PURCHASING DEPARTMENT

TOWN OF ARLINGTON
730 Massachusetts Avenue
Arlington, MA 02476

Telephone 781.316.3003
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August 15, 2023

Invitation for Bid #23-22

Robbins Farm Park Playground

ADDENDUM NO. 3

The attention of Bidders is called to the following Addendum to the Bid Documents. The items set forth herein, whether of omission, addition, substitution, or clarification, shall be included in and form a part of the proposal submitted and shall become part of the Contract.

1. **GENERAL BID DEADLINE EXTENSION**
   The General Bid deadline has been extended to August 23, 2023, no later than 10:00 a.m.

2. **BID FORM**
   Substitute attached bid form for the bid form originally issued.

3. **CHANGES TO THE SPECIFICATIONS**
   Substitute the attached Sections 012200, 013146, 033001, 057200, 079201, 101400, 116813, 311300, 312500, 321313, 321416, 321543 for the corresponding specifications originally issued.

4. **CHANGES TO THE PLANS**
   Substitute attached drawings L-100, L-111, L-121, L-131, L-400, L-420, L-450, and L-460 for the corresponding drawings originally issued.

All other terms and conditions of the bid documents remain unchanged.

ADDENDUM MUST BE ACKNOWLEDGED ON THE BID FORM. FAILURE TO ACKNOWLEDGE ANY OR ALL ADDENDA COULD RESULT IN REJECTION OF YOUR BID AS NON-RESPONSIVE.

James Feeney
Town Manager

BID FORM

For: **Robbins Farm Park Playground (Bid #23-22)**

Proposal (BID) of

_____

(hereinafter called "Bidder") a corporation, organized and existing under the laws of the Commonwealth of Massachusetts.

_____

doing business as _____
(corporation, proprietorship, partnership)

To the TOWN OF ARLINGTON, hereinafter called "Owner"

A. The Bidder, in compliance with the invitation for bids for the Robbins Farm Park Playground, having examined the plans and specifications with related documents and the site of the proposed project including the availability of materials and labor, hereby proposes to furnish all labor, materials and supplies, and to construct the project in accordance with the Contract Documents, within the time set forth therein, and at the prices stated below. These prices are to cover all expenses incurred in performing the work required under the Contract Documents, of which this proposal is a part.

Bidder hereby agrees to commence work under this Contract on or before a date to be specified in the written "Notice to Proceed" from the Owner, and to complete the work **by July 1, 2024**. The Bidder further agrees to pay as liquidated damages, the sum of $100.00 for each consecutive calendar day thereafter that the works remains incomplete, as provided in the Contract Documents.

B. Bidder acknowledges receipt of the following addenda:

_____ Dated _____

_____ Dated _____

_____ Dated _____

C. Bidder agrees to perform all work described in the specifications and shown on the drawings, for the following lump sum price of:

1. Total Proposed Base Bid Contract Price:

_____ Dollars ($_____)

2. Bid Deposit on total bid price, including alternates, in the sum of:

_____ Dollars ($_____) in

the form of _____ is submitted herewith in accordance with the INSTRUCTION FOR BIDDERS and is to become property of the Owner in the event the Contract and bonds are not executed within the time above set forth, as liquidated

damages for the delay and additional expense to the Owner caused thereby.

3. The Bid does not include premiums on Performance and Labor and Materials Bonds. Cost of required Bond Premiums (for base bid and any and all alternates):

   Bond Premiums Add $_____

4. Alternates
   In addition to the Base Bid work, the bidder proposes the following prices for the Alternate items as described in the bid and contract documents:

DEDUCT Alternate No. 1:

_____Dollars ($_____)

ADD Alternate No. 2:

_____Dollars ($_____)

DEDUCT Alternate No. 3:

_____Dollars ($_____)

5. The Supplemental Unit Prices set forth herein shall be used to determine any equitable adjustment of the Contract in connection with the changes or extra work performed under this Contract as directed by the Town of Arlington.

   It is mutually understood and agreed that such Supplemental Unit Prices include all items of costs, equipment, taxes, and insurance of every kind, overhead and profit for the Contractor, and they shall be used uniformly, without modification for addition and deductions. Prices listed under ADDITIONS and DEDUCTIONS are to be the complete total price billed to and paid by the Town of Arlington therefor. There can be no more than fifteen (15) percent difference in price between the additions and deductions.

	ITEM DESCRIPTION (All references to items shall correspond to work as described in the relevant portions of the Construction Documents.)	**UNIT**	**COST**	**APPROVED**
1	Construction Fencing	LF		
2	Ordinary borrow/clean fill, complete in place	CY		
3	Ledge rock removal	**CY**		
4	Gravel borrow, complete in place	CY		
5	Base drainage stone for poured-in-place rubber, complete in place	CY		
6	Dense graded gravel, complete in place	CY		
7	3/4” Crushed stone/drainage stone, complete in place	CY		
8	Asphalt walk paving, complete in place per detail and specification, including base and subbase preparation and steel edge	SF		

9	Concrete paving, complete in place including base and subbase preparation & broom finish	SF		
10	Stabilized decomposed granite, complete in place including base and subbase preparation	SF		
11	Concrete curb, complete in place	LF		
12	Concrete seatwall, complete in place	LF		
13	Poured-In-Place rubber surfacing on aggregate base, installed per detail and specification, including base and subbase preparation	SF		
14	Poured-In-Place rubber surfacing, at hillside slope, installed per detail and specification, including concrete base and subbase preparation	SF		
15	Clean screened loam, complete in place	SF		
16	Fine rake & seed, per detail and specification	SF		
17	Tree planting per detail and specification	EA		
18	Shrub planting per detail and specification	EA		
19	Groundcover planting-per detail and specification	SF		
20	Salvaged stone scramble placement on base	EA		

D. If the Bid is accepted by the Owner, the undersigned agrees to complete the entire work provided to be done under the contract within the time stipulated by the Owner.

E. The undersigned agrees that for extra work, if any, performed in accordance with the AGREMENT, he will accept compensation as stipulated therein in full payment for such extra work.

F. Bidder understands that the Owner reserves the right to reject any and all bids.

G. The undersigned hereby agrees that he will not withdraw the Bid within sixty (60) consecutive calendar days after the actual date of the opening of Bids and that, if the Owner accepts this Bid, the undersigned will duly execute and acknowledge the required Contract Bonds within 10 days after notification that the AGREEMENT is ready for signature.

H. Should the undersigned fail to fulfill any of his agreements as herein before set forth, the Owner shall have the right to retain as liquidated damages the amount of the Bid security, which shall become the Owner/s property. If a bid was furnished as bid security, it is agreed that the amount thereof shall be paid as liquidated damages to the Owner by the Surety.

I. The Undersigned certifies under penalty of perjury that this Bid is in all respect bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the "person" shall men natural person, joint venture, partnership, corporation or other business or legal entity.

J. The Bidder is required to state below all work he/she and his/her subcontractors (if subcontractors are to perform substantial portions of the work) has completed within the past 5 years of a similar character and value to that of the work included in the proposed Contract and to give references that will enable the Owners to judge the Bidder's experience, skill and business standing. The Bidder is required to list a minimum of 3 completed projects that are comparable in scope, complexity, and value. For each project, include the name, location,

type, date complete, construction value and owner contact.

_____

_____

_____

_____

_____

(add supplementary page if necessary)

K. The Bidder is required to state below all construction projects he/she currently has under contract. For each project, include the name, location, type, scheduled completion date, construction value and owner contact.

_____

_____

_____

_____

_____

(add supplementary page if necessary)

L. The undersigned bidder hereby certifies that the tools and equipment required to meet the specified requirements of the Contract document, will be utilized in the performance of the work.

M. The undersigned further certifies under the penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the Commonwealth of Massachusetts under the provisions of section 29F, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation declared there under

N. The undersigned further certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration (OSHA) that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section 44A of chapter 149.

Date_____

_____

(Company Name of Bidder)

By:_____

(Authorized Signature)

_____

(Name and Title of Person Signing Bid)

_____

(Business Address)

_____

(Business Phone/Email)

SECTION 01 22 00: UNIT PRICES

PART 1 - GENERAL

1.01 The Unit Prices set forth herein shall be used to determine any equitable adjustment of the Contract Price in connection with the changes or extra work performed under this Contract as directed by the Town.

1.02 It is mutually understood and agreed that such Unit Prices include all items of costs, equipment, taxes and insurance of every kind, overhead, and profit for the Contractor, and they shall be used uniformly, without modification for addition and deductions. Prices listed under ADDITIONS and DEDUCTIONS are to be the complete total price billed to and paid by the Owner therefor. There can be no more than fifteen (15) percent difference in price between the additions and deductions.

1.03 Sufficient prior notice shall be given in accordance with the General Conditions so that proper measurements of materials removed or to be replaced may be taken. All quantities used in the determination of additions to or deductions from the Contract Price due to Unit Prices shall only be those that have been determined and approved by the Owner in advance.

A. The unit price bid shall be taken to include all labor and materials necessary to make the item of work complete in place, whether listed or not. All supervision, overhead items, including but not limited to bond, insurance, and labor burden – and profit shall be included. Payment shall fully compensate the Contractor for any other work which is no specified or shown, but which is necessary to complete the work of the item.

1.04 Unit Prices Form

	ITEM DESCRIPTION (All references to items shall correspond to work as described in the relevant portions of the Construction Documents.)	**UNIT**	**COST**	**APPROVED**
1	Construction Fencing	LF		
2	Ordinary borrow/clean fill, complete in place	CY		
3	**Ledge rock removal**	**CY**		
4	Gravel borrow, complete in place	CY		
5	Base drainage stone for poured-in-place rubber, **complete** in place	CY		
6	Dense graded gravel, complete in place	CY		
7	3/4” Crushed stone/drainage stone, complete in place	CY		
8	Asphalt walk paving, complete in place per detail and specification, including **base and subbase preparation and** steel edge	SF		
9	Concrete paving, complete in place including base and subbase preparation & broom finish	SF		
10	Stabilized decomposed granite, complete in place **including base and subbase preparation**	SF		
11	Concrete curb, complete in place	LF		
12	Concrete seatwall, complete in place	LF		
13	Poured-In-Place rubber surfacing on aggregate base, installed per detail and specification, **including base and subbase preparation**	SF		

14	Poured-In-Place rubber surfacing, at hillside slope, installed per detail and specification, **including concrete base and subbase preparation**	SF		
15	Clean screened loam, complete in place	SF		
16	~~**Lawn seed & loam**~~ **Fine rake & seed**, per detail and specification	SF		
17	Tree planting ~~**& loam (at plantbed and on slope),**~~ per detail and specification	EA		
18	Shrub planting ~~**& loam (on slope),**~~ per detail and specification	EA		
19	Groundcover **planting** ~~**& loam (at plantbed and on slope)**~~, per detail and specification	SF		
20	Salvaged stone scramble **placement on base** ~~**(on slope)**~~	~~**SF**~~ **EA**		

1.05 General

A. Sufficient prior notice shall be given in accordance with the General Conditions so that proper measurements of materials removed or to be replaced may be taken. All quantities used in the determination of additions to or deductions from the Contract Price due to Unit Prices shall only be those that have been determined and approved by the Town in advance.

B. The unit price bid shall be taken to include all labor and materials necessary to make the item work complete in place.

PART 2 – MATERIALS

NOT USED

PART 3 – EXECUTION

NOT USED

END OF SECTION

SECTION 01 31 46: PERMITS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The conditions and general requirements of the contract, Division 01 and applicable parts of DIVISION 31 – EXCAVATION FILLING AND GRADING apply to the work under this Section.

B. The Contractor shall perform the work in accordance with the Contract Documents, and any applicable municipal requirements.

1.02 SCOPE OF WORK

A. The Contractor shall be responsible for obtaining all permits required to complete the work of this contract, to provide all coordination and furnish all bonds, assurances and required warranties. As applicable~~, the Contractor shall be responsible for~~ **the Town shall waive** any and all fees associated with the securing of permits necessary for the execution of the work of this contract. Should any street work be required, a contractor specifically approved by the Town shall perform it.

1.03 PERMITS BY CONTRACTOR

A. The Contractor shall prepare permit applications and obtain applicable permits after the contract is awarded, bearing all expenses. All required permits shall be obtained, INCLUDING BUT NOT LIMITED TO the following:

1. Parking Permits as needed and appropriate.

1.04 GENERAL

A. Guarantee all work per permit requirements.

1.05 DIG SAFE

A. Contact DIG-SAFE seventy-two (72) hours prior to initiating work at #811.

PART 2 – MATERIALS

2.1 GENERAL

A. All materials and equipment shall conform to permit requirements and the Town's standards for utilities, excavation, backfill, patching, and surveying or other work unless otherwise stated in these specifications. Coordinate as necessary with the appropriate Town official and/or private utility.

PART 3 – EXECUTION

3.1 GENERAL

A. Execute all work per permit requirements. All plumbing and electrical work to be approved by Town Inspectors; sidewalk ramps to be approved by Town Engineer.

END OF SECTION

SECTION 03 30 01

CAST-IN-PLACE CONCRETE - SITEWORK

PART 1 GENERAL

1.1 SUMMARY

A. Provide all equipment and materials, and do all work necessary to construct the cast-in-place concrete for sitework, including but not limited to: below grade slabs, pads, bases, foundations, and footings, stairs and walls, complete, as indicated on the Drawings and as specified.

1.2 RELATED WORK

A. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
3. Section 04 4302, GRANITE
4. Section 07 9201, EXTERIOR JOINT SEALANTS - SITEWORK; Backer rod and sealant for expansion joint.
5. Section 31 1100, EARTHWORK; Establishment of subgrade elevations, and subbase course beneath slabs.
6. Section 32 1313, CONCRETE PAVING; Cast-in-place concrete paving
8. Section 32 1416, BRICK PAVING
11. Section 32 3300, SITE FURNISHINGS
12. Section 11 6813, PLAYGROUND EQUIPMENT

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Concrete Institute (ACI):

325.9R	Guide for Construction of Concrete Pavements and Concrete Bases

2. American Plywood Association (APA):

Ref. 1	APA Design/Construction Guide, Residential and Commercial

3. American Society for Testing and Materials (ASTM):

A 36	Structural Steel
A 123	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
A 185	Welded Steel Wire Fabric for Concrete Reinforcement
A 307	Carbon Steel Externally Threaded Standard Fasteners
A 386	Zinc Coating (Hot-Dip) on Assembled Steel Products
A510	General Requirements for Wire Rods and Course Round Wire, Carbon Steel
A 569	Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip, Commercial Quality
A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C 33	Concrete Aggregates
C 94	Ready-Mixed Concrete
C 143	Slump of Portland Cement Concrete
C 150	Portland Cement
C 171	Sheet Materials for Curing Concrete
C 494	Chemical Admixtures for Concrete
D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.4 SUBMITTALS

A. Shop drawings of reinforcing steel shall be submitted. Drawings shall indicate bar sizes, locations, spacings, quantity required, bending and cutting schedules, and supporting and spacing devices.

B. Formwork Shop Drawings: Show formwork construction including form-facing joints, rustications, construction and contraction joints, form joint-sealant details, form tie locations and patterns, inserts and embedments, cutouts, cleanout panels, and other items that visually affect exposed to view cast-in-place concrete.

C. Samples of the following shall be submitted:

Item	Sample Size
Preformed joint filler	Two pieces, full depth and width, 12 in. length
Form	12 in. x 12 in.
Form ties	1 each, complete

D. Submit manufacturer's product data for forms and accessories.

E. Submit concrete design mix for Architect's approval.

F. Prior to start of concrete work, Contractor shall submit to the Architect for review a schedule for execution of the work of this section and a location plan indicating sequence of concrete placement and location of proposed control joints and construction joints, if required.

1.5 DESIGN OF CONCRETE MIX

A. Mix design shall be certified by independent testing laboratory. Statement of materials constituting design of mixes (as required by referenced standards) shall be submitted for Architect's approval within one week following award of Contract.

B. Concrete mix design shall include the following information:

1. Proportions of cement, fine and coarse aggregates, and water.
2. Water-cement ratio, design strength, slump, and air content.
3. Type of cement and aggregates.
4. Type and dosage of all admixtures.
5. Special requirements for pumping.
6. Range of ambient temperature and humidity for which the design is valid.
7. Any special characteristics of the mix which require precautions in the mixing, placing, finishing, or curing methods to achieve the finished product specified.

C. No concrete shall be delivered to the job site until the Architect has approved the design mixes.

1.6 PRECONSTRUCTION MOCK-UPS (Exposed Finish Work Only)

A. General

1. Schedule mock-up casting for acceptance 30 days prior to casting of concrete surfaces represented by the mockups.
2. Locate mock-up panels in non-public areas accepted by the Architect. **Mock-up may be compeleted in-place as approved by Architect.**
3. Continue to cast mock-ups until acceptable mock-ups area produced. Accepted mock-ups shall be the standard for color, texture, and workmanship for the work.
4. Mock-up sequence of forming, placing, form removal, curing, and finishing shall be reviewed and accepted by the Architect.
5. Demonstrate in the construction of the mock-up formwork the sealer material, form release agent, and curing materials and methods to be used.
6. Mock-up formwork shall be inspected and accepted by the Architect before placing of concrete.
7. Use the same concrete mixes and placement and timing procedures, accepted in mock-ups, in the final work, unless otherwise directed by the Architect.

8. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-up.
9. Remove mockups from site at completion of project, as directed by the Architect, **as needed**.

B. Mockups: Cast mockups of full-size sections simulating actual design and execution conditions for concrete mix materials, reinforcement, formwork, placing sequence, form removal, curing, finishing, methods and materials of stain removal and correction of defective work, and overall standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect. **Mock-up may be compeleted in-place as approved by Architect.**
2. Notify Architect ten days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect **as needed**.

C. Source of Materials. Utilize the same source, stock, or brand of concrete materials for each class or mix of concrete which is to be exposed. Do not interchange materials or mixes until an additional mock-up shows that uniformity in finish texture and color, as compared to original mock-up will be maintained. If necessary, obtain and stockpile materials in sufficient quantity to ensure continuity and uniformity.

1.7 QUALITY ASSURANCE

A. Unless otherwise specified, cast-in-place concrete work shall conform to ACI 301. Construction of concrete subbases shall conform to ACI 325.9R

B. Proposed wall footings shall be laid out and staked for review and approval by Architect prior to pouring concrete.

C. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

D. Preinstallation Conference: Conduct conference at Project site.

1.8 QUALITY CONTROL

A. Unless otherwise specified herein, or indicated on the Drawings, concrete formwork construction and materials shall conform to ACI 301, 318, and 347, and the following:

1. Variation from plumb
   a. In lines and surfaces of arrises:
      In any 10 ft. of length 1/4 in.
      Maximum for the entire length 1 in.
   b. For exposed conspicuous lines:
      In any 20 ft. length 1/4 in.
      Maximum for the entire length 1/2 in.

2. Variation in sizes and location of sleeves, wall openings: 1/4 in. (+ ,-)
3. Variation in location of anchor bolts unless provided with sleeves or other means of adjustment: 1/4 in.

B. Maximum deflection of form facing materials at concrete surfaces exposed to view shall be 1/240 of span between structural members.

C. Reinforcing steel shall be fabricated to conform to the required shapes, dimensions, and tolerances specified in CRSI Manual.

D. Allowable Tolerances:

1. Fabricating:
   a. Sheared length: Plus or minus 1 in.
   b. Stirrups and ties: Plus or minus 1/2 in.
   c. Members more than 8 in., but not over 2 ft. - 0 in. deep: Plus or minus 1/2 in.
   d. Members more than 2 ft. - 0 in. deep: Plus or minus 1 in.
   e. Crosswise of members: Space evenly within 2 in. of stated separation
   f. Lengthwise of members: Plus or minus 2 in.

2. Maximum bar relocation to avoid interference with other reinforcing steel, conduits, or other embedded item: 1 bar diameter.

1.9 TESTING

A. Inspection and testing of the concrete mix will be performed by an independent testing laboratory approved by the Architect. Testing equipment shall be supplied by the laboratory, and the preparation of samples and all testing shall be performed by the laboratory personnel.

B. Concrete materials and operations will be tested and inspected as work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered, nor shall it obligate the Architect to final acceptance.

C. The following testing services shall be provided by the Contractor:

1. Review and test of the Contractor's proposed materials for compliance with the specifications.
2. Review of the Contractor's proposed mix design.
3. Sampling and testing of materials at plants or stockpiles during the course of the work for compliance with the specifications.
4. Strength tests of concrete specimens.
5. Inspection of concrete batching, mixing, and delivery.

D. The following additional testing services shall be provided, at the Contractor's expenses:

1. Additional testing and inspection required because of changes in materials or proportions, requested by the Contractor.
2. Additional testing of materials or concrete occasioned by their failure by testing or inspection to meet specification requirements.

E. At least four standard compression test cylinders shall be made and tested from each day's placement of concrete. Four concrete test cylinders will be taken for every 50 cubic yards of each type and design strength of concrete placed. Two cylinders shall be tested at 7 days, and two at 28 days. One additional test cylinder will be taken during cold weather concreting, and will be cured at the job site under the same conditions as the concrete it represents. If job experience indicates additional cylinder tests or other tests are required for proper control or determination of concrete quality, such tests shall be made.

F. One slump test will be taken for each set of test cylinders taken.

G. Submit to the Owner, for forwarding to the testing laboratory, proposed concrete mix design for review, before beginning work.

H. Provide free access to work and full assistance and cooperation, concrete for samples, and such auxilliary personnel and equipment as needed for testing agency to take samples for required tests. Notify testing agency and Architect of intent to place concrete at least 24 hours before placement.

PART 2 PRODUCTS

2.1 AGGREGATE BASE

A. Refer to Section 32 1100, BASE COURSES.

2.2 FORMS

A. Forms for Exposed Wall Finish: Concrete wall surfaces which will be visible after completion of the structure shall be formed to have a "smooth-form" finish, as defined by ACI 301. The form facing materials shall produce the required “Smooth Finish” surface on the concrete.

1. Exposed surfaces: No-absorptive overlay plywood such as medium or high density overlay, Finn-Form, or approved equal.

B. Forms for Unexposed Finish: Plywood, lumber or metal, with lumber dressed on at least two edges and one side.

C. Cylindrical Forms: Sonotube Fibre Forms, wax-impregnated strippable forms manufactured by Sonoco Products Company, General Products Division or approved equal, or ABS or PVC plastic reusable forms.

D. Form Ties: Provide prefabricated, adjustable length galvanized steel snap-off ties, with brackets, cone tie (knock-off tie with breakback inside cone), cornerlocks and other accessories as necessary.

E. Form Coatings: Commercial formulation compounds that will not bond with, stain or adversely affect concrete.

F. Forms shall be true to line and free from warp, and shall be of sufficient strength, when staked, to resist the pressure of the concrete without springing. Formwork shall be designed so that sections may be fastened together to prevent vertical or horizontal movement of ends.

2.3 CONCRETE

A. Concrete Mix: Prepare design mixtures according to ACI 301.

B. Concrete shall be air-entrained type, conforming to ASTM C 94. Air-Entraining Admixture: ASTM C 260.

C. Unless otherwise indicated on the Drawings, minimum 28 day compressive strength shall be 4,500 psi.

D. Concrete slump shall be no less than 2 in. nor greater than 4 in., determined in accordance with ASTM C 143.

E. Cement shall be Portland cement, conforming to ASTM C 150, Type I or II.

F. Aggregates shall conform to ASTM C 33.

G. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.

H. No calcium chloride or admixtures containing calcium chloride shall be added to the concrete. No admixtures other than those specified shall be used in the concrete without the specific written permission of the Architect in each case.

2.4 CONCRETE REINFORCING

A. Steel reinforcing bars shall conform to ASTM A 615.

1. Bars employed as reinforcement shall be deformed type.
2. Bars employed as dowels shall be hot-rolled plain rounds.
3. Unless otherwise indicated on the Drawings, reinforcing bars shall be Grade 60.

B. Welded wire fabric reinforcement shall conform to the applicable requirements of ASTM A 1064. Fabric reinforcement shall be furnished in flat sheets. Fabric reinforcement in rolls will not be permitted.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

2.5 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class B. Include manufacturer's recommended adhesive or pressure-sensitive tape.

2.6 CURING MATERIALS

A. Curing shall be by moist curing or by use of curing compound.

B. Curing paper shall be a nonstaining, fiber reinforced laminated kraft bituminous product conforming to ASTM C 171. Four mil polyethylene sheeting may be substituted for curing paper.

C. Curing compound shall be a wax or resin-base, clear or white pigmented compound conforming to ASTM C 309, Type 1, Class B, dissipating.

2.7 EXPANSION JOINTS

A. Unless otherwise indicated on the Drawings, expansion joints shall be located 30 ft. o.c., maximum.

B. Expansion joint filler shall be preformed, nonbituminous type joint filler conforming to ASTM D 1752, Type II, similar to Sealtight Cork Expansion Joint Filler, manufactured by W.R. Meadows, Inc., Elgin, IL 60120, or approved equal.

1. Premolded filler shall be one piece for the full depth and width of the joint leaving a sealant recess as indicated.
2. Use of multiple pieces of lesser dimensions to make up required depth and width of joint will not be permitted.
3. Except as otherwise noted on the Drawings, joint filler shall be 3/8 in. thick.

C. Dowels shall be furnished under this Section, and shall be Type 304 stainless steel.

2.8 CONTROL JOINTS

A. Control joints indicated to be sawn shall be made by saw cutting concrete slab after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab. Saw blade shall cut into slab at least 1 in., but in no case less than 25% of slab depth.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.11 BOLTS

A. Anchor bolts shall conform to ASTM A 307.

B. Expansion bolts for anchoring into existing concrete shall conform to ASTM A 307, and shall have a self-drilling shell.

PART 3 EXECUTION

3.1 AGGREGATE BASE

A. Refer to Section 32 1100, BASE COURSES.

B. Base course shall be kept clean and uncontaminated. Less select materials shall not be permitted to become mixed with subbase material.

C. Aggregate base beneath concrete shall be inspected to ensure that material is suitable to receive concrete, including compaction. Subgrade unacceptable shall be brought to the attention of the Architect.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.3 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

3.4 REINFORCING

A. Before being placed in position, reinforcing shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between the concrete and reinforcing. Where there is delay in placing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.

B. Any bar showing cracks after bending shall be discarded.

C. Unless otherwise indicated on the Drawings, reinforcing shall extend within 2 in. of formwork and expansion joints. Reinforcing shall continue through control joints. Adjacent sheets of fabric reinforcing shall lap 6 in.

D. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel and anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Architect.

3.5 FORMWORK

A. Formwork shall be so constructed, braced, and tied that the formed surfaces of the concrete will be perfectly true, smooth, and to the dimensions shown on the Drawings, within the tolerances for formed surfaces as specified in ACI 301.

B. Forms shall be sufficiently tight to prevent leakage of mortar, and where necessary shall have temporary openings as required for thorough cleaning and as required for the introduction of concrete to avoid excessive free fall.

3.6 PLACING CONCRETE

A. Before placing concrete, forms and space to be occupied by concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint, and other material which might tend to reduce bond.

B. Existing concrete, earth, and other water-permeable material against which new concrete is to be placed shall be thoroughly damp when concrete is placed. There shall be no free water on surface.

C. Concrete which has set or partially set before placing shall not be employed. Retempering of concrete will not be permitted.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
2. If concrete can not be mechanically consolidated, concrete shall be thoroughly spaded and tamped to secure a solid and homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

E. Cold-Weather Placement: Comply with ACI 306.1.

F. Hot-Weather Placement: Comply with ACI 301.

G. When joining fresh concrete to concrete which has attained full set, latter shall be cleaned of foreign matter, and mortar scum and laitance shall be removed by chipping and washing. Clean, roughened base surface shall be saturated with water, but shall have no free water on surface. A coat of 1:1 cement-sand grout, approximately 1/8 in. thick, shall be well scrubbed into thoroughly dampened concrete base. New concrete shall be placed immediately, before grout has dried or set.

3.7 REMOVING FORMS AND SUPPORTS

A. Except as otherwise specifically authorized by the Architect, forms shall not be removed until the concrete has aged for at least three days or the following number of day-degrees, whichever is greater.

Location	Day-Degrees*
Walls and Vertical Surfaces	100

*The term day-degrees represents the product of the number of days elapsed since time of concrete placement and the average daily air temperature at the surface of the

concrete. For example, five days at a daily average temperature of 60 deg. F. equals 300 day-degrees.

1. Form removal by methods other than day-degree method will not be permitted.

3.8 FINISHING VERTICAL CONCRETE

A. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

B. As-Formed Finish: Remove fins by stoning, otherwise leave texture imparted by forms.

C. Vertical surfaces of concrete which will be concealed in finished structure shall be formed to produce a "rough form finish", as defined in ACI 301.

3.9 FINISHING SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

1. Below grade concrete slabs and pads shall be screeded off and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.
2. Finished concrete surface for subbases shall be wood-floated to a slightly rough surface. Surface shall not deviate more than 1/4 in. in 10 ft.

