CONTRACT DOCUMENTS AND SPECIFICATIONS

for

Project 7186

Market St Gateway Improvements Phase 2

Bid #37-19

State of New Hampshire

John P. Bohenko, City Manager

Prepared by:

City of Portsmouth
Engineering Division
Public Works Department

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City of Portsmouth
Portsmouth, New Hampshire
Department of Public Works

Market St Gateway Improvements Phase 2
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INVITATION TO BID

Sealed bid proposals, **plainly marked, Market St Gateway Improvements, Phase 2**, Bid Proposal #37-19 **on the outside of the mailing envelope as well as the sealed bid envelope,** addressed to the Finance/Purchasing Department, City Hall, 1 Junkins Avenue, Portsmouth, New Hampshire, 03801, will be accepted until March 7, 2019 at 1:00 p.m.; at which time all bids will be publicly opened and read aloud.

This project consists of the installation of plantings, traffic signals, granite curbing, drainage pipe & structures, concrete and brick sidewalks and bike paths, lighting, signs, guardrail and various other amenities on the section of Market St from the Albacore Submarine to the RR track crossing just east of Noble's Island signal.

Work may begin at any time on or after April 15, 2019. Final Completion of the project must occur by October 30, 2019. Liquidated damages shall be assessed at $100.00 per day. Hours of work will be 7AM to 5 PM weekdays.

The Contractor will be required to keep roadways and sidewalks passable for the public to the maximum degree possible**.**

The General Contractor for this project must be Pre-qualified with NHDOT for Road Construction. All electrical work on this project, including conduit, will be installed under the supervision of a New Hampshire Licensed Electrician. An electrical permit is required prior to any electrical work being completed.

Bidders must determine the quantities of work required and the conditions under which the work will be performed.

Specifications may be obtained at the City's website: http://www.cityofportsmouth.com/finance/purchasing.htm Addenda to this project, if any, including written answers to questions, will not be provided directly to vendors, but will be posted by 1:00 p.m., on March 1, 2019 on the City of Portsmouth Website under the project heading.

Electronic copies of the plans and specifications may be obtained off of the City's webpage. Documents are not available for pickup.

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts. The City of Portsmouth further reserves the right to reject any or all bids, to waive technical or legal deficiencies, to re-bid, and to accept any bid that it may deem to be in the best interest of the City. Also, the City reserves the right to approve or deny subcontractors for this project.

Each Bidder shall furnish a bid security in the amount of ten percent (10%) of the bid. The Bid Security may be in the form of a certified check or a bid bond executed by a surety company authorized to do business in the State of New Hampshire, made payable to the City of Portsmouth, N.H.

INSTRUCTIONS TO BIDDERS

BIDDING REQUIREMENTS AND CONDITIONS

1. Special Notice to Bidders

Appended to these instructions is a complete set of bidding and general contract forms. These forms may be detached and executed for the submittal of bids. The plans, specifications, and other documents designated in the proposal form will be considered as part of the proposal, whether attached or not.

The bidders must submit a statement of bidder's qualifications, if requested, subsequent to bid opening but prior to award.

Addenda to this bid document, if any, including written answers to questions, will be posted by March 5, 2019 on the City of Portsmouth website at http://www.cityofportsmouth.com/finance/purchasing.htm under the project heading. Addenda and updates will NOT be sent directly to firms. Contractors submitting a bid should check the web site daily for addenda and updates after the release date. Firms should print out, sign and return addenda with the proposal. Failure to do so may result in disqualification.

2. Interpretation of Quantities in Bid Schedules

The quantities appearing in the bid schedule are approximate only and are prepared for the comparison of bids. Payment to the contractor will be made only for actual work performed and accepted in accordance with the contract. Any scheduled item of work to be done and materials to be furnished may be increased, decreased or omitted as hereinafter provided, and no claim for loss, anticipated profits or costs incurred in anticipation of work not ultimately performed will be allowed due to such increase or decrease.

3. Examination of Plans, Specifications and Site Work

The bidder is expected to examine carefully the site of the proposed work, the plans, standard specifications, supplemental specifications, special provisions and contract forms before submitting a proposal. The submission of a bid shall be considered conclusive evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the contract. It will be conclusive evidence that the bidder has also investigated and is satisfied with the sources of supply for all materials.

Plans, surveys, measurements, dimensions, calculations, estimates and statements as to the condition under which the work is to be performed are believed to be correct, but the contractors must examine for themselves, as no allowance will be made for any errors or inaccuracies that maybe found therein.

4. Familiarity with Laws

The bidder is assumed to have made himself or herself familiar with all federal and state laws and all local by-laws, ordinances and regulations which in any manner affect those engaged or employed on the work or affect the materials or equipment used in the work or affect the conduct of the work, and the bidder, if awarded the contract, shall be obligated to perform the work in conformity with said laws, by-laws, ordinances and regulations notwithstanding its ignorance thereof. If the bidder shall discover any provision in the plans or specifications which is in conflict with any such law, by-law, ordinance or regulation the bidder shall forthwith report it to the engineer in writing.

5. Preparation of Proposal

a) The bidder shall submit its proposal upon the forms furnished by the Owner. The bidder shall specify a lump sum price in figures, for each pay item for which a quantity is given and shall also show the products of the respective prices and quantities written in figures in the column provided for that purpose and the total amount of the proposal obtained by adding the amount of the several items. All words and figures shall be in ink or typed. If a unit price or a lump sum bid already entered by the bidder on the proposal form is to be altered it should be crossed out with ink, the new unit price or lump sum bid entered above or below it and initialed by the bidder, also with ink.

b) The bidder's proposal must be signed with ink by the individual, by one or more general partners of a partnership, by one or more members or officers of each firm representing a joint venture; by one or more officers of a corporation, by one or more members (if member-managed) or managers (if manager-managed) of a limited liability company, or by an agent of the contractor legally qualified and acceptable to the owner. If the proposal is made by an individual, his or her name and post office address must be shown, by a partnership the name and post office address of each general and limited partner must be shown; as a joint venture, the name and post office address of each venturer must be shown; by a corporation, the name of the corporation and its business address must be shown, together with the name of the state in which it is incorporated, and the names, titles and business addresses of the president, secretary and treasurer.

6. Nonconforming Proposals

Proposals will be considered nonconforming and may be rejected in the Owner's sole discretion for any of the following reasons:

- If the proposal is on a form other than that furnished by the Owner, or if the form is altered or any portion thereof is detached;
- If there are unauthorized additions, conditional or altered bids, or irregularities of any kind which may tend to make the proposal or any portion thereof incomplete, indefinite or ambiguous as to its meaning;
- If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award; or
- If the proposal does not contain a unit price for each pay item listed except in the case of authorized alter pay items.

7. Proposal Guaranty

No proposal will be considered unless accompanied by a bid bond, surety, or similar guaranty of the types and in an amount not less than the amount indicated in the Invitation to Bid. All sureties shall be made payable to the "City of Portsmouth". If a bid bond is used by the bidder it shall be:

- In a form satisfactory to the Owner;
- With a surety company licensed, authorized to do business in, and subject to the jurisdiction of the courts of the State of New Hampshire; and
- Conditioned upon the faithful performance by the principal of the agreements contained in the sub-bid or the general bid.

In the event any irregularities are contained in the proposal guaranty, the bidder will have four business days (not counting the day of opening) to correct any irregularities. The corrected guaranty must be received by 4:00 p.m. If irregularities are not corrected to the satisfaction of the Owner, the Owner, in its sole discretion, may rejected the bid.

8. Delivery of Proposals

When sent by mail, the sealed proposal shall be addressed to the Owner at the address and in the care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and at the place specified in

the invitation for bids. Proposals received after the time for opening of the bids will be returned to the bidder, unopened.

9. Withdrawal of Proposals

A bidder will be permitted to withdraw his or her proposal unopened after it has been submitted if the Owner receives a request for withdrawal in writing prior to the time specified for opening the proposals.

10. Public Opening of Proposals

Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present.

11. Disqualification of Bidders

Any or all of the following reasons may be deemed by Owner in its sole discretion as being sufficient for the disqualification of a bidder and the rejection of his proposal:

- More than one proposal for the same work from an individual, firm, or corporation under the same or different name;
- Evidence of collusion among bidders;
- Failure to submit all required information requested in the bid specifications;
- If the Contractor is not listed with the New Hampshire Department of Transportation as a pre-qualified contractor under the classification of Road Construction;
- Lack of competency or of adequate machinery, plant or other equipment, as revealed by the statement of bidders qualification or otherwise;
- Uncompleted work which, in the judgment of the owner, might hinder or prevent the prompt completion of additional work if awarded;
- Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts;
- Default or unsatisfactory performance on previous contracts; or
- Such disqualification would be in the best interests of the Owner.

12. Material Guaranty and Samples

Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the construction of the work, and the Owner may, in its sole discretion, reject the bid based on the contents of the statement or as a result of the failure of the bidder to submit the statement.

AWARD AND EXECUTION OF CONTRACT

1. Consideration of Proposals

After the proposals are opened and read, they will be compared on the basis of the total price for all sections of work and any such additional considerations as may be identified in the bid documents. The results of such comparisons will be immediately available to the public. In case of a discrepancy between the prices written in words and those written figures, the prices written in words shall govern. In case of a discrepancy between the total shown in the proposal and that obtained by adding the products of the quantities of items and unit bid prices, the latter shall govern.

2. Award of Contract

Within 30 calendar days after the opening of proposals, if a contract is to be awarded, the award will be made to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed. The successful bidder will be notified, in writing, mailed to the address on his or her proposal, that his or her bid has been accepted and that the bidder has been awarded the contract.

3. Reservation of Rights

The Owner reserves the right to reject any or all proposals, to waive technicalities or to advertise for new proposals, if, in the sole discretion of the Owner, the best interest of the City of Portsmouth will be promoted thereby. The Owner further reserves the right to conduct such investigations of the contractor's history, financial resources, and other qualifications as it deems necessary to determine whether bidder is qualified to do the work. Bidder may be asked to execute releases. Failure to execute a release upon request may result in disqualification.

The Owner reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability of the Owner.

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts.

4. Return of Proposal Guaranty

All proposal guaranties, except those of the three lowest bidders, will be returned upon request following the opening and checking of the proposals. The proposal guaranties of the three lowest bidders will be returned within ten days following the award of the contract if requested.

5. Contract Bonds

At the time of the execution of the contract, the successful bidder shall furnish:

- A performance bond in the amount of 100 percent of the contract amount.
- Labor and materials payment bond in the sum equal to 100 percent of the contract amount.

At the time of project completion, the Owner may, in its sole discretion, permit the Contractor to substitute a maintenance bond in lieu of holding retainage for the entire guaranty period. If a bond is furnished it shall meet the following criteria:

- The bond shall be in an amount equal to 20 percent of the contract amount. Such bond shall guarantee the repair of all damage due to faulty materials or workmanship provided or done by the contractor. The guarantee shall remain in effect for a period of one year after the date of final acceptance of the job by the Owner.

Each bond shall be: (1) in a form satisfactory to the Owner; (2) with a surety company licensed and authorized to do business and with a resident agent designated for services of process in the State of New Hampshire; and (3) conditioned upon the faithful performance by the principal of the agreements contained in the original bid. All premiums for the contract bonds are to be paid by the contractor.

6. Execution and Approval of Contract

The successful bidder is required to present all contract bonds, to provide proof of insurance, and to execute the contract within 10 days following receipt of the City's notification of acceptance of the bid. No contract shall be considered as in effect until it has been fully executed by all parties.

7. Failure to Execute Contract

Failure to execute the contract and to provide acceptable bonds and proof of insurance within 10 days after notification of acceptance of bid shall be just cause for the cancellation of the award and the forfeiture of the proposal guarantee which shall become the property of the Owner, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible bidder, or the City may exercise its reserved rights including the rejection of all bids or re-advertisement.

PROPOSAL FORM

Market Street Gateway Improvements Phase 2, Bid 37-19

CITY OF PORTSMOUTH, N.H.

To the City of Portsmouth, New Hampshire, herein called the Owner.

The undersigned, as Bidder, herein referred to as singular and masculine declares as follows:

1. All interested in the Bid as Principals are named herein.

2. This bid is not made jointly, or in conjunction, cooperation or collusion with any other person, firm, corporation, or other legal entity;

3. No officer, agent or employee of the Owner is directly or indirectly interested in this Bid.

4. The bidder has carefully examined the sites of the proposed work and fully informed and satisfied himself as to the conditions there existing, the character and requirements of the proposed work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this Bid, and the bidder has carefully read and examined the Drawings, Agreement, Specifications and other Contract Documents therein referred to and knows and understands the terms and provisions thereof;

5. The bidder understands that the quantities of work calculated in the Bid or indicated on the Drawings or in the Specifications or other Contract Documents are approximate and are subject to increase or decrease or deletion as deemed necessary by the Director of Public Works. Any such changes will not result in or be justification for any penalty or increase in contract prices; and agrees that, if the Bid is accepted the bidder will contract with the Owner, as provided in the Contract Documents, this Bid Form being part of said Contract Documents, and that the bidder will supply or perform all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other activities required by the Contract Documents in the manner and within the time therein set forth, and that the bidder will take in full payment therefore the following item prices, to wit:

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
201.02	3.42	Acre	GRUBBING (F)	$_____	$_____
			_____		
202.41	123	Lf	REMOVAL OF EXISTING PIPES 0-24" DIAMETER (F)	$_____	$_____
			_____		
202.5	1	Ea	REMOVAL OF EXISTING STRUCTURES	$_____	$_____
			_____		

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
202.7	620	LF	REMOVAL OF GUARDRAIL	$_____	$_____
			_____		
203.1	5205	CY	COMMON EXCAVATION	$_____	$_____
			_____		
203.2	100	CY	ROCK EXCAVATION	$_____	$_____
			_____		
203.6	1600	CY	EMBANKMENT IN PLACE (F)	$_____	$_____
			_____		
206.1	42	CY	COMMON STRUCTURE EXCAVATION.	$_____	$_____
			_____		
206.19	14	CY	COMMON STRUCTURE EXPLORATORY EXCAVATION.	$_____	$_____
			_____		
206.2	30	CY	ROCK STRUCTURE EXCAVATION	$_____	$_____
			_____		
304.3	701	CY	CRUSHED GRAVEL	$_____	$_____
			_____		
304.90	268	CY	3/8" PEA STONE (Biomedian)	$_____	$_____
			_____		
304.91	1073	CY	NHDOT #4 CRUSHED STONE (Biomedian)	$_____	$_____
			_____		
403.11	20	Tons	Machine Method Bituminous Paving	$_____	$_____
			_____		
403.12	170	Tons	Hand Method Bituminous Paving	$_____	$_____
			_____		

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
520.1	60	Cy	Concrete, Class A curb backfill	$_____	$_____
583.1	16	CY	RIP RAP TYPE A	$_____	$_____
603.33112	2	EA	12" CORR. POLYETHYLENE END SECTION	$_____	$_____
603.33115	1	EA	15" CORR. POLYETHYLENE END SECTION	$_____	$_____
603.33124	1	EA	24" CORR. POLYETHYLENE END SECTION	$_____	$_____
603.82212	80	Lf	12" HDPE Drain Pipe	$_____	$_____
603.82215	470	Lf	15" HDPE Drain Pipe	$_____	$_____
603.82215	52	Lf	24" HDPE Drain Pipe	$_____	$_____
604.0007	8	Ea	Polyethylene Liner for CB	$_____	$_____
604.1	8	Ea	Eliminator© systems Oil/Water Separator Hood	$_____	$_____
604.2	3	Ea	Core and boot existing drain structures 12-15"	$_____	$_____
604.12	8	Ea	4' Diameter New Catch Basins (Type B Complete)	$_____	$_____

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
604.22	1	Ea	New Drop Inlet Basin (Type B Frame & Grate) (Contingency item)	$_____	$_____
604.324	2	Ea	4' Diameter Drain Manhole with Hinged ERGO XL Manhole Cover	$_____	$_____
604.4	2	LF	RECONSTRUCTING/ADJUSTING MASONRY FOR CATCH BASINS & DROP INLETS (Frame and Grate covered under 604.72 below)	$_____	$_____
604.51	1	LF	RECONSTRUCTING/ADJUSTING MASONRY FOR SEWER MANHOLES (Frame and Cover covered under 604.61 below)	$_____	$_____
604.52	1	LF	RECONSTRUCTING/ADJUSTING MASONRY FOR DRAINAGE MANHOLES (Frame and Cover covered under 604.62 below)	$_____	$_____
604.61	1	EA	Install New Hinged Sewer Manhole Covers if directed (Frame and Cover Provided by City)	$_____	$_____
604.62	1	EA	Provide and Install New Hinged Drain Manhole Covers if directed (32" or 24" as appropriate)	$_____	$_____
604.72	4	EA	Provide and Install New CB Frame & Grate if directed (Existing Structures Only)	$_____	$_____
605.512	310	Lf	12" Corrugated Perforated HDPE Underdrain With fittings as necessary	$_____	$_____

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
605.79	4	Ea	Underdrain flushing basins	$_____	$_____
606.1203	620	Lf	Beam Guardrail Standard Section (Steel Post)	$_____	$_____
606.1255	2	U	Beam Guardrail Terminal Unit EAGRT	$_____	$_____
606.1285	3	U	Beam Guardrail Bridge Approach	$_____	$_____
606.91	300	Lf	Resetting Beam Guardrail	$_____	$_____
608.24	2687	Sy	4” Concrete Sidewalk	$_____	$_____
608.26	50	Sy	6” Concrete Sidewalk in Ramp Areas	$_____	$_____
608.54	6	Sy	Detectable Warning Surface Panels Cast Iron	$_____	$_____
609.01	902	Lf	New Straight Vertical Granite Curb 5” Wide	$_____	$_____
609.02	140	Lf	New Curved Vertical Granite Curb 5” Wide	$_____	$_____
609.216	1067	Lf	New straight sloped Granite Curb	$_____	$_____
609.236	38	Lf	New curved sloped Granite Curb	$_____	$_____

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
609.5	40	Lf	Reset Existing Curb (Indeterminate quantity)	$_____	$_____
611.90001	1	EA	Adjusting Existing Gate Valves and Stops to Finish Grade (Indeterminate quantity)	$_____	$_____
614.321	10	Lf	2” Steel Conduit	$_____	$_____
614.331	10	Lf	3” Steel Conduit	$_____	$_____
614.511	18	Ea	Concrete Electrical Pull Boxes	$_____	$_____
614.512	5	Ea	Concrete Electrical Pull Boxes	$_____	$_____
614.72114	2217	Lf	2” Schedule 40 PVC Conduit (Lighting)	$_____	$_____
614.72118	10	Lf	2” Sch. 80 PVC Conduit (Contingency item)	$_____	$_____
614.73114	100	Lf	3” Schedule 40 PVC Conduit	$_____	$_____
614.73118	665	Lf	3” Sch. 80 PVC Conduit (road crossings)	$_____	$_____
615.0072	1000	Lb	Galvanized Steel U channel Breakaway Sign Posts	$_____	$_____
615.03	68	Sf	Traffic Signs type C	$_____	$_____

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
615.032	23	Sf	Traffic Signs type C with breakaway mounts	$_____	$_____
615.014	10	U	Relocating Traffic Signs, type C	$_____	$_____
616.191	1	U	Traffic Signals Market/Noble's Island	$_____	$_____
618.6	1	Allow	Portsmouth Police w/wo vehicle No Mark Up Allowed (Only Exact Cost will be paid)	$20,000.00	$20,000.00
618.7	1	Allow	Uniformed Flaggers No Mark Up Allowed (Only Exact Cost will be paid)	$40,000.00	$40,000.00
619.1	1	U	Maintenance of Traffic	$_____	$_____
621.6	6	Ea	Snow Plowable Markers	$_____	$_____
625.2	14	Ea	Light Pole Bases	$_____	$_____
628.2	5450	Lf	Saw Bituminous Pavement	$_____	$_____
632.0104	5025	Lf	4" Paint Striping (Chlorinated Rubber Paint)	$_____	$_____
632.0106	4292	Lf	6" Paint Striping (Chlorinated Rubber Paint)	$_____	$_____
632.3112	682	Lf	12" Thermoplastic Stop/Crosswalk	$_____	$_____
632.32	655	Sf	Thermoplastic Symbol/Word	$_____	$_____

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
632.911	6249	Lf	Obliterate Lines 12” wide or under	$_____	$_____
			_____		
632.92	50	Sf	Obliterate Pavement Markings Symbols and Words	$_____	$_____
			_____		
641.1	3400	Cy	Loam for Planting Beds and Parks	$_____	$_____
			_____		
641.2	800	Cy	Planting Media for Biomedian	$_____	$_____
			_____		
644.516	3400	Sy	Coastal Salt Tolerant Meadow Seed Mix	$_____	$_____
			_____		
645.112	452	Cy	Bark Mulch	$_____	$_____
			_____		
645.531	1340	Lf	Silt Fencing or silt log	$_____	$_____
			_____		
645.7	1	Ls	SWPPP	$_____	$_____
			_____		
645.71	128	Hr	SWPPP Inspections	$_____	$_____
			_____		
645.9	9	Ea	Catch Basin Silt Sacks	$_____	$_____
			_____		
646.512	1	Ls	Turf Establishment with Mulch	$_____	$_____
			_____		
651.13	10	Ea	JUNIPERUS VIRGINIANA (See Specifications for Substitutions)	$_____	$_____
			_____		

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
652.06	7	Ea	ACER RUBRUM (See Specifications for Substitutions) _____	$_____	$_____
652.17	38	Ea	BETULA NIGRA (See Specifications for Substitutions) _____	$_____	$_____
652.52	14	Ea	NYSSA SYLVATICA _____	$_____	$_____
652.691	15	Ea	QUERCUS BOREALIS 'RUBRA' (See Specifications for Substitutions) _____	$_____	$_____
653.97	12	Ea	SOPHORA JAPONICA 'REGENT' _____	$_____	$_____
654.21	121	Ea	ILEX GLABRA _____	$_____	$_____
654.211	191	Ea	ILEX GLABRA 'COMPACTA' _____	$_____	$_____
654.45	370	Ea	JUNIPERUS VIRGINIANA 'GREY OWL' _____	$_____	$_____
655.02	34	Ea	AMELANCHIER CANADENSIS (See Specifications for Substitutions) _____	$_____	$_____
655.06	51	Ea	ARONIA MELANCARPA _____	$_____	$_____
655.27	48	Ea	CLETHRA ALNIFOLIA _____	$_____	$_____

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
655.701	113	Ea	FOTHERGILLA GARDENII	$_____	$_____
			_____		
655.702	35	Ea	FOTHERGILLA MAJOR 'MT AIRY'	$_____	$_____
			_____		
655.703	15	Ea	FOTHERGILLA MAJOR	$_____	$_____
			_____		
655.801	122	Ea	ILEX VERTICILLATA 'WINTER RED'	$_____	$_____
			_____		
655.802	8	Ea	ILEX VERTICILLATA 'JIM DANDY'	$_____	$_____
			_____		
656.02	260	Ea	MYRICA PENNSYLVANICA	$_____	$_____
			_____		
656.321	278	Ea	RHUS AROMATICA 'LOW GROW'	$_____	$_____
			_____		
656.42	423	Ea	ROSA RUGOSA 'ALBA'	$_____	$_____
			_____		
656.73	91	Ea	VACCINIUM CORYMBOSUM	$_____	$_____
			_____		
656.82	38	Ea	VIBURNUM DENTATUM	$_____	$_____
			_____		
658.161	87	Ea	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	$_____	$_____
			_____		
658.311	122	Ea	ECHINACEA PURPUREA 'WHITE SWAN'	$_____	$_____
			_____		

PROPOSAL FORM (continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
658.345	74	Ea	EUPATORIUM FISTULOSUM	$_____	$_____
			_____		
658.54	161	Ea	LIATRIS SCARIOSA	$_____	$_____
			_____		
658.791	256	Ea	SCHIZACHYRIUM SCOPARIUM	$_____	$_____
			_____		
658.858	266	Ea	SPOROBOLIS HETEROLEPSIS	$_____	$_____
			_____		
658.866	135	Ea	SYMPHYOTRICHUM NOVAE-ANGLAIE	$_____	$_____
			_____		
665.14	27	Ea	PARK BOLLARD LIGHTS	$_____	$_____
			_____		
665.17	9	Ea	STREET LIGHTING TYPE-A 24' SINGLE ARM	$_____	$_____
			_____		
665.18	5	Ea	STREET LIGHTING TYPE-B 24' DOUBLE ARM	$_____	$_____
			_____		
665.91	1	Ea	METER CABINET PANEL AND ELECTRICAL WORK FOR LIGHTING AND SIGNAL POWER	$_____	$_____
			_____		

TOTAL FOR PROJECT <u>BASE BID</u>

In Figures $_____

<u>Form Continues on Next Page</u>

PROPOSAL FORM FOR ADDITIONAL/ALTERNATIVE BID #1 CONSTRUCTION ITEMS

It is mandatory to fill out this section as well.

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
665.15	3	Ea	UPLIGHTS AT PARK SIGNS _____	$_____	$_____
665.16	19	Ea	KIOSK LIGHTING _____	$_____	$_____
900.01	17	EA	BENCH _____	$_____	$_____
900.02	8	EA	BICYCLE RACK _____	$_____	$_____
900.03	2	EA	TRASH RECEPTACLE _____	$_____	$_____
900.04	2	EA	PARK SIGN - LARGE _____	$_____	$_____
900.05	1	EA	PARK SIGN - MEDIUM _____	$_____	$_____
900.06	1	LS	KIOSK CONCRETE SANDBLASTING AND STAINING FOR GREAT BAY _____	$_____	$_____
900.07	17	EA	BRONZE TABLETS IN WALKS _____	$_____	$_____
900.08	1	LS	CONCRETE PATH SANDBLASTING AND STAINING FOR FLORA _____	$_____	$_____
900.11	1	EA	KIOSK INTERPRETIVE PANEL FRAME (LARGE) _____	$_____	$_____

PROPOSAL FORM (add alt 1continued)

ITEM #	EST. QTY.	UNITS	ITEM DESCIPTION & UNIT PRICE IN WORDS	UNIT PRICE IN FIGURES	ITEM TOTAL IN FIGURES
900.12	1	EA	KIOSK INTERPRETIVE PANEL FRAME (MEDIUM)	$_____	$_____
901.1	1	LS	KIOSK STRUCTURE	$_____	$_____

The contractor will be provided an extra 30 working days and time extension if this add-alt is selected for approval.

TOTAL FOR PROJECT ADDITIONAL/ALTERNATIVE BID #1

In Figures $_____

PROPOSAL FORM FOR ADDITIONAL/ALTERNATIVE BID #2 CONSTRUCTION ITEMS

It is mandatory to fill out this section as well.

403.11	750	Tons	Machine Pave 1/2"-50 Gyr 1.5" Overlay	$_____	$_____
403.119	200	Tons	Machine Pave ½"-50 Gyr High Strength, 1.5" Overlay (Traffic Signal Areas)	$_____	$_____
403.6	4000	LF	Pavement Joint Adhesive,	$_____	$_____
417	11,100	Sy	Cold Planing (No work on bridge deck)	$_____	$_____
413.1	6000	Lbs	Crack Sealing	$_____	$_____
1010.2	2000	$	Asphalt Cement Adjustment	$2,000.00	$2,000.00

The contractor will be provided an extra 10 working days if this add-alt is selected for approval.

TOTAL FOR PROJECT ADDITIONAL/ALTERNATIVE BID #2

In Figures $_____

PROPOSAL FORM FOR ADDITIONAL/ALTERNATIVE BID #3 CONSTRUCTION ITEMS

It is mandatory to fill out this section as well.

659.5	1	U	Irrigation system for planted areas	$_____	$_____

_____

TOTAL FOR PROJECT ADDITIONAL/ALTERNATIVE BID #3

In Figures $_____

PROPOSAL FORM FOR ADDITIONAL/ALTERNATIVE BID #4 CONSTRUCTION ITEMS

It is mandatory to fill out this section as well.

673	1	U	Installation of Sara Long Bridge Plaque	$_____	$_____

_____

TOTAL FOR PROJECT ADDITIONAL/ALTERNATIVE BID #4

In Figures $_____

To Bidder:

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts and/or easements and agreements from one or more impacted property owners are not received.

It is the intention of this contract that the items listed above describe completely and thoroughly the entirety of the work as shown on the plans and as described in the specifications. All other items required to accomplish the above items are considered to be subsidiary work, unless shown as a pay item.

TOTAL FOR PROJECT (BASE BID + ADD ALTERNATIVE BID 1 + ADD ALTERNATIVE BID 2+ ADD ALTERNATIVE BID 3+ ADD ALTERNATIVE BID 4) AND **BASIS OF AWARD**

In Figures $_____

Form Continues on Next Page

In Words $_____

_____

The undersigned agrees that for extra work, if any, performed in accordance with the terms and provisions of the Contract Documents, the bidder will accept compensation as stipulated therein.

Date:

_____ By:_____
Company Signature

_____ Title:_____
Business Address

_____
City, State, Zip Code Telephone:_____

We certify that the Company is currently pre-qualified with the State of New Hampshire for Road Construction.

By: _____ _____
Signature & Title Date

The Bidder has received and acknowledged Addenda No._____through _____.

All Bids are to be submitted on this form and in a sealed envelope, plainly marked on the outside with the Bidder's name and address and the Project name as it appears at the top of the Proposal Form.

In order to follow the City's sustainability practices, future bid invitations/specifications may be sent electronically. Please provide an email address as to where I could email future bid invitations/specifications of this type. Thank you in advance for your cooperation.

Email
Address:_____

BID SECURITY BOND

(This format provided for convenience, actual Bid Bond is acceptable in lieu of, if compatible.)

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned

_____, as Principal, and

_____, as Surety, are hereby

held and firmly bound unto _____

IN THE SUM OF _____

as liquidated damages for payment of which, well and truly to be made we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of this obligation is such that whereas the Principal has submitted to the

_____ _____

A CERTAIN Bid attached hereto and hereby made a part hereof to enter into a contract in writing, hereinafter referred to as the "AGREEMENT" and or "CONTRACT", for

_____

_____

_____

NOW THEREFORE,

(a) If said Bid shall be rejected or withdrawn as provided in the INFORMATION FOR BIDDERS attached hereto or, in the alternative,

(b) If said Bid shall be accepted and the Principal shall duly execute and deliver the form of AGREEMENT attached hereto and shall furnish the specified bonds for the faithful performance of the AGREEMENT and/or CONTRACT and for the payment for labor and materials furnished for the performance of the AGREEMENT and or CONTRACT,

then this obligation shall be void , otherwise it shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder in no event shall exceed the amount of this obligation.

BID SECURITY BOND (continued)

The Surety, for value received, hereby agrees that the obligation of said surety and its bond shall be in no way impaired or affected by any extensions of the time within such BID may be accepted, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the parties hereto have duly executed

this bond on the _____ day of _____, 20__.

_____L.S.
(Name of Principal)

(SEAL)

BY _____

_____
(Name of Surety)

BY _____

STATEMENT OF BIDDER'S QUALIFICATIONS

Supply with Bid

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. Add separate sheets if necessary

1. Name of Bidder

2. Permanent Main Office Address

3. Form of Entity

4. When Organized

5. Where Organized

6. How many years have you been engaged in the contracting business under your present name; also state names and dates of previous firm names, if any.

7. Contracts on hand; (schedule these, showing gross amount of each contract and the approximate anticipated dates of completion).

8. General character of work performed by your company.

9. Have you ever failed to complete any work awarded to you? _____(no)____(yes). If so, where and why?

10. Have you ever defaulted on a contract?
_____(no)_____(yes). If so, where and why?

11. Have you ever failed to complete a project in the time allotment according to the Contract Documents?
_____(no)_____(yes). If so, where and why?

12. List the most important contracts recently executed by your company, stating approximate cost for each, and the month and year completed.

13. List your major equipment available for this contract.

14. List your key personnel such as project superintendent and foremen available for this contract.

15. List subcontractors for the following categories whom you will use for the following (unless this work is to be done by your own organization, in which case please state).

    a. Concrete Flatwork _____

    b. Landscaping _____

    c. Curbing _____

    d. Paving _____

STATEMENT OF BIDDERS QUALIFICATIONS (continued)

e. Electrical & Signals _____

f. Paint Striping _____

g. Guardrail _____

The City reserves the right to disallow any subcontractor including work proposed to be completed by the General Contractor.

16. With what banks do you do business?

a. Do you grant the Owner permission to contact this/these institutions?
____(yes) ___(no).

b. Latest Financial Statements, certified audited if available, prepared by an independent certified public accountant, may be requested by Owner. If requested, such statements must be provided within five (5) business days or the bid proposal will be rejected. Certified Audited Statements are preferred. Internal statements may be attached only if independent statements were not prepared.

Dated at _____ this _____ day of _____, 20___.

_____
Name of Bidder

BY_____

TITLE_____

State of_____

County of_____

_____being duly sworn, deposes and

says that the bidder is _____of_____
(Name of Organization)

and answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this ____day of _____, 20__.

_____
Notary of Public
My Commission expires_____

CONTRACT AGREEMENT

Market Street Gateway Improvements Phase 2

THIS AGREEMENT made as of the xx day of xxxx in the year **2019,** by and between the City of Portsmouth, New Hampshire (hereinafter call the Owner) and xxxxxxxxxxxxxxx (hereinafter called the Contractor),

WITNESSETH; that the Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE I- Work - The Contractor shall perform all work as specified or indicated in the Contract Documents for the completion of the Project. The Contractor shall provide, at his expense, all labor, materials, equipment and incidentals as may be necessary for the expeditious and proper execution of the Project.

ARTICLE II - ENGINEER - The Director of Public Works or his authorized representative will act as engineer in connection with completion of the Project in accordance with the Contract Documents.

ARTICLE III - CONTRACT TIME - The work will commence in accordance with the Notice to Proceed. **All work shall be substantially completed no later than October 30, 2019 unless otherwise extended by adding Add/Alt portions of the work to the contract.**

ARTICLE IV - CONTRACT PRICE - Owner shall pay Contractor for performance of the work in accordance with the Contract Documents as shown under item prices in the base bid and the add alternate bids if selected for approval as shown in the Bid Proposal. **The ADD ALTERNATIVE portion/(s) of the bid xxxxxxxx selected to be part of this contract**.

ARTICLE V - PAYMENT - Partial payments will be made in accordance with the Contract Documents. Upon final acceptance of the work and settlement of all claims, Owner shall pay the Contractor the unpaid balance of the Contract Price, subject to additions and deductions provided for in the Contract Documents.

ARTICLE VI - RETAINAGE – To insure the proper performance of this Contract, the Owner shall retain ten percent of the monthly payments claimed by the Contractor until 50% of the original contract work is invoiced and approved by the City. Once the Contractor has invoiced more than 50% of the contract value, provided that the Contractor has satisfied the City regarding the quality and timeliness of the work and provided further that there is no specific cause for withholding additional retainage, no further amount will be withheld. Upon substantial completion of the work the amount of retainage shall be reduced to 2% of the total contract value plus any additional retainage amounts required by the City based on the City's estimate of the fair value of any remaining punch list items. Any additional retainage held for punch list items shall be held until such time as all items on the punch list are repaired or completed to the City's acceptance. The final 2% of retainage shall be held until the warranty period has expired.

ARTICLE VII - LIQUIDATED DAMAGES - In event the Contractor fails to successfully execute the work within the specified contract time the Owner shall assess the Contractor liquidated damages in the amount of **one hundred dollars ($100)** for each calendar day beyond the specified completion date for each section of work. Liquidated damages shall be deducted from the Contract Price prior to final payment of the Contractor.

CONTRACT AGREEMENT (continued)

ARTICLE VIII – CONTRACT DOCUMENTS – The Contract Documents which comprise the contract between Owner and Contractor are attached hereto and made a part hereof and consist of the following:

8.1 This Agreement
8.2 Contractor's Bid and Bonds
8.3 Notice of Award, Notice to Proceed
8.4 Instruction to Bidders
General Requirements, Control of Work, Temporary Facilities, Measurement and Payment, Standard Specifications
8.5 Insurance Requirements
8.6 Special Conditions
8.7 Standard and Technical Specifications
8.8 Drawings
8.9 Special Provisions
8.10 Any modifications, including change orders, duly delivered after execution of this Agreement.

ARTICLE IX – TERMINATION FOR DEFAULT – Should contractor at any time refuse, neglect, or otherwise fail to supply a sufficient number or amount of properly skilled workers, materials, or equipment, or fail in any respect to prosecute the work with promptness and diligence, or fail to perform any of its obligations set forth in the Contract, Owner may, at its election, terminate the employment of Contractor, giving notice to Contractor in writing of such election, and enter on the premises and take possession, for the purpose of completing the work included under this Agreement, of all the materials, tools and appliances belonging to Contractor, and to employ any other persons to finish the work and to provide the materials therefore at the expense of the Contractor.

ARTICLE X – INDEMNIFICATION OF OWNER – Contractor will indemnify Owner against all suits, claims, judgments, awards, loss, cost or expense (including without limitation attorneys' fees) arising in any way out of the Contractor's negligent performance of its obligations under this Contract. Contractor will defend all such actions with counsel satisfactory to Owner at its own expense, including attorney's fees, and will satisfy any judgment rendered against Owner in such action.

ARTICLE XI – PERMITS –The Contractor will secure at its own expense, all other permits and consents required by law as necessary to perform the work and will give all notices and pay all fees and otherwise comply with all applicable City, State, and Federal laws, ordinances, rules and regulations.

ARTICLE XII – INSURANCE – The Contractor shall secure and maintain, until acceptance of the work, insurance with limits not less than those specified in the Contract.

ARTICLE XIII – MISCELLANEOUS –

A. Neither Owner nor Contractor shall, without the prior written consent of the other, assign, sublet or delegate, in whole or in part, any of its rights or obligations under any of the Contract Documents; and, specifically not assign any monies due, or to become due, without the prior written consent of Owner.

B. Owner and Contractor each binds himself, his partners, successors, assigns and legal representatives, to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents.

C. The Contract Documents constitute the entire Agreement between Owner and Contractor and may only be altered amended or repealed by a duly executed written instrument.

D. The laws of the State of New Hampshire shall govern this Contract without reference to the conflict of law principles thereof.

E. Venue for any dispute shall be the Rockingham County Superior Court unless the parties otherwise agree.

IN WITNESS WHEREOF, the parties hereunto executed this

AGREEMENT the day and year first above written.

BIDDER:

BY:_____

TITLE:_____

CITY OF PORTSMOUTH, N.H.

BY:_____
John P. Bohenko

TITLE: City Manager

NOTICE OF INTENT TO AWARD

Date:

TO:

IN AS MUCH as you were the low responsible bidder for work entitled:

Market Street Gateway Improvements Phase 2
Bid #37-19

You are hereby notified that the City intends to award the aforesaid project to you.

Immediately take the necessary steps to execute the Contract and to provide required bonds and proof of insurance within ten (10) calendar days from the date of this Notice.

The City reserves the right to revoke this Notice if you fail to take the necessary steps to execute this Contract.

City of Portsmouth
Portsmouth, New Hampshire

Judie Belanger,
Finance Director

NOTICE TO PROCEED

DATE:

Market Street Gateway Improvements Phase 2
Bid #37-19

TO: .

YOU ARE HEREBY NOTIFIED TO COMMENCE WORK IN ACCORDANCE

WITH THE AGREEMENT DATED xxxxxxxxxxxxxxxxxx AND ALL WORK SHALL

BE COMPLETED BY xxxxxxxxxxxxxxx. ONCE ON-SITE WORK HAS BEGUN, ALL

WORK SHALL BE COMPLETED WITHIN AN xxxxxxxxxxx DAY TIME FRAME.

CITY OF PORTSMOUTH, N.H.

_____
BY: Peter H. Rice, PE

TITLE: Public Works Director

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE TO
PROCEED IS HEREBY ACKNOWLEDGED BY

_____

This the _____day of_____ 20__

By:_____

Title:_____

CHANGE ORDER

Change Order Number Date of Issuance

Owner: CITY OF PORTSMOUTH, N.H

Contractor:

You are directed to make the following changes in the Contract Documents:

Description:

Purpose of Change Order:

Attachments:

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIME
Original Contract Price: $	Original Completion Date:
Contract Price prior to this Change Order: $	Contract date prior to this Change Order:
Net Increase or Decrease of this Change Order: $	Net Increase or Decrease of this Change Order:
Contract Price with all approved Change Orders: $	Contract Due date with all approved Change Orders:

RECOMMENDED:	APPROVED:		APPROVED:
by_____	by_____	by_____	by_____
PW Director	City Finance	City Manager	Contractor

PERFORMANCE BOND

(This format provided for convenience, actual Performance Bond is acceptable in lieu, if compatible)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS

that _____as Principal, hereinafter called Contractor, and _____ (Surety Company) a corporation organized and existing under the laws of the State of_____ and authorized to do business in the State of New Hampshire as surety, hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, N.H. Obligee, hereinafter called Owner, in the amount of _____ Dollars ($_____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents. WHEREAS, Contractor has by written agreement dated _____ entered into a contract with Owner for _____in accordance with drawings and specifications prepared by the Public Works Department, 680 Peverly Hill Road, Portsmouth, N.H. 03801, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall well and faithfully do and perform the things agreed by him to be done and performed, according to the terms of said Contract and such alterations as may be made in said Contract during progress work, and shall further indemnify and save harmless the said Owner in accordance with the Contract and shall remedy without cost to the Owner any defect which may develop within one year from the time of completion and acceptance of the work.

The Surety hereby waives notice of any alteration in work or extension of time made by the Owner or any of its agents or representatives.

Whenever Contractor shall be, and declared by Owner to be, in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

(1) Complete the Contract in accordance with its terms and conditions, or

PERFORMANCE BOND (continued)

(2) Obtain a bid or bids for submission to the Owner for completing the Contract in accordance with its terms and conditions, and upon determination by Owner and Surety of the lowest responsible bidder, arrange for a contract between such bidder and Owner and make available as work progresses (even though there should be a default or a succession of defaults under the contract of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price", as used in this paragraph, shall mean the total amount payable by the Owner to Contractor under the Contract and any amendments thereto, less the amount paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of (2) years from the date on which final payment under the contract falls due.

No right of action shall accrue on this bond to or for the use of any person or corporation other than the Owner named herein or the heirs, executors, administrators or successors of Owner.

Signed and sealed this _____ day of _____

A.D., 20___ .

In the presence of:

_____ BY: _____
(Witness) (Principal) (Seal)

_____
(Surety Company)

_____ BY: _____
(Witness) (Title) (Seal)

Note:
If the Principal (Contractor) is a partnership, the Bond should be signed by each of the partners.

If the Principal (Contractor) is a corporation, the Bond should be signed in its correct corporate name by its duly authorized Officer or Officers.

If this bond is signed on behalf of the Surety by an attorney-in-fact, there should be attached to it a duly certified copy of his Power of Attorney showing his authority to sign such Bonds.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Agreement.

LABOR AND MATERIAL PAYMENT BOND

(This format provided for convenience, actual Labor and Material Bond is acceptable in lieu, if compatible)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS:

that _____

as Principal, hereinafter called Contractor, and _____ (Surety Company) a corporation organized and existing under the laws of the State of

_____ and authorized to do business in the State of New Hampshire hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, N.H. Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the

amount of _____ Dollars ($_____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a

contract with Owner for _____ in accordance with drawings and specifications prepared by the Public Works Department, 680 Peverly Hill Road, Portsmouth, N.H. 03801, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and for the hire of all equipment, tools, and all other things contracted for or used in connection therewith, then this obligation shall be void, otherwise it shall remain in full force and effect, subject however, to the following conditions:

(1) A claimant is defined as one having a direct contract with the Principal or, with a subcontractor of the Principal for labor, material, equipment, or other things used or reasonably required for use in the performance of the Contract. "Labor and material" shall include but not be limited to that part of water, gas, power, light, heat, oil and gasoline, telephone service or rental of equipment applicable to the Contract.

(2) The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such a claimant, may sue on this bond for the use of such claimant, prosecute the suit by final judgment for such sum or sums as may be

LABOR AND MATERIAL PAYMENT BOND (continued)

justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any such suit or any costs or expenses of any such suit, and principal and surety shall jointly and severally indemnify, defend and hold the Owner harmless for any such suit, costs or expenses.

(3) No suit or action shall be commenced hereunder by any claimant:

(a) Unless Claimant, other than one having a direct contract with the Principal, shall have given notice to all the following:

The Principal, the Owner and the Surety above named, within six (6) calendar months after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of New Hampshire save that such service need not be made by a public officer.

(b) After the expiration of one (1) year following the date on which Principal ceased all work on said contract, it being understood , however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(c) Other than in a State court of competent jurisdiction in and for the county or other political subdivision of the State in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere. (4) The amount of this bond may be reduced by and to the extent of any payment of payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such lien by presented under and against this bond.

Signed and sealed this _____ day of _____, 20____. In the presence of:

_____ BY: _____
(Witness) (Principal) (Seal)

_____
(Surety Company)

_____ BY: _____
(Witness) (Title) (Seal)

LABOR AND MATERIAL PAYMENT BOND (continued)

Note:
If the Principal (Contractor) is a partnership, the Bond should be signed by each of the partners.

If the Principal (Contractor) is a corporation, the Bond should be signed in its correct corporate name by its duly authorized Officer or Officers.

If this bond is signed on behalf of the Surety by an attorney-in-fact, there should be attached to it a duly certified copy of his Power of Attorney showing his authority to sign such Bonds.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Agreement.

CONTRACTOR'S AFFIDAVIT

STATE OF _____:

COUNTY OF _____:

Before me, the undersigned, a _____
(Notary Public, Justice of the Peace)

in and for said County and State personally appeared, _____
(Individual, Partner, or duly authorized representative of Corporate)

who, being duly sworn, according to law deposes and says that the cost of labor, material, and equipment and outstanding claims and indebtedness of whatever nature arising out of the performance of the Contract between

CITY OF PORTSMOUTH, NEW HAMPSHIRE

and _____
(Contractor)

of _____

Dated: _____

has been paid in full for Construction of: **Market Street Gateway Improvements Phase 2**

_____
(Individual, Partner, or duly authorized representative of Corporate Contractor)

Sworn to and subscribed
before me this _____day
of _____ 20____

_____

CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that _____

(Contractor) of _____, County of _____and State of

_____ does hereby acknowledge

that_____(Contractor)

has on this day had, and received from the CITY OF PORTSMOUTH NEW HAMPSHIRE, final and completed

payment for the Construction of:

Market Street Gateway Improvements Phase 2

NOW THEREFORE, the said _____

(Contractor)

for myself, my heirs, executors, and administrators) (for itself, its successors and assigns) do/does by these presents remise, release, quit-claim and forever discharge the City of Portsmouth, New Hampshire, its successors and assigns, of and from all claims and demands arising from or in connection with the said Contract dated _____, and of and from all, and all manners of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specifications, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law of equity, or otherwise, against the City of Portsmouth, New Hampshire, its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of record time to the date of these presents.

IN WITNESS WHEREOF,

Contractor:

_____ By:_____

print name of witness:_____ Its Duly Authorized _____

Dated: _____

GENERAL REQUIREMENTS

SCOPE OF WORK

1. INTENT OF CONTRACT

The intent of the Contract is to provide for the construction and completion in every detail of the work described. The Contractor shall furnish all labor, materials, equipment, tools, transportation and supplies required to complete the work in accordance with the terms of the Contract. The Contractor shall be required to conform to the intent of the plans and specifications. No extra claims shall be allowed for portions of the work not specifically addressed in the plans and specifications but required to produce a whole and complete project, such work will be considered subsidiary to the bid items.

2. INCIDENTAL WORK

Incidental work items for which separate payment is not measured includes, but is not limited to, the following items:

a. Clearing, grubbing and stripping (unless otherwise paid for)
b. Clean up
c. Plugging existing sewers and manholes
d. Signs
e. Mobilization/Demobilization (unless otherwise paid for)
f. Restoration of property
g. Cooperation with other contractors, abutters and utilities.
h. Utility crossings, (unless otherwise paid for)
i. Minor items - such as replacement of fences, guardrails, rock wall, etc.
j. Steel and/or wood sheeting as required.
k. Accessories and fasteners or components required to make items paid for under unit prices or lump sum items complete and functional.

3. ALTERATION OF PLANS OR OF CHARACTER OF WORK

The Owner reserves the right, without notice to Surety, to make such alterations of the plans or of the character of the work as may be necessary or desirable to complete fully and acceptably the proposed construction; provided that such alterations do not increase or decrease the contract cost. Within these cost limits, the alterations authorized in writing by the Owner shall not impair or affect any provisions of the Contract or bond and such increases or decreases of the quantities as a result from these alterations or deletions of certain items, shall not be the basis of claim for loss or for anticipated profits by the contractor. The contractor shall perform the work as altered at the contract unit price or prices.

4. EXTRA WORK ITEMS

Extra work shall be performed by the Contractor in accordance with the specifications and as directed, and will be paid for at a price as provided in the Contract documents or if such pay items are not applicable than at a price negotiated between the contractor and the Owner or at the unit bid price. If the Owner determines that extra work is to be performed, a change order will be issued.

5. CHANGE ORDERS

The Owner reserves the right to issue a formal change order for any increase, decrease, deletion, or addition of work or any increase in contract time or price. The contractor shall be required to sign the change order and it shall be considered as part of the Contract documents.

6. FINAL CLEANING UP

Before acceptance of the work, the contractor shall remove from the site all machinery, equipment, surplus materials, rubbish, temporary buildings, barricades and signs. All parts of the work shall be left in a neat and presentable condition. On all areas used or occupied by the contractor, regardless of the contract limits, the bidder shall clean-up all sites and storage grounds.

The items prescribed herein will not be paid for separately, but shall be paid for as part of the total contract price.

7. ERRORS AND INCONSISTENCY IN CONTRACT DOCUMENTS

Any provisions in any of the Contract Documents that may be in conflict with the paragraphs in these General Requirements shall be subject to the following order of precedence for interpretation.

1. Standard Specifications for Road & Bridge Construction will govern General Requirements.
2. Technical Specifications will govern Standard Specifications.
3. Plans will govern Technical Specifications, and General Requirements.
4. Special Provisions written for this contract will govern the plans.

CONTROL OF WORK

1. AUTHORITY OF ENGINEER

(a) All work shall be done under supervision of the Engineer and to his satisfaction. The Engineer will decide all questions which may arise as to the quality and acceptability of materials furnished and work performed and as to the rate of progress of the work; all questions that may arise as to the interpretation of the plans and specifications; and all questions as to the acceptable fulfillment of the Contract by the Contractor.

