

SECTION 00 91 13

ADDENDUM NO. 1

NOTICE is hereby given that the **Bidding Documents have been modified and replacement pages or sections issued** herewith. Replacement pages have an **Issue Date of December 2, 2013**, contain reference to “**Addendum 1**” in the footer, and text changes for additions identified by **double underline** and deletions identified by ~~Strikeout~~. Answers to questions posed by Prospective Bidders are also included herein.

Specifications: Replacement pages or Modifications on:

- Section 00 41 01, Bid Form – Pages 3
- Section 01 20 25, Measurement and Payment – Pages 2, 3 & 6
- Section 31 62 00, Helical Piles – Page 15

REMINDER that this Addendum should be noted in the appropriate location on the Bid Form.

A. Specification Documents

The Bidding Documents have been modified by the following changes:

Section 00 41 01, Bid Form – Page 3

1. Replace page 00 41 01-3 with the revised attached Page 00 41 01-3 with specific attention to the double underlined Pay Item 15 – Helical Piles added to the Bid Form and the revised Quantity for Item 7 – Asphalt Paving.

Section 01 20 25, Measurement and Payment – Pages 2, 3 & 6

1. Replace the above listed Section 01 20 25 with the revised attached Section 01 20 25 with specific attention to the double underlined items on pages 2, 3, & 6.

Section 31 62 00, Helical Piles – Page 15

1. Completely delete subsection “7 – MEASUREMENT AND PAYMENT” on Page 15.
2. This Section 31 62 00, Helical Piles was in the on-line, electronic version of the Specifications but apparently was not included in some of the pre-printed hardcopy sets of the Specification Documents, therefore an additional copy is attached to this Addendum #1 as 15-page section. There are no edits in the attached version other than the deletion of subsection 7 noted above.

B. Drawings

There are no edits or modifications to the drawings.

C. Response to written questions / comments

The following are the written questions received by the City and the corresponding answers:

- Q. The contract plans state the sewer services are to be installed to the foundation of the

Issue Date: December 2, 2013

homes. A licensed plumber is therefore needed to install the pipe and connections within 10' of the foundation, please advise under which item the contractor will be compensated for the cost of the plumber.

- A. In locations where the sewer service pipe shall be installed to the face of the house, licensed plumbers costs should be carried under Pay Item #2 – 6 inch PVC Sewers.
- Q. Are flow rates available for the existing sewer lines in the project area?
- A. The City does not have any flow rates for the sewer in Rice Road.
- Q. Please provide a detail for the sidewalk and driveway paving.
- A. The sewer lateral trenches from the street to each property will have a three feet wide pay width. Disturbed roadway, sidewalk, driveway and landscaped areas shall be replaced in kind.
- Q. Bid item 4 has estimated quantity of 2,300 LF. Actual quantity based on plans is only 1,998 LF. Why such a discrepancy?
- A. This 1,998 LF measurement appears to omit sections of pipe to be installed at the Fenno Street / Haviland Street intersection on the drawings. Please bid the item as a unit cost item for 2,300 LF.
- Q. It appears that only permanent paving is being installed although there is a detail for temporary pavement and the specification 32 05 20; section 3.03 speaks of it. Please advise.
- A. Temporary pavement is to be used where needed, i.e.: where the temporary bypass crosses homeowners driveway, areas which the contractor cannot place permanent pavement, etc. This item will be compensated under pay item #7.
- Q. Please confirm that restoration, i.e.: Asphalt paving, curb resetting, loam, seed, etc. gets paid under bid item 2 – 6" PVC Sewer. Measurement and payment does not specify.
- A. Asphalt paving is listed as pay item #7 and will be compensated as such by the unit price. Curb resetting, loam and seed are called out in section 01 20 25-1 under Measurement and Payment and are incidental to the work or the associated item of work.
- Q. On sheet 3, there is an excavation sewer replacement detail labeled section A/C-1. Please identify the location / limits of this particular work? The trench detail on sheet 4 seems to conflict with the detail labeled A/C-1.
- A. The excavation sewer replacement detail on sheet 3 of 7 section A/C-1 is showing the existing sewer **and** the proposed sewer which will be going in its place after the existing sewer is removed. There will be only one (1) 12" sewer main in the trench when work is completed.
- Q. The sewer main is to be supported by piles on a portion of the project. Are the sewer services to be supported by piles in this section as well? Are sewer services within the limits of mainline helical piles required to have helical piles as well?

A. No.

Q. On DWG No. 5 of 7- Downstream of STA 0+00 the proposed 15" PVC Sewer is directly under the water main. On DWG No. 6 of 7- Downstream of STA 18+50 to 00+75 the proposed 8" PVC Sewer is directly under the water main. Can items be added to the contract to relocate the water main at these locations?

A. No. Field adjustments to the exact length of sewer to be replaced in these and other terminus locations, will be made during construction if the exact location of the existing watermain presents a potential conflict. Since this project is the replacement of existing sewers in the same location no watermain relocation is intended.

Q. It does not appear that the helical piles have a pay item. How will or under which item is the contractor to be compensated for furnishing and installing the helical piles? Measurement and payment does not specify where the helical piles get paid. Are we to assume their paid under Bid item 4 – 12" PVC Sewer?

A. No. A revised Bid Form showing Pay Item No. 15 has been added and is attached. See modification to the Specification Documents for Section 00 41 01, Bid Form and Section 01 20 25, Measurement and Payment.

Q. The note on sheet 7 reads "Contractor shall coordinate all dimensions for structural steel detailing with actual as-built helical pile locations prior to issuing any steel shop drawings for approval". Because the entire road can't be opened up at once, I assume this means we would excavate and shore the trench to drill the piles for one section of pipe, drill the piles, take measurements, submit shop drawings, wait for approval, release the steel for production, wait for the steel to be fabricated and delivered, then install the pipe. This does not appear to be an efficient method of construction. Can you clarify the intent of this note?