B. Immediately following finishing operations, arrises at edges and both sides of expansion joints shall be rounded to a 1/4 in. radius. Control joints shall be scored into slab surface with scoring tool. Adjacent edges of control joint shall at same time be finished to a 1/4 in. radius.

C. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

3.10 PROTECTION AND CURING

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

B. It is essential that concrete be kept continuously damp from time of placement until end of specified curing period. It is equally essential that water not be added to surface during floating and troweling operations, and not earlier than 24 hours after concrete placement. Between finishing operations surface shall be protected from rapid drying by a covering of waterproofing paper. Surface shall be damp when the covering is placed over it, and shall be kept damp by means of a fog spray of water, applied as often as necessary to prevent drying, but not sooner than 24 hours after placing concrete. None of the water so applied shall be troweled or floated into surface.

C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written

instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

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

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.11 EXPANSION JOINTS

A. Expansion joints (isolation joints) shall be 3/8 in. wide and unless otherwise indicated on the Drawings, shall be located 30 ft. o.c., at building edge and at places where pavement meets other structures. Expansion joint shall be formed in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full width and depth of the slab. Joint filler shall extend the full length of the expansion joint.

1. Depth of joint filler shall be as required to form a 1-1/4 in. deep sealant and backer rod recess below finished concrete surface.
2. Doweled Joints: Install sleeves and dowel bars at expansion joints as indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.12 CONTROL JOINTS

A. Control joints indicated shall be sawn by using a diamond blade concrete power saw. Joint shall be made after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab. Saw shall cut into slab at least 1 in., but in no case less than 25% of slab depth.

3.13 PATCHING FORMED SURFACES OF EXPOSED CONCRETE

A. After forms have been removed, inspect concrete surfaces and only at the direction of the Architect, patch pour joints, voids, stone pockets, other defective areas and before concrete is thoroughly dry. Chip away defective areas to depth of not less than 1 in. with edges perpendicular to surface. Wet areas to be patched and space at least 6 in. wide entirely surrounding it, to prevent absorption of water from patching mortar. Do not patch concrete in freezing weather.

B. Apply chemical bonding agent to surface in accordance with manufacturer's printed instructions, followed immediately by patching mortar. Make patch of same proportions used for concrete except omit coarse aggregate. Add only enough water consistent with requirements for handling and placing.

C. Thoroughly compact mortar into place and screed off; leave patch slightly higher than surrounding surface. Leave undisturbed for one to two hours to permit initial shrinkage before final finishing. Finish patch to match texture and color of adjoining surface.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval. All repairs to concrete will be at the discretion of the Architect.

3.15 CONSTRUCTION WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project’s Waste Management Plan.

END OF SECTION

SECTION 05 7200

EXTERIOR METAL HANDRAILS AND RAILS

PART 1 - GENERAL

1.1 SUMMARY

A. Work of this Section includes, but is not limited to:

1. Stainless steel climbing hoops at slopes
2. Stainless steel climbing grip bars
3. Stainless steel handrails

1.2 RELATED WORK

A. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
2. Section 03 3001, CAST-IN-PLACE CONCRETE - SITEWORK; Installation of inserts and sleeves.
3. Section 04 4302, GRANITE; Stone scrambles.
5. Section 321816.12, PLAYGROUND PROTECTIVE SURFACING

1.3 REFERENCES

A. Comply with applicable requirements of following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Architectural Manufacturers Association (AAMA):

2605	Powdercoating Standard

2. American Society for Testing and Materials (ASTM):

A 53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A 123	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip
A 153	Zinc Coating (Hot-Dip) on Iron and Steel Hardware
A 167	Stainless and Heat Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
A 312	Seamless and Welded Austenitic Stainless Steel Pipe
A 385	High-Quality Zinc Coatings (Hot-Dip)

A 386	Zinc Coating (Hot-Dip) on Assembled Steel Products
A 501	Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
A 554	Welded Stainless Steel Mechanical Tubing
A 653	Steel Sheet, Zinc-Coated (Galvanized) Or Zinc-Iron Alloy-Coated (Galvannealed) By The Hot-Dip Process
A 666	Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
A 743	Castings, Iron-Chromium, Iron-Chromium Nickel, and Nickel-Base Corrosion-Resistant for General Application
A 924	General Requirements For Steel Sheet, Metallic-Coated By The Hot-Dip Process
B 117	Standard Practice For Operating Salt Spray (Fog) Apparatus
D 245	Structural Grades and Related Allowable Properties for Visually Graded Lumber
D 2794	Resistance Of Organic Coatings To The Effects Of Rapid Deformation (Impact)
D 3363	Film Hardness By Pencil Test
D 7803	Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating
E 894	Anchorage of Permanent Metal Railing Systems and Rails for Buildings

3. American Welding Society (AWS):

D1.1	Structural Welding Code – Steel
D1.6	Structural Welding Code – Stainless Steel

4. Commonwealth of Massachusetts Building Code:

Code	State Building Code

1.4 QUALITY ASSURANCE

A. Conform to governing laws, building code, and following standards, as applicable:

1. AISC Code and AISC Specification.

2. National Association of Architectural Metal Manufacturers (NAAMM), applicable publications.

B. Mock-ups: Before beginning primary Work of this Section, provide mock-ups at locations acceptable to Architect and obtain Architect's acceptance of visual qualities for each type of handrail, railing, and guardrail indicated on the Drawings. **Mock-ups may be completed in-place as approved by Architect**. Protect and maintain acceptable mock-ups throughout Work of this Section to serve as criteria for acceptance of this Work.

C. Engineering: Provide services of a Professional Engineer, registered in the Commonwealth of Massachusetts to design and certify that Work of this Section meets or exceeds performance requirements specified.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.

B. Shop Drawings: Provide large scale shop drawings for fabrication, installation and erection of all parts of the work. Provide plans, elevations, and details of anchorages, connections and accessory items. Provide installation templates for work installed by others. Show all interfaces and relationships to work of other trades.

C. Field Measurements: Take all necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of the job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.

D. Initial Selection Samples: Submit samples showing complete range of colors, textures, and finishes available for each material used.

1. Provide minimum 6 in. long sample of the finished metal handrails for Architect’s review and approval.
2. Provide typical radial section of steel planter rail, for Architect’s review and approval.

E. Verification Samples: Submit representative samples of each material that is to be exposed in the completed work. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.

G. Calculations: Provide professionally prepared calculations and certification of the performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied.

1.6 WORKMANSHIP

A. Handrail and railing work shall be well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Welding shall be continuous along the entire area of contact except where tack welding is permitted. Exposed connections of work in place shall not be tack welded. Exposed welds shall be ground smooth. Exposed surfaces of work in place shall have a smooth finish, and unless otherwise approved, exposed riveting shall be flush. Where tight fits are required, joints shall be milled. Corner joints shall be coped or mitered, well formed, and in true alignment. Work shall be accurately set to established lines and elevations and securely fastened in place. Installation shall be in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

1.7 ANCHORAGE

A. Anchorage shall be provided where necessary for fastening handrails securely in place. Anchorage not otherwise specified or indicated shall include slotted inserts made to engage with the anchors, expansion shields, and power-driven fasteners when approved for concrete.

1.8 DISSIMILAR MATERIALS

A. Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of bituminous paint or asphalt varnish.

1.9 QUALITY ASSURANCE

A. Source: For each material type required for the work of this section, provide primary materials which are the product of one manufacturer. Provide secondary or accessory materials which are acceptable to the manufacturers of the primary materials.

B. Engineering: Provide services of Professional Engineer, registered in the Commonwealth of Massachusetts, to design and certify that work of this Section meets or exceeds performance requirements specified.

1.10 PERFORMANCE REQUIREMENTS

A. Structural Performances: Provide installed handrail and railing assemblies complying with following structural performances, unless otherwise indicated:

1. Live Loads shall not be less than the minimum required by applicable building codes.
2. Design shall incorporate safety factors as required by the applicable building codes.
3. Design and construction shall be as such to assure that under the required design live loads there shall be no failure of any member, deflection of not more than L/240 of length of any member, and without permanent deformation of any member or fastener.

B. Handrails, Guardrails and Lean Rails: shall be designed to resist a lateral load of 50 pounds per linear foot (plf) applied in any direction at the top and to transfer this load through the supports to the structure.

1. Concentrated Load: shall be able to resist a single concentrated load 200 pounds, applied in any direction at any point along the top, and to transfer this load through the supports to the structure. This load need not be assumed to act concurrently with the uniform load specified above.
2. Components: Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot, including openings and space between rails. Reactions due to this loading are not required to be superimposed with those of the previous sections.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Stainless Steel Handrails: Provide stainless handrail products of one of the following manufacturers that meet or exceed requirements specified, or approved equal:

1. Blum, Julius & Co., Inc.

2. CraneVeyor Corp.
3. KDI Paragon Inc.
4. Architectural Metal Works.
5. Blumcraft of Pittsburgh.
6. Pisor Industries, Inc.
7. Wylie Systems.

2.2 STAINLESS STEEL

A. Stainless Steel: Comply with following standards and requirements for stainless steel components:

1. Pipe: ASTM A 312, Type 316 stainless steel.
2. Castings: ASTM A 743, Grade CF 8 or CF 20.
3. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type316.
4. Bars and Shapes: ASTM A 276, Type316.

2.3 STEEL

A. Materials shall be new stock, free from defects impairing strength, durability or appearance, and of best commercial quality for each intended purpose.

1. Steel pipe shall be seamless steel pipe conforming to ASTM A 53, Schedule 40. Galvanized steel pipe shall be used at exterior uses.
2. Steel tubing shall be structural steel square tubing conforming to ASTM A 501.
3. All other steel shall conform to ASTM A 36.

2.4 WOOD RAIL CAP

A. Not Used.

2.5 FASTENERS

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless steel Items: Type 316 stainless-steel fasteners.

2.6 FASTENERS

A. Provide all anchors, bolts, sockets, sleeves, and other parts required for securing each item of work of this Section to the construction. Furnish required inserts and sleeves for installation in concrete under Section 033001, CAST-IN-PLACE CONCRETE - SITEWORK.

1. Stainless steel Items: Type 316 stainless-steel fasteners.

B. Exposed fastenings shall be of the same material and finish as the metal to which applied, unless otherwise noted.

C. Welded Connections: Perform welding to comply with AWS for recommended practices, using method appropriate for metal and finish indicated. Grind exposed welds flush and smooth to blend with adjoining finish metal surfaces.

2.7 FABRICATION

A. General: Fabricate handrails and railings to design, dimensions and details shown.

Provide members in sizes and profiles indicated, with posts and brackets of size and spacings shown, but not less than required to support indicated design loads.

B. Fabricate Work to be truly straight, plumb, level and square.

C. Brackets, Flanges, Fittings and Anchors: Provide brackets, flanges, fittings and anchors for interconnection of handrail and railing components to other Work.

D. Welded Connections: Perform welding to comply with AWS for recommended practices, using method appropriate for metal and finish indicated. Grind exposed welds flush and smooth to blend with adjoining finish metal surfaces.

E. Bends: Form bends by use of prefabricated elbow fittings and radius bends, as applicable.

F. Curves: Form simple and compound curves by bending members in jigs designed to produce uniform curvature with uniform profile of member throughout entire bend without buckling, twisting or deforming in any way.

1. Steel planter rail layout requiring radial geometry shall be constructed from radial sections. Straight tangent sections shall not be permitted.

G. Provide weep holes or other means of draining entrapped water in hollow Sections of railing members.

2.8 STAINLESS STEEL FINISH

A. Stainless Steel:

1. After fabrication, clean and de-scale stainless steel components in accordance with ASTM A 380.
2. Finish components with AISI Brushed No. 4 Satin Finish in accordance with ASTM B 912.

2.9 STEEL FINISH

A. Finish: Surface shall be mechanically cleaned and roughened per ASTM D7803 for optimal coating adhesion and polyester powdercoated per AAMA 2605 for non-lead, UV-stable, thermally-set polyester powder paints. This process shall afford maximum durability with minimal compromising of surface smoothness. Matching liquid paint shall be provided for field touch-up. Bolts and nuts shall be hot-dip galvanized or stainless steel only, for field painting.

B. Galvanizing: Hot-dip galvanize products made from rolled, pressed, and forged steel shapes, castings, plates, bars, and strips indicated to be galvanized to comply with ASTM A 123/A 123M.
1. Hot-dip galvanize steel and iron hardware indicated to be galvanized to comply with ASTM A 153/A 153M.
2. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

C. Powder-Coat Finish: Prepare, treat, and coat galvanized metal to comply with resin manufacturer's written instructions and as follows:

1. Prepare metal in accordance with ASTM D7803.
2. Treat prepared metal with zinc-phosphate pretreatment, rinse, and seal surfaces.
3. Apply thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than 2.0 mils.

a. Minimum hardness measured in accordance with ASTM D3363: 2H.
b. Direct impact resistance tested in accordance with ASTM D2794: Withstand 160 inch-pounds.
c. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity and after 1000 hours less than [3/16 inch] [5 mm] undercutting.
d. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted at 45 degrees.

4. Color: To be specified by landscape architect.

2.10 ANCHORING SYSTEMS

A. Fasteners: Furnish of basic metal and alloy, matching finished color and texture as metal being fastened, unless otherwise indicated.

B. Anchors and Inserts: Furnish inserts and anchors to be set in concrete or masonry, of proper type, size and material for loading conditions indicated. Use toothed steel or lead expansion bolt assemblies for drilled-in-place construction.

1. All mechanical fasteners used in the assembly of stainless steel railings shall be manufactured from stainless steel.

2.11 GROUT

A. Epoxy Grout: Provide non-shrink, non-metallic, non-corrosive epoxy grout.

1. Grout shall be manufactured specifically for use in supporting heavy loads.
2. Shrinkage at 28 days: None (0.00 shrinkage when tested in accordance with ASTMC827modified procedure) with a minimum effective bearing area (EBA) of 95 percent coverage of the tested base plate.
3. Compressive strength, minimum: 10,000 psi at seven days, when tested in accordance with ASTM C579.

2.12 MISCELLANEOUS

A. Provide neoprene pad between aluminum and concrete surfaces to prevent direct contact between the two materials.

B. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended for color match, strength and compatibility with fabricated items.

C. Bituminous Paint: SSPC-Paint (Cold-applied asphaltic mastic).

2.13 SEALER

A. Sealer shall be a penetrating oil sealer manufactured specifically for thermally modified hardwood with UV inhibitors.

1. Especially formulated to penetrate dense hardwoods
2. Added ultraviolet protection
3. Transparent natural tone permitting character of wood to be seen
4. Advanced mildew protection
5. Shall not be a surface film that will crack, bubble, or peel

PART 3 EXECUTION

3.1 INSPECTION

A. The Installer/Erector shall examine substrates, supports, and conditions under which this Work is to be performed and notify Contractor, in writing, of conditions detrimental to proper completion of Work. Do not proceed with Work until unsatisfactory conditions are corrected. Beginning Work means Installer accepts substrates and conditions.

3.2 FABRICATION, GENERAL

A. Assemble items in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces. Fabricate work to be truly straight, plumb, level and square and to sizes, shapes, and profiles indicated on approved shop drawings. Ease exposed edges. Cut, reinforce, drill and tap metalwork as necessary for proper assembly and use.

1. Fabricate all miscellaneous metal supports, brackets, braces and the like required to fully complete the work of this Section.
2. Coordinate with work of other Specification Sections to ensure proper interface of various parts of the work.
3. Obtain loading requirements from suppliers of work to be supported and design and fabricate support systems with factor of safety of at least 6.

B. Form ornamental metal to required shapes and sizes, true to line and level with true curves and accurate angles and surfaces. Finish exposed surfaces to smooth, sharp, well-defined lines and arris. Take special care in choosing materials that are smooth and free of blemishes such as pits, roller marks, trade names, scale and roughness. Fabricate work with uniform, hairline tight joints. Form welded joints and seams continuously and grind flush and smooth to be invisible after painting. For exposed fasteners, use hex head bolts or Phillips head machine screws.

1. Metal surfaces shall be clean and free from mill scale, flake, rust and rust pitting; well formed and finished to shape and size, true to details with straight, sharp lines and angles and smooth surfaces. Curved work shall be to true radii. Exposed sheared edges shall be eased.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form simple and compound curves in bars and extruded shapes by bending members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces.

E. Do all cutting, punching, drilling, and tapping required for attachment of hardware and of work by other trades where so indicated or where directions for same are given prior to, or with approval of, shop drawings.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

F. Mill joints to a tight, hairline fit. Cope or miter corner joints. Fabricate connections that will be exposed to weather in a manner to exclude water.

G. Weld all permanent connections. Weld shall be continuous on all exposed surfaces and where required for strength on concealed surfaces. Exposed welds shall be ground flush and smooth, with voids filled with metallic filling compound (metallic filling compound not permitted on surfaces to receive hot-dip galvanizing). Tack-welding will not be permitted unless specifically called for. Do not use screws or bolts where they can be avoided. Where used, fastener heads shall be countersunk, screwed up tight, and threads nicked to prevent loosening.

1. Comply with AWS for recommended practices in shop welding. Weld behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded joints of flux, and dress exposed and contact surfaces.

H. Provide weep holes where water may accumulate.

I. Provide necessary rebates, lugs, and brackets to assemble units and to attach to other work. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items, unless otherwise indicated.

J. Provide castings that are sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

K. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to weather shall be formed to exclude water.

3.3 SHOP COATINGS

A. Galvanizing:

1. Ferrous metal under this Section for exterior use shall be hot-dip galvanized, including all bolts, nuts, washers, and other related ferrous metal items used therewith.
2. Hot-dip galvanizing process shall comply with ASTM A 123, A 153, A 385, and A 386, as applicable. After galvanizing, processed items shall be straightened to remove all warpage and distortion caused by the process.
3. Furnish to the Contractor, with copy to Architect, a certified statement that galvanizing complies fully with this Specification.

B. Shop Finish:

1. Apply polyester powdercoat per AAMA 2605 in non-lead, UV-stable, thermally-set polyester powder paints in strict accordance with manufacturer's printed instructions to uniform thickness(es) recommended by manufacturer.
2. Do not powdercoat surfaces to be embedded in concrete, or to be welded in the field. After field welds are complete, grind smooth and flush, thoroughly clean and then apply specified finish in accordance with powdercoat manufacturer’s printed instructions.
3. After erection, sand smooth and retouch all portions of the shop coats chipped or damaged during erection, and coat all field welds and connections with specified finish in accordance with powdercoat manufacturer’s printed instructions.

3.4 INSTALLATION - GENERAL

A. Materials shall be carefully handled and stored under cover in manner to prevent deformation and damage to the materials and to shop finishes, and to prevent rusting and the accumulation of foreign matter on the metal work. All such work shall be repaired and cleaned prior to erection.

B. Work shall be erected square, plumb, and true, accurately fitted, and with tight joints and intersections. All anchors, inserts and other members to be set into concrete or masonry shall be furnished loose by this trade to be built-into concrete and masonry by those trades as the work progresses. Later cutting or drilling shall be avoided wherever possible.

C. Metal work shall be rigidly braced and secured to surrounding construction, and shall be tight and free of rattle, vibration, or noticeable deflection after installation.

D. Where members, other than expansion bolts or inserts, are fastened into concrete, set such members in proprietary-type expanding grout manufactured specifically for such purpose, used strictly in accordance with manufacturer's directions. Holes to receive members shall be formed with galvanized sheet metal sleeves, expanded polystyrene foam, or other approved method to provide at least 1/2 in. clearance around entire perimeter. At exposed applications, hold expanding grout back 1/2 in. from finish surface and fill voids with Portland cement grout to match color and texture of surrounding concrete surface.

E. Electrolytic Isolation: Where dissimilar metals are to come into contact with one another, isolate by application of a heavy coating of bituminous paint on contact surfaces in addition to shop coat specified above. Do not permit the bituminous paint in any way to remain on surfaces to be exposed or to receive sealant.

3.5 HANDRAILS, GRIP BARS AND CLIMBING HOOPS

A. Fabricate and install exterior steel handrails, planter rails and lean rails at locations as called for on the Drawings.

B. Handrails, at all but mechanical and service areas, throughout, shall be of Architectural Quality. Exceptional care shall be taken in welding and grinding, filling and surface sanding to provide truly smooth, clean, neat and flush construction throughout, free of all surface defects and defacements.

C. Steel handrails shall be fabricated of steel and stainless steel, in accordance with designs and configurations as called for on the Drawings. Sizes and shapes of all members shall be as indicated. Joints shall be full-welded and ground flush and smooth.

D. Include as part of this work all posts, balusters, pipe handrails, intermediate rails, proprietary wall brackets, proprietary weld-on fittings (escutcheons, flanges, and returns, 90 degree corners, bends, crossovers, tees, etc.) anchors, and other items required for complete installations.

E. Exterior steel handrails shall be hot-dip galvanized after fabrication as specified hereinbefore.

F. Installation of Handrails: Unless otherwise indicated on the Drawings, installation shall be in pipe sleeves embedded in concrete and filled with epoxy grout with anchorage covered with standard pipe collar pinned to post.

3.6 TOLERANCES

A. The following allowable installed tolerances are allowable variations from locations and dimensions indicated by Contract Document and shall not be added to allowable tolerances indicated for other Work.

1. Allowable Variation from True Plumb: ± 1/8 in. in 20 ft.-0 in.
2. Allowable Variation from True Level: ± 1/8 in. in 20 ft.-0 in.
3. Allowable Variation from True Line: ± 1/8 in. in 20 ft.-0 in.

3.7 REPAIR OF DEFECTIVE WORK

A. Remove stained or otherwise defective work and replace with material that meets specification requirements.

B. Repair damaged finish in accordance with manufacturer's printed instructions.

C. Touch-up damaged coatings and finishes to eliminate evidence of repair.

D. Remove and replace Work that cannot be successfully cleaned or repaired.

3.8 CLEANING

A. As installation is completed, wash thoroughly using clean water and soap; rinse with clean water.

B. Do not use acid solution, steel wool or other harsh abrasives.

C. If stain remains after washing, remove finish and restore in accordance with NAAMM/NOMMA Metal Finishes Manual.

3.9 PROTECTION

A. Provide temporary protection to ensure Work being without damage or deterioration at time of final acceptance. Remove protections and reclean as necessary immediately before final acceptance.

3.10 WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project's Waste Management Plan.

END OF SECTION

SECTION 07 9201

EXTERIOR JOINT SEALANTS – SITEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Caulk and seal joints as indicated on the Drawings and as specified. Include, but do not limit to:

1. Sealing of joints in exterior concrete and masonry construction.
2. All other exterior site related sealing called for, or reasonably inferred from the Drawings, and as required to provide weathertight conditions in exterior site assemblies.

1.2 RELATED WORK

A. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
2. Section 0 33001, CAST-IN-PLACE CONCRETE – SITEWORK.
4 Section 04 4302, GRANITE.
5. Section 32 1313, CONCRETE PAVING; Sealing of expansion joints.
6. Section 32 1413, BRICK PAVING

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Association of State Highway and Transportation Officials (AASHTO):

M 220	Preformed Elastomeric Compression Joint Seals for Concrete

2. American Society for Testing and Materials (ASTM):

C 719	Adhesion and Cohesion of Elastomeric Joint Sealants under Cyclic Movement
C 790	Use of Latex Sealing Compounds
C 834	Latex Sealing Compounds
C 920	Elastomeric Joint Sealants
C 962	Use of Elastomeric Joint Sealants

C 1330	Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants
D 412	Test Methods for Rubber Properties in Tension
D 624	Test Method for Rubber Property - Tear Resistance
D 2628	Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

3. Federal Specifications (Fed. Spec.):

TT-S-00227	Sealing Compound: Elastomeric Type, Multi-Component (For Calking, Sealing, and Glazing in Buildings and Other Structures)
TT-S-001543A	Sealing Compound: Silicone Rubber Base (For Calking, Sealing, and Glazing in Buildings and Other Structures)

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each sealant material used. Provide certifications that sealant materials comply with specified requirements.

B. Initial Selection Samples: Submit samples manufacturer's color charts showing complete range of colors, textures, and finishes available for each material used.

C. Verification Samples: Submit actual representative samples of each sealant material that is to be exposed in the completed work. Show full color ranges and finish variations expected. Provide sealant samples having minimum size of 4 in. long.

D. Test Reports: Provide certified reports for all specified tests.

1.5 MOCK-UPS

A. Prior to commencing primary work of this Section, provide mock-up of architectural preecast concrete units and pavement panels as directed by the Architect showing the exterior finish, surface color, surface texture. Mockup shall also include typical joints, including exterior corner joints and joints between units. Obtain Architect's acceptance of visual qualities. **Mockup may be completed in-place, as approved by Architect**. Protect and maintain approved mock-up throughout the work of this Section.

1.6 COMPATIBILITY

A. Provide sealant and sealant joint backing materials suitable for the use intended and compatible with the materials with which they will be in contact. Compatibility of sealant and accessories shall be verified by the sealant manufacturer.

1.7 QUALITY ASSURANCE

A. Source: For each sealant material type required for the work of this section, provide primary materials which are the product of one manufacturer. Provide secondary or accessory materials which are acceptable to the manufacturers of the primary materials.

B. Installer: A firm with a minimum of five years experience in type of work required by this Section and which is acceptable to the manufacturers of the primary materials.

C. Mock-Ups: Prior to commencing the primary work of this Section, provide mock-ups at locations acceptable to Architect. Obtain Architect's acceptance of visual qualities. Protect and maintain accepted mock-ups throughout the remainder of the work of this section to serve as criteria for acceptance of the work.

1.8 PROJECT CONDITIONS

A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within the limits established by manufacturers of the materials and products used.

B. Substrates: Proceed with work only when substrate construction and penetration work is complete.

1.9 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Materials under this Section shall be delivered to, and stored at, the job site in unbroken factory sealed containers with labels intact.

1.10 WARRANTY

A. Furnish joint sealant manufacturer's written single-source performance warranty that joint sealant work will be free of defects related to workmanship or material deficiency for five years from date of Substantial Completion of the Project.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Before installation check each sealant for compatibility with adjacent materials and surfaces and with indicated exposures. Select sealers which are recommended by manufacturer for each application indicated. Where exposed to pedestrian or vehicular traffic, provide sealants which are non-tracking and are strong enough to withstand the traffic without damage.

B. Provide colors as selected by Architect from manufacturer's standard and special (Tremco Fastpak) colors. Where specifically requested, provide custom color matches.

2.2 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

2.3 HIGH PERFORMANCE SILICONE SEALANT

A. Provide a general-purpose, low-modulus, high-performance, one-part, neutral-cure, non-staining, low dirt pickup, construction-grade silicone sealant manufactured by Tremco Commercial Sealants and Waterproofing, Pecora Corporation, Sika, or approved equal.

1. Color: as selected by Architect.

B. Extent: Provide high performance silicone sealant for joints at all architectural precast concrete, stone veneer and stone masonry work.

C. Stain-Test-Response Characteristics: Provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.4 NON-SAG POLYURETHANE SEALANT

A. Sealant shall be a polyurethane-based, one component, elastromeric sealant complying with Federal Spec. TT-S-00230C, Class A Type 2 or ASTM C 920, Type S, Grade NS, Class 35, Use NT for vertical use. Color shall match the color of the adjacent materials as approved by the Architect. Sealants shall be non-sag grade type for vertical use. Application of sealant for site improvements shall be in accordance with approved manufacturer's recommendations.

B. Provide products of one of the following manufacturers, that meet or exceed specified requirements:

1. Pecora Corporation
2. Harry S. Peterson Co.
3. Sika
4. Sonneborn.
5. Tremco
6. or approved equal.

C. Extent: Provide non-sag polyurethane sealant for paving joints all other joints not indicated to be sealed with another type of sealant.

2.5 PREFORMED JOINT SEALER

A. Preformed Resilient Joint Sealer: Preformed Resilient Joint Sealer for use at expansion joints in exterior concrete and masonry walls where specifically called for on Drawings shall be preformed, resilient, extruded polychlorophrene elastomeric joint sealer, conforming to ASTM D 2628 and AASHTO M 220 of indicated configuration(s), in continuous lengths, set in manufacturer's recommended primer-lubricating-adhesive consisting of moisture curing polyurethane and aromatic hydrocarbon solvent mixture (73% solid by weight) concrete gray color.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Provide primer recommended by sealant manufacturer for surfaces to be adhered to.

B. Bond Breaker Tape: Provide polyethylene or other plastic tape recommended by sealant manufacturer to prevent three-sided adhesion.

C. Backer Rod: Provide closed cell compressible rod of durable nonabsorptive material recommended by sealant manufacturer for compatibility with sealant, conforming to ASTM C 1330. Provide products of one of the following manufacturers:

1. Backer Rod Manufacturing and Supply Co.
2. Dow Chemical Co.
3. W. R. Meadows, Inc.
4. Williams Products, Inc.
5. Woodmont Products, Inc.
6. or approved equal.

D. Joint backing for general use at joints in horizontal surfaces shall consist of two rows of butyl rubber or neoprene foam rod in contact with one another, and each compressed to approximately 2/3 original width when in place.

E. Provide miscellaneous materials of type that will not bleed through sealant, discolor surface, or produce other deleterious effects. Select size to provide compression to approximately 2/3 original width when in place. Provide backing material profile concave to the rear of the sealant, and equipped with a bond-breaking film.

