SUBMITTAL COVER SHEET

AECOM's Submittal No.: **63e**

Project: NYSEG Penn Yan Oversight

First Submittal [X] Date: 10/15/2018

Resubmitted [X] Date: 10/23/2018

Resubmitted [X] Date: 11/05/2018

Resubmitted [X] Date: 11/13/2018

Resubmitted [X] Date: 11/20/2018

Resubmitted [X] Date: 11/20/2018

Contract For: NYSEG

Contractor: Sevenson Environmental Services, Inc.

Address: 2749 Lockport Road
Niagara Falls, New York, 14305

PH / Fax:

Subcontractor:

Shop Drawing Title:

Submittal Description: Technical Execution Plan - Addendum 1, Revision 5

[ ] Product Data [ ] Tests [ ] Samples [ ] Schedules [X] Other

Manufacturer:

REFERENCES:

Spec Section (s):

Drawing Number (s):

ADDITIONAL REMARKS:

CONTRACTOR'S APPROVAL

Date: 11/20/2018 By: M. Thorpe

[X] Approved

[ ] Approved-As-Noted

[ ] Revise and Resubmit

[ ] For Information Only

[ ] Rejected

Sevenson Environmental Services, Inc.

Technical Execution Plan

Addendum 1, Revision 5

NYSEG's Water Street Manufactured Gas Plant Site

Penn Yan, New York

Prepared for:

NYSEG

Prepared by:

Sevenson Environmental Services, Inc.
2749 Lockport Road
Niagara Falls, New York 14305

Sevenson Environmental Services, Inc.

Date: November 20, 2018

Introduction

Sevenson Environmental Services, Inc. (Sevenson) has prepared this Technical Execution Plan addendum which is intended to outline the means and methods that SES anticipates implementing in order to perform the remaining remediation of NYSEG"s Water Street Manufactured Gas Plant Site located in Penn Yan, New York for Work Change Directive 004 R1 and 005 R1. This work is being conducted by New York State Electric and Gas Corporation (NYSEG) and will be overseen by AECOM, who is the Engineer of record. This addendum addresses the building stabilization and underpinning, excavation and backfill within the former gas house building. A separate addendum will be prepared to describe the procedures for the sheeting and bracing installation, bank excavation, and backfill.

1.0 Building Stabilization and Underpinning

Prior to this phase of work, the south wall and a portion of the east wall were stabilized and underpinned using reinforced concrete grade beams and helical piles. This phase will include the stabilization and underpinning of the remainder of the building, consisting of a continuous 18"x 42" reinforced concrete grade beams on the interior and exterior of existing masonry wall, tie rods and helical piles (See Appendix A for Grade Beam and Helical Pile Sequencing)

<u>Preparation and installation of concrete grade beams</u>

- Ensure all utilities have been properly located, marked, and abandoned as necessary.
- Ensure the 100 gpm waste water treatment system, conveyance lines, and sewer connections are operational to treat contaminated construction water.
- Perform pre-excavation topographic survey within and adjacent to the former MGP building.
- Perform excavation of approximately 284 CY on the North & East side of the building to create an 8 foot wide level work platform to allow equipment and personnel access. Create a 2:1 slope from the level work platform. Transport spoils to the material handling pad using a front end loader.
- Assist Village of Penn Yan with the relocation of foundation and light post adjacent to the wine and spirits parking lot.
- Place crusher run backfill material as needed to create a level work platform.

- Remove existing concrete floor slab from the perimeter interior walls as needed using non vibratory methods (e.g. mini excavator with hydraulic breaker attachment and/or small pneumatic tools and saw cutting,
- Pre-Excavate along building walls as needed so that interior and exterior grades match to minimize unbalanced lateral earth pressure on the walls.
- Excavate and install grade beam in segments not exceeding 7.5 feet in length and backfill a minimum of 24 inches before excavating/constructing abutting segments.
- When placing grade beam segments against existing phase 1 beams, the existing beam surface will be roughened to 1/4'" amplitude using a pneumatic tool and a bonding agent will be applied.
- When placing grade beams at cold joints only, a keyway will be installed per "Keyway Details" located on the reinforcing shop drawing.
- No excavations will occur below the bottom of existing wall foundation unless approved otherwise for locations where bottom of existing wall foundation is shallower than bottom of grade beam.
- Existing foundation walls will be cleaned of all loose dirt, debris and soil and will be moistened prior to concrete beam placement
- Concrete beam segments will be formed and placed on the same day as a segment is excavated and no open excavations will be left overnight or on weekends.
- Dewatering of excavation areas shall be maintained using 2" electric submersible pumps installed inside temporary sumps. Water will be collected, treated by the onsite WWTP and discharged.

Materials

Grade beams will consist of the following:

- 18" x 42" reinforced concrete
- Normal weight stone concrete with minimum compressive strength of 4,000 psi at 28 days and 3,000 psi at 7 days (Lehigh Hanson Mix Design #4740003).