A. The design intent is to utilize field bolted connections between all structural steel components (including the helical piles). The connection details specify both oversized and/or slotted holes to account for tolerances in both shop fabrication and field erection. It is suggested that the pile drilling and installation be staggered in schedule from the excavation and remaining steel erection to allow time for as built pile locations to be used for final steel shop drawings and fabrication. It may be acceptable to have steel shop drawing submittal & approval early and then follow up with record shop drawings with actual dimensions used for fabrication.

Prepared by: City of Quincy (Engineer)

**END OF ADDENDUM
END OF SECTION**

SECTION 00 41 01**BID FORM****ARTICLE 1 – DEFINED TERMS**

- 1.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the Standard General and Supplementary Conditions, and the Additional Supplementary Conditions, if any.

ARTICLE 2 – BID RECIPIENT

- 2.01 This Bid is submitted to:

**City of Quincy Massachusetts
Purchasing Department
Quincy City Hall
1305 Hancock Street
Quincy, MA 02169**

- 2.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 3 – BIDDER'S ACKNOWLEDGEMENTS

- 3.01 Bidder accepts all of the terms and conditions of the Bidding Documents including, without limitation:
- A. those dealing with disposition of Bid security;
 - B. those included in the Supplementary Instructions to Bidders;
 - C. insurance and bonding requirements (Payment Bond and Performance Bond each equal to 100% of the total Contract Price) set forth in the Standard General and Supplementary Conditions and Additional Supplementary Conditions, if any;
 - D. Contract Times as set forth in the Agreement; and
 - E. provisions for liquidated damages as set forth in the Agreement.

3.02 This Bid will remain subject to acceptance for 90 days after the Bid opening or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3.03 Bidder acknowledges receipt of the following Addenda.

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

3.04 Bidder acknowledges the representations and certifications included in Section 00 45 05 are made a condition of the Bid.

ARTICLE 4 – BASIS OF BID

4.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s) based on unit prices included below.

BID PRICES SHALL EXCLUDE SALES AND USE TAX.

Item No.	Item Description with Unit Price in Written Words	Estimated Quantity & Unit	Unit Bid Price		Total Bid Item Price	
			Dollars	Cents	Dollars	Cents
1	Mobilization/Demobilization @ _____	1				
	_____ Dollars and _____ /100 LUMP SUM	LS				
2	6 inch diameter PVC Pipe @ _____	2,200				
	_____ Dollars and _____ /100 PER LINEAR FOOT	LF				
3	8 inch diameter PVC Pipe @ _____	220				
	_____ Dollars and _____ /100 PER LINEAR FOOT	LF				
4	12 inch diameter PVC Pipe @ _____	2,300				
	_____ Dollars and _____ /100 PER LINEAR FOOT	LF				
		Estimated	Unit Bid Price		Total Bid Item Price	

Item No.	Item Description with Unit Price in Written Words	Quantity & Unit	Dollars	Cents	Dollars	Cents
5	15 inch diameter PVC Pipe @ _____	45				
		LF				
	_____ Dollars and _____ /100 PER LINEAR FOOT					
6	4 foot diameter Sanitary Sewer Manhole @ _____	15				
		EACH				
	_____ Dollars and _____ /100 PER EACH					
7	Asphalt Paving @ _____	<u>600</u>				
		TON				
	_____ Dollars and _____ /100 PER TON					
8	Traffic Police Details - CONTINGENCY @ Sixty Thousand Five Hundred Dollars and 00/100	1	\$60,500		\$60,500	
		LS contingency				
9	Hot Mix Asphalt Driveway and Sidewalk @ _____	25				
		SY				
	_____ Dollars and _____ /100 PER SQUARE YARD					
10	Pavement Markings @ _____	200				
		LF				
	_____ Dollars and _____ /100 PER LINEAR FOOT					
11	Concrete Sidewalks @ _____	5				
		SY				
	_____ Dollars and _____ /100 PER SQUARE YARD					
12	Dense Graded Material @ _____	430				
		SY				
	_____ Dollars and _____ /100 PER SQUARE					
13	Loop Detectors @ _____	180				
		LF				
	_____ Dollars and _____ /100 PER LINEAR FOOT					
14	Portable Changeable Message Signs @ _____	2				
		LS				
	_____ Dollars and _____ /100 PER EACH					
15	Helical Piles @ _____	<u>250</u>				
		EA				
	_____ Dollars and _____ /100 PER EACH					

TOTAL BID PRICE (based on Unit Price Schedule above) As Basis of Award

(Use words) Dollars and _____/100 \$ _____
(Use figures)

- 4.02 Unit Prices have been computed in accordance with Paragraph 11.03.A of the Standard General and Supplementary Conditions and Additional Supplementary Conditions, if any.
- 4.03 Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for unit price items will be based on actual quantities determined and based on the unit prices included above.

ARTICLE 5 – TIME OF COMPLETION

- 5.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the Standard General and Supplementary Conditions and Additional Supplementary Conditions, if any, on or before the dates or within the number of calendar days indicated in the Agreement.
- 5.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 6 – ATTACHMENTS TO THIS BID

6.01 The following documents are submitted with and made a condition of this Bid:

00 43 13 Bid Security Form
OR
Required Bid security in the form of _____

Supplements:

- 00 43 93 Bid Submittal Checklist
- 00 45 05 Bidder's Representations and Certifications including required submittals
- 00 45 13 Bidder's Qualifications
- 00 45 19 Non-collusion Affidavit

ARTICLE 7 – BID SUBMITTAL

7.01 This Bid is submitted by:

A Corporation

Corporation Name: _____

State of incorporation: _____

Type: _____
(General Business, Professional, Service, other)

By: _____
(Signature – attach evidence of authority to sign)

Name *(typed or printed)*: _____

Title: _____

(CORPORATE SEAL)

Attest: _____
(Signature of Corporate Secretary)

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

Date of qualification to do business as out-of-state corporation: _____

A Limited Liability Company (LLC)

LLC Name: _____

State in which organized: _____

By: _____
(Signature – attach evidence of authority to sign)

Name *(typed or printed)*: _____

Title: _____

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

A Joint Venture

First Joint Venturer Name: _____

By: _____
(Signature – attach evidence of authority to sign)

Name *(typed or printed)*: _____

Title: _____

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

Second Joint Venturer Name: _____

By: _____
(Signature – attach evidence of authority to sign)

Name *(typed or printed)*: _____

Title: _____

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, corporation and limited liability company that is a party to the joint venture should be in the manner indicated above.)