PART 3 - EXECUTION

3.1 INSPECTION

A. The Installer shall examine substrates and conditions under which this work is to be performed and notify Contractor, in writing, of conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning of sealant work means Installer's acceptance of joint surfaces and conditions.

3.2 PREPARATION

A. Clean joint surfaces immediately before installation of sealants, primers, tapes and fillers.

B. Unless otherwise indicated, use of sealants shall conform to the following: ASTM C 790 for latex sealants and ASTM C 962 for other sealants.

3.3 INSTALLATION

A. Schedule work as long as possible after completion of concrete work and finished paving and granite work.

B. Provide backer rods for liquid sealants except where specifically recommended against by sealant manufacturers.

C. Prevent three sided adhesion by use of bond breaker tapes or backer rods.

D. Force sealant into joints to provide uniform, dense, continuous ribbons free from gaps and air pockets. Completely wet both joint surfaces equally on opposite sides.

E. Except in hot weather, make sealant surface slightly concave. Install sealants so that compressed sealants do not protrude from joints. Dry tool sealants to form a smooth dense surface. At horizontal joints form a slight cove to prevent trapping water.

F. Provide sealants to depths indicated, or if not indicated, follow manufacturer's recommendations. For joints up to 3/8 in. width, depth of joint shall not exceed 1/2 in.; for joints larger than 1/2 in. width, depth of joint shall not exceed 5/8 in.

3.4 EXTENT OF SEALANT WORK

A. Exterior Sealing: Without limitation, the work of this Section includes sealing the following:

1. Masonry to masonry joints.
2. Masonry to other exterior materials, including concrete and metal.
3. Concrete to concrete joints.
4. Precast to precast concrete joints.
5. Joints and cracks in paving and walks.
6. Water features.
7. Joint fillers for all joints.

3.5 CURING

A. Cure sealants in strict compliance with manufacturers' instructions and recommendations to obtain highest quality surface and maximum adhesion. Make every effort to minimize accelerated aging effects and increase in modulus of elasticity.

3.6 CLEANING AND PROTECTION

A. Remove smears from adjacent surfaces immediately, as the work progresses. Exercise particular care to prevent smearing or staining of surrounding surfaces which will be exposed in the finished work, and repair any damage done to same as result of this work without additional cost to Owner.

B. Remove and replace work that is damaged or deteriorated.

C. Clean adjacent surfaces using materials and methods recommended by sealant manufacturer. Remove and replace work that cannot be successfully cleaned.

D. Provide temporary protection to ensure work being without damage or deterioration at time of final acceptance. Remove protection immediately before final acceptance.

3.7 WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project’s Waste Management Plan.

END OF SECTION

SECTION 101400

EXTERIOR SIGNAGE

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Provide all equipment and materials, and do all work necessary to fabricate, furnish and install metal formed lettering for entry signage, complete, and as indicated on the Drawings and as specified herein.

1. Site survey to verify existing site conditions and dimensions. This survey shall note all potential installation conflicts between sign installation locations and existing building conditions and systems.
2. Coordination with Owner and Architect during all phases of development, fabrication, and installation.
3. Shop drawings, layouts, samples, and prototypes for Owner and Architect approval.
4. Structural design and calculations when appropriate to substantiate design. It is required that the Sign Contractor include a certified engineer’s review and stamp for all signage elements and footings.
5. Sign Fabrication: Signs, messages, and graphics are indicated on the Drawings and herein, and require various materials, various finishes, and various fabrication and installation techniques.
6. Review and coordinate, furnish and install all supports and footings not provided by General Contractor required for the installation of all signs.
7. Review and coordinate, furnish and install all electrical hardware and connections from junction boxes to illuminated signs.
8. Installation of all fabricated signs, including all fasteners related electrical connections.

1.3 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 033001, CAST-IN-PLACE CONCRETE - SITEWORK; Concrete for site structures and below grade slabs and bases.
3. Section 321313, CONCRETE PAVING.
4. Section 321543 STABILIZED STONE DUST SURFACING.

1.4 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):
   A 167 Stainless and Heat Resisting Chromium-Nickel
   Steel Plate, Sheet, and Strip

2. American Welding Society (AWS):
   D1.6 Structural Welding Code – Stainless Steel

1.5 CODES

A. Sign Fabricator is responsible for complying with all federal, state, and city/town building codes. Any and all proposed fabrication/installation that does not comply with these codes shall be brought to the attention of the Owner and Architect for review and resolution prior to fabrication.

B. Sign Fabricator is responsible for complying with the Americans with Disabilities Act. ADA legislation and guidelines have been published in the Department of Justice Federal Register, July 26, 1991, 28 CFR Part 36, Title III: Public Accommodations and Commercial Facilities. Sign Fabricator is responsible for complying with all regulations subsequently issued.

C. Any and all proposed fabrication/installation that does not comply with ADA (including but not limited to construction, mounting, finish, contrast, and character height) shall be brought to the attention of the Owner and Architect for review and resolution prior to fabrication.

1.6 SUBMITTALS

A. The signage drawings in this package are for design intent only. The Sign Fabricator is responsible for the proper engineering of all items. The internal structure, dimensions, and specifications for all items shall be indicated in the shop drawings. Architect will not provide electronic files of design intent drawings – it is intended that the sign fabricator produce original, CADD-generated shop drawings. In certain cases, artwork will be provided for specified patterns, logos and custom profiles.

B. Description: Provide shop drawings for all items including:

1. Complete fabrication and installation drawings for each sign type, indicate dimensions, materials, finishes, fastening, anchorage, joining, sealing, backing, utility requirements, rough-in, paving, foundation, expansion joints and adjacent related site conditions.
2. Each sign type with all graphic elements.
3. Accurately reproduced letter styles.
4. Provide two (2) complete sets to the Architect for review.
5. Provide one (1) complete set to Owner for review.
6. Sign message schedule: Designate to provide draft message schedule in MS Access. Sign contractor to prepare final message schedule and resubmit to Designer and Owner for approval.
7. Sign Location Plans: Designer to provide diagrammatic sign location diagrams. Based on these, sign Contractor to prepare site-specific dimensioned sign

location plans for submittal to Designer and Owner. Submittal maybe supported by site photos and notes.

C. Verification Samples: Submit representative samples of the formed stainless steel letters for approval prior to construction. Show full color ranges and finish variations expected. Provide minimum size of 144 sq. in. with letters of each proposed size and font.

1.7 MOCK-UP

A. General

1. Schedule mock-up of each sign type indicated on the Drawings for acceptance 30 days prior to installing signage represented by the mockups.
2. Locate mock-up in non-public areas accepted by the Architect. **Mock-ups may be completed in-place as approved by Landscape Architect.**
3. Continue to create mock-ups until acceptable mock-ups area produced. Accepted mock-ups shall be the standard for color, texture, etched graphics with infill, and workmanship for the work.
4. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-up.
5. Remove mockups from site at completion of project, as directed by the Architect, **as needed**.

B. Mockups: Cast mockups of full-size sign type simulating actual design and execution conditions for overall standard of workmanship.

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
   a. Playground entry sign
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Obtain Architect's approval of mockups before starting construction.
4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
5. Demolish and remove approved mockups from the site when directed by Architect.

1.8 SIGN FABRICATOR’S RESPONSIBILITIES

A. Sign fabricator is responsible for providing any necessary computer program conversion, font, computer program, or equipment purchases; or other provisions in order to coordinate exactly with the Architect’s drawings and other submissions.

B. Review shop drawings, product data, and samples prior to submission to Owner and Architect.

C. Verify field measurements, field construction criteria, catalog numbers, and similar data.

D. Coordinate each submittal with work of the project and with the Owner’s Contract Documents.

E. Sign Fabricator's responsibility for errors and omissions in submittals or in deviations from the requirements of the Contract Documents is not relieved by the Owner's and Architect's review of submittals.

F. Notify Owner and Architect in writing of deviations from requirements of the Contract Documents at the time of submittals.

1. A."deviation" shall be construed to mean any change to the sequence indicated on Drawings or specifications.
2. A "deviation" is not intended to allow substitutions or product options.
3. In addition to notifying Owner and Architect in writing of deviations, clearly indicate deviations on shop drawings.

G. Do not begin work that requires submittals until submittals have been returned with Architect's (or consultant's) stamp and initials indicating review and approval.

H. After the Owner and Architect review, distribute copies of approved drawings, data, and submittals.

1.9 QUALITY ASSURANCE

A. Source: For each material type required for the work of this Section, provide primary materials which are the product of one manufacturer. Provide secondary or accessory materials which are acceptable to the manufacturers of primary materials.

B. Installer: A firm with a minimum of three years experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.

1. If installer is different company than sign manufacturer, notify Architect in advance providing installer's name, address, telephone number, and name of contact person.

1.10 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products unopened. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.

B. Sequence deliveries to avoid delays, but minimize on-site storage. Coordinate work and storage requirements with the Building Contractor, subject to approval by the Owner and Architect.

PART 2 PRODUCTS

2.1 LETTERS

A. Letters for sign shall be manufactured by Matthews Architectural Division, 1315 W. Liberty Ave., Pittsburgh, PA 15226, or approved equal.

1. Letters shall be Type 316 stainless steel. No scrap metal will be permitted.
2. Depth of letters shall be ½" inch. Style of lettering and spacing shall conform to the Drawings and approved shop drawing.

3. Finish of letters shall be Satin Bronze with manufacturer's protective coating suitable for exterior signage.

B. Unless otherwise indicated, grind and polish surfaces to produce uniform finish indicated, free of cross scratches.

1. Run grain of directionally textured finishes with long dimension of each piece.

C. Directional Satin Finish: No. 4 finish.

D. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

2.2 COMMUNICATION BOARD

A. Inclusive communication board to be “Playground Communication Board” produced by the Flutie Foundation, PO Box 2157, Framingham, MA 01703, https://www.flutiefoundation.org/.

2.3 MOUNTING ACCESSORIES

A. Fastener Materials: Unless otherwise indicated, provide the following:

1. Stainless-Steel Items: Type 316 stainless-steel fasteners.
2. Dissimilar Metals: Type 316 stainless-steel fasteners.

B. Fasteners for Anchoring to Other Construction: Unless otherwise indicated, select fasteners of type, grade, and class required to produce connections suitable for anchoring indicated items to other types of construction indicated.

C. Provide concealed fasteners for interconnecting components and for attaching ornamental metal items to other work, unless otherwise indicated.

1. Provide tamper-resistant flat-head machine screws for exposed fasteners, unless otherwise indicated.

2.4 COATING SYSTEM: DIRECT EMBED

A. Powder Coating with Embedded Image using DECS Equipment: As manufactured by Direct Embed Coating Systems. Coating shall be resistant to abrasion, humidity and corrosion; antigraffiti, scratch resistant, non-combustible, super-durable (UV resistant), and TGIC free (nontoxic). Suitable for both interior and exterior applications. Coating shall withstand high traffic and extreme weather.

2.5 FINISHES : POWDER COATING

A. Provide polyurethane base powder coating finish by Thermoset Powder Coating Systems: PPG Envirocron Powder Coatings as produced by PPG Industries One PPG Place Pittsburgh, PA or approved equal.

B. Performance Requirements: Powder coatings shall conform to the following:

1. Chemical Type: Polyurethane

2. Particle Size: Suitable for electrostatic spraying
3. Flexibility: Pass 1/8 in., as per ASTM D522 (Conical mandrel)
4. Adhesion: Pass (Class 5B) as per ASTM D3359 (Cross hatch)
5. Gloss: ASTM D523 (60 degree)
6. Pencil Hardness: 2H, as per ASTM D3363
7. Impact Resistance: Minimum of 100 lbs direct and reverse, as per ASTM D2794.

2.6 HIGH-PRESSURE LAMINATE GRAPHICS

A. Sign panels: shall be Digital High Pressure Laminate panels (DHPL) composed of layers of phenolic resin impregnated kraft filler paper, a digitally imaged graphic, a layer of melamine resin, surfaced by a layer of translucent exterior UV / graffiti overlay protection. The entire panel, including exterior overlay, is bonded under heat and extreme pressure to form a composite panel. The DHPL graphics must be warranted for a minimum of 20 years against fading, delaminating and weather deterioration. All panels cutting and finishing must be done using a CNC router.

2.7 FABRICATION

A. General: Fabricate work of this Section in conformance with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, and sizes.

B. All Signs: Fabricate flat and curved signs using metals and shapes of sufficient thickness, with reinforcing when necessary, to produce sufficient flatness, free of "oil canning", and to impart sufficient strength for size, design, and application indicated. Produce smooth, even level sign surfaces.

1. Fabricate posts, brackets, and fittings from extruded aluminum to suit sign panel construction and mounting conditions indicated; all seams welded and ground smooth prior to painting.
2. Any wood members to be ipe, in dimensions noted, with eased edges and pre-drilled fastener holes.
3. Colors: Where applied graphics require color selection, provide colors as indicated and as approved by Architect.
4. Graphic Content and Style: Provide graphics for signs in letter style, size, spacing, and arrangement indicated.
5. Where applied vinyl copy is indicated, provide die-cut copy characters from vinyl film with pressure sensitive adhesive backing. Apply copy to exposed face of sign panel.
6. Fabricate framing with reinforced corners, fabricated to a hairline fit.
7. All signs to be properly vented top and bottom to minimize water penetration and prevent moisture buildup or condensation on transparent surfaces.
8. Any openings or vents must have fine mesh screen barriers to prevent insect or animal intrusion and nesting.

C. Allow for thermal movement resulting from a maximum ambient temperature change (range) of 100° F. (55.5° C.). Design, fabricate, and install the sign assembly to prevent buckling, opening up of joints, and overstressing of welds and fasteners.

D. Welded Connections: Comply with AWS for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of the exposed side. Clean exposed welded surfaces of welding flux and dress on all exposed and contact surfaces.

E. Mill joints to a tight, hairline fit. Form joints exposed to the weather to exclude water penetration.

F. It is intended that all finished work be of the highest quality to pass eye-level examination.

PART 3 EXECUTION

3.1 SIGN INSTALLATION

A. General Installation Requirements: Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this section.

B. Exterior signs shall be installed in various stages in response to the overall Project construction schedule. Install signage in strict accordance with the approved phasing plan.

C. Installation: Install units plumb, level, in alignment and plane without warp or rack. Anchor securely in place.

D. Verify the exact location with the Owner and Architect for all signs which are not precisely dimensioned on the Drawings.

E. Sign installation work shall be under the direct supervision of a journeyman sign erector.

F. Securely anchor work in proper location using anchors, fasteners, or other methods approved on shop and erection drawings. All anchors/fasteners shall be appropriate for the anchorage condition.

G. The Sign Fabricator shall be held directly responsible for the correct installation of all work performed under this Contract. He/she must make good repair, without expense to the Owner, of any part of the work which may become inoperative on account of leaving the work unprotected or unsupervised during the construction of the system or which may break or give out in any manner by reason of poor workmanship, defective materials, or lack of space to allow for expansion/contraction of the work during a period on one (1) year from date of final acceptance of the work by the Owner.

END OF SECTION

SECTION 11 68 13

PLAYGROUND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Provide all labor, materials, and equipment necessary to furnish and install the play equipment as indicated on the Drawings, and as specified herein.

1.2 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. Section 01 40 00, QUALITY REQUIREMENTS.
2. Section 01 74 19, CONSTRUCTION WASTE MANAGEMENT.
3. Section 31 00 00, EARTHWORK.
4. Section 03 30 00, CAST-IN-PLACE CONCRETE - SITEWORK
5. Section 32 18 16.12, PLAYGROUND SAFETY SURFACING; Playground safety surface.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Society for Testing and Materials (ASTM):

A 36	Structural Steel
A 123	Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip
A 325	High-Strength Bolts for Structural Steel Joints.
D4976	Standard Specification for Polyethylene Plastics Molding and Extrusion Materials
F 1292	Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment.
F 1487	Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use

2. Americans with Disabilities Act (ADA)

Accessibility Guidelines for Buildings and Facilities; Play Areas, amended November 20, 2000.

3. U.S. Consumer Product Safety Commission (CPSC):

#325 Public Playground Safety Handbook

1.4 DEFINITIONS

A. Fall Height: According to ASTM F 1487, "the vertical distance between a designated play surface and the protective surfacing beneath it."

B. IPEMA: International Play Equipment Manufacturers Association.

C. Use Zone: According to ASTM F 1487, "the area beneath and immediately adjacent to a play structure that is designated for unrestricted circulation around the equipment and on whose surface it is predicted that a user would land when falling from or exiting the equipment."

D. Clear Zone: Designated Use Zone for a piece of equipment that may not overlap with any adjacent Use Zone.

1.5 SUBMITTALS

A. Submit manufacturer’s safety data sheets indicating that material composition is safe for children’s interaction.

B. Submit to the Architect manufacturer's literature on all equipment to be provided. Provide binder including maintenance and safety inspection requirements for all play equipment, including warranty and contact info.

C. Submit tool and spare part kit with any specialty extra pieces, tools, templates, etc provided by manufacturer.

D. Shop drawings of play structures and equipment, including all fastening hardware shall be submitted. Show assembly and installation details. Include all play features in relationship to one another and site obstructions including dimensioned use and clear zones.

1. Site obstructions and limits must be shown as a field-verified As-Built condition.

E. Engineering: Provide services of a professional engineer, registered in the Commonwealth of Massachusetts, to design and certify the structural support system of play equipment.

F. Manufacturer's written guarantee for minimum period of one year from date of installation. Guarantee shall cover replacement of any damaged components, not including vandalism or improper use.

G. Product Data: Include physical characteristics such as materials, dimensions and finish.

H. Certified copies of independent (third-party) inspection reports on ASTM and CPSC tests paid for by the Contractor.

1.6 QUALITY ASSURANCE

A. Provide playground equipment and play structure components bearing the IPEMA Certification Seal. **For custom structures where IPEMA certification is not possible, procure a letter from the manufacturer stating that custom products are designed and manufactured to the same principles as standard IPEMA-certified elements.**

B. Engineering: Provide stamped and signed drawings prepared by a professional engineer, registered in the Commonwealth of Massachusetts, certifying the structural footings and support systems of all play equipment.

C. Installer Qualifications - An experienced installer familiar with local building codes and with the latest safety guidelines, who has completed installation of playground structures similar in material, design, and extent to that indicated for this project, and whose work has resulted in construction with a record of successful in-service performance.

D. Direct Purchase Installer Qualifications – Contractor shall have experience in Landscape Work and Playground Installations similar in materials, design, and extent to that indicated for this project and with a record of successful landscape establishment. Installer shall maintain an experienced supervisor on the project site during all times that playground construction is in progress. Provide written qualification data for firms and persons to be responsible for Work, to demonstrate their capabilities and experience. Include lists of completed projects, with project names, addresses, phone numbers, and names and address of designers and clients. Contractor shall conduct pre-landscape construction conference at Project site as directed by the Landscape Architect, to review playground construction procedures, site conditions, and submittal requirements required in the Work of this Section, before any products are submitted for review and approval, or playground construction commences.

E. Product - Play equipment shall conform to all current U.S. and Canadian standards and guidelines for public playgrounds:

1. ASTM F1487-07: Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
2. CPSC: U.S. Consumer Product Safety Commission, Handbook for Public Playground Safety
3. ADA: American Disability Act
4. ASTM F1292: Standard Guide for ASTM Standards on Playground Surfacing
5. CAN CSA – Z614-07, A National Standard of Canada

1.7 WARRANTY

A. Precast slide - The manufacturer shall warrant that its Precast Concrete Slides are free from defects in material and workmanship. This warranty shall be valid for twenty (20) years, from the date of delivery, excluding normal wear and tear. If the purchaser discovers within this period a failure of the product to conform to specifications, or a defect in material or workmanship, the purchaser must promptly notify the manufacturer in writing within thirty (30) days of discovering the defect. Within a reasonable time after notification, the manufacturer shall repair or supply replacement parts for any failure of the product to conform to specifications or any defect in material or workmanship, at the manufacturer's expense.

B. Site play equipment - all products shall be free from material or workmanship defect for two years. Steel posts are warranted for 15 years against structural failure due to corrosion or deterioration caused by materials and/or workmanship. Stainless steel popes, pipes and parts are warranted for 20 years against structural failure dues to corrosion or deterioration caused by materials and/or workmanship. Moving parts are warranted for ~~**five**~~ **two** years. The warranty period starts from the date of invoice and does not cover damage from vandalism, abuse, improper installation, or inadequate maintenance

PART 2 PRODUCTS

2.1 SITE PLAY EQUIPMENT OVERVIEW

A. Site Play Equipment Available Suppliers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/
2. Landscape Structures, 601 7th Street South, Delano, MN 55328, 888-438-6574, playlsi.com
3. UPC Parks, 16538 Clear Creek Road, Redding, CA 96001, 530-229-7965, upcparks.com
4. Richter Spielgerate, represented in the USA by Architectural Playground Equipment (APE Studio), New York, NY 10001, 212-213-6636, apeoriginal.com

B. Site Play Equipment Basis of Design:
   a. Kompan : Adventure Sheds, Tot Truck, Swings, Universal Carousel, Monkey Bars
   b. Richter: Sensory and Music play elements
   c. UPC Parks: Precast Concrete Slide
   d. Landscape Structures: Roller Slides

2.2 ADVENTURE SHEDS

A. Adventure Shed to be product code KRS8200701 “Adventure Shed” by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

B. Materials:

1. Robinia wood: Posts, crossbars, and other un-fabricated parts are made from de-barked and sap free Robinia trunks in various dimensions. Robinia is a native European wood species with high strength and natural durability in various climatic conditions. The low degree of fabrication allows for a very natural look leaving posts bending and winding in some degree. Basic lines, however, are cut to meet the safety requirements of EN1176 and ASTM F1487. Climbing walls are made in Robinia wood. Wood is in natural color and red-stained.

2. Metal: Curly climbers, handles and tubes are made from stainless steel. Type 316, brushed #4 finish.

3. Steel posts, Brackets, net beams, and chains are hot dip galvanized steel tested for compliance with US CPSIA requirements regarding lead content as well as the European Standard EN 71-3 regarding migration of unwanted substances.

4. Rope: Climbing ropes have six-stranded steel wires and a steel wire core. Each strand is tightly wrapped with PES yarn, which is melted onto each individual strand. After initial friction has been removed the surface fibers, a harder PES coating remains to protect each strand, making the ropes highly wear- and vandalism-resistant.

5. The net connectors are KOMPAN-designed and made from a specially formulated injection-molded PA (polyamide) in order to perform the maximum strength and UV stability. Nets and ropes are equipped with stainless steel chains at the end for adjustment due to variation in Robinia dimensions.

6. Plastic: A variety of plastics are used, selected for suitability, strength, and environmental properties. All plastic components retain their properties in the temperature range of -30°C to 60°C. All plastic materials are UV stabilized to a maximum without use of heavy metal

stabilities. All soft material fulfills the requirements against phthalates as if they were toys.

- Panels for decoration and attachment of slides are made of 19mm EcoCore™. EcoCore™ is a highly durable, ecofriendly material, which is not only recyclable after use, but also consists of a core produced from 100% recycled material. The core has a thickness of 15mm and represents 80% of the total material.
- Net connectors, tube connector and Do-nuts are injection-molded PA (polyamide).
- Polyamide (PA6) – Applications: Curved handholds, footholds, Do-Nut, Wood-Do, net connectors, spacers, swing hangers, 45° brackets, etc.
- Polypropylene (PP) – Applications: Nets and ropes, gear shifts, colored manipulative devices, sand scoops, sand pipes, etc.
- Polycarbonate (PC) – Applications: Various basins and funnels, etc.
- Synthetic rubber (PUR, TPE, TPU or EPDM) – Applications: Swing seats, steps and rungs on slide, access ways and bridges, binoculars, edges on crawl-through openings, teardrops handle, hammock etc.
- Polyethylene (PE) – Applications: Larger hollow plastic parts as slide beds, plastic spring ride bodies, etc. are made of polyethylene and rotation-molded. Panels for all bended balconies are thermo-molded high-density PE plates.

7. Transparent Panels: Made of UV-stabilized Polycarbonate or PETG. The UV-stabilization prevents the Transparent panels in being yellow over time and ensures mechanical performance. Vertical panels are made of 15 mm thick sheets, this ensures enough strength for all purposes.

8. The graphic prints are added by a unique multi-layer print process where the inner layer is the image and outer transparent layer functions as protection. The lacquer is water-based, and UV stabilized to prevent fading.

2.3 TOT TRUCK

A. Tot Truck to be product code NRO931024 “Custom Truck” by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

B. Materials and Style:

1. Robinia Wood – Natural and Red Stained
2. Embedded mount
3. Stainless steel fasteners

2.4 UNIVERSAL CAROUSEL

A. Universal Carousel to be product code PCM157 “Wheelchair Carousel” by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

B. Materials:

1. Metal: All metal parts are dimensioned for heavy-duty, industrial application. Types of metal used are carbon steel and aluminium.

a. Handrail frame:

Dimensions and material:
- Steel tubes for frame Ø42,3 x 3,2 mm
- Steel support tube for bench Ø38 x 4 mm
- Bottom flanges in steel with thickness 8 mm are welded to the tube frame

Surface treatment:

- Hot dip galvanised (HDG) according to ISO1461 with powder coating.
- Power coating corrosion class C3 according to ISO 12944-2
- Lead content for surfaces are below 90ppm, and below 100 ppm for base material.

b. Deck plate in aluminium or HPL
   - Aluminium Tread plate 3/5 mm
   - HPL plate 17,8 mm

c. Carousel chassis
   - Square steel tubes
   - The Chassis is a welded pentagon construction
   - Surface treatment: Hot dip galvanised (HDG) according to ISO1461 with powder coating. Power coating corrosion class C3 according to ISO 12944-2 Lead content for surfaces are below 90ppm, and below 100ppm for base material.
   - The carousel chassis is equipped with 5 lifting eyebolts for installation purposes.

d. Roller and bearing system: The roller system is designed with a fully closed lifetime lubricated center bearing supported by 10 support wheels.
   Center bearing:
   - Casted aluminium house
   - Two sealed bearings.
   - Support plate with diameter 50cm and thickness 10mm

   Support wheels:
   - Vulcanized soft polyurethane shore 75.
   - Dimensions: Diameter 125mm and width 40mm.
   - Two sealed ball bearings per wheel.

e. Plastic: All plastic components retain their properties in the temperature range of -30°C to 60°C. All plastic materials are UV and ozone protected to the maximum within the frames of the strongest environmental demands. Only plastic materials and additives in compliance with the EN 71 standard are used. Do-Nuts are made of polyamide (PA6).

f. Bolts: Bolts, nuts etc. are all stainless steel or hot dip galvanized and all connection are protected by thread lock. Bolts, nuts etc. may have a Delta-Magni surface treatment. For easier installation, the carousel has four lifting eyes. They are replaced with bolts when the installation is done.

2.5 MONKEY BARS

A. Monkey Bars to be product code NRO899901 “Overhead Ladder” by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

B. Materials
   1. Posts and Crossbars to be natural robinia – debarked and sap-free, cut to meet safety requirements of EN176
   2. Handles and ladder grips to be stainless steel, type 316 with brushed satin #4 finish

2.6 SWINGS

A. Long swing to be product code NRO926 “Robinia Swing Frame for 6 Seats” by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

B. Short swing to be product code NRO910 “Robinia – two seat swing” by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

C. Materials and Configuration:

1. Posts and Crossbars to be natural robinia – debarked and sap-free, cut to meet safety requirements of EN176
2. Metal parts to be stainless steel
3. Long swing to have two toddler swings, 1 ADA swing, 1 belt swing and one rope nest swing, see drawings.
4. Short swing to have two belt swings, see drawings
5. Swing seats made from synthetic rubber (PUR, TPE, EPDM and SBR). Swing seats tested to meet the impact criteria of EN1176 as well as ASTM F 1487.

