Waste Handling).
2. The Supplier shall verify in writing, and provide lab analyses that the Materials comply with the processes, testing, and standards specified in WAC 173-350 and these Specifications. An independent STA Program certified laboratory shall perform the analysis.
3. A list of the feedstock by percentage present in the final compost product.
4. A copy of the producer's current STA certification as issued by the U.S. Composting Council.
5. Acceptance shall be based upon a satisfactory Test Report from an independent STA program certified laboratory and the sample(s) submitted to the Engineer.

C. Testing Requirements. The compost Supplier shall test all compost products within 90 Calendar Days prior to application, at the Suppliers expense. Samples shall be collected using the Seal of Testing Assurance (STA) sample collection protocol, available from the U.S. Composting Council, Phone: 631-737-4931, www.compostingcouncil.org. The sample shall be tested by an independent STA Program certified laboratory. A copy of the approved independent STA Program laboratory test report shall be submitted to the Engineer prior to initial application of the compost.

D. Gradation. Compost shall meet the following size gradations when tested in accordance with the U.S. Composting Council "Testing Methods for the Examination of Compost and Composting" (TMECC) Test Method 02.02-B, "Sample Sieving for Aggregate Size Classification":

1. Fine Compost. Fine Compost, typically used for soil amendment, shall meet the following gradation by dry weight:

	Min.	Max.
Percent passing 2"	100%	
Percent passing 1"	99%	100%
Percent passing 5/8"	90%	100%
Percent passing 1/4"	75%	100%

2. Coarse Compost. Coarse Compost, typically used for erosion control or surface mulching, shall meet the following gradation by dry weight:

	Min.	Max.
Percent passing 3"	100%	
Percent passing 1"	90%	100%
Percent passing 3/4"	70%	100%
Percent passing 1/4"	40%	60%

E. Other Physical Properties

1. pH. The pH shall be between 6.0 and 8.5 when tested in accordance with TMECC 04.11-A; "1:5 Slurry pH".
2. Physical Contaminants. Manufactured inert material (concrete, ceramics, metal, etc.) shall be less than 1.0 percent by weight as determined by TMECC 03.08-A "percent dry weight basis". Film plastics shall be 0.1% or less, by dry weight.
3. Organic Content. Minimum organic matter content shall be 40 percent by dry weight basis as determined by TMECC 05.07A; "Loss-On-Ignition Organic Matter Method".
4. Salinity. Soluble salt contents shall be less than 5.0 mmhos/cm tested in accordance with TMECC 04.10-A; "1:5 Slurry Method, Mass Basis".

5. Maturity. Maturity shall be greater than 80% in accordance with TMECC 05.05-A; "Germination and Vigor". The Engineer may also evaluate compost for maturity using the Solvita Compost Maturity Test at time of delivery. Fine Compost shall score a number 6 or above on the Solvita Compost Maturity Test. Coarse Compost shall score a 5 or above on the Solvita Compost Maturity Test.
6. Stability, Stability shall be 7 or below in accordance with TMECC 05.08-B; "Carbon Dioxide Evolution Rate".
7. Feedstocks. The compost product shall contain a minimum of 65 percent by volume from recycled plant waste as defined in WAC 173-350-100 as "Yard waste", "Crop residues", and "bulking agents". A maximum of 35 percent by volume of" post-consumer food waste" as defined in WAC 173-350-100 may be substituted for recycled plant waste. A minimum of 10% food waste in compost is required. The Engineer may approve compost products containing up to 35% biosolids or manure feedstocks for specific projects or soil blends, but these feedstocks are not allowed unless specified, and not allowed in compost used for Bioretention Soils.
8. C:N. Fine Compost shall have a carbon to nitrogen ratio of less than 25:1 as determined using TMECC 04.01 "Total Carbon" and TMECC 04.02D; "Total Kjeldhal Nitrogen". The Engineer may specify a C:N ratio up to 35:1 for projects where the plants selected are entirely Puget Sound native species. Compost may be mixed with fir or hemlock bark meeting requirements of 9-14.4(3) to raise the C:N ratio above 25:1. Coarse Compost shall have a carbon to nitrogen ratio between 20:1 and 45:1.

2.03 ADDITIONAL FERTILIZERS AND SOIL AMENDMENTS:

A. Fertilizer

1. Landscape Planting Fertilizer: Use (20-10-5+ minors) TURFGRO, "GROPACS" Fertilizer Packets (or, approved equal) with the following characteristics:

Total Nitrogen* (N)	20.0%
(18% Urea Nitrogen)	
(2.0% Ammoniacal Nitrogen)	
Available Phosphate (P205)	10.0%
Soluble Potash (K20)	5.0%
Calcium (Ca)	3.0%
Magnesium (Mg)	2.0%
Sulfur (S)	3.0%
Boron (B)	0.04%
Copper (Cu)	0.20%
Iron (Fe)	1.0%
Manganese (Mn)	0.10%
Zinc (Zn)	0.10%

*Nitrogen shall be derived from: Ammonium Sulfate, Potassium Chloride, Monoammonium Phosphate, and Urea.

PART 3 - EXECUTION

3.01 PREPARATION OF SUB-GRADE:
Subgrade work shall proceed only under dry weather conditions or by approval of the Engineer.

A. Rip, disc, or scarify undisturbed or compacted sub-grade soils to a minimum depth of 12 inches. Sub-grade elevations shall be as follows:

1. For Landscape Planting Areas – Establish sub-grade elevation 6 inches below finished grade. After establishing subgrade, rip subgrade with minimum 13 inch shank ripper attachment pulled behind a tractor with minimum 20 horse power.
2. For Garden Beds at grade:
    a. Establish subgrade elevation 6 inches below finished grade. After establishing subgrade, rip subgrade with minimum 13 inch long shank ripper attachment pulled behind a tractor with minimum 20 horse power.
    b. Rototill the subgrade to create a well broken up and loose soil profile free of rocks and clumps of compacted soil larger than 6 inches.
    c. Re-establish subgrade elevation by rolling with a mechanical roller to a compaction rate of 85-90% compacted dry density.
2. For Raised Beds:
    a. Establish subgrade elevation 12 inches below finished grade. After establishing subgrade, fill Cedar Grove Vegetable Garden mix, or approved equal.

3.02 PLACING SOIL AND SOIL AMENDMENTS:
The placement of soils and soil amendments shall proceed only under dry weather conditions or by approval of the Engineer.

A. For Landscape Planting Areas:
1. Place 6 inches of Planting Soil and thoroughly rototill soil into top 12 inches of prepared sub-grade using a rototiller with minimum 12 inch long tines.
2. Broadcast Planting Fertilizer at a rate of one-half pound (1/2#) of nitrogen per 1,000 square feet after placement and before rototilling of planting soils.

3.03 FINE GRADING:
A. Perform fine grading to attain finish grades as shown on the Plans.

B. Rake out all rocks, roots, sticks and other debris larger than 1-inch diameter or sticks longer than 3 inches long. Leave surface even and readily able to accommodate lawn or planting installation.

C. Compact prepared soil with water filled drum or equal compactor to reach compaction levels between 85 to 95 percent density. Do not over –compact soil by over working or driving vehicles over the prepared soil.