(b) The Engineer will have the authority to suspend the work wholly or in part for such periods as he may deem necessary due to the failure of the Contractor to correct conditions unsafe for workers or the general public; for failure to carry out provisions of the Contract; for failure to carry out orders; for conditions considered unsuitable for the prosecution of the work, including unfit weather; or for any other condition or reason deemed to be in the public interest. The Contractor shall not be entitled any additional payments arising out of any such suspensions.

(c) The Owner reserves the right to demand a certificate of compliance for a material or product used on the project. When the certificate of compliance is determined to be unacceptable to the Engineer the Contractor may be required to provide engineering and testing services to guarantee that the material or product is suitable for use in the project, at its expense (see Sample of Certificate of Compliance).

2. PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPES

(a) The Contractor shall use every precaution to prevent injury or damage to wires, poles, or other property of public utilities; trees, shrubbery, crops, and fences along and adjacent to the right-of-way, all underground structures such as pipes and conduits, within or outside of the right-of-way; and the Contractor shall protect and carefully preserve all property marks until an authorized agent has witnessed or otherwise referenced their location.

(b) The Contractor shall be responsible for all damage or injury to property of any character, during the prosecution of the work, resulting from any act, omission, neglect, or misconduct in his manner or method of executing the work, or at any time due to defective work or materials, and said responsibility will not be released until the project shall have been completed and accepted.

(c) When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work, or as a result of the failure to perform work by the Contractor, the Contractor shall restore, at its own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing rebuilding, or otherwise restoring as may be directed, or the Contractor shall make good such damage or injury in an acceptable manner.

(d) The Contractor shall paint with tree paint all scars made on fruit or ornamental trees by equipment, construction operations, or the removal of limbs larger than one inch in diameter. Damaged trees must be replaced if so determined by the City Arborist, in his or her sole discretion.

(e) If the Contractor fails to repair, rebuild or otherwise restore such property as may be deemed necessary, the Owner, after 48 hours notice, may proceed to do so, and the cost thereof may be deducted from any money due or which may become due the Contractor under the contract.

(f) It is the intent of the Parties that the Contractor preserve, to as great an extent as possible, the natural features of the site.

CONTROL OF WORK (continued)

3. MAINTENANCE DURING CONSTRUCTION

The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute continuous and effective work prosecuted day by day, with adequate equipment and workers to ensure that the structure is kept in satisfactory conditions at all times.

4. SAFETY PRECAUTIONS

Upon commencement of work, the Contractor shall be responsible for initiating, maintaining and supervising all safety precautions necessary to ensure the safety of employees on the site, other persons who may be affected thereby, including the public, and other property at the site or adjacent thereto.

5. PERMITS

It will be the responsibility of the Contractor to obtain all permits required for the operation of equipment in, or on, all city streets and public ways.

6. BARRICADES, WARNING SIGNS AND TRAFFIC OFFICERS

(a) The Contractor shall provide, erect and maintain all necessary barricades, suitable and sufficient lights, danger signals, signs and other traffic control devices, and shall take all necessary precautions for the protection of the work and safety of the public. Roadway closed to traffic shall be protected by effective barricades. Obstructions shall be illuminated during hours of darkness. Suitable warning signs shall be provided to control and direct traffic in a proper manner, as approved by the engineer.

(b) The Contractor will be held responsible for all damage to the work from traffic, pedestrians, animals or any other cause due to lack of adequate controlling devices.

(c) The Contractor shall provide such police officers or flaggers as the Engineer deems necessary for the direction and control of traffic within the site of project.

The work prescribed herein will not be paid for separately but will be paid for as part of the Contract Price unless specifically appearing as a bid item.

TEMPORARY FACILITIES

1. STORAGE FACILITIES

(a) The Contractor shall not store materials or equipment in a public right-of-way beyond the needs of one working day. Equipment and materials shall be stored in an approved location.

(b) The Contractor shall protect all stored materials from damage by weather or accident and shall insure adequate drainage at and about the storage location.

(c) Prior to final acceptance of the work all temporary storage facilities and surplus stored materials shall be removed from the site.

2. SANITARY FACILITIES

(a) The Contractor shall provide for toilet facilities for the use of the workers employed on the work.

(b) Temporary toilet facilities may be installed provided that the installation and maintenance conform with all State and local laws, codes, regulations and ordinances governing such work. They shall be properly lit and ventilated, and shall be kept clean at all times.

(c) Prior to final acceptance of the work all temporary toilet facilities shall be removed from the site.

3. TEMPORARY WATER

The Contractor shall make all arrangements with the local water department for obtaining water connections to provide the water necessary for construction operations and shall pay all costs.

4. TEMPORARY ELECTRICITY

The Contractor shall make all arrangements with the Public Service Company for obtaining electrical connections to provide the electrical power necessary for construction operations and security lighting and shall pay all electrical connection and power costs.

The Contractor shall be responsible with obtaining an electrical permit from the City Electrical Inspector.

INSURANCE REQUIREMENTS

Insurance shall be in such form as will protect the Contractor from all claims and liabilities for damages for bodily injury, including accidental death, and for property damage, which may arise from operations under this contract whether such operation by himself or by anyone directly or indirectly employed by him.

AMOUNT OF INSURANCE

A) Comprehensive General Liability:
Bodily injury or Property Damage - $2,000,000
Per occurrence and general aggregate

B) Automobile and Truck Liability:
Bodily Injury or Property Damage - $2,000,000
Per occurrence and general aggregate

Coverage amounts may be met with excess policies

Additionally, the Contractor shall purchase and maintain the following types of insurance:

A) Full Workers Comprehensive Insurance coverage for all people employed by the Contractor to perform work on this project. This insurance shall at a minimum meet the requirements of the most current laws of the State of New Hampshire.

B) Contractual Liability Insurance coverage in the amounts specified above under Comprehensive General Liability.

C) Product and Completed Operations coverage to be included in the amounts specified above under Comprehensive General Liability.

ADDITIONAL INSURED

All liability policies (including any excess policies used to meet coverage requirements) shall include the City of Portsmouth, New Hampshire as named Additional Insureds.

1) The contractor's insurance shall be primary in the event of a loss.
2) City of Portsmouth shall be listed as a Certificate Holder. The City shall be identified as follows:

City of Portsmouth
Attn: Legal Department
1 Junkins Avenue
Portsmouth, NH 03801

MEASUREMENT AND PAYMENT

1. MEASUREMENT OF QUANTITIES

(a) All work completed under the contract will be measured according to the United States standard measure.

(b) The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice. Unless otherwise stated all quantities measured for payment shall be computed or adjusted for "in place" conditions.

(c) Unless otherwise specified, longitudinal measurements for area computations will be made horizontally, and no deductions will be made for individual fixtures having an area of 9 square feet or less. Unless otherwise specified, transverse measurements for area computations will be the dimensions shown on the plans or ordered in writing.

(d) Structures will be measured according to lines shown on the plans or as ordered unless otherwise provided for elsewhere in the specifications.

(e) In computing volumes of excavation, embankment, and borrow, the average end area method will be used. Where it is impracticable to measure by the cross-section method, acceptable methods involving three-dimensional measurement may be used. When measurement of borrow in vehicles is permitted, the quantity will be determined as 80 percent of the loose volume.

(f) In computing volumes of concrete, stone and masonry, the prismoidal method will be used. The term "ton" will mean the short ton consisting of 2,000 pounds avoirdupois.

(g) Except as specified below, all materials that are measured or proportioned by weight shall be weighed on scales which the Contractor has had sealed by the State or by a repairman registered by the Commissioner of Agriculture. All weighing shall be performed in a manner prescribed under the Rules and Regulations of the Bureau of Weights and Measures of the New Hampshire Department of Agriculture.

(h) Weighing of materials on scales located outside New Hampshire will be permitted for materials produced or stored outside the state, when requested by the Contractor and approved. Out-of-state weighing in order to be approved, must be performed by a licensed public weigh master or a person of equal authority in the state concerned on scales accepted in the concerned state.

(i) Each truck used to haul material being paid for by weight shall bear a plainly legible identification mark, and if required, shall be weighed empty daily at such times as directed.

(j) When material is weighed, the individual weight slips, which shall be furnished by the Contractor, for trucks, trailers, or distributors, shall show the following information: the date; the project; the material or commodity; the dealer or vendor; the Contractor or Subcontractor; the location of the scales; the vehicle registration number or other approved legible identification mark; the tare and net weights, with gross weights when applicable; and the weigher's signature or his signed initials.

MEASUREMENT AND PAYMENT (continued)

(k) The right is reserved to weight any truck, trailer, or distributor, at locations designated, before and after making deliveries to the project.

(l) Bituminous materials will be measured by the gallon or ton.

(m) When material is specified to be measured by the cubic yard but measurement by weight is approved, such material may be weighed and the weight converted to cubic yards for payment purposes. Necessary conversion factors will be determined by the Owner.

(n) The term "lump sum" when used as an item of payment will mean complete payment for the work described in the item.

(o) When a complete structure or structural unit (in effect, "lump sum" work) is specified as the unit of measurement, the unit will be construed to include all necessary fittings and accessories, so as to provide the item complete and functional. Except as may be otherwise provided, partial payments for lump sum items will be made approximately in proportion to the amount of the work completed on those items.

(p) Material wasted without authority will not be included in the final estimate.

2. SCOPE OF PAYMENT

(a) The Contractor shall receive and accept compensation provided for in the contract as full payment for furnishing all materials and for performing all work under the contract in a complete and acceptable manner and for all risk, loss, damage or expense of whatever character arising out of the nature of the work or the prosecution thereof.

(b) The Contractor shall be liable to the Owner for failure to repair, correct, renew or replace, at his own expense, all damage due or attributable to defects or imperfections in the construction which defects or imperfections may be discovered before or at the time of the final inspection and acceptance of the work.

(c) No monies, payable under the contract or any part thereof, except the first estimate, shall become due or payable if the Owner so elects, until the Contractor shall satisfy the Owner that the Contractor has fully settled or paid all labor performed or furnished for all equipment hired, including trucks, for all materials used, and for fuels, lubricants, power tools, hardware and supplies purchased by the Contractor and used in carrying out said contract and for labor and parts furnished upon the order of said Contractor for the repair of equipment used in carrying out said contract; and the Owner, if he so elects, may pay any and all such bills, in whole or in part, and deduct the amount of amounts so paid from any partial or final estimate, excepting the first estimate.

MEASUREMENT AND PAYMENT (continued)

3. COMPENSATION FOR ALTERED QUANTITIES

(a) Except as provided for under the particular contract item, when the accepted quantities of work vary from the quantities in the bid schedule the Contractor shall accept as payment in full, so far as contract items are concerned, at the original contract unit prices for the accepted quantities of work done. No allowance will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the Bidder and subsequent loss of expected reimbursements therefore or from any other cause.

(b) Extra work performed will be paid for at the contract bid prices or at the price negotiated between the Owner and the Contractor if the item was not bid upon. If no agreement can be negotiated, the Contractor will accept as payment for extra work, cost plus 15% (overhead and profit). Costs shall be substantiated by invoices and certified payroll.

4. PARTIAL PAYMENTS

Partial payments will be made on a monthly basis during the contract period. From the total amount ascertained as payable, an amount will be deducted and retained by the Owner as described in Article VI in the Agreement..

5. FINAL ACCEPTANCE

Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer will make an inspection. If all construction provided for and contemplated by the contract is found complete to his satisfaction, this inspection shall constitute the final inspection and the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of the final inspection.

If, however, the inspection discloses any work in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final inspection provided the work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

MEASUREMENT AND PAYMENT (continued)

6. ACCEPTANCE AND FINAL PAYMENT

(a) When the project has been accepted and upon submission by the Contractor of all required reports, completed forms and certifications, the Owner will review the final estimate of the quantities of the various classes of work performed. The Contractor may be required to certify that all bills for labor and material used under this contract have been paid.

(b) The Contractor shall file with the Owner any claim that the Contractor may have regarding the final estimate at the same time the Contractor submits the final estimate. Failure to do so shall be a waiver of all such claims and shall be considered as acceptance of the final estimate. From the total amount ascertained as payable, an amount ill be deducted and retained by the Owner for the guaranty period as described in Article VI of the Agreement.

(c) All prior partial estimates and payments shall be subject to correction in the final estimate and payment.

7. GENERAL GUARANTY AND WARRANTY OF TITLE

(a) Neither the final certification of payment nor any provision in the contract nor partial or entire use of the improvements embraced in this Contract by the Owner or the public shall constitute an acceptance of work not done in accordance with the Contract or relieve the Contractor of liability in respect to any express or implied warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of twelve (12) months from the date of final acceptance of the work. The Owner will give notice of defective materials and work with reasonable promptness.

(b) No material, supplies or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease purchase or other agreement by which an interest therein or in any part thereof is retained by the Seller or supplier. The Contractor shall warrant good title to all materials, supplies and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the Owner free from any claims, liens or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have the right to a lien upon any improvements or appurtenances thereon.

Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontractors and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

MEASUREMENT AND PAYMENT (continued)

8. NO WAIVER OF LEGAL RIGHTS

(a) Upon completion of the work, the Owner will expeditiously make final inspection and notify the Contractor of acceptance. Such final acceptance, however, shall not preclude or stop the Owner from correcting any measurement, estimate, or certificate made before or after completion of the work, nor shall the Owner be precluded or be stopped from recovering from the Contractor or his Surety, or both, such overpayment as it may sustain by failure on the part of the Contractor to fulfill his obligations under the contract. A waiver on the part of the Owner of any breach of any part of the contract shall not be held to be a waiver of any other or subsequent breach.

(b) The Contractor, without prejudice to the Contract shall be liable to the terms of the Contract, shall be liable to the Owner for latent defects, fraud or such gross mistakes as may amount to fraud, and as regards the Owner's right under any warranty or guaranty.

9. TERMINATION OF CONTRACTOR'S RESPONSIBILITY

Whenever the improvement provided for by the Contract shall have been completely performed on the part of the Contractor and all parts of the work have been released from further obligations except as set forth in his bond and as provided in Section 8 above.

STANDARD SPECIFICATIONS

The Standard Specifications for Road and Bridge Construction of the State of New Hampshire Department of Transportation and any Addenda shall apply but without regard to Section 100 "General Conditions" of those Standard Specifications and without regard to any of those NHDOT provisions that allow for an adjustment for changing fuel and asphalt prices.

Special Provisions

Technical Specifications included herein:

202 Removing Structures and Obstructions
203 Excavation and Embankment
304 Aggregate Base Courses
401 Asphalt Paving
608 Sidewalks and HC Ramps
609 Curbing
616.191 Traffic Signals
621 Delineators
641 Loam
645 Erosion Control
650 Planting – General
651 Evergreen Trees
652 Deciduous Trees
654 Evergreen Shrubs
655 Deciduous Shrubs
659.5 Irrigation System
665 Light Poles
665.91 Lighting and Signal Service
900 Site Features/ Park Amenities
901 Kiosk Structure

Appendix

Wetland Permit
Light Pole Cut Sheets
Irrigation As-built from Phase 1
Informational sign plaque details

SECTION 202

REMOVING STRUCTURES AND OBSTRUCTIONS
(Catch basins and Pipes)

Amend Section 202 to include:

202.5 Basis of Payment. The accepted quantity of removal of existing pipe shall be measured and paid by the linear foot of pipe removed regardless of pipe depth. Measurement shall extend to the exterior wall of associated structures and no payment shall be made for pipe extensions into structures. The accepted quantity of removal of existing structures shall be measured and paid by each structure regardless of structure depth.

There will be **no compensation under this item** for removal of the pavement surface, excavation, dust control, hauling, temporary removal of detrimental objects and all tools, equipment, labor and other materials necessary to satisfactorily complete the work.

Pavement removal and excavation down to the limits of the typical roadway subgrade shall be measured and paid under Pay Item 203.10 Common Excavation. All other excavation required to remove pipes or structures shall be considered incidental to the appropriate item below.

Payment will be made under:

Pay Item		Pay Unit
202.41	Removal of Existing Pipe, 0 - 24" Diameter (drainage and sewer pipe)	Linear Foot
202.5	Removal of Catch Basins, drop inlets and manhole (drainage and sewer)	Each

SECTION 203

EXCAVATION AND EMBANKMENT

Amend Section 203 to include:

203.4 Method of Measurement. Exploratory excavations will be paid under item 206.19.

203.5 Basis of Payment. Payment shall be full compensation for furnishing all labor, materials and equipment necessary for excavation, backfilling, compaction, disposal of materials, and the protection of the utilities.

Payment will be made under:

Pay Item		Pay Unit
203.1	Common Excavation- includes removal of material for existing pavement and sidewalks and earth removal for the installation of the biomedian and excludes excavation for utilities such as conduit, drainage, curb, light poles etc.	Cubic Yard
203.6	Embankment-in-Place	Cubic Yard

SECTION 304

AGGREGATE BASE COURSES

Amend Section 304 to include:

Materials:

1.1. Aggregate. Sources of Aggregate and preliminary test results shall be submitted ten working days prior to any placement of material on the job. Failure of these preliminary tests will be grounds for rejection of material from that source. Aggregates will be tested on the job and shall meet these specifications as the material is incorporated into the work. All Measurements shall be in-place compacted quantities in accordance with the plans and specifications.

1.2. 3/8" PEA GRAVEL. 3/8" Pea Gravel shall be used in the biomedian drainage section.

Related Sections:

Section 650 – PLANTING – GENERAL

Pea Stone Drainage Layer shall be a semi round aggregate, clean, dried and free of organic and deleterious materials.

Sieve Analysis (% Passing by weight)

Sieve	Specification
1/2"	100
3/8"	85-100
#4	10-30
#8	0-10
#16	0-5

1.3 Crushed Stone for Biomedian shall be #4 crushed stone as described in table 703.1 in the NHDOT standard specifications.

Basis of Payment

The cost of the all laboratory testing including compaction testing at 1 test per 50' in areas to be designated by the Engineer, shall be the responsibility of the Contractor. The accepted quantities of gravel and crushed gravel will be paid at the contract unit price per cubic yard, complete in place.

Payment will be made under:

Pay Item		Pay Unit
304.3	CRUSHED GRAVEL	CY
304.9	3/8" PEA GRAVEL	CY
304.91	NHDOT #4 CRUSHED STONE	CY

SPECIAL PROVISION

AMENDMENT TO SECTIONS 401 AND 403

ITEM 403.11	**HOT BITUMINOUS PAVEMENT, MACHINE METHOD**	**TON**
ITEM 403.119	**HOT BITUMINOUS PAVEMENT, HIGH STRENGTH MACHINE METHOD**	**TON**
ITEM 403.12	**HOT BITUMINOUS PAVEMENT, HAND METHOD**	**TON**

The work under these items shall conform to the relevant provisions of Sections 401 and 403 of the Standard Specifications and the following.

Description

1.1 Description

A. Work Included: Furnish and install bituminous concrete pavement courses in accordance with Sections 401 of the NHDOT Standard Specifications for Road and Bridge Construction (latest edition) and as specified in this section.

B. All reference to NHDOT, NHDOT personnel or the Department may be construed as the Engineer, the City of Portsmouth, their agents and their representatives.

1.2 Quality Assurance

A. Work shall conform to NHDOT Section 401, Tier 2 except as noted herein:

1. Ride Smoothness: Section 401.3.17.3.4.1 shall apply except variations exceeding **3/8** inch in profile or cross slope shall be eliminated.
2. Ride Smoothness: Section 401.3.17.3.4.4 shall apply except high points **0.5** inches in 25 feet shall corrected.

Materials

2.1 Materials

A. Materials shall conform to NHDOT Section 401 except the following:

1. **The maximum amount of Total Reused Binder (TRB) in the pavement mix design shall be .5% and the mix shall meet all volumetric mix design criteria.**
2. Asphalt Cement shall not contain any form of used, recycled or refined oil. Suppliers of PG Binder shall certify that the PG Binder does not contain any used, recycled or refined oil.
3. All ½" (12mm), ¾" inch (19mm) and 1 inch (25mm) pavement mixes shall be designed using the 50 gyration N design, unless specified otherwise.
4. Liquid asphalt cement binder shall have a Performance Grade (PG) of PG 64-28 for all standard bituminous and PG 64-E for all high strength bituminous pavements.
5. All high strength asphalt, when specified, shall be 50 gyration unless otherwise directed.

2.2 Pavement Mix Designs

Pavement mix designs shall meet NHDOT Section 401.2.5.1 except the following:

A. Minimum asphalt binder content shall be as follows whenever more than 50 tons or more of material is placed:

Minimum Asphalt Binder Content		
Mix Type	50 Gyration	75 Gyration*
3/8-in (9.5 mm)	6.3	5.9
1/2-inch (12.5 mm)	5.9	*
3/4-inch (19 mm)	5.3	*

The required minimum asphalt content is based on the use of aggregate with a specific gravity of 2.65 to 2.70. The minimum asphalt content requirement may be adjusted when aggregate with a higher specific gravity is used, or the minimum may be adjusted at the Engineer's discretion if it is believed to be in the best interest of the Owner**.** All mix designs shall be submitted to the Engineer for verification and approval.
*75 Gyration mix is not allowed for these sizes without express written permission of the engineer.

B. Method Requirements NHDOT Section 401.2.6 shall apply including the following:
   1. Coarse Aggregate: Stockpiled coarse aggregate shall meet the requirements of 2.6.1, Table 2.
   2. Tolerances: All mixtures shall conform within the range of tolerances provided in NHDOT Section 401.2.6.2
   3. When Non-Compliant test result, it shall be the Contractor's responsibility to correct non-compliant pavement. The Contractor may be required to remove non-compliant material that is poorly graded or material exhibiting cracks, open joints or other imperfections **(no payment will be made for this material or its removal).**

Construction Requirements

Construction requirements shall be in accordance with Sections 401 of the NHDOT Standard Specifications for Road and Bridge Construction (latest edition) **and** as specified in this section.

1. Prior to placing any mix, a mix design shall be submitted for approval and pre-paving conference shall be held with the Owner, Contractor, and Engineer to discuss the proposed paving schedule, source of mix, type and amount of equipment to be used, sequence of paving pattern, rate of mix supply, traffic control, and general continuity of the operation. Special attention shall be made to the paving pattern sequence to minimize cold joints.
2. The Contractor shall notify the Engineer one week in advance of paving operations to allow sufficient time for scheduling personnel.
3. Any pavement course four inches (compacted depth) or greater shall be placed and compacted in two lifts.
4. Sweeping. Existing pavement or previously laid courses shall be thoroughly dry and free from all dust, dirt, and loose material. Sweeping with a power broom, supplemented by hand brooming, may be necessary.
5. Tack coat. Surfaces of any pavement course shall have a tack coat of emulsified asphalt applied in accordance with NHDOT Specifications. Application of emulsified asphalt shall be between 0.03 and 0.05 gal/yd^2.

6. Joint adhesive shall be used for all transverse and lateral seams when placing more than 100 tons of asphalt or more. This item is subsidiary unless a separate pay item is provided.
6. Utility covers, frames and grates, valves and other castings shall be set and raised. Contact surfaces of the drainage and utility castings shall be painted with a thin coating of suitable bituminous material. Surface pavement shall be removed from covers and castings immediately following pavement operations.
7. Method requirements NHDOT Section 401.3.1.2 shall apply.
8. In addition to 3.1.A.7 above, the following performance requirements shall apply:
   a). Tier 2 QA/QC performance requirements shall apply.
   b). Ride Smoothness: NHDOT Section 401.3.17.3.4.1 shall apply except variations exceeding **3/8** inch in profile or cross slope shall be eliminated.
   c). Ride Smoothness: Section 401.3.17.3.4.4 shall apply except high points 0.5 inches in 25 feet shall corrected.

Method of Measurement

Items listed here will be measured in accordance to the standard specifications.

Basis of Payment

All pavement items will be paid for in accordance to the standard specifications.

SECTION 608

SIDEWALKS

Amend Section 608 to include:

SECTION 608.2

CONCRETE SIDEWALK CONSTRUCTION

Description

1.1 This work shall consist of constructing sidewalks of Portland cement concrete, reinforced when specified. Portland cement concrete sidewalks shall receive a protective coating unless otherwise directed.

Materials

2.1 Base course materials shall conform to the class of materials as specified in the plans.

2.2 Portland cement concrete shall be Class AA (4000 PSI) conforming to 520.

2.2.1 Coarse aggregate shall be standard size #67.

2.2.2 Protective coating shall be Silane/Siloxane conforming to 534.2.2.

2.3 Reinforcement shall conform to 544.7. (Synthetic Fibers)

2.4 Joint filler shall conform to AASHTO M 213.

Construction Requirements

3.2 Concrete Sidewalks.

3.2.1 Excavation shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The foundation shall be shaped and compacted to a firm, even surface conforming to the section shown on the plans. All soft and yielding material shall be removed and replaced with acceptable material.

3.2.2 Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be straight, free from warp, and of sufficient strength to resist the pressure of the concrete without springing. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.

3.2.3 The foundation and granite curb shall be thoroughly moistened immediately prior to the placing of the concrete. Any standing water shall be removed before the concrete is placed. The proportioning, mixing, and placing of the concrete shall be in accordance with 520.3.

3.2.4 Reinforcement in reinforced concrete sidewalk shall be placed at mid-depth or as shown on the plans, using the methods described in 544.3.

3.2.5 Finishing.

3.2.5.1 Concrete shall be finished by use of wood, or magnesium floats, by skilled concrete finishers. A fine-grained broom finish shall be applied to all concrete sidewalks subject to foot traffic.

3.2.5.2 All outside edges and expansion or construction joints shall be edged with an edging tool having a radius of 1/4 in. (6 mm). All crack control joints in sidewalks subject to foot traffic shall be edged with a jointing tool.

3.2.6 Joints.

3.2.6.1 Construct transverse and longitudinal crack control joints by sawing, jointing tool or other approved method to a minimum depth of one third the slab thickness. If the jointing tool is not capable of constructing a joint to the correct depth, saw the joint to the correct depth. Saw crack control joints as soon as concrete has hardened sufficiently to permit sawing without excessive raveling and before uncontrolled shrinkage cracking occurs, usually between four and twenty four hours. Control joints for expansion shall be spaced at 25 ft [2.5 m] for slab thickness of 4 in [100 mm] and 6 in [150 mm], unless otherwise specified. Form crack control joints every 5 ft. (1.5 m), or as specified in the plans, in sidewalks subject to foot traffic. Bond breaker shall be used at all construction joints.

3.2.6.2 Expansion joints shall be formed at any angles or intersections in the sidewalks, around all appurtenances such as manholes, utility poles and catch basins, and between buildings or bridges. Preformed expansion joint filler of the thickness indicated shall be installed for the full depth of the slab.

3.2.7 Curing. Concrete shall be cured for a minimum of 7 days. Curing compounds will not be permitted unless otherwise approved. Plastic sheets or other approved materials shall be placed in close contact with the finished concrete as soon as the concrete has set sufficiently to avoid damage from the placement of coverings. The protective covering shall be maintained vapor-proof in close contact with the concrete for the entire 7 day period unless otherwise approved. All traffic shall be excluded during the curing period. Vehicular traffic shall be excluded for such additional time as ordered.

3.2.8 Protective coating. Protective coating shall be applied in accordance with 534.3.

Method of Measurement

4.1 Sidewalks will be measured by the square foot. The area occupied by the curb will not be included in the final pay quantity.

4.1.1 Protective coating will not be measured.

Basis of Payment

5.1 Sidewalks will be paid for at the Contract unit price per square foot complete in place.

5.1.1 Protective coating for concrete sidewalks will be subsidiary.

5.2 Base course material will be paid for under item 304.3.

5.3 Necessary excavation will be paid for under 203.

Pay item		**Pay unit**
608.24	4” Concrete Sidewalks	Square Foot
608.26	6” Concrete Sidewalks (Accessible Ramps)	Square Foot

SECTION 608.31

BRICK SIDEWALK INCLUDING DEMOLITION AND EARTHWORK

1.0 Description

A. The work shall consist of reconstructing the sub-base (if ordered necessary by the Engineer) and constructing a new brick sidewalk as directed in the field by the Engineer.

2.0 Materials

A. All bricks shall conform to the requirements of ASTM Standard Specifications for Building Bricks Designation C902 SX for Grade SW. The bricks shall be No. 1, wire cut type for paving, with a compressive strength of not less than 6,000 pounds per square inch. The bricks shall not be cored or have frogs and shall be of a standard size (4" x 8"). Bricks will be manufactured by **Pinehall Brick** style is 'Pathway, Full Range' or approved equal.

B. The setting bed for the bricks will be composed of 3 parts course sand and 1 part type II portland cement dry mixed. This is Subsidiary for payment.

C. The setting bed shall be placed on a hot mix asphalt base 2" thick which is composed of 3/8" surface mix. This asphalt will be paid for separately under asphalt hand work.

D. The sidewalk will be built on a minimum of 8"of NHDOT item '304.3' crushed gravel. This gravel will be paid for separately.

3.0 Construction Requirements

A. All labor and materials shall conform to the State of New Hampshire Standard Specifications for Road and Bridge Construction.

B. Excavation for sidewalks shall be at a depth of 12 inches below finish grade. In areas not butting curbing or buildings, the excavation shall be 6 inches wider than the finished sidewalk width. At all drive crossings, the depth of excavation shall be increased accordingly. The Contractor's price shall include neat and square cutting of existing asphalt road surface as needed. All unsuitable material shall be removed and disposed of off-site at the Contractor's own expense. This is subsidiary to the brick sidewalk item.

C. The base material shall be placed to grade at the proper slope and shall be thoroughly compacted to the depth specified or directed. In the way of all drive crossings the base will be increased to a compacted depth of 12 inches. Gravel requirements for reconstruction will be as directed, based on site conditions. The work includes backing up any and all curb being installed by others on both sides.

D. The 2" structural asphalt layer will be placed on the sidewalk area across the entire surface area of the sidewalk. The asphalt layer will be fine graded before compaction to the proper grade and slope.

E. The setting bed for the bricks will be between ¾" and 1¼" thick as necessary for fine grading. Setting beds greater than 1½" thick are unacceptable. Work in inclement conditions will not be allowed. The setting bed will be kept reasonably dry until compaction of the bricks can occur.

F. The Contractor shall lay the bricks so that approximately 4.5 bricks shall cover one square foot so that joints are no greater than 1/16" of an inch. The pattern will be as shown on the contract drawings. The sidewalk shall pitch a minimum of 1/8 inch and a maximum 1/4 inch per foot towards the street.

G. Mason's fine sand may be used for compaction of the bricks. Polymeric sand will be applied to the entire sidewalk area after all compaction is complete and the mason's sand has been allowed to settle. Typically this period is no less than 1 week.

H. In areas where the edge of the brick sidewalk is not adjacent to granite curbing, the Contractor shall install plastic edging to hold the bricks in place. Such edging shall be installed per the manufacturer's recommendations.

I. The Contractor shall be required to submit a sample of bricks for approval by the Engineer before the contracts are signed.

J. Half Bricks will be snapped whenever possible to cut down on dust and noise.

K. Bricks will be wet cut whenever snapping is not practical.

L. Contractor will provide control of brick dust slurry from cutting in a method approved by the Engineer.

M. Defective bricks will be removed and replaced before the final sweeping of polymeric sand. The Engineer will determine bricks to be removed and replaced.

4.0 Method of Measurement

A. Bricks will be measured by the Engineer to the nearest square foot.

5.0 Basis of Payment

5.1 Sidewalks will be paid for at the Contract unit price per square foot complete in place.

Pay item		**Pay unit**
608.31	BRICK SIDEWALKS	SQUARE FOOT

SECTION 608.54

ADA Compliant Accessible Ramp Panels

Description

1.1 This work shall consist of furnishing and installing a detectable warning surface and accessories on sidewalk ramps at locations shown on the plans, as specified herein, or as ordered including any and all required surface preparation. Detectable warnings shall be installed at sidewalk ramps where a sidewalk crosses a vehicular way, excluding unsignalized driveway crossings. The edge nearest the curbline shall be located 6 to 8 in from the face of curbline. The panel shall be centered on the ramp and extend the entire width of the ramp to the nearest whole panel dimension.

Materials

2.1 Detectable Warning Device:

2.1.1 Material. The detectable warning surface shall consist of units from Neenah Foundry, East Jordan Iron Works, or approved equal. The units shall be cast into Portland cement or other owner approved material, as recommended by the manufacturer. The paver units shall be of cast iron.

2.1.2 Color. The color of the tile used shall be natural rust, and will be installed in a concrete ramp as described in 608.26.

2.1.3 Paver Dimensions. Nominal paver dimensions shall be 2’ deep x 2’ wide. The panels shall be combined to span the width of the walk to the nearest whole panel dimension.

2.1.4 Detectable Warning Truncated Dome Geometry:

2.1.4.1 Detectable warnings shall be in full compliance with ADAAG guidelines (Title 49 DFR Transportation, Part 37.9 Standard for Accessible Transportation Facilities, Appendix A, Section 4.29.2- Detectable Warning on Walking Surfaces).

2.1.4.2 Size and spacing for truncated domes shall be as follows: base diameter of nominal 0.9 inch, top diameter of nominal 0.4 inch, height of nominal 0.2 inch, with a center to center spacing of nominal 2.35 inches.

2.1.4.3 The truncated dome pattern shall align properly from paver to paver if more than 1 paver is required.

2.2 Setting Bed Material

2.2.1 Material. Pavers shall be set into fresh concrete before it sets. Concrete pad for setting bed to be 6" in both directions larger than the tactile panel so that no more than 3" of concrete is showing around the panels. See manufacturer instructions.

Construction Requirements

3.1 The Contractor shall submit manufacturer's installation instructions and descriptive literature for materials specified herein.

3.2 Transport, storage, and handling of products shall be in accordance with manufacturer's instructions.

3.2.1 All sealants/adhesives shall be protected from freezing conditions.

3.3 The air and surface temperatures during construction shall be in accordance with manufacturer's recommendations.

3.4 Concrete foundation shall be installed in accordance with the specifications included within Section 608 to depths indicated in the section shown on the plans.

3.5 Install detectable warning pavers in accordance with manufacturer's instructions directly in the setting bed and the allowing the top surface of the paver units to be at or just below the required finish grade.

3.6 Care shall be taken to ensure the safety of pedestrians when sidewalks must remain in service during construction.

Method of Measurement

4.1 These are measured by each panel installed under the truncated dome panel item.

Basis of Payment

Pay Item		**Pay Unit**
608.54	Detectable Warning Devices, Cast Iron	Each

SPECIAL PROVISION

AMENDMENT TO SECTION 609 – Curbing Installation

Basis of Payment:

Amend 5.3: Class A Concrete backfill will be used for curb installation and will be paid for under item 520.1 by the cubic yard installed.

PORTSMOUTH

January 2019

S P E C I A L P R O V I S I O N

AMENDMENT TO SECTION 616 - TRAFFIC SIGNALS

Item 616.191 – Alterations to Traffic Signals

This special provision provides for the reconstruction of the existing traffic control signal at the intersection of Market Street and Noble's Island in the City of Portsmouth, NH.

GENERAL:

All provisions of Section 616, except as modified or changed below, shall apply.

1. The Contractor shall be responsible for the traffic signal operation and maintenance once alterations to the existing signals, excavation or other work within 75 feet of the stop bar at any leg of the intersection has begun. The Contractor shall notify the City of Portsmouth Department of Public Works (603-427-1530) with names and phone numbers of persons to be contacted in case of a malfunction. The Contact person(s) must be available 24 hours a day, seven days a week. The Contractor shall also keep a signal log in the cabinet to track all maintenance work the Contractor completes on the signal system. This log shall be placed within a plastic cover and shall at least include the description of the trouble call, corrective action taken, date, time, and personnel who completed the work.

2. It is not intended that every fitting, minor detail or feature be shown and described, as the assumption is made that the Contractor and/or their Subcontractor is an expert in the particular area of responsibility and is capable of interpreting the plans, Specifications, and Special Provisions so that the bid and/or construction shall include all items required to provide complete, fully operational traffic control signal system and that they shall be provided and installed in a neat and workmanlike manner.

3. All quantities for traffic signal items as listed below shall be checked against the plans by the Contractor. Where a discrepancy between the quantities is noted, the plans shall override.

4. The traffic signal must be inspected and approved by the City of Portsmouth Department of Public Works (603-427-1530) prior to placing in operation. The Contractor shall contact David Desfosses (603-766-1411) one week prior to turning the signals on. If the Contractor does not speak directly with David Desfosses they must leave a detailed message with the Administrative Assistant and expect a call back. Leaving a message does not constitute an approval.

5. The Contractor shall install a generator anchoring system to the new traffic controller cabinet's cement concrete foundation. The location of the anchoring system will be on the side of the cabinet that houses the controller's power supply and installed to the minimum 12" raised concrete foundation (see location A on Attachment A Detail Plan). If the controller cabinet doesn't have a raised foundation to accommodate the anchoring system then the Contractor shall install the anchoring system to the front access pad of the controller cabinet. The anchoring system shall be a ½-inch x 13 tpi galvanized wrought eyebolt with a thread length of 1 5/8-inch. The eyebolt shall be installed in a 5/8-inch diameter drilled hole into the concrete foundation or pad (the location of the drilled hole shall be placed in an area where it does not interfere with the existing controller cabinet anchor bolt system to the concrete foundation). The eyebolt shall be bonded into the concrete by an epoxy compound [Component "A" (105 resin) and Component "B" (205 hardener)], with the epoxy compound filling the drilled hole and covering the threads of the eyebolt. The epoxy compound shall be a product as included on the Department's Qualified Product List. [See "Attachment A" Detail Plan]

6. The electrical service modifications and new hook-up shall be paid for by the Contractor. The monthly power costs will continue to be paid for by the City of Portsmouth during the construction contract.

7. The notation of approved equal or equivalent is denoted on several items and requires specific approval by the Engineer and the City.

Add to 2.1:

2.1.3 List of Major Materials:

1 – Maintain existing traffic signal cabinet and controller during the duration of construction and remove and dispose of following switch-over to the new cabinet control listed below. Any ancillary equipment requested to be shall be salvaged and delivered to DPW.

1 – Existing loop detectors will be abandoned following the installation of the video detection system. The Contractor shall properly dispose of all old cabling unless otherwise directed by the City of Portsmouth.

1 – The traffic signal equipment shall be housed in a "P" Type cabinet that is on the NHDOT approved products list and assembled by the equipment manufacturer with a 12-inch extension base. The interior and exterior of the controller cabinet shall be powder coated, white on the inside and black on the exterior. The cabinet shall be equipped with a pull out keyboard tray, an LED interior light, and a standard generator hook-up for future auxiliary power needs. The cabinet shall be equipped with a newly installed ground rod array and lightning arresting connections on all external cables leads. The cabinet shall be furnished on a cement concrete foundation. Cabinet to be provided with thermostatically controlled dual exhaust fans and electric heat unit.

1 – 16-Phase programmable traffic actuated signal controller of current NEMA specifications (TS2-Type 1) with internal time-based coordination with associated MMU to be operated

in conflict monitor mode. The controller shall be a Siemens model m60 NEMA controller with compatible MMU. The controller shall include an integrated Ethernet port.

1 – System cable drop for connection between interconnect / video system to City of Portsmouth Department of Public Works.

1 – System cable modem in controller cabinet for broadband service between interconnect / video system and City of Portsmouth Department of Public Works. [The installation/service connection cost to be paid by the Contractor; monthly service to be assumed by the Portsmouth DPW]

1 – EDI 16-channel Ethernet equipped enhanced malfunction management unit (as noted above), set-up to operate in conflict monitor mode. The MMU shall be compatible with the Siemens model m60 NEMA controller and shall include an integrated Ethernet port, or approved equal.

1 – ½ inch x 13 tpi galvanized wrought eyebolt with a thread length of 1-5/8-inch.

1 – Two-part epoxy bonding agent (105 resin and 205 hardener).

1 – Generator transfer switch, hookup and cord from GenTran.

1 – Environmentally Hardened Ethernet Switch.

1 – 4-Channel Video Detection – Miovision Smartview 360, Grid Smart omni-directional, Iteris – Vantage Series (4 camera system), or approved equal Video Cameras with manufacturer cables and rack cards, including hardware mounted on the mast arms (include spare camera if Vantage system is provided) with integral counting capability.

1 – Rack Mounted Video Detection Processor and Cabling of the same manufacturer as above.

1 – 9” Color flat screen portable monitor or approved equal, compatible with installed video detection system, with capabilities to view video detection. [This monitor will become the property of the Portsmouth DPW.]

1- Galvanized steel, gloss black powdercoat painted, approximately 26’ high mast arm signal pole with foundation, with 50’ signal arm, 6’ black powdercoat luminaire arm KA72-T-2-6’-KPL20 to match luminaire poles to be mounted at 45 degree rotation to the arm and same height as luminaire poles, with nut covers, Union Metal Manufacturing Company, Design 50400, Valmont Industries, Inc., Design F283A, or approved equal.

1- Galvanized steel, gloss black powdercoat painted, approximately 26’ high mast arm signal pole with foundation, with 45’ signal arm, 6’ black powdercoat luminaire arm KA72-T-2-6’-KPL20 to match luminaire poles to be mounted at 45 degree rotation to the arm and same height as luminaire poles, with nut covers, Union Metal Manufacturing Company, Design 50400, Valmont Industries, Inc., Design F283A, or approved equal.

1- Galvanized steel, gloss black painted, approximately 26’ high mast arm signal pole with foundation, with 25’ signal arm, 6’ black powdercoat luminaire arm KA72-T-2-6’-KPL20 to match luminaire poles to be mounted at 45 degree rotation to the arm and same height as luminaire poles, with nut covers, Union Metal Manufacturing Company, Design 50400, Valmont Industries, Inc., Design F283A, or approved equal.

1- Galvanized steel, gloss black powdercoat painted, approximately 26' high mast arm signal pole with foundation, with 20' signal arm, 6' black powdercoat luminaire arm KA72-T-2-6'-KPL20 to match luminaire poles to be mounted at 45 degree rotation to the arm and same height as luminaire poles, with nut covers, Union Metal Manufacturing Company, Design 50400, Valmont Industries, Inc., Design F283A, or approved equal.

4 - King Lighting Powder coated Black K833 Solitaire LED pendant with deep dish lens luminaires to be mounted on all four of the new mast arm assemblies in the Nobles Island Intersection.

10 – One-way, three-section, 12-inch black polycarbonate signal heads with LED modules, type (Eagle, Duralight Corp., G.E. Lighting (Gelcore) or Dialight/Trastar), mounted on mast arms with Astro-Bracs, with 5-inch black louvered backplates. The outside perimeter of the backplate shall be lined with a fluorescent-yellow 2-inch strip of Type IX or XI retroreflective sheeting to highlight the three-section signal head.

8 – One-way, 16-inch black polycarbonate pedestrian signal head with LED countdown module, type (Leotek, G.E. Lighting or Dialight/Trastar) side-mounted on mast arms with brackets, or on signal posts. The pedestrian signal indications shall provide countdown indications.

4 – Polara Pedestrian push button assemblies, mounted on traffic signal poles or posts. The push button assemblies shall provide Accessible Pedestrian signal (APS) capabilities; including vibratory warning and audio/audible warning. Push buttons shall be mounted perpendicular to the path of travel and detectable arrow parallel to the path of travel. Push button assemblies shall include a R10-3e sign, mounted with the push button, with arrow facing the corresponding crossing path.

1 – Optical Fire Preemptor Phase Selector, GTT Opticom Model 764, with a Model 760 Card Rack, or City approved Opticom brand equivalent for City compatibility based on Portsmouth Fire Department requirements.

4 – Optical Fire Preemptor receivers, GTT Opticom Model 711 or City approved Opticom brand equivalent for City compatibility based on Portsmouth Fire Department requirements.

2 – Confirmation strobe lights, 120 VAC, with red Lexan optic lens. Whelan Model, IAC 12 RP.

2 – 24" x 18" R3-17 "BIKE LANE" sign rigidly mounted on mast arm using an Astro Brac or other similar rigid sign bracket.

1- 30" x 30" R10-15 "RT TURN YIELD TO PEDESTRIAN" sign rigidly mounted on mast arm using an Astro Brac or other similar rigid sign bracket.

2- 48" x 24" D3-1 "Market St" sign rigidly mounted on mast arm using an Astro Brac or other similar rigid sign bracket.

1- 96" x 48" D3-1b "← Nobles Island / NH Port Auth. →" sign rigidly mounted on mast arm using an Astro Brac or other similar rigid sign bracket.

1- 96" x 48" D3-1c "←NH Port Auth. / Nobles Island →" sign rigidly mounted on mast arm using an Astro Brac or other similar rigid sign bracket.

2.1.4 Ethernet Switch. This work shall consist of furnishing, installing, and testing an Ethernet Switch that meets the requirements of a 100 Mbps Ethernet Switch.

2.1.4.1 The Ethernet Switch shall include a minimum of four single mode fiber optic patch cords, each one meter in length, and terminated on both ends with Type SC single mode fiber optic connectors

2.1.4.2 The Ethernet Switch shall include sufficient Category 6 Ethernet patch cords, each one meter in length, and terminated on both ends with Type RJ45 connectors to provide full connectivity within the cabinet as shown in the Contract Documents.

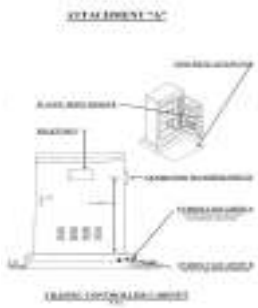
2.1.4.3 The Ethernet Switch shall include all accessories required for a full and complete installation, including but not limited to all connecting cables, serial to Ethernet modems, power supplies, and mounting hardware.

Add to 3.15

3.15.2 Contractor shall be responsible for maintaining operations of the traffic signal during construction. The labor and equipment necessary to complete this application will be included in the cost.

Add to 5.1

5.1.2 Alterations to Traffic Signals will be paid for at the Contract lump sum price complete in place. The price shall be full compensation for all labor, equipment, hardware and incidentals necessary to make the traffic signal operational.



614.512	CONCRETE PULL BOX - 18 INCH	EA
614.73118	3" PVC CONDUIT, SCH 80	LF
616.191	TRAFFIC SIGNALS, MARKET/NOBLES ISLAND	U

SECTION 621

DELINEATORS

Amend Section 621 to include:

Description

1.1 This work shall include the placement of snowplowable raised reflector markers at the location and spacing identified on the project plans.

Materials

2.1 Item 621.6 Snow Plowable Markers shall be snowplowable raised reflector markers, manufactured by Rayolite Snow-Lite CR 150, Type G, or approved equal. Reflectors shall be one-way clear and reflect to oncoming traffic. Reflectors shall include the center rail for additional protection.

Contractor shall submittal shop drawings or product cut sheets to the City of Portsmouth for approval.

Construction Requirements

3.1 The snowplowable raised reflector markings shall be constructed per manufacturer's recommendation.

Method of Measurement

4.1 Item 621.6 Snow Plowable Markers shall be measured by the number of in-pavement delineators installed in the complete and accepted work.

Basis of Payment

5.1 Item 621.6 Snow Plowable Markers will be paid for at the contract unit price per each. Payment shall be full compensation for the snowplowable reflector, housing, grinding / cutting, epoxy and all necessary hardware, labor, and construction methods for the complete and accepted installation.

Pay item		Pay unit
621.6	SNOW PLOWABLE MARKERS	EACH

SECTION 641

LOAM AND PLANTING MEDIA

Amend Section 641 to read:

Materials

1.1 Loam shall conform to the material specification in amended Section 650 – Planting – General.

X.X PLANTING MEDIA

A. 641.1: Topsoil

1. Topsoil required shall be obtained from off-site sources.

2. Topsoil supplied from off-site, shall be a sandy loam as defined by the USDA Soil Conservation Service, Soil Classification System, and shall have the following mechanical analysis:

Textural Class	% of Total Weight	Average %
Sand (0.05-2.0 mm dia. range)	45 to 75	60
Silt (0.002-0.05 mm dia. range)	15 to 35	25
Clay (less than 0.002 mm dia. range)	5 to 25	15

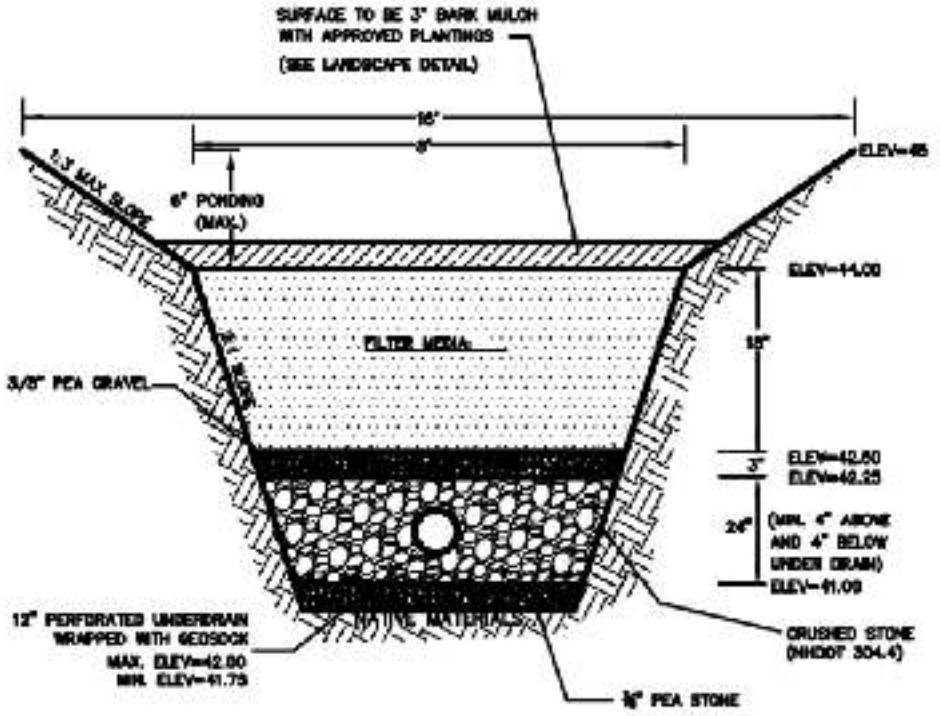
a. 95 percent of topsoil shall pass a No. 8 (2.0 mm) sieve.
b. Topsoil shall be free of stones >1 inch (25 mm) in longest dimension, earth clods or clay, plant parts, weeds, debris, and other extraneous materials harmful to plant growth.
c. Organic matter content shall be 4 to 12 percent of total dry weight.
d. Range of pH: 5.5 to 7.