2.7 SENSORY AND MUSIC PLAY ELEMENTS

A. Double-Sided Distorting Mirror to be “9.10702 Distorting Mirror” manufactured by Richter Spielgerate GmbH, represented in the USA by Architectural Playground Equipment (APE Studio), New York, NY 10001, 212-213-6636, apeoriginal.com

1. Posts and Framing to be non-impregnated mountain larch made of core-free timbers
2. Mirror made of double-sided, high gloss polished stainless steel, 2 curvatures crosswise
3. Ground anchor stainless steel

B. Moire Disc to be “10.14000 Moire Disc” manufactured by Richter Spielgerate GmbH, represented in the USA by Architectural Playground Equipment (APE Studio), New York, NY 10001, 212-213-6636, apeoriginal.com

1. Posts and Framing to be non-impregnated mountain larch made of core-free timbers
2. Mirror made of double-sided, high gloss polished stainless steel, 2 curvatures crosswise
3. Ground anchor stainless steel
4. Roller bearings: stainless steel, sealed
5. Impact and weather-resistant acrylic glass held in four corrosion-proof bearings
6. Large-diameter board with thick, transparent and completely non-smear UV-proof outer disc

C. Tubular Chimes to be “10.524000 Tubular Chimes” manufactured by Richter Spielgerate GmbH, represented in the USA by Architectural Playground Equipment (APE Studio), New York, NY 10001, 212-213-6636, apeoriginal.com

1. Supporting tubes, ring, foot plates, and base plate made of high gloss polished stainless steel
2. Equipment to include five (5) tuned brass sound tubes, stainless steel tensioning cables, and two (2) plastic beaters with stainless steel cable suspension.
3. Ground anchor stainless steel

D. Sansa Rimba to be “Sansa Rimba” manufactured by Percussion Play, https://www.percussionplay.com/

1. Black anodized aluminum resonators between HDPE sheets.
2. 316 mirror polished stainless steel leg.
3. 15 aluminum notes.
4. 2 x 1 part vandal resistant mallets.
5. Vandal resistant 300 series stainless steel fixings.
6. Base condition: In-ground mount

2.8 ROLLER SLIDES

A. Embankment Roller Slide 4’ to be “12333 Rollerslide, 56” Manufactured by Landscape Structures, 601 7th Street South, Delano, MN 55328, 888-438-6574, playlsi.com

B. Embankment Roller Slide 7.5’ to be “Custom 7.5’ Roller Slide” Manufactured by Landscape Structures, 601 7th Street South, Delano, MN 55328, 888-438-6574, playlsi.com

C. Materials and Style:

1. Tube: 1 1/8" O.D. x 1 5/8" long aluminum tube. Finish: ProShield, color to be selected by landscape architect from standard colors.
2. Spacer Tube: Made from 6061-T6 aluminum 7/8" O.D. x 1 11/16". Finish: ProShield, color to be selected by landscape architect from standard colors.
3. Offset Hanger Clamp Assembly: Cast aluminum. Finish: ProShield, color to be selected by landscape architect from standard colors.
4. Fasteners: Primary fasteners shall be socketed and pinned tamperproof in design, stainless steel (SST) per ASTM F 879 unless otherwise indicated (see specific product installation/specifications).
5. Mount: Direct Bury
6. Dignity platform at exit, right hand side

2.9 EUROFLEX BALLS

A. Euroflex balls to be “standard Half Ball with EPDM Topping” manufactured by Kraiburg Relastec and supplied by Kompan inc, 605 W Howard Ln - Suite 101, Austin, TX 78753 - US, 1 (800) 426-9788, https://www.kompan.us/

B. Materials and Configuration:

1. Topping: Colored EPDM rubber granulate atop granulated recycled rubber; smooth surface with open pores and minor color variations
2. Colors: mix of colors to be selected by landscape architect from standard offerings
3. Binding agent: MDI Polyurethane
4. Mix of small, medium and large balls, see plans
5. Tolerances: +/- 0.8%
6. Steel anchors
7. Fire resistance: Class E, DIN EN 13501-1, 2010

2.10 PRECAST CONCRETE SLIDE

A. Concrete Slides Basis of Design by UPC Parks, by Universal Precast Concrete, Inc., 16538 Clear Creek Road, Redding, CA 96001, 1-530-605-2664. https://www.upcparks.com/

B. Concrete Slide and dignity platform shall be made of Ultra-High Performance Concrete (UHPC) and cast as a single piece, including the Entrance Platform with ADA handhold, Slide Bedway and Exit Region. Slide bedway to be polished to create effective slide surface.

1. Additional Requirements:
   a. Reinforcing steel: - #4 and #5 rebar- ASTM A615M, Grade 60.
   b. A specialized ultra-high-performance precast concrete formulation produce a quality sliding surface and other playground products. Minimum 4000 psi. Design Loads: International Building Code 2018 edition or newer (ICC IBC-2018), and

ASTM – F1487-17 (Standard Consumer Safety Performance Specifications for Playground Equipment for Public Use).

c. Connections for foundation attachments shall be embedded during the casting process.
d. All edges shall be radiused or ground smooth and the surface of each slide shall be polished (slide bed) or lightly etched (entrance platform and sides) sandblasted to remove sharp edges.
e. Exposed metal elements – sit down bars, grip bars – shall be brushed #4 stainless steel complying with Section 057200 EXTERIOR METAL HANDRAILS AND RAILS
f. Concrete Slide and Dignity Platform Mix Color: to be selected by landscape architect from standard offerings.

2. The precast slide and dignity platform shall be shipped as a package including the installation instructions.

2.11 INSTALLATION INSTRUCTIONS AND AIDS

A. Furnish manufacturer's published erection drawings (including post anchorage, footings, etc.) and a bill of materials for each model. Drawings shall include all data necessary for assembly, including the recommended erection sequence.

B. To facilitate assembly, each member shall be indelibly stenciled with an easily recognized identification number keyed to the erection drawings. All components shall be unitized and packaged by model number, ready for assembly.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, site surface and subgrade drainage, and other conditions affecting performance.

1. Do not begin installation before final grading required for placing protective surfacing is completed, unless otherwise permitted by Architect.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Verify locations of playground perimeter and pathways. Verify that playground layout and equipment locations comply with requirements for each type and component of equipment.

3.3 PLAY EQUIPMENT INSTALLATION

A. Contractor shall conduct pre-landscape construction conference at Project site as directed by the Landscape Architect, to review playground construction procedures, site conditions, and submittal requirements required in the Work of this Section, before any products are submitted for review and approval, or playground construction commences.

B. Equipment and associated Use Areas must be precisely located per approved shop drawings. Any equipment installed without an adequate use area as specified in the shop drawings shall be rejected and re-installed with proper clearances at no additional cost to the Owner.

C. Playground equipment shall be assembled and installed in strict accordance with manufacturer's printed instructions, true to the dimensions, layout, and details shown on the

Drawings.

1. Install play structure in compliance with manufacturer's written instructions.
2. Install components in sequence as recommended by manufacturer.
3. Install play structure as indicated on the drawings provided.
4. Variations from the installation indicated must be approved.
5. Variations from the installation indicated and all costs for removal and replacement will be the responsibility of the contractor.
6. Installation Contractor will warranty the replacement of any warranty item for the entire manufactor's warranty period at no cost to the Owner.

D. Locate positions of all play equipment support posts with proper clearances as dimensioned on the Drawings, and as called for on manufacturer's shop drawings.

E. Post and Footing Excavation: Excavate holes for posts and footings as indicated in firm, undisturbed or compacted subgrade soil.

1. Footings: Refer to Section 03 30 01, CAST-IN-PLACE CONCRETE – SITEWORK.

F. Install all members at proper heights, levels, in plumb or horizontal relationships as required. Assemble all structures in conformance with approved shop drawings. Final installations shall be stable, secure and free from any hazardous projections.

1. Maximum Equipment Height: Coordinate installed heights of equipment and components with finished elevations of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. Verify that playground equipment elevations comply with requirements for each type and component of equipment.
2. Set rope tension in accordance with manufacturer's printed instructions.

G. Touch up finishes damaged during installation with finish kits provided by manufacturer.

3.4 PRECAST CONCRETE SLIDE INSTALLATION

A. When unloading, pad slings and use other precautions to protect finish. (Do not use chains or buckets to move materials.) Field handle carefully to avoid chipping structures.

B. Install according to manufacturer's installation instructions and these specifications.

C. The precast slides shall be set on prepared footings or concrete slab to be provided by contractor unless otherwise specified. Footing details shall be designed by an engineer based on load information as provided by the manufacturer. Foundation shall be constructed to local codes, and good construction practices for the specific site conditions. Anchor attachments shall be installed as per manufacturer's installation instructions.

D. Pick Point holes to be filled and colored per manufacturer's installation instructions.

3.5 INSTALLATION OF PLAY EQUIPMENT

A. When unloading, pad slings and use other precautions to protect finish. (Do not use chains or buckets to move materials.) Field handle carefully to avoid bending, cracking or chipping structures.

B. Examination

1. Examine areas to receive play equipment.

2. Notify Architect of conditions that would adversely affect installation or subsequent use.
3. Do not begin installation until unacceptable conditions are corrected.

C. Installation

1. Install equipment in accordance with manufacturer's instructions at locations indicated on the Drawings.
2. Install level.
3. Anchor securely in place.

D. Adjusting

1.Finish Damage: Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
2.Component Damage: Remove and replace damaged components that cannot be successfully repaired as determined by Architect.

E. Cleaning

1.Clean equipment promptly after installation in accordance with manufacturer's instructions.
2.Do not use harsh cleaning materials or methods that could damage finish.

F. Protection

1.Protect installed equipment to ensure that, except for normal weathering, equipment will be without damage or deterioration at time of Substantial Completion.

G. Concrete footings shall be furnished and installed under Section 03 3001, CAST-IN-PLACE CONCRETE - SITEWORK

3.6 FIELD QUALITY CONTROL

A. Arrange for playground equipment manufacturer's technical personnel to inspect playground and playground equipment and components during installation and at final completion and to certify compliance with the safety standards specified.

B. Notify Architect 48 hours in advance of date and time of final inspection.

3.7 WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project's Waste Management Plan.

END OF SECTION

SECTION 31 13 00

SELECTIVE TREE REMOVAL AND TRIMMING

1.1 SUMMARY

A. Provide all work necessary to perform selective clearing within the limits indicated on the Drawings and as specified herein. Selective clearing work shall include, but not be limited to, the following:

1. Tree pruning.
2. Flush cutting shrubs and trees, and grinding of stumps and backfilling of holes with clean fill and topdress with 6 in. loam.
3. Removal of deadwood and brush.
4 Removal of all rubbish, debris, and other materials to be disposed of as a result of the work of this section.

1.2 RELATED WORK

A. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
2. Section 015639, TEMPORARY TREE AND PLANT PROTECTION; Protection and pruning of trees to remain.
3. Section 024113, SELECTIVE SITE DEMOLITION AND REMOVALS; Clearing and grubbing and removal and disposal of felled trees and stumps outside of the work limits of this section.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American National Standards Institute (ANSI):

A300	Best management practices Tree Support Systems: Cabling, Bracing, and Guying
Z133.1	Safety Requirements for Pruning, Trimming, Repairing, Maintaining and Removing Trees, and for Cutting Brush
Z133A	Best Management Practices Tree and Shrub Fertilization

2. Tree Care Industry Association, 3537 Stratford Rd., Wantagh, NY 11793 (TCIA):

Ref. 1	Pruning Standards for Shade Trees
Ref. 2	Standard for Fertilizing Shade and Ornamental Trees
Ref. 3	Bracing, Cabling and Guying Standard for Shade Trees.

1.4 SUBMITTALS

A. The Contractor shall submit to the Architect for review, proposed methods and materials for selective clearing, including a schedule indicating specific dates for implementing specific work items in each major work area.

1.5 DEFINITIONS

A. The Critical Root Zone (CRZ) is defined as having a radius of 1.25' for every 1" of dbh (diameter at breast height).

1.6 QUALITY ASSURANCE

A. All work performed under this Section requires approval by **~~City of Boston Arborist~~ Town of Arlington (Owner)** prior to any arboricultural remedial service.

B. Selective clearing methods shall conform to the applicable requirements of ANSI Z133.1

C. Selective pruning methods shall conform to the applicable requirements of ANSI Z133.1.

D. Work of this section shall be completed by a professional ISA Certified Arborist with a minimum five years experience, who has successfully completed an exam and education program equal to the International Society of Arboriculture (ISA) Certification Program, sponsored by the International Society of Arboriculture 2009, P.O. Box 3129, Champaign, IL 61826 (217) 355-9411; Email: isa@isa-arbor.com.

1. While in the tree the arborist shall perform an aerial inspection to identify any defects, weak branch and trunk attachments and decay not visible from the ground. Any additional work needed to mitigate defects shall be reported to the property owner.
2. Trees and or woody shrubs to be removed shall be felled/cut so as to fall away from (CRZ) and avoid pulling and breaking of roots of trees to remain. If roots are entwined, an ISA Certified Arborist® may require first severing the major woody root mass before extracting the trees or grinding the stump below ground.

PART 2 PRODUCTS

2.1 CABLES AND GUYING MATERIALS:

A. Materials for guying and cabling trees shall conform to TCIA Ref. 2.

PART 3 EXECUTION

3.1 TREE PRUNING

A. Tree pruning shall be "Class II Medium Pruning" conforming to TCIA Ref. 1.

B. Schedule of trees to be pruned and extent of pruning shall be as indicated on the Drawings. Tree pruning shall be as directed and approved by the Architect.

3.2 TREE REMOVAL

A. Trees indicated on the Drawings as "Remove" or trees tagged in the field by the Landscape Architect to be removed shall be felled.
   1. If trees are felled with stumps left in ground, stumps shall be routed out to a minimum depth of 12 in. below finish grade.
   2. If trees are felled by being pushed over, exposing their root mass, entire root mass to be removed ensuring a minimum of 12 in. below finish grade.
   3. Holes shall be backfilled with clean fill and topdressed with 6 in. loam.

B. Tags of each felled tree shall be saved and returned to the Architect.

3.3 DEADWOOD AND BRUSH REMOVAL

A. Deadwood and brush within the limits of work indicated on the Drawings shall be disposed of as follows:

   1. Brush, limbs, and other material less than 6 in. in diameter shall be chipped and stockpiled on-site in an area designated by the Architect.
   2. All deadwood shall be chipped and stockpiled as specified above.
   3. Limbs 6 in. and larger shall, at the Contractor's option, be disposed of as follows:
      a. Material shall become the property of the Contractor and be disposed of off-site, or;
      b. Material shall be cut to 4 ft. lengths and stacked in an on-site location designated by the Architect.

B. All debris material not otherwise indicated shall be legally disposed of off-site.

END OF SECTION

SECTION 31 2500

SOIL EROSION AND SEDIMENT CONTROL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Section Includes

1. Dust control
2. Drainage and erosion control
3. ~~**Haybales and siltation fence**~~
4~~3~~. Sediment trapping devices

B. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
2. Section 02 4113, SELECTIVE SITE DEMOLITION AND REMOVALS; Clearing and grubbing and stripping of topsoil.
3. Section 31 1100, EARTHWORK; Excavation, backfill; establishment of subgrade elevations.
4. Section 32 9100, PLANTING SOILS.
5. Section 32 9119, LANDSCAPE GRADING.
6. Section 32 9300, PLANTING; New plantings.

1.2 SUBMITTALS – NOT USED

PART 2 - PRODUCTS

~~**2.1 HAYBALES**~~

~~**A. Haybales required for siltation control shall be wire tied bales of the type normally used for siltation or erosion control or construction projects.**~~

~~**2.2 FILTER FABRIC**~~

~~**A. Filter fabric siltation fencing shall be a woven filter fabric having a weight of at least 2.5 ounces per square yard, a thickness of at least 17 mils, a coefficient of permeability of not less than 0.0009 centimeters per second and allows a water flow rate of a minimum 40 gallons per minute per square yard. The material shall have a high sediment filtration capacity, high slurry flow and minimum clogging characteristics. The material shall be equal to FW-300 as manufactured by Mirafi, Inc., Charlotte, North Carolina; Amoco 2130 by Nilex, Inc., Centennial, CO; MISF 180 by Mutual Industries, PA; or equal.**~~

2.~~3~~1 SEDIMENT TRAPPING DEVICES

A. Sediment trapping devices shall be Siltsack®, Dandy Bag II®, or equal.

2.~~4~~ **2** MULCH

A. Hay mulch shall consist of mowed cured grass, clover, alfalfa, timothy, oats, or wheat. No salt hay shall be used.

PART 3 - EXECUTION

3.1 DUST CONTROL

A. Control dust during the Work. Use a mechanical street sweeper as needed or at the request of the Engineer.

B. Prevent dust from becoming a nuisance or hazard. During construction, excavated material and open or stripped areas are to be policed and controlled to prevent spreading of the material.

C. Control dust during the work on-site using calcium chloride and/or water.

D. During the Work on-site, all paved road and driveway surfaces shall be scraped and broomed free of excavated materials on a daily basis. The surfaces shall be hosed down or otherwise treated to eliminate active or potential dust conditions and the natural road or wearing surface shall be exposed.

E. Ensure that the existing equipment, facilities, and occupied space adjacent to or nearby areas of the work do not come in contact with dust or debris as a result of concrete demolition, excavation or surface preparation for coatings.

F. Control dust by the construction of temporary wooden frame/polyethylene sheeting walls and covering enclosures separating adjacent or nearby areas and equipment from the Work site.

3.2 DRAINAGE AND EROSION CONTROL

A. Control erosion and siltation during the construction through mulching, haybales, siltation fencing, diversion and control of storm water run-off, ponding areas and similar methods.

B. Provide and maintain sediment trapping systems.

C. Discharge surface runoff from any disturbances to the site into silt containment basins. Utilize siltation prevention measures including haybale and geotextile fences before discharge to drainage systems.

D. Control surface waters within the construction area through the use of temporary culverts.

E. Install sediment trapping devices in catch basins located in existing paved areas with sediment trapping devices to minimize the transport of sediment through the subsurface stormwater collection system.

3.3 HAYBALES AND SILTATION FENCE

A. Place and maintain both haybales and a staked filter fabric siltation fence along the entire length of the proposed construction between the area of construction and where shown on the Drawings or required by permit.

B. Install haybales by anchoring bales butted together to existing ground with at least 2 stakes per bale. The stake shall be a minimum of 2 inch square cross section and shall be long enough to penetrate 12 inches into the ground. Replace deteriorated haybales. Remove and dispose of the haybales following the successful growth of vegetation in the areas disturbed by the construction. Haybales shall not be removed until their removal is approved by the Engineer.

C. Install a filter fabric siltation fence in addition to the staked haybales, prior to construction and remove after full surface restoration has been achieved. Install the siltation fence parallel and immediately adjacent to the haybales as shown on the Drawings. Install as follows:
   1. Hand shovel excavate a small trench on the upstream side of the desired fence line location.
   2. Unroll the siltation fence system, position the post in the back of the trench (downhill side), and hammer the post at least 1½ feet into the ground.
   3. Lay the bottom 6 inches of the fabric into the trench to prevent undermining by storm water run-off.
   4. Backfill the trench and compact.

3.4 RESTORATION

A. Provide erosion control, seed and mulch and netting for surface restoration of areas disturbed during construction activities.

B. Provide temporary stabilization of disturbed areas that remain inactive greater than 14 consecutive days to minimize erosion. Methods to minimize erosion may include but are not limited to:
   1. Spreading straw and/or providing temporary planting stabilization.
   2. Installing jute netting.
   3. Preparing surfaces to increase the runoff flow path, reduce the runoff flow velocity, or create small storage pockets to retain surface flows. Methods of accomplishing this include using mechanical devices such as track equipment or sheep's foot rollers.

C. Place mulch on seeded areas. Use jute netting on areas having a slope greater than 3 horizontal to 1 vertical, to anchor the mulch until a satisfactory growth is obtained. If seeding is not possible because of the time of the year, apply mulch and netting to stabilize the area until such time as seed can be sown.

D. Provide grading, refertilizing, reseeding, remulching and/or netting to maintain the restored areas until the Work is accepted by the Owner.

E. See Section 329200 – Turfs and Grasses for seed.

3.5 CLEANING

A. Remove any sediment that builds up around the haybales or catch basins.

B. Clean sediment trapping devices periodically during the Work. Devices shall be cleaned on a weekly basis, or more frequently if the devices become clogged.

C. Clean catch basins that collect sediment as a result of the Work.

END OF SECTION

SECTION 32 1313

CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. The work includes furnishing all labor, materials, equipment, and supervision to construct the Portland cement pedestrian concrete paving work, including standard concrete paving, ~~**integrally colored concrete paving**~~, concrete paving on drain mat over structure, and handicap ramps, in accordance with the Drawings and Specifications.

1.2 RELATED WORK

A. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
2. Section 31 1100, EARTHWORK; Establishment of subgrade elevation.
3. Section 32 1100, BASE COURSES; Aggregate base course.
4. Section 03 3001, CAST-IN-PLACE CONCRETE - SITEWORK; Below grade pads, slabs and bases.
5. Section 07 9 201, EXTERIOR JOINT SEALANTS – SITEWORK

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirements shall govern.

1. American Concrete Institute (ACI):

305R	Hot Weather Concreting
306R	Cold Weather Concreting
325.9R	Guide for Construction of Concrete Pavements and Concrete Bases.

2. American Society for Testing and Materials (ASTM):

A 185	Welded Steel Wire Fabric for Concrete Reinforcement
A 615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
C 33	Concrete Aggregates

C 94	Ready-Mixed Concrete
C 143	Slump of Portland Cement Concrete
C 150	Portland Cement
C 171	Sheet Materials for Curing Concrete
C 231	Air Content of Freshly Mixed Concrete by the Pressure Method
C 309	Liquid Membrane-Forming Compounds for Curing Concrete
C 494	Chemical Admixtures for Concrete
~~**C1116**~~	~~**Fiber-Reinforced Concrete**~~
D 226	Asphalt-Saturated Organic Roofing Felt for Use in Membrane Waterproofing and Built-Up Roofing
D 1557	Moisture - Density Relations of Soils and Soil Aggregate Mixtures Using 10 lb. (4.54-kg) Rammer and 18-in. (457 mm) Drop
D 1752	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction

3. Americans with Disabilities Act (ADA):

Appendix to Part 1191	Accessibility Guidelines for Buildings and Facilities

4. City of Boston Department of Public Works – Standards and Specifications

5. Commonwealth of Massachusetts Department of Transportation (MassDOT):

Specifications	Standard Specifications for Highways and Bridges

1.4 ADA AND MAAB COMPLIANCE

A. Special attention is to be given to compliance with the Americans with Disabilities Act (ADA) and the requirements of the Massachusetts Architectural Access Board (MAAB).

1. Slopes: All Walkways as defined by Section 22.1 of 521 CMR shall be graded to a maximum 4.9%. The cross pitch (perpendicular to travel) for all walkways and paths shall be constructed at 1.9% max. The slope of all “curb cut” ramps and side slopes of handicap curb cuts as defined by Section 21.1 of 521 CMR shall be constructed at 7.5% maximum. Ramps as defined in section 24.1 of 521 CMR shall be constructed to a maximum slope of 8%.
2. The Contractor is to assume that all grades in pedestrian paths of travel shall be verified/checked with a 2-foot electronic “Smart Level”.
3. A 5’-0” minimum level (1.5% pitch, 1.9% max.) area shall be provided at all flush entrances to buildings with cross pitch as indicated on the Drawings. Puddling of water

at the entrances will not be allowed.

B. The above requirements identify the maximum allowable slope conditions on the Drawings.

1.5 QUALITY ASSURANCE

A. General: City of Boston Standards.

B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. ACI Publications: Unless otherwise specified, work and materials for construction of the Portland cement concrete paving shall conform to ACI 301 and 325.9R.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1.

1. Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices. Require representatives, including the following, of each entity directly concerned with concrete pavement, to attend conference:
   a. Contractor's superintendent.
   b. Independent testing agency responsible for concrete design mixtures.
   c. Ready-mix concrete producer.

F. Work, materials, and color of the handicap ramp paving shall conform to applicable sections of Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.

G. Paving work, base course etc., shall be done only after excavation and construction work which might injure them have been completed. Damage caused during construction shall be repaired before acceptance.

H. Existing paving areas shall, if damaged or removed during course of this project, be repaired or replaced under this section of the specification. Workmanship and materials for such repair and replacement, except as otherwise noted, shall match as closely as possible those employed in existing work.

I. Pavement, base, or subbase shall not be placed on a muddy or frozen subgrade.

1.6 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1.7 PRECONSTRUCTION MOCK-UP PANELS

A. General

1. Schedule mock-up casting for acceptance 30 days prior to casting of concrete surfaces represented by the mock-ups.
2. Locate mock-up panels in non-public areas accepted by the Architect. **Mock-ups may be done in-place as approved by Architect.**
3. Continue to cast mock-ups until acceptable mock-ups area produced. Accepted mock-ups shall be the standard for color, texture, and workmanship for the work.
4. Mock-up sequence of forming, placing, form removal, curing, and finishing shall be reviewed and accepted by the Architect.
5. Mock-up formwork shall be inspected and accepted by the Architect before placing of concrete.
6. Use the same concrete mixes and placement procedures, accepted in mock-ups, in the final work, unless otherwise directed by the Architect.
7. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-up.
8. Remove mock-up panels from site at completion of project, as directed by the Architect **as needed**.

B. Construct mock-up panels or areas as indicated to demonstrate the ability to cast concrete for concrete paving to achieve shape, color, jointing, and textured finish required. Mock-ups shall include or meet the following requirements:

1. Provide mock-up panel 5 ft. x 10 ft. size, full depth.
2. Provide mock-ups simulating actual design and execution conditions for concrete mix materials, reinforcement, formwork, placing sequence, form removal, curing, finishing, and methods and materials of stain removal and correction of defective work.
3. On mock-ups where directed by the Architect, provide minimum of three variation of mix color to be used in the repair of defective work, in order to determine acceptable color and texture match.
4. Demonstrate in the construction of the mock-up formwork the sealer material, form release agent, and curing materials and methods to be used.
5. Include control joints and expansion joints with joint sealer.

C. Sample panel, 5 ft. x 5 ft. minimum, shall be constructed prior to start of handicap ramp paving, exhibiting detectable warning surface and required color contrast with adjacent paving in accordance with ADA Guidelines.

D. Source of Materials. Utilize the same source, stock, or brand of concrete materials for each class or mix of concrete which is to be exposed. Do not interchange materials or mixes until an additional mock-up shows that uniformity in finish texture and color, as compared to original mock-up will be maintained. If necessary, obtain and stockpile materials in sufficient quantity to ensure continuity and uniformity.

1.8 SUBMITTALS

A. Description of Methods and Sequence of Placement. For each type of specially-finished concrete provide description of methods and sequence of placement.

B. Submit manufacturer's product data for the following:

1. Form release agent.
~~**2. Concrete coloring additive**~~.
~~**3**~~**2**. Preformed joint filler.
~~**4**~~**3. Fiber reinforcement**

~~5~~**3**. Drainage panel

C. Submit samples of the following:

1. Preformed joint filler.

D. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

E. Submit concrete delivery tickets. Each ticket shall contain the following:

1. Batch number.
2. Mix by class or sack content with maximum size aggregate.
3. Admixtures.
4. Air content.
5. Slump.
6. Time of loading.

F. Submit concrete test reports to verify mix design.

G. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Bonding agent or epoxy adhesive.

H. Minutes of preinstallation conference.

1.9 TESTING AND INSPECTION

A. Contractor shall provide and pay for testing procedures specified herein. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated, and in accordance with Division 01, GENERAL REQUIREMENTS.

B. The Owner reserves the right to inspect and test paving and associated work in accordance with Section 01 40 00, QUALITY REQUIREMENTS.

PART 2 - PRODUCTS

2.1 DENSE GRADED BASE COURSE

A. Refer to Section 32 1100, BASE COURSES.

2.2 MOLDED-SHEET DRAINAGE PANELS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal:

1. American Wick Drain Corporation.

2. Grace, W. R. & Co.; Construction Products Div.
3. GREENSTREAK/Western Textile Products.
4. JDR Enterprises, Inc.
5. Ling Industrial Fabrics, Inc.
6. Mirafi, Inc.

B. Description: Prefabricated, composite panels, 36 to 60 inches (915 to 1525 mm) wide x 2 in. thick, and manufactured with geotextile facing laminated to molded-plastic drainage core.

2.3 REINFORCING BARS

A. Steel reinforcing bars shall conform to ASTM A 615.

1. Bars employed as reinforcement shall be deformed type.
2. Bars employed as dowels shall be hot-rolled plain rounds.
3. Unless otherwise indicated on the Drawings, reinforcing bars shall be Grade 60.

B. Welded wire fabric reinforcement shall conform to the applicable requirements of ASTM A 1064. Fabric reinforcement shall be furnished in flat sheets. Fabric reinforcement in rolls will not be permitted.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice."

~~**2.4 FIBER REINFORCEMENT**~~

~~**A. Fiber reinforcement shall be polypropylene fiber processed into fibrillated bundles designed to open when placed in concrete to produce a homogeneously distributed monofilament polypropylene fiber reinforcement.**~~

~~**1. Fiber size (length) required shall be based on top size of coarse aggregate in the concrete mix, in accordance with manufacturer's recommendations and printed instructions.**~~

2.~~5~~4 PORTLAND CEMENT CONCRETE

A. Concrete shall be air entrained, ~~**5000**~~ **4000** psi, and (¾") three-quarter-inch maximum size aggregate with 660 lbs of cement per cubic yard of concrete. Entrained air shall be between 5.5% and 7.5% with a slump not to exceed (4½") four-and-one-half inches. ASTM C150 Type 11 cement shall be used. The use of mineral additives or supplements such as Ground Granulated Blast Furnace Slag, Fly Ash, Silica Fume or Micro Silica is prohibited. Normal weight aggregate shall conform to ASTM C33, containing no deleterious substances, which cause surface spalling. The Contractor must certify that no alkali reactivity is produced with the proposed aggregate-cement combinations when tested in accordance with ASTM C227.