3.04 INSPECTIONS:

A. The Contractor shall notify the Owner's Representative least 48 hours in advance of the time of inspection required for completion of soil preparation before covering and incorporating final 6" of compost in at grade planting/bed areas and final 12" of topsoil in raised planters.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION:
Provide planted trees, shrubs and ground covers as shown and specified. The work includes but is not limited to:

A. Soil Preparation and/or Installing Specified Planting Soils.

B. Plant Materials and Planting.

C. Fertilizing and Mulching.

D. Tree Staking.

E. Maintenance and Establishment Procedures.

F. Plant Warranties.

1.02 RELATED SECTIONS:
All work of the Contract shall be performed in coordination with the requirements of the following sections:

Section 32 91 13 - Soil Preparation

1.03 REFERENCES:

A. All construction shall be in accordance with the City of SeaTac Standard Plans and Specifications (most recent editions).

B. The SeaTac Parks & Recreation Standard Specifications and Details (most recent edition).

C. Comply with sizing and grading standards of the "American Standards for Nursery Stock" (most recent edition).

D. Nomenclature shall conform to “Hortus Third”, compiled by the L. H. Bailey Arboretum, Cornell University, 1976.

1.04 QUALITY ASSURANCE:

/

A. All plants shall be nursery grown or collected materials that has been held in a nursery for at least one year. Nursery climatic conditions must be similar to those in the locality of the project. All plants shall be weed free at the time of planting.

B. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable at no additional cost, and providing that the larger plants will not be cut back to size indicated. Provide plants indicated by two (2) measurements so that only a maximum of twenty-five percent (25%) are of the minimum size indicated and seventy-five percent (75%) are of the maximum size indicated.

1.05 SUBMITTALS:

A. Submit the following material samples:

1. Topsoil submittals in accordance with Section 32 91 13.
2. Fertilizers for planting submittal in accordance with Section
3. Mulch submittal in accordance with this Section.

B. Submit the following material certifications:

1. Planting fertilizer.
2. Plant material sources.

1.06 DELIVERY, STORAGE AND HANDLING:

A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. The Contractor shall store fertilizer in such a manner as to prevent wetting and deterioration.

B. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock. On arrival, the certificate shall be filed with the Engineer. Protect all plants from desiccation. “Wiltproof” or another antidesicant shall be applied only with approval of the Engineer. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Engineer. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.

C. Cover plants transported on open vehicles with a protective covering to prevent wind-burn.

D. Provide dry, loose soils for planting. Frozen or muddy soil is not acceptable.

E. Stock shall be handled by root ball only, not the trunks, stems or tops.

/

1.07 PROJECT CONDITIONS:

A. Work Notification: Notify the Nic Morin at least 5 working days prior to the installation of plant materials by calling the SPR Inspection Request Line @ (206) 684-7034 or by email at parksconstruction.inspection@seattle.gov to make arrangements for inspection.

B. Protect existing utilities, paving, and other facilities from damage caused by planting operations.

C. Do not install plant material when ambient temperatures may drop below 35^{O}F or above 80^{O}F.

D. Do not install plants when wind velocity exceeds 30 MPH.

E. Confine work to designated areas. Do not disturb existing vegetation outside project limits and protect all trees, shrubs and ground covers within project limits not designated to be removed. Do not permit vehicular traffic or materials storage under or around new or existing trees.

PART 2 - PRODUCTS

2.01 PLANT MATERIALS:

A. Plants: Provide plants typical of their species or variety; with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from weeds, defects, disfiguring knots, sunscald injuries, and abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids, open spaces, broken branches, flush cuts or stubs.

1. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and absorbing root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock." Cracked or mushroomed balls are not acceptable.
2. Bare-root plants: Dug with adequate fibrous roots, covered with a uniformly thick coating of mud by being puddled immediately after they are dug, or packed in moist straw, sawdust or peat moss.
3. Container-grown stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
   a. No plants shall be loose in the container.
   b. Container stock shall not be pot bound.

/

4. No pruning wounds shall be present with a diameter of more than one (1) inch and such wounds must show vigorous callous on all edges. Trees shall not be pruned within six (6) months prior to delivery.

2.02 SOILS:

A. All other Planting Soil Native Soil Mix: All planting shall be done with a mix of 50% native soil and 50% specified Planting Soil or Organic Amendment when the existing native soil is determined to require amending per Section 32 91 13.

2.03 PLANTING FERTILIZERS:

A. Fertilizers shall be according to the following:

1. Commercial Fertilizer: Use (20-10-5+ minors) TURFGRO, "GROPACS" Fertilizer Packets (or, approved equal) with the following characteristics:

Total Nitrogen (N)	20.0%
(18% Urea Nitrogen)	
(2.0% Ammoniacal Nitrogen)	
Available Phosphate ($P_2 0_5$)	10.0%
Soluble Potash ($K_2 0$)	5.0%
Calcium (Ca)	3.0%
Magnesium (Mg)	2.0%
Sulfur (S)	3.0%
Boron (B)	0.04%
Copper (Cu)	0.20%
Iron (Fe)	1.0%
Manganese (Mn)	0.10%
Zinc (Zn)	0.10%

2. Organic Fertilizer: Use Planting Fertilizer (7-4-9) 'Rainy Pacific NW Blend', shall be 100% Organic Fertilizer as manufactured by Walt's Organic Fertilizer Co., or approved equal, and shall be composed of the following:

Total Nitrogen* (N)	7%
(0.5% nitrate nitrogen (N))	
(6.5% water insoluble nitrogen (N))	
Available Phosphoric Acid (P_2O_5)	4%
Soluble Potash (K_2O)	9%
Calcium	7%

*Shall be derived from fish meal, crab meal fines, kelp meal, fish bone meal, and agricultural gypsum.

/

B. Recommended Sources for Planting Fertilizers:

1. WILCO, 922 Valley Avenue East, Suite 103, Puyallup, WA 98371, Ph. (253) 841-3378, Fax. (253) 841-8549.
2. HORIZON DISTRIBUTION, Bellevue, WA, Ph. 425-828-4554, Fax 425-822-0419.
3. WILBUR-ELLIS, 16300 Christensen Road, Tukwila, WA 98188-3418, Ph. (206) 439-9950.
4. Or, approved equal. (Provide manufacturer's written analysis by way of substitution request, for approval by the Engineer, prior to delivery).

2.04 SUPPLEMENTAL:

Mycorrhizal Amendment (3-3-4) 'EndoROOTS', shall be 100% Organic as manufactured by Roots, Inc, or approved equal, and shall be composed of the following:

Total Nitrogen* (N)	3.0%
(0.5% water soluble nitrogen (N))	
(2.5% water insoluble nitrogen (N))	
Available Phosphate (P_2O_5)	3.0%
Soluble Potash (K_2O)	4.0%
Calcium (Ca)	9.0%
Magnesium (Mg)	0.8%
(0.8% water soluble Magnesium (Mg))	
Sulfur (S)	1.5%
(1.5% combined Sulfur (S))	
Iron (Fe)	1.0%

*Shall be derived from composted poultry manure, ferrous sulfate, and potassium sulfate. Non-plant food ingredients: Kelp meal, humus, vitamins, amino-acids, and EndoMycorrhiza spores. Recommended Source for Endo ROOTS is: WILCO, 922 Valley Avenue East, Suite 103, Puyallup, WA 98371, Ph. (253) 841-3378, Fax. (253) 841-8549.