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name *(typed or printed)*: _____

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

An Individual

Name *(typed or printed)*: _____

By: _____
(Individual's signature)

Doing business as: _____

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

SUBMITTED ON:
EIN/FEIN:

Communications concerning this Bid shall be addressed to:

Name: _____

Title: _____

Business Address: _____

Phone & Facsimile Nos: _____

Email address: _____

END OF SECTION

SECTION 01 20 25**MEASUREMENT AND PAYMENT****PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This Section describes the measurement and payment for the Work to be completed under each item in the Bid Form.
- B. Payment procedures are in accordance with the Agreement, Article 14 of the Standard General and Supplementary Conditions, the Additional Supplementary Conditions (if any), and the General Requirements.
- C. Measurement: as determined, verified, or approved by Engineer in accordance with Paragraph 11.03 of the Standard General and Supplementary Conditions, the Additional Supplementary Conditions (if any), and the General Requirements, except as otherwise specified.
- D. The Bid item descriptions are general and may not specifically describe all associated Work or elements thereof. Work described in each Bid item shall be as specified and shown on the Drawings and not included in other Bid items.
- E. Review Work associated with each Bid item. Claims for being unfamiliar with these requirements or of the content of the Specifications and Drawings will not be considered.
- F. The following Work is not specifically described or designated as a Bid item, is considered incidental to the Work or the associated item of Work, and shall not be measured separately for payment.
 - 1. General Requirements specified in Sections 01 00 10 and 01 15 00 including, but not limited to:
 - a. temporary traffic control and regulation; field offices, overall Site construction sewage bypass, dewatering and erosion control (including installation, operation, maintenance, removal and offsite disposal of erosion control devices; construction dewatering (including compliance with applicable Laws and Regulations); notifications to abutters.
 - 2. Labor, materials, and equipment necessary to conduct test pits to verify existing field conditions and the location, size, type, material, and orientation of existing pipes and utilities shown on the Drawings

3. Design, installation and removal of excavation support systems, utility/structure support systems temporary and permanent utility/structure support systems
 4. Additional dewatering and erosion control (including installation, operation, maintenance, removal and off Site disposal of erosion control devices)
 5. Raising and adjusting castings
 6. Removal and resetting granite curbing
 7. Removal, protection, storage and reinstallation of PVC, metal, wood fencing
 8. Stone/CMU masonry wall restoration
 9. Tree/bush protection and tree/bush removal, protection, storage, and reinstallation
 10. Loam borrow and seeding
- G. Payment for replacement of utility services, including water and fire services, shall only be made for that Work specifically identified for replacement on the Drawings. Relocation or replacement of any utility services shown on the Drawings for the Contractor's convenience or due to breakage by the Contractor or at locations which could reasonably be assumed shall be replaced at no cost to the Owner.
- H. Paved and unpaved surfaces and pavement markings disturbed by the Contractor outside the limits of Work shall be restored at no cost to the Owner.

1.02 MEASUREMENT AND PAYMENT BASIS FOR EACH BID ITEM

Item 1: Mobilization/Demobilization	
Measurement	At Project commencement and at Project completion
Payment	Lump sum price based on Schedule of Values, operations and expenses in connection with mobilization and demobilization shall not exceed five percent (5%) of the Contract Price.
Schedule of Payment	50% Project commencement 50% Substantial Completion
Includes delivery and removal of equipment to the Project Site, obtaining necessary permits including associated fees, insurance and bond costs, signage, traffic management plan, sanitary sewage bypass and other required plans; necessary pre-construction investigations, verifying existing field conditions, and temporary facilities and controls. Includes obtaining necessary permits including associated fees, insurance and bond costs, signage, development of traffic management plan, and Sewer Control and Bypass Plan and other required plans; necessary pre-construction investigations, test pits and verifying existing field conditions, preparation of Work and operations, movement of men, equipment and all other Work and operations which must be performed from the time prior to the start of the Work to the final acceptance of the Work by the City. Note Owner will waive fees associated with City permits and costs for these permits shall not be included in this item.	

Item 2: 6 inch diameter PVC Pipe	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations as well as all <u>curb resetting, loam, seed</u> , wyes, bends, flexible couplings concrete and fiber forms to remove and replace the sewer lateral connections to each service indicated on the Drawings. <u>A licensed plumber will be required to install pipes and connections within ten (10) feet of a dwelling.</u>	

Item 3 : 8 inch diameter PVC Pipe	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings to remove and replace 8 inch sewers.	

Item 4: 12 inch diameter PVC Pipe	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work including mirafi paper, crushed stone and gravel borrow at locations shown and as indicated on the Drawings to remove and replace 12 inch sewers.	

Item 5: 15 inch diameter PVC Pipe	
Measurement	Along the horizontal projection of the centerline of the pipe; measured from inside face of manhole
Payment	Unit price per linear foot
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings to remove and replace 15 inch sewers.	

Item 6: 4 foot diameter Sanitary Sewer Manhole	
Measurement	Each installed
Payment	Unit price each
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings including replacement of manhole structure; removal, storage and reinstallation of sewer manhole frames and covers; inside drop connections; and manhole seals (rubber gaskets, flexible sleeve casts, rubber sleeves, stainless steel straps)	

Item 7: Asphalt Paving	
Measurement	Per ton delivered and placed based on plant slips
Payment	Unit price per ton
Schedule of Payment	Monthly
Includes labor, services, material, <u>temporary pavement</u> , equipment and tools associated with furnishing and installing the asphalt regardless of placement method, subgrade grading and compaction. Contractor is to match pre-construction conditions, meet the surrounding elevations and ensure smooth transition, proper compaction, proper material testing and all other required Work.	