B. 641.2: Bioretention Soil:

COMPONENT MATERIAL	PERCENT OF MIXTURE BY VOLUME	GRADATION OF MATERIAL SIEVE NO.	% PASSING STANDARD SIEVE
	FILTER MEDIA		
ASTM C-33 CONCRETE SAND	50 TO 55	PER ASTM REQUIREMENTS	
LOAMY SAND TOPSOIL WITH FINES AS INDICATED	20 TO 30	200	15 TO 25
MODERATLY FINE SHREDED BARK OR WOOD FIBER MULCH WITH FINES AS INDICATED	20 TO 30	200	<5

NOTES:
1. BARK MULCH SHALL BE AGED A MINIMUM OF 12 MONTHS AND SHALL NOT FLOAT.
2. RAIN GARDENS SHOULD NOT BE PLACED INTO SERVICE UNTIL THE BMP HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
3. DO NOT TRAFFIC EXPOSED SOIL SURFACES WITH CONSTRUCTION EQUIPMENT. CONTRACTOR SHALL KEEP ALL EXCAVATION EQUIPMENT OUTSIDE THE LIMIT OF THE RAIN GARDEN.
4. SEE GRADING PLAN FOR LOCATIONS.

BIORETENTION SPECIFICATION



BIORETENTION SECTION

NOT TO SCALE

Basis of Payment

Pay Item	Pay Unit	
641.1	Cy	Loam for Planting Beds and soil amendment
641.2	Cy	Loam for Biomedian

SECTION 645

EROSION CONTROL

Amend Section 645 to include:

Description

1.1 This work shall include the placement of Catch Basin Inlet Protection devices at the locations specified in the contract plans.

Materials

2.1 The Catch Basin Inlet Protection shall consist of a pre-manufactured non-woven geotextile intended for use as inlet protection; manufactured items include SiltSack, and approved equals.

Construction Requirements

3.1 Contractor shall install per manufacturer's recommendation. Inlet protection devices shall be maintained weekly or after every storm event.

Contractor shall remove and dispose of the inlet protection device following construction, and shall remove any accumulated debris inside the Catch Basin.

Method of Measurement

4.1 Inlet Protection Devices will be measured per each installation location in the project area.

Basis of Payment

5.1 Item 645.9 Inlet Protection will be paid for at the contract unit price per each. Payment will be made once per construction season and shall be full compensation for the maintenance, replacement if necessary, removal following construction, and Catch Basin vacuuming of any debris resulting from failed Inlet Protection Devices..

Pay item		**Pay unit**
645.9	Inlet Protection Devices	Each

SECTION 650

PLANTING – GENERAL

Amend Section 650 to read:

GENERAL

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

SUMMARY

Section Includes:

The provision and installation of all plant materials and products specified, including all supervision, labor, equipment and materials necessary to complete the project.

General maintenance of stored and installed materials until Acceptance.

Provision of Landscaping Warranty.

Description of Work:

Provide all materials and equipment, and do all work required to install new plants, as indicated on the Drawings and as specified.

Related Sections:

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:

Section 641 – LOAM AND PLANTING MEDIA
Section 644 – GRASS SEED
Section 651 – EVERGREEN TREES
Sections 652 and 653 – DECIDUOUS TREES
Section 654 – EVERGREEN SHRUBS
Sections 655 and 656 – DECIDUOUS SHRUBS
Section 657 – VINES AND GROUND COVERS

REFERENCES

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

American National Standards Institute, Inc. (ANSI):

Z60.1 American Standard for Nursery Stock - 2004
A300 (part 6)-2012

American Society for Testing and Materials (ASTM):

C 136 Sieve Analysis of Fine and Coarse Aggregates
E 11 Wire-Cloth Sieves for Testing Purposes

American Wood Preservers' Association (AWPA):

C2 Lumber, Timbers, Bridge Ties and Mine Ties – Preservative Treatment By Pressure Processes

4. National Arborist Association, 3537 Stratford Rd., Wantagh, NY 11793 (NAA):

Ref. 1 Transplanting of Trees and Shrubs in the Northeastern and North Central United States

5. Hortus Third, A Concise Dictionary of Plants Cultivated in the United States and Canada, Cornell University, L.H. Bailey Hortorium, MacMillian Publishing Co., New York, NY.

6. Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation and Uses, Michael A. Dirr, Stipes Publishing Company, Champaign, Illinois, 1975, Revised 1998.

7. "A Field Guide: Standards for Urban Forestry Data Collection." 2010. By the USDA Forest Service, ISA and the IUFRO (International Union of Forest Research Organizations.

DEFINITIONS

Backfill: The earth used to replace or the act of replacing earth in an excavation.

Compaction: A loss of soil aggregates; destroyed aeration pore spaces; crushed or collapsed pore spaces; and, undergone extensive resorting and packing of soil particles.

Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

Finish Grade: Elevation of finished surface of planting soil.

Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

Planting Media: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

SUBMITTALS

Product certificates: Labels from the manufacturer's container or manufacturer's cutsheets certifying that the product meets the specified requirements shall be submitted for the following materials:

Anti-desiccant	Chemical Products
Erosion Control Fabric	Fertilizers
Filter Fabric	Inorganic Soil Amendments
Mycorrhizal Fungi	Organic Soil Amendments
Root Control Barrier	Structural Soil

Test Reports: Test reports from an approved testing agency indicating compliance with the specifications shall be submitted for:

Compost	Manufactured soil
Manure	Mulch
Planter Soil	Planting Media
Topsoil	Mulch

Any other materials designated by the Landscape Architect.

Samples* of the following:

Compost	Planting Media
Mulch	Root ball stabilization materials

*Bulk materials in quantities sufficient to demonstrate range of color, texture, particle size, etc.

List of Plant Materials: Species to be installed, noting any discrepancies with Drawings. This list does NOT imply permission for substitutions unless approved in writing by Landscape Architect.

Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year.

QUALITY ASSURANCE

Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project Site when work is in progress.

Soil Analysis:

The Contractor shall engage an independent testing agency, experienced in the testing of agricultural soils and acceptable to the Landscape Architect, to perform the following tests and analyses:

Material	Tests and Analysis Required
Soils	Mechanical analysis of soil indicating the percent passing by weight of the following sieve sizes: 1 in., 1/2 in., No. 4, No. 10, No. 100, and No. 200. Determination of pH, organic content, and nutrient content. Recommendations shall be made by the testing agency as to the type and quantity of soil additives required to bring pH, organic content, and nutrient content to satisfactory levels for planting.
Organic Amendments	Determination of moisture absorption capacity, organic matter content, and pH.

Report presence of problem salts, minerals, or heavy metals; if present, provide additional recommendations for corrective action.

A Solvita test shall be performed to determine the maturity and stability of the compost.

Gradation of granular materials shall be determined in accordance with ASTM C 136. Sieves for determining material gradation shall be as described in ASTM E 11.

Soil Drainage:

1. Test drainage of adverse soils in three to five plant pit locations chosen by the Landscape Architect. Pits shall be excavated to a size suitable for a large tree, completely filled with water and observed to determine the length of time the soils take to completely drain. Landscape Architect shall then be notified of the time it takes for the pits to drain completely. Planting operations shall not proceed until Landscape Architect has reviewed drainage test results.

Plants:

The Contractor shall provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

The Contractor shall inspect all nursery materials to determine that the materials meet the requirements of this Section. Submit List of Plant Materials to be installed indicating discrepancies with Drawings. No changes or substitutions may be made without prior approval by the Landscape Architect, and municipal authority, if applicable.

When requested by the Landscape Architect, the Contractor shall submit the names and locations of nurseries proposed as sources of acceptable plant material.

Proposed materials shall be flagged at the nurseries by the Contractor prior to viewing by the Landscape Architect, when requested by the Landscape Architect.

When requested by the Landscape Architect, deliver photographs of plant material or representative samples of plants.

Schedule time with the Landscape Architect for viewing plant material at the source(s). Time spent at the nursery shall occur prior to the anticipated delivery time.

Viewing and/or sealing of plant materials by the Landscape Architect at the nursery does not preclude the Landscape Architect's right to reject material at the site of planting.

Identification of plant names shall be as listed in Hortus Third or M. Dirr's Manual of Woody Landscape Plants.

All plants shall be delivered to site with identifying tags that shall not be removed until Substantial Completion acceptance.

Owner's Inspection And Testing:

Work may be subject to inspection at any time by the Landscape Architect. The Owner reserves the right to engage an independent testing laboratory in accordance with requirements of Section 140000 – QUALITY CONTROL to analyze and test materials used in the construction of the work. Where directed by the Landscape Architect, the testing laboratory will make material analyses and will report to the Landscape Architect whether materials conform to the requirements of this specification.

1. Cost of tests and material analyses made by the testing laboratory will be borne by the Owner when they indicate compliance with the specification and by the Contractor when they indicate non-compliance.

2. Testing equipment will be provided by and tests performed by the testing laboratory. Upon request by the Landscape Architect or Owner, the Contractor shall provide such auxiliary personnel and services needed to accomplish the testing work and to repair damage caused thereto by the permanent work.

Contractor's Inspection And Testing:

1. Testing, analyses, and inspection required by the Contractor for his own information or guidance shall be at his own expense.

2. Materials shall not be used in construction until the test results have been reviewed by the Landscape Architect.

DELIVERY, STORAGE, AND HANDLING

Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage.

Digging Plant Material: Plants shall not be dug at the nursery or approved source until the Contractor is ready to transport them from their original locations to the site of the work or acceptable storage location.

Handling of Plant Materials: Exercise care in handling plant materials to avoid damage or stress. Handle planting stock by root ball or container. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

Deliver bare-root stock plants freshly dug. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting.

Deliver plants after preparations for planting have been completed, and install immediately.

Plants that are not planted immediately shall be protected as follows:

If planting is delayed more than six hours after delivery, set plants and trees in shade, protect from weather and mechanical damage, and keep roots moist. Plants shall not be allowed to dry out or freeze.

Bareroot plants shall be installed on the same day of delivery or placed in storage until installed. Injury and desiccation of plants on-site shall be prevented.

Earth balls shall be kept intact and moist.

Store bulbs, corms, and tubers in a dry place at 60° to 65°F (16° to 18°C) until planting.

Both the duration and method of storage of plant materials shall be subject to the approval of the Landscape Architect.

Extended storage at site: Plants shall then be protected and kept moist by "heeling-in" the roots or by placing the plant in a cool moist storage building. The "heeling-in" procedure shall require the plants to be separated and the roots heeled in a suitable moist soil. If plants are stored in a building, the roots shall be covered with suitable moist mulch.

In certain situations, and depending on plant species, apply anti-desiccant to trees and shrubs as needed to protect plant material.

The following shall be cause for rejection of materials by the Landscape Contractor or Landscape Architect:

Evidence of inadequate protection following digging, carelessness while in transit, or improper handling or storage, shall be cause for rejection.

Upon arrival at the temporary storage location or the site of the work, plants shall be inspected for proper shipping procedures. Should the roots be dried out, large branches be broken, balls of earth broken or loosened, or areas of bark be torn, the Landscape Architect will reject the injured plant.

When a plant has been rejected, remove it from the area of the work and replace it with one of the required size and quality.

PLANTING SEASONS AND CONDITIONS

Planting shall only be performed when weather and soil conditions are suitable for planting the material specified in accordance with locally accepted practice.

No planting shall occur if said activity results in permanent compaction of soil.

MAINTENANCE

A. Plant material shall be maintained by the Contractor until one year after Final Completion, as described in Part 3 of this Section.

B. After the maintenance period, maintenance of the plant material shall become the Owner's responsibility. Provide instructions and service as follows.

The Contractor shall provide the Owner with written recommended maintenance program at time of Final Completion.

The Contractor may make as many periodic inspections as necessary during the guarantee period, at no additional cost to the Owner, to inspect and guarantee the condition of all plant materials. Submit written report of each inspection to the Landscape Architect and Owner outlining corrective measures taken to keep the guarantee valid.

ACCEPTANCE

A. The Landscape Architect will inspect all work for Substantial Completion upon written notice of completion. The request shall be received at least ten calendar days before the anticipated date of inspection.

B. Acceptance of plant material by the Landscape Architect will be for general conformance to specified size, character, and quality, and shall not diminish responsibility for full conformance to the Contract Documents.

C. Upon satisfactory completion and re-inspection of all repairs or renewals necessary in the judgment of the Landscape Architect, the Landscape Architect will recommend to the Owner that acceptance of the work of this Section be given.

D. Acceptance in Part

1. The work may be accepted in parts when it is deemed to be in the Owner's best interest to do so, and when permission is given to the Contractor in writing to complete the work in parts.

2. Acceptance and use of such areas by the Owner shall not waive any other provisions of this Contract.

WARRANTY

A. Plants shall be guaranteed for a period of two years after the date of Substantial Completion by the Owner and Landscape Architect.

1. When the work is accepted in parts, the guarantee periods shall extend from each of the partial acceptances to the terminal date of the last guarantee period. Thus, all guarantee periods terminate at one time.

B. Plants shall be healthy, free of pests and disease, and in flourishing condition at the end of the guarantee period. Plants shall be free of dead and dying branches and branch tips, and shall bear foliage of normal density, size, and color.

C. Replace dead plants and all plants not in a vigorous, thriving condition, as determined by the Landscape Architect during and at the end of the guarantee period, without cost to the Owner, as soon as weather conditions permit and within the specified planting period.

1. Replacements shall closely match adjacent specimens of the same species. Replacements shall be subject to all requirements stated in this Specification.

2. Make all necessary repairs due to plant replacements. Such repairs shall be done at no extra cost to the Owner.

3. The guarantee of all replacement plants shall extend for an additional one-year period from the date of their acceptance after replacement.

D. Guarantee does not cover defects resulting from abuse, accident, lack of adequate maintenance, or neglect by Owner, or incidents that are beyond Contractor's control.

E. At the end of the guarantee period, and no less than five days prior to final inspection, staking and guying materials shall be removed from the site.

FINAL INSPECTION AND FINAL ACCEPTANCE

At the end of the guarantee period, the Landscape Architect will, upon written notice of end of guarantee period, inspect the work for Final Acceptance. Request shall be received at least ten calendar days before the anticipated date for Final Inspection.

Upon completion and re-inspection of full repairs or replacements necessary in the judgment of the Landscape Architect. At that time, the Landscape Architect will recommend to the Owner that Final Acceptance of the Work of this Section be given.

PRODUCTS

PLANT MATERIAL

Except as otherwise specified, form, size, and grade of plant materials shall conform to ANSI Z60.1.

Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting. Plants shall have, at a minimum, an acceptable form typical of species.

The Landscape Architect will be the final arbiter of plant form acceptability.

The planting stock selected shall be specimen quality, symmetrical, correctly pruned, cold-hardy, decorative, and disease resistant. They shall be free from physical damage or other conditions that would prevent rigorous growth. Trees which fail to meet these standards will be refused by the owner.

Trunk(s), Canes and Branches:

a. Well-formed and sturdy with a straight, distinct leader where this is characteristic of species.
b. Branching plentiful and uniformly distributed to form a well-balanced plant.
c. Trees with leaders that are damaged, crooked, or crossed shall be rejected.
d. Trees with multiple leaders shall be rejected, unless form is typical for the species or specifically indicated in the Drawings.
e. Multiple leaders with narrow crotches (included bark) shall not be acceptable.
f. Scars shall be free of rot and not exceed 1/4 the diameter of the wood beneath in greatest dimension unless completely healed (except pruning scars).
g. Pruning scars clean cut leaving little or no protrusion from the trunk or branch.
h. Graft union completely healed.
i. No mechanical or pest damage.
j. No excessive succulence or suckering atypical of species.

Foliage:

a. Densely supplied with healthy, vigorous leaves of normal size, shape, color, and texture (except shrubs moved bare-root or deciduous shrubs when dormant).
b. No chlorosis.
c. Minimally perceptible pest or mechanical damage, affecting no more than 5 percent of foliage.

Root System:

Plants shall have a well-developed fibrous root system.
Sturdily established in container, but shall not be excessively root bound except plants deliberately grown root bound to produce a dwarf plant.
a. No stem girdling roots.
b. No weeds.
c. **All wire and two thirds (2/3) of the burlap will be removed from the root ball.**

Plants shall be healthy and vigorous, free of disease, insect pests and their eggs and larvae.

Plants shall be free of physical damage such as scrapes, broken or split branches, large scars, bark abrasions, sunscalds, fresh limb cuts, disfiguring knots, or other defects.

Plants shall not be pruned for form (if needed to improve aesthetic appearance and/or growth habit) until Substantial Completion Acceptance.

Plants shall meet the sizes indicated on the Plant List or Schedule. Plants larger or smaller than specified may be used only if accepted by the Landscape Architect.

To the greatest extent practicable, plant material shall be obtained from sources located in similar climatic zones to the Project site.

Plants indicated as “B&B” shall be balled and burlapped.

Unless otherwise permitted by the Landscape Architect, plants shall be nursery grown.

Nursery grown plants shall be freshly dug or heeled-in. No plants from cold storage will be accepted unless permitted by the Landscape Architect.

Container stock, where specified or approved by Landscape Architect, shall meet the standards of ANSI Z60.1 and the following:

Container stock shall have a heavy fibrous root system that has been developed by proper cultural treatment, transplanting, and root pruning.

Container stock shall be sturdy, healthy and sufficiently vigorous to ensure plant growth.

K. Herbaceous Plants: Including, but not limited to, annuals, biennials, perennials, wetland or water plants, bulbs, tubers, and corms: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems or well-formed root forms. Provide only plants that are acclimated to outdoor conditions before delivery.

Bareroot stock, where specified or approved by Landscape Architect, shall meet the standards of ANSI Z60.1 and the following:

Bareroot stock shall have a heavy fibrous root system that has been developed by proper cultural treatment, transplanting, and root pruning.

Bareroot stock shall be sturdy, healthy and sufficiently vigorous to ensure plant growth.

INORGANIC SOIL AMENDMENTS

Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent, by weight. Class T is more finely ground and quicker acting but dustier than Class O.

Sulfur: Granular, biodegradable, and containing a minimum of 90 percent sulfur.

Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

Aluminum Sulfate: Commercial grade, unadulterated.

Perlite: Horticultural perlite, soil amendment grade.

Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through No. 50 (0.30-mm) sieve.

Sand: Clean, washed, natural or manufactured angular grains, free of toxic materials.

Diatomaceous Earth: Calcined, 90 percent silica, with approximately 140 percent water absorption capacity by weight.

ORGANIC SOIL AMENDMENTS

Compost: Well-composted, stable, and substantially weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; soluble salt content of <3 mmhos/cm or <3 decisiemens/m and free of substances toxic to plantings; and as follows:

The compost stock must mature for a minimum of 90 days. During this time, the compost stock shall achieve thermophilic temperatures (175° to 180°F, 79° to 82°C) for 15 days; multiple turnings may be required for the entire stockpile. A Solvita test may be requested to determine the maturity and stability of the compost.

Frozen or muddy compost shall be unacceptable for use.

B. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

C. Mycorrhizal Fungi: Dry, organic, granular root stimulant/inoculant containing at least 5300 spores per pound (0.45 kg) of vesicular-arbuscular mycorrhizal fungi and 95 million spores per pound (0.45 kg) of ectomycorrhizal fungi, 33 percent hydrogel, and a maximum of 5.5 percent inert material.

1. Mycorrhizal fungi amendment shall be manufactured by one of the following, or approved equivalent:
   Roots
   Plant Health Care
   Mycorrhizal Applications of Oregon

D. Hydrogel: Shall be water absorbant crystals or granules manufactured by one of the following, or approved equal: Plant Health Care, Terra-Sorb, Viterra Gelscape.

FERTILIZERS

Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde. Nitrogen (N), Phosphorus (P) and Potassium (K) in amounts recommended in soil test results.

Controlled-release fertilizer:

1. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium of equal proportions.

2. Planting Tablets: Tightly compressed chip type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots. Nutrient composition: nitrogen, phosphorous, potassium and micronutrients.

3. Controlled-release fertilizer shall be equal to the following:

Product	Manufacturer
Osmocote	Scotts Miracle-Gro Company
Agriform 20-10-5	Sierra Chemical Co.
Planting Tablets	Milpitas, CA 95035
EZY-Grow Fertilizer Packet	EZY-Grow - Landscape Specialties

2.5 WATER

A. Water shall be suitable for irrigation and free from ingredients harmful to seeded areas.

2.6 WEED-CONTROL BARRIERS

A. Weed control barriers are not recommended for planted areas as the materials prevent or slow water penetration required for plant growth. They may be beneficial for largely unplanted, mulched areas.

2.7 MULCHES

A. Organic Mulch: Mulch shall be 100 percent dark aged hemlock or approved alternative of uniform size and free from rot, leaves, twigs, debris, stones, or any material harmful to plant growth. Bark shall have been shredded and stockpiled no less than two months and no more than two years before use.

B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch (25-mm) sieve; soluble salt content less than 3 decisiemens/m or 3 mmhos/cm as measured for soil mixture electrical conductivity; not exceed 0.5 percent inert contaminants and free of substances toxic to plantings. Product must be cured for a minimum of 90 days and produce minimal heat or odor to be considered a stable, mature product suitable for use with plants.

2.8 CHEMICAL PRODUCTS

A. General: Pesticides, herbicides, fungicides, bactericides or any other chemical compounds shall be registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

1. Pre-Emergent Herbicide (Selective and Non-Selective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

2. Post-Emergent Herbicide (Selective and Non-Selective): Effective for controlling weed growth that has already germinated.

3. Anti-desiccant: Shall be an emulsion specifically manufactured for plant protection which provides a protective film over plant surfaces which is permeable enough to permit transpiration. Anti-desiccant shall be delivered in manufacturer's sealed containers and shall contain manufacturer's printed instructions for use. Anti-desiccant shall be
Wilt-Pruf as manufactured by Wilt-Pruf Products, Inc. P.O. Box 469 Essex, CT 06426, or approved equal.

4. Fungicide: Shall be zinc ethylene bisdithiocarbonate (Zineb), or equal, appled at manufacturer’s suggested rates.

5. Chemical Root Control Barrier: Chemical compounds or fabric impregnated with growth-regulating chemicals designed to modify root growth. Manufacturers shall be Plant Health Care or Typar Biobarrier, or approved equal.

2.9 FILTER FABRIC OR SOIL SEPARATION FABRIC

A. Nonwoven geotextile made of polypropylene, polyolefin, or polyester fibers, or combination, 101 g/sq. m (3 oz./sq. yd.) minimum, Mirafi 140-N, or approved equal.

2.10 TREE SUPPORT MATERIALS

A. Install tree support materials only when conditions warrant. See Part 3. Rootball stabilization is preferred method.

B. Rootball Stabilization Materials:

1. At-grade or below-grade stabilization systems to secure each new tree planting by its rootball; sized per manufacturer's written recommendations unless otherwise indicated. Provide one of the following products, or approved equal:
   a. Tomahawk Tree Stabilizers by Border Concepts, Inc.
   b. Duckbill Rootball Fixing System by Foresight Products, LLC
   c. Tree Staples by Tree Staple, Inc.

C. Wood Stakes: For trees under 10 feet (3.05 m) in height, straight, sound, rough sawn lumber not less than 2 x 2 inch (50 mm x 50 mm), if square, or 2-1/2 inch (62 mm) diameter, if round. Wire for staking shall be 12-gauge steel.

D. Wire for Guying: Galvanized steel 1 x 19 preformed 3/16 inch (4.76 mm) diameter.

E. Turnbuckles: Galvanized steel fitted with locking eyebolts.

F. Deadman: Sound, rough sawn lumber 2 x 4 inch (50 mm x 100 mm) triangular galvanized steel plates, or other material approved by the Landscape Architect.

G. Hose: High quality braided rubber hose, 3/4 inch (19 mm) diameter and suitable length, black in color.

H. Polyethylene tie strapping may be used with 2 x 2 inch (50 mm x 50 mm) wood stakes.

2.12 ROOT CONTROL BARRIER (PHYSICAL)

A. N/A

2.13 LANDSCAPE EDGING

A. N/A

PART 3 - EXECUTION

3.1 APPROVAL OF EXISTING CONDITIONS

A. Prior to commencing installation, the Contractor shall be responsible for immediately notifying the Landscape Architect if any existing site or job conditions are observed which would negatively affect the character of the finished work, its future performance, or that would in any way be to the detriment of job progress and completion. If unobservable, substandard or unacceptable conditions are encountered during the course of work, the Contractor shall alert the Landscape Architect.

3.2 PLANT BED PREPARATION

A. Loosen subgrade of planting areas to a minimum depth of 6". Remove stones larger than 1" in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

Spread on rough grade, a thoroughly blended planting media consisting of a combination of compost, topsoil, inorganic soil amendments and fertilizer, as recommended by soil test results.

Spread planting media to a depth of 18" but not less than required to meet finish grades after natural settlement.

Do not spread if planting media or subgrade is frozen, muddy, or excessively wet.

Finish grade (below mulch, after settling) for planted areas shall be 3½ inches (87 mm) below adjacent pavement surfaces.

Finish grade after settling for seeded areas shall be ½ inch (12 mm) below adjacent pavement surfaces and 1 inch (25 mm) for sodded areas.

a. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Restore planting areas if eroded or disturbed after finish grading.

b. Application of Mychorrhizal Fungi, if specified: Broadcast dry product uniformly over prepared soil at the application rate suggested by the manufacturer. Mychorrhizal fungi shall not be used on herbaceous materials or in compacted soils.

3.3 LAYOUT OF PLANTING AREAS

A. Protect structures, utilities, sidewalks, pavements, other facilities, work by others, grassed areas, and existing plants from damage caused by planting operations. All damage caused by the Contractor or his work shall be the responsibility of the Contractor to repair or rectify at no additional cost to the Owner.

B. Lay out individual tree and shrub locations and areas for multiple or mass plantings. Stake locations, outline plant bed areas, adjust locations when requested, and obtain Landscape Architect's acceptance of layout before excavating or planting. Make subsequent adjustments as required.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits with tapered sides. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit sheared or smoothed during excavation.

Excavate two times as wide as ball diameter.

Excavate at least 12 inches (300 mm) wider than root spread and deep enough to accommodate vertical roots for bare-root stock.

Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.

c. Subsoil and topsoil removed from excavations may not be used as planting media.

3.5 WOODY PLANT INSTALLATION

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. **Remove excess soil from root ball to expose root flare as necessary.**

d. Remove injured roots by cutting cleanly; do not break.

e. Remove only dead, dying, or damaged branches. Pruning intent and procedure shall be reviewed with the Landscape Architect before proceeding.

f. Set stock plumb and in center of planting pit or trench with root flare a maximum of 2 inches (50 mm) above adjacent finish grades.

Use planting media as specified in Part 2 for backfill.

Add fertilizer and soil amendments in accordance with soil test recommendations and per manufacturers' recommendations.

If specified, add mycorrhizal fungi per manufacturer's recommendations if not incorporated during plant bed preparation.

Add water absorbent crystals or granules to backfill at rates recommended by the product manufacturer.

Balled and Burlapped Plants: After placing some backfill around root ball to stabilize plant, carefully cut and remove **all** of the wire baskets and the burlap, rope, ties, etc. from at least 2/3 of the root balls without comprising the integrity of the root ball. Non-biodegradable wrappings and ties shall also be totally removed from root ball and plant pit.

Container-Grown Plants: Carefully remove root ball from container without damaging root ball or plant.

Fabric Bag-Grown Stock: Carefully remove root ball from fabric bag without damaging root ball or plant.

Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When plant pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

Continue backfilling process. Form water saucer around perimeter of plant pits of trees and large shrubs. Water again after placing and tamping final layer of soil.

g. Bare-Root Stock: Set and support bare-root stock in center of planting pit or trench with root a maximum of 2 inches (50 mm) above adjacent finish grade.

Use planting media as specified in Part 2 for backfill.

Add fertilizer and soil amendments in accordance with soil test recommendations and per manufacturers' recommendations.

If specified, add mycorrhizal fungi per manufacturer's recommendations if not incorporated during plant bed preparation.

Spread roots without tangling or turning toward surface, and carefully work backfill around roots by hand. Puddle with water until backfill layers are completely saturated. Plumb before backfilling, and maintain plumb while working backfill around roots and placing layers above roots.

Continue backfilling process. Water again after placing and tamping final layer of soil.

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

3.6 GROUND COVER AND HERBACEOUS PLANTS INSTALLATION

A. Use planting media as specified in Part 2 for backfill.

B. Excavate and place planting media to a depth of 18 inches. Add fertilizer and soil amendments as recommended by soils test, and per manufacturers' recommendations.

C. If specified, add mycorrhizal fungi per manufacturer's recommendations if not incorporated during plant bed preparation.

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

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

3.7 MEADOW SEED MIX

A. "New England Coastal Salt Tolerant Grass Mix" Amherst, MA **www.newp.com**

B. Use planting media as specified in Part 2 for backfill.

C. Excavate and place planting media to a depth of 6 inches. Preparation of a clean weed free seed bed is necessary for optimal results. Add fertilizer and soil amendments as recommended by soils test, and per manufacturers' recommendations. Fertilization is not required unless the soils are particularly infertile.

D. Apply by mechanical spreader, or by hand. Lightly rake, or roll to ensure proper soil seed contact then apply weed free straw mulch.

E. Best results are obtained with a Spring seeding. If conditions are drier than usual, watering will be required. Late Fall and winter dormant seeding require an increase in the seeding rate.

3.8 TRANSPLANTING – GENERAL

A. N/A

3.9 TRANSPLANTING WITH MECHANICAL TREE SPADE

A. N/A

3.10 APPLICATION OF FERTILIZER

A. Provide supplements at application rates as recommended by soil test reports from a qualified soil-testing laboratory.

B. Fertilizer shall be applied when planting pits are backfilled two-thirds full. Fertilizer application shall be of the type, rate, and timing recommended by the testing agency for each plant type and in accordance with ANSI A300 (Part 2) standards for application.

C. Slow-release fertilizer:

Fertilization schedule for trees and shrubs using slow release 4-ounce (118 ml) packet system shall be per manufacturer's recommendations.

Fertilizer packets shall be placed 6 to 8 inches (150 to 200 mm) deep below top of planting soil around root balls of plants. Packets shall be spaced evenly depending on the number of packets required.

3.11 MULCHING

A. N/A

B. Mulch surfaces of plant beds, plant water saucers, and other areas indicated.

1. Trees and Shrubs in Grassed Areas: Create mulched rings 3 inches (75 mm) in depth to encompass plant pits, water saucers, and tree support systems (if applicable). Do not place mulch within 3 inches (75 mm) of trunks or stems. A continuous, linear mulched area shall be formed if plants are closely spaced to avoid grassed strips less than 2 feet (600 mm) wide or scallops of grass that are difficult to maintain.

2. Organic Mulch in Planting Areas: Apply mulch to 3" in depth throughout planting area extending to bedline indicated in Drawings, and at least 12 inches (300 mm) beyond edge of individual plant pit or trench. Do not place mulch within 3 inches (75 mm) of trunks or stems. Finished surface of settled mulch shall be ½ -1 inches (6-12 mm) below adjacent pavement or curb surfaces and flush with adjacent grassed areas.

3.12 CHEMICAL APPLICATIONS

A. In areas designated for plantings, remedial and preventative measures shall be taken well in advance of planting to eliminate competitive weed growth, to provide a weed-free and safe, non-toxic media for planting and as a finished landscape product.

B. If necessary, a systemic post-emergent herbicide shall be applied to existing and emergent weeds in prepared planting beds.

C. Pre-emergent herbicides are recommended for preventative use in areas not seeded.

3.13 FILTER FABRIC OR SOIL SEPARATION FABRIC

A. Soil separation fabric shall be installed where indicated on the Drawings. Unless otherwise indicated on the Drawings, soil separation fabric shall be overlapped 6 inches (150 mm) along all edges.

3.14 TREE SUPPORT

A. Trees shall not be staked or guyed except when absolutely necessary or under special conditions that warrant precautions be taken. Examples of special conditions that may pose a risk to public safety if trees were unsecured or unsupported include, and are not limited to:

1. High winds
2. Exceptional size and value
3. Steep slope locations (on slopes exceeding 3 Horizontal:1 Vertical)
4. High vandalism areas

B. When warranted, each tree shall be staked, guyed, or stabilized immediately following planting and in accordance with ANSI A300 (Part 3) standards for guying.

C. Root stabilization is preferred method, installed per manufacturer’s instructions.

D. Plants shall stand plumb after staking, guying, or stabilizing.

E. Above-ground support systems shall be removed after one year if tree root system is established.

F. Duckbill Tree Support Systems and Duckbill Root Ball Fixing Systems shall be installed in strict conformance with manufacturer's published installation instructions.

3.15 ROOT CONTROL BARRIER (PHYSICAL)

A. Install in accordance with manufacturer’s instructions in areas indicated in the Drawings.

B. Do not install root barrier surrounding the root ball of tree.

3.16 LANDSCAPE EDGING

A. N/A

3.17 MAINTENANCE OF PLANTINGS

A. Maintenance shall begin immediately after each plant is planted and shall continue until Substantial Completion Acceptance. The Contractor shall provide water for irrigation if none is available on site.

B. Note: Extend maintenance beyond Final Acceptance of Project if necessary to meet above requirements. Landscape Architect may withhold funds from Substantial and Final Completion payments as necessary to assure proper performance of maintenance operations.

C. Maintenance required:

1. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring water saucers, resetting to proper grade or vertical position, and performing other operations as required to establish healthy, viable plantings.

2. Planting areas shall be kept free of weeds, grass, and other undesired vegetative growth.

3. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of settling. Do not place mulch within 3 inches (75 mm) of trunks or stems. A continuous, linear mulched area shall be maintained between closely spaced plants to avoid grassed strips less than 2 feet (600 mm) wide or scallops of grass that are difficult to maintain.

4. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use practices to minimize the use of chemicals and pesticides and reduce hazards.

5. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

6. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings without additional cost to the Owner.

7. Prune, thin, and shape woody materials according to standard professional horticultural and arboricultural practices and in accordance with ANSI A300 (Part 3) Pruning Standards. Unless otherwise indicated by Landscape Architect, do not cut tree leaders; remove only injured, dying, or dead branches from trees and shrubs. Prune to retain natural character.

8. Pruning shall be done with clean, sharp tools. Cuts shall be made at branch collars, leaving no stubs. No tree paint shall be used.

SECTION 651

EVERGREEN TREES

Amend Section 651 to include:

Cultivar specificity overrides genus and species as indicated on NHDOT Master Item List. The City will specify where the replacements go while onsite during planting.

Pay Item			**Unit:**
~~651.13 Juniperus virginiana~~	~~Red Cedar~~	~~6-7'~~	~~EA~~
SUBSTITUTE 10 ON BID FORM AND PLANS TO BE REPLACED WITH:			
5 Chionanthus virginicus	Fringetrees	2" Cal.	EA
5 Oxydendrum arboretum	Sourwood	2" Cal.	EA

SECTION 652 and 653

DECIDUOUS TREES

Amend Section 652 to include:

Cultivar specificity overrides genus and species as indicated on NHDOT Master Item List. The City will specify where the replacements go while onsite during planting.

Pay Item			**Unit:**
~~652.06 Acer Rubrum~~	~~Red Maple~~	~~2" Cal.~~	~~EA~~
SUBSTITUTE 7 ON BID FORM AND PLANS TO BE REPLACED WITH:			
3 Liquidambar styraciflua 'Rontundiloba'	Rotundiloba Sweet Gum	2" Cal.	EA
2 Ginkgo Biloba	Ginkgo	2" Cal.	EA
2 Gymnocladus dioicus	Kentucky Coffeetree	2" Cal.	EA
~~652.17 Betula nigra~~	~~River Birch~~	~~6-8' mix single/clump~~	~~EA~~
SUBSTITUTE 38 ON BID FORM AND PLANS TO BE REPLACED WITH:			
8 Gymnocladus dioicus	Kentucky Coffeetree	2" Cal.	EA
15 Metasequoia glyptostroboides	Dawn Redwood	2" Cal.	EA
15 Quercus muehlinbergii	Chinkopin Oak	2" Cal.	EA
652.52 Nyssa sylvatica	Black Tupelo	2" Cal.	EA
~~652.691 Quercus borealis 'Rubra'~~	~~Red Oak~~	~~2" Cal.~~	~~EA~~
SUBSTITUTE 15 ON BID FORM AND PLANS TO BE REPLACED WITH:			
10 Quercus borealis 'Rubra'	Red Oak	2" Cal.	EA
5 Corylus colurna	Turkish filbert	2" Cal.	EA
653.97 Sophora japonica 'Regent'	Japanese Pagodatree	2" Cal.	EA

SECTION 654

EVERGREEN SHRUBS

Amend Section 654 to include:

Cultivar specificity overrides genus and species as indicated on NHDOT Master Item List. No Substitutions in this specification.

Pay Item			Unit:
654.21 Ilex glabra	Inkberry Holly	#3 Cont.	EA
654.211 Ilex glabra 'Compacta'	Compact Inkberry Holly	#3 Cont.	EA
654.45 Juniperus virginiana 'Grey Owl'	Grey Owl Juniper	#3 Cont.	EA
656.02 Myrica pennsylvanica	Bayberry	#5 Cont.	EA

SECTION 655 and 656

DECIDUOUS SHRUBS

Amend Section 655 and 656 to include:

Cultivar specificity overrides genus and species as indicated on NHDOT Master Item List The City will specify where the replacements go while onsite during planting.

Pay Item			**Unit:**
~~655.02 Amelanchier Canadensis~~	~~Shadblow-Small~~	~~5-6' Clump~~	~~EACH~~
SUBSTITUTE 34 ON BID FORM AND PLANS TO BE REPLACED WITH:			
10 Amelanchier Canadensis	Shadblow-Small	5-6' Clump	EACH
12 Halesia caroliniana	Carolina Silverbell	2" Cal.	EACH
12 Oxydendrum arboreum	Sourwood	2" Cal.	EACH
655.06 Aronia melanocarpa	Black Chokeberry	#3 Cont.	EACH
655.27 Clethra alnifolia	Summersweet	#3 Cont.	EACH
655.701 Fothergilla gardenii	Dwarf Fothergilla	#3 Cont.	EACH
655.702 Fothergilla major 'Mt. Airy'	Mount Airy Fothergilla	#3 Cont.	EACH
655.703 Fothergilla Major	Fothergilla Major	#5 Cont.	EACH
655.801 Ilex verticillata 'Winter Red'	Winter Red Winterberry	#3 Cont.	EACH
655.802 Ilex verticillata 'Jim Dandy'	Jim Dandy Winterberry	#3 Cont.	EACH
656.321 Rhus aromatica 'Grow low'	Grow-low Fragrant Sumac	#3 Cont.	EACH
656.42 Rosa rugosa 'Alba'	Beach Rose	#3 Cont.	EACH
656.73 Vaccinium corymbosum	Highbush blueberry	#3 Cont.	EACH
656.82 Viburnum dentatum	Viburnum dentatum	#5 Cont.	EACH
658.161 Calamagrostis x acutiflora 'Karl Foerster'	Feather Reed Grass	#2 Cont.	EACH
658.311 Echinacea purpurea 'White Swan'	White Swan Echinacea	#2 Cont.	EACH
658.35 Eupatorium fistulosum	Joe Pye Weed	#2 Cont.	EACH
658.541 Liatris scariosa	Tall Gayfeather	#2 Cont.	EACH
658.791 Schizachyrium scoparium	Little Bluestem	#2 Cont.	EACH
658.858 Sporobolis heterolepsis	Prairie Dropseed	#2 Cont.	EACH
658.866 Symphyotrichum novae-anglaie	New England Aster	#2 Cont.	EACH

Section 659.5 – Irrigation System for planted areas

Description

1.1 This work shall consist of furnishing and installing an irrigation system in all of the planting areas in this phase of the project. The median island nearest the Albacore and the large park already have been supplied a sleeve across their respective road crossings and an extension of the system runs through it. See irrigation as-builts attached in the appendix. The areas south of Cutts Cove (the median Island and the small park) will need a new controller and complete new setup. The areas north of Cutts Cove are to be extensions of the existing system.

Materials

2.1 Major materials for the new irrigation system are as follows:

Controller: SMARTLINE Solar 48TW with SL1600 Series Controller by Weathermatic

Techline CV dripper check valves

Drip Valve controls by Hunter

All other materials shall be like those used in the phase 1 project, sized appropriately.

2.2 Major Materials for the existing system extension should be equipment and piping like those supplied in phase 1 sized appropriately.

Contractor shall submit shop drawings or manufacturer's cut sheets on selected equipment prior to ordering.

Construction Requirements

3.1 Create a functioning system that distribute water appropriately and that is able to be winterized in the fall with a two year warranty.

The City will tap the main, provide meter and backflow of appropriate size with ground box as was provided in phase 1.

Provide construction as-builts of the system and start up and shut down services for 2 years after installation.

Method of Measurement

4.1 This is priced as a complete unit.

Basis of Payment

5.1 Payment will be made when the system is complete and accepted.

Section 665 – Street Lights

Description

1.1 This work shall consist of furnishing and installing the specified lights throughout the project area. Lights include Bollard Lights along the Park paths, Kiosk down lighting under the roof of the Kiosk, Park Sign up-lighting at the Park entrance signs, and single- and double- luminaire streetlights. The lighting shall be of the specified type at the locations shown on the project plans.

Materials

2.1 Materials for the various lighting styles and types are documented in the "Site Details" of the project plans.

Bollard Light: Silhouette Bollard, Stresscrete Group, Catalog number KL-A-OAAF-V-36-SSL-120-BK, Chicago Bronze color, or approved equal.

Kiosk Down Light: Spot Fixture, Hunza Lighting, Catalog number EWS/L-D3-38-3-COP, copper finish, or approved equal

Sign Up Light: Safertouch 150 Ultra Flush Mount, Hunza Lighting, Catalog number ST150/U/CAN-R-S/22-3-ST|50HCR-ST|50FL-SBZ, or approved equal

Street Light: Stresscrete Black Decorative 25' Belmont style concrete pole with buried baseplate, Powder coated Black K833 Solitaire LED pendant with deep dish lens, and KA72-T Single and Double Top Mounted Arm C/W Finial, with flag holder to match existing lights.

Contractor shall submit shop drawings or manufacturer's cut sheets on selected equipment prior to ordering.

It is the contractor's responsibility to ensure the required anchor bolts and anchor bolt templates are acquired for foundation construction. **Set pole bases below grade in order to ensure base plate is hidden from view.**

Construction Requirements

3.1 Bollard Light, Kiosk Down Light, and Sign Up Light. Contractor to coordinate power source, electrical connection, conduit, wiring, electrical metering and load, junction boxes, installation hardware, and foundation and foundation design as appropriate for a complete and powered lighting system. All necessary power source, electrical connection, conduit, wiring, electrical metering and load, junction boxes, installation hardware, and foundation and foundation design as appropriate shall be subsidiary to the appropriate pay item.

Contractor will place junction boxes between conduit runs greater than 500 feet.

All wiring and electrical work shall conform to applicable NEC, NHDOT and City of Portsmouth electrical standards. It is the Contractor's responsibility to ensure all codes are met, including the use of Professional Licensed Electricians as required.

3.2 Street Light. Refer to related specifications for street light construction:

614.72114	2" PVC CONDUIT, SCHEDULE 40
614.73118	3" PVC CONDUIT, SCHEDULE 80
625.2	CONCRETE LIGHT POLE BASES, TYPE B
665.91	METER CABINET AND ELECTRICAL WORK FOR LIGHTING AND SERVICE

Additional construction requirements shall are documented on the "Site Details" of the project plans.

Method of Measurement

4.1 Project Lights will be measured by the number of light fixtures of the specified style in the complete and accepted work.

Basis of Payment

5.1 Project Lights will be measured by the number of light fixtures of the specified style in the complete and accepted work.

5.1.1 Payment shall be full compensation for Contractor to coordinate power source, electrical connections, conduit, wiring, electrical metering and load, junction boxes, installation hardware, and foundation and foundation design as appropriate for a complete and powered lighting system.

5.1.2 Payment shall be full compensation for light pole, fixture, finial, arms, luminaires, and wiring for 665.17 Street Lighting Type A and 665.18 Street Lighting Type B. Conduit, wiring between fixtures, junction boxes, and meters shall be paid under separate items. Connections to an electrical meter and panel shall be subsidiary to Item 665.91 LIGHTING CABINET AND ELECTRICAL WORK FOR LIGHTING AND SERVICE.

Pay item	**Unit:**
665.14 – Bollard Light	EA
665.15 – Sign Up Lights	EA
665.16 – Kiosk Down Lights	EA
665.17 – Street Lighting Type-A 25' Single Arm	EA
665.18 – Street Lighting Type-B 25' Double Arm	EA

SPECIAL PROVISION – Not a Standard NHDOT Specification

SECTION 665.91
LIGHTING CABINET AND ELECTRICAL WORK FOR LIGHTING AND SERVICE.

PART I – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings also apply to work of this section.

B. The Contractor must be familiar will all other Sections of this specifications and the associated Drawings, which affect the scope of work. Where paragraphs of this Section conflict with similar paragraphs elsewhere, the more stringent requirements shall prevail.

1.02 DESCRIPTION OF WORK

A. The Contractor shall furnish a complete finished product, which meets all applicable codes and standards, and the intent and specific requirements of the Drawings and specifications for this project. It is the intent of these specifications that the electrical system shall be suitable in every way for the service (and use) required. All materials and all work, which may be reasonably implied as being incidental to the work of this Section, shall be furnished at no extra cost to the Owner.

B. As used in this Section, "*provide*" means "furnish and install", "*furnish*" means "to purchase and deliver to the project site complete with every necessary appurtenance and support", and "*install*" means "to unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project".

C. Perform work and provide (furnish and install) material and equipment as shown on Drawings and as specified, or indicated, in this Section of the specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation. Drawings and specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.

D. Remove all debris caused by Contractors' work.

E. Provide demolition and relocation of existing electrical items as shown on the drawings.

F. The work under this section shall require that the Contractor provide all labor, materials, equipment, tools, supplies and transportation involved in the installation of electrical equipment as specified.

G. The work to be done under this contract generally includes, but is not limited to the following:

Electrical System

1. Provide new conduit and handhole system for outdoor electrical work, in locations as shown on Drawing. Provide precast concrete electric handholes in locations as shown and "Electric" logo on grey iron cover rated for H-20 loading.

2. Provide new light poles and concrete bases for new proposed lighting poles in locations and quantities as shown on Drawing. Foundations to be reinforced with conduits and bolt patterns as shown on Contract Drawings and/or as specified by the manufacturer.

3. Install new light poles, fixtures, along with necessary accessories in quantities and locations as shown on Contract Drawings. Provide bulbs (if necessary) in each fixture for a complete system.

4. Provide one (1) new NEMA 3R Electrical Cabinet for outdoor power on new cast-in-place or precast concrete foundations. Foundation to include reinforcement, conduit stubs (with one spare conduit) and grounding, per local and NEC requirements. Provide cabinet with service entrance rated distribution panelboard (min. 10 space), lighting contactor with H/O/A switch, photocell(s), circuit breakers (as needed), outlet (one GFCI duplex inside), and other accessories as shown on Contract Drawings. This cabinet will also supply power to the adjacent signal cabinet. **Cabinet to be black powder coated Milbank model CP3B type SL.**

5. Provide electrical feed for new outdoor Electrical Cabinets from utility as shown on Drawings, per Local Utility standard requirements. Service to be 100A, 120/240V single-phase, 3-wire. Routing as shown, or as required by NEC or local authorities. Obtain necessary electrical permits prior to starting conduit work. Provide new 100A utility service including all PSNH hookup fees.

6. Provide conduit and cabling for outdoor lighting between fixtures, handholes, Electrical Cabinet, and utility service. Cabling per panel schedules and as shown on Contract Drawings.

7. Conduits outside below grade to be PVC Schedule 40 or 80 or RGS if required by utility for service. Conduit sizes as indicated on Drawings or required by utility. Provide all necessary grounding, including ground rods at electrical cabinet location and at each light pole foundation as shown or if required by NEC or local authorities.

8. Provide startup services for new lighting system.

9. Provide other associated electrical equipment necessary for a complete system, shown, or implied in these Specifications and on Contract Drawings.

10. Coordinate with the City and local utility staff for new underground service to site, installation of new conduit, service and electrical requirements.

1.03 SITE VISIT

A. Contractor shall visit the site of the proposed work and fully acquaint himself with the conditions there relating to construction and labor, and should fully inform himself as to the facilities involved, and the difficulties and restrictions attending the performance of the Contract. The Contractor should thoroughly examine and familiarize himself with Drawing, Technical Specifications and all other Bid and Contract Documents. The Contractor, by the execution of the Contract, shall in no way be relieved of any obligation under it due to his failure to receive or examine any form or legal document or to visit the site and acquaint himself with the conditions there existing and the Owner will be justified in rejecting any claim thereof.

1.04 AS-BUILT DRAWINGS:

A. After completion of the electrical installation, the Contractor shall furnish an "as-built" drawings showing all conduits, cables, cabinets, transformers, light poles, etc. to scale with dimensions where required. Instruction sheets and parts lists covering all operating equipment will be bound into a folder and furnished to the Owner in duplicate.

1.05 INSTRUCTIONS:

A. Within 10 days, after completion and testing of the system, the Contractor will instruct the Owner's personnel in the proper operations and maintenance of the system, in a 1/2 hour training session.

1.06 GUARANTEE

A. Guarantee work of this Section in writing for one year from date of Owner's acceptance. Repair or replace defective materials, equipment, workmanship and installation that develop within this period, promptly and to Owner's satisfaction and correct damage caused in making necessary repairs or replacements under guarantee with no extra cost to Owner. Contractor shall transfer all equipment warrantees for all systems to Owner.

1.07 REFERENCE STANDARDS AND SPECIFICATIONS

A. Perform work strictly as required by rules, regulations, standards, codes, ordinances, and laws of local, state, and federal government, and other authorities that have lawful jurisdiction.

B. All materials and installations shall be in accordance with the latest edition of the National Code, and all applicable local codes and ordinances. Materials and equipment shall be listed by Underwriters Laboratories (UL). Special Attention shall be paid to the latest edition of the following standards:

American National Standards Institute	ANSI
American Society for Testing & Materials	ASTM
Illuminating Engineering Society	IES
Institute of Electrical & Electronics Engineers	IEEE
Insulated Cable Engineers' Association	ICEA
National Electrical Code	NEC
National Electrical Manufacturer's Association	NEMA
National Electrical Safety Code	NESC
InterNational Electrical Testing Association	NETA
National Fire Protection Association	NFPA
Occupational Safety & Health Administration	OSHA
Underwriter's Laboratories, Inc.	UL

C. The above listed codes and standards are referenced to establish minimum requirements and wherever this Section requires higher grades of materials and workmanship than required by the listed codes and standards, this Section shall apply. In the event a conflict occurs between the above listed codes and standards and this Section, the more stringent requirement shall govern.