2.05 MULCHES:

A. Mulches shall be according to the following:

1. **Wood Chip Mulch**

Used for most general shrub beds, all native plantings and all Natural Areas restoration plantings:

a. Procurement. For Project Sites located within the City limits of SeaTac; the Contractor shall procure arborist wood chip mulch Materials from only approved sources as specified by the City of SeaTac, City Purchasing and Contracting Services.

b. Arborist Wood Chip Mulch shall be coarse ground wood chips (approximately 1/2" to 6" along the longest dimension) derived from the mechanical grinding or shredding of whole trees or portions of

/

trees. It may contain wood, wood fiber, roots, bark, branches, and leaves, but may not contain visible amounts of soil. It shall be free of weeds and weed seeds, and may not contain more than 1% by weight of manufactured inert material (plastic, concrete, ceramics, metal, etc.). Arborist wood chip mulch, when tested, shall meet the following loose volume gradation:

	Percent Passing	
Sieve Size	Minimum	Maximum
2”	95	100
1”	70	100
5/8”	0	50
¼”	0	40

c. Acceptable substitutes, subject to the engineer’s approval, include chipped or shredded woody material, meeting the above size and inert material requirements, derived from composting operation screening (“overs”), or derived from recycling of clean dimensional lumber (e.g. pallets or framing lumber) that has passed through a metal removal process to meet the 1% manufactured inert standard above.

2. Compost Mulch for Annual & Perennial plantings only:
Coarse Compost See Section 32 91 13 2.02 D(2).

3. Submittals. At the Engineer’s request, prior to delivery the Contractor shall provide the following:

a. The source of the product and species of trees included in it;

b. A sieve analysis verifying the product meets the above size gradation requirement;

c) A 5 gallon sample of the product, for the Engineer’s approval.

PART 3 - EXECUTION

3.01 INSPECTIONS:

A. Finish grading shall be inspected and approved by the Consultant and the Engineer prior to any planting.

B. Plant material shall be inspected and approved by the Consultant and the Engineer at the nursery or site prior to installation. The Contractor shall remove all unsatisfactory material from the site immediately and his/her own expense.

3.02 PREPARATION:

/

A. Contractor shall locate plants by staking with stakes and flags as indicated on the Drawings or as approved in the field. If obstructions are encountered that are not shown on the drawings, do not proceed until the Consultant and the Engineer have approved the locations or selected alternate plant locations.

3.03 INSTALLATION PROCEDURES:

A. Plants brought to the planting site shall be bare root, balled and burlapped, or in containers, depending on how specified in the planting schedule in the Contract for the particular type of planting Material. Plants shall not be planted during freezing weather or when the ground is frozen. Plants shall not be planted during excessively wet conditions. Plants shall not be placed on any day in which temperatures are forecast to exceed 80 degrees unless the Engineer approves otherwise. Plants shall not be placed in areas that are below finished grade.

B. Dates to plant: Planting trees, shrubs, and groundcovers within an SPR project site shall be performed during the period between October 1 and April 30. Planting at other times shall only by done by approval of the Engineer.

C. Plants shall be removed from containers in a manner that prevents damage to the root system. Containers may require vertical cuts down the full depth of the container to accommodate removal. All circling roots shall be loosened to ensure natural directional growth after planting.

D. Excavate circular plant pits with scarified vertical sides, except for plants specifically indicated to be planted in beds. Provide planting pits at least twice the diameter of the root system or container. Depth of pit shall accommodate the entire root system. Scarify the bottom and sides of the pit to a depth of four inches. If groundwater is encountered upon excavation of planting holes, the Contractor shall promptly notify the Engineer.

E. Place specified planting soil for use around the balls and roots of the plants.

F. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure. Set crown of plant material at the finish grade. No filling will be permitted around trunks or stems or above grafts on grafted trees. Backfill the planting pits with specified soil or amendment. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.

G. After balled and burlapped plants are set, water in soil mixture around bases of balls and fill all voids.

1. Remove at least the top 2/3 of the burlap. If burlap has been chemically treated (green color), remove from the planting pit.
2. Remove completely all plastic wrapping materials, twine, and wires, and wire baskets from root balls.

/

H. Space ground cover plants using triangular spacing in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Always plant ground covers to within eighteen inches (18") of the trunks of trees and shrubs within planting bed and to within twelve inches (12") of edge of bed.

I. Spread and arrange roots of bare-rooted plants in their natural position. Work in specified planting soil. Do not mat roots together. Cut all broken and frayed roots before backfilling with remaining specified planting soil.

J. Fertilizer Application Rates:

1. TURFGRO, “GROPACS” Fertilizer Packets - Place fertilizer packets in the planting pits at the rate of one packet per gallon sized plant container.
2. ‘Rainy Pacific NW Blend’ - Broadcast at a rate of 20lbs. per 1000 square feet. Apply once a month for the first four months of the growing season.

K. Other Amendments Application Rates:

1. Optional Supplemental Mycorrhizal Amendment ‘EndoROOTS’ - Broadcast at a rate of lbs. per 1000 square feet.

L. Mulching:

1. Mulch tree and shrub planting pits and shrub beds with required mulching material at least 2" deep (settled) immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.
2. Mulch ground cover beds with at least 2" deep (settled) immediately after planting is completed.

M. Staking: Stake all deciduous and coniferous trees immediately after planting per SPR Standard Details.

N. Pruning: Prune all trees only to remove broken or damaged branches, or for aesthetic purposes as directed by the Engineer. Branches shall be pruned at the branch collar. Neither stubs nor flush cuts will be acceptable.

3.04 MAINTENANCE AND ESTABLISHMENT:

A. Maintain plantings for a period of at least 30 days after substantial completion of planting operations or until all plants are sufficiently recovered from transplanting and in a healthy growing condition acceptable to the Engineer.

/

B. Maintenance shall include regular (at least twice weekly) cultivating, weeding, watering, pruning (only as directed), and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.

1. Re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.
2. Straighten, repair and adjust guy wires and stakes as required.
3. Correct defective work, as soon as possible, after deficiencies become apparent and weather and season permit.
4. Water trees, plants, and ground cover beds within the first 24 hours of initial planting, and not less than twice per week (including rain) until Physical Completion.

3.05 SUBSTANTIAL/PHYSICAL COMPLETION:

A. Inspection to determine Substantial Completion of planted areas will be made by the Engineer, upon the Contractor's request. Provide notification at least 5 working days before requested inspection date.

1. Planted areas will be accepted provided all requirements, including the maintenance period have been complied with and plant materials are alive and in a healthy, vigorous condition.

B. Upon Physical Completion, the Owner shall assume all plant maintenance.

3.06 CLEAN UP:

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from planting operations.

3.07 WARRANTY AND REPLACEMENT:

A. Warranty plant material to remain alive and be in healthy, vigorous condition for a period of 1 year after the date of Substantial Completion. Inspection of plants will be made by the Engineer at the completion of planting.

B. Replace, in accordance with the drawings and specifications, all plants that are dead or, as determined by the Engineer, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. The cost of such replacement(s) is at the Contractor's expense. Warrant all replacement plants for 1 year after Physical Completion, unless otherwise specified.