Item 8: Traffic Police Details	
Measurement	Work completed to date
Payment	Contingency of \$60,500.00
Schedule of Payment	Based on actual hours worked and invoices paid by Contractor including standard administrative charges levied by the Police Department and excluding Contractor mark-up.
Includes all labor, materials, and equipment, tools and all else incidental thereto in the scheduling and managing of Traffic Police Details.	

Item 9: Hot Mix Asphalt Driveway and Sidewalk	
Measurement	Square yards
Payment	Unit price per square yard
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings or directed by the Engineer.	

Item 10: Pavement Markings	
Measurement	Linear foot
Payment	Unit price per linear foot
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings or directed by the Engineer including double yellow lines, fog lines, crosswalks and legends.	

Item 11: Concrete Sidewalks	
Measurement	Square Yards
Payment	Unit price per square yard
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings or directed by the Engineer.	

Item 12: Dense Graded Material	
Measurement	Square Yards
Payment	Unit price per square yard
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings or directed by the Engineer.	

Item 13: Loop Detectors	
Measurement	Linear Foot
Payment	Unit price per linear foot
Schedule of Payment	Monthly
All materials, equipment, services, and construction inherent to the Work at locations indicated on the Drawings	

Item 14: Portable Changeable Message Signs	
Measurement	Each
Payment	Lump Sum
Schedule of Payment	At Substantial Completion
Furnish, use and operate, and deliver to Owner at Substantial Completion.	

Item 15: Helical Piles	
Measurement	Each
Payment	Each
Schedule of Payment	Monthly
Helical Pile work shall include all labor, equipment, and materials necessary to complete the work associated with Section 32 62 00 including but not limited to the pre-production test program, submittals and coordination meeting with structural engineering firm Veitas & Veitas, and Helical Pile installations.	

PART 2 - PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

Addendum 1 issued Dec 2, 2013

**Section 31 6200
Helical Piles**

1. GENERAL

1.1 Purpose of Specification

The purpose of this specification is to detail the furnishing of all designs, materials, tools, equipment, labor and supervision, and installation techniques necessary to install Helical Piles as detailed on the drawings, including connection details. This shall include provisions for load testing that will be part of the scope of work.

1.2 Scope of Work

This work consists of furnishing all necessary engineering and design services (if required), supervision, labor, tools, materials, and equipment to perform all work necessary to install the Helical Piles, at Rice Road in Quincy, MA for the City of Quincy per the specifications described herein, and as shown on the drawings. The Contractor shall install a Helical Pile that will develop the load capacities as detailed on the drawings. This also includes provisions for load testing to verify Helical Pile capacity and deflection.

1.3 Qualifications of the Helical Pile Contractor

The Helical Pile Contractor shall be experienced in performing design and construction of Helical Piles and shall furnish all materials, labor, and supervision to perform the work. The Contractor shall be trained and certified by a material supplier in the proper methods of design and installation of Helical Piles. The Contractor shall provide names of on-site personnel materially involved with the work, including those who carry documented certification. At a minimum, these personnel shall include foreman, machine operator, and project engineer/manager.

The Helical Pile Contractor shall not sublet the whole or any part of the contract without the express written permission of the Owner.

1.4 Related Project Specifications

Structural Steel.

1.5 Definitions

A partial list follows.

Contractor: The person/firm responsible for performing the Helical Pile work.

Coupling: Central steel shaft connection means formed as integral part of the plain extension shaft material. For Type SS & RS Helical Piles, couplings are internal or external sleeves, or hot upset forged sockets.

Coupling Bolt(s): High strength, structural steel fasteners used to connect Helical Pile segments together. For Type SS segments, the coupling bolt transfers axial load. For Type RS segments, the coupling bolts transfer both axial and torsional forces.

Helical Extension: Helical Pile foundation component installed immediately following the lead or starter section, if required. This component consists of one or more helical plates welded to a central steel shaft of finite length. Function is to increase bearing area.

Helix Plate: Generally round steel plate formed into a ramped spiral. The helical shape provides the means to install the helical pile, plus the plate transfers load to soil in end bearing. Helix plates are available in various diameters and thickness.

Helical Pile: A bearing type foundation element consisting of a lead or starter section, helical extension (if so required by site conditions), plain extension section(s), and a pile cap. A.k.a. helical screw pile, screw pile, helical screw foundation.

Installation Torque(T): The resistance generated by a Helical Pile when installed into soil. The installation resistance is a function of the soil type, and size and shape of the various components of the Helical Pile.

Lead Section: The first Helical Pile foundation component installed into the soil, consisting of single or multiple helix plates welded to a central steel shaft. A.k.a. Starter Section.

Pile Cap: Connection means by which structural loads are transferred to the Helical Pile. The type of connection varies depending upon the requirements of the project and type of Helical Pile material used.

Round Shaft (RS): Round steel pipe central Shaft elements having an outside diameter (o.d.) of 3.5 inches.

Plain Extension: Central steel shaft segment without helix plates. It is installed following the installation of the lead section or helical extension (if used). The segments are connected with integral couplings and bolts. Plain extensions are used to extend the helix plates beyond the specified minimum depth and into competent load bearing stratum.

Safety Factor: The ratio of the ultimate capacity to the working or design load used for the design of any structural element.

Torque Strength Rating: The maximum torque energy that can be applied to the helical pile foundation during installation in soil or safe torque.

1.6 Allowable Tolerances

The tolerances quoted in this section are suggested maximums. The actual values established for a particular project will depend on the structural application.