1.08 SUBMITTALS

A. Within 10 days after Award of Contract, submit shop drawings and product data on below listed items for approval by the City. Submit copies as requested.

B. Check, stamp and mark with project name shop drawings and product data before submitting for approval. Specifically indicate on shop drawing transmittal form, or by separate letter any deviations from Contract Documents because of standard shop practice or other reason. Rectify with no extra cost to Owner, deviations which escape Engineer's scrutiny and have not been indicated on shop drawings.

C. List of materials and equipment requiring shop drawings shall include:

1. Conduits and Wiring
2. Service Cabinet and Equipment
3. Circuit Breakers
4. Concrete Products and Light Bases
5. Handholes & Manholes
6. Lighting Contactors
7. Receptacles and covers
8. Grounding materials

D. The Engineer's review shall be only for conformance with the design concept of the project and compliance with the specifications and Drawings. The responsibility of, and the necessity of, furnishing materials and workmanship required by the specifications and Drawings which may not be indicated on the shop drawings is included under the work of this Section.

E. The Contractor shall furnish at least two (2) complete sets of operating and instruction manuals for the equipment provided under this Contract. These manuals shall detail the operation, testing, and maintenance of the electrical equipment and systems. Manuals shall be provided upon Engineer's request or upon project completion, whichever comes first.

1.09 INSPECTIONS AND FEES

A. Obtain all necessary permits and licenses, file necessary plans and pay all fees for permits and inspections. Permit fees will not by charged by the City, any other permits required are the responsibility of the Contractor as part of his bid, as is all coordination with the local utility. Contractor is also responsible for obtaining any site-specific utility requirements for this project prior to the start of construction and notifying local utility for all inspections prior to backfilling, etc.

1.10 INTERPRETATION OF DRAWINGS

A. Drawings are diagrammatic and indicate general arrangement of systems and work included in Contract. Drawings are not intended to specify or show every offset, fitting or component; however, Contract Documents require components and materials whether or not indicated or specified as necessary to make installation complete and operational.

B. Any work installed contrary to, or without review by, the Engineer shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.

C. Circuit layouts are not intended to show the number of fittings, or other installation details. Additional circuits shall be installed wherever needed to conform to the specific requirements of the equipment or local codes.

D. As work progresses and for duration of Contract, maintain complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately, including work installed as a modification or addition to the original design.

1.11 ELECTRIC UTILITY

A. All coordination with the Electric Utility is the responsibility of the Contractor. All work and materials for the electric service shall be in accordance with the requirements of the Electric Utility, and are to be met under this Section and included in the bid price of the Contractor.

PART II – MATERIALS & PRODUCTS

2.01 GENERAL

A. Materials and products furnished shall be designed for the intended use, shall meet all requirements of the latest edition of the National Electric Code (NEC), and all local codes.

B. Materials shall be manufactured in accordance with the standards indicated in this Section, and typical industry standards and codes for the products specified. Materials and equipment shall be Underwriter's Laboratory (UL) listed.

C. The materials used shall be new, unused, and of the best quality for the intended use. All equipment shall have the manufacturer's name, address, model or type designation, serial number and all applicable ratings clearly marked thereon in a location which can be readily observed after installation. The required information should be marked on durable nameplates that are permanently fastened to the equipment.

D. Electrical equipment shall at all times during construction be adequately protected against mechanical injury or damage by water. Electrical equipment shall not be stored outside exposed to the elements. If any equipment or apparatus is damaged, such damage shall be repaired at no additional cost, or replaced at no additional cost as directed by the Engineer.

2.02 RACEWAYS

A. Rigid Metallic Conduit: UL6 and ANSI C80.1.

B. Polyvinyl Chloride (PVC) Conduit, electrical, gray, Schedule 40 or 80 as specified, meeting the requirements of UL 651 and NEMA TC-2. If concrete encasement is required, a minimum of 3,000 psi concrete shall be used. All conduits placed under roadways, and subject to vehicular traffic, shall be Schedule 80.

C. Minimum size of conduit shall be 2". Unless indicated on Drawings, conduit sizes can be sized in accordance with National Electric Code (NEC). Conduit bends shall not have kinks or flats, and shall not be less than standard radii.

D. Rigid Galvanized Steel (RGS) conduit shall be used for all entry and exit into concrete pads and at riser poles as required by Eversource, with ground bushings connected to new grounding with minimum #4Awg ground wire for conduit grounding bushings.

E. Conduits shall be made electrically continuous at coupling and connections to boxes and cabinets by means of joining fasteners or copper bond wires. Conduit shall be connected to grounded structural steel or the ground network. After assembly all conduit locknuts, all EMT coupling fittings, and all bond wire screws shall be set up tight before installation of wiring. Insulated metallic bushings shall be used on all conduits entering panel cabinets, pull-boxes, and wiring gutters, except on branch lighting circuits.

F. Expansion fittings shall be provided on all conduits as required by the National Electrical Code, and as required by local and state codes. This includes, but is not limited to, vertical conduit risers coming from below-grade.

2.03 WIRE AND CABLE

A. Unless otherwise noted, conductors for power, lighting, and grounding *above grade* shall be No. 12 through No. 8 AWG, NEC type THWN/THHN, meeting

the requirements of UL 83. Conductors for power and lighting shall be no smaller than No. 12 AWG.

B. Conductors for power, lighting, grounding, and control *below grade* (and in wet locations) shall be No. 8 AWG or larger, NEC type XHHW (or XHHW-2), meeting the requirements of NEMA WC7 and ICEA S-66-524.

C. All conductors shall be annealed copper, 98% conductivity, Class B stranded. All conductors should be rated for 600 volts or less, with a thermal rating of 90° C.

D. The outside covering of all wiring for power, lighting, grounding, and control uses shall be color coded to identify polarity.

2.04 WIRE AND CABLE CONNECTORS AND DEVICES

A. Wire and cable connectors and devices shall meet the requirements of UL 486. Connectors, including miscellaneous nuts, bolts, and washers shall be silicon bronze. Ferrous materials shall not be used. All connectors below grade shall be water-proof secondary type, gel-filled, bolted submersible connectors (gel-port style). No “wire-nuts” are allowed to be used below grade.

2.05 BOXES

A. Outlet and Switch Boxes: NEMA OS 1.

B. Pull Boxes, Junction Boxes, and Equipment Enclosures: NEMA ICS 6.

C. Pull boxes, junction boxes, and equipment enclosures shall be of NEMA Type 1 construction for indoor use, and NEMA Type 3R construction for outdoor or wet location use, unless otherwise noted.

D. Box sizes shall not be less than that required by the National Electrical Code.

2.06 WIRING DEVICES

A. Wiring Devices: NEMA WD 1.

B. Wiring devices for shall be specification grade, 20 ampere, gray with Type 302 stainless steel plates. Ground fault current interrupting (GFCI) devices shall be provided where specified and/or required by applicable codes.

2.07 PANELBOARDS

A. Panelboards: NEMA PB1, and UL 67.

2.08 WARNING TAPE

A. Warning tape shall be six (6) inches wide, polyethylene not less than 3.5 mil thick with a minimum strength of 1,500 psi. Install 8 inches below final grade. Tape shall be red for electric conduit, and red or yellow for communication conduit. Tape shall have black lettering on two lines as indicated below:

B. For Electric conduit:

CAUTION CAUTION CAUTION
BURIED ELECTRIC LINE BELOW

2.09 ELECTRIC HANDHOLES

A. Electric Handholes are to be precast concrete as required by utility company. Handhole size as required by utility company.

B. Handholes shall be provided with skid-resistant cast iron surface covers, with an "Electric" logo. Handholes and Covers shall be design for street-rated, heavy duty applications, meeting the requirements of the either: AASHTO HS-20 loading, with a minimum design load of 15,000 lbs for both the handhole box and cover. . Handholes shall meet the requirements of the latest edition of the National Electric Code (2008 or later) with regards to structural integrity, installation methods, grounding of the cover and metallic parts, etc.

C. A layer of 6-inches of crushed rock shall be installed below and in the bottom of each handhole to assist with drainage, and this compacted gravel base material shall extend out beyond the sidewalls of the handhole. Conduits shall sweep up and be at least 4-inches above top of crushed rock layer.

2.10 ELECTRICAL CABINET

A. Provide one (1) outdoor NEMA 3R powder coated black outside, white inside Milbank CP3B cabinet, to contain 100A 1-phase, 3-wire, 120/240V panelboard and associated electrical equipment, etc. Cabinet and equipment components shall be UL listed. Integral locking mechanism, with provision for pad-lock. Cabinets shall be ventilated type. Utility electric meter to be mounted inside of this cabinet.

B. Contractor to coordinate with sizes of equipment to be installed within cabinets, including panelboard. Dimensions shown are typical and are for reference only. Cabinet to allow installation and removal of all electrical equipment with no interference between equipment. All equipment doors shall open 90 degrees.

Electrical Cabinet doors to be provided with stay-open door catches. Contractor is responsible for coordinating size of this equipment prior to submitting Electrical Cabinet for approval.

2.11 CAST-IN-PLACE CONCRETE FOUNDATION

A. Provide the materials, labor and equipment necessary for the installation of the following cast-in place concrete foundations, in accordance with these Specifications, Contract Drawings, Utility & City requirements and all applicable codes & regulations.

Electrical Cabinet Foundation: complete with reinforcing rebar, ground rods, grounding connectors, conduit entrances, etc. as shown and as directed by Owner or Engineer. Contractor responsible for coordinating foundation dimensions to be 6-inches wider than cabinet base dimensions, on all four sides. Cabinet grounding to include a buried loop on all four sides, connected to the two buried ground rods as shown. Foundation shall be 6" above finish grade and 30" deep below grade.

B. Foundations shall be built with 4,000 psi. Class AA concrete, on a base of crushed gravel and sand, as shown.

C. Reinforcing rod to be #3 or #4 (as shown) grade 60 bars and shall conform to ASTM A-615 (latest revision). Reinforcing rods shall not be installed any closer than 2" from the face of the concrete.

D. Provide grounding in the form of one (1) 5/8" diameter x 8'-0" long copperweld ground rod for each foundation, connected with a loop of #1/0Awg bare copper stranded ground wire (as shown), leaving a 3 foot long tail to ground the enclosure, transformers, etc. Buried loop for Electrical Cabinet to be buried approx. 6-8" below finished grade, offset approximately 12-inches from the edge of concrete foundation on all four sides.

2.12 FOUNDATIONS FOR LIGHTING POLES

A. Provide approved cast-in-place foundations, and other devices as necessary and as required.

B. Foundations for light poles shall be as shown on Drawings or as specified by the manufacturer, including number, type and location of anchor bolts. Foundations shall be made of minimum 4,000 psi concrete (at 28 days) and have steel reinforcement meeting ASTM A-615, grade 60 (cover to steel, 1" minimum). Foundations shall have 2-2" conduits for lighting circuits, 180 degrees apart. Foundations to be installed with the top

of the concrete below final grade to hide the base plate of the poles. Conduits to be flush with top of concrete to not interfere with anchor bolts or pole base.

2.13 LIGHTING

Install light poles and fixtures in quantities and locations as shown on the drawings.

2.14 LIGHTING CONTACTOR

A. Lighting contactor with H/O/A switch to be in Electrical Cabinet. Feed to contactor shall be from photo-control, to be mounted on outside of Electrical Cabinet.

PART III – EXECUTION

3.01 GENERAL

A. This Section covers the requirements for installation of materials, proper workmanship, testing, cleaning, grounding, and work methods to be followed by the Contractor. This Section also includes specific instructions and to be used in conjunction with the contract Drawings. Any discrepancies noted between the specification, Drawings, and actual installation shall be reported immediately to the Owner, Engineer, and Architect. Failure on the part of the Contractor to report discrepancies immediately will be considered negligent and Contractor will be responsible for correcting actions at no cost to Owner.

B. Contractor is responsible for coordinating work with other trades, Owner, and Architect's schedule. Work will be coordinated such that systems can be properly located, and conflicts and delays are avoided. Contractor shall consider commencement of work acceptance of existing conditions.

3.02 MATERIALS AND WORKMANSHIP

A. Work shall be executed in workmanlike manner and shall present neat, rectilinear and mechanical appearance when completed. Do not run raceway exposed unless shown exposed on Drawings. Material and equipment shall be new and installed according to manufacturer's recommended best practice so that complete installation shall operate safely and efficiently.

3.03 CONTINUITY OF SERVICES

A. Do not interrupt existing services without Owner's, Utilities, or Engineer's approvals.

3.04 TESTING, INSPECTION AND CLEANING

A. Insulation resistance between conductors and grounds for secondary distribution systems shall meet National Electrical Code (NEC) and interNational Electrical Testing Association (NETA) requirements.

B. Verify and correct as necessary: voltages, tap settings, trip settings and phasing on equipment from secondary distribution system to point of use. Test secondary voltages at transformers, bus in panelboards, and at other locations on distribution systems as necessary. Test secondary voltages under no-load and full-load conditions.

C. Test lighting fixtures with specified lamps in place for 100 hours. Replace lamps that fail within 90 days after acceptance by Owner at no extra cost to Owner (no exceptions).

D. Provide necessary testing equipment and testing services.

E. Failures or defects in workmanship or materials revealed by tests or inspection shall be corrected promptly and retested. Replace defective material.

F. Clean panels and other equipment. Panelboard interiors shall be cleaned and vacuumed. Equipment with damage to painted finish shall be repaired to Engineer's or Architect's satisfaction. After completion of project, clean exterior surfaces of electrical equipment.

3.05 WIRING METHODS

A. Install wire and cables in approved raceways as specified and as approved by authorities that have jurisdiction.

B. Follow homerun circuit numbers and/or notes as shown on Drawings to connect circuits to panelboards. Where homerun circuit numbers are not shown on Drawings, divide similar types of connected loads among phase buses so that currents are approximately equal in normal usage.

C. Run concealed conduit in as direct lines as possible with a minimum number of bends of longest possible radius. Run exposed conduit parallel to or at right angles to building/field lines. Bends shall be free from dents or flattening. The exact locations and routing of conduit shall be determined by the Contractor subject to the approval of the Owner and Engineer.

D. Polarity of all electrical connections shall be observed in order to preserve phase relationship in all feeders and equipment.

E. Splices shall be made in neat, workmanlike manner using approved mechanical connectors. After splicing, insulation equal to that on the spliced wires shall be applied at each splice. Splices are permitted only in junction boxes, outlet boxes, or other permanently accessible locations. Splices installed in electric handholes shall be weather and waterproof, pre-molded polymer splices. Hand taping of splices below-grade is not acceptable.

3.06 GROUNDING

A. Bond and ground equipment and systems connected under this Section in accordance with standards of the NEC and other applicable regulations and codes.

B. Conduit system shall be electrically continuous throughout, grounded at service entrance. Equipment frames, enclosures, boxes, etc. shall be grounded by use of green-jacketed (or bare copper) ground, sized as per Table 250-95 of the NEC.

C. Green bonding jumper shall be installed in flexible conduits.

D. Copper fittings for ground connections shall conform to the requirements of ASTM B 30. All bolts, u-bolts, cap screws, nuts, and lock washers for copper fitting shall be of approved corrosion-resisting material. Compression connectors required for all below-grade grounding connections. Exothermic (cad-weld) connectors are also acceptable for use below grade. The use of bolted grounding and ground rod connectors below grade is not acceptable.

E. Ground Rods shall be 5/8” diameter and 8’ in length, copperweld as required by applicable codes (NEC, NESC). Bonding connections to ground rods shall be permanent, welded or crimped, with copper connectors. All wire used for grounding shall be no smaller than #4 Awg copper, stranded conductor. Contractor shall bond all meter enclosure cabinets, meter sockets, safety disconnects, conduit grounding bushes, etc. .

3.07 INSTALLATION OF LIGHTING FIXTURES

A. Verify construction of light pole foundations is suitable, and provide fixtures, poles, hardware, and other accessories suitable for construction encountered.

B. Install Lighting System, as specified elsewhere in this Specification. Ground pole steel/aluminum to power system grounding conductor at each pole location, per NEC.

C. Coordinate installation of fixtures with installation of surrounding materials and landscaping (if applicable). Investigate lighting fixture locations and foundation

supports to ensure that no interference exists between lighting fixtures, supports, and other equipment including that provided by other trades. Report any possible interference's to the Engineer.

3.08 EXECUTION – INSTALLATION OF ELECTRICAL EQUIPMENT

A. Contractor to Provide (furnish & install) all items as indicated as Contractor-furnished and install all items, and all necessary minor and expected accessories.

B. Contractor to meet with local wiring inspector prior to the start of any work and obtain any local site requirements and restrictions, which must be followed. Contractor shall also meet with local utility, any other Town/City officials, as directed by Owner and wire inspector, prior to the start of work, or ordering of materials. Failure to meet with the local officials and utility prior to ordering materials and start of construction will be considered negligent and all necessary corrections resulting form this failure will be at no cost to Owner.

C. Provide, furnish and install all products and work outlined in Paragraph 1.02.G of this Specification Section.

D. Provide all grounding of electrical cabinet installations and lighting. Grounding to be installed per installation details and National Electrical Code.

E. Balance the lighting, receptacle and electrical load evenly on all circuits and on all phases of each circuit. Add additional circuits as necessary to balance loads.

F. Provide new handholes and conduit system for lighting and electrical work, in locations as shown on Contract Drawings and as required.

G. Install all equipment in locations as shown on Contract Drawings. All deviations must be approved, in advance by Owner and Engineer.

H. Install all equipment per manufacturer's instructions.

I. Provide complete "As-Built" drawings to Engineer & Owner.

END OF SECTION

SPECIAL PROVISION
SECTION 673 – SARA LONG BRIDGE PLAQUE
(Interpretive Sign Panel Holder)

Description: This work shall consist of furnishing all labor, materials and equipment to fabricate, finish and install (1) Interpretive Sign Panel Holder in accordance with these specifications and details. The Panel Holder shall consist of two granite posts, a stainless steel mounting bracket and all specified hardware. Interpretive Sign Panel with fasteners shall be furnished by others.

Submittals: The Contractor shall submit granite sample or photograph to the City for approval.

Materials: Mounting Brackets shall be fabricated from 316L Stainless Steel and skip welded as per details. All metal parts shall be de-burred and smooth to touch, with no sharp or jagged edges.

- End Plates: 3/16" steel, round over corners. See detail in appendix for plate dimensions and bolt hole locations.
- Channel: 3/16" x 3" x 2"and 36.5" overall length shop manufactured.
  Backing Plate: 3/16" x 23" x 35" Ref Detail for locations of (4) drilled 3/8" hole locations, round over all corners. Metal bracket parts shall be fastened with non-continuous welds.
- Hardware:
  -Wedge anchor ITW Ramset Red Head SWW 3826 316SS 3/8" x 2 ¾" or approved equal.

-Vandal Resistant Penta Nut [Bryce Fastener Inc] 316SS Stainless Steel 3/8"-16 or approved equal.
Granite: Granite posts for the Panel Holders shall manufactured by Swenson Granite Works or approved equal and be 6" x 6" x 7' long, tight grained, salt and pepper light gray color, and shall be from one quarry source for consistency of granite color and grain structure. Each post shall be thermal faced on two opposite sides and split face on the other two opposite sides. Rock face top surface.

Construction: The contractor shall fabricate and finish mounting brackets as per details prior to on-site installation. All granite posts shall be delivered and handled to prevent soiling and damage. Stack posts off the ground. Posts shall be installed so that the thermal faced sides are used for attaching the mounting brackets and the split face sides are facing the viewer of the sign. All posts to be set plum and the tops of both posts shall be level relative to each other and the finished grade. Posts shall be set on a compacted gravel base and backfilled in accordance with details. The backfill used around the post shall meet the requirements of crushed gravel, Section 304.3. Backfill shall be placed in lifts not to exceed 8" and compacted with hand operated equipment. Holes in the granite posts for wedge anchors shall be drilled in the field using end plates for template during installation by the contractor and as per details

Method of Measurement: Each Interpretive Sign Panel Holder installed consists of two granite posts, attached assembled and mounting bracket. Sign to be attached by the contractor and will be provided by the State of Maine. The sign will be delivered to the site by others.

Basis of Payment:
Payment for an installed Interpretive Sign Panel Holder will be made under

Pay Item:	Pay Unit
673 Interpretive Sign Panel Holder System	Each

SECTION 900

SITE FEATURES

Create Section 900 to include:

Item 900.01 – Bench (City Standard)

Description

1.1 This work shall consist of furnishing and installing Park Benches of the specified type at the locations shown on the project plans.

Materials

2.1 Bench materials and finishes, including fastening hardware, shall be Du Mor model 91-60I 6' Powder Coated Black Bench with Ipe wood seat. Benches shall be mounted to concrete using 3 ½" minimum embedment stainless steel fasteners of a proper diameter to properly secure the bench.

Contractor shall submit shop drawings or cut sheets of the bench manufacturer, dimensions, material, and finish to the City of Portsmouth for approval prior to ordering.

Construction Requirements

3.1 Benches shall be installed as shown on the site plans.

Method of Measurement

4.1 Item 900.01 - Bench shall be measured by the number of benches installed in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Benches will be paid for at the Contract unit price per each in the complete and accepted work. Payment will be full compensation for all hardware, fasteners, and installation labor.

Pay Item	**Unit:**
900.01 Bench (City Standard)	EA

Item 900.02 – Bicycle Rack (City Standard)

Description

1.1 This work shall consist of furnishing and installing bike racks of the specified type at the locations shown on the project plans.

Materials

2.1 Bicycle Rack materials and finishes, including fastening hardware, shall be as manufactured by MADRAX, powder coated black U24 surface mounted.

Contractor shall submit shop drawings or cut sheets of the bicycle rack manufacturer, dimensions, material, and finish to the City of Portsmouth for approval prior to ordering.

Construction Requirements

3.1 Bicycle Racks shall be installed as shown on the site plans, and constructed with appropriate offsets between bicycle racks as detailed by the City Standards and project plans. Mounting fasteners shall be stainless steel and sized to fit the mounting plates on the rack, minimum length, 3 ½" in concrete attachment.

Method of Measurement

4.1 Item 900.02 – Bicycle Rack (City Standard) shall be measured by the number of U-style racks installed in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Bicycle Racks will be paid for at the Contract unit price per each for each U-style rack in the complete and accepted work. Payment will be full compensation for all hardware, fasteners, and installation labor.

Pay item	**Unit:**
900.02 Bike Rack (City Standard)	EA

Item 900.03 – Trash Receptacle (City Standard)

Description

1.1 This work shall consist of furnishing and installing trash receptacles of the specified type at the locations shown on the project plans.

Materials

2.1 Trash Receptacle materials and finishes, including fastening hardware, shall be Victor Stanley model number A-45, 45 Gallon side door opening litter receptacle, powder coated black.

Contractor shall submit shop drawings or cut sheets of the trash receptacle manufacturer, dimensions, material, and finish to the City of Portsmouth for approval prior to ordering.

Construction Requirements

3.1 Trash Receptacles shall be installed as shown on the site plans. Anchors shall be stainless steel with a minimum 3 ½" concrete embedment sized to fit the receptacle.

Method of Measurement

4.1 Item 900.03 – Trash Receptacle (City Standard) shall be measured by the number of trash receptacles installed in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Trash Receptacles will be paid for at the Contract unit price per each for Trash Receptacles in the complete and accepted work. Payment will be full compensation for all hardware, fasteners, and installation labor.

Pay item	**Unit:**
900.03 Trash Receptacle (City Standard)	EA

Item 900.04 – Park Sign (Large)

Description

1.1 This work shall consist of fabricating Cor-Ten steel sign welded to a galvanized base plate, stainless steel letters mounted to the sign, and mounting the sign to a reinforced concrete footing, all of the specified type at the locations shown on the project plans.

Materials

2.1 Materials shall be consistent with the site details in the project plans.

Construction Requirements

3.1 Construction requirements shall be consistent with the site details in the project plans.

The foundation for the park signs shall subsidiary to Park Sign (Large).

Method of Measurement

4.1 Item 900.04 – Park Sign (Large) shall be measured by the number of permanent large park signs installed in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Park Signs (Large) will be paid for at the Contract unit price per each for Park Signs (Large) in the complete and accepted work. Payment will be full compensation for all excavation, concrete, reinforcement, anchor bolts, lettering, hardware, fasteners, and installation labor.

Pay item	**Unit:**
900.04 Park Sign (Large)	EA

Item 900.05 – Park Sign (Medium)

Description

1.1 This work shall consist of fabricating Cor-Ten steel sign welded to a galvanized base plate, stainless steel letters mounted to the sign, and mounting the sign to a reinforced concrete footing all of the specified type at the locations shown on the project plans.

Materials

2.1 Materials shall be consistent with the site details in the project plans.

Construction Requirements

3.1 Construction requirements shall be consistent with the site details in the project plans.

The foundation for the park signs shall subsidiary to Park Sign (Medium).

Method of Measurement

4.1 Item 900.05 – Park Sign (Medium) shall be measured by the number of permanent medium park signs installed in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Park Signs (Medium) will be paid for at the Contract unit price per each for Park Signs (Medium) in the complete and accepted work. Payment will be full compensation for all excavation, concrete, reinforcement, anchor bolts, lettering, hardware, fasteners, and installation labor.

Pay item	**Unit:**
900.05 Park Sign (Medium)	EA

Item 900.06 – Kiosk Concrete Sandblasting and Staining

Description

1.1 This work shall consist of sandblasting and staining concrete in the shape of a Great Bay Estuary Map over an area of approximately 170 SF under the Kiosk Structure, as shown in the project plans.

Materials

2.1 Sandblasting shall occur over concrete sidewalk surface, to be paid separately. Contractor to confirm control and expansion joint locations and finish technique. Additional material detail is provided on "Site Details" on project plans.

Construction Requirements

3.1 Construction requirements are detailed on the project plans. Concrete shall be sandblasted approximately ¼" and stained with color sealant. Contractor shall provide a 5' x 5' concrete mock-up of sandblasting and staining for approval by the City of Portsmouth prior to construction.

The Landscape Architect shall provide provided digital CAD linework of Great Bay Estuary Map, The Contractor shall in turn provide "sandblasting templates" shop drawings based on digital CAD linework for approval prior to construction.

Additional construction requirements are documented on the Site Details in the project plans.

Contractor shall submit cut sheets and product information on concrete color and sealant for City of Portsmouth review and approval.

Method of Measurement

4.1 Item 900.06 – Kiosk Concrete Sandblasting and Staining will be measured as a unit.

Basis of Payment

5.1 Item 900.06 – Kiosk Concrete Sandblasting and Staining will be paid at the Contract lump sum unit price complete in place. Concrete sidewalks shall be pad under section 608.

5.1.1 – The required mock-ups will not be paid for separately, but will be subsidiary to Item 900.06 – Kiosk Concrete Sandblasting and Staining.

Pay item	**Unit:**
900.06 – Kiosk Concrete Sandblasting and Staining	U

Item 900.07 – Bronze Tablets

Description

1.1 This work shall consist of fabricating and installing cast bronze tablets with custom lettering of names of regional waterbodies near the Kiosk Structure of the specified type and at the locations shown in the project plans.

Materials

2.1 Materials shall be consistent with the site details in the project plans, and shall include bronze panels, mortar setting bed, and threaded studs.

Construction Requirements

3.1 Construction requirements shall consist of fabricating one full scale tablet for approval prior to final fabrication. Contractor shall furnish cast bronze tablets with custom, sunken lettering of the specified type at the locations shown. Construction requirements shall refer to "Site Details" for installation.

Landscape Architect to provide font and size. Contractor to layout bronze plaques in field for approval by City of Portsmouth and Landscape Architect.

Method of Measurement

4.1 Item 900.07 – Bronze Tablets shall be measured by the number of bronze tablets installed in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Bronze Tablets will be paid for at the Contract unit price per each for Bronze Tablets complete in place. Payment shall be full compensation for tablet, hardware, mortar, and activities to create the setting bed.

Pay item	**Unit:**
900.07 – Bronze Tablet	EA

Item 900.08 – Concrete Path Sandblasting, Flora

Description

1.1 This work shall consist of sandblasting concrete in the shape of significant aquatic flora of the Great Bay Estuary on the Mill Pond Park pathways. There shall be three separate flora stencils, and each stencil shall be used equally.

Materials

2.1 Sandblasting shall occur over concrete sidewalk surface, to be paid separately. Contractor to confirm control and expansion joint locations and finish technique. Additional material detail is provided on "Site Details" on project plans.

Construction Requirements

3.1 Construction requirements are detailed on the project plans. Concrete shall be sandblasted approximately 1/8" and stained with color sealant. The Landscape Architect shall provide provided digital CAD linework of three noted aquatic flora. The Contractor shall in turn provide "sandblasting templates" shop drawings based on digital CAD linework for approval by the Landscape Architect and City of Portsmouth prior to construction. Contractor to layout flora sandblasting templates in field for approval by City of Portsmouth and Landscape Architect.

Additional construction requirements are documented on the Site Details in the project plans.

Contractor shall submit cut sheets and product information on concrete color and sealant for City of Portsmouth review and approval.

Method of Measurement

4.1 Item 900.08 – Concrete Path Sandblasting, Flora will be measured by the number of flora sandblasted in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Concrete Path Sandblasting, Flora will be paid for at the Contract unit price per each in the complete and accepted work.

Pay item	**Unit:**
900.08 – Concrete Path Sandblasting, Flora	EA

Item 900.1 – Kiosk Interpretive Panel Frames

Description

1.1 This work shall consist of fabricating and installing Kiosk Interpretive Panel Frames mounted to the Kiosk steel columns and girders for future artwork. The panels shall be of the specified type at the locations shown on the project plans.

Materials

2.1 Panels shall be constructed of galvanized steel. Welds and damage to galvanized surface shall be repaired with appropriate galvanization material. Additional detail on the materials are shown in the "Site Details" of the project plans.

Construction Requirements

3.1 Construction requirements shall consist of fabricating a galvanized interpretive panel frame mounted to a steel Kiosk column and a galvanized hanger rod mounted to a steel Kiosk girder. Construction requirements shall refer to "Site Details" for installation.

All hangers and support hardware and fasteners shall be subsidiary to the appropriate Interpretive Panel pay item.

Method of Measurement

4.1 Kiosk Interpretive Panels will be measured by the number of panels of the specified size in the complete and accepted work.

Basis of Payment

5.1 The accepted quantities of Kiosk Interpretive Panel Frame will be paid for at the Contract unit price per each for Kiosk Interpretive Panel Frame complete in place. Payment will be full compensation for all materials, labor, repairs, and hardware necessary to support the final frames.

Pay item	**Unit:**
900.11 – Kiosk Interpretive Panel Frame (Large)	EA
900.12 – Kiosk Interpretive Panel Frame (Medium)	EA

SECTION 901

KIOSK STRUCTURE

Create Section 901 to include:

Description

1.1 This work shall include the construction of kiosk in the Riverfront Park at the location identified on the project plans.

Materials

2.1 The following Construction Specifications Institute (CSI) sections are hereby included in the Kiosk Specification:

03330 – Cast In Place Concrete
05120 – Structural Steel Framing
06163 – Exterior Rough Carpentry
07410 – Exposed Fastener Metal Roof Panels
079220 – Joint Sealants

All materials, finishes, and construction requirements are documented in these technical specifications and the project plans.

Construction Requirements

3.1 All materials, finishes, and construction requirements are documented in following CSI technical specifications and the project plans.

Method of Measurement

4.1 Item 901.1 Kiosk Structure shall be measured as a unit.

Basis of Payment

5.1 Item 901.1 Kiosk Structure will be paid at the Contract lump sum unit price complete in place.

Pay item		**Pay unit**
901.1	Kiosk Structure	U

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 2 - GENERAL

2.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

2.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

2.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

2.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

2.5 QUALITY ASSURANCE

A. 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.

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

2.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

2.7 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 3 - PRODUCTS

3.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301.
2. ACI 117.

3.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.

B. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

C. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

D. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

3.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

3.4 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I.
2. Fly Ash: ASTM C 618, Class F or C.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.

C. Normal-Weight Aggregates: ASTM C 33/C 33M, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C 260/C 260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do 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.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

F. Water: ASTM C 94/C 94M and potable.

3.5 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Foundation Piers and Footings: Normal-weight concrete.

1. Minimum Compressive Strength: 3000 psi at 28 days.
2. Maximum W/C Ratio: 0.50.
3. Slump Limit: 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
4. Air Content: 5.5 percent, plus or minus 1.5 percent at point of delivery for 1-1/2-inch nominal maximum aggregate size.

3.6 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

3.7 CONCRETE MIXING

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

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

PART 4 - EXECUTION

4.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

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

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.

2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

4.2 EMBEDDED ITEM INSTALLATION

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.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

4.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 72 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

4.4 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

4.5 JOINTS

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

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

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.

3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

4.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is 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. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

4.7 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view,.

C. 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.

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

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

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

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

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

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

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

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

4.9 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

4.10 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.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes

and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

4.11 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

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

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.

    a. When frequency of testing provides 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.

3. 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 mixture. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete;one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure four standard cylinder specimens for each composite sample.
    b. Cast and field cure four standard cylinder specimens for each composite sample during hot or cold weather concreting.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at 7 days and two specimens at 28 days. Hold fourth specimen for 56-day testing if needed, otherwise discard.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

10. 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.
11. 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.
12. 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. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION

SECTION 05120 - STRUCTURAL STEEL FRAMING

PART 5 - GENERAL

5.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

5.2 SUMMARY

A. Section Includes:

1. Structural steel.

2. Special bolts for wood fillers.

5.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

5.4 COORDINATION

A. Coordinate installation of anchorage items to be embedded in or attached to other construction, including but not limited to concrete foundations and wood fillers, without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

5.5 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.

5.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC 172).

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

C. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 360.
3. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

5.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 6 - PRODUCTS

6.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles-Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500/A 500M, Grade B, structural tubing.

E. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.

F. Welding Electrodes: Comply with AWS requirements.

G. Special bolts for wood fillers: As specified on the Drawings.

6.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade C, heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers; all with plain finish.

B. Anchor Rods: ASTM F 1554, Grade 36.
   1. Nuts: ASTM A 563hex carbon steel.
   2. Plate Washers: ASTM A 36/A 36M carbon steel.
   3. Washers: ASTM F 436, Type 1, hardened carbon steel.

6.3 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.

   1. Camber structural-steel members where indicated.
   2. Fabricate beams with rolling camber up.
   3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.

4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill,or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

6.4 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

6.5 GALVANIZING

A. Hot-Dip Galvanizing: For all steel components, provide coating for iron and steel fabrications applied by the hot-dip process.

1. Basis-of-Design: Duragalv by Duncan Industries.
2. Comply with ASTM A 123 for fabricated products and ASTM A 153 for hardware.
3. Provide thickness of galvanizing specified in referenced standards.
4. Galvanizing bath shall contain special high grade zinc and other earthly materials.
5. Fill vent holes after galvanizing, if applicable, and grind smooth.

6.6 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

PART 7 - EXECUTION

7.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

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

7.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

7.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.

3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.

C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

7.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

7.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:

1. Verify structural-steel materials and inspect steel frame joint details.
2. Verify weld materials and inspect welds.
3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

7.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780/A 780M.

B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

END OF SECTION

SECTION 061063 - EXTERIOR ROUGH CARPENTRY

PART 8 - GENERAL

8.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

8.2 SUMMARY

A. Section Includes:

1. Wood roof framing.
2. Wood filler at webs of steel columns and girders.

8.3 DEFINITIONS

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

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

1. NeLMA: Northeastern Lumber Manufacturers' Association.
2. NSLB: National Softwood Lumber Bureau.

8.4 DELIVERY, STORAGE, AND HANDLING

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

PART 9 - PRODUCTS

9.1 LUMBER, GENERAL

A. Comply with DOC PS 20 and with grading rules of lumber grading agencies certified by ALSC's Board of Review as applicable. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by ALSC's Board of Review.
1. For items that are exposed to view in the completed Work, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
3. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content:
1. Dimension Lumber: 19 percent.

9.2 LUMBER

A. Hand select wood for high-quality appearance for freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot holes, shake, splits, torn grain, and wane.

B. Steel web wood filler pieces: Up to two spliced scarf joints are acceptable. Round all edges.

C. Dimension Lumber: No. 1 grade, Eastern Hemlock (native to Maine or New Hampshire)

9.3 FASTENERS

A. General: Provide fasteners of size and type indicated, acceptable to authorities having jurisdiction, and that comply with requirements specified in this article for material and manufacture.

PART 10 - EXECUTION

10.1 INSTALLATION, GENERAL

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

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

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

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

E. Select fasteners of size that do not fully penetrate members where opposite side is exposed to view. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads unless otherwise indicated.

END OF SECTION

SECTION 07410 - METAL ROOF PANELS

PART 11 - GENERAL

11.1 SECTION INCLUDES

A. Exposed fastener metal roof panels, with related metal trim and accessories.

11.2 RELATED REQUIREMENTS

A. Division 07 Section "Joint Sealants" for field-applied Joint Sealants.

11.3 REFERENCES

A. International Accreditation Service (IAS):

1. IAS AC 472 - Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, Part B.

11.4 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal roof panel assembly and accessories from a single manufacturer providing fixed-base roll forming, and accredited under IAS AC 472 Part B.

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years experience in manufacture of similar products in successful use in similar applications.

1. Substitutions following award of contract are not allowed.
2. Approved manufacturers must meet separate requirements of Submittals Article.

C. Installer Qualifications: Experienced Installer with minimum of five years experience with successfully completed projects of a similar nature and scope.

1. Installer's Field Supervisor: Experienced mechanic, able to communicate with Owner, Architect, and installers, supervising work on site whenever work is underway.

11.5 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets for specified products.

B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, roof accessories, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work.

1. Indicate points of supporting structure that must coordinate with metal panel system installation.
2. Include data indicating compliance with performance requirements.
3. Include structural data indicating compliance with requirements of authorities having jurisdiction.

C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification: Provide 12-inch- long section of each metal panel profile. Provide color chip verifying color selection.

11.6 INFORMATIONAL SUBMITTALS

A. Manufacturer's Warranty: Sample copy of manufacturer's standard warranty.

11.7 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Manufacturer's Warranty: Executed copy of manufacturer's standard warranty.

11.8 DELIVERY, STORAGE, AND HANDLING

A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.

1. Deliver, unload, store, and erect metal panel system and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.

11.9 WARRANTY

A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail within one year from date of Substantial Completion.

B. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within 25 years from date of Substantial Completion, including:

1. **Modified Silicone-Polyester Two-Coat System**:

a. Color fading in excess of 5 Hunter units per ASTM D 2244, for vertical applications.
b. Color fading in excess of 7 Hunter units per ASTM D 2244, for non-vertical applications.
c. Chalking in excess of No. 8 rating per ASTM D 4214, for vertical applications.
d. Chalking in excess of No. 6 rating per ASTM D 4214, for non-vertical applications.
e. Failure of adhesion, peeling, checking, or cracking.

PART 12 - PRODUCTS

12.1 MANUFACTURER

A. Basis of Design Manufacturer: **MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.**; Houston TX. Tel: (877)713-6224; Email: info@mbci.com; Web: www.mbci.com.

1. Provide basis of design product.

12.2 PERFORMANCE REQUIREMENTS

A. General: Provide metal roof panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.

B. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

C. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated:

1. Wind and Snow Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/240 of the span with no evidence of failure.

12.3 METAL PANEL MATERIALS

A. **Aluminum-Zinc Alloy-Coated Steel Sheet**: ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ50, prepainted by the coil-coating process per ASTM A 755/A 755M.

12.4 METAL ROOF PANELS

A. **Tapered-Rib-Profile, Exposed Fastener Metal Roof Panels**: Structural metal roof panel consisting of formed metal sheet with trapezoidal ribs, installed by lapping edges of adjacent panels.

1. Basis of Design: **MBCI, 7.2 Panel,** www.mbci.com/72.html.
2. Coverage Width: 36 inches.
3. Continuous Rib Spacing: 7.2 inches on center.
4. Rib Height: 1-1/2 inch.
5. Nominal Coated Thickness: 0.034 inch/22 gage.
6. Panel Surface: Smooth.
7. Exterior Finish: Modified silicone-polyester two-coat system.
8. Color: As selected by Architect from manufacturer's standard colors.

12.5 METAL ROOF PANEL ACCESSORIES

A. General: Provide complete metal roof panel assembly incorporating ridge, eave, rake, valley, and parapet trims, copings, fascias, gutters and downspouts, and miscellaneous flashings, in profiles as indicated. Provide required fasteners, closure strips, support plates, and sealants as indicated in manufacturer's written instructions.

B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.

C. Panel Fasteners: Self-tapping screws and other acceptable fasteners recommended by roof panel manufacturer.

1. Exposed Fasteners: Long life fasteners with EPDM or neoprene gaskets, with heads matching color of metal panels by means of factory-applied coating.

D. Joint Sealers: Manufacturer's standard or recommended liquid and preformed sealers and tapes, and as follows:

1. Tape Sealers: Manufacturer's standard non-curing butyl tape, AAMA 809.2.
2. Concealed Joint Sealantst: Non-curing butyl, AAMA 809.2.
3. Exposed Joint Sealants: Urethane, single component, ASTM C 920.

E. **Roof Accessories**: Approved by metal roof panel manufacturer. Refer to Section 07 72 00 "Roof Accessories" for requirements for curbs, equipment supports, roof hatches, heat and smoke vents, ventilators, and preformed flashing sleeves.

12.6 FABRICATION

A. General: Provide factory fabricated and finished metal panels and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Panel Lengths: Form panels in continuous lengths for full length of detailed runs, except where otherwise indicated on approved shop drawings.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings. Form from materials matching metal panel substrate and finish.

12.7 FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

B. **Modified Silicone-Polyester Two-Coat System**: 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat.

1. Basis of Design: **MBCI, Signature 200**.

PART 13 - EXECUTION

13.1 EXAMINATION

A. Examine metal panel system supports with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panel installation.

1. Inspect metal panel support to determine if support components are installed as indicated on approved shop drawings. Confirm presence of acceptable supports at recommended spacing to match installation requirements of metal panels.
2. Panel Support Tolerances: Confirm that panel supports are within tolerances acceptable to metal panel system manufacturer but not greater than the following:

    a. 1/4 inch in 20 foot in any direction.
    b. 3/8 inch over any single roof plane.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with metal roof panel system installation.

13.2 PREPARATION

A. **Miscellaneous Supports**: Install subframing, girts, furring, and other miscellaneous panel support members according to ASTM C 754 and manufacturer's written instructions.

B. Flashings: Install flashings to cover exposed materials as indicated.

13.3 METAL PANEL INSTALLATION

A. Exposed Fastener Metal Roof Panels: Install weathertight metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal roof panels in orientation, sizes, and locations indicated, free of waves, warps, buckles, fastening stresses, and distortions. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Panel Sealants: Install manufacturer's recommended tape sealant at panel sidelaps and endlaps.

C. Panel Fastening: Attach panels to supports using screws, fasteners, and sealants recommended by manufacturer and indicated on approved shop drawings.

1. Fasten metal panels to supports at each location indicated on approved shop drawings, with spacing and fasteners recommended by manufacturer.
2. Provide weatherproof jacks for conduit penetrations as recommended by manufacturer.
3. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.

13.4 ACCESSORY INSTALLATION

A. General: Install metal panel trim, flashing, and accessories using recommended fasteners and joint sealers, with positive anchorage to building, and with weather tight mounting. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.

3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

B. Joint Sealers: Install joint sealers where indicated and where required for weathertight performance of metal panel assemblies, in accordance with manufacturer's written instructions.

1. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."

13.5 CLEANING AND PROTECTION

A. Remove temporary protective films immediately in accordance with metal roof panel manufacturer's instructions. Clean finished surfaces as recommended by metal roof panel manufacturer.

B. Replace damaged panels and accessories to the satisfaction of the Owner.

END OF SECTION

SECTION 07 92 00 JOINT SEALANTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Polyurethane Sealants

B. Tape Mastic Sealants

C. Non-skinning Sealants

D. Silicone Sealants

E. Acrylic Sealants

1.2 REFERENCES

A. American Architectural Manufacturer’s Association (AAMA)

1. AAMA 800-10 - Voluntary Specifications and Test Methods for Sealants

B. ASTM International (ASTM)

1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM A 792 - Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy- Coated by the Hot-Dip Process.
3. ASTM C 639 - Standard Test Method for Rheological (Flow) Properties of Elastomeric Sealants
4. ASTM C 661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer
5. ASTM C 681 - Standard Test Method for Volatility of Oil- and Resin-Based, Knife- Grade, Channel Glazing Compounds
6. ASTM C 711 - Standard Test Method for Low-Temperature Flexibility and Tenacity of One-Part, Elastomeric, Solvent-Release Type Sealants
7. ASTM C 794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
8. ASTM C 908 - Standard Test Method for Yield Strength of Preformed Tape Sealants
9. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants
10. ASTM D 56 - Standard Test Method for Flash Point by Tag Closed Cup Tester
11. ASTM D 217 - Standard Test Methods for Cone Penetration of Lubricating Grease
12. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
13. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
14. ASTM D 925 - Standard Test Methods for Rubber Property—Staining of Surfaces (Contact, Migration, and Diffusion)
15. ASTM D 2452 - Standard Test Method for Extrudability of Oil- and Resin-Base Caulking Compounds
16. ASTM D 2453 - Standard Test Method for Shrinkage and Tenacity of Oil- and Resin- Base Caulking Compounds
17. ASTM D 1475 - Standard Test Method For Density of Liquid Coatings, Inks, and Related Products
18. ASTM D 2202 - Standard Test Method for Slump of Sealants
19. ASTM D 2203 - Standard Test Method for Staining from Sealants
20. ASTM G 154 - Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials

C. Interim Federal Specifications (FS)

1. FS TT-S-00230C - Sealing Compound: Elastomeric Type, Single Component
2. FS TT-C-1796A – Caulking Compounds, Metal Seam and Wood Seam
3. FS TT-S-001543A – Sealing Compounds: Silicone Rubber Base (For Caulking, Sealing, and Glazing in Buildings and Other Structures

D. South Coast Air Quality Management District (SCAQMD)

1. Rule 1168 – Adhesive and Sealant Applications

E. Underwriter's Laboratories

1. UL 580 - Tests for Uplift Resistance of Roof Assemblies

1.3 SUBMITTALS

A. Material Safety Data Sheets (MSDS): Provide in accordance with 29 CFR 1910.1200, Hazard Communication

B. Product Test Reports: Reports of tests required by this section performed by a qualified testing agency, indicating that the sealants comply with the requirements.

C. Buy American Compliance: Provide documentation that the products provided in this section comply with the following requirements:

1. Buy American provisions of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA).

D. VOC Content: Provide documentation of the Volatile Organic Content (VOC) in accordance with SCAQMD Rule 1168

E. USDA Approval: Provide documentation that the product is approved for use in meat and poultry processing areas by the USDA for the following types of sealants:

1. Polyurethane
2. Tape Mastic
3. Non-skinning Sealant

1.4 WARRANTY

A. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within 5 years of installation.