1. All concrete shall be produced in accordance with the approved mix designs. The Contractor shall comply with ACI 304 and 309 as herein specified.
2. The Contractor shall be allowed to add water for slump adjustment, but is required to adhere to the standards of ASTM C94. This standard allows for slump adjustment on

site if the truck arrives with a concrete slump less than (4½") four-and-one-half inches. This shall only be allowed if the following conditions are satisfied:

a. The water addition shall not increase the water cement ratio above the maximum permitted by the specification.
b. The water shall be added to the entire batch, not in the middle or end of the batch.
c. Water addition is not allowed to by-pass the 1½ hour or 300 revolution criteria.
d. Water shall be added into the batch at the head section of the drum or by injection into the head and discharge section of the drum.
e. Water added requires an additional 30 revolutions at mixing speed.
f. The driver's delivery ticket shall document any water withheld at the batching plant.

3. Maximum Water-Cement Ratio: The concrete mix must have a maximum water-cement ratio of 0.45. Mixes must comply with Chapters 3, 4, and 5 of ACI 318 latest building code adopted edition.

B. Concrete with a slump exceeding (4½") four-and-one-half inches, air entrainment outside of the allowable range, or of a temperature exceeding (90°F) ninety degrees Fahrenheit is not to be installed. All concrete must be placed within 90 minutes of when it was batched as recorded on the delivery slip. The 90 minutes can be exceeded only if the concrete remains workable, there is no appreciable loss of slump, no water has been added, or the temperature does not exceed (90°F) ninety degrees Fahrenheit.

C. Concrete Mix Designs

1. Substantiating data for each concrete mix design to be installed must be submitted to the Architect not less than (6) six weeks prior to the first placement of concrete. Data for each mix shall at a minimum include the following:
   a. Mix identification designation (unique for each mix)
   b. Statement of intended use.
   c. Mix proportions, including all admixtures.
   d. Manufacturer's data and/or certifications verifying conformance of all mix, materials, including admixtures with specified requirements.
   e. Wet and dry unit weight.
   f. Design slump, ASTM C143
   g. Entranced air content, ASTM C138
   h. Required average strength qualifications data per ACI 301-391 and 392. Submit separate qualifications for each production facility that supply concrete to the project.

2.**65** CHEMICAL ADMIXTURES

A. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.

~~2.7 COLOR ADMIXTURE~~

~~A. Color admixture shall be suitable for concrete pavement and shall meet or exceed the requirements set by Portland Cement Association (PCA) and ASTM C 979.~~

~~B. Color admixture shall not affect workability, setting, or strength of concrete adversely.~~

~~Color pigments shall consist of chemically inert, non-fading, alkali-fast mineral oxides, finely ground and prepared for use in cement and mortar. Admixture shall not contain calcium chloride.~~

~~C. Color admixture shall be one of the following, or approved equal:~~

~~1. Chromix Color Admixture, manufactured by L.M. Scofield Company, 4155 Scofield Road, Douglasville, GA 30134; Tel. 800-800-9900, or approved equal.~~
~~2. Davis Colors manufactured by Davis Colors; 7101 Muirkirk Road Beltsville, MD 20705; phone 800-356-4848, e-mail info@daviscolors.com, or internet www.daviscolors.com~~
~~3. Color Paving Admix, manufactured by Mapei Corp.~~

~~D. Colors: will be selected by the Architect.~~

~~E. Mix design shall conform to manufacturer's recommendations, and directions of the Architect to achieve proposed color. Strictly monitor additive/cement ratio throughout job to ensure uniform color.~~

~~F. Basis of design: Chromix Color Admixture, manufactured by L.M. Scofield Company, 4155 Scofield Road, Douglasville, GA 30134; Tel. 800-800-9900.~~

~~2.8 CURING COMPOUND FOR COLOR CONDITIONED CONCRETE~~

~~A. Concrete colored with color admixture shall be cured with a product compatible with the color admixture and by the same manufacturer as the color admixture. Curing product shall be manufactured by one of the following:~~

~~1. L.M. Scofield Company, 4155 Scofield Road, Douglasville, GA 30134; Tel. 800-800-9900, or approved equal.~~
~~2. Davis Colors; 7101 Muirkirk Road Beltsville, MD 20705; phone 800-356-4848, e-mail info@daviscolors.com, or internet www.daviscolors.com~~
~~3. Mapei Corp.~~

2.~~9~~**6** TACTILE WARNING SURFACE

A. Not Used.

2.~~10~~**7** CURING MATERIALS FOR UNCOLORED CONCRETE

A. Curing shall be by moist curing or by use of curing compound.

B. Curing compound shall be a resin-base, white pigmented compound conforming to ASTM C 309, Type 2.

C. Water: Potable.

2.~~11~~**8** EXPANSION JOINTS

A. Unless otherwise indicated on the Drawings, expansion joints shall be located 30 ft. o.c., maximum.

B. Expansion joint filler shall be preformed, nonbituminous type joint filler conforming to ASTM

D 1752, Type II.

1. Premolded filler shall be one piece for the full depth and width of the joint leaving a sealant recess as indicated.
2. Use of multiple pieces of lesser dimensions to make up required depth and width of joint will not be permitted.
3. Except as otherwise noted on the Drawings, joint filler shall be 3/8 in. thick.

C. Dowels shall be furnished under this Section, and shall be Type 304 stainless steel.

2.~~12~~**9** SEALANT

A. Sealant for sealing of expansion joints shall conform to Section 07 9201, EXTERIOR JOINT SEALANTS - SITEWORK.

2.~~13~~**10** CONTROL JOINTS

A. Control joints indicated on the Drawings to be sawn, shall be made by saw cutting concrete slab after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab. Saw blade shall cut into slab at least 1 in., but in no case less than 25% of slab depth.

2.~~14~~**11** CONSTRUCTION JOINTS

A. Transverse construction joints shall be placed whenever placing of concrete is suspended for more than 30 minutes.

1. Butt joint with dowels or thickened edge joint shall be used if construction joints occurs at location of control joint.
2. Keyed joints with tiebars shall be used if the joint occurs at any other location.

2.~~15~~**12** GROUT

A. Grout shall be mixed in the proportions of one part Portland cement to two parts sand, by volume. Only sufficient water shall be used to enable grout to barely hold its shape when squeezed into a ball in the hand. Sand for grout shall be "Fine Aggregate", conforming to ASTM C 33.

B. Nonshrink grout shall be pre-mixed non-shrinking, high strength grout. Compressive strength in 28 days shall be 5,000 psi minimum, but in no case less than the specified strength of the adjacent concrete. Manufacturer shall provide evidence that the material meets the requirements of the COE CRD-C 621 (558). Grout permanently exposed to view shall be nonoxidizing; metallic grout may be used in other locations.

1. Nonshrink grout shall be one of the following, or approved equal:

Manufacturer	Product
Gifford-Hill Co.	Supreme
Master Builders Co.	Embeco
U.S. Grout Corporation	Five Star Grout

2.~~16~~**13** BOND BREAKER

A. Bond breaker shall be asphalt felt conforming to ASTM D 226, Type I or 6 mil polyethylene

sheeting.

PART 3 - EXECUTION

3.1 PREPARATION OF SUBGRADE

A. Areas to be paved will be compacted and brought approximately to subgrade elevation under Section 31 1100, EARTHWORK before work of this section is performed. Final fine grading, filling, and compaction of subgrade to receive paving, as required to form a firm, uniform, accurate, and unyielding subgrade at required elevations and to required lines, shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to Section 31 1100, EARTHWORK.

C. Subgrade of areas to be paved shall be recompacted as required to bring top 8 in. of material immediately below gravel base course to a compaction of at least 90% of maximum density, as determined by ASTM D 1557, Method D. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.

D. Excavation required in pavement subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade or subbase subsequent backfill and compaction shall be performed as directed by the Architect as specified in Section 31 1100, EARTHWORK. Completed subgrade after filling such areas shall be uniformly and properly graded.

3.2 AGGREGATE BASE COURSE

A. Refer to Section 32 1100, BASE COURSES.

3.3 REINFORCEMENT BARS

A. Before being placed in position, reinforcing bars shall be thoroughly cleaned of loose mill and rust scale, dirt, ice, and other foreign material which may reduce the bond between the concrete and reinforcing. Where there is delay in placing concrete after reinforcement is in place, bars shall be reinspected and cleaned when necessary.

B. Any bar showing cracks after bending shall be discarded.

C. Unless otherwise indicated on the Drawings, reinforcing shall extend within 2 in. of formwork and expansion joints. Reinforcing shall continue through control joints. Adjacent sheets of fabric reinforcing shall lap 6 in.

D. After forms have been coated with form release agent, but before concrete is placed, reinforcing steel and anchors shall be securely wired in the exact position called for, and shall be maintained in that position until concrete is placed and compacted. Chair bars and supports shall be provided in a number and arrangement satisfactory to the Architect.

~~**3.4 FIBER REINFORCEMENT**~~

~~**A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing,**~~

~~**and supporting reinforcement.**~~

~~**B. Fiber Reinforcement:**~~

~~**1. Mix in accordance with manufacturer's printed instructions**~~.

3.~~**5**~~**4** PORTLAND CEMENT CONCRETE PAVING

A. Paving mix, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base etc., shall meet the requirements of ~~**City of Boston**~~ **Town of Arlington** Standard Specifications and ACI 301 and 325.9R. Pavement shall be constructed in accordance with the Drawings and ~~**City of Boston**~~ **Town of Arlington** Standard Specifications.

B. The Architect shall be notified of concrete placement sufficiently in advance of start of operation to allow his representative to complete preliminary inspection of the work, including subgrade, forms, and reinforcing steel, if used.

C. Normal concrete placement procedures shall be followed. Concrete shall arrive at the jobsite so that no additional water will be required to produce the desired slump. When conditions develop that required addition of water to produce the desired slump, permission of the Architect must be obtained. The concrete shall be transported from the mixer to its place of deposit by a method that will prevent segregation or loss of material.

D. Work shall not be performed during rainy weather or when temperature is less than 40^{o} F. (4.4^{o} C).

E. Adjacent work, etc., shall be protected from stain and damage during entire operation. Damaged and stained areas shall be replaced or repaired to equal their original conditions.

F. Existing concrete, earth, and other water-permeable material against which new concrete is to be placed shall thoroughly damp when concrete is placed. There shall be no free water on surface.

G. Concrete which has set or partially set before placing shall not be employed. Retempering of concrete will not be permitted.

H. Concrete shall be thoroughly spaded and tamped to secure a solid and homogeneous mass, thoroughly worked around reinforcement and into corners of forms.

I. When joining fresh concrete to concrete which has attained full set, latter shall be cleaned of foreign matter, and mortar scum and laitance shall be removed by chipping and washing. Clean, roughened base surface shall be saturated with water, but shall have no free water on surface. A coat of 1:1 cement-sand grout, approximately 1/8 in. thick, shall be well scrubbed into thoroughly dampened concrete base. New concrete shall be placed immediately, before grout has dried or set.

3.~~**6**~~**5** HANDICAP RAMPS

A. Paving mix, equipment, methods of mixing and placing, and precautions to be observed as to weather, condition of base etc., shall meet the requirements of ACI 316 for any concrete paving in similar conditions. Handicap ramps shall be constructed in accordance with the Drawings, and ADA Guidelines 4.7.10, and 4.29.2., and ~~**City of Boston**~~ **Town of**

Arlington Standard Specifications.

B. Architect shall be notified of concrete placement sufficiently in advance of start of operation to allow his representative to complete preliminary inspection of the work, including subgrade, forms, and reinforcing steel, if used.

C. Normal concrete placement procedures shall be followed. Concrete shall arrive at the jobsite so that no additional water will be required to produce the desired slump. When conditions develop that required addition of water to produce the desired slump, permission of the Architect must be obtained. The concrete shall be transported from the mixer to its place of deposit by a method that will prevent segregation or loss of material.

3.~~7~~**6** TACTILE WARNING SURFACE

A. Refer to Section 32 1726, TACTILE WARNING SURFACE.

3.~~8~~**7** FINISHING

A. Concrete flatwork surfaces shall be screeded off, bullfloated, power or hand floated, troweled and finished true to line and grade, and free of hollows and bumps. Surface shall be dense, smooth, and at exact level and slope required.

1. Finished concrete surface for subbases shall be woodfloated to a slightly rough surface. Surface shall not deviate more than 1/4 in. in 10 ft. Refer to Section 03 30 01, CAST-IN-PLACE CONCRETE – SITEWORK.
2. Finished concrete surface for exposed concrete walks, ramps and pads shall be wood-floated, steel troweled to a smooth surface and given a medium broom finish as specified below. Surface shall not deviate more than 1/8 in. in 10 ft.
3. Finished concrete surface for water play basin shall be wood-floated, steel troweled to a smooth surface and given a medium broom finish as specified below. Surface shall not deviate more than 1/8 in. in 10 ft.

B. Unless otherwise indicated, horizontal surfaces of concrete surfaces which will be exposed shall be given a medium broom finish, with direction of grooves in concrete surface perpendicular to length of concrete band, slab, or pad. After concrete has set sufficiently to prevent coarse aggregate from being torn from surface, but before it has completely set, brooms shall be drawn across it to produce a pattern of small parallel grooves. Broomed surface shall be uniform, with no smooth, unduly rough or porous spots, or other irregularities. Coarse aggregate shall not be dislodged by brooming operation.

C. Immediately following finishing operations, arrises at edges and both sides of expansion joints shall be rounded to a 1/4 in. radius.

D. Where finishing is performed before end of curing period, concrete shall not be permitted to dry out, and shall be kept continuously moist from time of placing until end of curing period, or until curing membrane is applied.

3.~~9~~**8** CURING

A. It is essential that concrete be kept continuously damp from time of placement until end of specified curing period. It is equally essential that water not be added to surface during floating and troweling operations, and not earlier than 24 hours after concrete placement. Between finishing operations surface shall be protected from rapid drying by a covering of waterproofing paper. Surface shall be damp when the covering is placed over it, and shall

be kept damp by means of a fog spray of water, applied as often as necessary to prevent drying, but not sooner than 24 hours after placing concrete. None of the water so applied shall be troweled or floated into surface.

B. Concrete surfaces shall be cured by completely covering with curing paper or application of a curing compound.

1. Concrete cured using waterproof paper shall be completely covered with paper with seams lapped and sealed with tape. Concrete surface shall not be allowed to become moistened between 24 and 36 hours after placing concrete. During curing period surface shall be checked frequently, and sprayed with water as often as necessary to prevent drying, but not earlier than 24 hours after placing concrete.
2. If concrete is cured with a curing compound, compound shall be applied at a rate of 200 sq. ft. per gallon, in two applications perpendicular to each other.
3. Curing period shall be seven days minimum.

~~**3.10 CURING COLORED CONCRETE**~~

~~**A. General:**~~

~~**1. Colored concrete shall not under any circumstances, be cured using water fog misting or ponding, burlap, plastic sheeting, or other wet covering.**~~
~~**2. Curing material and method shall be in strict conformance with manufacturer's guidelines and recommendations.**~~
~~**3. Only if additional protection is absolutely required, the surface should remain uncovered for at least 4 days, after which time new and unwrinkled non-staining reinforced waterproof kraft curing paper may be used.**~~

~~**B. Apply Color Wax curing compound for colored concrete according to manufacturer's instructions using manufacturer's recommended application techniques. Apply curing compound at consistent time for each pour to maintain close color consistency.**~~

~~**1. Curing compound shall be same color as the colored concrete and supplied by same manufacturer of the colored admixture.**~~
~~**2. Precautions shall be taken in hot weather to prevent plastic cracking resulting from excessively rapid drying at surface as described in CIP 5 *Plastic Shrinkage Cracking* published by the National Ready Mixed Concrete Association.**~~
~~**3. Do not cover concrete with plastic sheeting.**~~

3.~~**11**~~**9** CONSTRUCTION JOINTS

A. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

1. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
2. Provide tie bars at sides of pavement strips where indicated.
3. Butt Joints: Use epoxy bonding adhesive at joint locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

3.~~**12**~~**10** EXPANSION JOINTS

A. Expansion joints (isolation joints) shall be 3/8 in. wide and unless otherwise indicated on the Drawings, shall be located 30 ft. o.c., at building edge and at places where pavement meets other structures. Expansion joint shall be formed in the concrete to required width with preformed joint filler in place. Joint filler shall extend the full width and depth of the slab. Joint filler shall extend the full length of the expansion joint.

1. Depth of joint filler shall be as required to form a 1-1/4 in. deep sealant and backer rod recess below finished concrete surface.
2. Doweled Joints: Install sleeves and dowel bars at expansion joints as indicated. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.~~13~~**11** CONTROL JOINTS

A. Control joints indicated shall be sawn by using a diamond blade concrete power saw. Joint shall be made after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab. Saw shall cut into slab at least 1 in., but in no case less than 25% of slab depth.

3.~~14~~**12** DECORATIVE SAW CUT JOINTS

A. Review layout of decorative saw cut joints with Architect prior to beginning saw cutting work. Unless otherwise indicated, decorative saw cut joints shall be sawn into the concrete slab at intervals and patterns indicated on the Drawings. Joint shall be made after concrete is finished and when the surface is stiff enough to support the weight of workmen without damage to the slab, but before slab has achieved its final set. Saw cut joints shall be straight and accurate to line.

1. Saw cut joints shall be sawn flush to vertical surfaces.

B. Decorative saw cut joints shall be located each way to create scoring patterns indicated on the Drawings.

C. Depth of decorative saw cut joint shall be 3/4 in.

3.~~15~~**13** COLD WEATHER CONCRETING

A. Materials for concrete shall be heated when concrete is mixed, placed, or cured when the mean daily temperature is below 40^{O}F. or is excepted to fall to below 40^{O}F. within 72 hours, and the concrete after placing shall be protected by covering, heat, or both.

B. Details of handling and protecting of concrete during freezing weather shall be subject to the approval and direction of the Architect. Procedures shall be in accordance with provisions of ACI 306R.

3.~~16~~**14** HOT WEATHER CONCRETING

A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing shall be sprinkled with cold water. Every effort shall be made to minimize delays which will result in excessive mixing of the concrete after arrival on the job.

B. During periods of excessively hot weather (95^{O}F., or above), ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 95^{O}F., when ready for placement will not be acceptable, and will be rejected.

C. Temperature records shall be maintained throughout the period of hot weather giving air temperature, general weather conditions (calm, windy, clear, cloudy, etc.) and relative humidity. Records shall include checks on temperature of concrete as delivered and after placing in forms. Data should be correlated with the progress of the work so that conditions surrounding the construction of any part of the structure can be ascertained.

3.~~17~~**15** SEALING OF JOINTS

A. Where indicated on the Drawings, expansion joints and control joints shall be sealed with joint sealant in accordance with Section 07 9201, EXTERIOR JOINT SEALANTS - SITEWORK.

3.~~18~~16 FIELD QUALITY CONTROL

A. Testing Agency: **Contractor** ~~**Owner**~~ will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

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

1. Testing Frequency: Obtain at least 1 composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.
   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
   a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.

C. Strength of each concrete mix will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project

identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.~~19~~**17** PROTECTION OF CONCRETE SURFACES

A. Concrete surfaces shall be protected from traffic or damage until surfaces have hardened sufficiently. If necessary 1/2 in. thick plywood sheets shall be used to protect the exposed surface.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

3.~~20~~**18** WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project’s Waste Management Plan.

END OF SECTION

SECTION 32 1416

BRICK PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all equipment and materials and do all work necessary to furnish and install the brick pavers, as indicated on the Drawings and as specified.

1. Brick unit pavers (on structure) installed on a bituminous setting bed ~~**over drainage mat**~~ with polymeric sand swept joints.
2. Brick unit pavers (on grade) installed on a bituminous setting bed over perforated concrete slab with sand swept joints.

1.2 RELATED WORK

A. Related Documents and Sections: Examine Contract Documents for requirements that directly affect or are affected by the Work of this Section. A list of those Documents and Sections include, but is not limited to, the following:

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, and Division 01 General Requirements Specification Sections, apply to this Section.
2. Section 07 9201, EXTERIOR JOINT SEALANTS - SITEWORK; Sealing expansion joints.
3. Section 03 3001, CAST-IN-PLACE CONCRETE - SITEWORK; Concrete base slab.

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

1. American Association of State Highway and Transportation Officials (AASHTO):

Specifications	Standard Specifications for Highway Bridges
M 81	Cut-back Asphalt (Rapid-Curing Type)

2. American Society for Testing and Materials (ASTM):

C 67	Sampling and Testing Brick and Structural Clay Tile
C 91	Masonry Cement
C 207	Hydrated Lime for Masonry Purposes
C 216	Facing Brick (Solid Masonry Units Made from Clay or Shale)
C 902	Pedestrian and Light Traffic Paving Brick

C 1272	Heavy Vehicular Paving Brick
D 36	Softening Point of Bitumen (Ring-and-Ball Apparatus)
D 113	Ductility of Bituminous Materials
D 3381	Viscosity-Graded Asphalt Cement for Use in Pavement Construction.

3. Americans with Disabilities Act (ADA):

Appendix to Part 1191	Accessibility Guidelines for Buildings and Facilities

4. ~~**City of Boston**~~ **Town of Arlington** Standards

1.4 SUBMITTALS

A. Samples: Furnish ten individual brick pavers as samples, showing extreme variations in color and texture.

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following items:

Brick paver
Neoprene-modified asphalt adhesive
~~**Drainage panel**~~

C. Test Report: Submit reports from tests conforming to ASTM C 67 methods indicating:

1. Compressive strength, psi.
2. Absorption, 5 hr. submersion in cold water.
3. Absorption, 24 hr. submersion in cold water.
4. Maximum saturation coefficient.
5. Initial rate of absorption (suction).
6 Abrasion index.
7. Freeze-thaw.
8. Efflorescence.

1.5 FIELD MOCKUP

A. Construct a sample panel of brick paving on the specified base and setting bed before start of any brick paving. **Mock-up may be done in-place as approved by Landscape Architect.** Panel shall exhibit the specified base, setting method, thickness, colors, jointing, pattern, finish, edging and workmanship. The Contractor shall not proceed with the brick unit paving work until the Architect has approved each sample panel. If panel is not acceptable, the Contractor shall construct additional panels as required, at no additonal cost to the Owner, until an acceptable panel is obtained. The accepted panel shall become the standard for the entire job and shall remain undisturbed until completion of the brick unit paving

1. Sample panel shall exhibit proposed color range, texture, bond, jointing, pattern, and workmanship.
2. Size of panel shall be 8 ft. x 8 ft., minimum.

B. Mockups: Before installing unit pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:

1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Obtain Architect's approval of mockups before starting unit paver installation.
5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
6. Demolish and remove mockups when directed.
7. Approved mockups may become part of the completed Work if permitted in writing by the Architect.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Brick pavers **shipment to site** shall be ~~**carefully packed by the supplier for shipment**~~ **coordinated with Owner**.

B. Brick shall be stored off the ground and protected against staining and other damage.

C. Pavers damaged in any manner will be rejected and replaced with new materials at no additional cost to the Owner.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.

1.8 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Bituminous Setting Bed: Comply with the following requirements:

1. Apply asphalt adhesive when ambient temperature is above 50 deg F (10 deg C) and when temperature has not been below 35 deg F (2 deg C) for 12 hours immediately before application. Do not apply when base is wet or contains excess moisture.
2. Install bituminous setting bed only when atmospheric temperature is above 40 deg F (4 deg C) and when base is dry.

1.9 PROTECTION OF FINISHED SURFACES

A. Finished surfaces adjacent to the brick paving work shall be adequately protected from soiling, staining, and other damage during construction.

PART 2 PRODUCTS

2.1 SUPPLIERS

A. Brick to be supplied by Owner – from available brick supply stock within the Town of Arlington yard. If insufficient quantity or quality is avilable, use available suppliers below.

B. Available Suppliers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following, or approved equal:

1. Pine Hall Brick Company, PO Box 11044, 2701 Shorefair Drive, Winston Salem, North Carolina 27116-7500, T: 336-271-1044
2. Endicott Clay Products Co., Fairbury, NE, 68352; Tel. 1-402-729-3315
3. Belden Brick Company, Canton, OH; PO Box 20910, Canton, Ohio 44701-0910; T: 330-451-2031
4. or approved equal

B. Basis of Design: Pathway HD Full Range Blend by Pine Hall Brick Company

1. Finishes, and Surfaces
   a. Rectangles: 4" x 8" x 2 3/4" thick.
   b. Wire-cut finish, die skim, or struck molded finish
   c. Edges: Square

2.2 BRICK PAVERS

A. Brick shall have full range color blend as noted above, be uniform in size, and dimensions, and shall have smooth regular edges where they are closely butted.

1. Comply with ASTM C1272 Type F, Application PX and the dimensional tolerances for length, width and depth shall be 1/16”.
2. Average Compressive Strength: 12,500 psi
3. Average Cold Water Absorption: 5.5%, with no individual unit greater than 7%. Absorption test results shall not be achieved through the use of sealers or other products applied to the paver.
4. Freeze Thaw Cycles: 150+
5. Passes CSA-A231.2 freeze thaw test in saline solution without the use of sealers or other products applied to the paver.
6. Average Coefficient of Friction (ASTM C1028): 1.06 dry, 0.97 wet

B Color and texture shall match the samples approved by the Architect from samples submitted by the Contractor prior to delivery.

2.3 CONCRETE BASE

A. Refer to Section 03 3001, CAST-IN-PLACE CONCRETE – SITEWORK.

2.4 WATER

A. Water shall be potable and shall be free of injurious contaminants.

2.5 BITUMINOUS SETTING BED

A. Asphalt cement to be used in the bituminous setting bed shall conform to AASHTO M 320.

B. Fine aggregate to be used in the bituminous setting bed shall be clean, hard sand with durable particles and free from adherent coating, lumps of clay, alkali salts, and organic matter. Aggregate shall be uniformly graded from "coarse" to "fine" with 100% by weight passing the No. 4 sieve and shall meet the gradation requirements when tested in accordance with ASTM C 136 and ASTM D 1073, No. 2 or No. 3..

C. Fine aggregate shall be dried and shall be combined with hot asphalt cement, and the mix shall be heated to approximately 300^{O}F. at an asphalt plant. The approximate proportion of materials shall be 7% cement asphalt and 93% fine aggregate. Each ton of material shall be apportioned by weight in the approximate ratio of 145 lb. asphalt to 1,855 lb. sand. The Contractor shall determine the exact proportions to produce the best possible mixture for construction of the bituminous setting bed to meet specified requirements.

D. Mix bituminous setting-bed materials at an asphalt plant in approximate proportion, by weight, of 7 percent asphalt cement to 93 percent fine aggregate, unless otherwise indicated. Heat mixture to 300 deg F (149 deg C).

2.6 NEOPRENE-MODIFIED ASPHALT ADHESIVE

A. Paving manufacturer's standard adhesive consisting of oxidized asphalt combined with 2 percent neoprene and 5 percent long-fibered mineral fibers containing no asbestos. Neoprene modified asphalt adhesive shall meet the following requirements:

1. Mastic (asphalt adhesive):
   a. Solids (base) content by volume = 75$\pm$1%.
   b. Weight = 8 to 8.5 lb./gal.
   c. Solvent vehicle = Varsol (over 100^{O}F. flash).
2. Base (2% neoprene, 5% fibers, 50% asphalt):
   a. Melting point (ASTM D 36) = 200^{O}F., minimum.
   b. Penetration at 77^{O}F. 100 gram load 5 second (0.1 mm) = 23 to 27.
   c. Ductility (ASTM D 113 at 25^{O}C, 5 cm/minute) = 125 cm, minimum.

2.7 ASPHALTIC PRIMER (Vehicular Traffic)

A. Primer for base slab beneath bituminous setting bed and brick pavers shall be an emulsified asphalt rapid setting type conforming to AASHTO M 140, Grade RS-1, or AASHTO M 208, Grade CRS-1, or cut-back rapid curing type conforming to AASHTO M 81, Grade RC-70 or RC-250.

2.8 SAND JOINT FILLER

A. Sand shall be a clean, sharp, natural sand conforming to ASTM C 33, except that the fineness modulus shall be 2.25 + 0.10.

1. Joint Filler Sand: Gradation for joint filler sand shall be as follows:
   a. Sand shall be a clean, washed, uniformly well graded masonry sand with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing

No. 200 (0.075-mm) sieve, conforming to ASTM C 144, except that the fineness modulus shall be 2.25+ 0.10. Sand shall be from a single source. Source of supply shall not be changed during course of job without written permission of the Architect.

b. Color of sand shall be uniform matching the paver in color, and shall be approved by the Architect.
c. Sand shall be supplied by a single source. Source of supply shall not be changed during course of project without written permission of the Architect.

2.9 POLYMERIC SAND FOR JOINT FILLER

A. Joint Filler Polymeric Sand shall be one of the following or approved equal. Color; will be selected by Architect.

1. Alliance Gator Maxx polymeric sand, manufactured by Alliance Designer Products Inc., 225 Boulevard Bellerose West Laval, Quebec H7L 6A1; TOLL FREE: 1.866.212.1611; MAIN OFFICE: 450.624.1611; Technical Support TOLL FREE: 1.855.847.7767; Fax: 450.624.1622.
2. Joint filler shall be Hanover Polymeric Sand for Paving Joints, manufactured by Hanover Architectural Products, Inc., 5000 Hanover Road, Hanover, PA 17331; Tel. 717.637.0500 • fax 717.637.7145; www.hanoverpavers.com.
3. Unilock Polymeric Sand for Paving Joints, manufactured by Unilock, Uxbridge, MA 01569.