1.6.1 Centerline of Helical Piles shall not be more than 3 inches from indicated plan location.

1.6.2 Helical Pile plumbness shall be within 2° of design alignment.

1.6.3 Top elevation of Helical Pile shall be within +1 inch to -2 inches of the design vertical elevation.

1.7 Quality Assurance

1.7.1 Helical Piles shall be installed by an authorized certified Contractor. These Contractors shall have satisfied the certification requirements relative to the technical aspects of the product and installation procedures as therein specified. Certification documents shall be provided upon request to the Owner or their representative.

1.7.2 The Contractor shall employ an adequate number of skilled workers who are experienced in the necessary crafts and who are familiar with the specified requirements and methods needed for proper performance of the work of this specification.

1.7.3 All Helical Piles shall be installed in the presence of a designated representative of the Owner unless said representative informs the Contractor otherwise. The designated representative shall have the right of access to any and all field installation records and test reports.

1.7.4 Helical Pile components as specified therein shall be manufactured by a facility whose quality systems comply with ISO (International Organization of Standards) 9001 requirements. Certificates of Registration denoting ISO Standards Number shall be presented upon request to the Owner or their representative.

1.7.5 Design of Helical Piles shall be performed by an engineer registered in the Commonwealth of Massachusetts.

1.8 Design Criteria

- 1.8.1 Helical Piles shall be designed to meet the specified loads and acceptance criteria as shown on the drawings. The calculations and drawings required from the Contractor or Engineer shall be submitted to the City for review and acceptance in accordance to Section 3.1 “Construction Submittals”.
- 1.8.2 The allowable working load on the Helical Piles shall be greater than or equal to 20 kips, minimum safety factor for Helical piles is 2.0. All Helical Pile components shall be hot dip galvanized, metallization will not be accepted.

1.9. Ground Conditions

The Geotechnical Report by CHG Geotechnical Engineering dated July 25, 2012, including logs of soil borings as shown on the boring location plan, shall be considered to be representative of the in-situ subsurface conditions likely to be encountered on the project site. Said Geotechnical Report shall be used as the basis for Helical Pile design using generally accepted engineering judgement and methods.

The Geotechnical Report shall be provided for purposes of bidding. If during Helical Pile installation, subsurface conditions of a type and location are encountered of a frequency that were not reported, inferred and/or expected at the time of preparation of the bid, the additional costs required to overcome such conditions shall be considered as extras to be paid for.

2 REFERENCED CODES AND STANDARDS

Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation. In case of conflict, the particular requirements of this specification shall prevail. The latest publication as of the issue of this specification shall govern, unless indicated otherwise.

2.1 American Society for Testing and Materials (ASTM):

- 2.1.1 ASTM A29/A29M Steel Bars, Carbon and Alloy, Hot-Wrought and Cold Finished.
- 2.1.2 ASTM A36/A36M Structural Steel.
- 2.1.3 ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- 2.1.4 ASTM A153 Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- 2.1.5 ASTM A252 Welded and Seamless Steel Pipe Piles.
- 2.1.6 ASTM A320/A320M Alloy-Steel Bolting Materials for Low Temperature Service.
- 2.1.7 ASTM A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

- 2.1.8 ASTM A500 Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- 2.1.9 ASTM A513 Standard Specification for Electric Resistance Welded Carbon and Alloy Steel Mechanical Tubing.
- 2.1.10 ASTM A618 Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.
- 2.1.11 ASTM A656 Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability.
- 2.1.12 ASTM A958 Standard Specification for Steel Castings, Carbon, and Alloy, with Tensile Requirements, Chemical Requirements Similar to Wrought Grades.
- 2.1.13 ASTM A1018 Steel, Sheet and Strip, Heavy Thickness Coils, Hot Rolled, Carbon, Structural, High-Strength Low-Alloy, Columbium or Vanadium, and High-Strength Low-Alloy with Improved Formability.
- 2.1.14 ASTM D1143 Method of Testing Piles Under Static Axial Compressive Load.
- 2.1.15 ASTM D3689 Method of Testing Individual Piles Under Static Axial Tensile Load.

2.2 American Welding Society (AWS):

- 2.2.1 AWS D1.1 Structural Welding Code – Steel.
- 2.2.2 AWS D1.2 Structural Welding Code – Reinforcing Steel.

2.3 American Society of Civil Engineers (ASCE):

- 2.3.1 ASCE 20-96 Standard Guidelines for the Design and Installation of Pile Foundations.

2.4 Society of Automotive Engineers (SAE):

- 2.4.1 SAE J429 Mechanical and Material Requirements for Externally Threaded Fasteners.

3 SUBMITTALS

3.1 Construction Submittals

- 3.1.1 The Contractor shall prepare and submit to the Owner, for review and approval, shop drawings and design calculations for the Helical Piles intended for use at least 14 calendar days prior to planned start of construction. All submittals shall be signed and sealed by a Registered Professional Engineer currently licensed in the Commonwealth of Massachusetts.
- 3.1.2 The Contractor shall submit a detailed description of the construction procedures proposed for use to the Owner for review. This shall include a list of major equipment to be used.
- 3.1.3 The Shop Drawings shall include the following:
 - 3.1.3.a Helical Pile number, location and pattern by assigned identification number
 - 3.1.3.b Helical Pile design load
 - 3.1.3.c Product material data for 3 ½” o.d. x 0.300” thick steel pipe piles.