PART 2 - PRODUCTS

2.1 GENERAL MATERIAL REQUIREMENTS

A. Substrate Requirements: When testing is requited on a substrate, the material used shall be either ASTM A653 G-90 or ASTM A792 AZ50 and tests shall be conducted with each of the following coatings:

1. Bare (No coating)
2. Acrylic (Galvalume Plus)
3. Polyester

4. Siliconized Polyester
5. Polyvinylidene Fluoride Resin (PVDF)

2.2 POLYURETHANE SEALANT

A. General: Provide Sealants that meet the following specifications:

1. ASTM C 920, Type S, Grade NS, Class 25, Use: NT, A, M, G and O paintable sealant 2. AAMA 808.3
3. FS TT-S-00230C, Type II, Class A

B. Color: The sealant shall be in the following colors:

1. White
2. Gray
3. Bronze
4. Almond

C. Physical Properties: The sealant shall have the following additional physical properties:

1. Peel Adhesion: All panels shall have at least a 90% cohesive failure of at least 15 lb/in when tested in accordance with ASTM C 794.
2. Tensile Strength: Sealant shall have a tensile maximum of 300 psi and an elongation of 500-600% when tested in accordance with ASTM D 412.
3. Sag: There shall be no sag when tested in accordance with ASTM C 639.
4. Hardness: Shore "A" hardness on all three samples shall not exceed 40 when tested in accordance with ASTM C 661
5. Service Temperature Range: -40 degrees Fahrenheit to 200 degrees Fahrenheit.
6. Water Resistance: There shall be no presence of voids, cracks, separation or breakdown of the compound when tested in accordance with AAMA 800-10, Section 2.11.1.
7. Flash Point: No less than 145 degrees Fahrenheit when tested in accordance with ASTM D 56.
8. Shelf Life: The compound shall have a shelf life of 9 months or more when stored at or below 80 degrees.
9. Skin Time: The compound shall have a skin time of 2-4 hours
10. Cure Time: The compound shall have a cure time of 24-48 hours
11. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

2.3 TAPE MASTIC SEALANT

A. General: Provide Sealants that meet the following specifications:

B. 1. AAMA 804.3

2. AAMA 807.3

3. FS TT-C-1796A,Type II, Class B
4. Approved by Underwriters Laboratories for use in roof deck constructions classified under UL-518 Class 90

C. Color: Gray

D. Physical Properties: The sealant shall have the following additional physical properties:

1. Specific Gravity: 1.4 or higher when tested in accordance with ASTM D 792
2. Tensile Adhesive Strength: 20 psi or higher when tested in accordance with ASTM C 908
3. Elongation: 1000% or higher when tested in accordance with ASTM C 908
4. Cone Penetration: The sealant shall meet the following conditions when tested in accordance with ASTM D 217 with a 300g cone in 5 seconds:
   a. 8.5 – 100 mm at 77 degrees Fahrenheit
   b. 125-135 mm at 120 degrees Fahrenheit
   c. 45-55 mm at Zero degrees Fahrenheit
5. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

2.4 NON-SKINNING SEALANT

A. General: Provide sealants that meet the following

specifications: 1. AAMA 809,2
2. FS TT-C-1796A, Type 1, Class A

B. Color: White

C. Physical Properties: The sealant shall have the following additional physical properties:

1. Extrudability: The sealant shall deposit in 30 to 50 seconds through a 0.104" orifice at 50 psi pressure in accordance with ASTM D 2452
2. Total Solids: At least 85% by weight when determined in accordance with ASTM C 681
3. Volume Shrinkage: Less than 15% when determined in accordance with ASTM D 2453
4. Weight per U.S. Gallon: 10.75 lbs. +/- 0.25 lbs. when determined in accordance with ASTM D 1475
5. Vehicle Bleed out: There shall be no visible exudation of vehicle from sealant after 21 days at 158 degrees Fahrenheit on the test panel
6. Flexibility: There shall be no loss of adhesion at -60 degrees Fahrenheit when tested in accordance with ASTM C 711
7. Sag: 0.20 in max, full button when tested in accordance with ASTM D 2202
8. Staining: Sealant will not stain a painted test panel when tested in

accordance with ASTM D 925, Method A

9. UV Resistance: There shall be no cracking, bleeding, or loss of elasticity after 1,000 hours of QUV exposure in accordance with ASTM G 154.
10. Wet Flammability: No less than 110 degree Fahrenheit flash point when determined in accordance with ASTM D 56
11. Coverage: Each gallon of sealant shall provide the following minimum coverage:
    a. 1,500 lineal feet with 1/8 in bead
    b. 690 lineal feet with 3/16 in bead
    c. 390 lineal feet with 1/4 in bead.
12. Shelf Life: 18 months minimum in unopened container when stored at or below 90 degrees Fahrenheit.
13. Drying time: Non-skinning, remains permanently soft and tacky
14. Engageability: Sealant will easily engage and transfer to male joint at 10 degrees Fahrenheit
15. Service Temperature Range: -60 degrees Fahrenheit to 200 degrees Fahrenheit
16. Application Temperature Range: 10 degrees Fahrenheit to 120 degrees Fahrenheit
17. Non-Reactive: Will not darken, etch, or leave salt deposits on the test panel after two years
18. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

2.5 SILICONE SEALANT

A. General: Provide sealants that meet the following specifications:

1. ASTM C 920, Type S, Grade NS, Class 25
2. AAMA 802.3, Type I and II
3. AAMA 805.2

Group C 4. AAMA 808.3

5. FS TT-S-001543A, Class A
6. FS TT-S-00230C, Class A

B. Color: Clear

C. Physical Properties: The sealant shall have the following additional physical properties:

1. Mechanical Properties: The sealant shall have the following mechanical properties as determined by ASTM D 412:
    a. Tensile Strength: 150 psi minimum (Method A)
    b. Modulus at 100% Elongation: 35 psi minimum
    c. Elongation: 400% minimum
    d. Recovery: 100%
2. Hardness: Maximum Shore A hardness of 15 when determined in

accordance with ASTM C 661

3. Tack-free Time: 1/4 in dia. bead at 77 degrees Fahrenheit, 50% relative humidity, 10- 15 minutes
4. Cure Time: 1/4 in dia. bead at 77 degrees Fahrenheit, 50% relative humidity, 10-12 hours
5. Service Temperature: -60 degrees Fahrenheit to 300 degrees Fahrenheit
6. Shelf Life: 9 months when stored in unopened original containers at 80 degrees Fahrenheit or less
7. VOC Content: The Volatile Organic Compound (VOC) content shall be less than 250 g/L when calculated SCAQMD Rule 1168.

2.6 ACRYLIC SEALANT

A. Color:

1. Clear
2. White
3. Gray

B. Physical Properties:

1. Percent Solids:
   a. Colors: 75% minimum determined in accordance with ASTM D 1475
   b. Clear: 70% minimum determined in accordance with ASTM D 1475
2. Peel Adhesion: All panels shall have at least a 90% cohesive failure of at least 5 lb./in when tested in accordance with ASTM C 794
3. Weight per U.S. Gallon: 8.7 lbs. +/- 0.25 lbs. when determined in accordance with ASTM D 1475
4. Viscosity: The sealant shall meet the following conditions when tested in accordance with ASTM D 2452 with a 20g cone with a 0.104 in orifice at 60 psi at 77 degrees Fahrenheit in the indicated time:
   a. Colors: 40-60 seconds
   b. Clear: 35-45 seconds
5. Elongation: 200% minimum when tested in accordance with ASTM D 412
6. Hardness: Maximum Shore A hardness of 55 when determined in accordance with ASTM C 661
7. Flash Point: No less than the following when tested in accordance with ASTM D 56
   a. Colors: 52 degrees Fahrenheit
   b. Clear: 40 degrees Fahrenheit
8. Slump: 0.10” maximum when tested in accordance with ASTM D 2202
9. Vehicle Migration: No vehicle migration from the sealant edge when tested in accordance with ASTM D 2203 as modified by Section 2.8.1 of AAMA 800-10
10. Paintability: Compatible with Alkyds, enamels and lacquers post-solvent release
11. Service Temperature Range: Zero degrees Fahrenheit to 180 degrees

Fahrenheit

12. Shelf Life:18 months when stored in original, unopened containers at or below 80 degrees Fahrenheit

PART 3 - EXECUTION

APPENDIX

The State of New Hampshire

Department of Environmental Services

Thomas S. Burack, Commissioner

October 15, 2015

City of Portsmouth
c/o John Bohenko
1 Junkins Ave.
Portsmouth, NH 03801

RE: NHDES Wetlands File # 2015-00046 City of Portsmouth –Market Street Gateway – Portsmouth Tax Map/Lot # ROW

Dear Mr. Bohenkoh:

Attached please find Wetlands Permit # 2015-00046 to temporarily impact approximately 129,876 sq. ft. of the undeveloped upland tidal buffer zone to remove invasive species, regrade old fill, and replant with native species as restoration/enhancement of buffer zone integrity; permanently impact approximately 27,800 sq. ft. to construct a bike path and grass park area, as part of the Market Street Gateway project. Impact 480 sq. ft. of tidal wetlands for repair of six (6) existing outfalls as part of the storm water improvement portion of the project.

The decision to approve this application was based on the following findings:

1. This is a major impact project per Administrative Rule Env-Wt 303.02(b), projects within 100' of the highest observable tide line that alter or disturb undeveloped upland tidal buffer zone, with respect to the work in the upland tidal buffer zone; and classified as minimum impact per Env-Wt 303.04(x), relative to the repair in-kind of existing outfalls.
2. The need for the proposed impacts has been demonstrated by the applicant per Env-Wt 302.01. The project is part of an overall upgrade of an important City roadway access point, and includes stormwater improvements, pedestrian and vehicular transportation improvements, as well as transformation of tidal buffer areas currently dominated by invasive plant species growing on historic fill, into pedestrian/park areas with a significant buffer zone native vegetative restoration/enhancement component.
3. The applicant has provided evidence which demonstrates that this proposal is the alternative with the least adverse impact to areas and environments under the department's jurisdiction per Env-Wt 302.03. The project will provide a substantial improvement to tidal buffer zone vegetative quality and functional integrity, and will remove 5,415 square feet of impervious surface from the tidal buffer zone adjacent to tidal surface waters.
4. Relative to Chapter Env-Wt 800, the project is found to be self-mitigating in that the extensive removal of 10+ various invasive species and restoration of native vegetation within the degraded tidal buffer zone adequately compensates for the limited amount of permanent impacts in the form of bike path and park amenities, such as the existing grassed areas that will be regraded and maintained as grass.
5. The applicant has demonstrated by plan and example that each factor listed in Env-Wt 302.04(a)and(c), Requirements for Application Evaluation, has been considered in the design of the project. No species of concern were reported by the NH Natural Heritage Bureau as occurring in the project area.
6. The Portsmouth Conservation Commission did not report.
7. In accordance with RSA 482-A:8, DES finds that the requirements for a public hearing do not apply as the permitted project is not of substantial public interest, and will not have a significant impact on or adversely affect the values of the tidal buffer zone resource, as identified under RSA 482-A:1.

Any person aggrieved by this decision may appeal to the N.H. Wetlands Council ("Council") by filing an appeal that meets the requirements specified in RSA 482-A:10, RSA 21-O:14, and the rules adopted by the Council, Env-WtC 100-200. The appeal must be filed **directly with the Council within 30 days** of the date of this decision and must set forth fully **every ground** upon which it is claimed that the decision complained of is unlawful or unreasonable. Only those grounds set forth in the notice of appeal can be considered by the Council.

Information about the Council, including a link to the Council's rules, is available at <http://nhec.nh.gov/> (or more directly at <http://nhec.nh.gov/wetlands/index.htm>.) Copies of the rules also are available from the DES Public Information Center at (603) 271-2975.

Your permit must be signed, and a copy must be posted in a prominent location on site during construction. If you have any questions, please contact me at the Pease District Office at (603) 559-1507.

Sincerely,

Dori Wiggin
East Region Supervisor
DES Wetlands Bureau

cc: Portsmouth Conservation Commission
Portsmouth Municipal Clerk
Normandeau Associates

The State of New Hampshire

DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

NOTICE TO RECIPIENTS OF MAJOR IMPACT N.H. WETLANDS PERMITS

Your permit was approved by the New Hampshire Wetlands Bureau as a major impact project, and your project will be reviewed by the U.S. Army Corps. Of Engineers for possible approval under the Army Corps. New Hampshire State Programmatic General Permit- SPGP. The Army Corps. will notify you within thirty (30) days as to whether you qualify.

*********NO WORK SHOULD BE DONE IN********
***********WETLANDS UNTIL YOU RECEIVE THAT NOTICE***********

IF YOU DO NOT HEAR FROM THE ARMY CORPS WITHIN THIRTY (30) DAYS, YOU SHOULD CALL THEM AT 1-800-343-4789.

****

'HIS NOTICE WAS SENT WITH MAJOR IMPACT PERMIT #2015-46 ON 10-15-15 BY DAC

'C: U.S. ARMY CORPS. OF ENGINEERS

DES Web site: www.des.nh.gov
P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095
Telephone: (603) 271-2147 • Fax: (603) 271-6588 • TDD Access: Relay NH 1-800-735-2964

The State of New Hampshire

Department of Environmental Services

Thomas S. Burack, Commissioner

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WETLANDS AND NON-SITE SPECIFIC PERMIT 2015-00046

Permittee: City of Portsmouth
c/o John Bohenko
1 Junkins Ave.
Portsmouth, NH 03801

Project Location: Market Street, Portsmouth
Portsmouth Tax Map/Lot No. ROW / ROW

Waterbody: Piscataqua River & North Mill Pond

NOTE -- CONDITIONS

APPROVAL DATE: 10/15/2015 **EXPIRATION DATE: 10/15/2020**

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Based upon review of the above referenced application, in accordance with RSA 482-A and RSA 485-A:17, a Wetlands Permit and Non-Site Specific Permit was issued. This permit shall not be considered valid unless signed as specified below.

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1. All work shall be in accordance with revised plans by RSG dated 5/8/2015, as received by the NH Department of Environmental Services (DES) on 6/19/2015.
2. This permit is not valid unless an Alteration of Terrain permit or other method of compliance with RSA 485-A:17 and Env-Wq 1500 is achieved.
3. This permit is further contingent upon execution of approved mitigation "Market Street Gateway Mitigation Plan" by Normandeau Associates dated June 12, 2015, with the following requirements:
   a. The Plan shall be initiated concurrent with the project facility construction;
   b. Initial report documenting the first season's activities shall be submitted no later than October 1;
   c. A second report shall be submitted following the next season no later than October 1 of the second year;
   d. A plan for long-term success and monitoring shall be submitted to DES at the end of the second year for review and approval.
4. Orange construction fence shall be installed around permitted impact areas to avoid activities expanding into unintended areas, and in further accordance with specific requirement relative to threatened species protection stated below.
5. Appropriate siltation and erosion controls shall be in place prior to construction, shall be maintained during construction, and shall remain until the area is stabilized. Temporary controls shall be removed once the area has been stabilized.
6. Any further alteration of areas on this property that are subject to RSA 482-A jurisdiction will require a new application and further permitting.
7. All development activities associated with this project shall be conducted in compliance with applicable requirements of RSA 483-B and N.H. Code Admin. Rules Env-Wq 1400 during and after construction.
8. No person undertaking any activity shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards in RSA 485-A and Env-Wq 1700.
9. Erosion control products shall be installed per manufacturers recommended specifications.
10. The contractor responsible for completion of the work shall use techniques described in the New Hampshire Stormwater Manual, Volume 3, Erosion and Sediment Controls During Construction (December 2008).
11. No concrete is to be used anywhere in the construction of the stone riprap revetment. All stone shall be dry laid or placed stone underlain with filter fabric.
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13. A report documenting such restoration shall be submitted to DES within 30 days of the restoration activities being completed.
14. Construction equipment shall be inspected daily for leaking fuel, oil, and hydraulic fluid prior to entering surface waters or wetlands or operating in an area where such fluids could reach groundwater, surface waters, or wetlands.
15. The permittee's contractor shall maintain appropriate oil/diesel fuel spill kits on site that are readily accessible at all times during construction, and shall train each operator in the use of the kits.
16. All refueling of equipment shall occur outside of surface waters or wetlands during construction. Machinery shall be staged and refueled in upland areas only.
17. Faulty equipment shall be repaired immediately prior to entering areas that are subject to RSA 482-A jurisdiction.

GENERAL CONDITIONS THAT APPLY TO ALL DES WETLANDS PERMITS:
1. A copy of this permit shall be posted on site during construction in a prominent location visible to inspecting personnel;
2. This permit does not convey a property right, nor authorize any injury to property of others, nor invasion of rights of others;
3. The Wetlands Bureau shall be notified upon completion of work;
4. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits, and/or consult with other agencies as may be required (including US EPA, US Army Corps of Engineers, NH Department of Transportation, NH Division of Historical Resources (NH Department of Cultural Resources), NHDES-Alteration of Terrain, etc.);
5. Transfer of this permit to a new owner shall require notification to and approval by DES;
6. This project has been screened for potential impacts to **known** occurrences of rare species and exemplary natural communities in the immediate area. Since many areas have never been surveyed, or have received only cursory inventories, unidentified sensitive species or communities may be present. This permit does not absolve the permittee from due diligence in regard to state, local or federal laws regarding such communities or species.
7. Review enclosed sheet for status of the US Army Corps of Engineers' federal wetlands permit.

APPROVED: _____
Dori Wiggin, East Region Supervisor
DES Wetlands Bureau

==========

BY SIGNING BELOW I HEREBY CERTIFY THAT I HAVE FULLY READ THIS PERMIT AND AGREE TO ABIDE BY ALL PERMIT CONDITIONS.

_____ _____
OWNER'S SIGNATURE (required) CONTRACTOR'S SIGNATURE (required)

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

January 27, 2016

Regulatory Division
CENAE-R-PEC
Permit Number: **NAE-2015-00267**

City of Portsmouth
c/o John Bohenko
1 Junkins Ave.
Portsmouth, New Hampshire 03801

Dear Applicant:

This is to inform you that we have reviewed your application to conduct activities as described on the attached NH State Permit 2015-00046, dated 10/15/2015.

Based on the information you provided to the New Hampshire Wetlands Bureau, we have determined that your project, which includes a discharge of dredged or fill material into waters or wetlands, will have only minimal individual or cumulative environmental impacts on waters of the United States, including wetlands. Therefore, this work is authorized under the attached Federal permit known as the New Hampshire Programmatic General Permit (PGP). This work must be performed in accordance with the terms and conditions of the PGP and the following special condition:

Special Condition 1: Tree clearing work to complete the work authorized herein shall not be conducted during the time of year (TOY) restriction of April 15 to August 31 in order to minimize adverse impacts to the Northern Long Eared Bat.

You are responsible for complying with all of the PGP's requirements. Please review the attached PGP carefully to familiarize yourself with its contents. You should ensure that whoever does the work fully understands the requirements and that a copy of the permit document is at the project site throughout the time the work is underway. A copy of the PGP can also be found at http://www.nae.usace.army.mil/Regulatory/SGP/NH_PGP.pdf.

This authorization expires on August 3, 2017 unless the PGP is modified, suspended, or revoked before that. You must complete the work authorized herein by that date. If you do not, you must contact this office to determine the need for further authorization before continuing the activity. We recommend that you contact us *before* this authorization expires to discuss a time extension or reissuance of the authorization.

If you change the plans or construction methods for work within our jurisdiction, please contact us immediately to discuss modification of this authorization. This office must approve any changes before you undertake them.

This authorization requires you to complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

This authorization presumes that the work as described above and as shown on your plans noted above is in waters of the U.S. Should you desire to appeal our jurisdiction, please submit a request for an approved jurisdictional determination in writing to this office.

This permit does not obviate the need to obtain other Federal, state or local authorizations required by law, including those listed in the PGP. Performing work not specifically authorized by this determination or failing to comply with all the terms and conditions of the PGP may subject you to the enforcement provisions of Corps regulations.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at http://www.nae.usace.army.mil/reg/Customer_Service_Survey.pdf.

If you have questions concerning this, please contact Richard Kristoff of my staff at (978) 318-8171, (978) 318-8335/8338, (800) 343-4789, or, if calling from within Massachusetts, (800) 362-4367.

Sincerely,

Frank J. DelGiudice
Chief, Permits & Enforcement Branch
Regulatory Division

Enclosures

Copies Furnished:

New Hampshire Department of Environmental Services, Wetlands Bureau, Attn: Mr. Collis Adams, P.O. Box 95, 29 Hazen Drive, Concord, New Hampshire 03302-0095

Viki Chase, Environmental Analyst, Normandeau Associated, Inc., 25 Nashua Road, Bedford, New Hampshire 03110, vchase@normandeau.com

2015-00267

The State of New Hampshire

Department of Environmental Services

Thomas S. Burack, Commissioner

WETLANDS AND NON-SITE SPECIFIC PERMIT 2015-00046

Permittee: City of Portsmouth
c/o John Bohenko
1 Junkins Ave.
Portsmouth, NH 03801

Project Location: Market Street, Portsmouth
Portsmouth Tax Map/Lot No. ROW / ROW

Waterbody: Piscataqua River & North Mill Pond

NOTE -- CONDITIONS

APPROVAL DATE: 10/15/2015 **EXPIRATION DATE: 10/15/2020**

Based upon review of the above referenced application, in accordance with RSA 482-A and RSA 485-A:17, a Wetlands Permit and Non-Site Specific Permit was issued. This permit shall not be considered valid unless signed as specified below.

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Dori Wiggin, East Region Supervisor
DES Wetlands Bureau

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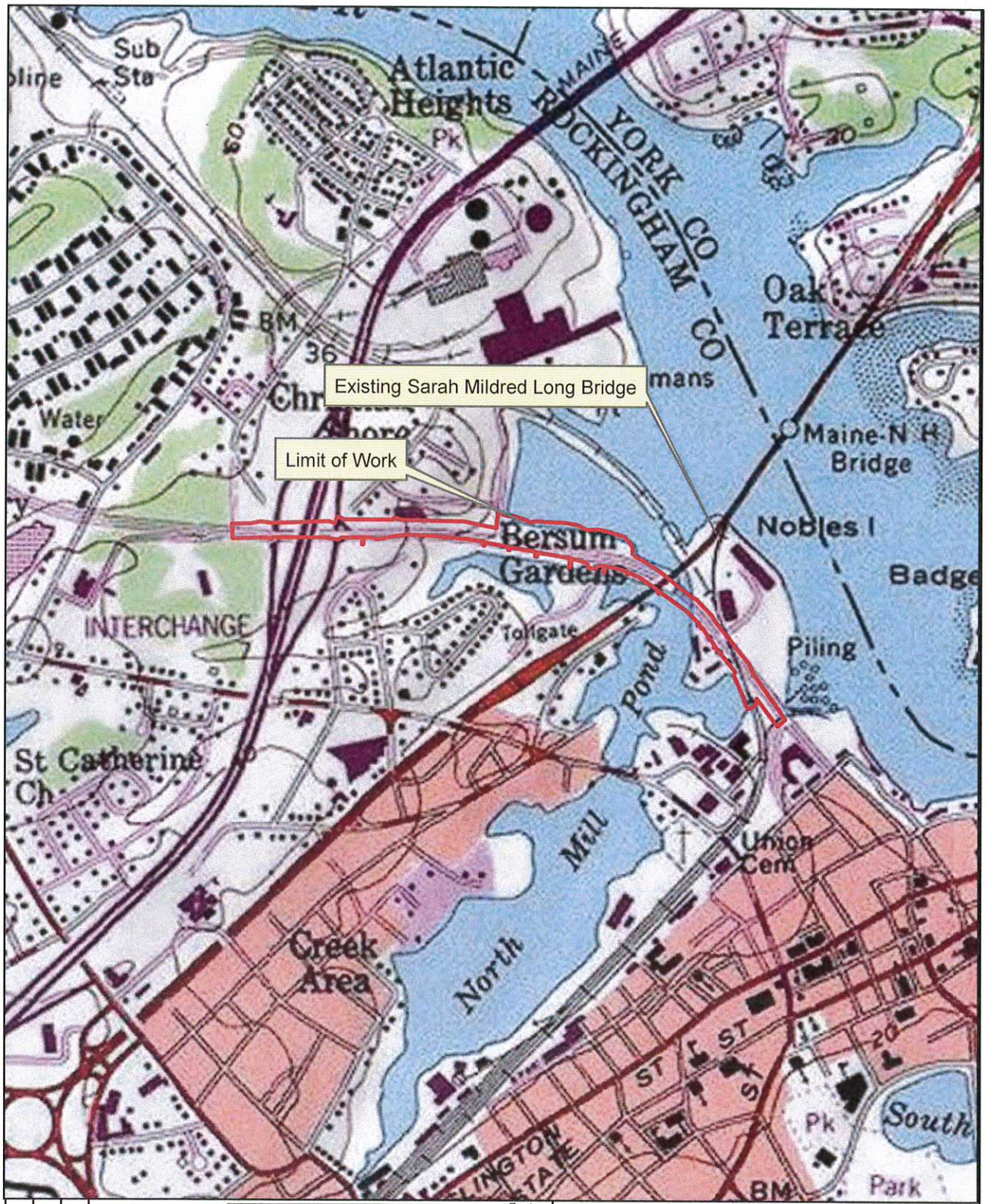
_____ OWNER'S SIGNATURE (required)

_____ CONTRACTOR'S SIGNATURE (required)



Project No: 23300.000

Drawn By: vchase

Date : 11/30/2015

CITY OF PORTSMOUTH

PORTSMOUTH, NEW HAMPSHIRE

MARKET STREET GATEWAY IMPROVEMENTS

FIGURE 1 - PROJECT AREA

SCALE: 1:12,000

NORMANDEAU environmental consultants
25 Nashua Road Bedford, NH 03110
(603) 472-5191 www.normandeau.com

NOVEMBER 2015

INDEX OF SHEETS

G-01	TITLE SHEET
W-01 - W-08	WETLAND IMPACT PLANS

MARKET STREET GATEWAY IMPROVEMENTS – WETLAND PLANS

CITY OF PORTSMOUTH
NEW HAMPSHIRE

WETLAND IMPACT NOTES:

1. WETLANDS WERE DELINEATED BY GZA ENVIRONMENTAL CONSULTANTS IN 2013. THE WETLAND DELINEATIONS WERE COMPLETED IN ACCORDANCE WITH THE CRITERIA DESCRIBED IN THE U.S ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL TECHNICAL REPORT Y-87-1 (1987) AND THE REGIONAL SUPPLEMENT OF THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL FOR THE NORTHCENTRAL AND NORTHEAST REGION, AND MEET THE CRITERIA FOR WETLAND DELINEATION IN ACCORDANCE WITH THE NH DES ADMINISTRATIVE RULES ENV-WT 301.01 AND ENV-WT 101.48.
2. INTENT OF THESE PLANS ARE FOR APPLICATION TO NH DES WETLAND DREDGE AND FILL PERMIT.

EXISTING SQUARE FOOTAGE OF IMPERVIOUS SURFACE WITHIN TIDAL BUFFER ZONE

155,650 SF

PROPOSED SQUARE FOOTAGE OF IMPERVIOUS SURFACE WITHIN TIDAL BUFFER ZONE

150,235 SF

NET CHANGE IN IMPERVIOUS SURFACE AREA FOLLOWING PROJECT

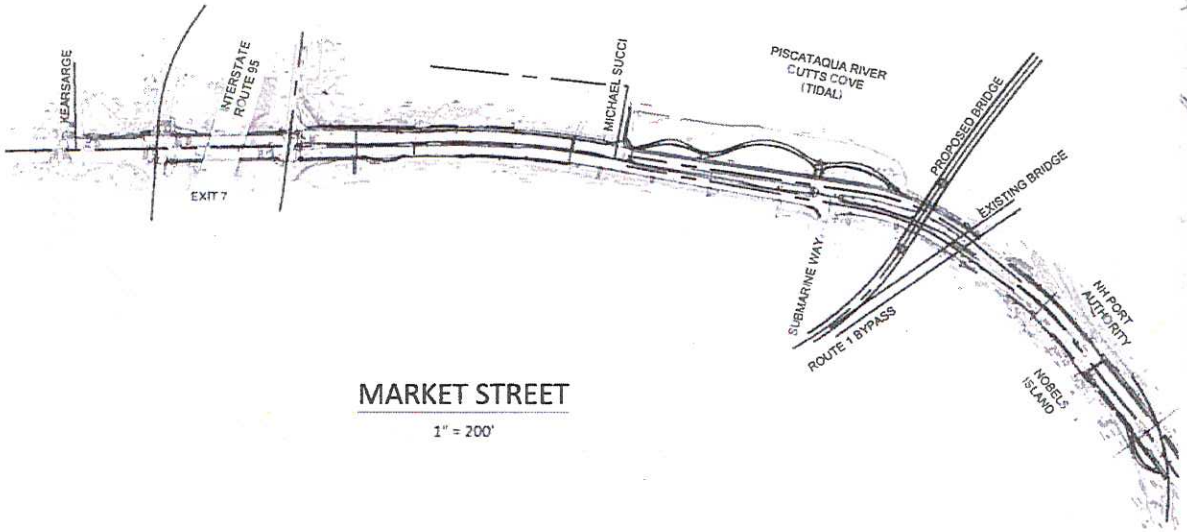
-5,415 SF

PROJECT LOCATION: THE PROJECT AREA IS MARKET STREET, APPROXIMATELY 200-FT EAST OF I-95 EXIT 7 OVERPASS TO RUSSELL STREET.

PROJECT DESCRIPTION: THIS PROJECT WILL CONSTRUCT NEW MEDIANS, BIKE LANES, SIDEWALKS, STREET LIGHTING, STREETSCAPING, PAVEMENT MARKINGS, SIGNAGE, DRAINAGE, RECREATIONAL PARKS, AND GUARDRAIL.

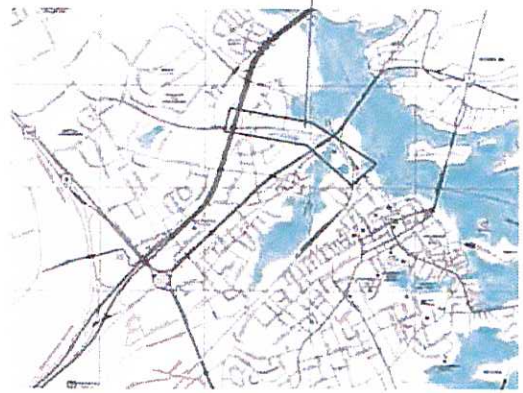
LENGTH OF PROJECT: APPROXIMATELY 5,000 FEET ALONG MARKET STREET

PROJECT LOCATION
MARKET STREET
PORTSMOUTH, NH



MARKET STREET

1" = 200'



RSG the science of

Richardson & Associates Landscape Architects

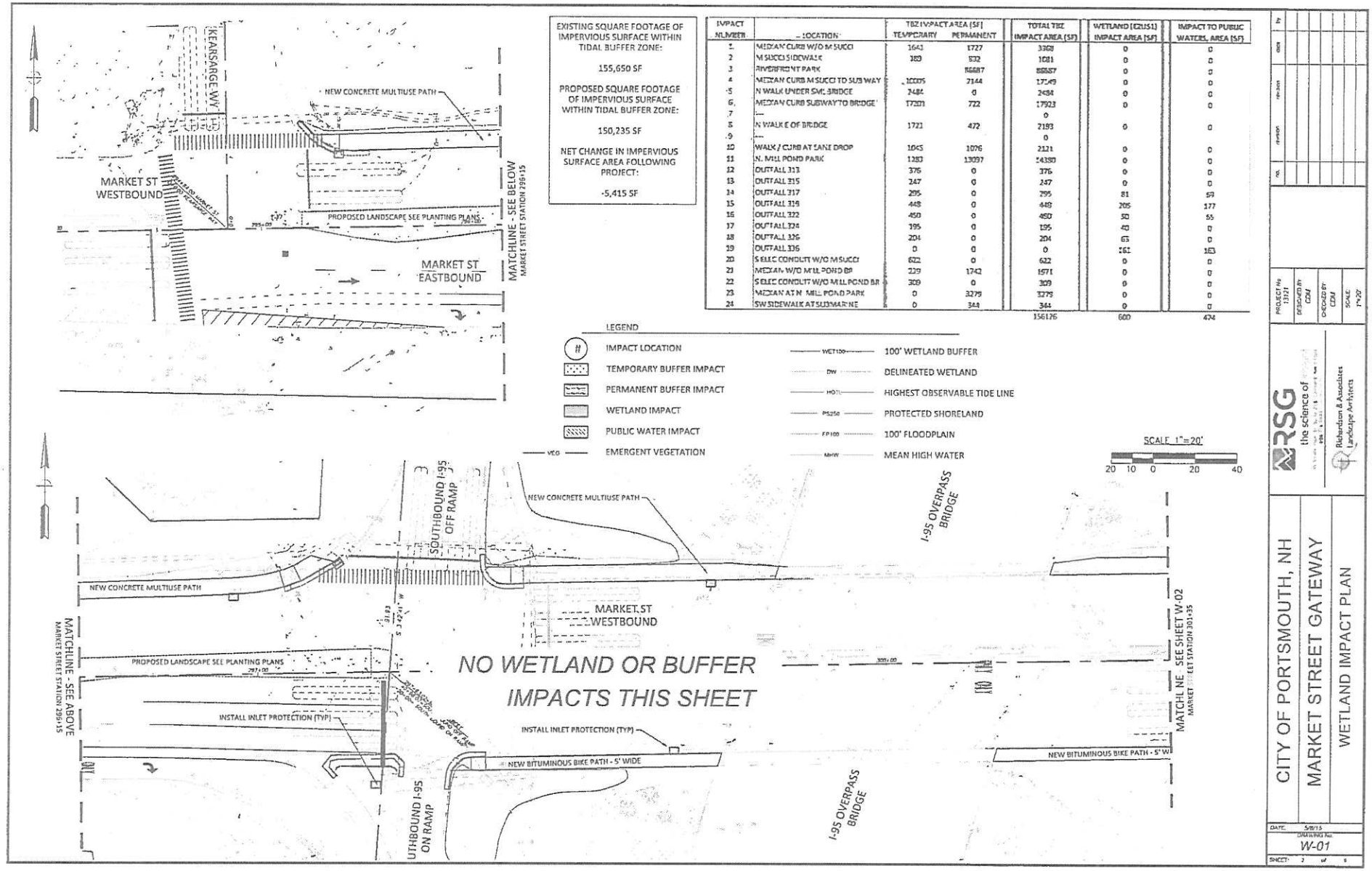
CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

WETLAND IMPACT PLANS

DATE: 5/8/15

G-01



IMPACT NUMBER	LOCATION	TBZ IMPACT AREA (SF) TEMPORARY	TBZ IMPACT AREA (SF) PERMANENT	TOTAL TBZ IMPACT AREA (SF)	WETLAND (E2US1) IMPACT AREA (SF)	IMPACT TO PUBLIC WATERS, AREA (SF)
1	MEDIAN CURB W/O M SUCCI	1641	1727	3368	0	0
2	M SUCCI SIDEWALK	189	832	1021	0	0
3	RIVERFRONT PARK		86687	86687	0	0
4	MEDIAN CURB M SUCCI TO SUBWAY	10005	7144	17149	0	0
5	N WALK UNDER SML BRIDGE	2484	0	2484	0	0
6	MEDIAN CURB SUBWAY TO BRIDGE	17201	722	17923	0	0
7	---			0		
8	N WALK E OF BRIDGE	1721	472	2193	0	0
9	---			0		
10	WALK / CURB AT SANE DROP	1045	1076	2121	0	0
11	N. MILL POND PARK	1283	13097	14380	0	0
12	OUTFALL 313	376	0	376	0	0
13	OUTFALL 315	247	0	247	0	0
14	OUTFALL 317	295	0	295	81	59
15	OUTFALL 319	448	0	448	205	177
16	OUTFALL 322	450	0	450	50	55
17	OUTFALL 324	195	0	195	43	0
18	OUTFALL 326	204	0	204	63	0
19	OUTFALL 336	0	0	0	161	163
20	S ELEC CONDUIT W/O M SUCCI	622	0	622	0	0
21	MEDIAN W/O MILL POND BP	229	1742	1971	0	0
22	S ELEC CONDUIT W/O MILL POND BR	309	0	309	0	0
23	MEDIAN AT N. MILL POND PARK	0	3279	3279	0	0
24	SW SIDEWALK AT SUBWAY NE	0	344	344	0	0
				156126	600	474

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Richardson & Associates Landscape Architects

PROJECT No. 13121
DESIGNED BY CDM
DRAWN BY CDM
SCALE 1"=20'

CITY OF PORTSMOUTH, NH
MARKET STREET GATEWAY
WETLAND IMPACT PLAN

DATE: 5/8/15
DRAWING No. W-01
SHEET 2 of 6

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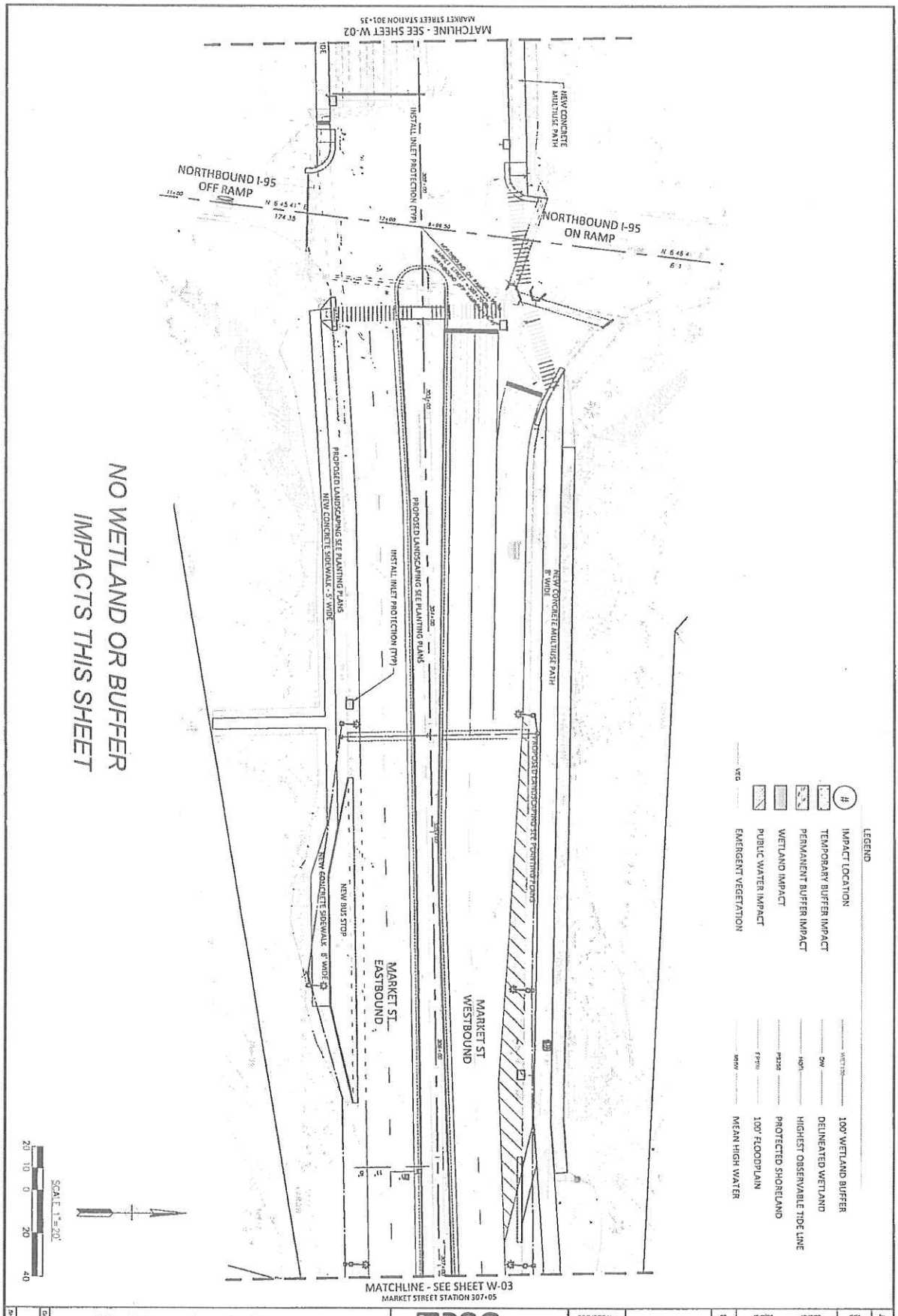

NO WETLAND OR BUFFER IMPACTS THIS SHEET

CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

WETLAND IMPACT PLAN

RSG the science of

Richardson & Associates Landscape Architects

PROJECT No. 13121

DESIGNED BY

CHECKED BY

SCALE 1"=20'

no.	revision	revision	date	by

SHEET W-02

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CITY OF PORTSMOUTH, NH
MARKET STREET GATEWAY
WETLAND IMPACT PLAN
W-04
RSG
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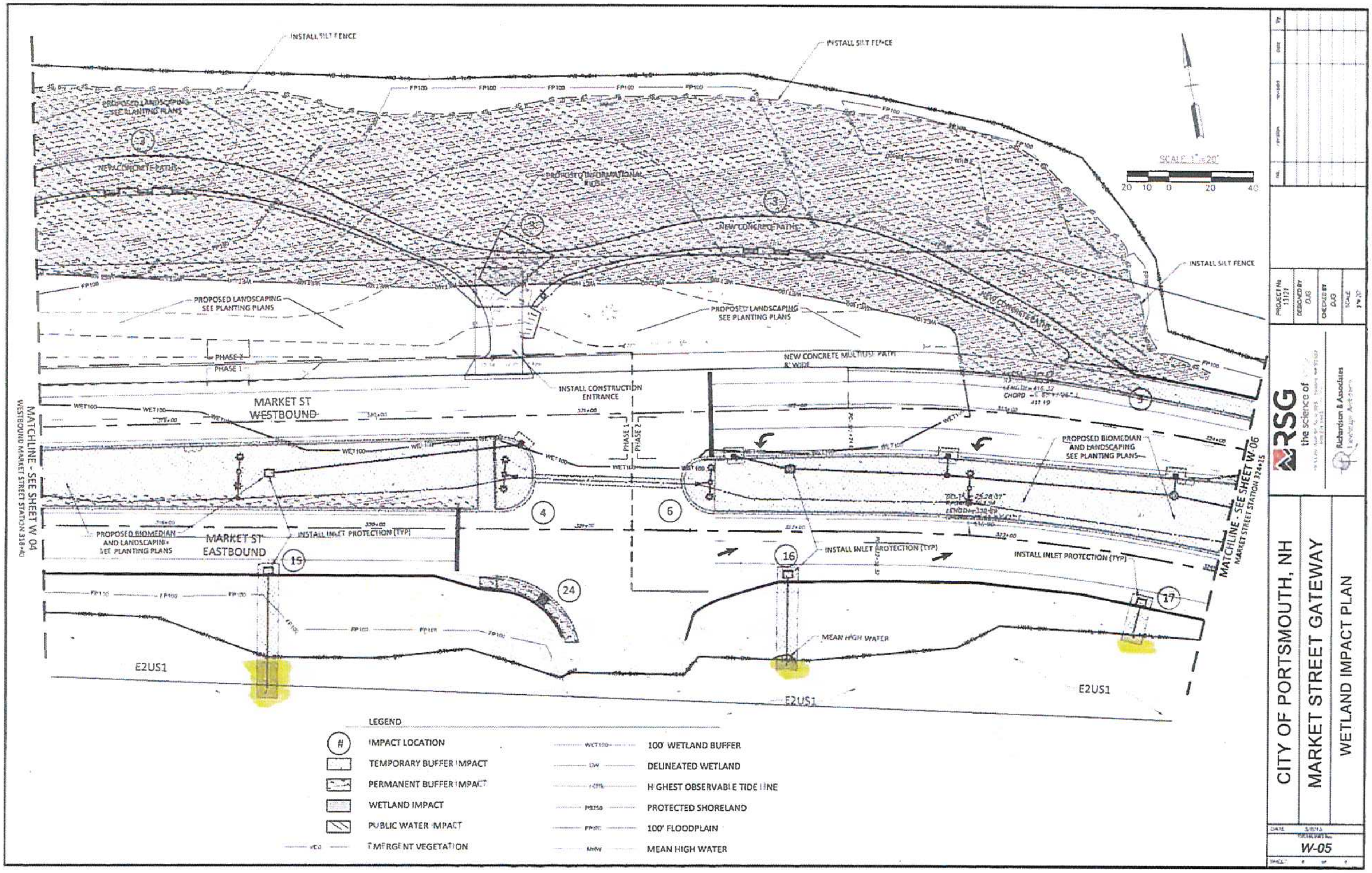
Richardson & Associates
Landscape Architects
PROJECT No.
13121
DESIGNED BY
DJG
DRAWN BY
DJG
CHECKED BY
DJG
SCALE:
1"=20'
MATCHLINE - SEE SHEET W-05
WESTBOUND MARKET STREET STATION 318+40
MATCHLINE - SEE SHEET W-03
WESTBOUND MARKET STREET STATION 312+70
SCALE: 1"=20'
20 10 0 20 40
LEGEND
IMPACT LOCATION
TEMPORARY BUFFER IMPACT
PERMANENT BUFFER IMPACT
WETLAND IMPACT
PUBLIC WATER IMPACT
EMERGENT VEGETATION
100' WETLAND BUFFER
DELINEATED WETLAND
HIGHEST OBSERVABLE TIDE LINE
PROTECTED SHORELAND
100' FLOODPLAIN
MEAN HIGH WATER
INSTALL SILT FENCE
PROPOSED LANDSCAPING SEE PLANTING PLANS
NEW CONCRETE MULTI-USE PATH
8' WIDE
INSTALL INLET PROTECTION (TYP)
PROPOSED BIOMEDIAN AND LANDSCAPING SEE PLANTING PLANS
EMERGENT VEGETATION E2EM
E2US1
1
2
3
4
12
13
14



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CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

WETLAND IMPACT PLAN

W-06

RSG the science of

Richardson & Associates

PROJECT No. 1312

DESIGNED BY DJG

DRAWN BY DJG

CHECKED BY

SCALE 1"=20'

SCALE 1" = 20'

20 10 0 20 40

MATCHLINE - SEE SHEET W-07

MARKET STREET STATION 330+15

MARKET ST WESTBOUND

MARKET ST WESTBOUND

MARKET ST EASTBOUND

EXISTING BRIDGE ALIGNMENT

PROPOSED BRIDGE ALIGNMENT

INSTALL INLET PROTECTION (TYP)

INSTALL INLET PROTECTION (TYP)

E2US1

MATCHLINE - SEE SHEET W-05

MARKET STREET STATION 324+15

LEGEND

IMPACT LOCATION

TEMPORARY BUFFER IMPACT

PERMANENT BUFFER IMPACT

WETLAND IMPACT

PUBLIC WATER IMPACT

EMERGENT VEGETATION

100' WETLAND BUFFER

DELINEATED WETLAND

HIGHEST OBSERVABLE TIDE LINE

PROTECTED SHORELAND

100' FLOODPLAIN

MEAN HIGH WATER

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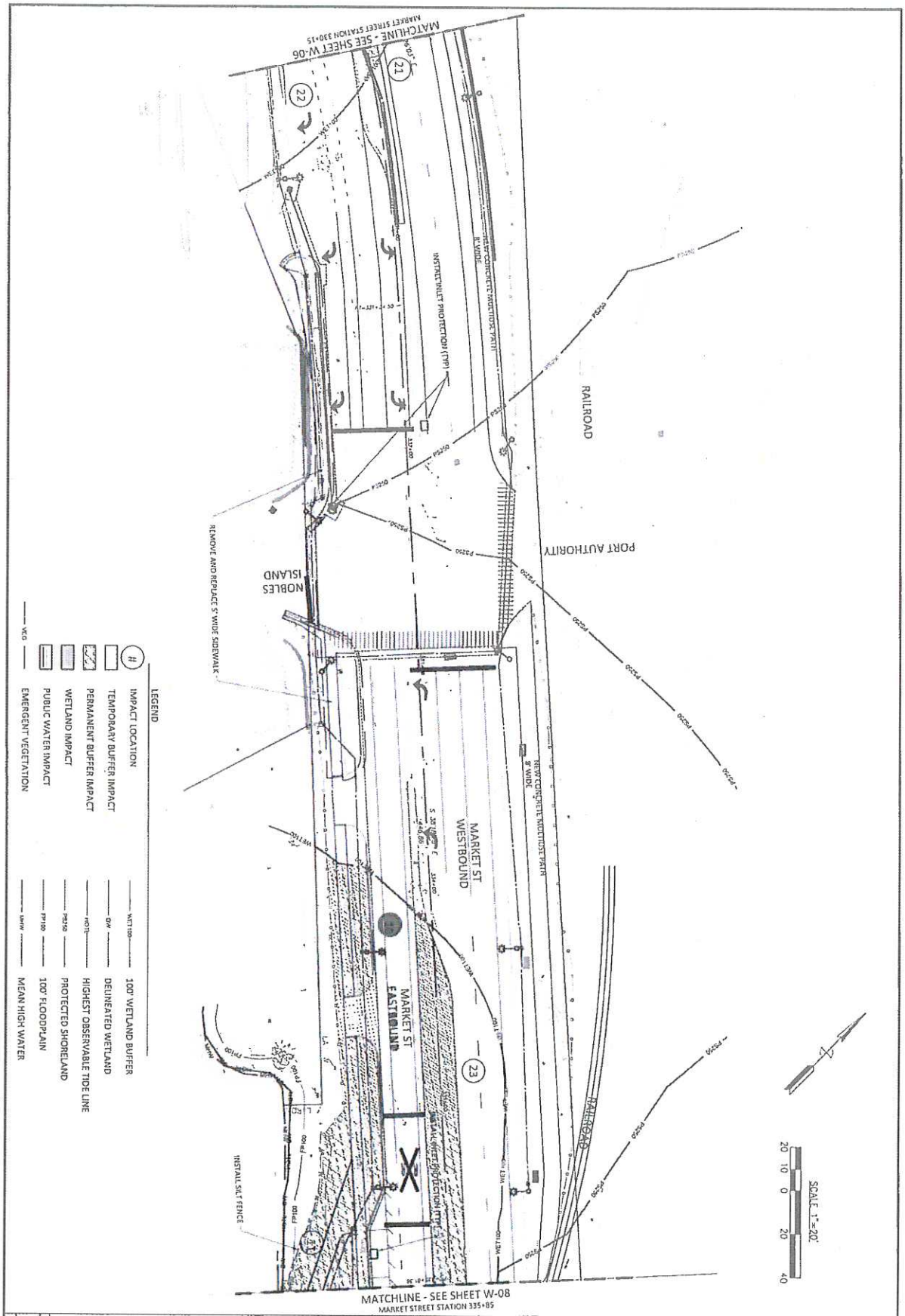


CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

WETLAND IMPACT PLAN

DRAWING No. W-07

RSG the science of

Richardson & Associates Landscape Architects

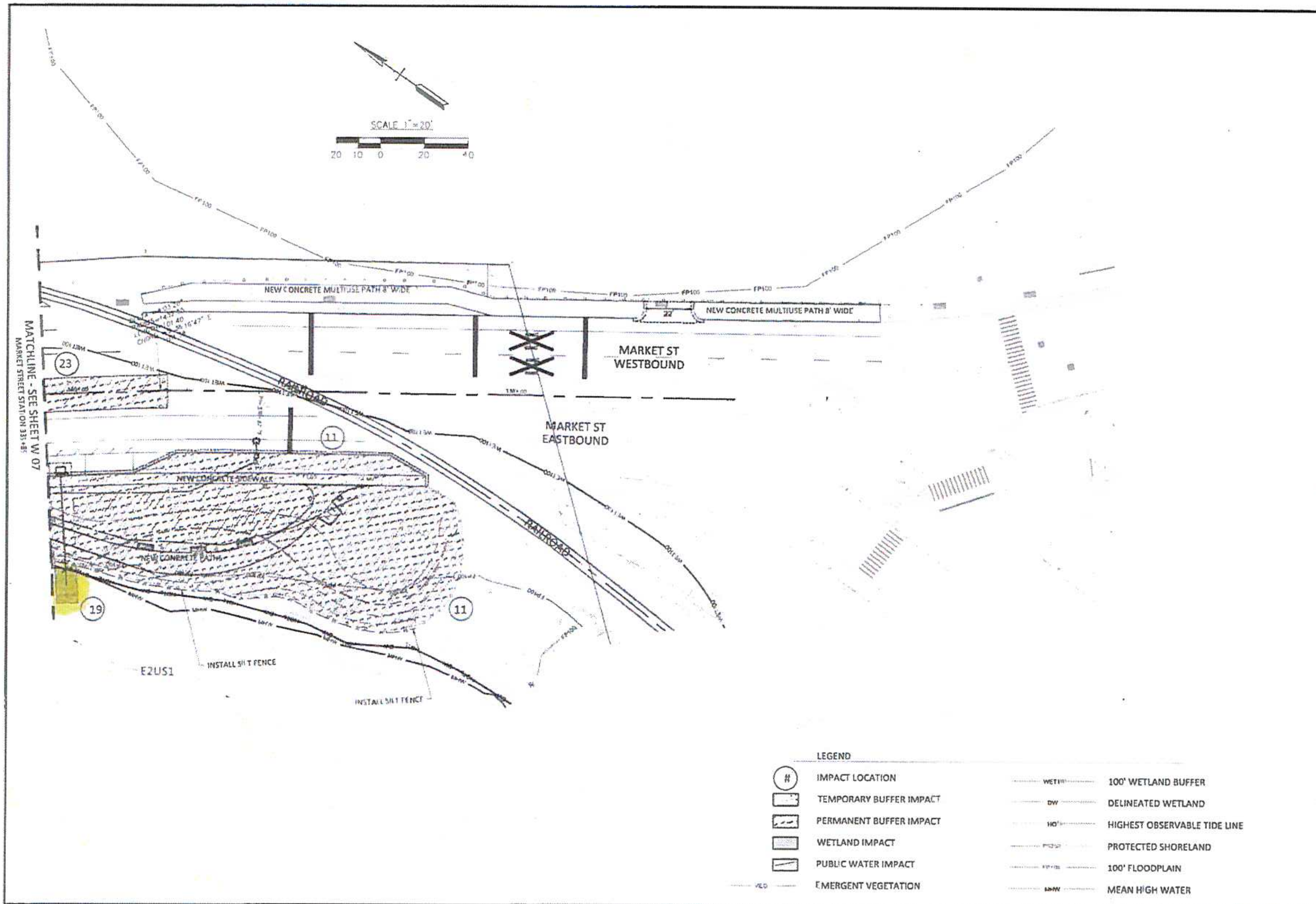
PROJECT No. 13121

DESIGNED BY: DJG

CHECKED BY: DJG

SCALE: 1"=20'

no.	revision	revision	date	by



CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

WETLAND IMPACT PLAN

RSG the science of

Richardson & Associates Landscape Architects

PROJECT No. 13121

DESIGNED BY

CHECKED BY

SCALE 1"=20'