2.10 DRAIN STONE AT VERTICAL WEEPS

A. Drain stone shall be crushed stone with 90% fractured faces, LA Abrasion < 40 per ASTM C 131, minimum CBR of 80% per ASTM D 1883.

1. Do not use rounded river gravel.
2. All stone materials shall be washed with less than 1% passing the No. 200 sieve.

B. Drain stone for filling vertical weeps conforming to ASTM D 448. Gradation shall conform to the following:

ASTM No. 57 Base
Grading Requirements

Sieve Size	Percent Passing
37.5 mm (1 1/2 in.)	100
25 mm (1 in.)	95 to 100
12.5 mm (1/2 in.)	25 to 60
4.75 mm (No. 4)	0 to 10
2.36 mm (No. 8)	0 to 5

2.11 GEOTEXTILE FABRIC

A. Filter fabric shall be equal to one of the following, or approved equal.

1. Mirafi 140N, manufactured by Tencate, 365 South Holland Drive, Pendergrass, GA 30567; Tel 800 685 9990; Tel 706 693 2226; Fax 706 693 4400; www.mirafi.com.
2. SKAPS GT-142 Nonwoven geotextile, manufactured by US Construction Fabrics LLC, 8 Ledge Rd. Windham, NH 03087; Tel. 1`-603-893-5480; www.usconstructionfabrics.com.

3. 4.2 oz. Lightweight Nonwoven Geotextile, manufactured by GEI Works, P.O. Box 780928, Sebastian, FL 32978; Tel. 1-772-646-0597; www.geiwporks.com.

2.12 EDGING

A. Steel edging shall be DuraEdge, manufactured by The J.D. Russell Company; Tel. 1-800-888-7425; Border Concepts Edging, "Border King", manufactured by Border Concepts, Inc., P.O. Box 471185, Charlotte, NC 28247, or approved equal. Steel edging shall be shop fabricated, 1/4 in. thick x 5 in. deep, steel, primed and painted black. Edging shall be furnished in 16 or 20 ft. lengths.

1. Steel edging shall accommodate staking steel edging every 30 in. o.c.
2. Steel stakes shall be minimum 24 in. long, tapered.
3. Provide manufacturer's end stake and splicer unit if applicable.
4. Provide manufacturer's standard touch-up paint for in field touch-up of scratched or damaged finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ACCEPTABILITY OF CONCRETE BASE

A. Contractor shall examine the concrete base slab to determine its adequacy to receive brick paving and setting bed. Concrete shall have fully cured. Evidence of inadequate base shall be brought to the immediate attention of the Architect.

B. Start of work of this Section shall constitute acceptance of concrete base slab.

3.3 VERTICAL WEEPHOLES

A. Drill 3 in. diameter vertical weepholes in concrete base slab at 8 ft. o.c. and at low points, fill with drain stone and cover with geotextile filter fabric.

3.4 PREPARATION

A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.

B. Remove substances, from concrete substrates, that could impair bond, including curing and sealing compounds, form oil, and laitance.

3.5 INSTALLATION, GENERAL

A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.

B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.

D. Joint Pattern: As indicated on the Drawings.

E. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet (3 mm in 3 m) from level, or indicated slope, for finished surface of paving.

F. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler as backing for sealant-filled joints where indicated. Install joint filler before setting pavers. Sealant materials and installation are specified in Section 079201, EXTERIOR JOINT SEALANTS - SITEWORK.

3.6 EDGING:

A. Steel edging shall be installed at locations indicated on the Drawings. Where required, edging shall be cut square and accurately to required length.

1. Steel edging shall be securely staked in required position. Stakes shall be driven every 30 in. o.c. along length of edging.
2. Adjacent lengths of edging shall meet in strict accordance with manufacturer's printed instructions.
3. Edging shall be set plumb and vertical at required line and grade. Straights sections shall not be wavy; curved sections shall be smooth and shall have no kinks or sharp bends.

3.7 CUT-BACK ASPHALT PRIME COAT (Vehicular Traffic)

A. Cut-back asphalt shall be applied to concrete base slab at a rate sufficient to act as an adhesive between the concrete slab and the bituminous setting bed.

3.8 BITUMINOUS SETTING BED

A. At vehicular condition, apply primer to concrete slab immediately before placing setting bed.

B. Bituminous setting bed shall be installed over the fully cured concrete base. Control bars 3/4 in. deep shall be placed directly over the base approximately 11 feet (3.3 m) apart and parallel to one another, to serve as guides for striking board. Adjust bars to subgrades required for accurate setting of paving units to finished grades indicated. If grades must be adjusted, wood chocks under depth control bars shall be set to proper grade. Set two bars parallel to each other to serve as guides for the striking board. The depth control bars must be set carefully to bring the pavers, when laid, to proper grade.

C. While still hot (not less than 250^{O}F.) some of the bituminous bed material shall be placed between the parallel depth control bars. This bed shall be pulled with the striking board over the control bars several times. After each passage, low porous spots shall be showered with fresh bituminous material to produce a smooth, firm, and even 3/4 inch (19 mm) thick setting bed. As soon as this initial panel is completed, advance the first bar to the next position in readiness for striking the next panel. After the depth control bars and wood chocks have been removed, carefully fill any depressions that remain.

1. Roll setting bed with power roller to a nominal depth of 3/4 inch (19 mm) while still hot. Adjust thickness as necessary to allow accurate setting of unit pavers to finished grades indicated.
2. Apply neoprene-modified asphalt adhesive to cold setting bed by squeegeeing or troweling. If troweled on, use trowel with serrations not exceeding 1/16 inch (1.6 mm). Proceed with setting of paving units only after adhesive is dry to the touch.

3.8 SETTING BRICK PAVERS – BITUMINOUS BED

A. Brick pavers shall be on a bituminous setting bed over a prepared concrete base. All setting shall be done by competent masons under adequate supervision.

B. Brick pavers with chips, cracks, stains, or other defects which might be visible in the finished work shall not be used.

C. After the modified asphalt adhesive is applied, carefully place the pavers by hand in straight courses with hand tight joints and uniform top surface.

D. Brick pavers shall be set true to the required lines and grades in the pattern detailed on the Drawings. Brick pavers shall be neatly cut and fitted at all perimeters and closures to fit neatly and closely, with joints uniform in thickness. Pavers shall be cut with a water-cooled, cut-off wheel masonry saw using a diamond blade.

3.9 JOINT TREATMENT

A. Polymer Sand: Spread dry polymeric sand and fill joints immediately after setting. Minimum depth: 1.25".

1. Installation:
   Surface must be completely dry. Cover surface with product; using a push broom, sweep product so as to fill joints completely down to their full depth; sweep surface clean of polymeric sand to avoid staining during compaction.
   Joints must be filled up to the bottom of the paver chamfer or at minimum 1/8” below the top of the pavers.
2. Compaction: A rubber roller attachment or neoprene pad shall be used under the plate to protect pavers or slabs from damage. Check with the paver supplier as to the suitability of compacting pavers or slabs 2 inches or less in thickness.
   Compact surface at least twice with a plate vibrator.
   Repeat steps 1 and 2.
3. Wetting:
   Important: Surface must be free of polymeric sand; clean it with a fine bristle brush or a leaf blower. Wetting must be performed gradually in at least three sprayings; each time, especially during the first spraying, be sure not to flood pavement or generate run-off, as this could wash out the binder, especially on sloped sites.
   Spraying principles: Use a very fine mist so that the water falls lightly on pavement without displacing polymeric sand; take care not to aim the jet directly on the surface. First spraying: Dampen surface very lightly with a fine mist; this first spraying will stabilize polymeric sand on the surface and make it more absorbent for subsequent sprayings. Wait for 5 to 10 minutes. Subsequent sprayings: Lightly spray surface in 5 to 10 minute intervals, so as to gradually moisten joints; repeat sprayings until joints are moistened down to the bottom, and this, using a minimum amount of water; using a small screwdriver, check wetting progress in several spots by emptying a little section of polymeric sand down to the bottom of the joint.
4. Drying time:

Drying time is directly influenced by ambient humidity and temperature - at least 24 hours for pedestrian areas; - at least 48 hours is recommended for vehicular areas.
NOTE: Drying time can be considerably less in dry climates
After application, if there is a risk of rain during drying time, protect the pavement with a tarp.

B. Sand: Under dry weather conditions, spread dry sand and completely fill joints immediately after vibrating pavers into leveling course in accordance with manufacturer's printed instructions. Vibrate pavers and add sand until joints are completely filled. When joints are filled, paver surfaces shall be lightly misted with a fine spray of water to settle sand joint filler. Additional dry sand shall be added and swept into joints, repeating the process until joints are completely filled. Pavers shall then be swept clean and rinsed with a fine spray, careful not to dislodge joint filler.

1. Leave a slight surplus of sand on the surface for joint filling.
2. Do not allow traffic on installed pavers until sand has been vibrated into joints.
3. Repeat joint-filling process 30 days later

3.10 CLEANING AND PROTECTION OF BRICK SURFACES

A. After completion of brick paving, surfaces shall be carefully cleaned, removing all dirt, excess filler, and stains.

B. Expansion joints shall be cleaned and left ready for sealing of joints under Division 07; Sealing of expansion and control joints.

3.11 WASTE MANAGEMENT

A. Separate and dispose of waste in accordance with the Project's Waste Management Plan.

END OF SECTION

SECTION 32 1543

STABILIZED STONE DUST SURFACING

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. Attention is directed to the PROCUREMENT AND CONTRACTING REQUIREMENTS and all Sections within DIVISION 01, GENERAL REQUIREMENTS, which are made a part of this Section of the Specifications.

1.2 WORK INCLUDED

A. Provide all equipment and materials, and do all work necessary to construct the stone dust (decomposed granite) paving with stabilizer material, including aggregate base and edging, as indicated on the Drawings and as specified.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
   1. Division 1 – General Requirements; Inspection and testing.
   2. Section 310800, EARTHWORK; Establishment of subgrade elevation.
   3. Section 321100 BASE COURSES; aggregate base

1.3 REFERENCES

A. Comply with applicable requirements of the following standards. Where these standards conflict with other specified requirements, the most restrictive requirement shall govern.

   1. American Society for Testing and Materials (ASTM):

D 1557	Moisture-Density Relations of Soils and Soil Aggregate Mixtures Using 10-lb. (4.54-kg) Rammer and 18-in. (475-mm) Drop

   2. North Carolina Department of Transportation (NCDOT):

Specifications	Standard Specifications for Roads and Structures

1.4 SUBMITTALS

A. Samples: The following samples shall be submitted:

Material	Sample Size or Quantity
Decomposed granite	1 lb. (for color approval)

B. Manufacturer's Product Data: Manufacturer's product data shall be submitted for the following materials:

Stabilizer
Edging

C. Test results for stabilized crushed stone surfacing indicating compliance with ADA Requirements for accessibility and slip resistance.

1.5 QUALITY ASSURANCE

A. Crushed granite sample of sufficient quantity shall be submitted to stabilizer manufacturer for recommended blending proportions and procedures to be followed by crushed granite supplier. Blending operations shall be performed at crushed granite supplier facility, and provided to Contractor pre-blended in accordance with stabilizer manufacturer's recommendations.

B. Installer shall provide evidence to indicate successful experience in providing crushed granite surfacing containing stabilizer binder/additive or ability to follow installation instructions.

C. Installer shall provide documentation of at least three (3) installations similar in scale (all reference projects to be equal or greater than 75% of the total square footage of the project being bid on) using specified stabilizer solution material, completed over the past five (5) years. If Contractor is not able to meet experience qualifications, Contractor shall be required to have a representative from Stabilizer Solutions be present on site for preconstruction training, installation of mockup, and at least 25% of the project install`ation. Contractor shall be responsible for any and all costs associated with this requirement. If contractor is unable to meet these requirements a qualified replacement contractor will be located subject to all qualifications listed above and Owner approval.

1.6 PERFORMANCE REQUIREMENTS

A. Perform gradation of decomposed granite material or 3/8" or 1/4" minus crushed aggregate in accordance with ASTM C 136 – Method for Sieve Analysis for Fine and Course.

1.7 MOCK-UP

A. General
   1. Schedule mock-up for acceptance 30 days prior to constructing decomposed granite surfaces represented by the mockups.
   2. Locate mock-up panels in non-public areas accepted by the Architect. **Mock-up may be completed in-place as approved by Landscape Architect.**
   3. Continue to construct mock-ups until acceptable mock-up is produced. Accepted mock-up shall be the standard for color, texture, mix ratio, and workmanship for the work.
   4. Use the same decomposed granite /stabilizer mix and placement procedure accepted in mock-ups, in the final work, unless otherwise directed by the Architect.
   5. Protect accepted mock-ups from damage until completion and acceptance of the work represented by the mock-up.
   6. Remove mock-up panels from site at completion of project, as directed by the Architect, **as needed.**

B. Sample panel shall be 5 ft. x 5 ft. minimum.

C. Source of Materials. Utilize the same source, stock, or brand of stabilizer material for all decomposed granite surfacing. Do not interchange materials or mixes until an additional mock-up shows that uniformity in finish texture and color, as compared to original mock-up will be maintained. If necessary, obtain and stockpile materials in sufficient quantity to ensure continuity and uniformity.

1.8 PROJECT/SITE CONDITIONS

A. Field Measurements: Each bidder is required to visit the site of the Work to verify the existing conditions. No adjustments will be made to the Contract Sum for variations in the existing conditions.

1. Where surfacing is indicated to fit with other construction, verify dimensions of other construction by field measurements before proceeding with the work.

B. Environmental Limitations: Do not install decomposed granite or crushed 3/8” or 1/4" minus aggregate paving during rainy conditions or below 40 degrees Fahrenheit and falling.

1.9 TESTING AND INSPECTION

A. The Owner reserves the right to test and inspect materials and construction of crushed stone surfacing in accordance with the requirements of Division 1 – General requirements.

1.10 WARRANTY

A. Provide written warranty signed by stabilizer manufacturer, installer, and Contractor, agreeing to repair or replace all work of this section which exhibits defects in materials or workmanship. Warranty shall cover stabilizer, decomposed granite and aggregate base work. "Defects" is defined to include, but not limited to, differential settlement, ponding of water, abnormal aging or deterioration of stabilized paving system, and failure to perform as required.

1. Warranty Period: 90 days from date of Substantial Completion.
2. Contractor shall provide unconditional maintenance and repairs as required through the warranty period.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE COURSE

A. Refer to Section 321100, BASE COURSES.

2.2 DECOMPOSED GRANITE

A. Decomposed granite or 3/8 in. or 1/4 in. crushed aggregate screenings, quarried from Wake Stone Corporation’s Knightdale quarry, 6811 Knighdale Blvd., Knightdale, NC 27545, or approved equal.

1. Surfacing material shall be sand and crushed stone consisting of inert materials that are hard and durable, with stone free from surface coatings and deleterious

materials. Crushed Stone Sieve Analysis Percentage of weight Passing a Square Mesh AASHTO T11-82 and T2782. Gradation requirements shall be as follows:

Sieve Size	% Passing by Weight
3/8 in.	100
No. 4	90 - 100
No. 8	75 - 80
No. 16	55 - 65
No. 30	40 - 50
No. 50	25 - 35
No. 100	15 - 20
No. 200	10 - 15

B. Decomposed granite color will be slected by Architect.

2.3 STABILIZER

A. Stabilizer additive shall be "Stabilizer", a non-toxic, colorless, odorless, concentrated powder organic binder capable of binding crushed aggregate screenings, manufactured by Stabilizer Solutions, Inc., 33 South 28th Street, Phoenix, AZ 85034; Tel. 602-225-5900; 1-800-336-2468; Fax: 602-225-5902; E-mail: info@stabilizersolutions.com, or approved equal.

1. Material shall be provided by supplier pre-mixed with stone dust (decomposed granite) material specified herein.

2.4 PRE-EMERGENT HERBICIDE

A. Herbicide shall be LESCO Ornamental Herbicide 5G, pre-emergent grassy and selected broadleaf weed control for ornamental plants, nursery stock and ground covers, #019515, manufactured by LESCO, Rocky River, OH 44116; Sierraron, manufactured by Scotts; Preen, manufactured by Lebanon Seaboard Corporation, or approved equal.

2.5 GEOTEXTILE FABRIC

A. Filter fabric shall be equal to one of the following, or approved equal.

1. Mirafi 140N, manufactured by Tencate, 365 South Holland Drive, Pendergrass, GA 30567; Tel 800 685 9990; Tel 706 693 2226; Fax 706 693 4400; www.mirafi.com.
2. SKAPS GT-142 Nonwoven geotextile, manufactured by US Construction Fabrics LLC, 8 Ledge Rd. Windham, NH 03087; Tel. 1`-603-893-5480; www.usconstructionfabrics.com.
3. 4.2 oz. Lightweight Nonwoven Geotextile, manufactured by GEI Works, P.O. Box 780928, Sebastian, FL 32978; Tel. 1-772-646-0597; www.geiwporks.com.

2.12 EDGING

A. Steel edging shall be DuraEdge, manufactured by The J.D. Russell Company; Tel. 1-800-888-7425; Border Concepts Edging, "Border King", manufactured by Border Concepts, Inc., P.O. Box 471185, Charlotte, NC 28247, or approved equal. Steel edging shall be shop fabricated, 1/4 in. thick x 5 in. deep, steel, primed and painted black. Edging shall be furnished in 16 or 20 ft. lengths.

1. Steel edging shall accommodate staking steel edging every 30 in. o.c.

2. Steel stakes shall be minimum 24 in. long, tapered.
3. Provide manufacturer's end stake and splicer unit if applicable.
4. Provide manufacturer's standard touch-up paint for in field touch-up of scratched or damaged finish.

PART 3 - EXECUTION

3.1 GRADING

A. Areas to receive stone dust surfacing will be compacted and brought to subgrade elevation under Section 310800, EARTHWORK before work of this section is performed. Final fine grading, furnishing and installing aggregate base course, stabilizer, and stone dust surface and compaction of these materials as required to form a firm, uniform, accurate, and unyielding stone dust surface at required elevations and to required lines, shall be done under this Section.

B. Existing subgrade material which will not readily compact as required shall be removed and replaced with satisfactory materials. Additional materials needed to bring subgrade to required line and grade and to replace unsuitable material removed shall be material conforming to Section 310800, EARTHWORK.

C. Immediately prior to paving, subgrade below exterior pavements shall be rough graded as needed, and then scarified and recompacted. This process shall include scarifying the exposed subgrade to a depth of about 9 inches, moisture conditioning the scarified soil to within -2 to +3 percent of the material’s optimum, and compacting the scarified soil to at least 98% of standard Proctor density (ASTM D 698). Scarified soils which cannot be recompacted to this degree should be undercut and replaced with stable material. Subgrade compaction shall extend for a distance of at least 1 ft. beyond pavement edge.

   1. Field testing shall be conducted to determine in-place density, accompanied by visual inspection of the compaction methods being used.

D. Excavation required in subgrade shall be completed before fine grading and final compaction of subgrade are performed. Where excavation must be performed in completed subgrade or gravel base, subsequent backfill and compaction shall be performed as directed by the Architect as specified in Section 310800, EARTHWORK. Completed subgrade after filling such areas shall be uniformly and properly graded.

E. Areas being graded or compacted shall be kept shaped and drained during construction. Ruts greater than or equal to 1 in. deep in subgrade, shall be graded out, reshaped as required, and recompacted before placing stone dust surfacing.

F. Materials shall not be stored or stockpiled on subgrade.

G. Disposal of debris and other material excavated and/or stripped under this section, and material unsuitable for or in excess of requirements for completing work of this section shall be disposed of off-site.

3.2 AGGREGATE BASE COURSE

A. Aggregate base course for paving and the spreading, grading, and compaction methods employed shall conform to Section 310800, EARTHWORK.

3.3 EDGING:

A. Steel edging shall be installed at locations indicated on the Drawings. Where required, edging shall be cut square and accurately to required length.

1. Steel edging shall be securely staked in required position. Stakes shall be driven every 30 in. o.c. along length of edging.
2. Adjacent lengths of edging shall meet in strict accordance with manufacturer's printed instructions.
3. Edging shall be set plumb and vertical at required line and grade. Straights sections shall not be wavy; curved sections shall be smooth and shall have no kinks or sharp bends.

3.4 STONE DUST (DECOMPOSED GRANITE) SURFACING

A. Stabilizer shall be provided thoroughly and unifomly pre-blended with decomposed granite by local supplier, at rate, and by method in strict accordance with manufacturer's printed instructions.

1. Blend 12 to 16-lbs (contact manufacturer for exact blend) of Stabilizer per 1-ton of decomposed granite or crushed aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed aggregate screenings.
2. Bucket blending is not acceptable. Blending with a rake and or shovel is not acceptable.
3. Blend material dry.

B. Decomposed granite surfacing shall be done only after excavation and construction work which might injure it has been completed. Damage caused during construction shall be repaired before acceptance.

C. Decomposed granite surfacing shall be constructed on a compacted aggregate base or sand-based structural soil mix as indicated on the Drawings.

D. Pre-blended stabilized decomposed granite or crushed aggregate screenings shall be spread evenly over the base in 1-1/2 in. maximum lifts, rolled and compacted to 85% of maximum density as determined by ASTM D 1557. Final compacted thickness shal be 3 in.

1. Contractor shall wait a minimum of 24 hours after placing stabilized decomposed granite material prior to compaction. Longer periods may be required for material to adequately dry. Consult manufacturer to make determination.

E. Water shall be added to decomposed granite for full-depth moisture penetration prior to compacting.

1. Minimum 25 to 45-gallons of water per 1-ton must be applied to achieve saturation of stabilized pathway profile.
2. During water application randomly test for depth using a probing device, which reaches full depth.

F. Upon thorough moisture penetration, compact stabilized decomposed granite to 85% relative compaction with 2 to 4 ton durable drum roller or 1000 lb. single drum roller as required to achieve a dense, hard packed surface conforming to the finish grades indicated.

1. Do not use vibratory rollers or compactors.
2. Do not begin compaction for 12 hours after placement and up to 72 hours.
3. Contractor shall hand tamp areas adjacent to irrigation or plantings with 8 in. or 10 in. hand tamper.
4. If surface aggregate dries significantly quicker than subsurface material, lightly mist surface before compaction operations.

G. Variations in smoothness of finished stone dust surface shall be less than or equal to 1/4 in. when tested with a 10 ft. straightedge, applied both parallel to and at right angles to centerline of stone dust surface areas. Irregularities exceeding these amounts or which retain water on surface shall be corrected by removing defective work and replacing with new material conforming to this specification.

H. Crushed stone surface shall comply with ADA Requirements for slip resistance and accessibility, with a minimum static coefficient of friction of 0.6 for accessible routes and 0.8 for ramps, when tested in accordance with ASTM C1028.

I. Allow finished surface to dry completely before permitting use.

3.5 INSPECTION

A. Finished aggregate surfacing shall be smooth, uniform and solid. Cured and compacted aggregate shall be firm throughout profile with no spongy areas. Loose material shall not be present on the surface after installation, but may appear after use and according to environmental conditions. Aggregate shall remain stable underneath loose decomposed granite on top. Surfacing shall appear “natural” yet stable throughout. Any significant irregularities in surfacing shall be repaired to the uniformity of the entire installation.

3.6 MAINTENANCE

A. Remove debris, such as paper, grass clippings, leaves or other organic material by mechanically blowing or hand raking the surface as needed. Any plowing program required during winter months shall involve the use of a rubber baffle on the plow blade or wheels on the plow that lifts the blade 1/4" off the paving surface.

B. During the first year, a minor amount of loose aggregate will appear on the paving surface (1/16” to 1/4"). If this material exceeds a 1/4", redistribute the material over the entire surface. Water thoroughly to the depth of 1”. Compact with power roller of no less than 1000 lbs. This process should be repeated as needed.

C. If cracking occurs, simply sweep fines into the cracks, water thoroughly and hand tamp with an 8” – 10” hand tamp plate.

3.7 REPAIRS

A. Excavate damaged area to the depth of the stabilized aggregate and square off sidewalls.

B. If area is dry, moisten damaged portion lightly.

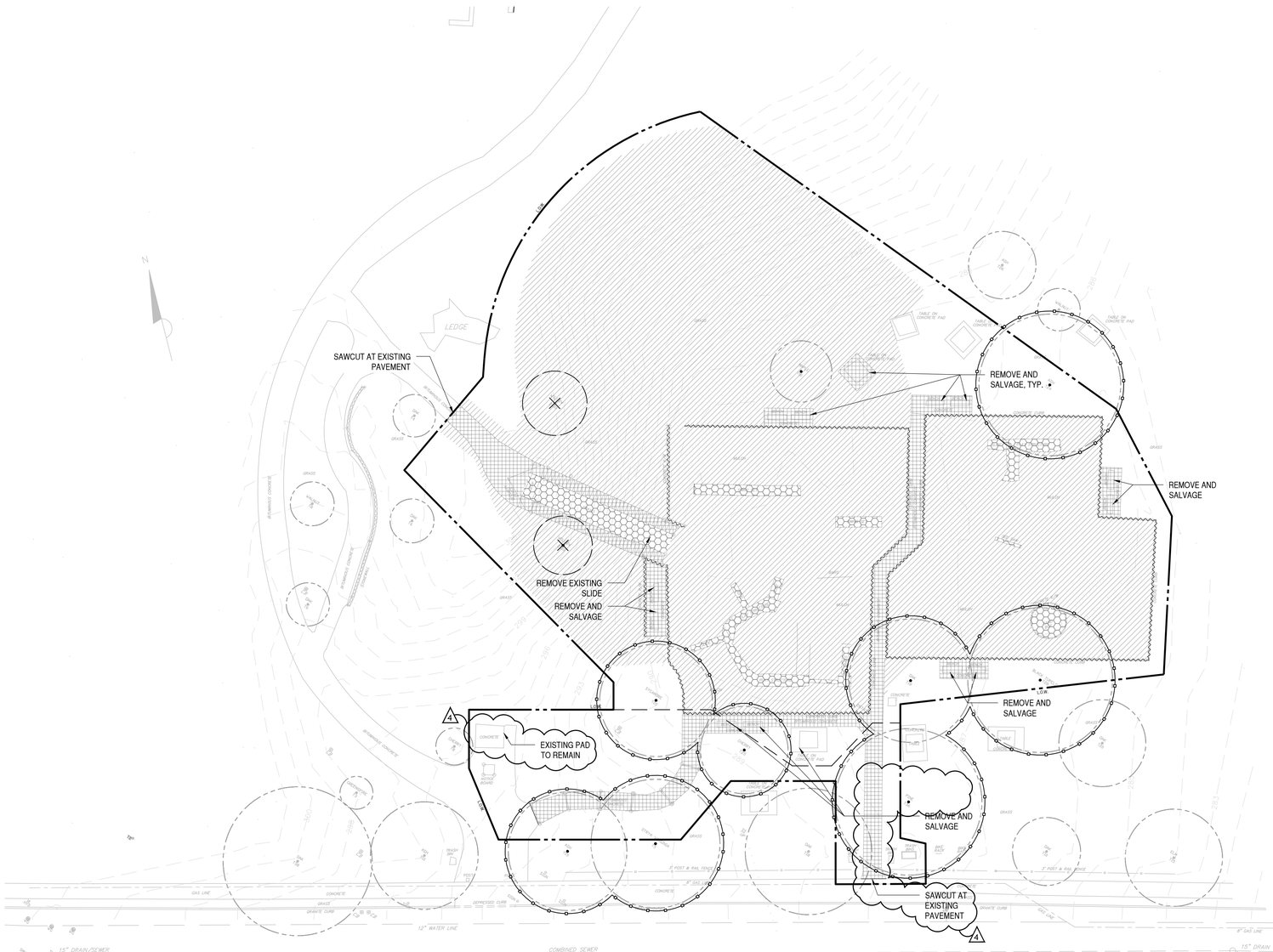
C. Pre-blend the dry required quantity of stabilizer powder with the proper quantity of aggregate in a concrete batch mixer.

D. Add water to the pre-blended aggregate and stabilizer. Thoroughly moisten mix with 25 to 45 gallons per 1 ton of pre-blended material or to approximately 10% moisture content.

E. Apply moistened, pre-blended aggregate to excavated area to finish grade.

F. Compact with an 8 in. to 10 in. hand tamper or 250 lb to 300 lb. roller. Keep traffic off areas for 12 to 48 hours after repair has been completed.