C. Warranty shall not include damage or loss of trees, plants, or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 MPH, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.

/

D. Remove and immediately replace all plants, as determined by the Engineer, to be unsatisfactory during the initial planting installation.

E. This warranty also applies to existing trees, shrubs and ground covers that are to be removed and heeled-in for later replanting on-site.

END OF SECTION

/

INSPECTION CRITICAL PATH:
(P-Patch Water System Testing, Inspections & Close Out Procedures)

1. Pressure Test and Visual Inspections of trenches, main lines and valves (at 150 psi, for 30 minutes).
2. Pressure Test and Visual Inspections of trenches, lateral (sub-main) lines and hose bib assemblies (at the design pressure).
3. Preliminary Punch List Inspection of the entire system, control/communications equipment, and trench backfilling. Punch list is developed.
4. Substantial Completion Inspection (10 working days after punch list inspection) punch list items are substantially complete.

SUBSTANTIAL COMPLETION

5. Inspection of backflow prevention device by a Backflow Assembly Tester (BAT), hired by the Contractor, who will present the certification report to the , SPR project manager
6. M & O manuals and red lined drawings of "as-built" conditions submitted to SPR project manager

PHYSICAL COMPLETION

7. Physical Completion (Final) Inspection of the entire project (all punch list items have been completed).
8. Transfer to Operations – SPR Project Manager fills out the appropriate form and the P-Patch Program takes over all maintenance responsibilities.
9. Warranty period - (for a period of one year after documented Substantial Completion date). The Contractor takes care of any outstanding Warranty items. "Acts of God", vandalism or lacks of appropriate maintenance are the only exceptions to the Contractor's Warranty responsibilities.

RECORD DOCUMENTS: It is the Design Consultant's responsibility to ensure that the following steps are taken to record the "as-built" information of all underground utilities.

Step 1: The Contractor shall keep a current working set of drawings with all as-built changes or actual conditions as work proceeds, to be submitted to Consultant at completion of irrigation system installation.

Step 2: The Contractor shall locate all piping and equipment with trenches open as system is constructed to be entered onto red-lined plans.

Step 3: The Contractor performs all required tests, audits, etc. with adequate notice as spelled out in specs.

Step 4: The Contractor shall transfer the "as-built" information to a scaled drawing (same as contract documents) and provide to the Consultant prior to substantial completion of project.

Step 5: The Consultant shall prepare AutoCAD record documents with the Contractor's and/or SPR Surveyor's "as-built" information included, to be submitted to the Engineer on a CD or DVD along with all other required information, M&O manuals, etc. The CD or DVD shall also include .pdf, .jpg or .tif format files of the record documents, along with Mylar hard copies of the record documents to be submitted to the Engineer at Physical Completion of the project.

PART 1 - GENERAL

1.01 Description: Furnish and install P-Patch Water Systems in conformance with the drawings and specifications, complete and ready for use. The work consists of furnishing all materials necessary for a complete installation, including, pipe, pipe sleeves, fittings, back-flow prevention device assemblies, valves, valve boxes, swing joints and all appurtenances related thereto. Included shall be all labor necessary for installation, including trenching, plumbing, back-filling, electrical work, adjustments, and all other items of labor necessary for a satisfactory operating system.

1.02 Quality Assurance: Basic Qualifications - The Contractor must be a Washington State Landscape Industry Professional and has passed the Certified Landscape Professional (CLP) exam. The irrigation system must be installed under the direct supervision of a Certified Irrigation Technician or Journey Plumber. All potable water system components shall be installed by a Washington State Licensed Plumber and all testing of the backflow prevention equipment shall be done by a Washington State Certified Backflow Assembly Tester (BAT).

1.03 Definition: Within this specification section the term "The Engineer" refers to the Parks Engineer and all their representatives that may be involved with the project. Those may include (but are not limited to) Parks Engineering and Design Services staff (including Landscape Architects, Engineers and Architects), Parks' Construction Manager and Inspection Staff, Parks Surveyors, Parks' Facilities Maintenance Shops staff (including Plumbers and Electricians), and Parks' Resource/Operations Staff (including District Senior Gardeners and other maintenance staff) as required and appropriate for the project.

1.04 Reference Sections:

Section 26 00 00 - Electrical
Section 31 00 00 - Earthwork
Section 33 10 00 - Water Distribution Systems

1.05 Submittals:

A. Submit complete materials list prior to performing any work. Submit manufacturer catalog data and full descriptive literature, including current manufacturer's price list.

B. Equipment or materials installed or furnished without prior approval of the Engineer will be rejected and such materials will be required to be removed and replaced with approved materials at the complete expense of the Contractor.

C. Submit shop drawings for review and approval prior to beginning work.

1.06 Project Conditions:

A. Underground utilities and elements: The Contractor shall call Utility Notification Center at (811) or (800) 424-5555 or click www.callbeforeyoudig.org to locate all underground utilities (on or near Public Rights-of-Way / Property Lines) prior to digging and/or driving stakes. The Contractor can also engage the services of a

private utilities locating service for location of utilities within the site by calling Locating, Inc. @ (425) 392-6412, CNI @ (206) 255-8650 or Applied Professional Services @ (425) 313-1034 to locate utilities within the site. (Note: these firms will charge for services rendered). The Contractor is also required to call Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781) to make arrangements for utility locates within park property, in addition to contacting the professional utility location services. The Contractor shall request that the SPR Plumbing, Electrical, and Sewer Crews, along with the SPR Environmental Services Staff be contacted with at least two (2) working days notice. The Contractor to contact the City for "as- built" information for on-site underground utility system information by calling Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781).

B. Site Inspection and Layout: Before proceeding with any work, the Contractor shall inspect the site, carefully checking all grades and verifying all dimensions and conditions affecting the work to satisfy him/her that he/she may safely proceed. Changes or alterations to the system to meet actual conditions shall be made at the Contractor's expense. Always use appropriate fittings for changes in direction or elevation. Do not bend the pipe more than that allowed by this specification. The irrigation plan is diagrammatic and is not intended to show exact locations of existing or proposed piping, valves and hose bibs. Pipelines shown parallel on drawing may be placed in a common trench but separated by at least 6 inches and all pipes of dissimilar materials shall be installed per UPC and SPR standard details included with the plans.

C. When renovating or working around an existing park irrigation system, the Contractor and the Engineer (including the SPR Plumbing and Electrical Shops personnel) shall locate, test and document the condition of the existing system prior to the Contractor beginning the Work.

D. All materials shall be inspected by the Engineer (including SPR Plumbing and Electric shops personnel) prior to installation of any and all materials required to complete the work. The Contractor shall Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781) to make arrangements for inspections.

E. Take care, to neither disturb nor damage any existing above ground or underground utilities or elements. Keep streets, sidewalks and site clean, free from debris and affected drains open and free flowing at all times.

F. During the installation of the new water system, if underground utilities are encountered, including (but not limited to) existing irrigation systems, the Contractor shall notify the Engineer two (2) working days in advance and perform repairs to that system per this section and/or as directed by the Engineer. This shall also apply to the connection of new irrigation systems to existing older systems. Repairs and connections shall be done per SPR Standard Details and/or as directed by the Engineer in the field. (Note: No telescoping repair couplings will be allowed).