DRAWING No. W-08

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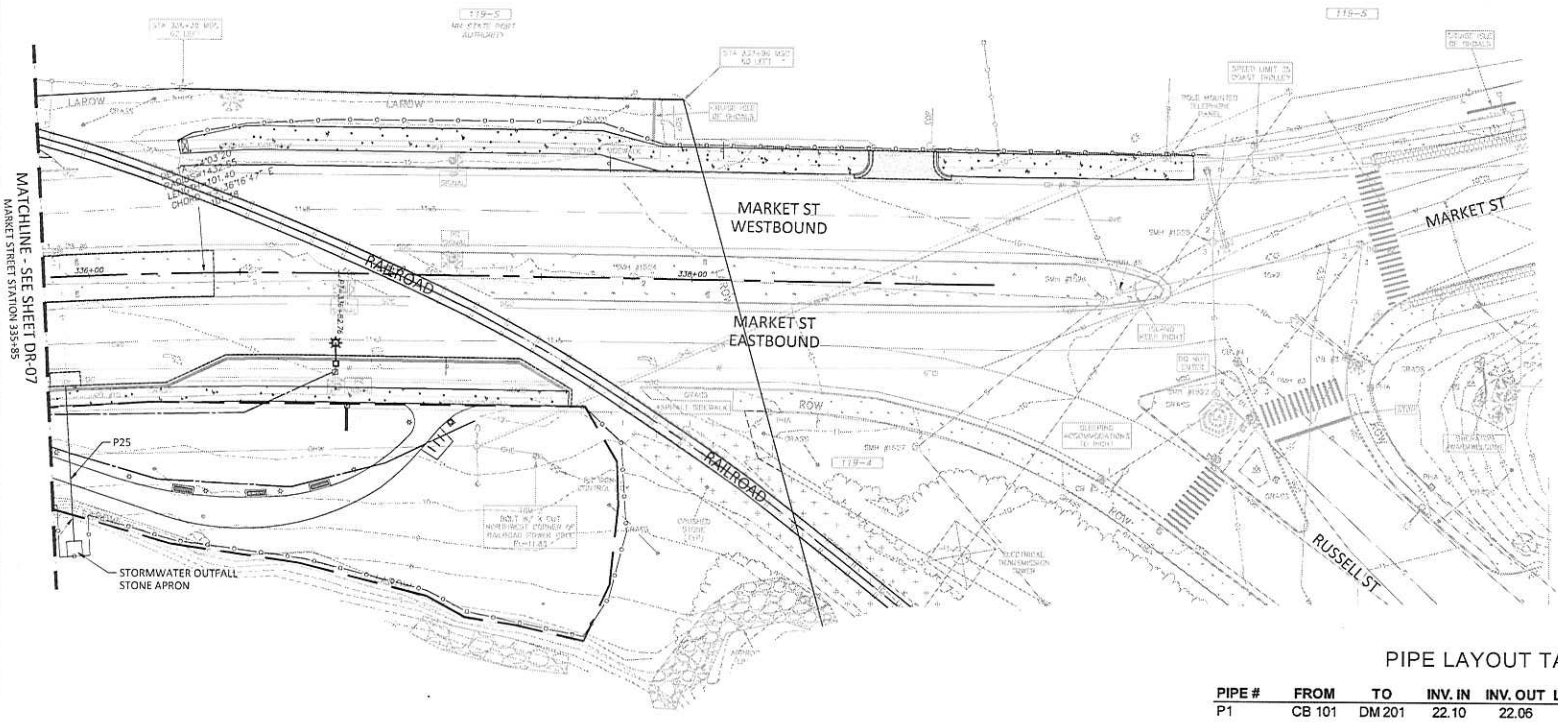


PIPE LAYOUT TABLE

PIPE #	FROM	TO	INV. IN	INV. OUT	LENGTH	PITCH	MATERIAL
P1	CB 101	DM 201	22.10	22.06	8	0.5%	12" SL HDPE
P2	CB 102	CB 34	19.04	19.00	8	0.5%	15" SL HDPE
P3	CB 103	DM 202	18.04	18.00	8	0.5%	15" SL HDPE
P4	CB 104	CB 32	17.04	17.00	8	0.5%	15" SL HDPE
P5	CB 105	CB 29	12.10	12.00	20	0.5%	15" SL HDPE
P6	CB 105	CB 25	5.10	5.00	20	0.5%	15" SL HDPE
P10	CB 108	CB 23	4.90	4.30	120	0.5%	15" SL HDPE
P11	CB 109	DM 204	4.77	4.65	24	0.5%	15" SL HDPE
P12	CB 111	DM 204	5.01	4.65	72	0.5%	15" SL HDPE
P13	CB 110	CB 111	5.15	5.11	7	0.5%	15" SL HDPE
P14	DM 205	CB 111	5.64	5.11	105	0.5%	15" SL HDPE
P15	CB 112	DM 205	5.77	5.74	6	0.5%	15" SL HDPE
P16	DM 206	DM 205	6.21	5.74	94	0.5%	15" SL HDPE
P17	CB 113	DM 206	6.34	6.31	6	0.5%	15" SL HDPE
P18	CB 30	OUT	9.31	9.14	28	0.6%	15" SL HDPE
P19	CB 27	OUT	9.09	7.67	15	9.5%	12" SL HDPE
P20	CB 26	OUT	3.30	2.64	33	2.0%	15" SL HDPE
P21	CB 24	OUT	4.42	1.40	56	5.4%	15" SL HDPE
P22	CB 21	OUT	2.27	2.19	41	0.2%	12" SL HDPE
P23	CB 19	OUT	4.05	3.84	21	1.0%	12" SL HDPE
P24	CB 16	OUT	6.63	6.32	14	2.2%	12" SL HDPE
P25	CB 10	OUT	4.63	4.59	44	0.1%	24" SL HDPE
P26	CB 115	CB 114	7.34	7.14	40	0.50%	15" SL HDPE
P27	CB 114	CB 12	7.09	6.77	106	0.30%	15" SL HDPE

no.	revision	date	by

PROJECT No. 13121 | DESIGNED BY: - | CHECKED BY: - | SCALE: 1"=20'

CITY OF PORTSMOUTH, NH

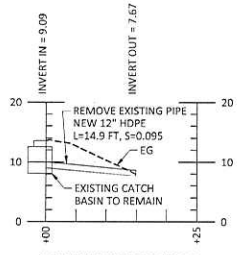
MARKET STREET GATEWAY

DRAINAGE PLAN

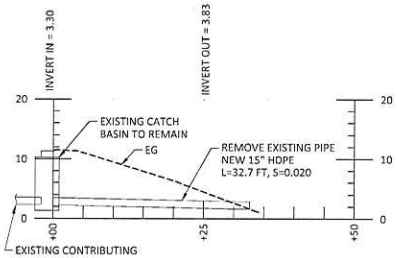
DATE: APRIL 2015

DRAWING No. DR-08

SHEET 23 of 40



DRAINAGE PROFILE A
STATION 315+00 RT
P19



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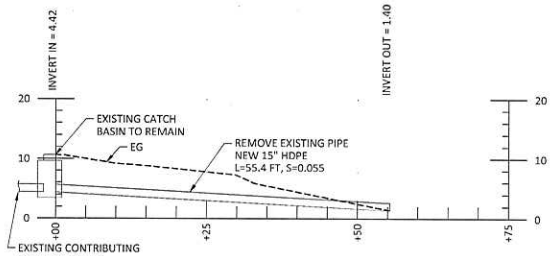
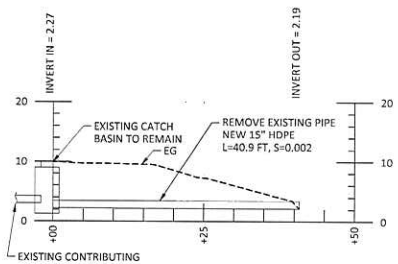
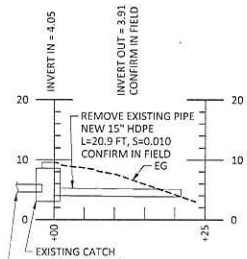
STATION 317+00 RT
P20



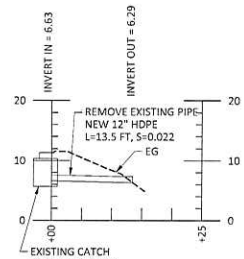
DRAINAGE PROFILE C
STATION 319+50 RT
P21



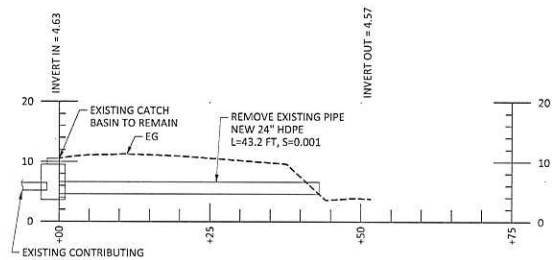
DRAINAGE PROFILE D
STATION 322+00 RT
P22



DRAINAGE PROFILE E
STATION 323+75 RT
P23



DRAINAGE PROFILE F
STATION 325+60 RT
P24



DRAINAGE PROFILE F
STATION 335+85 RT
P25

no.	revision	date	by

PROJECT No. 13121
DESIGNED BY: ...
CHECKED BY: ...
SCALE: 1"=20'

CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

DRAINAGE PROFILES

DATE: APRIL 2015
DRAWING No. DR-09
SHEET: 24 of 40

Q:\Projects\NH\Portsmouth-NH\113121 - Portsmouth Market Street Gateway\CAD\Final Design\Market Street Drainage Plan.dwg

US Army Corps
of Engineers®
New England District

Minimum Notice: Permittee must sign and return notification
within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

Permit Number: NAE-2015-0267

Project Manager Richard Kristoff

Name of Permittee: City of Portsmouth

Permit Issuance Date: 01/17/2016

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

****
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Permits and Enforcement Branch C *
* Regulatory Division *
* 696 Virginia Road *
* Concord, Massachusetts 01742-2751 *
****

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee Date

_____ _____

Printed Name Date of Work Completion

The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES

Thomas S. Burack, Commissioner

September 7, 2015

City of Portsmouth
Attn: Peter Rice
680 Peverly Hill Road
Portsmouth, New Hampshire 03801

Re: Market Street Gateway
Market Street, Portsmouth, NH

Permit: AoT-0975

Dear Applicant:

Based upon the plans and application, approved on September 7, 2015, we are hereby issuing RSA 485-A:17 Alteration of Terrain Permit AoT-0975. As part of the processing of this application, DES granted approval to waiving specific requirements of Rule Env-Wq 1504.09(b)(2)b, *Stormwater Drainage Report; Drainage Area Plans; Hydrologic Soil Group Plans*, finding that the identification of soil types with site-specific soil mapping standards would not provide any additional benefit for the hydrologic analysis of the linear project, and Env-Wq 1503.09 *Floodplain Requirements*, finding that the studies required by the rule would be of limited value given the project location within an estuarine system subject to tidal surges. It was further determined that granting the waiver would not have an adverse impact on the environment, public health, public safety, or abutting properties, and that granting the request is consistent with the intent and purpose of the rule waived. Additional documentation relative to the waiver requested is contained within the file. This permit is subject to the following conditions:

1. Activities shall not cause or contribute to any violations of the surface water quality standards established in Administrative Rule Env-Wq 1700.

2. You must submit revised plans for permit amendment prior to any changes in construction details or sequences. You must notify the Department in writing within ten days of a change in ownership.

3. You must notify the Department in writing prior to the start of construction and upon completion of construction. Forms are available at: http://des.nh.gov/organization/divisions/water/aot/categories/forms.htm. **If any underground detention systems, infiltration systems, or filtering systems are installed, a letter must be provided, signed by a qualified engineer, stating that the individual observed such system(s) prior to such system(s) being backfilled, and that in his or her professional opinion, such system(s) conform to the approved plans and specifications.**

4. The plans and supporting documentation in the permit file are a part of this approval.

5. **This permit expires on September 7, 2020.** No earth moving activities shall occur on the project after this expiration date unless the permit has been extended by the Department. If requesting an extension, the request must be received by the department before the permit expires. The Amendment Request form is available at: http://des.nh.gov/organization/divisions/water/aot/categories/forms.htm

6. This permit does not relieve the applicant from the obligation to obtain other local, state or federal permits that may be required (e.g., from US EPA, US Army Corps of Engineers, etc.). Projects disturbing over 1 acre may require a federal stormwater permit from EPA. Information regarding this

permitting process can be obtained at:
http://des.nh.gov/organization/divisions/water/stormwater/construction.htm.

7. If applicable, no activity shall occur in wetland areas until a Wetlands Permit is obtained from the Department. Issuance of this permit does not obligate the Department to approve a Wetlands Permit for this project.

Sincerely,

Ridgely Mauck

Ridgely Mauck, P.E.
Alteration of Terrain Bureau

cc: Portsmouth Planning Board

ec: Normandeau Associates

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF ENVIRONMENTAL SERVICES
LAND RESOURCES MANAGEMENT
WETLANDS BUREAU
29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
Phone: (603) 271-2147 Fax: (603) 271-6588
Website: http://des.nh.gov/organization/divisions/water/wetlands/cspa/index.htm
Permit Application Status: http://www2.des.state.nh.us/OneStop/Wetland_Permits_Query.aspx

RECEIVED
JAN 09 2015
NHDES
LAND RESOURCE MANAGEMENT

SHORELAND PERMIT BY NOTIFICATION (PBN) [1]

Office use only: Accepted ☑ Expires: 1/9/20 Rejected ☐
Check Amount $ ____ Check No. ____ Initials: AH Date: 1/9/15

Shoreland File Number 2015- 00050 Reviewed Date: 1/9/15 Initials: AH

A. PROJECT AND OWNER INFORMATION					
1. Project Property Address		Town/City		State	Zip code
Market St		Portsmouth		NH	03801
2. Waterbody Name		Tax Map	Lot	Block	Unit
Piscataqua River and North Mill Pond		NA	NA	NA	NA
3. Property Owner Name (last, first, MI)	Phone No.	Fax No.		An email address authorizes electronic communication	
City of Portsmouth	603-766-1411			plbritz@cityofportsmouth.com	
Mailing address		Town/City		State	Zip code
1 Junkins Ave		Portsmouth		NH	03801

B. PROPOSED PROJECT DETAILS: (NOTE: This process cannot be used: a) for impacts to areas under the jurisdiction of RSA 482-A including surface waters and their banks, wetlands, tidal areas including the 100 ft tidal buffer zone, sand dunes and beaches , and; b) to expand the footprint of nonconforming primary structures within the waterfront buffer.)

TOTAL PROPOSED IMPACT AREA:	NEW IMPERVIOUS AREA PROPOSED:
171921 **square feet**	19710 **square feet**

DESCRIPTION: A brief description of the proposed project must be stated here. It must list all proposed temporary and permanent impacts, new pervious and impervious areas, and structures.

Improvements will take place entirely within the existing roadway right-of-way associated with Market Street between Kearsarge Way and Russell Street. Improvements will include removing the concrete median and replacing it with a "biomedian" for stormwater treatment. The biomedian will be a planted streetscape. Improvements also include the installation of concrete sidewalks, granite curbs, street lighting, right-of-way landscaping, creation of two scenic public parks, and traffic improvements including lane removal and installation of traffic signals. Within the shoreland buffer zone, impacts will include the 19710 square feet of new impervious surfaces in the form of sidewalks and new roadways as well as the replacement of 15487 square feet of impervious surface with a pervious median for a net increase of 4223 square feet of impervious surface. This project will increase vegetation density with native plantings.

C. CONDITIONS: Agree to the following Permit by Notification conditions by initialing each one:	
AH Env-Wq 1406.17(a)	Erosion and siltation control measures shall (1) Be installed prior to the start of work; (2) Be maintained throughout the project; and (3) Remain in place until all disturbed surfaces are stabilized.
AH Env-Wq 1406.17(b)	Erosion and siltation controls shall be appropriate to the size and nature of the project and to the physical characteristics of the site, including slope, soil type, vegetative cover, and proximity to wetlands or surface waters.
AH Env-Wq 1406.17(c)	No person undertaking any activity in the protected Shoreland shall cause or contribute to, or allow the activity to cause or contribute to, any violations of the surface water quality standards established in Env-Ws 1700 or successor rules in Env-Wq 1700.
AH Env-Wq 1406.17(d)	Any fill used shall be clean sand, gravel, rock, or other suitable material.
AH Env-Wq 1406.05	Upon receiving acceptance of this Permit by Notification, a copy of page one of this form shall be posted on site prior to the start of work.

[1] Form is not valid unless a shoreland file number is assigned and the notification is accepted, dated and initialed by DES.

D. PBN CRITERIA: In addition to meeting all requirements of RSA 483-B and Rule Chapter Env-Ws1400 the project must meet one of the following. Please check the appropriate qualifying criteria per RSA 483-B:5-b:	
☐	1. This project will result in less than 1,500 sq ft of total impact area, of which no more than 900 square feet will be added impervious area (*excluding public infrastructure projects*); **or**
☒	2. This is a public infrastructure maintenance or repair project (public utilities, public roadways and access facilities); **or**
☐	3. This project is directly related to stormwater management improvements, erosion control projects or environmental restoration or enhancement; **or**
☐	4. This project is an activity defined as qualified for a permit by notification under Env-Wq 1406.05. Identify the specific paragraph under Env-Wq 1406.05 qualifying this project: ☐ Env-Wq 1406.05(a) relative to geotechnical borings ☐ Env-Wq 1406.05(b) relative to monitoring wells ☐ Env-Wq 1406.05(c) relative to drinking water wells ☐ Env-Wq 1406.05(d) relative to remediation activities

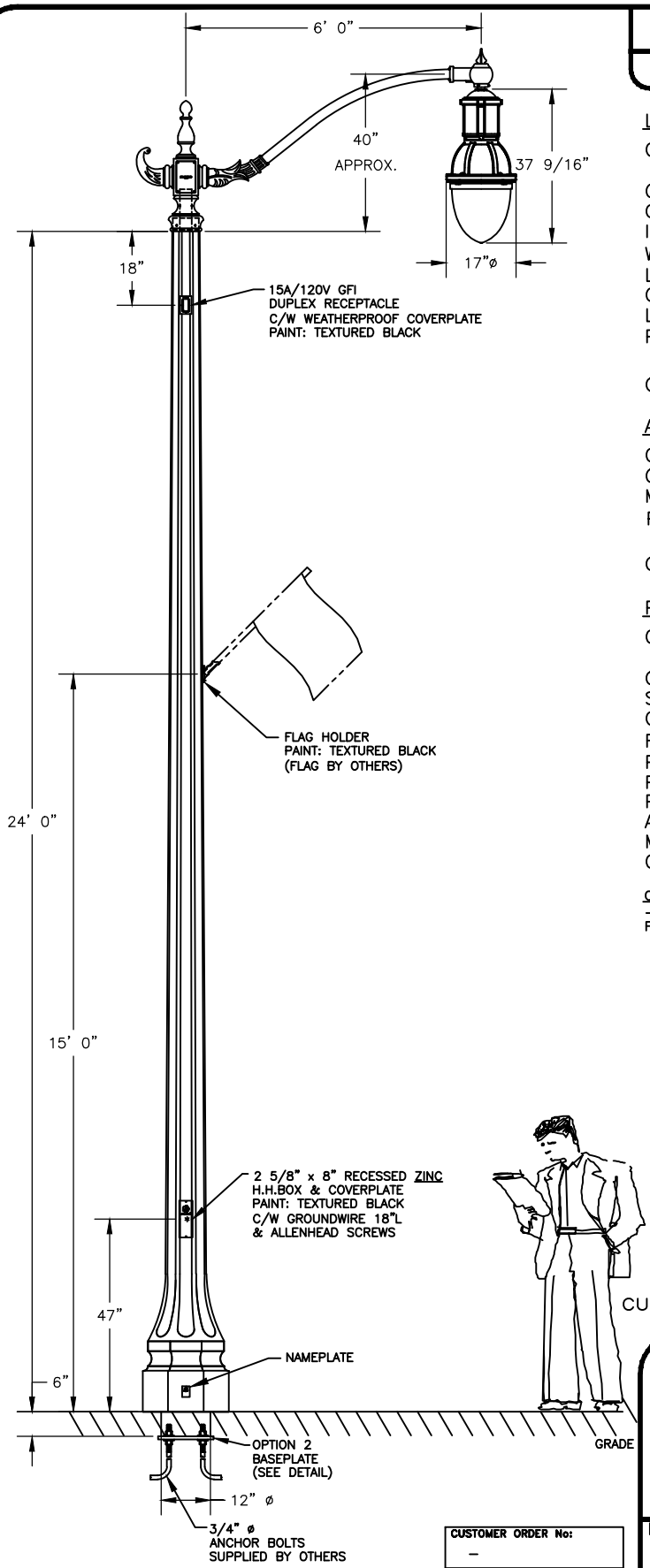
E. IMPACT AREA AND APPLICATION FEE: Indicate the project type, impact area and fee by checking the appropriate box below.		
☐	1. The proposed project will temporarily impact square feet and permanently impact square feet for a total of square feet of impact within 250 feet of the reference line. Total Impact area x $0.10 per square foot + $100 = **This is the project filing fee. If the result is more the $250 you cannot use this form.**	(Max $250) $
☒	2. The proposed project is a public infrastructure maintenance or repair project.	Fee Exempt
☐	3. The proposed project meets the criteria of Section D.3. above.	$100.00

F. REQUIRED CERTIFICATIONS: Read and, by hand, initial each of the blank spaces below. By initialing each box and signing below, you are *certifying* that you understand and agree to comply with each statement.	
JB	1. I understand that any impacts completed under a Permit by Notification filed and accepted based on false, incomplete, or misleading information on the application, plans or attachments shall be subject to enforcement action.
JB	2. I am aware that an accepted Shoreland Permit by Notification will not exempt the work I am proposing from other state, local or federal approvals.
JB	3. I am aware of the requirements regarding impervious area thresholds and have provided all necessary materials necessary to clearly demonstrate this project meets at least the minimum standards of RSA 483:B:9, V(g) 1,2 and 3.
JB	4. I understand that project proposals that do not meet the minimum standards of RSA 483-B and Administrative Rules Chapter Env-Wq 1400 shall be rejected.
JB	5. I understand that failure to conduct the work in accordance with the plans and materials submitted with this Notification shall be considered work without a permit and subject to enforcement action. I agree to conduct all work under this Permit by Notification in accordance with the conditions specified in Section C, above.
JB	6. I understand that incomplete notifications will be rejected and the notification fee will be forfeited.

G. REQUIRED SIGNATURE

Signature of Owner: *(agent may not sign on owner's behalf)*	**Date:** 1/8/15

H. AGENT INFORMATION: If this form has been completed by an agent or any person acting on behalf of the owner, said person shall provide the following information: (*Signature of owner must be present on in Section G*)			
1. Agent Name(last, first, MI)	Phone No.	Fax No.	An email address authorizes electronic communication
Fiorillo, Adele F.	603-319-5303	603-334-6419	afiorillo@normandeau.com
Mailing address	Town/City	State	Zip code
30 International Drive, Suite 6	Portsmouth	NH	03801



REV.	ALTERATION	DATE	BY
A	FH ADDED & CCT WAS 4000K	01/04/17	T.B

LUMINAIRE SPECIFICATIONS

CATALOGUE NO.:	K833-P4RAD-II-150(SSL) -8084-120:277 S/F KPL20
QUANTITY:	
GLOBE MAT'L:	FLAT ARRAY, ACRYLIC DEEP DISH
IES CLASSIFIC.:	TYPE II
WATTAGE:	150W (8084 SERIES)
LIGHT SOURCE:	SOLID STATE LIGHTING
CCT/DIODE:	3000K/HE7
LINE VOLTAGE:	120:277V
PAINT:	TEXTURED BLACK (INCLUDING HARDWARE)
OPTIONS:	S/F KPL-20 LEVELING DEVICE

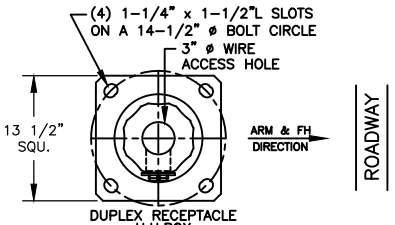
ARM SPECIFICATIONS

CATALOGUE NO.:	(MOD) KA72-T-1-6'-KPL20
QUANTITY:	
MATERIAL:	ALUMINUM
PAINT:	TEXTURED BLACK (INCLUDING HARDWARE)
OPTIONS:	KPL-20 LEVELING DEVICE

POLE SPECIFICATIONS

CATALOGUE NO.:	KTT24-G-E11-SBP C/W 140-30/100 & DR-FH
QUANTITY:	
SECTION:	OCTAGONAL
COLOUR:	ECLIPSE
FINISH:	ETCHED
POLE TOP:	6 11/16" ø
POLE BUTT:	12" ø
POLE LENGTH:	24' 6"
APPROX WEIGHT:	T.B.A.
MIN. RACEWAY:	1 1/8" ø
OPTIONS:	FLAG HOLDER & DUPLEX RECEPTACLE

COATINGS REQUIRED:
-2 COATS ACRYLIC
FULL LENGTH



BASEPLATE DETAILS (SCALE 2:1)
13 1/2" SQU. x 1"THK. GALV. STEEL
TEMP. #115 DWG. #503C0048

CUSTOMER APPROVAL & DATE: _____

King Luminaire • StressCrete • Est. 1953

STRESSCRETE GROUP

Manufacturing Locations:

Burlington, Ontario 1-800-268-7809

Northport, Alabama 1-800-435-6563

Atchison, Kansas 1-800-837-1024

Jefferson, Ohio 1-800-268-7809

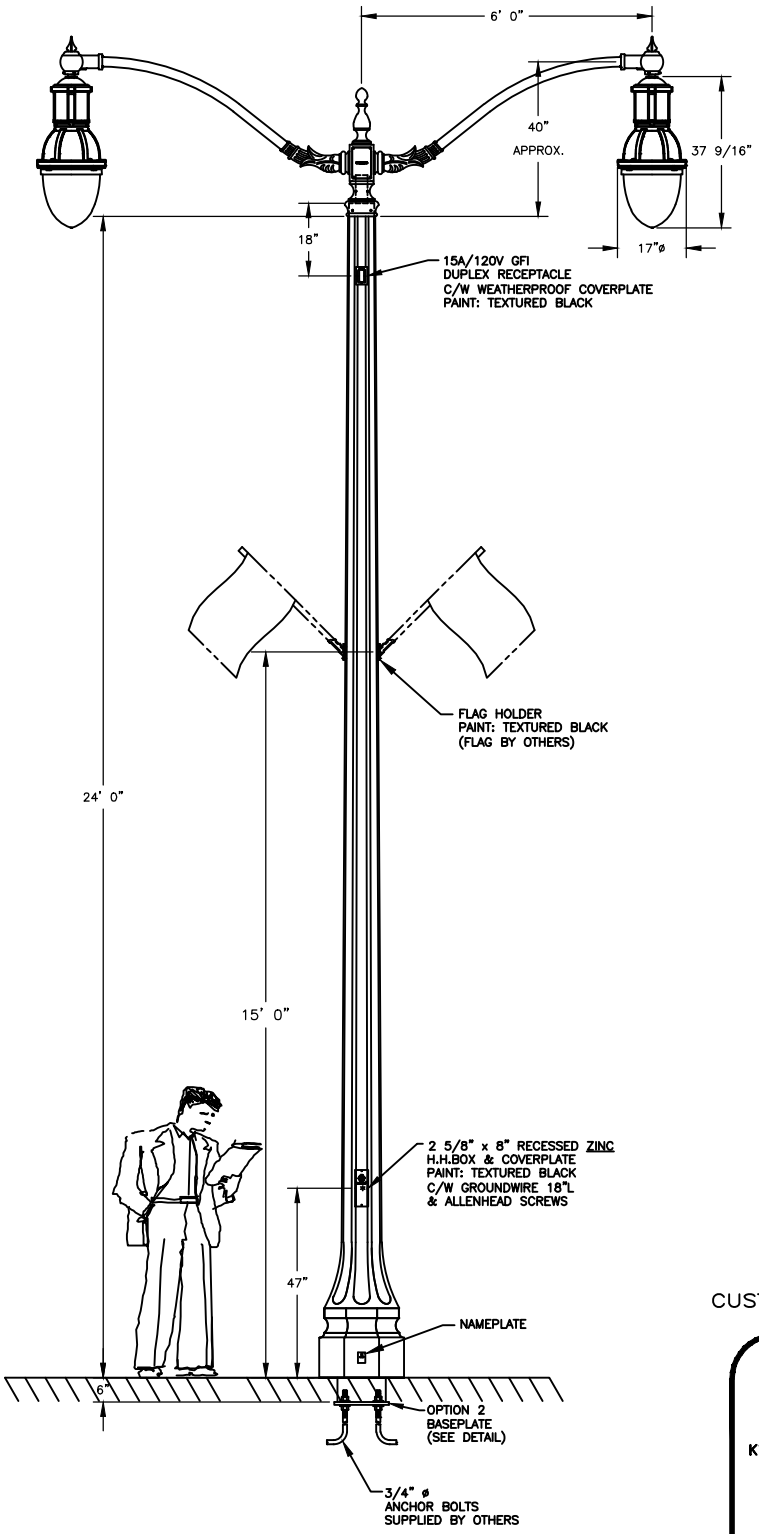
CUSTOMER ORDER No:	-
STRESSCRETE ORDER No:	-
KMFG. ORDER No:	-
KING U.S. ORDER No:	-

PROJECT/CUSTOMER: MARKET STREET GATEWAY – PORTSMOUTH, NH

DRAWN BY:	AT:	CHECKED BY:	DATE:	REVISION:
A. ALVELA	SC1		12/16/16	A

DRAWING TYPE:	DRAWING NUMBER:
CONCEPT DWG.	206A8549-5

REV.	ALTERATION	DATE	BY
A	FH ADDED & CCT WAS 4000K	01/04/17	T.B



LUMINAIRE SPECIFICATIONS

CATALOGUE NO.:	K833–P4RAD–II–150(SSL) –8084–120:277 S/F KPL20
QUANTITY:	
GLOBE MAT'L:	FLAT ARRAY, ACRYLIC DEEP DISH
IES CLASSIFIC.:	TYPE II
WATTAGE:	150W (8084 SERIES)
LIGHT SOURCE:	SOLID STATE LIGHTING
CCT/DIODE:	3000K/HE7
LINE VOLTAGE:	120:277V
PAINT:	TEXTURED BLACK (INCLUDING HARDWARE)
OPTIONS:	S/F KPL–20 LEVELING DEVICE

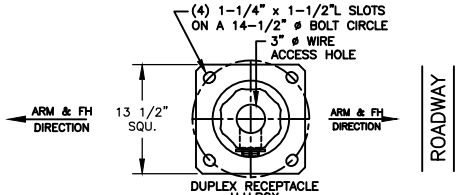
ARM SPECIFICATIONS

CATALOGUE NO.:	(MOD) KA72–T–2–6'–KPL20
QUANTITY:	
MATERIAL:	ALUMINUM
PAINT:	TEXTURED BLACK (INCLUDING HARDWARE)
OPTIONS:	KPL–20 LEVELING DEVICE

POLE SPECIFICATIONS

CATALOGUE NO.:	KTT24–G–E11–SBP C/W 140–30/100 & DR & FH
QUANTITY:	
SECTION:	OCTAGONAL
COLOUR:	ECLIPSE
FINISH:	ETCHED
POLE TOP:	6 11/16" ø
POLE BUTT:	12" ø
POLE LENGTH:	24' 6"
APPROX WEIGHT:	T.B.A.
MIN. RACEWAY:	1 1/8" ø
OPTIONS:	FLAG HOLDER & DUPLEX RECEPTACLE

COATINGS REQUIRED:
–2 COATS ACRYLIC
FULL LENGTH



BASEPLATE DETAILS (SCALE 2:1)
13 1/2" SQU. x 1"THK. GALV. STEEL
TEMP. #115 DWG. #503C0048

CUSTOMER APPROVAL & DATE: _____

CUSTOMER ORDER No:
–
STRESSCRETE ORDER No:
–
KMFG. ORDER No:
–
KING U.S. ORDER No:
–

GRADE

King Luminaire • StressCrete • Est. 1953

STRESSCRETE GROUP

Manufacturing Locations:

Burlington, Ontario 1–800–268–7809

Northport, Alabama 1–800–435–6563

Atchison, Kansas 1–800–837–1024

Jefferson, Ohio 1–800–268–7809

PROJECT/CUSTOMER:
MARKET STREET GATEWAY – PORTSMOUTH, NH

DRAWN BY:	AT:	CHECKED BY:	DATE:	REVISION:
A. ALVELA	SC1		12/16/16	A

DRAWING TYPE:	DRAWING NUMBER:
CONCEPT DWG.	206A8549–6

SUBMITTAL CERTIFICATION FORM

PROJECT Portsmouth-Market St. Gateway Improvements-Phase 1

CONTRACTOR S.U.R. Construction, Inc. **CONTRACTOR'S PROJECT NO.:**

ENGINEER RSG **ENGINEER'S PROJECT NO.:** 13121

MANUFACTURER Salmon Falls Nursery **SHOP DRAWING NO.:** 28

TRANSMITTAL NO.: 1

SPECIFICATION SECTION

DESCRIPTION Irrigation Layout

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with (check 1):

[X] NO DEVIATIONS

[ ] LIST OF DEVIATIONS AS FOLLOWS:

By S.U.R. Construction, Inc.
Contractor

By: Salmon Falls Nursery
Manufacturer

General Contractor's Stamp

APPROVED FOR SUBMITTAL
S.U.R. CONSTRUCTION, INC.

NOV 08 2017

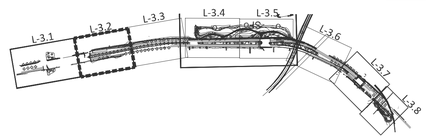
Robert K. Schultz

Reviewing Engineers Stamp

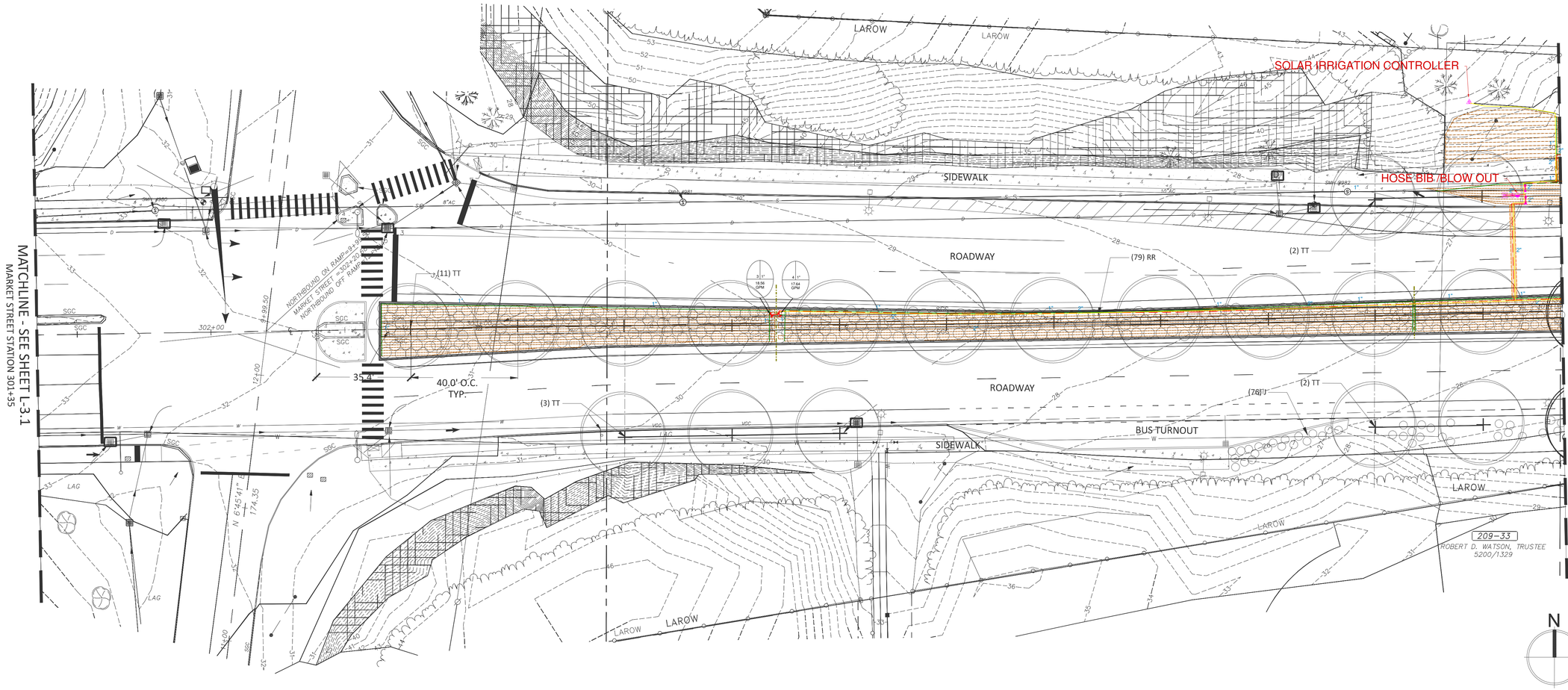
OVERALL MARKET STREET CORRIDOR PLANTING SCHEDULE

General Planting Plan Notes

1. Contractor shall begin maintenance immediately after planting and shall continue until final acceptance. Contractor shall be responsible for all means and methods of watering and maintenance.
2. The Landscape contractor shall supply all plant materials in quantities sufficient to complete all plantings shown on this drawing. Clarify any discrepancies with the landscape architect prior to ordering plant material.
3. All materials shall conform to the guidelines established by the American Association of Nurserymen.
4. All plants shall bear the same relationship to finish grade as the original grades before digging.
5. The landscape contractor shall guarantee all plant materials for one(1) full year from date of substantial completion.
6. All plant materials are subject to the approval of the landscape architect at the nursery and at the site.
7. All areas of the site which have been disturbed and not otherwise developed shall be loamed with a minimum depth of 6" of topsoil and seeded as specified.
8. Landscape contractor is encouraged to provide the landscape architect with concerns and/or suggestions with regard to proposed plant material selection prior to placing a purchase order.
9. All trees located adjacent to walks and drives shall have 6' of clear height to first branching.
10. Contractor shall verify all tree removals with landscape architect prior to start of construction.
11. Contractor shall obtain approval for proposed lawn seed mix prior to installation.
12. No plant shall be put into the ground before rough grading has been finished and approved by the project landscape architect.
13. All plants shall be balled and wrapped or container grown as specified. No container grown stock will be accepted if it is root bound. All root wrapping material made of synthetics or plastics shall be removed at the time of planting.
14. With container grown stock, the container shall be removed and the container ball shall be cut through the surface in two vertical locations.
15. The location of trees, shrubs and bedlines shall be staked for approval by the landscape architect prior to installation. The contractor shall notify the landscape architect 48 hours prior to required site visit.
16. All broad leaf evergreen plants shall be sprayed with an antidessicant at the beginning of their first winter.
17. All plants shall be installed as per details and the contract specifications. The landscape contractor shall refer to the contract specifications for additional requirements.
18. All plants and stakes shall be set plumb unless otherwise specified.
19. The landscape contractor shall provide loam fill as per the contract specifications.
20. All plants shall be watered thoroughly twice during the first 24-hour period after planting. All plants shall then be watered by the contractor, as necessary to insure health until final acceptance.
21. The landscape contractor shall refer to the plant list and planting specifications for seasonal requirements and other restrictions related to the time of planting.



PLAN KEY



ISSUE FOR BID

no.	revision	revision	date	by

PROJECT No. 13121
DESIGNED BY: ...
CHECKED BY: ...
SCALE: 1"=20'

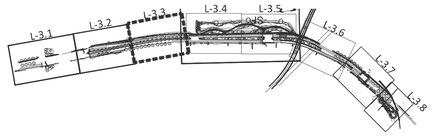
Irrigation AS-BUILT

CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

PLANTING PLAN

DATE: 11/9/2015
DRAWING No. L-3.2

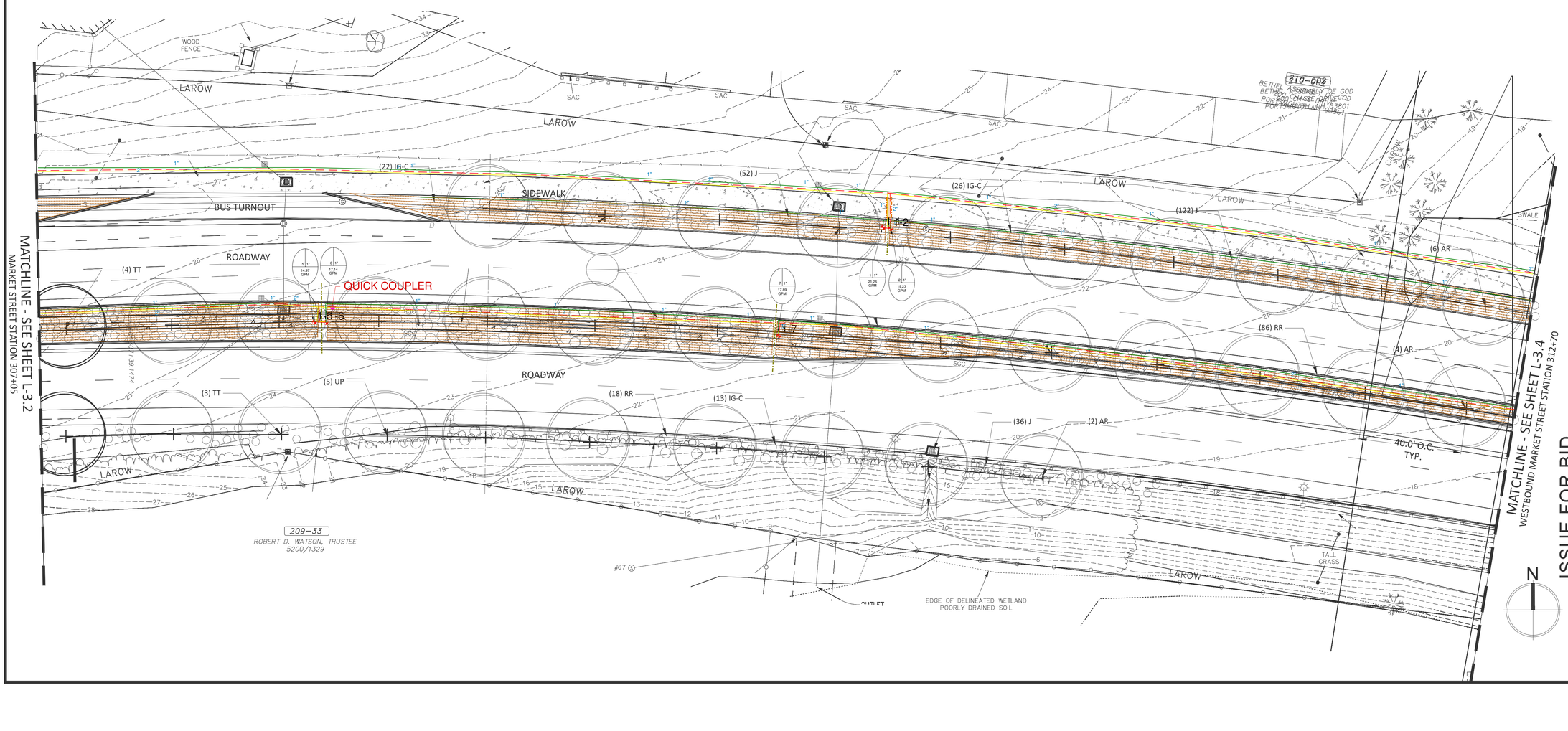


PLAN KEY

OVERALL MARKET STREET CORRIDOR PLANTING SCHEDULE

General Planting Plan Notes

1. Contractor shall begin maintenance immediately after planting and shall continue until final acceptance. Contractor shall be responsible for all means and methods of watering and maintenance.
2. The Landscape contractor shall supply all plant materials in quantities sufficient to complete all plantings shown on this drawing. Clarify any discrepancies with the landscape architect prior to ordering plant material.
3. All materials shall conform to the guidelines established by the American Association of Nurserymen.
4. All plants shall bear the same relationship to finish grade as the original grades before digging.
5. The landscape contractor shall guarantee all plant materials for one(1) full year from date of substantial completion.
6. All plant materials are subject to the approval of the landscape architect at the nursery and at the site.
7. All areas of the site which have been disturbed and not otherwise developed shall be loamed with a minimum depth of 6" of topsoil and seeded as specified.
8. Landscape contractor is encouraged to provide the landscape architect with concerns and/or suggestions with regard to proposed plant material selection prior to placing a purchase order.
9. All trees located adjacent to walks and drives shall have 6' of clear height to first branching.
10. Contractor shall verify all tree removals with landscape architect prior to start of construction.
11. Contractor shall obtain approval for proposed lawn seed mix prior to installation.
12. No plant shall be put into the ground before rough grading has been finished and approved by the project landscape architect.
13. All plants shall be balled and wrapped or container grown as specified. No container grown stock will be accepted if it is root bound. All root wrapping material made of synthetics or plastics shall be removed at the time of planting.
14. With container grown stock, the container shall be removed and the container ball shall be cut through the surface in two vertical locations.
15. The location of trees, shrubs and bedlines shall be staked for approval by the landscape architect prior to installation. The contractor shall notify the landscape architect 48 hours prior to required site visit.
16. All broad leaf evergreen plants shall be sprayed with an antidessicant at the beginning of their first winter.
17. All plants shall be installed as per details and the contract specifications. The landscape contractor shall refer to the contract specifications for additional requirements.
18. All plants and stakes shall be set plumb unless otherwise specified.
19. The landscape contractor shall provide loam fill as per the contract specifications.
20. All plants shall be watered thoroughly twice during the first 24-hour period after planting. All plants shall then be watered by the contractor, as necessary to insure health until final acceptance.
21. The landscape contractor shall refer to the plant list and planting specifications for seasonal requirements and other restrictions related to the time of planting.



no.	revision	revision	date	by

PROJECT No. 13121 | DESIGNED BY: | CHECKED BY: | SCALE: 1"=20'

Irrigation AS-BUILT

ISSUE FOR BID

CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

PLANTING PLAN

DATE: 11/9/2015

DRAWING No. L-3.3

General Planting Plan Notes

1. Contractor shall begin maintenance immediately after planting and shall continue until final acceptance. Contractor shall be responsible for all means and methods of watering and maintenance.
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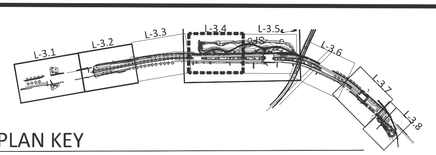
3. All materials shall conform to the guidelines established by the American Association of Nurserymen.
4. All plants shall bear the same relationship to finish grade as the original grades before digging.
5. The landscape contractor shall guarantee all plant materials for one(1) full year from date of substantial completion.
6. All plant materials are subject to the approval of the landscape architect at the nursery and at the site.
7. All areas of the site which have been disturbed and not otherwise developed shall be loamed with a minimum depth of 6" of topsoil and seeded as specified.
8. Landscape contractor is encouraged to provide the landscape architect with concerns and/or suggestions with regard to proposed plant material selection prior to placing a purchase order.
9. All trees located adjacent to walks and drives shall have 6' of clear height to first branching.
10. Contractor shall verify all tree removals with landscape architect prior to start of construction.
11. Contractor shall obtain approval for proposed lawn seed mix prior to installation.
12. No plant shall be put into the ground before rough grading has been finished and approved by the project landscape architect.
13. All plants shall be balled and wrapped or container grown as specified. No container grown stock will be accepted if it is root bound. All root wrapping material made of synthetics or plastics shall be removed at the time of planting.
14. With container grown stock, the container shall be removed and the container ball shall be cut through the surface in two vertical locations.
15. The location of trees, shrubs and bedlines shall be staked for approval by the landscape architect prior to installation. The contractor shall notify the landscape architect 48 hours prior to required site visit.
16. All broad leaf evergreen plants shall be sprayed with an antidessicant at the beginning of their first winter.
17. All plants shall be installed as per details and the contract specifications. The landscape contractor shall refer to the contract specifications for additional requirements.
18. All plants and stakes shall be set plumb unless otherwise specified.
19. The landscape contractor shall provide loam fill as per the contract specifications.
20. All plants shall be watered thoroughly twice during the first 24-hour period after planting. All plants shall then be watered by the contractor, as necessary to insure health until final acceptance.
21. The landscape contractor shall refer to the plant list and planting specifications for seasonal requirements and other restrictions related to the time of planting.