END OF SECTION



LEGEND

SYMBOLS	DESCRIPTION
	LIMIT OF WORK
	CURB/WALL REMOVAL, FULL DEPTH
	TREE PROTECTION FENCE
	EXISTING TREE AND CRITICAL ROOT ZONE, TO BE PROTECTED
	EXISTING TREE, TO BE REMOVED
	SITE CLEARING AND GRUBBING
	PAVEMENT REMOVAL, FULL DEPTH
	PLAY STRUCTURE REMOVAL

SITE PREPARATION NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES TO REMAIN FOR THE LENGTH OF THE CONSTRUCTION PERIOD. THE PLACEMENT OF PROTECTION DEVICES SHALL OCCUR BEFORE ANY SUBSTANTIAL CONSTRUCTION ACTIVITIES HAVE OCCURRED ON SITE. REFER TO SPECIFICATIONS FOR TREE PROTECTION PROTOCOL.
2. NO STOCKPILING OR STORAGE OF ANY MATERIALS OR VEHICLES OR MACHINERY IS PERMITTED BELOW THE DRIPLINE OF ANY EXISTING TREES.

DEMOLITION NOTES:

1. ITEMS WITHIN THE LIMIT OF WORK NOT SPECIFICALLY CALLED OUT TO BE DEMOLISHED SHALL BE PROTECTED AND REVIEWED WITH THE LANDSCAPE ARCHITECT.
2. ANY DAMAGED ITEMS MUST BE RETURNED TO EXISTING, OR IMPROVED, CONDITIONS AT NO ADDITIONAL COST TO THE OWNER.
3. THE DISPOSAL OF ALL DEMOLISHED MATERIALS IS THE RESPONSIBILITY OF THE CONTRACTOR AND MUST BE OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL MUNICIPAL REQUIREMENTS. THE CONTRACTOR SHALL CHARACTERIZE ALL MATERIAL FOR OFF-SITE DISPOSAL PER THE DISPOSAL FACILITY REQUIREMENTS.
4. PROTECT IN-PLACE EXISTING STORMWATER AND UTILITY CATCH BASINS/MANHOLES/ACCESS HATCHES UNLESS SPECIFICALLY CALLED TO BE REMOVED. RESET FRAMES AND GRATES TO BE PROTECTED TO PROPOSED FINISHED GRADE. REFER TO THE PAVER COVER DETAIL.
5. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AND STRUCTURES, AS SHOWN ON THESE PLANS, IS BASED ON RECORDS OF VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THIS INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR, PRIOR TO THE START OF CONSTRUCTION, SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES IN THE FIELD. THE CONTRACTOR MUST CONTACT THE APPROPRIATE UTILITY COMPANY ANY GOVERNING PERMITTING AUTHORITY, AND " DIG SAFE" AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION WORK TO REQUEST THE EXACT FIELD LOCATION OF UTILITIES AND THE ENGINEER SHALL BE NOTIFIED, IN WRITING, OF ANY UTILITIES INTERFERING WITH THE PROPOSED CONSTRUCTION AND APPROPRIATE REMEDIAL ACTIONS TAKEN BEFORE PROCEEDING WITH THE WORK. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLAN.
6. PROPERTY LINE, EXISTING UTILITY INFORMATION, BENCHMARK AND TOPOGRAPHY IS BASED UPON A SURVEY PERFORMED BY ROBER SURVEY DATED 12/14/2023.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL CONTROL POINTS AND BENCH MARKS NECESSARY FOR THE WORK.
8. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING AND PAYING FOR ANY PERMITS AND/OR CONNECTION FEES REQUIRED TO CARRY OUT THE WORK INCLUDING, BUT NOT LIMITED TO, DEMOLITION.
9. PAVING MARKED FOR REMOVAL SHALL BE SAW CUT TO NEAREST EXISTING JOINT WHEN APPLICABLE.
10. ALL SEVERELY CRACKED AND DAMAGED CIP CONCRETE AND ASPHALT SHALL BE REMOVED AND REPLACED.
11. ALL REMOVAL OF SOFTSCAPE (LAWN, PLANTING, ETC.) AND HARDSCAPE (PAVING) WITHIN CRITICAL ROOT ZONES SHALL BE ACCOMPLISHED WITH HAND-OPERATED EQUIPMENT. EXISTING UTILITIES TO BE VERIFIED AND PROTECTED IN-FIELD.
12. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES TO REMAIN FOR THE LENGTH OF THE CONSTRUCTION PERIOD. THE PLACEMENT OF PROTECTION DEVICES SHALL OCCUR BEFORE ANY SUBSTANTIAL CONSTRUCTION ACTIVITIES HAVE OCCURRED ON SITE.
13. NO STOCKPILING OR STORAGE OF ANY MATERIALS OR VEHICLES OR MACHINERY IS PERMITTED BELOW THE DRIPLINE OF ANY EXISTING TREES.
14. PLAY EQUIPMENT FOOTINGS TO BE REMOVED TO THEIR FULL DEPTH BY CONTRACTOR.
15. THE CONTRACTOR TO CONFIRM SITE FURNSHINGS TO BE SALVAGED/RELOCATED WITH LANDSCAPE ARCHITECT AND OWNER PRIOR TO REMOVAL.

Agency
Landscape + Planning

Owner
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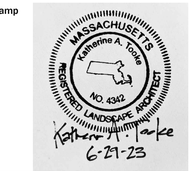
www.arlingtonma.gov/recreation

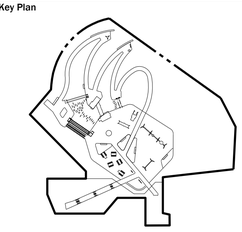
01	100% DESIGN DEVELOPMENT	04/14/2023
02	90% CONSTRUC. DOCUMENTS	06/14/2023
03	100% CONSTRUC. DOCUMENTS	06/29/2023
04	ADDENDUM 03 - BIDDING REVISIONS	08/15/2023

DWG ISSUE & REVISION HISTORY

Stamp



Key Plan



Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

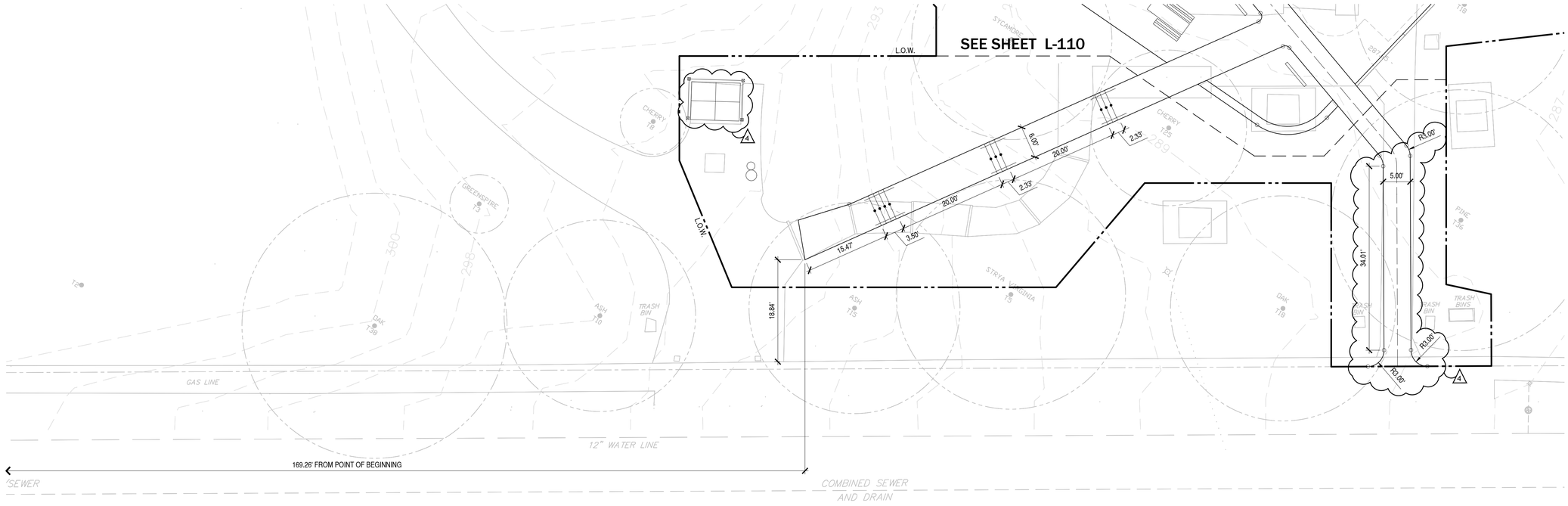
Drawing Title:

DEMOLITION AND SITE PREPARATION PLAN

Project No:	AG 2248	Scale:	1" = 20' - 0"
Drawn By:	NC		
Checked By:	ER		
Approved By:	KT		
Date:	08.15.2023		

Drawing No:

L-100



LEGEND

SYMBOLS	DESCRIPTION
	LIMIT OF WORK
	MATCHLINE
	MATERIAL CHANGE
○	POINT OF TANGENCY

0' 5' 10' 20'

SCALE: 1" = 10'

N

LAYOUT NOTES:

1. DO NOT SCALE FROM DRAWINGS.
2. ANY DISCREPANCIES BETWEEN DRAWINGS, SPECIFICATIONS AND SITE CONDITIONS SHALL BE REPORTED IMMEDIATELY TO THE LANDSCAPE ARCHITECT FOR CLARIFICATION AND RESOLUTION PRIOR TO CONSTRUCTION.
3. PROPERTY LINE, EXISTING UTILITY INFORMATION, BENCHMARK AND TOPOGRAPHY IS BASED UPON A SURVEY PERFORMED BY ROBER SURVEY DATED 12/14/2023. REFER TO EXISTING CONDITIONS PLANS, FOR BENCHMARK REFERENCES, AND HORIZONTAL/VERTICAL CONTROLS
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
5. ALL DIMENSIONS IN PLANS ARE IN FEET, UNLESS OTHERWISE NOTED.
6. ALL, SIDEWALKS, PATHWAYS, FENCES, AND STAIRWAYS SHALL BE COMPLETELY LAID OUT AND STAKED WITH VISIBLE MARKERS. THE STAKES SHALL BE APPROVED IN THE FIELD BY OWNER/LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE 48 HOURS PRIOR TO SITE VISIT.
7. THE FOLLOWING LAYOUT CRITERIA SHALL CONTROL UNLESS OTHERWISE NOTED:
   -ALL DIMENSIONS ARE TO FACE OF CURB, FACE OF WALL, OR FACE OF STRUCTURE
8. TAKE ALL DIMENSIONS FROM FACE OF CURB, WALL OR BUILDING OR TO CENTERLINE OF TREES UNLESS OTHERWISE NOTED. ALL MEASUREMENTS TO DESIGNATED CENTERLINE(S).
9. DIMENSIONS ARE FROM BACK OF CURB, TO CENTERLINE OF PAVEMENTS, TO OUTSIDE EDGE OF PAVEMENTS, TO CENTERLINES OF STAIRS; FROM EDGE OF PAVEMENT.
10. ALL CURVES TO BE TRUE RADII WITHOUT STRAIGHT SEGMENTS.
11. TAKE ALL DIMENSIONS PERPENDICULAR TO ANY REFERENCE LINE, WORK LINE, FACE OF WALL, OR CENTERLINE.
12. ALL ANGLES SHALL BE 90 DEGREES, UNLESS OTHERWISE NOTED, AND ALL LINES OF PAVING AND FENCING SHALL BE PARALLEL UNLESS NOTED OTHERWISE.
13. MAINTAIN HORIZONTAL ALIGNMENT OF ADJACENT ELEMENTS AS NOTED ON THE DRAWINGS.
14. REFERENCE TO NORTH REFERS TO TRUE NORTH, REFERENCE TO SCALE IS FOR FULL-SIZED DRAWINGS ONLY.
15. IN THE EVENT OF A DISCREPANCY, DIMENSIONS TAKE PRECEDENCE OVER SCALES SHOWN ON DRAWINGS.
15. IN THE EVENT OF A DISCREPANCY, NOTES AND DETAILS ON SPECIFIC DRAWINGS TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS.

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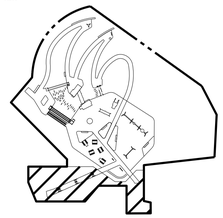
01	100% DESIGN DEVELOPMENT	04/14/2023
02	90% CONSTRUC. DOCUMENTS	06/14/2023
03	100% CONSTRUC. DOCUMENTS	06/29/2023
04	ADDENDUM 03 - BIDDING REVISIONS	08/15/2023

DWG ISSUE & REVISION HISTORY

Stamp

MASSACHUSETTS
Katherine A. Tocke
NO. 4342
REGISTERED LANDSCAPE ARCHITECT
6-29-23

Key Plan



Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

Drawing Title:

LAYOUT PLAN

Project No:	AG 2248	Scale:	1" = 10' - 0"
Drawn By:	ER		
Checked By:	RM		
Approved By:	KT		
Date:	08.15.2023		

Drawing No:

L-111

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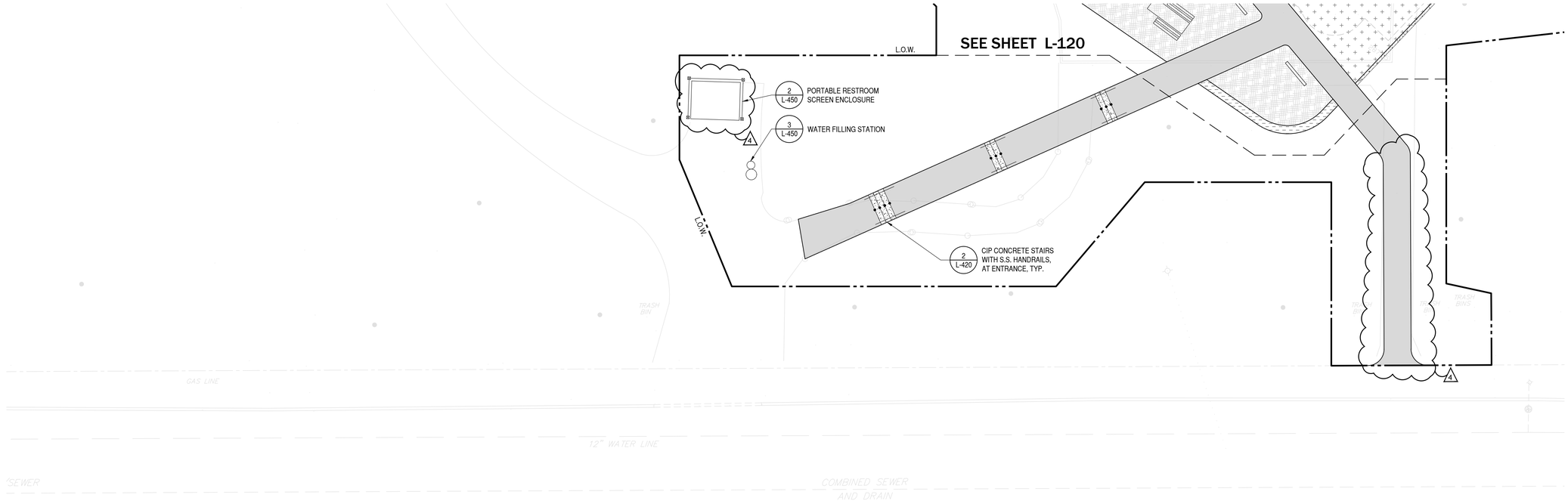

LEGEND

SYMBOLS	DESCRIPTION
	LIMIT OF WORK
	MATCHLINE
	MATERIAL CHANGE
	ASTM SAFETY ZONE
	STEEL EDGE
1 L-400	ASPHALT PAVING
4 L-400	BRICK UNIT PAVERS ON CONCRETE BASE
6 L-400	STABILIZED DECOMPOSED GRANITE
2 L-400	CIP CONCRETE PAVING
1 L-410	CIP CONCRETE SEATWALL
7 L-400	PIP RUBBER SURFACING ON AGGREGATE BASE
8 L-400	PIP RUBBER SURFACING AT SLOPE

SYMBOLS	DESCRIPTION
PA	PLANTED AREA
1 L-440	SALVAGED STONE SCRAMBLE
2 L-440	EUROFLEX HALF BALLS
3 L-440	METAL HOOPS
3 L-450	WATER FILLING STATION
4 L-450	ENTRY SIGNAGE

0' 5' 10' 20'
SCALE: 1" = 10'

N

MATERIALS NOTES:

1. THE LIMIT OF WORK LINE IS NOTED ON DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE DUE TO OPERATIONS INSIDE AND OUTSIDE OF THE CONTRACT LIMIT LINE. ANY AREAS OUTSIDE THE LIMIT OF WORK THAT ARE DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO ADDITIONAL COST TO THE OWNER.
2. SITE MATERIAL TYPES ARE NOTED IN THE LEGEND AND CALLED OUT ON PLANS, INCLUDING BUT NOT LIMITED TO SITE PAVEMENTS, EDGING CONDITIONS, AND SITE FURNISHINGS.
3. ALL LANDSCAPE MATERIALS AND LAYOUT SHALL BE COORDINATED WITH FIELD CONDITIONS, INCLUDING BUT NOT LIMITED TO LOCATIONS OF DRAINAGE STRUCTURES AND UTILITY COVERS.
4. CONTRACTOR SHALL COORDINATE LOCATION OF ALL UTILITIES (LINES, DUCTS, CONDUITS, SLEEVES, FOOTINGS, ETC.) WITH LOCATIONS OF PROPOSED LANDSCAPE ELEMENTS (WALLS, FENCE, FOOTINGS, TREE ROOTBALLS, ETC.). CONTRACTOR SHALL REPORT ANY DISCREPANCIES TO LANDSCAPE ARCHITECT PRIOR TO CONTINUING WORK.

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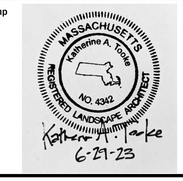
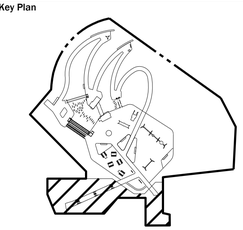
04	ADDENDUM 03 - BIDDING REVISIONS	08/15/2023

DWG ISSUE & REVISION HISTORY

Stamp



Key Plan



Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

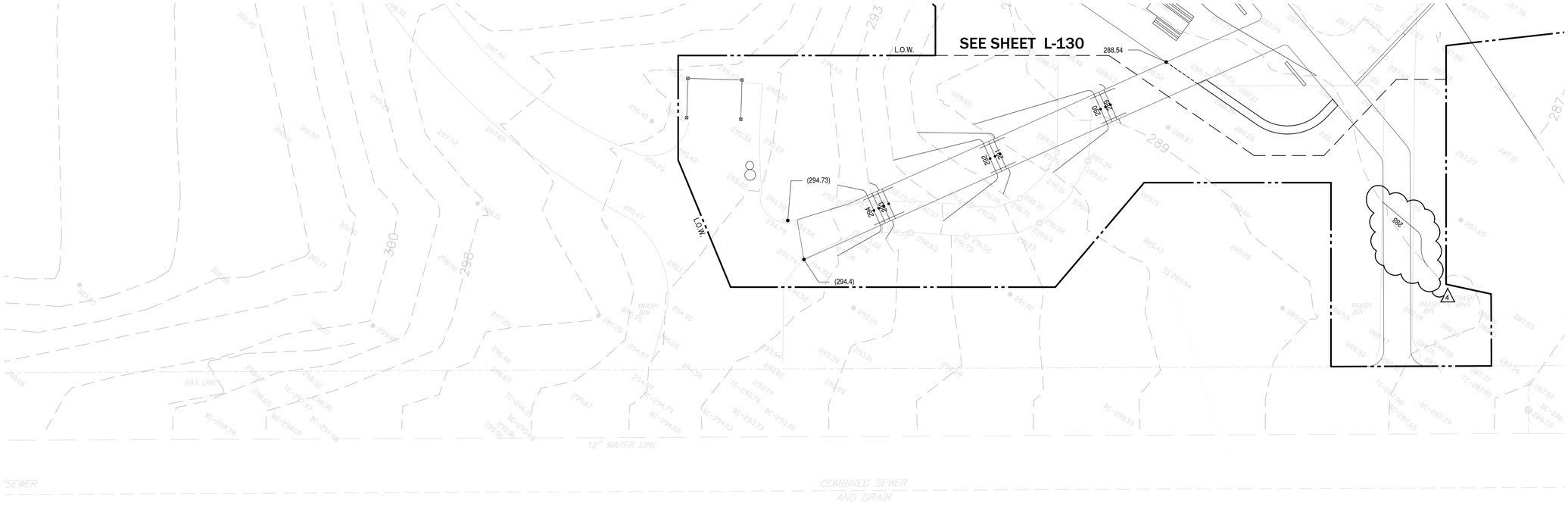
Drawing Title:

MATERIALS PLAN

Project No:	AG 2248	Scale:	1" = 10' - 0"
Drawn By:	ER		
Checked By:	RM		
Approved By:	KT		
Date:	08.15.2023		

Drawing No:

L-121



LEGEND

SYMBOLS	DESCRIPTION
	LIMIT OF WORK
	MATCHLINE
	CONTOUR, MAJOR
	CONTOUR, MINOR
	CONTOUR, EXISTING
	GRADE BREAK
TS	TOP OF STAIR
BS	BOTTOM OF STAIR
TW	TOP OF WALL
BW	BOTTOM OF WALL
(X.XX)	MEET EXISTING
9 / L-400	PIP RUBBER SURFACING, ANGULATION AT SLOPE

0' 5' 10' 20'

SCALE: 1" = 10'

N

GRADING NOTES:

1. PROPERTY LINE, EXISTING UTILITY INFORMATION, BENCHMARK AND TOPOGRAPHY IS BASED UPON A SURVEY PERFORMED BY ROBER SURVEY DATED 12/14/2023.
2. PRIOR TO COMMENCING ANY EXCAVATION WORK, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES IN ACCORDANCE WITH THE "DIG SAFE' NOTIFICATION PROCEDURES PROMOTED BY RESPECTIVE UTILITY COMPANIES. THE 'DIG SAFE' TELEPHONE NUMBER FOR MASSACHUSETTS IS 1-888-344-7233.
3. ALL GRADING SHALL BE REVIEWED WITH THE ARCHITECT PRIOR TO START OF WORK.
4. BOTTOM OF CURB ELEVATIONS BETWEEN EXISTING SPOT GRADES SHOWN ON SURVEY ARE INTERPOLATIONS. CONTRACTOR SHALL VERIFY ALL EXISTING GRADES IN THE FIELD AND SHALL REPORT ANY DISCREPANCIES BETWEEN EXISTING AND PROPOSED CONDITION TO THE ARCHITECT.
5. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO THE OWNER.
6. COMPACT SUBGRADE PRIOR TO ANY FINISH GRADING. REMOVE ALL SOFT SPOTS OBSERVED OR IDENTIFIED IN FIELD.
7. PITCH EVENLY BETWEEN SPOT GRADES. ALL PAVED AREAS MUST PITCH TO DRAIN AT A MINIMUM SLOPE OF ONE-EIGHTH INCH (1/8") PER FOOT. ANY DISCREPANCIES NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO THE ARCHITECT PRIOR TO CONTINUING WORK.
8. CONTRACTOR SHALL BLEND NEW EARTHWORK SMOOTHLY INTO EXISTING, PROVIDING VERTICAL CURVES OR ROUNDINGS AT ALL TOP AND BOTTOM OF SLOPES.
9. EXCAVATION REQUIRED WITHIN DRIP LINE OF TREES DESIGNATED TO REMAIN SHALL BE DONE BY HAND. PLANT MATERIALS DAMAGED BY CONTRACTOR SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS
10. ALL POINTS OF CONSTRUCTION EGRESS OR INGRESS SHALL BE MAINTAINED TO PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADS OR ABUTTING PROPERTY.
11. AT ALL LOCATIONS WHERE EXISTING PAVEMENT ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE. WHERE NEW PAVING MEETS EXISTING PAVING, MEET LINE AND GRADE OF EXISTING WITH NEW.
12. MAXIMUM CROSSPITCH OF ALL WALKS IS 2%. ANY DISCREPANCIES NOT ALLOWING THIS TO OCCUR SHALL BE REPORTED TO THE ARCHITECT.
13. ALL WALKWAYS SHALL MAINTAIN A LONGITUDINAL SLOPE OF NOT MORE THAN 5% UNLESS EXPLICITLY NOTED OTHERWISE. IF THE CONTRACTOR CANNOT ACHIEVE A SLOPE THAT MEETS THIS REQUIREMENT, THE ARCHITECT AND OWNER SHALL BE NOTIFIED IMMEDIATELY.
14. ALL PAVEMENTS SHALL HAVE A MINIMUM PITCH OF 1.0%, UNLESS NOTED OTHERWISE.
15. ALL GRADING SHALL COMPLY WITH THE RULES AND REGULATIONS OF THE MASSACHUSETTS ARCHITECTURAL ACCESS BOARD (MAAB) AND THE AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES (ADAAG), LATEST EDITION. IN CASE OF CONFLICT BETWEEN REGULATIONS, THE GUIDELINE PROVIDING GREATER ACCESS SHALL APPLY.
16. FINISHED SURFACES OF ALL PROPOSED PAVEMENTS SHALL MEET THE LINE AND GRADE OF EXISTING ADJACENT PAVEMENT SURFACES.

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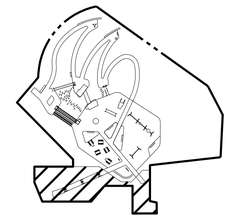
DWG ISSUE & REVISION HISTORY

Stamp

MASSACHUSETTS
Katherine A. Tocke
NO. 4342
REGISTERED LANDSCAPE ARCHITECT
6-29-23

Key Plan



Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

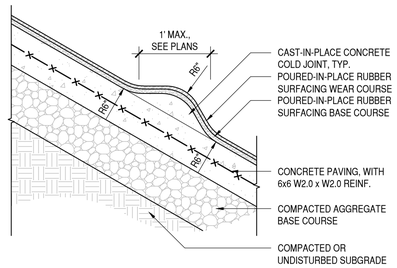
Drawing Title:

GRADING PLAN

Project No:	AG 2248	Scale:	1" = 10' - 0"
Drawn By:	ER		
Checked By:	RM		
Approved By:	KT		
Date:	08.15.2023		

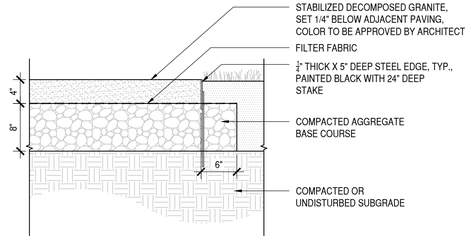
Drawing No:

L-131



9 POURED-IN-PLACE RUBBER SURFACING ANGULATION AT SLOPE

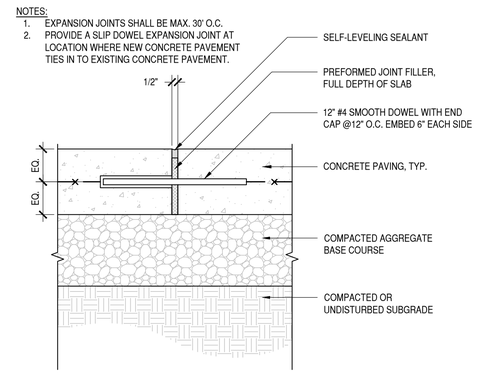
1" = 1'-0"



6 STABILIZED DECOMPOSED GRANITE

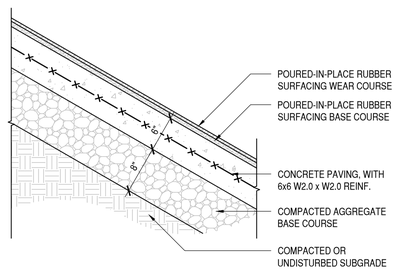
1" = 1'-0"

NOTES:
1. EXPANSION JOINTS SHALL BE MAX. 30' O.C.
2. PROVIDE A SLIP DOWEL EXPANSION JOINT AT LOCATION WHERE NEW CONCRETE PAVEMENT TIES IN TO EXISTING CONCRETE PAVEMENT.



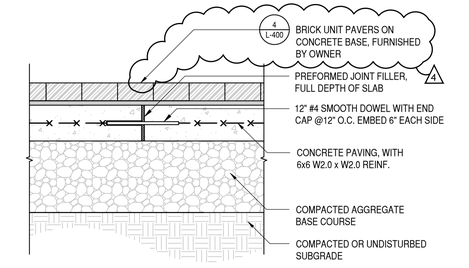
3 CAST-IN-PLACE CONCRETE PAVING - EXPANSION JOINT

2" = 1'-0"



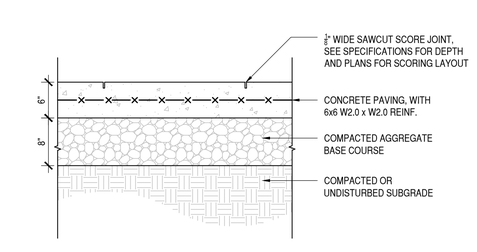
8 POURED-IN-PLACE RUBBER SURFACING AT SLOPE

1" = 1'-0"



5 BRICK UNIT PAVERS - EXPANSION JOINT

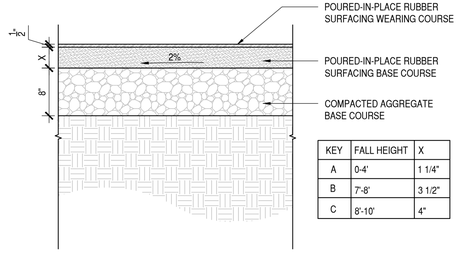
1" = 1'-0"



2 CAST-IN-PLACE CONCRETE PAVING

1" = 1'-0"

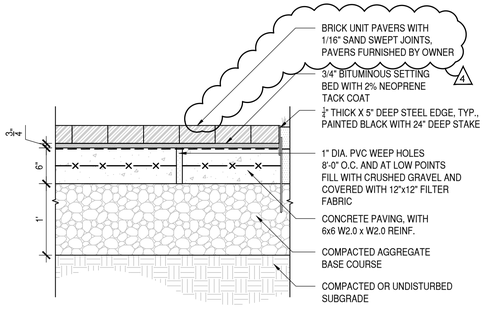
NOTES:
1. PLAY SURFACE THICKNESS VARIES. SEE SHEET L-401 FOR POURED-IN-PLACE RUBBER SURFACING TRANSITION DETAILS AND L-200 PLANS FOR LOCATIONS AND TYPES.
2. REFER TO TABLE FOR POURED-IN-PLACE RUBBER SURFACING FALL HEIGHT DEPTH REQUIREMENTS, SEE SHEET L-200 PLANS FOR BASE CONDITIONS.