1.07 Water System Warranty: Contractor shall provide a One Year written Warranty as per the last page of this section. The Warranty shall include restoration of planted or paved areas due to settlement of trenches.

Note: The Warranty shall include one complete winterization and one complete de-winterization of the irrigation system. (Applies only for construction projects that carry over into the winter months or where extended maintenance & establishment periods are in place).

PART 2 - PRODUCTS

2.01 Water Distribution System Piping:

A. Copper Pipe and Fittings:

1. All Copper Piping shall be Type 'K' Copper and shall conform to industry standards and be in conformance with applicable ASTM or ANSI standards.
2. Copper Tubing: ASTM B 88, Type 'L' water tube. For tubing up to 2" diameter, use 'soft' copper (annealed temper). For tubing with diameters larger than 2", use 'hard' copper.
   a. For 2"O.D. and smaller: Cast-copper alloy solder-joint pressure fittings and soldered joints with Alloy Sn95 solder.
   b. Any copper pipe installed under or thru any paving and within 3' of the paving must be braised at each joint, per UPC Building Codes.
3. Copper Fittings:
   a. Cast-Copper-Alloy, Solder-Joint Pressure Fittings: ASME B16.18.
   b. Copper Unions: ASME B16.18, cast-copper-alloy body, hexagonal stock, with ball-and-socket joint, metal-to-metal seating surfaces, and solder-joint, threaded, or solder-joint and threaded ends.
   c. Threaded Ends: Threads conforming to ASME B1.20.1.

B. Brass Pipe and Fittings:

1. Brass pipe shall be seamless red brass per ASTM B 43 rated for 250-psi working pressure.
2. All Brass Pipe and fittings shall conform to industry standards and be in conformance with applicable ASTM or ANSI standards.
3. Brass fittings shall be Class 250 fittings rated for a minimum of 250-psi working pressure and shall conform to ANSI/ASME B16.15 and ASTM B584.

C. High Density Polyethylene (HDPE) Pipe and Fittings:

1. **Polyethylene (PE) Pressure Pipe (3" O.D. and larger)**: Pipe shall be manufactured from a PE 3408 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350

with a cell classification of PE: 345464C. The pipe shall have a manufacturing standard of ASTM F714. The pipe O.D. sizes 4" to 24" shall be available in steel Inside Pipe Sizes (IPS). The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipes shall be suitable for use as pressure conduits, listed as NSF 61, and per AWWA C906 Pressure Class (PC) 100 have a nominal burst value of three and one-half times the Working Pressure Rating (WPR) of the pipe. Peak flow water velocity of 5 ft/sec shall be used in the hydraulics engineering design.

2. **Polyethylene (PE) Pressure Pipe (2" O.D. and Smaller)**: Pipe shall be manufactured from a PE 3408 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D3350-02 with a cell classification of PE: 345464C. The pipe shall have a manufacturing standard of ASTM D3035 (IPS). The pipe shall be DR 11 (160psi WPR) unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipes shall be suitable for use as pressure conduits, and per AWWA C901, have nominal burst values of three times the Working Pressure Rating (WPR) of the pipe. Pipe shall also have the following agency listing of NSF 61.
3. **Polypropylene Compression Fittings for HDPE (PE) pipe**: Fittings **(2" O.D. and smaller lines only)** shall be "Polypropylene Compression Fittings" suitable for use on HDPE pipe per ASTM D3035 (IPS diameter, OD controlled). Fittings shall be long term rated for 230 psi complying with ISO 14236 and meet the dimensional and performance requirements of AWWA C800. Fittings shall comply with NSF 61 and shall be "listed" by NSF. Fitting "Bodies" shall be Polypropylene. Fitting "Compression Nuts" shall be 'Acetal'. Joint seal activation shall be accomplished solely by the Compression Nut. Joint "Seals" shall not "interfere" with pipe insertion. No beveling or lubrication of pipe shall be required. Fitting components shall not require dismantling prior to assembly on to pipe. Fittings shall be "3G" or "UTC" with "Slide & Tighten" capability as manufactured by Philmac Pty Ltd. and represented by The Harrington Corporation (HARCO) of Lynchburg, VA (434) 845-7094 and distributed locally by H.D. Fowler, Bellevue, WA.
4 **Butt Fusion Fittings**: Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02, and approved for AWWA use. Butt Fusion Fittings shall have a manufacturing standard of ASTM D3261. Molded & fabricated fittings shall have a pressure rating equal to the pipe unless otherwise specified in the plans. Fabricated fittings are to be manufactured using Data Loggers. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records. All fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.
5. **Electro-fusion Fittings**: Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02. Electro-fusion Fittings shall

have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electro-fusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting. Mechanical saddles shall not be allowed.

6. **Flanged and Mechanical Joint Adapters**: Flanged and Mechanical Joint Adapters shall be PE 3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans**.**

D. Joint Restraints shall be used with the ductile iron fittings.

1. Fitting to Pipe Joint Restraints (4" O.D. and smaller) shall be knuckle type as manufactured by HARCO (Harrington Corporation) of Lynchburg, Virginia, or approved equal. The grip ring shall be one piece residing within a ductile iron housing having machined serrations and shall be activated by one bolt. Housing and grip ring shall be of ductile iron per ASTM A536. Bolt and nut shall be Type 304 stainless steel.

2 Pipe to Pipe Restraints for pre-belled pipe shall meet the requirements of UNI-B-13-94. Grip ring serrations shall be machined. As cast serrations are not permitted, Restraint rods, bolts and nuts shall be of low alloy steel per AWWA/ANSI C111/A21.11. Pipe to Pipe Restraints shall be supplied by HARCO (Harrington Corporation) of Lynchburg, VA.

E. Thrust Blocking is required for all mainline pipe where necessary and as directed by the Engineer in the field.

F. Use Teflon tape on all threaded fittings, regardless of pipe type.

2.02 Sleeves:

A. Sleeves required for main and lateral (sub-main) lines located under paving (pathways and service roads within the site) where vehicles are anticipated, shall be, HDPE, DR-11 (or better). The inside diameter (I.D.) of the sleeve shall be twice (2 times) the outside diameter (O.D.) of the inserted pipe with a maximum of one (1) insert pipe per sleeve.

B. Sleeves under roadways (street rights-of-way, boulevards or parkways) where heavy vehicular traffic is anticipated, shall be HDPE, DR-11 pipe. The inside diameter (I.D.) of the sleeve shall be at least twice (2 times) the outside diameter (O.D.) of the total inserted pipes with multiple pipes inserted per sleeve (only as directed by the Engineer).

C. All sleeves shall be inspected and approved by the Engineer after forms are placed (for wall penetrations) and/or before paving operations are executed.

2.03 Pressure Reducing Valve (PRV):

A. PRV shall be capable of a minimum 150 psi working pressure as specified. Pressure fall off through the PRV shall not exceed designer's specified limit. PRV shall be the same size as the mainline where installed.

B. PRV shall be of the type, manufacture and size shown on the Plans and Details and/or the following: ***for (3/4" to 2") use Wilkens 600 Series PRV, for (2-1/2" and larger) use Wilkins 500 Series PRV with Wye Strainer: Watts No. 777S***, or approved equal.