- 3.1.3.d Helix configuration (number and diameter of helix plates)
 - 3.1.3.e Minimum effective installation torque
 - 3.1.3.f Minimum overall length
 - 3.1.3.g Cut-off elevation
- 3.1.4 The Contractor shall submit plans for pre-production (optional) and production testing for the Helical Piles to the Owner for review and acceptance prior to beginning load tests. The purpose of the test is to determine the load versus displacement response of the Helical Pile and provide an estimation of ultimate capacity.
- 3.1.5 The Contractor shall submit to the Owner copies of calibration reports for each torque indicator or torque motor, and all load test equipment to be used on the project. The calibration tests shall have been performed within forty five (45) working days of the date submitted. Helical Pile installation and testing shall not proceed until the Owner has received the calibration reports. These calibration reports shall include, but are not limited to, the following information:
- 3.1.5.a Name of project and Contractor
 - 3.1.5.b Name of testing agency
 - 3.1.5.c Identification (serial number) of device calibrated
 - 3.1.5.d Description of calibrated testing equipment
 - 3.1.5.e Date of calibration
 - 3.1.5.f Calibration data
- 3.1.6 Work shall not begin until all the submittals have been received and approved by the Owner. The Contractor shall allow the Owner a reasonable time to review, comment, and return the submittal package after a complete set has been received. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Contractor.

3.2 Installation Records

The Contractor shall provide the Owner copies of Helical Pile installation records within 24 hours after each installation is completed. Formal copies shall be submitted on a weekly basis. These installation records shall include, but are not limited to, the following information.

- 3.2.1 Name of project and Contractor
- 3.2.2 Name of Contractor's supervisor during installation
- 3.2.3 Date and time of installation
- 3.2.4 Name and model of installation equipment
- 3.2.5 Type of torque indicator used
- 3.2.6 Location of Helical Pile by assigned identification number

- 3.2.7 Actual Helical Pile type and configuration – including lead section (number and size of helix plates), number and type of extension sections (manufacturer's SKU numbers)
- 3.2.8 Helical Pile installation duration and observations
- 3.2.9 Total length of installed Helical Pile
- 3.2.10 Cut-off elevation
- 3.2.11 Installation torque at one-foot intervals for the final 10 feet
- 3.2.12 Comments pertaining to interruptions, obstructions, or other relevant information

3.3 Test Reports

The Contractor shall provide the Owner copies of field test reports within 24 hours after completion of the load tests. Formal copies shall be submitted within a reasonable amount of time following test completion. These test reports shall include, but are not limited to, the following information (note Section 6 – Helical Pile Load Tests).

- 3.3.1 Name of project and Contractor
- 3.3.2 Name of Contractor's supervisor during installation
- 3.3.3 Name of third party test agency, if required
- 3.3.4 Date, time, and duration of test
- 3.3.5 Location of Helical Pile by assigned identification number
- 3.3.6 Description of calibrated testing equipment and test set-up
- 3.3.7 Actual Helical Pile type and configuration – including lead section, number and type of extension sections (manufacturer's SKU numbers)
- 3.3.8 Steps and duration of each load increment
- 3.3.9 Cumulative pile-head movement at each load step
- 3.3.10 Comments pertaining to test procedure, equipment adjustments, or other relevant information
- 3.3.11 Signed by third party test agency rep., registered professional engineer, or as required by local jurisdiction

3.4 Closeout Submittals

- 3.4.1 Manufacturer's Warranty: Submit, for Owner's Acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights the Owner may have under Contract Document.

4 PRODUCTS AND MATERIALS

4.1 Central Steel Shaft:

The central steel shaft, consisting of lead sections, helical extensions, and plain extensions, shall be Type RS (Round Shaft).

4.1.1 Shall be structural steel tube or pipe, seamless or straight-seam welded, per ASTM A53, A252, ASTM A500, or ASTM A618. Outside diameter is 3.50" and wall thickness is 0.300" (schedule 80). Also known as Pipe 3 x-strong.

4.1.1.a Torque strength rating = 13,000 ft-lb

4.1.1.b Minimum yield strength = 50 ksi

4.2 Helix Bearing Plate:

Shall be hot rolled carbon steel sheet, strip, or plate formed on matching metal dies to true helical shape and uniform pitch. Bearing plate material shall conform to the following ASTM specifications.

4.2.1 Per ASTM A36, or A572, or A1018, or A656 depending on helix diameter, per the minimum yield strength requirements cited above. Plate thickness is 3/8" or 1/2".

4.3 Bolts:

The size and type of bolts used to connect the central steel shaft sections together shall conform to the following ASTM specifications.

4.3.1 3/4" diameter bolts (3 or 4 per coupling) per SAE J429 Grade 5 or 8.

4.4 Couplings:

For Type RS3500 material, the couplings shall either be formed as an integral part of the plain and helical extension material as hot forge expanded sockets, or as internal sleeve wrought steel connectors. The steel connectors can be either tubing or solid steel bar with holes for connecting shaft sections together.

4.5 Plates, Shapes, or Pile Caps:

Depending on the application, the pile cap shall be a welded assembly consisting of structural steel plates and shapes designed to fit the pile and transfer the applied load. Structural steel plates and shapes for HELICAL PILE top attachments shall conform to ASTM A36 or ASTM A572 Grade 50.

4.6 Corrosion Protection :

4.6.1 Galvanization: All material shall be hot-dipped galvanized in accordance with ASTM A153 or A123 as specified after fabrication.

5 EXECUTION

5.1 Site Conditions

- 5.1.1 Prior to commencing Helical Pile installation, the Contractor shall inspect the work of all other trades and verify that all said work is completed to the point where Helical Piles may commence without restriction.
- 5.1.2 The Contractor shall verify that all Helical Piles may be installed in accordance with all pertinent codes and regulations regarding such items as underground obstructions, right-of-way limitations, utilities, etc.
- 5.1.3 In the event of a discrepancy, the Contractor shall notify the Owner. The Contractor shall not proceed with Helical Pile installation in areas of discrepancies until said discrepancies have been resolved.

5.2 Installation Equipment

- 5.2.1 Shall be rotary type, hydraulic power driven torque motor with clockwise and counter-clockwise rotation capabilities. The torque motor shall be capable of continuous adjustment to revolutions per minute (RPM's) during installation. Percussion drilling equipment shall not be permitted. The torque motor shall have torque capacity 15% greater than the torsional strength rating of the central steel shaft to be installed.
- 5.2.2 Equipment shall be capable of applying adequate down pressure (crowd) and torque simultaneously to suit project soil conditions and load requirements. The equipment shall be capable of continuous position adjustment to maintain proper Helical Pile alignment.