KEY	FALL HEIGHT	X
A	0-4'	1 1/4"
B	7'-8'	3 1/2"
C	8'-10'	4"

7 POURED-IN-PLACE RUBBER SURFACING ON AGGREGATE BASE

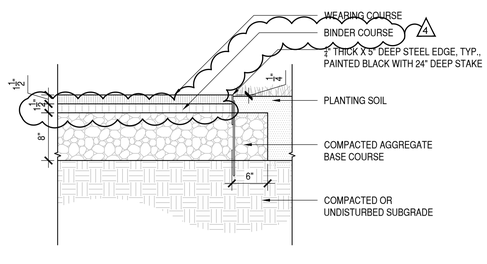
1" = 1'-0"



4 BRICK UNIT PAVERS ON CONCRETE BASE

1" = 1'-0"

NOTES:
1. PROVIDE METAL EDGE ALONG ALL ASPHALT PAVING WALKS. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. BITUMINOUS CONCRETE PAVEMENT SHALL CONFORM TO MASSDOT STANDARDS.



1 ASPHALT PAVING

1" = 1'-0"

8:14:23 6:00:34 PM G:\Shared Drives\Projects 2022\AG2248 - Robbins Farm Park Playground\02_Working\05_CAD\02_SheetFiles\L-400 PAVEMENT DETAILS.dwg

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01	100% DESIGN DEVELOPMENT	04/14/2023
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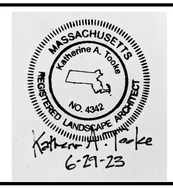
DWG ISSUE & REVISION HISTORY

Stamp



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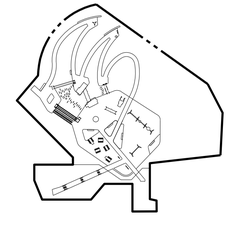


Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

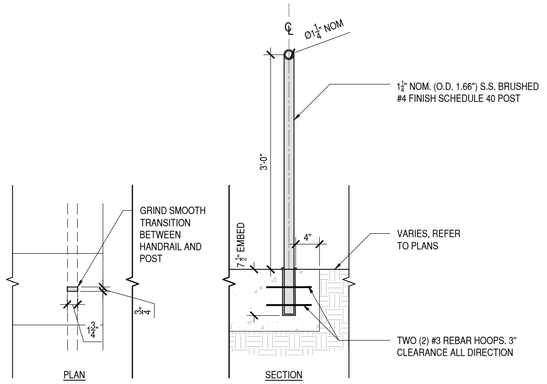
Drawing Title:

SITE DETAILS - PAVING

Project No:	AG 2248	Scale:	AS NOTED
Drawn By:	NC		
Checked By:	ER		
Approved By:	KT		
Date:	08.15.2023		

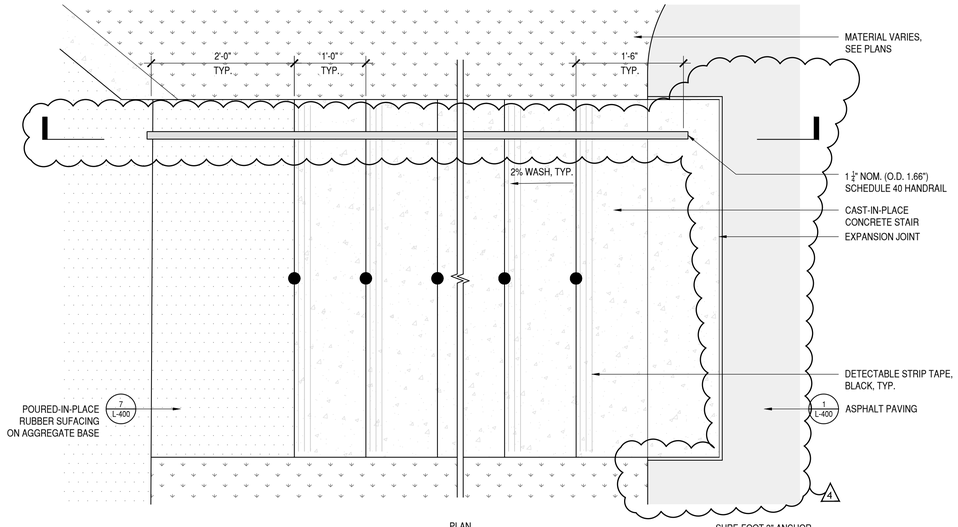
Drawing No:

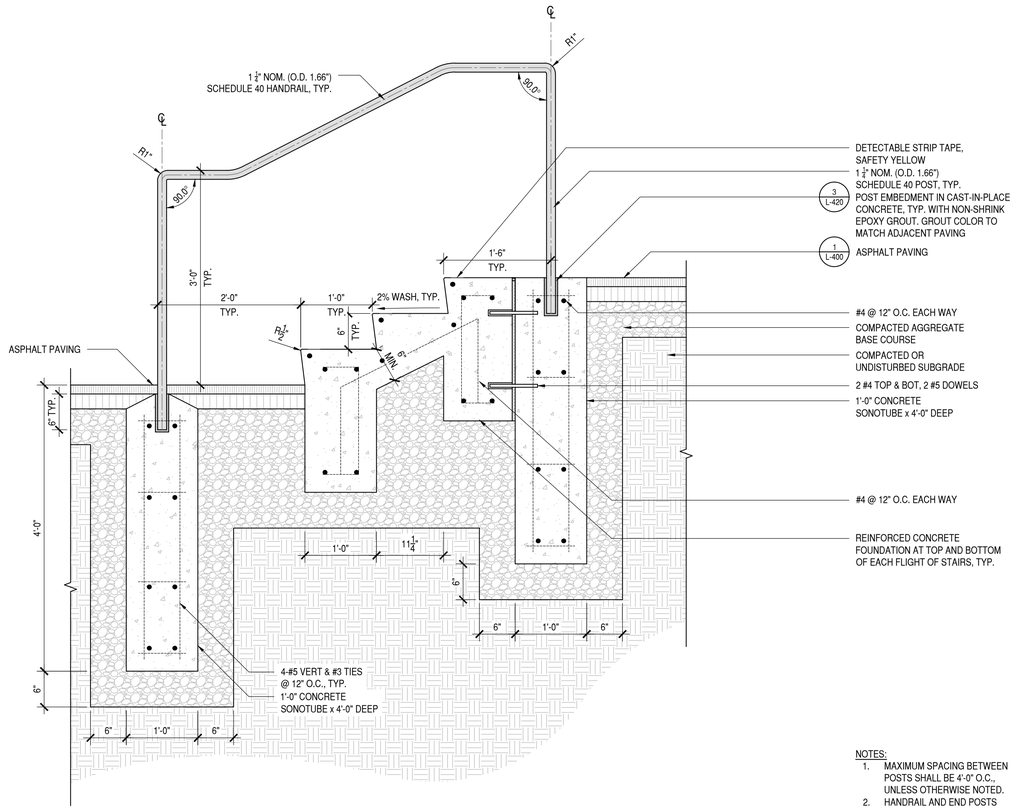
L-400



3 POST EMBEDMENT IN CAST-IN-PLACE CONCRETE, TYP.

1" = 1'-0"

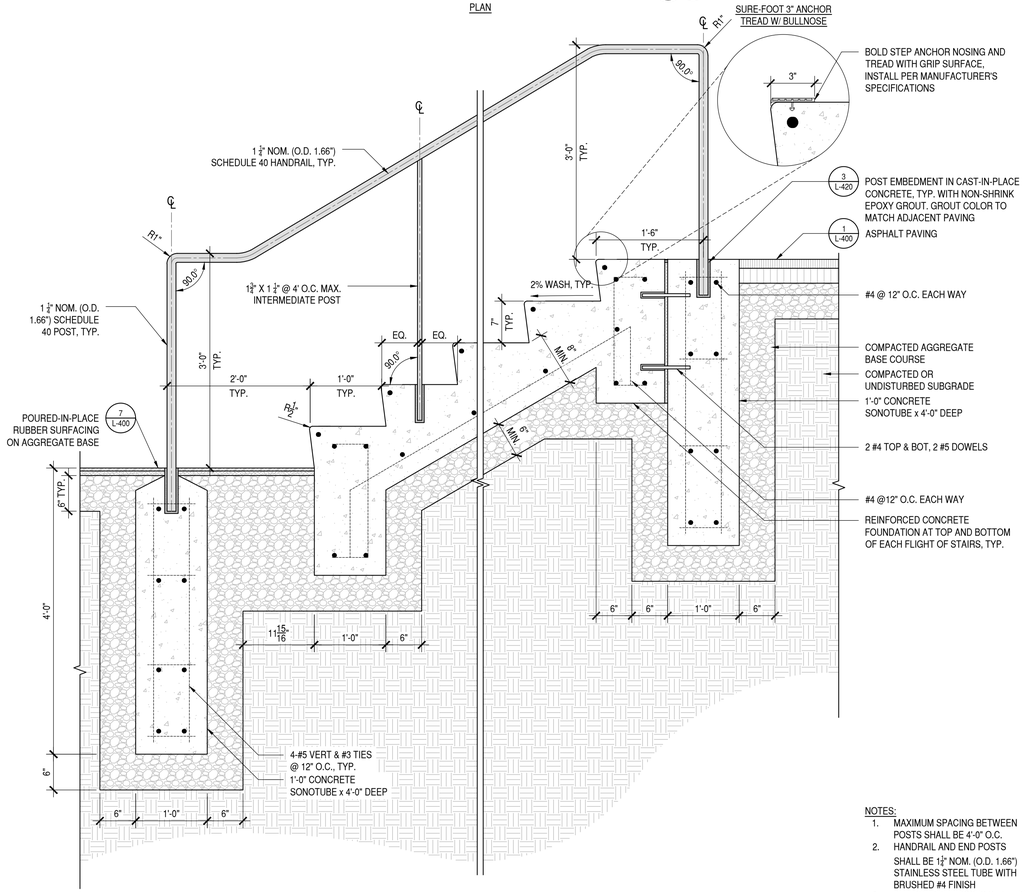




NOTES:
1. MAXIMUM SPACING BETWEEN POSTS SHALL BE 4'-0" O.C., UNLESS OTHERWISE NOTED.
2. HANDRAIL AND END POSTS SHALL BE 1½" NOM. (O.D. 1.66") STAINLESS STEEL TUBE WITH BRUSHED #4 FINISH
3. WELDS SHALL BE CONTINUOUS AND GROUND SMOOTH, TYP.

2 CAST-IN-PLACE CONCRETE STAIRS WITH STAINLESS STEEL HANDRAILS, AT ENTRANCE, TYP.

1" = 1'-0"



NOTES:
1. MAXIMUM SPACING BETWEEN POSTS SHALL BE 4'-0" O.C.
2. HANDRAIL AND END POSTS SHALL BE 1½" NOM. (O.D. 1.66") STAINLESS STEEL TUBE WITH BRUSHED #4 FINISH
3. INTERMEDIATE POSTS SHALL BE 1½" X ¾" STAINLESS STEEL BAR STOCK WITH BRUSHED #4 FINISH
4. WELDS SHALL BE CONTINUOUS AND GROUND SMOOTH, TYP.

1 CAST-IN-PLACE CONCRETE STAIRS WITH STAINLESS STEEL HANDRAILS, AT HILLSIDE

1" = 1'-0"

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DWG ISSUE & REVISION HISTORY

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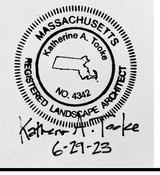
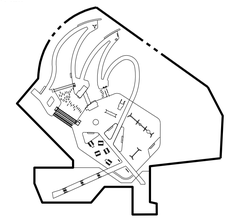


Key Plan



Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

Drawing Title:

SITE DETAILS - STAIRS AND HANDRAILS

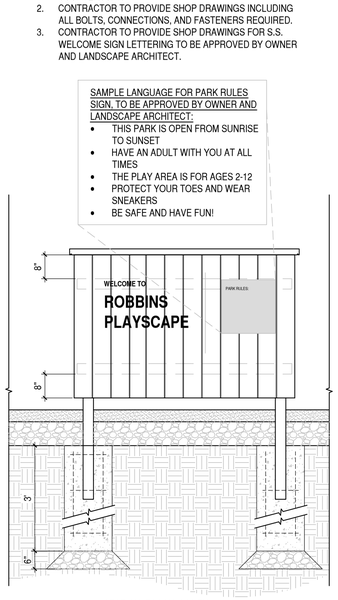
Project No:	AG 2248	Scale:	AS NOTED
Drawn By:	NC		
Checked By:	ER		
Approved By:	KT		
Date:	08.15.2023		

Drawing No:

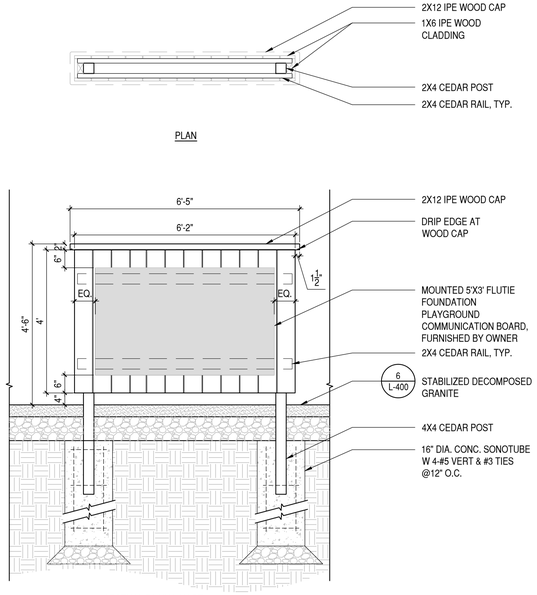
L-420

NOTES:
1. ALL FASTENERS TO BE TYPE 316 S.S. AND TO BE COUNTERSUNK.
2. CONTRACTOR TO PROVIDE SHOP DRAWINGS INCLUDING ALL BOLTS, CONNECTIONS, AND FASTENERS REQUIRED.
3. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR S.S. WELCOME SIGN LETTERING TO BE APPROVED BY OWNER AND LANDSCAPE ARCHITECT.

SAMPLE LANGUAGE FOR PARK RULES SIGN, TO BE APPROVED BY OWNER AND LANDSCAPE ARCHITECT:
- THIS PARK IS OPEN FROM SUNRISE TO SUNSET
- HAVE AN ADULT WITH YOU AT ALL TIMES
- THE PLAY AREA IS FOR AGES 2-12
- PROTECT YOUR TOES AND WEAR SNEAKERS
- BE SAFE AND HAVE FUN!



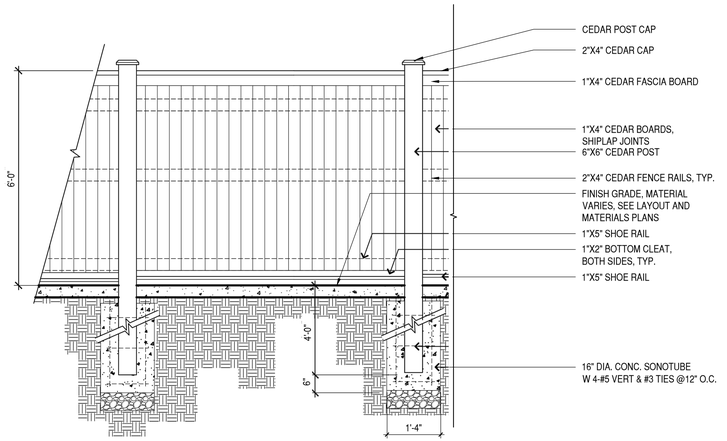
SECTION, FACING SOUTH



SECTION, FACING NORTH

PLAN

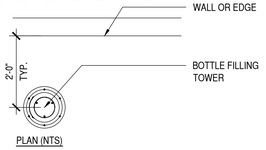
NOTES:
1. PRODUCT AND MATERIAL FINISH TO BE APPROVED BY OWNER TO MATCH THE ARLINGTON RESERVOIR PARK SCREEN ENCLOSURE.
2. SUBMIT CEDAR POST CAP PRODUCT CUT SHEETS FOR APPROVAL BY LANDSCAPE ARCHITECT
3. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR ALL HINGES AND LATCHES REQUIRED



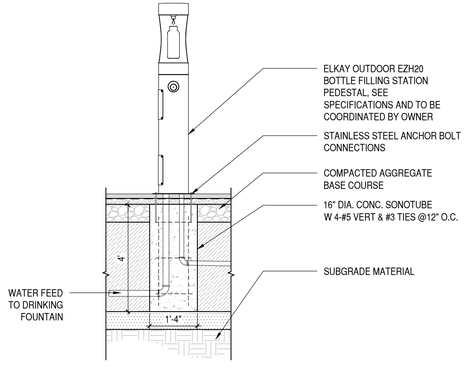
4 ENTRY SIGNAGE
1" = 1'-0"

NOTES:
1. REFER TO MANUFACTURER'S INSTRUCTIONS FOR MOUNTING AND INSTALLATION INFORMATION.
2. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. FOUNTAIN BUBBLER TO BE ANGLED FOR ADA ACCESSIBILITY.
4. CONNECTION TO WATER TO BE COORDINATED BETWEEN CONTRACTOR AND OWNER.

4



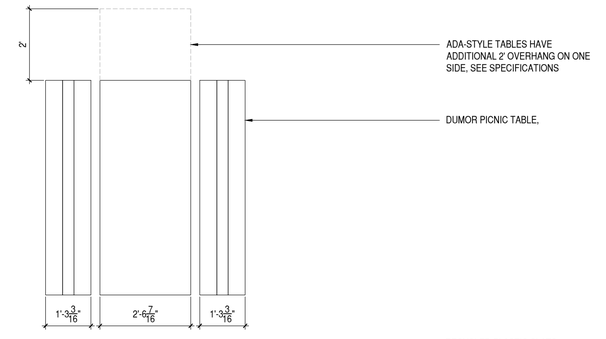
PLAN (NTS)



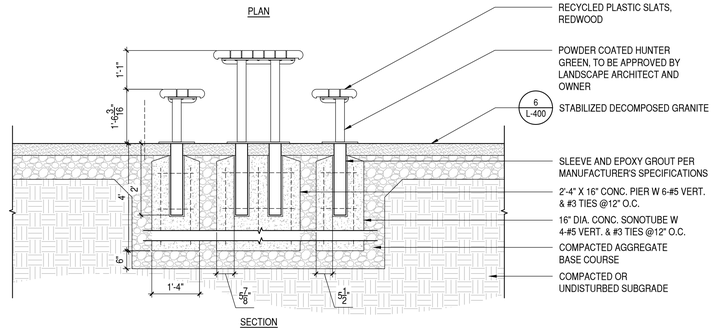
SECTION

3 WATER FILLING STATION
1" = 1'-0"

2 PORTABLE RESTROOM SCREEN ENCLOSURE
1" = 1'-0"



PLAN



SECTION

1 PICNIC TABLE, TYP.
1" = 1'-0"

8/14/23, 6:01:56 PM, G:\Shared Drives\Projects 2022\AG2248 - Robbins Farm Park Playground\02_Working\05_CAD\02_SheetFiles\L-450 FURNISHING DETAILS.dwg

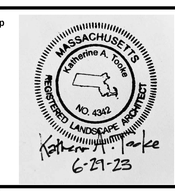
Agency Landscape + Planning

Owner
Town of Arlington
422 Summer St.
Arlington, MA 02474
TEL. 781.316.3880
www.arlingtonma.gov/recreation

01	100% DESIGN DEVELOPMENT	04/14/2023
02	90% CONSTRUC. DOCUMENTS	06/14/2023
03	100% CONSTRUC. DOCUMENTS	06/29/2023
04	ADDENDUM 03 - BIDDING REVISIONS	08/15/2023

DWG ISSUE & REVISION HISTORY

Stamp



Key Plan

Project Title:

Robbins Farm Park Playground

61 Eastern Avenue
Arlington, MA 02476

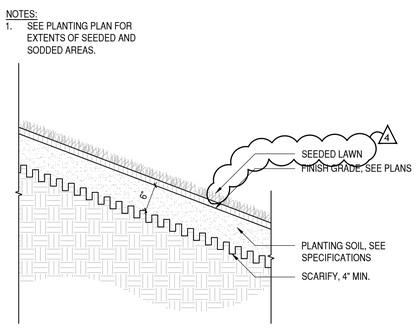
Drawing Title:

SITE DETAILS - SITE FURNISHINGS

Project No: AG 2248
Drawn By: NC
Checked By: ER
Approved By: KT
Date: 08.15.2023
Scale: AS NOTED

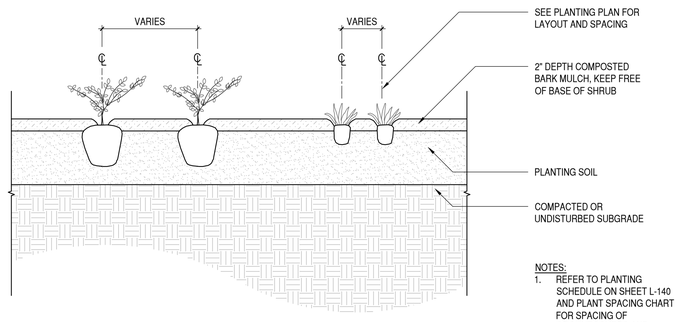
Drawing No:

L-450



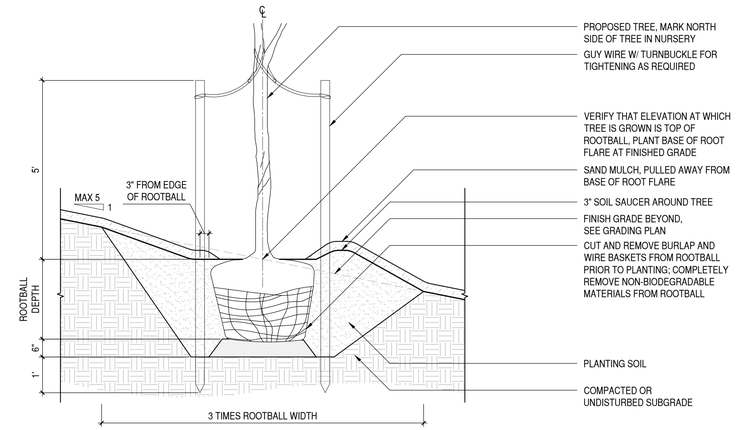
8 LAWN PLANTING AT SLOPE, TYP.

1" = 1'-0"



5 PERENNIAL & GROUNDCOVER PLANTING, TYP.

1" = 1'-0"

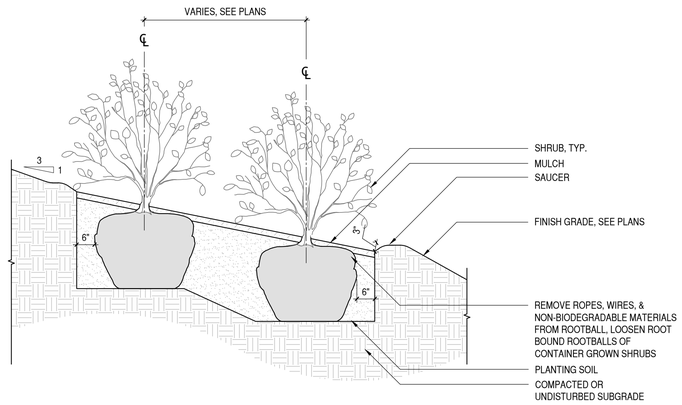


2 TREE PLANTING AT SLOPE, TYP.

1/2" = 1'-0"

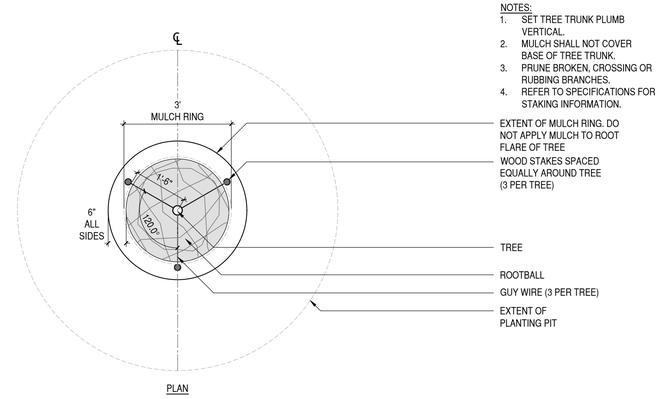
7 LAWN PLANTING, TYP.

1" = 1'-0"

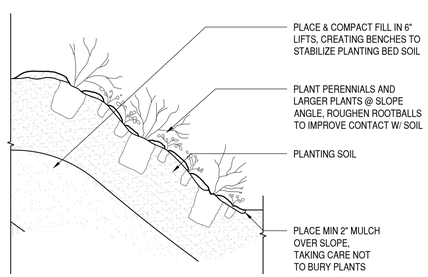


4 SHRUB PLANTING AT SLOPE, TYP.

1" = 1'-0"

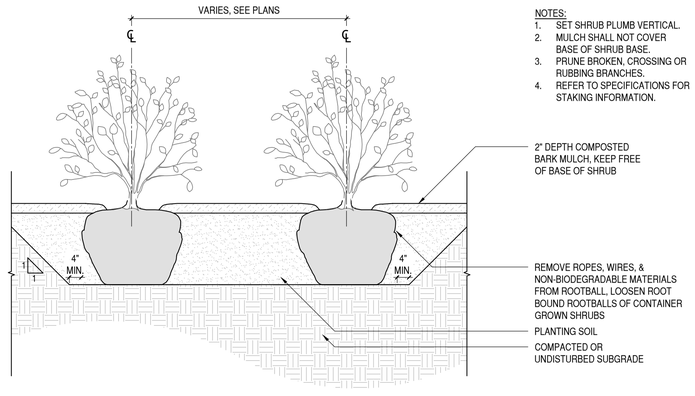


PLAN



6 PERENNIAL & GROUNDCOVER PLANTING AT SLOPE, TYP.

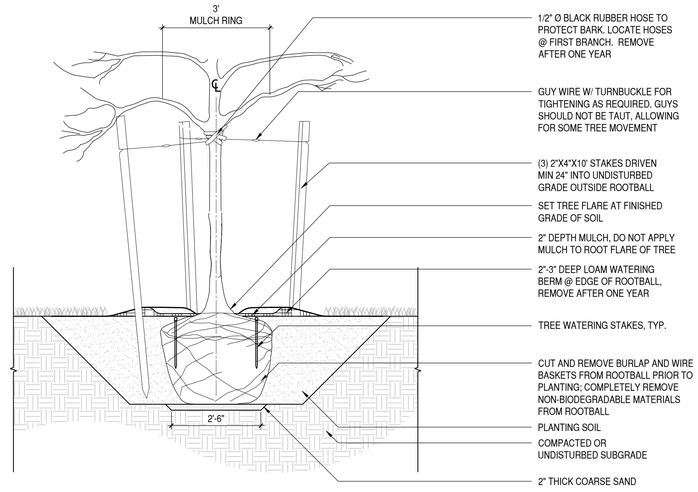
1" = 1'-0"



SECTION

3 SHRUB PLANTING, TYP.

1" = 1'-0"



SECTION

1 TREE PLANTING AT PLANT BED, TYP.

1/2" = 1'-0"

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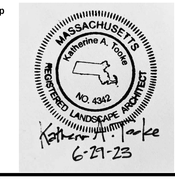

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Arlington, MA 02476

Drawing Title:

SITE DETAILS - PLANTING

Project No:	AG 2248	Scale:	AS NOTED
Drawn By:	NC		
Checked By:	ER		
Approved By:	KT		
Date:	08.15.2023		

Drawing No:

L-460

8:14:23 6:02:31 PM G:\Shared Drives\Projects 2022\AG2248 - Robbins Farm Park Playground\02_Working\05_CAD\02_SheetFiles\L-460 PLANTING DETAILS.dwg