OVERALL MARKET STREET CORRIDOR PLANTING SCHEDULE

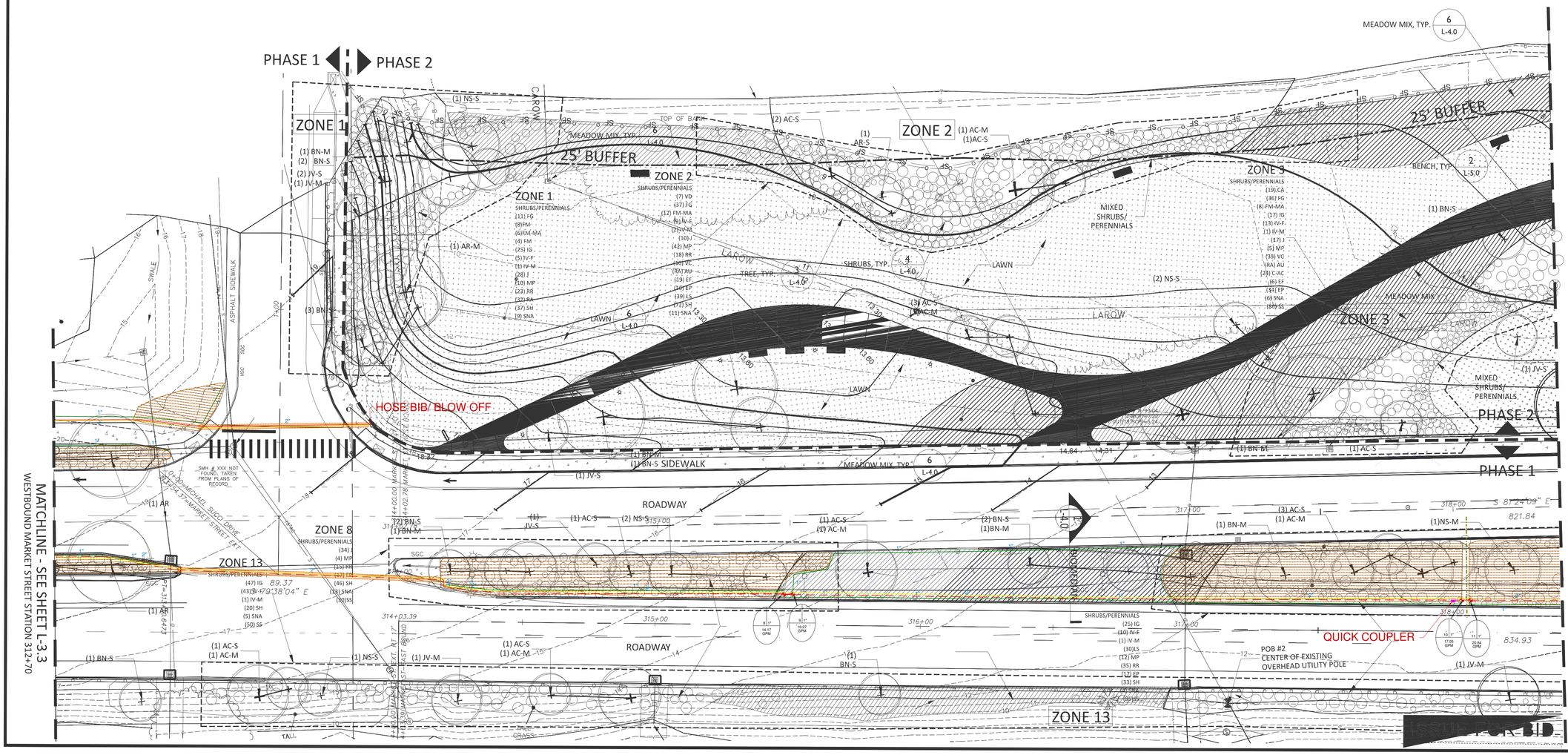


PLAN KEY

LEGEND

MEADOW MIX

LAWN



Irrigation AS-BUILT

CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

PLANTING PLAN

no.	revision	revision	date	by

PROJECT No. 13121
DESIGNED BY:
CHECKED BY:
SCALE: 1"=20'

DATE: 11/9/2015
DRAWING No. L-3.4

ISSUED FOR BID

General Planting Plan Notes

1. Contractor shall begin maintenance immediately after planting and shall continue until final acceptance. Contractor shall be responsible for all means and methods of watering and maintenance.
2. The Landscape contractor shall supply all plant materials in quantities sufficient to complete all plantings shown on this drawing. Clarify any discrepancies with the landscape architect prior to ordering plant material.
3. All materials shall conform to the guidelines established by the American Association of Nurserymen.
4. All plants shall bear the same relationship to finish grade as the original grades before digging.
5. The landscape contractor shall guarantee all plant materials for one(1) full year from date of substantial completion.
6. All plant materials are subject to the approval of the landscape architect at the nursery and at the site.
7. All areas of the site which have been disturbed and not otherwise developed shall be loamed with a minimum depth of 6" of topsoil and seeded as specified.
8. Landscape contractor is encouraged to provide the landscape architect with concerns and/or suggestions with regard to proposed plant material selection prior to placing a purchase order.
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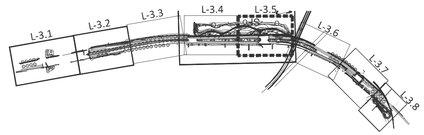
14. With container grown stock, the container shall be removed and the container ball shall be cut through the surface in two vertical locations.
15. The location of trees, shrubs and bedlines shall be staked for approval by the landscape architect prior to installation. The contractor shall notify the landscape architect 48 hours prior to required site visit.
16. All broad leaf evergreen plants shall be sprayed with an antidessicant at the beginning of their first winter.
17. All plants shall be installed as per details and the contract specifications. The landscape contractor shall refer to the contract specifications for additional requirements.
18. All plants and stakes shall be set plumb unless otherwise specified.
19. The landscape contractor shall provide loam fill as per the contract specifications.
20. All plants shall be watered thoroughly twice during the first 24-hour period after planting. All plants shall then be watered by the contractor, as necessary to insure health until final acceptance.
21. The landscape contractor shall refer to the plant list and planting specifications for seasonal requirements and other restrictions related to the time of planting.

LEGEND

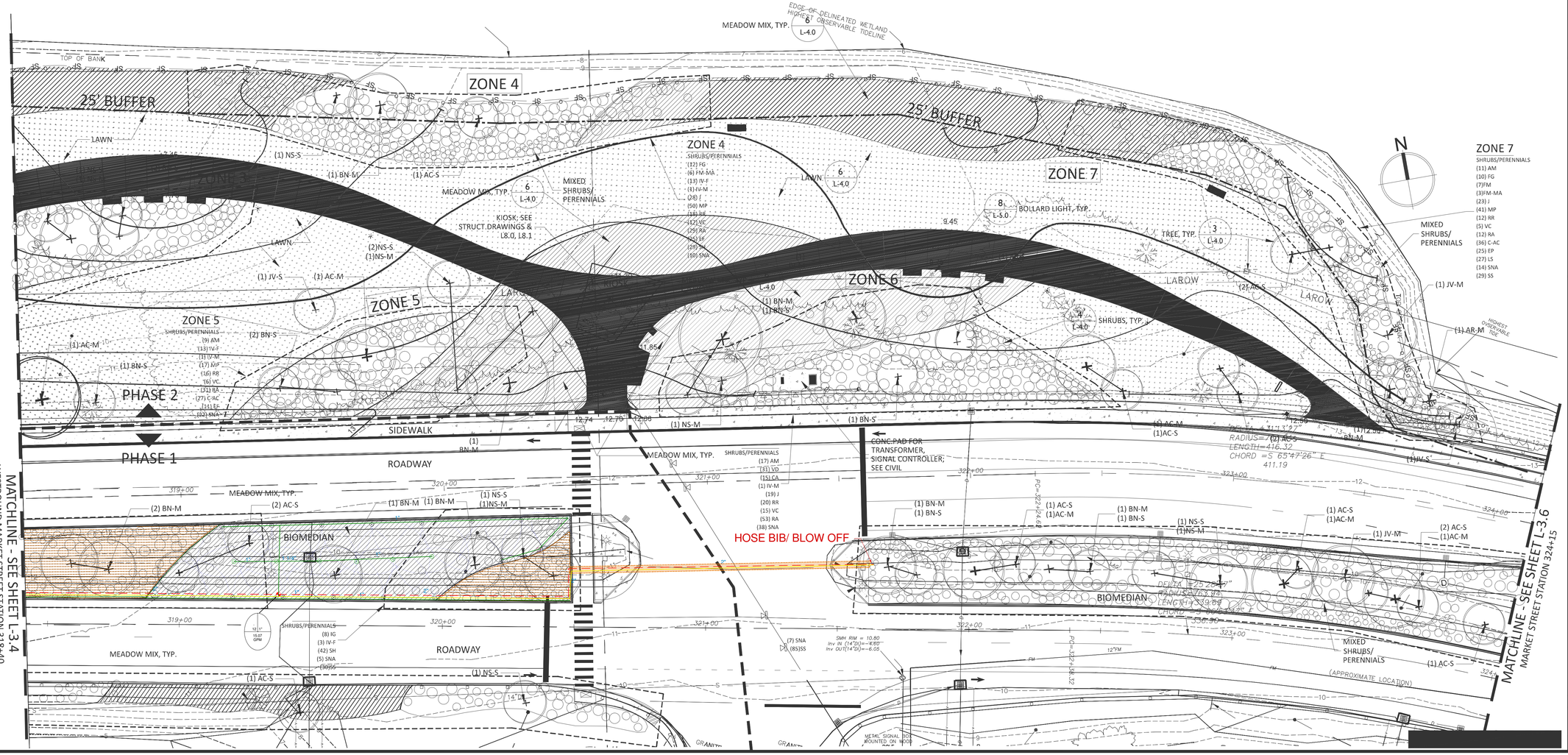
MEADOW MIX

LAWN



PLAN KEY

OVERALL MARKET STREET CORRIDOR PLANTING SCHEDULE



no.	revision	revision	date	by

PROJECT No. 13121 | DESIGNED BY: | CHECKED BY: | SCALE: 1"=20'

Irrigation AS-BUILT

CITY OF PORTSMOUTH, NH

MARKET STREET GATEWAY

PLANTING PLAN

DATE: 11/9/2015

DRAWING No. L-3.5

SUBMITTAL CERTIFICATION FORM

PROJECT Portsmouth-Market St. Gateway Improvements-Phase 1

CONTRACTOR S.U.R. Construction, Inc. **CONTRACTOR'S PROJECT NO.:**

ENGINEER RSG **ENGINEER'S PROJECT NO.:** 13121

MANUFACTURER Salmon Falls Nursery **SHOP DRAWING NO.:** 27

TRANSMITTAL NO.: 1

SPECIFICATION SECTION

DESCRIPTION Irrigation Components

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with (check 1):

[X] NO DEVIATIONS

[ ] LIST OF DEVIATIONS AS FOLLOWS:

By S.U.R. Construction, Inc.
Contractor

By: Salmon Falls Nursery
Manufacturer

General Contractor's Stamp

APPROVED FOR SUBMITTAL
S.U.R. CONSTRUCTION, INC.

NOV 08 2017

Robert M. Schulte

Reviewing Engineers Stamp

Technical Specifications
SMARTLINE SOLAR48TW

FEATURES

- 48 Station two-wire configuration
- Converts SmartLine to a totally “portable” water management system using proven solar technology
- The SmartLine controller paired with the SLW weather station is SWAT tested and EPA Watersense certified: Smart Irrigation, Smart Power
- Green power source using 100% renewable energy
- SmartLine Solar uses industry standard 24VAC valves, which outperform debris-prone latching solenoids required with battery operated systems
- Patented system diagnostics include Volt meter, Amp meter and Valve Locator
- LCD display indicates battery and solar power condition
- Dual deep cycle solar batteries provide up to 7 days of operation with no solar charge
- State of the art Solar Charge Technology (SCT) prolongs battery life and protects batteries from over charge and assures a full charge
- Heavy-duty 16-gauge stainless steel enclosure for secure installation
- Easy conversion from solar to standard AC grid power allowing for early stage construction of landscape in new or phased-in projects
- Comes pre-wired and ready to install with:
  - SmartLine controller with all modules
  - Stainless steel enclosure
  - Two industrial-grade solar panels
  - Two solar batteries
  - Four-digit digital meter
  - Circuit breakers
  - Wiring harnesses and cables

SmartLine Solar Controller	
Model	**Description**
SLSOLAR48TW	48 Zone Solar Two-Wire Controller

3301 W. Kingsley Road
Garland, Texas 75041-2207
888-484-3776 Fax: 972-271-5710
www.weathermatic.com

Technical Specifications
SMARTLINE SOLAR48TW

SMARTLINE CONTROLLER

Two-wire configured controller

- Large backlit LCD display
- Nonvolatile memory and real time clock/calendar to retain programs and current date and time even if solar batteries lose their charge
- 2 run modes: Standard mode runs user input zone run times; Auto Adjust mode requires SLW Series On-Site Weather Station to calculate weather based run times
- 4 programs: A, B, C; program D can operate concurrently
- 8 start times per program
- Zone run times from 1 min. to 9 hrs. 55 min. with operation countdown displayed in hours, minutes, and seconds
- Watering day selections of custom days of the week, odd/even, or interval days (1 – 30 days)
- Omit settings: omit time of day window, omit day(s) of week, and omit up to 7 calendar dates
- Two-Wire Configuration - LED display and status lights for decoder programming, operation status, and troubleshooting with error codes
- SLDEC valve decoders are fully programmable for valve addresses and operate 24VAC valve solenoids

SOLAR DIGITAL METER

- Four-digit digital meter displays voltage, current, temperature, logged data, settings, alarms and error reporting.
- Additional displayed information includes battery level, amp hours, and battery operating state
- 3-button menu navigation with custom icons and back lighting
- Automatic circuit protection against faults and user mistakes such as short circuit, overload, high temperature and low voltage disconnect

SOLAR PANELS

Two 24” x 36” Industrial-rated Solar Panels

- Low iron High-transmission 3.2mm tempered impact resistant glass.
- Clear anodized extruded aluminum frame
- 36 EVA encapsulated solar cells bonded to a TPT/TPE Tedlar backsheet.

SOLAR BATTERIES

Two 12-volt GEL maintenance free deep cycle solar GEL batteries

- High purity lead calcium-tin alloy charging grid
- Non-spillable
- Combination reaction (recombinant battery) which prevents escape of hydrogen and oxygen gases.
- Electrical
    - Nominal Voltage: 12V
    - Amp Hour Capacity @ 20 hr rate: 97.6 a/h

STAINLESS STEEL ENCLOSURE

- 16-gauge stainless steel construction with brushed finish
- 2-part cabinet and pedestal mount model
- Filtered louvers for ventilation
- Cam style keylock
- Weather-resistant
- NEMA TYPE 3R rated with SmartLine controller installed
- SLPED-ENC CABINET Dimensions – *19½” W x 19½" H x 9” D (49,53 cm x 49,53 cm x 22,86 cm)*
- SLPED-ENC BASE Dimensions – *19 ¾” W x 24” H x 15” D (50,17 cm x 60,96 cm x 38,1 cm)*

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Technical Specifications
SMARTLINE SOLAR48TW

CONTROLLER(S) shall be model SL4800TW as manufactured by Weathermatic Sprinkler Division of Telsco Industries. Controller(s) shall be a four (4) program controller with SLM48DM module to allow (3) two-wire path operation up to 48 zones.

OPERATION: Controller shall be capable of standard timed watering or auto adjust watering times when equipped with an optional SLW weather monitor manufactured by Weathermatic. Auto Adjust watering shall be based on real time, on-site weather data and system audit data entered by the user. Auto adjust timing shall be based on the Hargreaves ET calculation formula. Controller shall provide reviewable watering deficits, scheduled run times by zone and a total run time recap for each zone which is resettable by the user. A more or less function shall be provided to allow run time adjustment by zone for shade/sunlight, system efficiency and other local factors. Auto adjust mode shall also include automatic calculation of run/soak times based on both soil type and zone elevation.

Each program shall have eight independent start times, calendar schedules, watering budgets by month and a soak/cycle for varying soil percolation rates.

Controller shall have a pump start/master valve position which shall be programmable to operate on demand from any selected zone. A programmable safety delay shall be included for zone to zone delay and master valve to zone delay for opening and closure.

Controller shall have input for rain and freeze sensor devices. Use of the optional SLW weather monitor shall incorporate the rain and freeze shutdown functions and shall incorporate a 48 hour delay after closure of the rain sense switch.

Controller shall have self-diagnostic capabilities to detect “short” or “open” zones and the ability to display lists of faults on an LCD display for the user. Diagnostics shall also include LCD display of volt/amp readings by zone and for transformer output as well as backup battery reading. A chatter function shall also be provided to assist in locating buried valves. The controller shall automatically prevent master valve opening or pump start when the valve locator diagnostic is used.

Display shall be backlit for clear viewing in all lighting conditions. Zone timing shall be settable from 1 minute to 9 hours and 55 minutes.

Program D shall operate concurrently with programs A, B and C. Programs A, B and C shall stack in sequence of start time operation.

Program schedules shall include options for days of the week, odd date, even date or an interval of 1 to 30 days. A ‘no water’ window shall be available to inhibit daily operations of a program between two selected times on a given day; omission of up to 7 specified calendar dates or specific days of the week. Adjustments for leap year shall be automatic.

Manual operation shall be provided by program, by station, or on a programmable test program with durations from ten (10) seconds to ten (10) minutes. The programmable test program shall also check for short and open conditions on each zone each time it is run.

Non-volatile memory shall retain all programming and real-time clock shall be provided to maintain date and time.

CONSTRUCTION: Controller shall be enclosed in a U.L., CE and C-Mark Listed rainproof plastic enclosure with optional key lock. The enclosure shall be rated for outdoor or indoor use. Enclosure shall be a wall mount (pedestal mount) model with removable knockouts on the lower side and back of the housing for choice of wiring location. The operating panel shall be a totally enclosed module that is removable from the housing for programming at a separate location. A test post for 24V a.c. operation shall be accessible with or without the operating panel. Zone modules (SLM12) shall be self-contained modules that can be installed without turning off power to the unit and programming of new zones shall not be required. Module wiring connections shall be of the type that allows insertion of solid wires without any tool. Each module shall contain its own surge protection.

ELECTRIC: Controller shall be completely electric in operation. Controller shall be installed and wired in accordance with manufacturer’s published instructions. Controller shall be capable of operating from an independent power supply. Primary shall be 115V a.c. 60hz or 230V, 50hz.

SOLAR BATTERY ASSEMBLY shall be model SOLARBATT-48 as assembled by Weathermatic Sprinkler Division of Telsco Industries, or approved equal.

CONSTRUCTION: SOLARBATT-48 shall be an American made GEL maintenance free deep cycle battery. The GEL battery case shall be a shock absorbent thick wall polypropylene. The charging grid shall be a high purity lead calcium-tin alloy. The battery shall be non-spillable and be a recombination reaction (recombinant battery) which prevents escape of hydrogen and oxygen gases. The battery may be operated in virtually any position except upside-down.

ELECTRIC: SOLARBATT-48 shall have the following electrical specifications:
Nominal Voltage: 12V; Amp Hour Capacity @ 20 hr rate: 97.6 a/h; Reserve Capacity @ 25 amp discharge rate: 190 mins; BCI Group Size: 30H; Terminal Type: dual terminal

SOLAR CHARGE CONTROL BOX ASSEMBLY shall be model SOLARCHG as assembled by Weathermatic Sprinkler Division of Telsco Industries, or approved equal. SOLARCHG shall consist of a digital meter, voltage inverter, and fuse box.

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www.weathermatic.com

Technical Specifications
SMARTLINE SOLAR48TW

OPERATION: The SOLARCHG digital meter shall be a universal, four digit display with custom icons that is compatible with several Morningstar controllers and inverters. The digital meter shall display voltage, current, temperature, logged data, settings, alarms and error reporting. The digital meter shall display this data as present, cumulative and maximums/minimums measurements. The digital meter shall also display battery level and operating state. The digital meter's icons and units indicators shall be displayed to indicate whether the numerical information relates to solar, load, battery 1 or 2, options, errors or self-test. The digital meter shall have three soft buttons to allow for navigation of the meter menus. The unit shall also have custom icons and back lighting. The digital meter shall be designed for low self-consumption to avoid draining the system batteries. Self-consumption shall be 6 mA with
backlight off and 15 mA with backlight on. The temperature may be displayed in either °C or °F, the backlight timer may be adjusted for desired running time and the amp-hours and minimum/maximum values may be reset.

The SOLARCHG voltage inverter shall be a pure sine wave inverter designed specifically for electrification requiring AC power using solar. The pure sine wave design shall provide an AC equivalent to grid power. The unit shall utilize a toroidal transformer design to generate a stable wave form throughout the range of input voltages. The voltage inverter shall handle a 200% surge during load start-up to a maximum of 600 watts. Self-consumption shall be 450mA while powering loads and automatically powers down to stand-by mode during no load conditions. The unit shall have electronic protections that will automatically protect against faults and user mistakes such as short circuit, overload, high temperature and low voltage disconnect. Recovery from most faults shall be automatic.

SOLAR PANELS shall be model SOLARPAN-50 as assembled by Weathermatic Sprinkler Division of Telsco Industries, or approved equal.

CONSTRUCTION: SOLARPAN-50 shall be high quality industrial solar modules that have a low iron High-transmission 3.2mm tempered glass front that is impact resistant. The panel frames shall be constructed from clear anodized extruded aluminum. The units shall have pre-drilled holes for easy mounting to mounting frame. Each panel shall have TPT/TPE Tedlar backsheet. The solar cells shall be encapsulated in EVA and bonded to the Tedlar backsheet. Each panel unit shall consist of 36 solar cells that are connected in series. A weather proof junction box shall be mounted to each panel to allow for connection with a waterproof strain relief connectors and conduits or weather resistant output cables.

STAINLESS STEEL PEDESTAL ENCLOSURE shall be model SLPED-ENC as manufactured by Weathermatic Sprinkler Division of Telsco Industries

CONSTRUCTION: Pedestal enclosure shall be fabricated from 16-gauge stainless steel with a brushed finish. The enclosure shall be NEMA type 3R rated weather-resistant with filtered side louvers for cross-ventilation. A removable stainless steel door shall be mounted to the front of the enclosure and include a cam style key-lock to restrict access to the enclosure. Enclosure shall measure 19 ¾" wide x 24" high x 15" deep.

The cabinet shall be fabricated from 16-gauge stainless steel with a brushed finish. The cabinet shall be NEMA type 3R rated weather-resistant. A removable stainless steel door shall be mounted to the front of the cabinet and include a cam style key-lock to restrict access to the cabinet. The cabinet shall measure 19 ½" wide x 19 ½" high x 9" deep.

WARRANTY:
SLSOLAR48TW –

- 3-Years – When used with Weathermatic SLWIRE decoder wire and SLCONN connectors
- 1-Year – When used without Weathermatic SLWIRE decoder wire and SLCONN connectors

3301 W. Kingsley Road
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888-484-3776 Fax: 972-271-5710
www.weathermatic.com

Technical Specifications
SL1600 SERIES CONTROLLER

FEATURES

- 4-zone base model, expandable to 16 zones using slide in SLM4 (Indoor/Outdoor rated)
- 4-zone hot-swappable modules
- Internal transformer with commercial terminal block, On/Off power switch and LED status indicator
- Large backlit LCD display
- 2 run modes: Standard mode runs user input zone run times; Auto Adjust mode requires SLW Series On-Site Weather Station to calculate weather based run times
- Rain/Freeze sensor bypass/active button displays sensor status with tricolor LEDs (red indicates sensor is prohibiting irrigation; orange indicates an extended rain delay; green indicates normal operation)
- 4 programs: A, B, C, D Programs can operate stacked or concurrently
- 8 start times per program
- Nonvolatile memory and real time clock/calendar to retain programs and current date and time – no battery required
- Zone run times from 1 min. to 9 hrs. 55 min. with operation countdown displayed in hours, minutes, and seconds
- Watering day selections of custom days of the week, odd/even, or interval days (1 – 30 days)
- Omit settings: omit time of day window, omit day(s) of week, and omit up to 7 calendar dates
- Monthly % adjust by program, for simple year-round water budgeting

ADVANCED FEATURES

- Fault review displays all faults, including open and shorted zones
- On-board multi-meter displays transformer voltage; milliamp measurement for each zone
- Built-in valve locator chatters the solenoids (patent pending)
- Review menu displays ET deficits by zone and corresponding zone run times
- Review menu displays maximum run time and minimum soak times
- Review menu displays temperature readings (daily high/ low) for previous 5 days
- Review menu accumulates total run times by zone
- Programmable rain delay of 1 – 7 days
- SLW Weather Station extended rain delay programmable from 0 – 99 hours
- Run/Soak cycles allow setting of maximum run time and minimum soak time by program for use in Standard mode only
- Zone-to-zone delay programmable for 1 min. – 3 hrs.
- Master valve timing sequence with zone valve programmable by “On Delay” (1 sec. – 1 min.; 2 sec. default) and “Off Delay” (1 sec. – 3 min.; 5 sec. default)
- Master valve/pump start operation assignable On/Off by zone
- Clear program function to selectively delete an individual program
- Backtrack Stored Program™ feature allows contractor to easily store a default program and retrieve the saved program

SmartLine Controller	
Model	**Description**
SL1600	16 Zone Modular Controller
SL1620	20 Fixed Zone Controller
SL1624	24 Fixed Zone Controller

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Technical Specifications
SL1600 SERIES CONTROLLER

CONTROLLER(S) shall be model SL1600, SL1620, or SL1624 as manufactured by Weathermatic Sprinkler Division of Telsco Industries. Controller(s) shall be a four (4) program controller with hot swappable 4-zone modules to allow expansion to 16 zones (SL1600) or fixed zone counts or 20 (SL1620) or 24 (SL1624).

OPERATION: Controller(s) may be programmed to operate with either user supplied station run times or automatically calculated station run times based on SLW weather station data, sprinkler type, plant type, soil type and slope. Automatic water conservation shall be available using either twelve programmable monthly seasonal percentage adjustments or automatic ET based adjustments based on SLW series weather station real-time, on-site climate data. The user may select to move between timed station mode or ET mode without loss of programming information. Each program shall have eight independent start times, calendar schedules, watering budgets, and cycles for varying sprinkler types and soil percolation rates. Controller shall have a user-selectable cycle and soak feature, by program, and fully automatic cycle and soak based on sprinkler precipitation rates, soil type and slope for reduction of run-off. The controller shall be capable of storing a user-created default program which may be retrieved at a later date to replace any overrides or adjustments to scheduled operation. Controller shall have a standard pump start or master valve output which shall be programmable to operate on demand from any selected controller station. A programmable pump start/master valve delay shall be included in the pump circuit.

Controller shall have input for rain and freeze sensor devices. Use of the optional SLW weather monitor shall incorporate the rain and freeze shutdown functions and shall incorporate a 48-hour delay after closure of the rain sense switch.

Controller shall have self-diagnostic capabilities to detect “short” or “open” zones and the ability to display lists of faults on an LCD display for the user. Diagnostics shall also include LCD display of volt/amp readings by zone and for transformer output as well as backup battery reading. A chatter function shall also be provided to assist in locating buried valves. The controller shall automatically prevent master valve opening or pump start when the valve locator diagnostic is used.

Display shall be backlit for clear viewing in all lighting conditions. Zone timing shall be settable from 1 minute to 9 hours and 55 minutes.

Program D shall operate concurrently with programs A, B and C. Programs A, B and C shall stack in sequence of start time operation.

Program schedules shall include options for days of the week, odd date, even date or an interval of 1 to 30 days. A ‘no water’ window shall be available to inhibit daily operations of a program between two selected times on a given day; omission of up to 7 specified calendar dates or specific days of the week. Adjustments for leap year shall be automatic.

Manual operation shall be provided by program, by station, or on a programmable test program with durations from ten (10) seconds to ten (10) minutes. The programmable test program shall also check for short and open conditions on each zone each time it is run.

Non-volatile memory shall retain all programming and real-time clock shall be provided to maintain date and time.

WARRANTY: The SL1600 Series controller shall have a manufacturer’s limited warranty of (2) two years.

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888-484-3776 Fax: 972-271-5710
www.weathermatic.com

TECHLINE™ CV

PRESSURE-COMPENSATING, CONTINUOUSLY SELF-CLEANING DRIPPER
CHECK VALVE ANTI-DRAIN (CV)

APPLICATIONS

- Sub-surface and on-surface installation.
- Slopes.
- High wind areas.
- Areas subject to vandalism.
- Planting areas.
- Curved, narrow and unshaped planting areas.
- Turf, shrubs, trees and flowers.
- Rooftop gardens.
- Green walls.
- Sports turf, tennis courts and golf courses.
- High traffic/high liability areas.
- Raised planters.

SPECIFICATIONS

- Broadest choice of dripper flow rates: 1.0, 1.6, 2.3, 3.5 l/h.
- Dripper spacing's: 0.3, 0.4, 0.5, 1.00 m (other dripper spacing available upon request).
- Pressure-compensating range: 1.0-4.0 bar.
- Anti-drain mechanism, shut-off pressure 0.14 bar
- Anti-siphon mechanism.
- Recommended filtration: 130 micro / 120 mesh.
- Coil length: 50, 100, 200, 400 m.

FEATURES AND BENEFITS

PRESSURE COMPENSATING

- Precise and equal amounts of water are delivered over a broad pressure range.
- 100 % uniformity of water and nutrients distribution along the laterals.

CONTINUOUS SELF-FLUSHING DRIPPER DESIGN

- Flushes debris as it is detected, throughout operation, not just at the beginning or end of a cycle, ensuring uninterrupted dripper operation.

0.14 BAR CHECK VALVE IN EACH DRIPPER

- All drippers turn on and off at the same time, maximizing balance of application. System holds back up to 1.4 m of water (elevation change). No low emitter drainage, great on slopes. Delivers more precise watering.

ANTI-SIPHON MECHANISM

- Anti-Siphon mechanism prevents contaminants from being drawn into the dripper.

UNIQUE DRIPPER DESIGN WITH

- Physical root barrier: better protection against root intrusion without reliance on chemicals.
- Largest filter in each dripper.
- Widest water passages within the dripper.
- Unique TurboNet™ flow path.

DRIPPER POSITION WITHIN THE DRIPPERLINE

- The water is drawn in to the dripper from the stream center, preventing the entrance of sediments in to the drippers.

FLEXIBLE TUBING

- Adapts to any planting area shape.

UV RESISTANT

- Withstands heat and direct sun - for on-surface installations.

NETAFIM™
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DRIPPERS TECHNICAL DATA

FLOW RATE* (L/H)	WORKING PRESSURE RANGE (BAR)	WATER PASSAGES DIMENSIONS WIDTH-DEPTH-LENGTH (MM)	FILTRATION AREA (MM^2)	CONSTANT K	EXPONENT * X	RECOMMENDED FILTRATION (MICRON)/(MESH)
1.0	1.0 – 4.0	0.83 × 0.74 × 40	130	1.0	0	130/120
1.6	1.0 – 4.0	1.26 × 0.70 × 40	130	1.6	0	200/80
2.3	1.0 – 4.0	1.26 × 0.95 × 40	130	2.3	0	200/80
3.5	1.0 – 4.0	1.59 × 1.15 × 40	150	3.5	0	200/80

*Within working pressure range

DRIPPERLINE TECHNICAL DATA

MODEL	INSIDE DIAMETER (MM)	WALL THICKNESS (MM)	OUTSIDE DIAMETER (MM)	MAX. WORKING PRESSURE (BAR)	KD
16012	14.20	1.20	16.60	4.0	1.3

DRIPPERLINES PACKAGE DATA

MODEL	COIL LENGTH (METER)	DISTANCE BETWEEN DRIPPERS (METER)	AVERAGE COIL WEIGHT (KG)	COILS IN A 40 FEET CONTAINER (UNITS)	TOTAL IN A 40 FEET CONTAINER (METERS)	COILS IN A 40 FEET CONTAINER (UNITS)	TOTAL IN A 40 FEET CONTAINER (METERS)
16012	50	0.20 to 1.00	2.9	1440	72000	720	36000
	100		5.9	960	96000	480	48000
	200		11.7	480	96000	240	48000
	400		23.5	352	140800	176	70400

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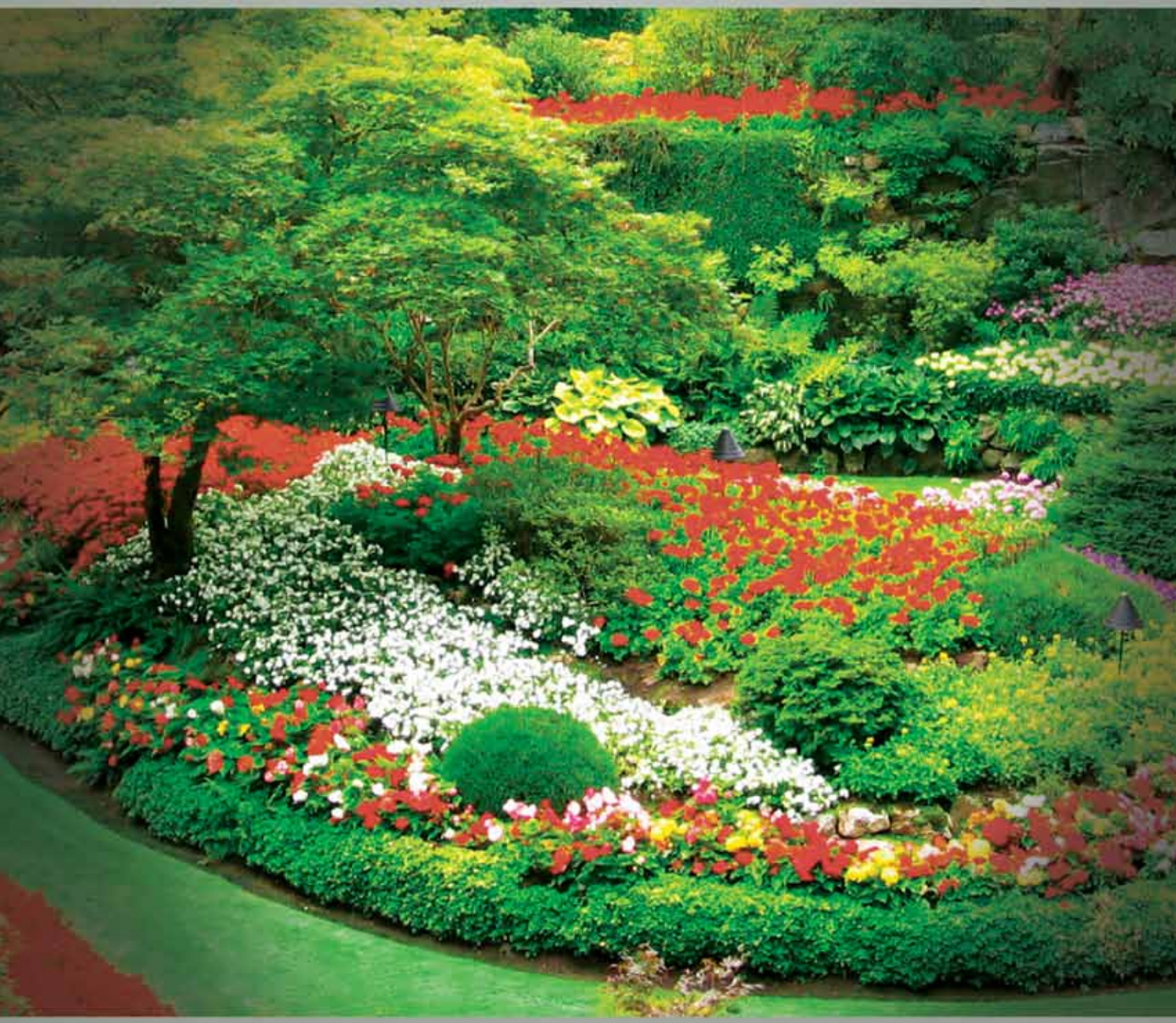
ROTORS MP ROTATOR SPRAYS VALVES CONTROLLERS SENSORS CENTRAL CONTROLS MICRO

Hunter®

DRIP ZONE
control kit

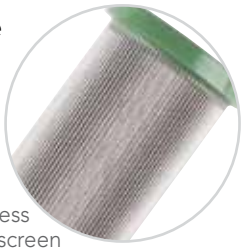


Create Your Vision

Drip Zone Control Kits

For automatic control of a drip zone, Hunter has it covered.

Our pre-assembled, factory water-tested kits marry our popular and dependable high-grade valves with a filter and a pressure regulator, ideal for drip zones. Made for our Professional Landscape Drip Line and Micro Irrigation products, each comes with our brawny solenoid for which Hunter valves are known, as well as a stainless steel screen in 150 mesh (075 and 101 models) and 120 mesh (151 model) sizes.



Stainless steel screen

ACZ-075

EXTRA DURABILITY

- Flow range: 0.5–15 GPM
- Pressure: 20–120 PSI
- Filtration: 150 mesh
- Pressure regulation: 25 PSI, 40 PSI
- Standard flush cap
- ¾" Inlet and outlet

PCZ-101

ADDED TOUGHNESS

- Flow range: 0.5–15 GPM
- Pressure: 20–120 PSI
- Filtration: 150 mesh
- Pressure regulation: 25 PSI, 40 PSI
- Standard flush cap
- 1" Inlet and ¾" outlet

ICZ-101

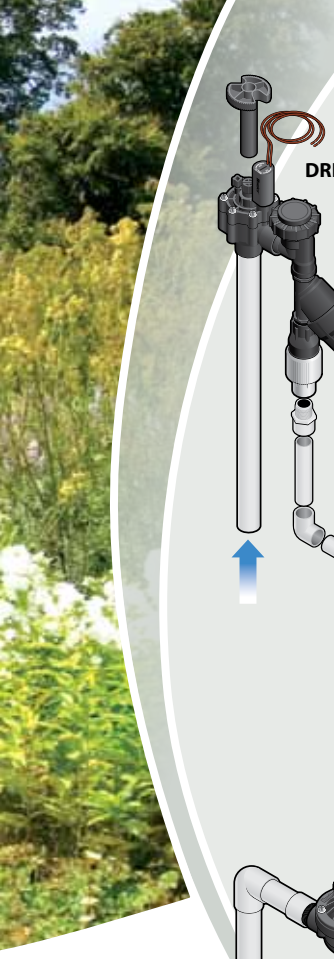
A WINNING COMBINATION

- Flow range: 2–20 GPM
- Pressure: 20–120 PSI
- Filtration: 150 mesh
- Pressure regulation: 25 PSI, 40 PSI
- Filter Sentry™ dirty water valve
- Standard flush cap
- 1" Inlet and outlet

ICZ-151

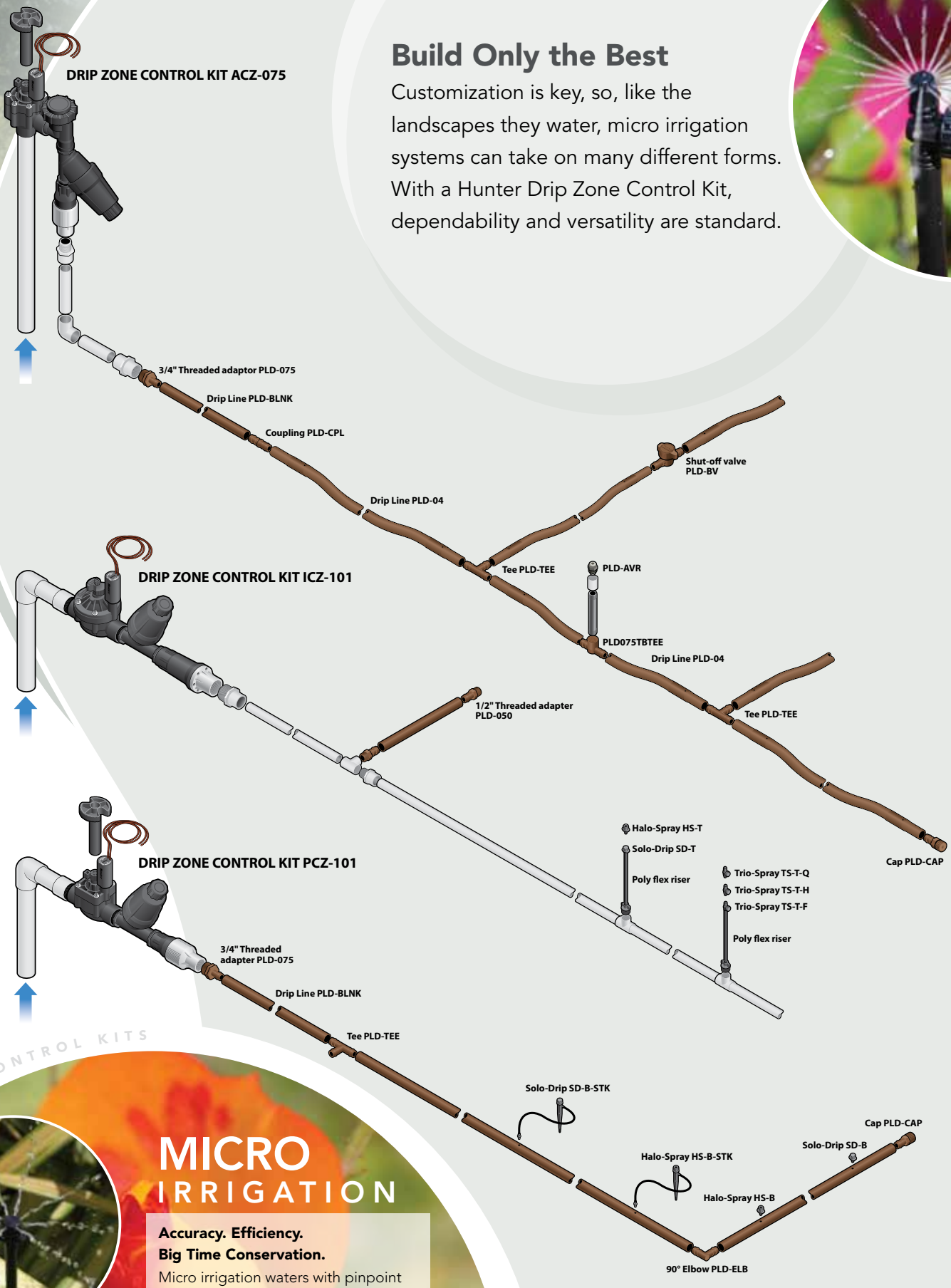
A HARDWORKING PARTNERSHIP

- Flow range: 20–60 GPM
- Pressure: 20–120 PSI
- Filtration: 120 mesh
- Pressure regulation: 40 PSI
- Filter Sentry dirty water valve
- Standard flush cap
- 1½" Inlet and 1" outlet



Build Only the Best

Customization is key, so, like the landscapes they water, micro irrigation systems can take on many different forms. With a Hunter Drip Zone Control Kit, dependability and versatility are standard.



DRIP ZONE CONTROL KITS

MICRO IRRIGATION

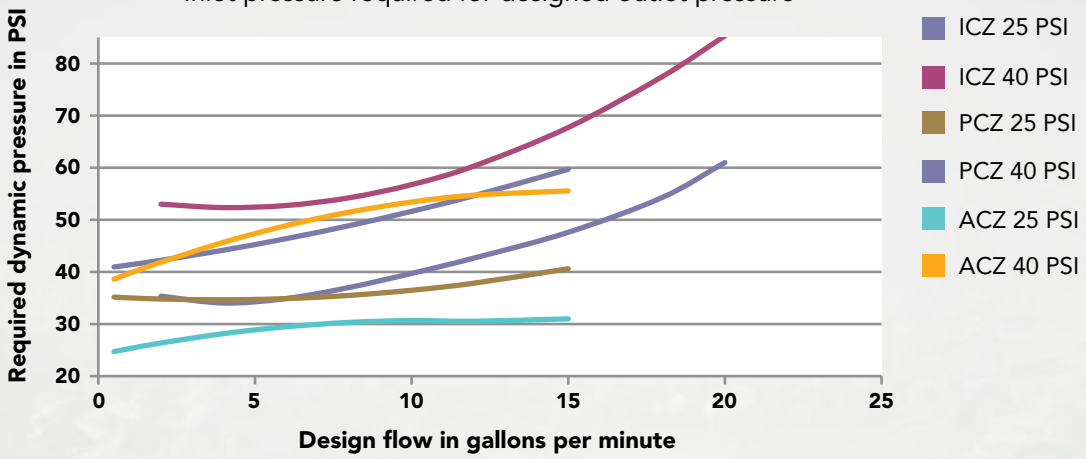
Accuracy. Efficiency. Big Time Conservation.

Micro irrigation waters with pinpoint accuracy. Plain and simple. That means less wasted water and more control. And Hunter Drip Zone Control Kits bring total command to a zone, for maximized efficiency every time.