5.3 Installation Tooling

- 5.3.1 Shall consist of a Kelly Bar Adapter (KBA) and Type RS drive tools as manufactured by the material supplier and used in accordance with the manufacturers written installation instructions.
- 5.3.2 A torque indicator shall be used during Helical Pile installation. The torque indicator can be an integral part of the installation equipment or externally mounted in-line with the installation tooling.
 - 5.3.2.a Shall be capable of providing continuous measurement of applied torque throughout the installation.
 - 5.3.2.b Shall be capable of torque measurements in increments of at least 500 ft-lb
 - 5.3.2.c Shall be calibrated prior to pre-production testing or start of work. Torque indicators which are an integral part of the installation equipment, shall be calibrated on-site. Torque

indicators which are mounted in-line with the installation tooling, shall be calibrated either on-site or at an appropriately equipped test facility. Indicators that measure torque as a function of hydraulic pressure shall be calibrated at normal operating temperatures.

- 5.3.2.d Shall be re-calibrated, if in the opinion of the Owner and/or Contractor reasonable doubt exists as to the accuracy of the torque measurements.

5.4 Installation Procedures

5.4.1 Central Steel Shaft: (Lead and Extension Sections)

- 5.4.1.a The Helical Pile installation technique shall be such that it is consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project.
- 5.4.1.b The lead section shall be positioned at the location as shown on the working drawings. The Helical Pile sections shall be engaged and advanced into the soil in a smooth, continuous manner at a rate of rotation of 5 to 20 RPM's. Extension sections shall be provided to obtain the required minimum overall length and installation torque as shown on the working drawings. Connect sections together using coupling bolt(s) and nut torqued to 40 ft-lb.
- 5.4.1.c Sufficient down pressure shall be applied to uniformly advance the Helical Pile sections approximately 3 inches per revolution. The rate of rotation and magnitude of down pressure shall be adjusted for different soil conditions and depths.

5.5 Termination Criteria

- 5.5.1 The torque as measured during the installation shall not exceed the torsional strength rating of the central steel shaft.
- 5.5.2 The minimum installation torque and minimum overall length criteria as shown on the working drawings shall be satisfied prior to terminating the Helical Pile installation.
- 5.5.3 If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to achieving the minimum overall length required, the Contractor shall have the following options:
- 5.5.3.a Terminate the installation at the depth obtained subject to the review and acceptance of the Owner, or:
- 5.5.3.b Remove the existing Helical Pile and install a new one with fewer and/or smaller diameter helix plates. The new helix configuration shall be subject to review and acceptance of the Owner. If re-installing in the same location, the top-most helix of the new Helical Pile shall be terminated at least (3) three feet beyond the terminating depth of the original Helical Pile.

- 5.5.4 If the minimum installation torque as shown on the working drawings is not achieved at the minimum overall length, and there is no maximum length constraint, the Contractor shall have the following options:
- 5.5.4.a Install the Helical Pile deeper using additional extension sections, or:
 - 5.5.4.b Remove the existing Helical Pile and install a new one with additional and/or larger diameter helix plates. The new helix configuration shall be subject to review and acceptance of the Owner. If re-installing in the same location, the top-most helix of the new Helical Pile shall be terminated at least (3) three feet beyond the terminating depth of the original Helical Pile.
 - 5.5.4.c De-rate the load capacity of the Helical Pile and install additional Helical Pile(s). The de-rated capacity and additional Helical Pile location shall be subject to the review and acceptance of the Owner.
- 5.5.5 If the Helical Pile is refused or deflected by a subsurface obstruction, the installation shall be terminated and the pile removed. The obstruction shall be removed, if feasible, and the Helical Pile re-installed. If the obstruction can't be removed, the Helical Pile shall be installed at an adjacent location, subject to review and acceptance of the Owner.
- 5.5.6 If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to proper positioning of the last plain extension section relative to the final elevation, the Contractor may remove the last plain extension and replace it with a shorter length extension. If it is not feasible to remove the last plain extension, the Contractor may cut said extension shaft to the correct elevation. The Contractor shall not reverse (back-out) the Helical Pile to facilitate extension removal.
- 5.5.7 The average torque for the last three feet of penetration shall be used as the basis of comparison with the minimum installation torque as shown on the working drawings. The average torque shall be defined as the average of the last three readings recorded at one-foot intervals.

6 HELICAL PILE LOAD TESTS

6.1 Pre-Production Tests

Load tests shall be performed to verify the suitability and capacity of the proposed Helical Pile, and the proposed installation procedures prior to installation of production helical piles. One sacrificial test helical pile shall be constructed immediately prior to the start of work on the production piles. Additional purpose of pre-production tests is to empirically verify the ultimate capacity to the average installing torque of the Helical Pile for the project site.

Pre-production Helical Pile installation methods, procedures, equipment, and overall length shall be identical to the production Helical Piles to the extent practical except where approved otherwise by the Owner.

The Contractor shall submit for review and acceptance the proposed Helical Pile load testing procedure. The pre-production test proposal shall be in general conformance with ASTM D1143 and/or D-3689, and shall provide the minimum following information:

- ◆ Type and accuracy of load equipment
- ◆ Type and accuracy of load measuring equipment
- ◆ Type and accuracy of pile-head deflection equipment
- ◆ General description of load reaction system, including description of reaction anchors
- ◆ Calibration report for complete load equipment, including hydraulic jack, pump, pressure gauge, hoses, and fittings.

If the pre-production test fails to meet the design requirements, the Contractor shall modify the Helical Pile design and/or installation methods and retest the modified anchor, as directed by the Owner.