2.04 Backflow Prevention Devices (BPD): May include a Double Check Valve Assembly (DCVA):

A. The backflow prevention devices shall meet the requirements specified in the City of SeaTac Standard Plans and Specifications for Road, Bridge, and Municipal Construction, (most recent edition). Proper drainage shall be provided at all backflow prevention devices. Drainage problems shall be brought to the attention of the Engineer at the time of system layout.

B. The backflow prevention devices shall be type and size as shown on the Plans and Details and/or the following: ***for (3/4" to 2") use Febco Master Series Model 850U Double Check Valve Assembly (DCVA), for (2-1/2" to 10") use Febco Master Series Model 850 DCVA or for other water features (as directed) use Febco Model 825Y (3/4" to 2") Reduced Pressure Assembly (RPA)***, or approved equal.

C. The manufacturer must be on the "Approved Cross Connection Control Devices" list of the Washington State Department of Social and Health Services for that size device.

2.05 Manual Valves:

A. Gate Valves (GV): (2" O.D. and smaller) shall be flanged, iron body, brass trimmed, resilient double disc wedge, and integral taper seats with non-rising stem and square actuator. All gate valves shall be Class 150 with a minimum 150 psi - 300 WOG.

B. Lateral (Sub-main) Isolation Valves (LIV): (2" O.D. through 3" O.D.) shall be 200 psi rated angle globe valves with integrally restrained ends. Ends shall be male swivel or integrally restrained push on gasketed joint as required. Components shall be Ductile Iron, 316 Stainless Steel, and Low Zinc Bronze complying with ASTM A536, ASTM A276, ASTM B62-C83600 respectively or equivalent. Ductile Iron shall be fusion bond epoxy coated. Gasketed joints shall be SBR Rubber and comply with ASTM F477. Internal seals shall be EPDM rubber.

C. Curb Stop (Shut-off) Valves: shall be all bronze construction with 'tee' handle, 175 psi water working pressure, Mueller Oriseal Mark II, or approved equal.

D. Manual Drain (Stop & Waste) Valves: shall be all bronze construction, 175 psi water working pressure, Mueller Oriseal Mark II, or equal.

E. Manual Valves (MV): (Size varies) **s**hall be of types, manufacture and sizes as shown on the Plans and Details and/or the following:

1. Gate Valves: Shall be Kennedy, Mueller, or Hammond, or approved equal.
2. Lateral (Sub-main) Isolation Valves: Shall be HARCO, or approved equal.
2. Drain Valves: Shall be Mueller Mark II Oriseal H-10284, stop and waste, or approved equal.

2.06 Quick Coupling Valves (QCV):

A. Shall be of the type, manufacture and size shown on the drawings and/or the following: Buckner QB44LRC-10 with 1 inch outlet, single lug 2-piece with locking lid and matching key, or approved equal. All quick coupling valves shall be installed in a 10" diameter valve box as shown in the Details.

A. Shall be one (1) inch, all brass, and two piece bodies, with locking brass tops and have galvanized steel swing joints as shown in the Details. Provide five (5) operating keys and hose swivels on each project.

2.07 Swing Joints:

A. Valve boxes shall be of the type, manufacture and size shown on the Plans and Details and/or the following:

1. Use Armor or NDS Pro Series 10 inch diameter round valve boxes with locking lids for quick coupler valves, green color, or approved equal.
2. Use Armor Super Jumbo Valve Boxes with Pentagon Lock or NDS Pro Series Jumbo boxes with bolt down locking lids and extensions as required (for single valve assembly only), green color, or approved equal.
3. Backflow Prevention Device Assemblies and pressure reducing valves (1-1/2" O.D. and larger) shall be installed in a Fogtite #25-TA Concrete Vault as shown on the Plans and Details. For backflow prevention devices and pressure reducing valves (1-1/4 O.D. and smaller), use Fogtite #2 Meter Box or Christy Concrete Vault with metal lid and extensions and/or bricks as required, or approved equal.
4. Use Armor or NDS Pro Series 6-7 inch diameter round box for grounding rods, green color, or approved equal.

B. Manual drain valves and individual gate valves shall be enclosed in a Cast Iron Roadway Box, as manufactured by Olympic Foundry, Tyler Pipe from Hughes Supply, Inc., or Armor "Polyiron" 5-1/4" valve box, or approved equal, with bottom, top, and lid, sized and extensions, as required. Lid shall have the word "water" printed on it.

D. Provide two (2) sets of all keys required for valves, valve box covers, and protective sleeve covers unless otherwise noted.

2.08 Other Supplies:

A. Electrical tape shall be black plastic, three-quarters inch (3/4") wide and a minimum of 0.007 inches thick and the all-weather type.

B. Teflon tape shall be used for all threaded connections. Tape shall be set back a minimum of one quarter inch (1/4") into the pipe threading.

C. Pressure gages for the pressure reducing valve assembly shall be liquid-filled with one quarter inch (1/4") gage cock attached, or approved equal.

2.09 Identification:

A. Underground - Type Plastic Line Markers (Detect-a-Tape): Permanent, bright-colored, continuous-printed plasticized aluminum tape, intended for direct-burial service; not less than 3" wide x 5 mils thick and shall be placed directly over the pipes at 6” below finished grades. Provide blue tape with black printing reading "CAUTION IRRIGATION LINE BURIED BELOW".

2.10 Backfill Materials:

A. For backfill around all irrigation heads use common builder’s sand, or per Section 31 00 00 - Earthwork.

B. For suitable bedding material around all pipes and equipment as shown on the Details, use: native topsoil with no rocks or other debris more than 1 inch diameter or common builder’s sand.

PART 3 - EXECUTION

3.01 Layout of Water System:

A. Stake the water system following the design shown on the Plans before construction begins. Alterations and changes to the layout may be expected in order to conform to the site conditions and to obtain full and adequate coverage of area to be irrigated. It is understood that corrective measures in the system may become necessary, but no changes or alterations to the system as planned shall be made without the prior authorization of the Engineer.

B. Before starting work, determine that work may proceed without disruption of the activities of other trades.

C. The Contractor shall carefully check grades to ensure that the area is ready to begin work.

D. The Contractor is responsible for taking all reasonable investigative actions and precautions when working around all utility systems.

3.02 Trenching:

A. The contractor will save and maintain any sod from the ditches and replace it after system installation. Sod shall not be displaced for more than 72 hours. Survival of the sod shall be warranted as specified in the City of SeaTac Standard Specifications (most recent edition).

B. Exercise care when excavating trenches near existing trees per Section 01 56 39 - Temporary Tree & Plant Protection. Where roots are two inches (2") and greater in diameter hand excavate and tunnel. When large roots are exposed, wrap with heavy burlap for protection and prevent excessive drying. Trenches dug by machines adjacent to trees having roots two inches (2") and less in diameter shall have the sides hand trimmed making a clean cut of the roots. Trenches having exposed tree roots shall be back-filled within twenty-four (24) hours unless adequately protected with moist burlap or canvas.

C. The top six inches (6") of soil shall be kept separate from subsoil and shall be replaced as the top layer when backfill is made.

D. Trenches shall be excavated for all pipe to provide the minimum depth of cover below finish grade of 24" for live lines (mains), and 18" for laterals and all others, no wider at any point than is necessary to lay the pipe or install equipment. Trenches shall be excavated with vertical sides. Locate outside of paved areas wherever possible.