Charts and Specs

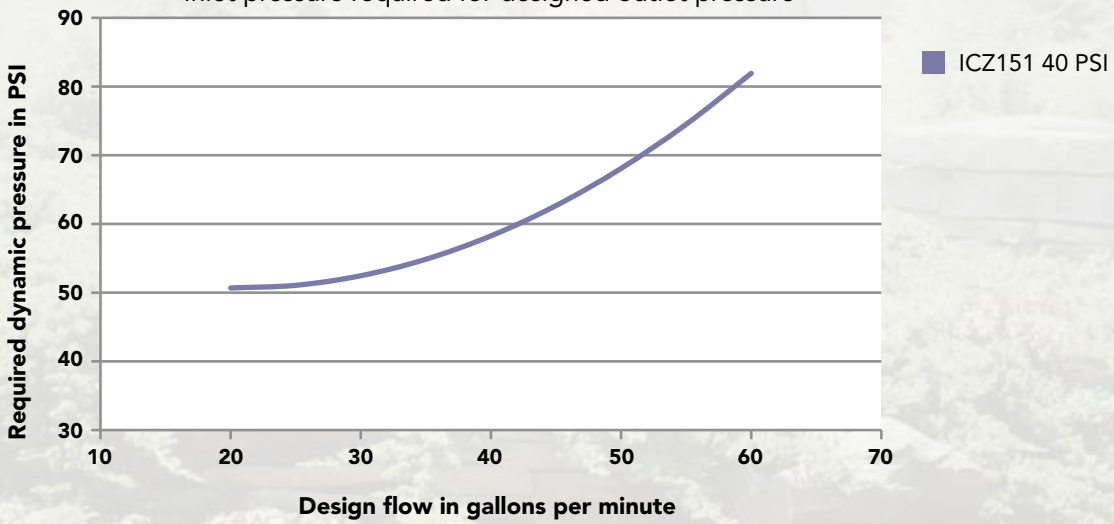
ICZ101, PCZ101, ACZ075

Inlet pressure required for designed outlet pressure



ICZ151

Inlet pressure required for designed outlet pressure



MODELS
ACZ-075 = ¾" PGV-ASV valve with ¾" HY075 filter system
PCZ-101 = 1" PGV globe valve with 1" HY100 filter system
ICZ-101 = 1" ICV globe valve with 1" HY100 filter system
ICZ-151 = 1½" ICV globe valve with 1½" filter system

OPTIONS	
25 =	25 PSI regulator (excluding ICZ-151)
40 =	40 PSI regulator

Quick Reference Chart
GPM per 100'

Emitter (GPH)	12"	18"	24"
0.4	0.67	0.44	0.33
0.6	1.00	0.67	0.50
1.0	1.67	1.11	0.83

EXAMPLES

ACZ-075 - 25	¾" PGV-ASV valve with ¾" HY075 filter system, and 25 PSI regulator
PCZ-101 - 25	1" PGV globe valve with 1" HY100 filter system, and 25 PSI regulator
ICZ-101 - 40	1" ICV globe valve with 1" HY100 filter system, and 40 PSI regulator

Hunter® THE IRRIGATION INNOVATORS

Hunter Industries Incorporated
1940 Diamond Street, San Marcos, California 92078
www.hunterindustries.com

1" PGV & PGV JAR TOP

Size: **1"**
Flow: **0.2 to 40 GPM**

FEATURES

- External and internal manual bleed allows quick and easy "at the valve" activation
- Double-beaded diaphragm seal design assures leak-free performance
- Durable glass-filled nylon threaded bonnet ring allows easy access without tools (Jar Top)
- Optional: DC latching solenoids enable Hunter's battery-powered controllers
- Captive bonnet bolts provide hassle-free valve maintenance
- Low flow capability allows use of Hunter's micro irrigation products
- Encapsulated 24 VAC solenoid with captive plunger for hassle-free service
- Temperature rating: 150° F
- Warranty period: 2 years
- ▸ Flow control
- ▸ Accu-Sync® pressure regulation
- ▸ Optional reclaimed water ID handle

OPERATING SPECIFICATIONS

- Flow:
  - PGV-100: 0.2 to 40 GPM
  - PGV-101: 0.2 to 40 GPM
- Recommended pressure range: 20 to 150 PSI

SOLENOID SPECIFICATIONS

- 24 VAC solenoid
  - 350 mA inrush, 190 mA holding, 60 Hz
  - 370 mA inrush, 210 mA holding, 50 Hz

FACTORY INSTALLED OPTIONS

- Valve without solenoid
- DC latching solenoid

USER INSTALLED OPTIONS

- Solenoid conduit cover (P/N 464322)
- DC latching solenoid (P/N 458200)
- Accu-Sync pressure regulator*
- Reclaimed water ID handle for PGV-101 models (P/N 269205)

▸ = *Advanced Feature descriptions on page 71*

* Accu-Sync product information on page 79

PGV-100G
Inlet Diameter: 1"
Height: 5"
Length: 4½"
Width: 2½"

PGV-101G
Inlet Diameter: 1"
Height: 5"
Length: 4½"
Width: 2½"

PGV-100JTG
Inlet Diameter: 1"
Height: 5½"
Length: 4½"
Width: 3¼"

PGV-101JTG
Inlet Diameter: 1"
Height: 5½"
Length: 4½"
Width: 3¼"

PGV Jar Top

PGV 1" – SPECIFICATION BUILDER: ORDER 1 + 2 + 3 + 4

1 Model	2 Inlet/Outlet	3 Options (Factory Installed)	4 Options (User Installed)
PGV-100G = 1" Globe valve, without flow control **PGV-101G** = 1" Globe valve, with flow control **PGV-100A** = 1" Angle valve, without flow control **PGV-101A** = 1" Angle valve, with flow control	**(blank)** = NPT threads **S** = Slip x Slip *(only available in 100G and 101G models)*	**(blank)** = No Option **DC** = DC latching solenoid **LS** = Valve without solenoid	**(blank)** = No option **R** = Reclaimed water ID handle *(Except for PGV-100)* **CC** = Solenoid conduit cover **DC** = DC latching solenoid **AS-ADJ** = Accu-Sync® adjustable pressure regulator **AS-xx*** = Accu-Sync pressure regulator **20 *** = *20 PSI*, **30 *** = *30 PSI*, **40 *** = *40 PSI* **50 *** = *50 PSI*, **70 *** = *70 PSI*
PGV-100 = 1" Globe valve, without flow control **PGV-101** = 1" Globe valve, with flow control	**MM** = Male x male (NPT) **MB** = Male NPT x 1" Barb **MB125** = Male NPT x 1¼" Barb		

Example:
PGV-101G - S - DC = 1" Globe valve, with flow control, slip x slip, and DC latching solenoid

PGV JAR TOP – SPECIFICATION BUILDER: ORDER 1 + 2 + 3 + 4

1 Model	2 Inlet/Outlet	3 Options (Factory Installed)	4 Options (User Installed)
PGV-100JT = 1" Globe jar top valve, without flow control **PGV-101JT** = 1" Globe jar top valve, with flow control	**G** = Female NPT **GS** = Slip x Slip **MM** = Male x male (NPT) **MB** = Male NPT x 1" Barb **MB075** = Male NPT x ¾" Barb **MB125** = Male NPT x 1¼" Barb	**(blank)** = No option **LS** = Valve without solenoid **DC** = DC latching solenoid	**(blank)** = No option **R** = Reclaimed water ID handle *(Except for PGV-100JT)* **CC** = Solenoid conduit cover **DC** = DC latching solenoid **AS-ADJ** = Accu-Sync adjustable pressure regulator **AS-xx*** = Accu-Sync pressure regulator **20 *** = *20 PSI*, **30 *** = *30 PSI*, **40 *** = *40 PSI*, **50 *** = *50 PSI* **70 *** = *70 PSI*

Examples:
PGV-101JT - G = 1" Globe jar top valve, with flow control, and 1" female
PGV-101JT - GS - R = 1" Globe jar top valve, with flow control, slip x slip, and reclaimed water ID handle
PGV-101JT - G - R = 1" Globe jar top valve, with flow control, 1" female, and reclaimed water ID handle
PGV-100JT - MB075 - DC = 1" Globe jar top valve, without flow control, with 1" male x ¾" barb, and DC latching solenoid

PGV PRESSURE LOSS IN PSI

Flow GPM	1" Globe
1	1.1
5	1.6
10	1.9
15	2.3
20	3.3
30	9.0
35	16
40	20

PGV-100-G Installed

PRO-SPRAY®

Models: **Shrub, 2", 3", 4", 6", 12"**
Inlet: **½"**

FEATURES

- Models: Shrub, 2", 3", 4", 6", 12"
- Compatible with all female threaded nozzles
- Side inlet (SI) version available in 6" and 12"
- Innovative directional flush plug design
- Warranty period: 5 years
- Co-molded wiper seal
- Heavy-duty spring
- Industry's strongest spray body
- Innovative seal design
- Pro-Spray check valve

OPERATING SPECIFICATIONS

- Operational pressure range: 15 to 100 PSI

FACTORY INSTALLED OPTIONS

- Drain check valve (up to 10' of elevation)
- Check valve available on 4", 6", 12"
- Reclaimed water ID cap

USER INSTALLED OPTIONS

- Drain check valve (up to 10' of elevation; P/N 437400)
- Reclaimed water ID cap (P/N 458520)
- Snap-on reclaimed cover (P/N PROSRCCAP)

▸ = *Advanced Feature descriptions on page 50*

Pro-Spray Reclaimed
Pro-Spray models include optional factory-installed purple reclaimed caps

PROS-00
Retracted height: 1½"
Inlet size: ½"

PROS-02
Retracted height: 4"
Pop-up height: 2"
Exposed diameter: 2¼"
Inlet size: ½"

PROS-03
Retracted height: 5"
Pop-up height: 3"
Exposed diameter: 2¼"
Inlet size: ½"
Shut-Off

PROS-04
Retracted height: 5⅞"
Pop-up height: 4"
Exposed diameter: 2¼"
Inlet size: ½"
Shut-Off

[A] **PROS-06-SI**
[B] **PROS-06**
Retracted height: 8¾"
Pop-up height: 6"
Exposed diameter: 2¼"
Inlet size: ½"

[A] **PROS-12-SI**
[B] **PROS-12**
Retracted height: 16⅛"
Pop-up height: 12"
Exposed diameter: 2¼"
Inlet size: ½"

PRO-SPRAY® – SPECIFICATION BUILDER: ORDER 1 + 2

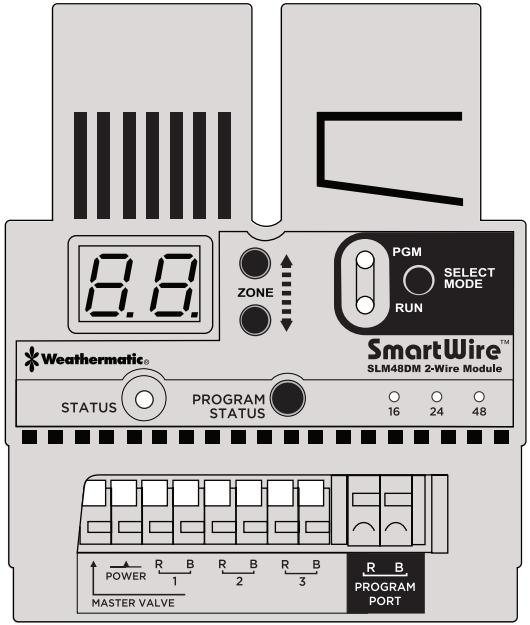
1 Models	2 Options
PROS-00 = Shrub Adapter	**(blank)** = No option
PROS-02 = 2" Pop-up	**CV** = Factory-installed drain check valve *(Pop-up models only, 6" and 12" models ordered as CV will come as no side inlet)*
PROS-03 = 3" Pop-up	**CV-R** = Factory-installed reclaimed body cap *(Shrub molded in purple)*
PROS-04 = 4" Pop-up	
PROS-06-SI = 6" Pop-up with side inlet	
PROS-06 = 6" Pop-up (no side inlet)	
PROS-12-SI = 12" Pop-up with side inlet	
PROS-12 = 12" Pop-up (no side inlet)	

Examples:
PROS-04 = 4" pop-up
PROS-06 - CV = 6" pop-up, drain check valve
PROS-12 - CV-R = 12" pop-up, drain check valve, reclaimed body cap

SmartWire

2-Wire Decoder System

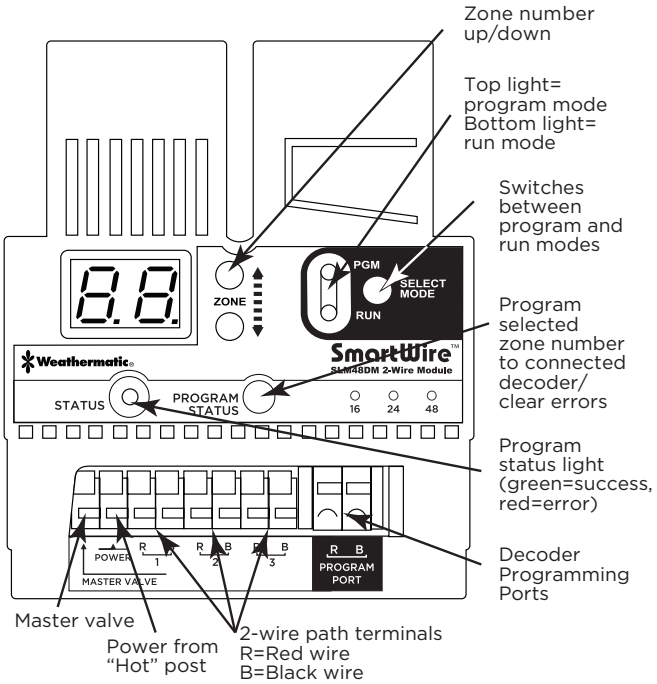
Owner's Manual



Weathermatic
Water Conserving Innovation

1.1 System Components

SLM48DM	48-zone 2-wire decoder module
SLDEC1	Single-zone decoder
SLDEC2	Two-zone decoder
SLDEC4	Four-zone decoder
SLGDT	Lightning arrestor for surge protection
SLCAM	Clamp-on Amp Meter
SLCONN	Specialty Wire Connector
SLWIRE	2-conductor, jacketed UL/UF approved for direct burial



1.2 How it Works

A decoder is installed at each valve box to activate the valves. Each decoder has a unique address which identifies it to the Weathermatic SLM48DM 2-wire programming module installed in any SL1600 SmartLine® controller. The SLM48DM 2-wire decoder module broadcasts a command to activate on a certain address. All the decoders on the 2-wire system "decode" the message but only the appropriate decoder responds and turns the attached valve on or off. The decoder responds back to the decoder module with a status message.

The advantages of a SmartWire™ system include cost savings from reduction in copper wire usage and corresponding trenching, simplicity of wiring and troubleshooting and ease of expansion when additional zones are needed. Weathermatic SmartWire™ 2-Wire allows for connection of up to 3 separate 2-wire paths to simplify installation on larger projects. SmartWire™ is a member of the SmartLine® family of water management products offering automated, on-site water management.

1.3 Installing the SLM48DM 2-Wire Decoder Module

The SLM48DM 2-Wire Decoder Module permits use of any SL1600 controller for 2-wire installation. The SL1600 will display 48 programmable zones when the SLM48DM is installed. You cannot exceed a total of 48 zones.

Step 1: Turn off the power to the SmartLine® Controller.

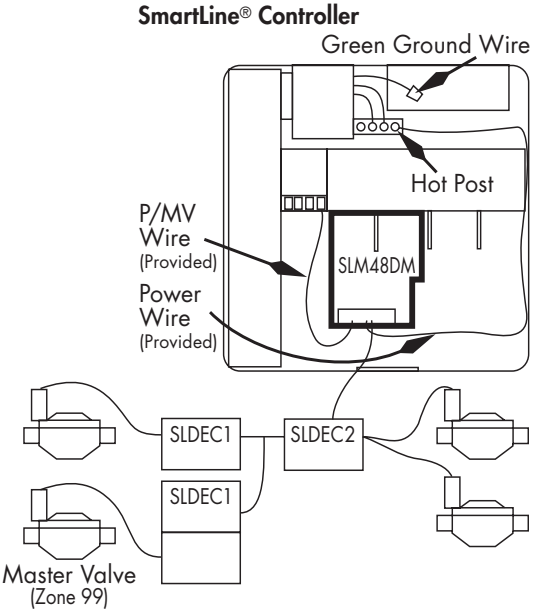
Step 2: Remove any previously installed zone modules and insert the SLM48DM into the far left side module slots in your controller.

Step 3: Disconnect the transformer's green grounding wire from the terminal strip and cover exposed wire with a wire nut. This step is REQUIRED for SmartWire lightning protection to work properly.

Step 4: Connect the provided power wire from the Power terminal on the SLM48DM to the controller Hot Post.

Step 5 (optional): If you are using a master valve or pump start relay, and it is more convenient to wire to these devices at a location not near the controller, you can connect a wire (provided) from the master valve terminal on the SLM48DM to the P/MV terminal on the SL1600 controller as shown in the illustration. If you choose this method of wiring, you will need to program a decoder as Zone 99 for use with the pump start relay or master valve. If it is convenient to wire the devices directly to the P/MV terminal on the controller, no wire link is needed between the P/MV terminal and SLM48DM.

Step 6: Re-connect power to the controller. You are ready to program your decoders. The SLM48DM will perform a "power-up self test" at initial power-up. The power-up self test will confirm the integrity of the processor and will test the display and all LEDs to make sure they are working. A successful test will terminate with two dashes "– –" in the display.

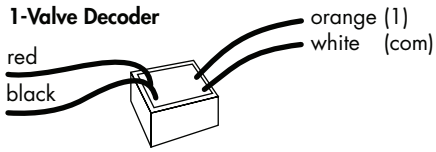


1.4 Programming the Decoders

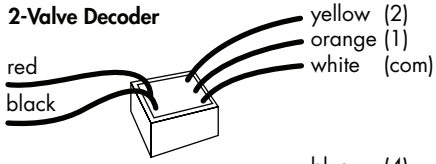
Step 1: Map out your valve and decoder locations. See Section 1.5.

Step 2: Program all your decoders at the SmartLine® controller. You will need to mark each decoder with a pen (included) to record the zone number assigned to each valve. Note the adjacent chart of valve wire colors for each decoder:

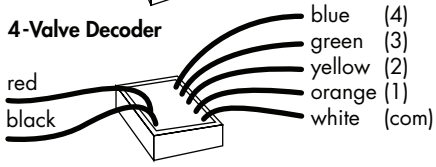
- Each decoder will have RED and BLACK wires. These are the wires that will connect to the 2-wire path. The RED and BLACK are also the wires that you will insert in the Programming Ports on the SLM48DM to program the decoder.
- The wires on the other end of each decoder are for connection to your valves.
- 1-Valve Decoder: WHITE wire for the common and ORANGE wire for valve one.



- 2-Valve Decoder: Common is WHITE; ORANGE is valve one and YELLOW is valve two.



- 4-Valve Decoder: Common is WHITE; ORANGE is valve one; YELLOW is valve two; GREEN is valve three and BLUE is valve four.



1.4 Programming the Decoders

Decoder Programming Steps:

- Use the SLM48DM mode button to select the PGM programming position.
- Insert the RED and BLACK wires on the decoder in the Programming Ports on the SLM48DM (RED to RED, BLACK to BLACK).
- Use up/down arrow buttons to select the zone number to be programmed.
- Push Program Zone button to select the zone showing in the display window. Note: When you are programming a multi-valve decoder, the display will only show the zone number for the first zone to be assigned to that decoder. The remaining zones in the decoder are automatically assigned in sequential numerical order.
- A GREEN status light will confirm your selection.
- If programming is not successful, a RED status light will flash and an error code will be shown on the display. See Troubleshooting for description of error codes.
- Mark the zone number programmed on the decoder. Note: If you are using a multi-valve decoder, the decoder will record the zone selected in the order previously noted for wire colors. For example, if you are using the 4-valve decoder, the first zone programmed will be Orange, the second Yellow and so on. Mark the zone number on the decoder for reference during field installation. You should also mark all zone numbers on your valve layout plan for reference during installation of the decoders.
- After the decoders are connected to the valves, use the Mode button on the SLM48DM to place the decoder programmer in the Run position. The Green status light will confirm that the system is ready for operation. If the light is Red, refer to the Troubleshooting guide.
- If you are using a master valve on your system, be sure to program it as zone 99 in the SLM48DM using a 1-valve decoder.

SLM48DM RUN Mode

- The program status LED will be GREEN.
- After a program is complete, the SLM48DM display will show any malfunctioning zones. If more than one zone is malfunctioning, each zone along with the corresponding error code will be displayed sequentially in a repeating loop. The Program Zone button will clear each error code as it is displayed. See Troubleshooting for fault code descriptions.

Programming Zones on your SmartLine® Controller

After the 2-wire installation and decoder programming is complete, you can use the SmartLine® controller to establish the watering schedule for all zones. The normal SL1600 programming convention applies to the SmartWire™ system.

1.5 Planning Your 2-Wire Layout

The SmartWire™ SLM48DM 2-Wire Decoder Module allows you to have several options in cable routing to determine the most efficient 2-wire layout for your project. You can connect as many as three 2-wire runs. Maximum decoder to valve distance is 100 feet (30.5m).

Each 2-wire run can be laid out in Straight Run, Complete Loop, Star, or Combination configurations as shown to the right.

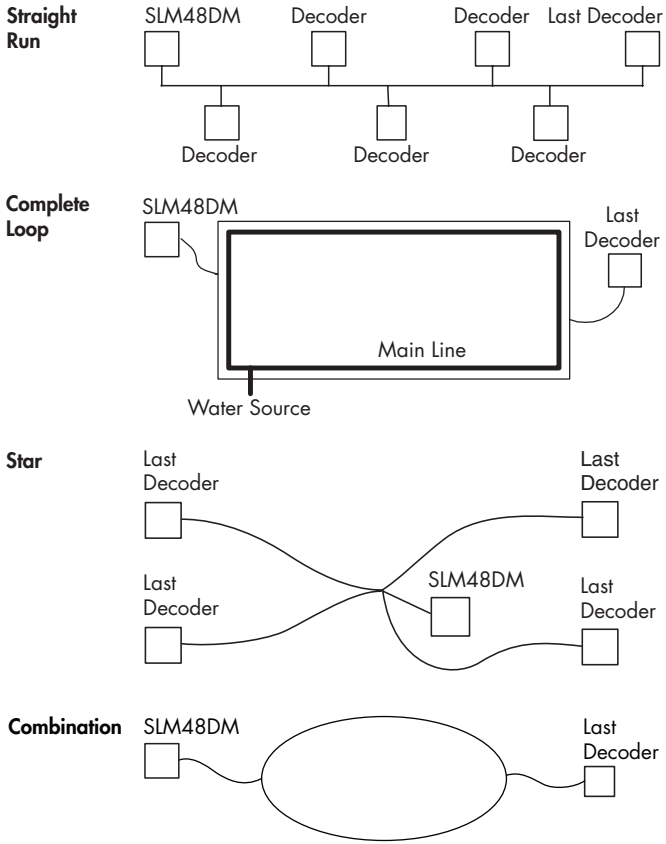
It is suggested that a continuous loop be laid out around the site. This usually follows the main water lines. The loop will start at the SmartLine® controller and continue around the site and then return to the controller. This provides the best communication and power path for the system. The loop provides a redundant path for the power and signal allowing the system to continue operation if the loop is cut.

Branches can come off the main loop and they do not need to be looped back to the main trunk line. These branches can be other loops, stars or single dead-end lines. The system will work with most wiring configurations if the wire length requirements are met. (Note: Keep BLACK to BLACK and RED to RED when wiring the communication wire.)

Attaching Components

- Twist wires together and secure with the SLCONN metal block wire connector.
- Encapsulate the metal block inside the 3M DBR type, grease filled waterproof connector. Use of a connector is required for all connections between the 2-wire path and the decoders.
- Use the appropriate connector for the wire size being used.
- Adhere to all local and national building and electrical codes.

Suggested Wire Details



1.5 Planning Your 2-Wire Layout

Wiring Sizes

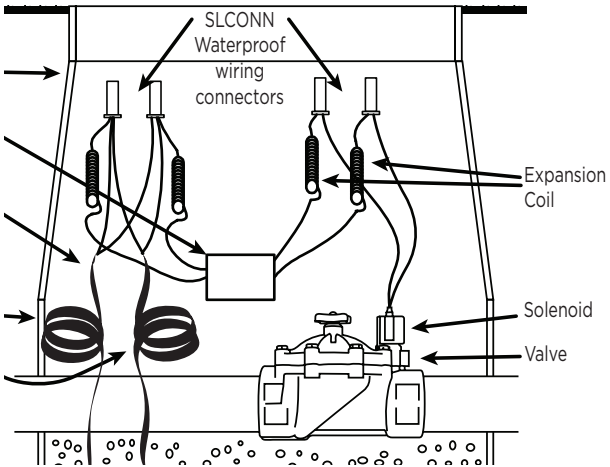
Straight line configuration, i.e. wire distance to the furthest decoder, no loop:

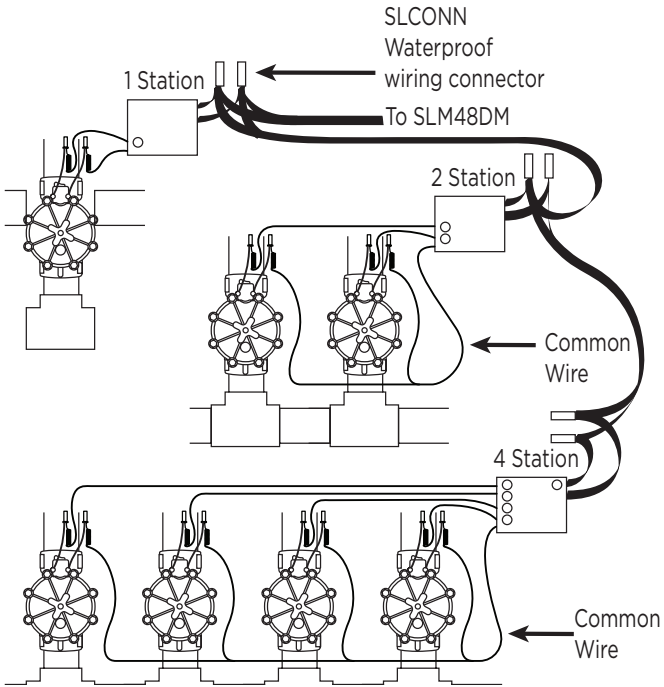
Wire Size (Gauge)	#18	#16	#14	#12
Wire Length (ft)	1,000	2,000	4,000	6,000
Wire Length (m)	305	610	1,210	1,829

Loop configuration, i.e. wire distance to the furthest decoder in the loop:

Wire Size (Gauge)	#18	#16	#14	#12
Wire Length (ft)	2,000	4,000	10,000	10,000
Wire Length (m)	610	1,210	3,048	3,048

Maximum total wire path length is 10,000 ft. (3,048 m).





Weathermatic recommends the use of SLWIRE cable specifically designed for an irrigation control system and complying with the following specifications:

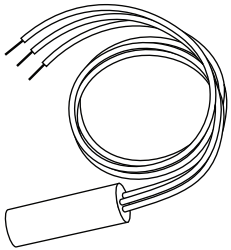
- Conductors must be soft drawn, annealed, solid copper conforming to ASTM 33.
- Conductor insulation must be 4/64-inch thick polyvinyl chloride (PVC) conforming to UL #493.

- The two insulated conductors laid in parallel and encased in a single outer jacket of 3/64-inch thick, high-density, sunlight resistant polyethylene conforming to ICEA S-61-402 and NEMA WC5, having a minimum wall thickness of .045-inch.
- The two conductors must be color-coded: normally one conductor red and the other black. Both conductors shall be the same size.
- The following models meet the above specifications for direct burial cable: Weathermatic SLWIRE12; Weathermatic SLWIRE14.

1.6 Lightning Protection

Weathermatic SLGDT gas discharge tube lightning arrestors must be used on all 2-wire grids. The SLGDT lightning arrestor attaches directly to the 2-wire system and helps dissipate static electricity generated by a nearby lightning strike. While Weathermatic components have lightning arresting features, the SLGDT provides an extra measure of protection.

SLGDT Lightning Arrestor



Features

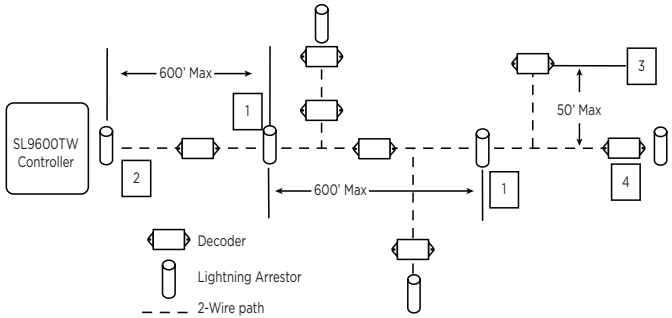
- Protects the 2-wire system from excessive static charges created by a lightning strike.
- Sealed and impervious to moisture, salts, fertilizers and mild chemicals. Can be buried directly in the soil.
- Shock resistant
- Freeze/heat resistant (-20° to 60° C)
- No electrical contact with the soil
- Each Lightning Arrestor protects a 300 foot radius

Electrical Specifications

- Requires no power from the 2-wire system
- Can only be connected to SmartWire™ 2-wire systems

Procedures for Installation

- Connect the RED and BLACK lead wires to the 2-wire system RED and BLACK wires.
- Attach the GREEN ground wire to Earth Ground (Grounding Requirements below)
- Use only DBY or DBR 3M Type waterproof connectors encapsulating a twisted wire connection inside a metal block (SLCONN included).
- For maximum protection, place an SLGDT every 600 feet along the 2-wire system. (Example 1 in graphic above.)



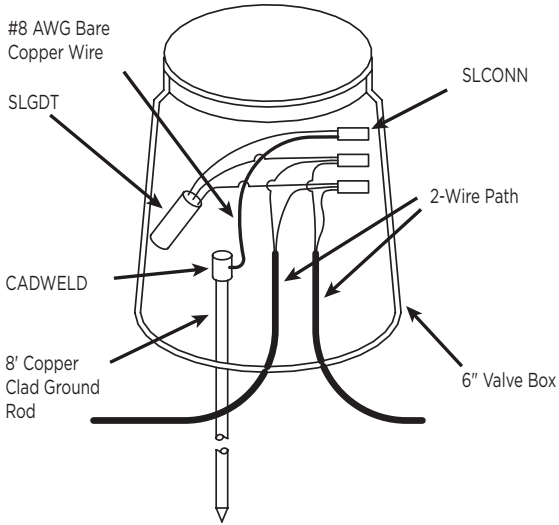
1.6 Lightning Protection

- One SLGDT should be within 25 ft of the host SmartLine® controller. (Example 2 in graphic above.)
- A single stub line must not exceed 50 feet without an SLGDT lightning arrestor. (Example 3 in graphic above.)
- An SLGDT lightning arrestor must also be placed at the end of the 2-wire run that is the maximum distance from the SmartLine® controller, or if looped, at the point of maximum distance from the SmartLine® controller. (Example 4 in graphic above.)

Grounding Requirements

- The GREEN ground wire must be attached to a #8 solid bare copper wire using the included SLCONN wire connector. Connect the bare ground wire to a grounding circuit with 12 Ohms or less resistance to earth ground, measured with a ground resistance meter or Megger.
- A grounding circuit is comprised of 4 major components:
  - o Ground Rod(s) and/or Plate(s).
  - o Ground Conductor.
  - o Exothermic or Cadmium Weld connections.
  - o Soil and/or Ground Enhancement Materials.
- Ground Rods/Plates must be installed in a 6” min. valve box, 6” below grade or below frost line, located within an irrigated zone to maintain soil moisture and maximum ground performance.
- Ground Rods shall be UL listed “copper clad”, 5/8” minimum diameter, 8’ of length, and must meet the requirements of NEC article 250-52(c).

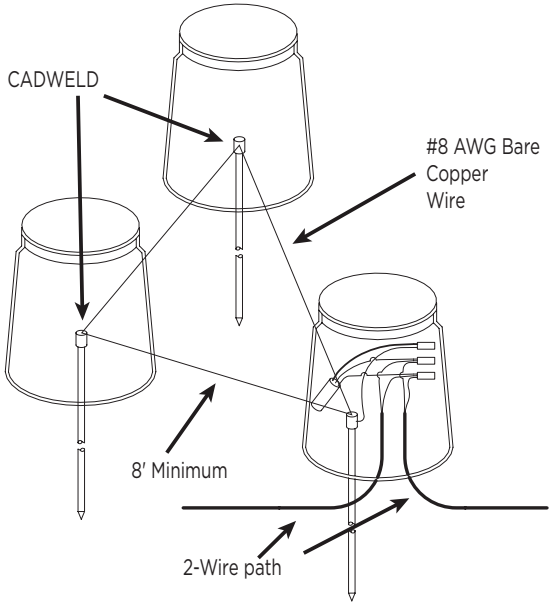
Ground Detail #1: SLGDT with single ground rod



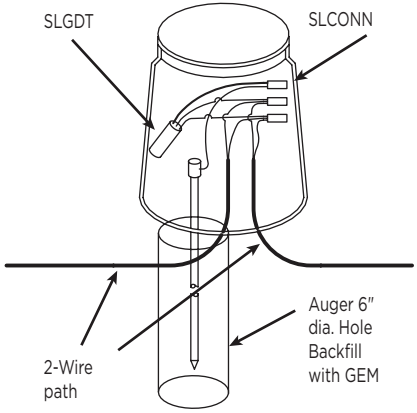
- Ground Plates shall be a copper alloy specifically intended for grounding, with a minimum thickness of 0.060”. Each plate shall expose a minimum of 5 square feet of surface area to contact the soil, and meet the requirements of NEC article 250-52(d).
- Grounding Conductor shall be a solid, bare copper wire or strap used to connect the green ground wire to the ground rod or plate, sized appropriately to achieve specified resistance.

- Exothermic or Cadmium Weld products such as CADWELD One Shot ®, shall be used to connect the #8 AWG bare copper ground conductor to the ground rod or plate.
- Ground Enhancement Materials such as Powerset®, PowerFill®, and GEM® shall be used as required to achieve specified resistance to earth ground.

Ground Detail #2: SLGDT with Triangular Grid



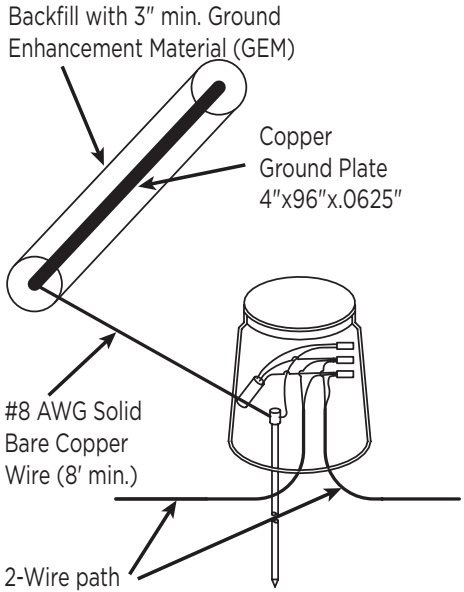
Ground Detail #3: Ground Rod with GEM



- Local soil and site conditions will dictate what extent of grounding measures will be required. Generally there are 3 soil types that each require different methods and equipment to achieve the 12 Ohm minimum resistance to ground:
  - o Clay soils: A single ground rod is typically sufficient, located in an irrigated zone, with CADWELD connections and no soil amendments. Some sites require a 6” diameter hole to be augured and backfilled with Ground Enhancement Materials.
  - o Loam Soils: Typically a 3-ground rod grid is required, located in an irrigated zone, with CADWELD connections, 6” augured holes and Ground Enhancement Material as required.

- Sandy soils: Require the most extensive ground circuits which require combinations of ground rods, plates, CADWELD connections and ground enhancement materials, located in an irrigated zone.

Ground Detail #4: Ground Rod and Plate with GEM



- Any combination of the above recommendations should be considered to achieve 12 Ohms or less. Long-term maintenance of any ground system requires that it be located within an irrigated or wetted zone.
- Refer to www.erico.com for a complete line of grounding equipment and materials.
- Refer to www.asic.org/design_guides.htm for American Society of Irrigation Consultants (ASIC) Guideline 100-2002 For Earth Grounding Electronic Equipment in Irrigation Systems.

1.7 Troubleshooting

The SLM48DM provides special key combinations that can be used to access special features and information that can be helpful during the diagnostic process. These key combinations are as follows:

- Push Up Arrow and Down Arrow simultaneously to view the software version for your SLM48DM.
- Push Select Mode and Up Arrow buttons simultaneously, then release and use Up and Down Arrows to select a zone, then push the Program Zone button to view the software version for that particular decoder.
- Hold down Select Mode button for 5 seconds and release to initiate a quick test of all zones. When using the test mode, zone addresses will be displayed while the zone is operating. If multiple zones are operating, the zone addresses will be displayed rotating every three seconds until the zone is turned off.
- Push Program Zone and Up Arrow simultaneously to view the SLM48DM temperature.

If an over current or over temperature is sensed by the SLM48DM decoder programmer, it will cause a FAULT message to appear on the display of the SmartLine® controller. Open the SmartLine® panel and check the FAULT on the display of the SLM48DM decoder programmer. After the FAULT is repaired, press the Program Zone button on the SLM48DM to clear the error message. Refer to the table below for SLM48DM error messages and corresponding corrective actions.

- Decoder Locating: To use a 521 locator to find a decoder, the decoder should be turned on by the controller and located using the 521 wand (patent pending).
- Valve Locating: Use the SL1600 controller Advanced Functions menu options for the valve locator to find the valve. This feature will create a “chatter” for a selected valve as a convenient method of locating buried valves. Use NEXT and BACK buttons to scroll to the valve you want to “chatter.”

FAULT CODE	DESCRIPTION	CAUSE/ACTION
E1	No decoder found	Cause: wiring error, defective decoder, defective SLM48DM programmer. Action: check wiring, move decoder closer to the SLM48DM, replace.
E2	2-wire over current	Cause: shorted wiring, wire connected to dirt, improper connections, failed decoder (shorted), valve connected directly to 2-wire. Action: troubleshoot wiring problems by undoing the last thing you did when it worked before, and/or by breaking the 2-wire system in half to isolate the problem, then in half again as needed.
E3	Open circuit at solenoid	Cause: the decoder detects no solenoid current when activated: open solenoid, poor connections/wiring between decoder and solenoid, broken decoder. Action: check decoder to solenoid connections, ohm solenoid, replace solenoid, replace decoder.

FAULT CODE	DESCRIPTION	CAUSE/ACTION
E4	Short Circuit at solenoid	Cause: poor quality wiring between SLM48DM and decoder (length, connections, high resistance, 2-wire connected to dirt), failing decoder, failing SLM48DM (gives errors on “all” decoders), multiple decoders with same address. Action: test 2-wire quality (end-to-end resistance, resistance to earth ground, isolate decoder in error (test close to decoder manager), check for duplicate addresses.
E5	Decoder Communication Error	Cause: poor quality wiring between SLM48DM and decoder (length, connections, high resistance, 2-wire connected to dirt), failing decoder, failing SLM48DM (gives errors on “all” decoders), multiple decoders with same address. Action: test 2-wire quality (end-to-end resistance, resistance to earth ground, isolate decoder in error (test close to decoder manager), check for duplicate addresses.
E6	High Temperature Shut Down	Cause: high temperature, excessive 2-wire duty cycle at temperature. Action: shade controller, replace SLM48DM.
E7	Decoder Programming Failure	Cause: multiple decoders at one time, decoder removed before program cycle completes, failed decoder, failing SLM48DM. Action: retry, replace decoder, replace SLM48DM.

1.8 Special System Features

- A unique address is configured in each decoder during the configuration process.
- Valves are actuated by a command from the decoder.
- Diagnostic features—The SLM48DM reports failing solenoids.
- If a solenoid has failed, the decoder senses an open circuit and/or over current condition and shuts down the valve.
- Each decoder will shut down if communication is lost to the SLM48DM decoder module in the SmartLine® controller.
- Valves can be located up to 100 feet from the decoder.
- Decoder electronics are potted in chemical and waterproof compounds for impervious protection from moisture and dirt.

1.9 Electrical Specifications

- Input voltage 24 - 28 VAC over the 2-wire system.
- The Weathermatic SLM48DM can support a total of 48 valves plus a master valve. A maximum of 3 valves including master valve or pump relay can be operated concurrently.
- No electrical contact with soil.
- Shock resistant.
- Freeze/heat resistant (-20° to 60° C).
- All connecting wires are 14 gauge coated PVC and must be installed with industry standard waterproof connectors such as the 3M DBY or DBR.

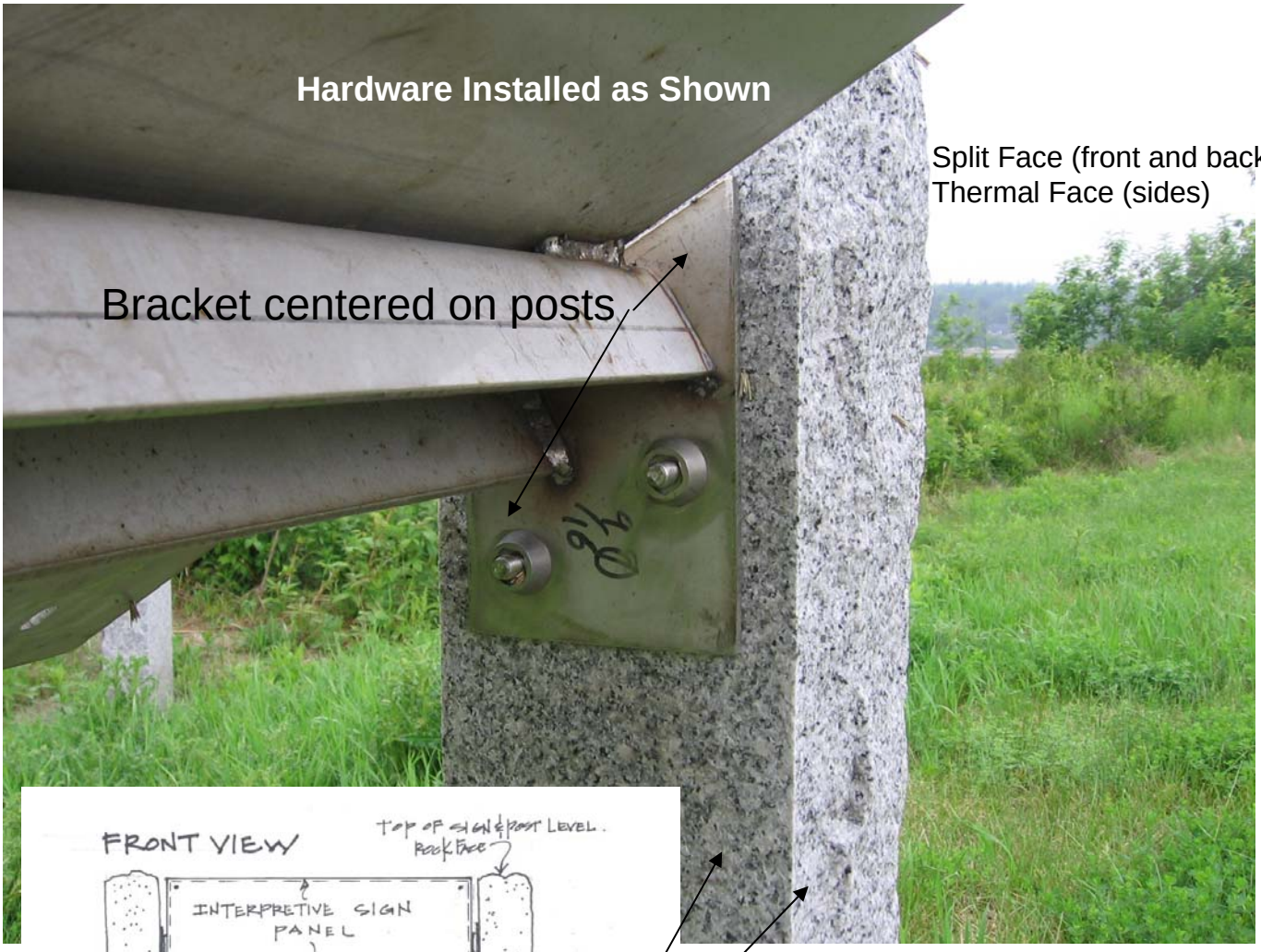
SmartWire

2-Wire Decoder System

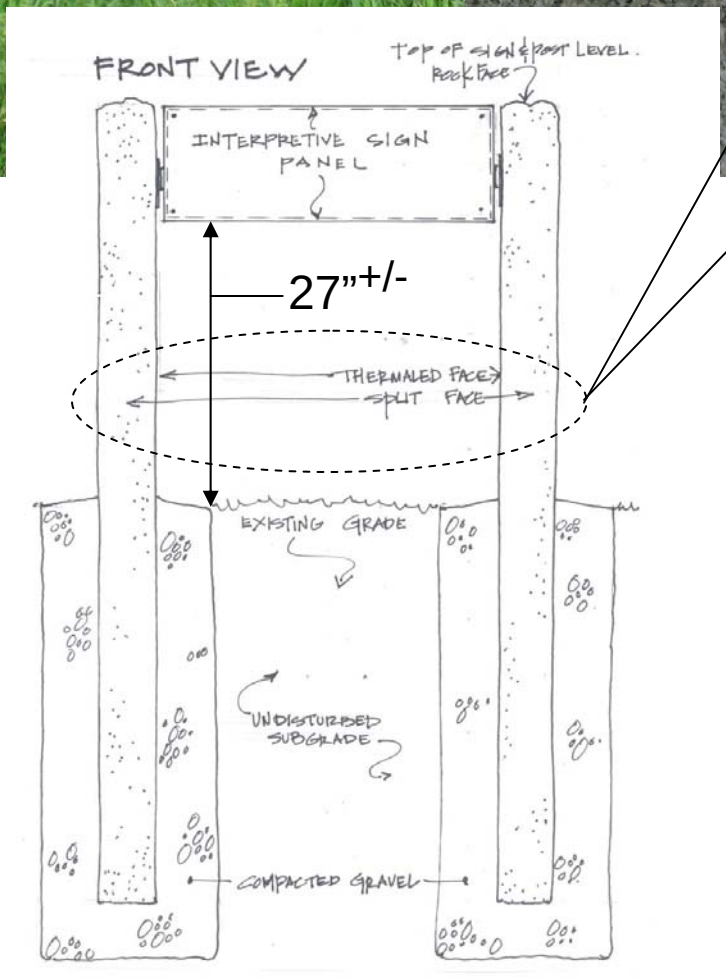
ADSL48DM_revB

Weathermatic®
Water Conserving Innovation

8670.10 Township D Scenic Vista – Interpretive sign installation notes



Split Face (front and back)
Thermal Face (sides)

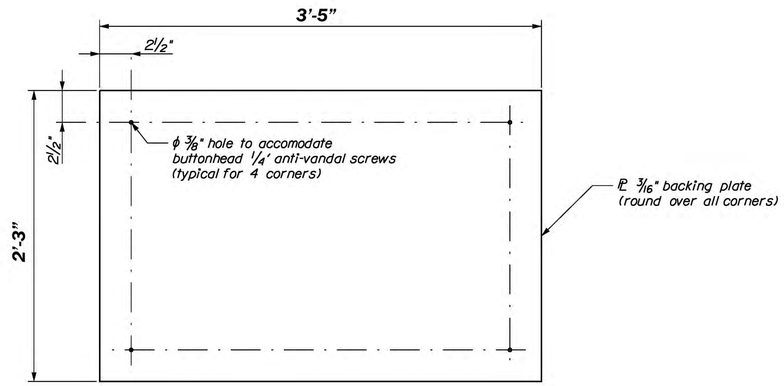


Install Notes:

Make sure posts are set plumb and top ofbracket is level

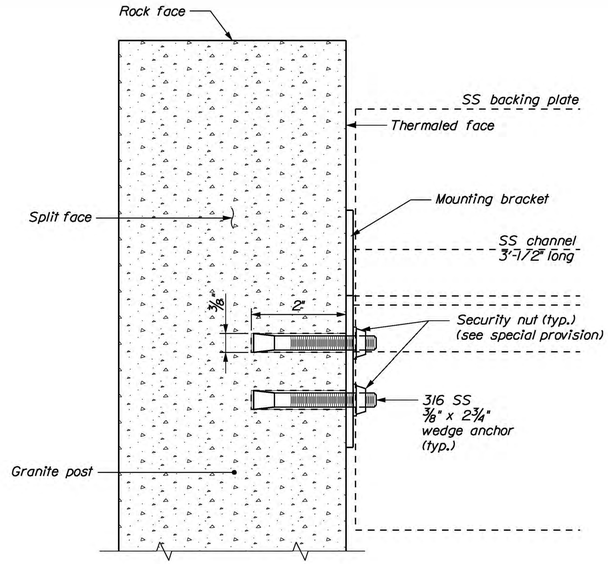
Front post faces and leading edge of bracket set parallel to sidewalk

Lower front edge of bracket set 3"+/- from edge of sidewalk

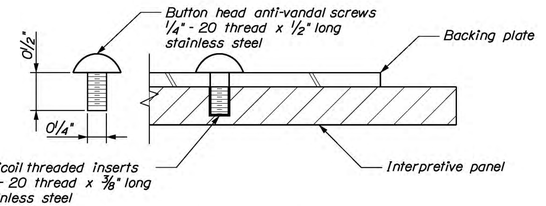


BACKING PLATE

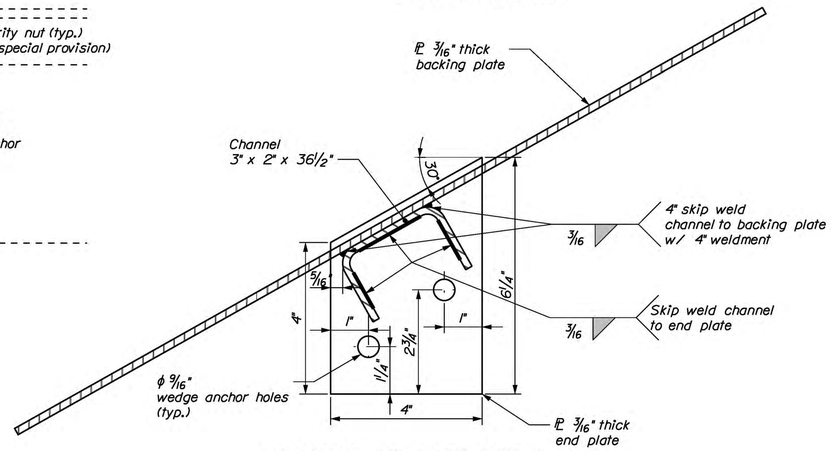
*See special provisions section 645 - Highway Signage for further information.



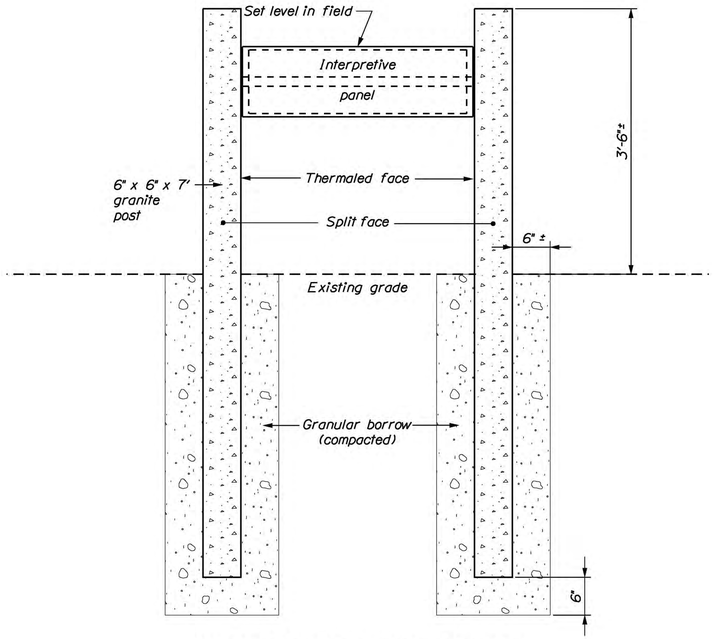
MOUNTING BRACKET ANCHOR DETAIL



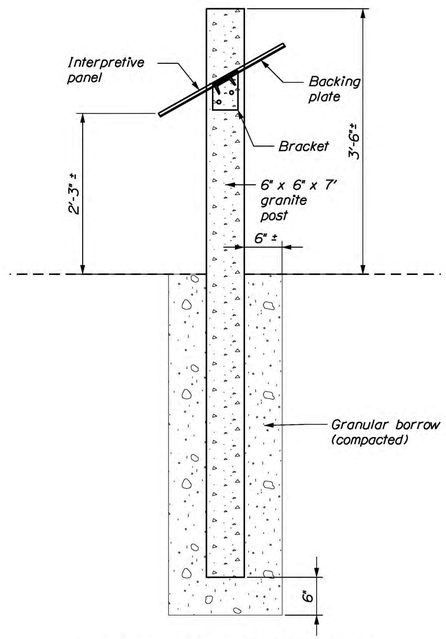
FASTENING DETAIL
installation by others



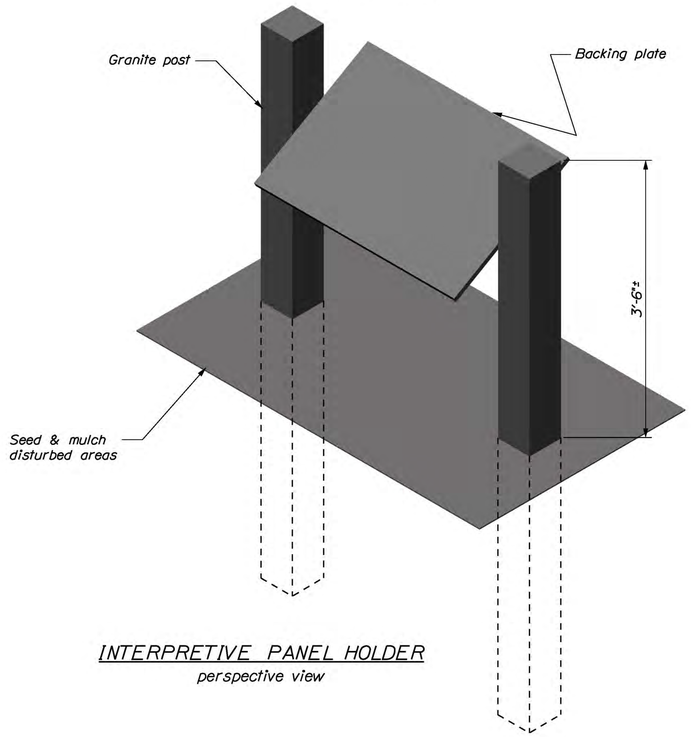
MOUNTING BRACKET DETAIL
All Components to be stainless steel



INTERPRETIVE PANEL HOLDER
front elevation



INTERPRETIVE PANEL HOLDER
side elevation



INTERPRETIVE PANEL HOLDER
perspective view

ALL DETAILS NOT TO SCALE

STATE OF MAINE
DEPARTMENT OF TRANSPORTATION

AC-BH-1267(400)

WIN 12674.00

BRIDGE NO. 2506

BRIDGE PLANS

	BY	DATE
PROJ. MANAGER	N. Benoit	
DESIGN-DETAILED	K. Cooper	Feb. 2013
CHECKED-REVIEWED	-----	-----
DESIGN2-DETAILED2	-----	-----
DESIGN3-DETAILED3	-----	-----
REVISIONS 1	-----	-----
REVISIONS 2	-----	-----
REVISIONS 3	-----	-----
REVISIONS 4	-----	-----
FIELD CHANGES	-----	-----

SIGNATURE

P.E. NUMBER

DATE

MAINE KENNEBEC BRIDGE
KENNEBEC RIVER
RICHMOND, SAGADAHOC CTY. DRESDEN, LINCOLN CTY.

INTERPRETIVE PANELS

SHEET NUMBER

208

OF 238

Filename: ...\208_Interpretive Panels.dgn Division: BRIDGE Username: alan.nadeau Date:8/28/2013