6.2 Load Test Equipment

- 6.2.1 The load test equipment shall be capable of increasing or decreasing the applied load incrementally. The incremental control shall allow for small adjustments, which may be necessary to maintain the applied load for a sustained, hold period.
- 6.2.2 The reaction system shall be designed so as to have sufficient strength and capacity to distribute the test loads to the ground. It should also be designed to minimize its movement under load and to prevent applying an eccentric load to the pile head. Test loads are normally higher than the design loads on the structure. The direction of the applied load shall be collinear with the Helical Pile at all times.
- 6.2.3 Dial gauge(s) shall be used to measure Helical Pile movement. The dial gauge shall have an accuracy of at least ± 0.001 -in. and a minimum travel sufficient to measure all Helical Pile movements without requiring resetting the gauge. The dial gauge shall be positioned so its stem is parallel with the axis of the Helical Pile. The stem may rest on a smooth plate located at the pile head. Said plate shall be positioned perpendicular to the axis of the Helical Pile. The dial gauge shall be supported by a reference apparatus to provide an independent fixed reference point. Said reference apparatus shall be independent of the reaction system and shall not be affected by any movement of the reaction system.
- 6.2.4 The load test equipment shall be re-calibrated, if in the opinion of the Owner and/or Contractor reasonable doubt exists as to the accuracy of the load or deflection measurements.

6.3 Testing Program

- 6.3.1 The hydraulic jack shall be positioned at the beginning of the test such that the unloading and repositioning of the jack during the test shall not be required. The jack shall also be positioned coaxial with respect to the pile-head so as to minimize eccentric loading. The hydraulic jack shall be capable of applying a load not less than two times the proposed design load (DL). The pressure gauge shall be graduated in 100 psi increments or less. The stroke of the jack shall not be less than the theoretical elastic shortening of the total Helical Pile length at the maximum test load.
- 6.3.2 An alignment load (AL) shall be applied to the Helical Pile prior to setting the deflection measuring equipment to zero or a reference position. The AL shall be no more than 10% of the design load (i.e., 0.1 DL). After AL is applied, the test set-up shall be inspected carefully to ensure it is safe to proceed.
- 6.3.3 Axial compression load tests shall be conducted by loading the Helical Pile in step-wise fashion as shown in Table-3 to the extent practical. Pile-head deflection shall be recorded at the beginning of each step and after the end of the hold time. The beginning of the hold time shall be defined as the moment when the load equipment achieves the required load step.
- 6.3.4 Test loads shall be applied until continuous jacking is required to maintain the load step or until the test load increment equals 200% of the design load (DL) (i.e., 2.0 DL), whichever occurs first. The observation period for this last load increment shall be 10 minutes. Displacement readings shall be recorded at 1, 2, 3, 4, 5 and 10 minutes (load increment maxima only).
- 6.3.5 The applied test load shall be removed in four approximately equal decrements per the schedule in Table-3. The hold time for these load decrements shall be 1 minute, except for the last decrement, which shall be held for 5 minutes.

Table-3. Steps for Pre-Production Load Testing

LOAD STEP	HOLD TIME (MINUTES)
AL	1.0 Min.
0.20 DL	2.5 Min.
0.40 DL	2.5 Min.
0.60 DL	2.5 Min.
0.80 DL	2.5 Min.
1.0DL	2.5 Min.
0.75 DL	1.0 Min.
0.50 DL	1.0 Min.

0.25 DL	1.0 Min.
AL	1.0 Min.
0.5 DL	1.0 Min.
1.0 DL	1.0 Min.
1.2 DL	2.5 Min.
1.4 DL	2.5 Min.
1.6 DL	2.5 Min.
1.8 DL	2.5 Min.
2.0 DL	10.0 Min.
1.5 DL	1.0 Min.
1.0 DL	1.0 Min.
0.5 DL	1.0 Min.
AL	5.0 Min.

AL = Alignment Load; DL = Design Load = 20 kips

6.4 Acceptance Criteria for HELICAL PILE Verification Load Tests

Both of the following criteria must be met for approval:

1. The Helical Pile shall sustain the compression and tension design capacities (1.0 DL) with no more than .5 in. total vertical movement of the pile-head as measured relative to the top of the Helical Pile prior to the start of testing.
2. Failure does not occur at the 2.0 DL maximum compression and tension test loads. The failure load shall be defined by one of the following definitions – whichever results in the lesser load:
 - The point at which the movement of the Helical Pile tip exceeds the elastic compression/tension of the pile shaft by 0.08 B, where B is defined as the diameter of the largest helix.
 - The point at which the slope of the load versus deflection (at end of increment) curve exceeds 0.05 inches/kip.

The Contractor shall provide the Owner copies of field test reports confirming Helical Pile configuration and construction details within 24 hours after completion of the load tests. Formal copies shall be submitted as per Section 3.3. This written documentation will either confirm the load capacity as required on the working drawings or propose changes based upon the results of the pre-production tests.

When a Helical Pile fails to meet the acceptance criteria, modifications shall be made to the design, the construction procedures, or both. These modifications include, but are not limited to, de-rating the Helical Pile load capacity, modifying the installation methods and equipment, increasing the minimum effective installation torque, changing the helix configuration, or changing the Helical Pile material (i.e., central steel shaft). Modifications that require changes to the structure shall have prior review and acceptance of the

Owner. The cause for any modifications of design or construction procedures shall be decided in order to determine any additional cost implications.

~~7 MEASUREMENT AND PAYMENT~~

Subsection 7 deleted in Addendum 1
on Dec 2, 2013

~~Helical Pile work can be paid for in different ways, reflecting the relative risk to be accepted by the Owner and the Contractor. However, the following items are common and standard:~~

QUANTITY	DESCRIPTION	UNIT
±	Mobilization/Demobilization	Lump sum
±	Conduct pre-production test program of declared scope	Lump sum
As required	Helical Pile Installation	As below

- ◆ Lump Sum: ~~The whole Helical Pile project shall be paid for on a “lump sum” basis (no allowance for changes due to additional Helical Pile length relative to that originally bid).~~

END OF SPECIFICATION