E. Materials unsuitable for bedding of pipe to be removed to a depth 4" below trench bottom, and replaced with suitable bedding material as directed by the Engineer. Suitable bedding material shall be: excavated trench material, free from rocks, roots, sticks, debris or other sharp objects over one inch in diameter; or sand, as required.

F. All trenches must be straight, with appropriate pipe-fittings used to allow pipe to be laid without undue bending and not have abrupt changes in grade.

G. The trench bottom must be free of rocks or sharp-edged objects.

H. The use of an underground vibratory plow or similar device to pull pipe will not be permitted.

3.03 Pipe Installation:

A. Brass Pipe and Fittings:

1. Brass pipe shall be installed in accordance with the local Plumbing Code and as shown on the Plans and Details.

2. Use 'Teflon' tape on all male threads to prevent leaks and corrosion.
3. Wrap all brass pipes with black PVC tape where they pass through grouted openings in concrete vaults.

B. HDPE (PE) Pipe joining and installation methods:

1. Pipe and fittings shall be installed using procedures recommended by the manufacturer.
2. Plain end pipe and fittings shall be made using butt fusion. The butt fusion procedures shall be in accordance with the manufacturer or the PPI. The fusion equipment operator shall receive training using the recommended procedure. The Contractor shall be responsible to verify that the fusion equipment is in good operating condition and that the operator has been trained within the past twelve months. Fusion beads shall not be removed.
3. Heat Fusion Training. The supplier of the pipe and fittings shall provide a person certified by the pipe manufacturer and the fusion equipment manufacturer to train contractor fusion equipment operators and inspectors representing the Owner.
4. Mechanical Joining. Polyethylene pipe and fittings may be joined together using Flanges or Mechanical Joint (MJ) adapters. These fittings shall be made from PE 3408 HDPE, with a Cell Classification of 345464C as determined by ASTM D3350-02. Flanged and MJ adapters shall have a manufacturing standard of ASTM D3261. They shall have a pressure rating equal to the pipe unless otherwise specified on the plans. Mechanical saddles shall not be allowed.
5. Electrofusion couplings. Polyethylene pipe and fittings may be joined using approved electrofusion couplings. Fittings shall be PE3408 HDPE, Cell Classification of 345464C as determined by ASTM D3350-02. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans. All electrofusion fittings shall be suitable for use as pressure conduits, and per AWWA C906, have nominal burst values of three and one-half times the Working Pressure Rating (WPR) of the fitting.
6. Flange/MJ Adapter Installation. Flanges/MJ adapters shall be attached to pipe and fittings using butt fusion. The flanges/MJ adapters shall be aligned and centered relative to the pipe. Flanges/MJ adapters should be square with the valve or other flange before tightening of bolts. Bolts should not be used to draw flanges into alignment. Bolt threads shall be lubricated, and flat washers shall be used under flange nuts. Bolts shall be tightened using a "star tightening pattern". See the manufacturer's recommendations. Twenty-four hours after first tightening the flange bolts, they must be re-tightened using the same "star tightening pattern used above. The final tightening torque shall be as indicated by the manufacturer.

C. Sleeves:

1. Pipe trenches located under areas of existing or new paving shall have sleeves installed. Sleeves shall extend 12" beyond the pavement on each

side. Trenches shall be back-filled with sand (6 inches above and 4 inches below the pipe) and compacted in layers to 95% compaction, using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in firm unyielding condition. All trenches shall be left flush with the adjoining grade. The Contractor shall set in place; cap and pressure test all piping under paving prior to paving work.

2. All sleeves installed by the Contractor prior to and during the installation of the rest of the irrigation system shall be inspected by the Engineer and the SPR Plumbing Shop with at least two (2) working days prior notice by calling Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781) **with at least two (2) working days notice**.

D. Backflow Prevention Device Assembly:

1. A Water Service Line shall be provided by the City of SeaTac. The Water Service Line connection shall be inspected prior to backfilling by Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781).
2. Install the Backflow Prevention Device Assembly in accordance with the current local plumbing codes, and as shown on the Details.
3. For proper maintenance, the Backflow Prevention Device Assembly shall be located with sufficient clearance from other site features, not in paving and away from traffic patterns.
4. The Backflow Prevention Device Assembly shall be installed in a specified and approved vault per the Details.
5. Drain valves shall be installed in accordance with current local plumbing codes and per the Details.
6. All Backflow Prevention Device Assembly installations, including DCVA, require testing and certification by a Certified Backflow Assembly Tester (BAT), hired and paid for by the Contractor, prior to substantial completion and acceptance.
7. Once the device assembly is installed and certified, the Contractor shall send report copies to Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781, email: mfitzpatrick@ci.seatac.wa.us).
8. The device assembly shall also be inspected by **SPR's Plumbing Shop**. To arrange for that inspection the Contractor shall contact Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781, email: mfitzpatrick@ci.seatac.wa.us).
   with at least two (2) working days notice.

E. Manual Valves:

1. All manual (gate, isolation, lateral isolation, shut-off or drain) valves shall be installed as shown in the SPR Standard Details.
2. Gate, isolation and lateral isolation valves shall be installed in an adjustable two-piece cast-iron roadway box designed with tabs (lugs) on cover with 5 inches minimum inside diameter. The top section shall be 18 inches minimum length with a valve cover marked "WATER".
3. All gate valve assemblies shall be installed at least 24" away from any other valve boxes, vaults or other equipment or strucrures to allow for ease of maintenance and replacement.

F. Quick Coupling Valves:

1. One quick coupling valve shall be installed at the Point of Connection (POC) for use of compressed air for winterizing the system.
2. All quick coupling valves shall be installed in a 10" diameter valve box as shown in the Details.

G. Risers and Hose Bibs:

1. Minimum riser size shall be the pipe size of the hose bib.
2. All threaded joints shall have Teflon tape applied to male threads only. No pipe dope is allowed.
3. Risers are to be capped after installation in preparation for pressure testing.

H. Backfilling:

1. Backfilling shall be done when pipe is not in an expanded condition due to heat or pressure. Cooling of the pipe can be accomplished by operating the system for a short time before back-fill, or by back-filling in the early part of the morning before the heat of the day.
2. While backfilling the trenches fill and tamp around, 4 inches below and 6 inches above the pipe and fittings with approved suitable bedding material, or sand as required. The remainder of the backfill shall contain no lumps or rocks larger than three inches. A six inch separation is required between all pipes when more than one pipe occupies the trench. If no sodding is required, the top 6 inch of backfill shall be replaced by topsoil where it exists (free of rocks over one inch, subsoil or trash) or selected fill soil or sand if soil conditions are rocky.
3. All roots, rocks and surplus excavation shall be removed from the site unless otherwise directed. Any turf areas buried under ditch excavation shall be raked clean of any excavated material.
4. Trenches under roads or paved areas shall be back-filled and tamped with a mechanical tamper in successive six inch (6") lifts. Paving shall be replaced to the satisfaction of the Engineer.
5. Prior to completing backfill, place detection tape 6 inches below finished grades and directly above the installed lateral and supply mains for future line detection. Provide extra length to clearly expose ends in the valve boxes.

6. Before complete back-filling, all underground appurtenances including risers, valves, double check valve assembly, drain valves, and joints must remain exposed so that they can be viewed during testing.
7. The location, inspecting and testing provisions of these specifications will be strictly adhered to. If, for any reason, any part of the sprinkler system is back-filled before approved location, testing, or inspection is authorized, it must be completely uncovered and exposed until approved for back-filling by the Engineer.

3.04 Clean-Up: Upon completion of operations and prior to watering, clean all adjoining areas such as paving, curbs, and lawns of debris caused by the work on this project, or any part of this project. All hard surfaced areas shall be washed clean. Daily clean up shall be required on all areas used for circulation, parking, or other daily use.

3.05 Testing and Inspections:

A. Pressure Testing:

1. Make hydrostatic tests in the presence of the Engineer and SPR's Plumbing Shop. No pipe shall be backfilled until it has been inspected, tested and approved.
2. Furnish necessary pump, gauges and all other test equipment.
3. All HDPE mainlines with gate (isolation) valves installed and closed shall be flushed and pressure tested with all joints exposed to one hundred fifty (150) psi until watertight. Maximum psi loss in a thirty (30) minute test period shall be five (5) PSI.
4. Similarly, all HDPE lateral lines with risers installed and capped shall be flushed and pressure tested with all joints exposed to service line pressure required for design for 30 minutes. Maximum PSI loss allowed shall be five (5) PSI. The Engineer and SPR's Plumbing Shop shall visually inspect all lateral lines, joints, and swing joints for leakage.
5. To be valid, all tests must be witnessed and approved by the Engineer and SPR's Plumbing Shop. The contractor must give at least two (2) working days notice prior to the anticipated date of inspection by calling Mike Fitzpatrick, Park Operations Manager (Shop: 206-973-4770 or Direct: 206-973-4781, email: mfitzpatrick@ci.seatac.wa.us) **with at least two (2) working days notice**.
6. All gauges used in the testing of water pressures shall be certified correct by an independent testing laboratory immediately prior to use on the project. Gauges shall be re-tested when directed by the Engineer and SPR's Plumbing Shop.
7. An Inspection Report shall be made and submitted by the Engineer and SPR's Plumbing Shop immediately after the completion of testing.

B. Equipment Surveying: Upon the Engineer's approval of the Pressure Test, the Contractor shall locate main lines and lateral lines and transfer that information onto the red-lined plan, to be passed along to the Consultant for final "As-Built" Record Document preparation. The Contractor shall provide that service at their cost or can

request that the Engineer provide survey services (if agreed to by the Engineer, in advance) before the backfilling of trenches can be completed.

C. Complete System Inspection (Preliminary Punch List):

1. Upon approved completion of the Coverage Test, trenching and installation of all equipment, the Contractor shall request a Complete System Inspection of the entire irrigation system including: backfilling, irrigation heads, valves, valve boxes, controller and all other equipment.
2. From this inspection, a punch list shall be prepared by the Engineer and presented to the Contractor for completion. The Engineer shall give a date for completion of the punch list, not to exceed ten (10) working days.

D. Substantial Completion:

1. Contractor shall write a letter to the Engineer requesting substantial completion of the irrigation system.
2. Refer to Division 1 Specifications for information about how the irrigation system shall be determined to be substantially complete.

E. Record Documents: It is the Consultant's responsibility to ensure that the following steps are taken to record the "as-built" information of all underground utilities.

1. The Contractor shall keep a current working set of drawings with all as-built changes or actual conditions as work proceeds, to be submitted to Consultant at completion of irrigation system installation.
2. The Contractor performs all required tests, audits, etc. with adequate notice as spelled out in specs.
3. The Consultant shall prepare AutoCAD record documents with the Contractor's and/or SPR Surveyor's "as-built" information included, to be submitted to the Engineer on a CD or DVD along with all other required information, M&O manuals, etc. The CD or DVD shall also include .pdf, .jpg or .tif format files of the record documents, along with Mylar hard copies of the record documents to be submitted to the Engineer at Physical Completion of the project.
    a. The "As-built" plans shall be reviewed and all features explained. The "as-built" plans shall consist of red-lined corrections, notes, comments, etc. on a clean bond paper copy. Any major deviations from the original design (as previously approved) shall be documented on the as-builts and explained at the session. All critical dimensions shall be shown.
    b. The Consultant shall review and approve the "as-built" plans submitted by the Contractor. The Consultant shall then prepare AutoCAD Record Documents with the Contractor's and SPR surveyor's "as-built" information included, to be submitted to the Engineer on a CD or DVD along with all other required information, M&O manuals, etc. The CD or DVD shall also include .pdf, .jpg or .tif format files of the record documents, along with Mylar hard

copies of the record documents to be submitted to the Engineer at Physical Completion of the project.

c. A complete Maintenance and Operations (M&O) Manual shall be prepared by the Contractor and three copies of the manual shall be turned over to the Engineer at the final inspection. The manuals shall consist of three ring binders containing: (1) catalogs of all materials used, (2) a complete parts list of all materials, (3) a written summary of all operations data including spring start-up and winterization techniques, controller programming, valve cleaning, irrigation adjustments, backflow preventer operation and any other information required to operate and maintain system, (4) two local distributors.

d. The controller station timing shall be set by the Engineer.

4. The Contractor shall provide the Engineer with the necessary keys and/or other tools necessary to operate/drain/activate the system and spend sufficient time with the Engineer to insure that the system operation, maintenance, and winterizing can continue after departure of the Contractor. The Contractor shall be liable for all damage or loss resulting from failure to comply with the provisions of this paragraph.

F. Physical Completion:

1. Upon completion and approval of all tests, inspections, training, manuals, as-built drawings, and other requirements of this Section, the Engineer shall write a letter to the Contractor transferring the project to the Owner's Maintenance and Operation personnel.
2. Physical Completion of the system will be contingent upon Contractor providing signed and approved irrigation/plumbing/health/electrical permits as may be applicable.

G. Water System Warranty:

1. The Contractor shall submit a written Warranty, on the approved/attached form, stating that all work showing defects in materials or workmanship will be repaired or replaced at no cost to the Engineer for a period of one year from date of Substantial Completion.
2. A final site meeting shall take place eleven months after the date of Substantial Completion. The system shall be examined by the Engineer to determine if the system requires alterations or replacements covered in the Warranty.
3. The sample Warranty Form following this section may be re-typed on Contractor's letterhead and contain the following information:

P-PATCH WATER SYSTEM WARRANTY

(Project Name)

We hereby guarantee that the irrigation system we have furnished and installed for is free from defects in materials and workmanship, and the work has been completed in accordance with the drawings and specifications. Exceptions include ordinary wear and tear, acts of god, and unusual abuse, or neglect by the Owner.

We agree to repair or replace any defects in materials or workmanship, which may develop during the period of one year from date of Substantial Completion. We agree to correct any damage resulting from the repairing or replacing of such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Engineer, after receipt of written notice. In the event of our failure to make such repair or replacements within a reasonable time after receipt of written notice, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

Project Information

Project Name: _____

Project Location: _____

Consultant (System Designer): _____

Authorized Contractor Representative

Signed: _____ Date _____

Title: _____

Effective Dates of Warranty

Start Date (Substantial Completion): _____

End / Warranty Testing Date / Completion of Guarantee Period: _____

Approvals

Approved by: _____
(Project Manager)

Approved by: _____
(Construction Manager)

END OF SECTION