Concrete Reinforcement

- All reinforcing bars will conform with the requirements specified in the contract drawings and in accordance with the reinforcement shop drawings.

- Drawing detail 6/C-04 will be followed when placing the new grade beams to the existing grade beams at the (3) locations.

Post Tensioned Tie Rods

- (2) galvanized #8 tie rods will be installed within the top and bottom third of the concrete grade beam at 2' on center and no less than 3" from any construction joint or beam end.
- At each tie rod location a tapered dowel will be inserted in the form of the interior grade beam. Dowel will be greased and rotated as the concrete sets and will be removed the same day. This will provide a pilot hole to drill thru the existing masonry wall (See Appendix B, tie rod sleave detail).
- Drill 1-1/8" holes through the existing stone foundation from the interior every 2 feet on center with 1-1/8" concrete core drill or similar with minimum vibration (thru the pilot hole opening in the interior grade beam and after both the exterior and interior grade beams are poured).
- Install #8 x 5' galvanized tie rods through foundation wall. Grout annulus.
- Tie rods will be post tensioned and locked off to a load of 10 kips after concrete achieves a minimum strength of 3,000 psi (7 days). A calibrated torque wrench will be used to measure and document the lock off load.
- Tie Rods at outside and inside/Tee Corner locations will be embedded into the existing masonry wall 18" of which 12" (min.) will be embedded with approved adhesive anchoring system. For these locations, a tapered dowel will be inserted in the form of the exterior grade beam to provide a pilot hole to drill and anchor tie rod into masonry wall. (See Appendix F- Wall Underpinning Tie Rod Example Layout Drawing for further details)

Pressure Grouting

- After completion of the grade beams the lower portion of the masonry wall will be pressure grouted with the intent of filling voids in the masonry wall and to replace lost mortar in the foundation zone between the grade beams.
- Drill 9 inches into existing foundation wall with a 5/8" masonry drill bit a maximum 2.5 feet on center, approximately 2 feet below finished floor elevation.
- Install ½" Pex Tubing into wall and extend out through the top of the grade beam.

- Once grade beams are poured and forms are removed, pressure grout using Portland cement grout through ½' Pex Tubing not exceeding 5 psi.

Helical Piles

- Upon completion of concrete grade beam installation and the required cure time, excavate as necessary at pile locations noted on drawing C-03.
- Remove soil as necessary under grade beam to allow for installation of underpin bracket
- Install 3.5" galvanized helical pile to required depth / minimum torque using a hydraulic drive motor mounted onto a mini excavator. There are (87) helical piles that will be installed in the locations identified on Drawing C-03. (Additional details regarding the helical pile materials and equipment to be used are included in the load testing and design calculations submittals).
- The Helical Pile sequencing will be the same as the grade beam sequencing (See Appendix A drawing).
- Mark pile shaft at cut-off elevation and cut with portable band saw
- Slide underpin bracket over shaft and rotate under new grade beam
- Install T-bracket on top of shaft and extend two (7/8") all-thread between underpin bracket and T-bracket; secure with required nuts and washers
- Install jack bracket on top of the underpin bracket system and preload pile to specified load.

2.0 Excavation and Backfill within the former MGP building

Excavation

- Upon completing the underpinning of grade beams, excavation within the former MGP building will commence.
- Remove any remaining sections of concrete floor slabs as needed using non vibratory methods (e.g. mini excavator with hydraulic breaker attachment and/or small pneumatic tools and saw cutting,

- Precut excavation to the bottom of grade beams (approx. 3.5' below existing grade) beginning in the Southeast room using a mini excavator.
- Remove excavated material using a rubber tracked skidsteer and place on the material handling pad for processing.
- Excavate deeper (additional 4' maximum) as needed based on direction from the Engineer.
- Based on the confirmation sample results and direction from the Engineer, either backfill or excavate additional material.
- Excavate under foundation walls as needed per direction from the Engineer in short segments no longer than 10' using a mini excavator and/or hand tools. Multiple segments may occur simultaneously with minimum separation of 15 feet. This may occur from the inside of the building or from the exterior.
- Excavation will not extend deeper than 4' below the bottom of the grade beam.
- Dewatering of excavation areas shall be maintained using 2" electric submersible pumps installed inside temporary sumps. Water will be collected, treated by the onsite WWTP and discharged.

Backfill

- Backfill within the building will follow the excavation and will not proceed until approved by the engineer and an as-built survey has been performed.
- Backfill will be stockpiled onsite and transported into the building using a rubber tracked skidsteer and placed with a mini excavator.
- Place backfill in uniform horizontal lifts not exceeding 6 inches.
- Compact common fill to a minimum of 95% of the material's maximum dry density and within 3% of optimum moisture content using a plate tamper and/or walk behind roller.
- Field Compaction testing will be performed by NYSDOT approved testing firm for every 2,500 square feet for each lift.

Materials

- Controlled low strength material (CLSM) with minimal compressive strength of 500 PSI for under building foundation as needed.
- Common Fill to within 6” of final grade
- Crusher run backfill for 6” final surface

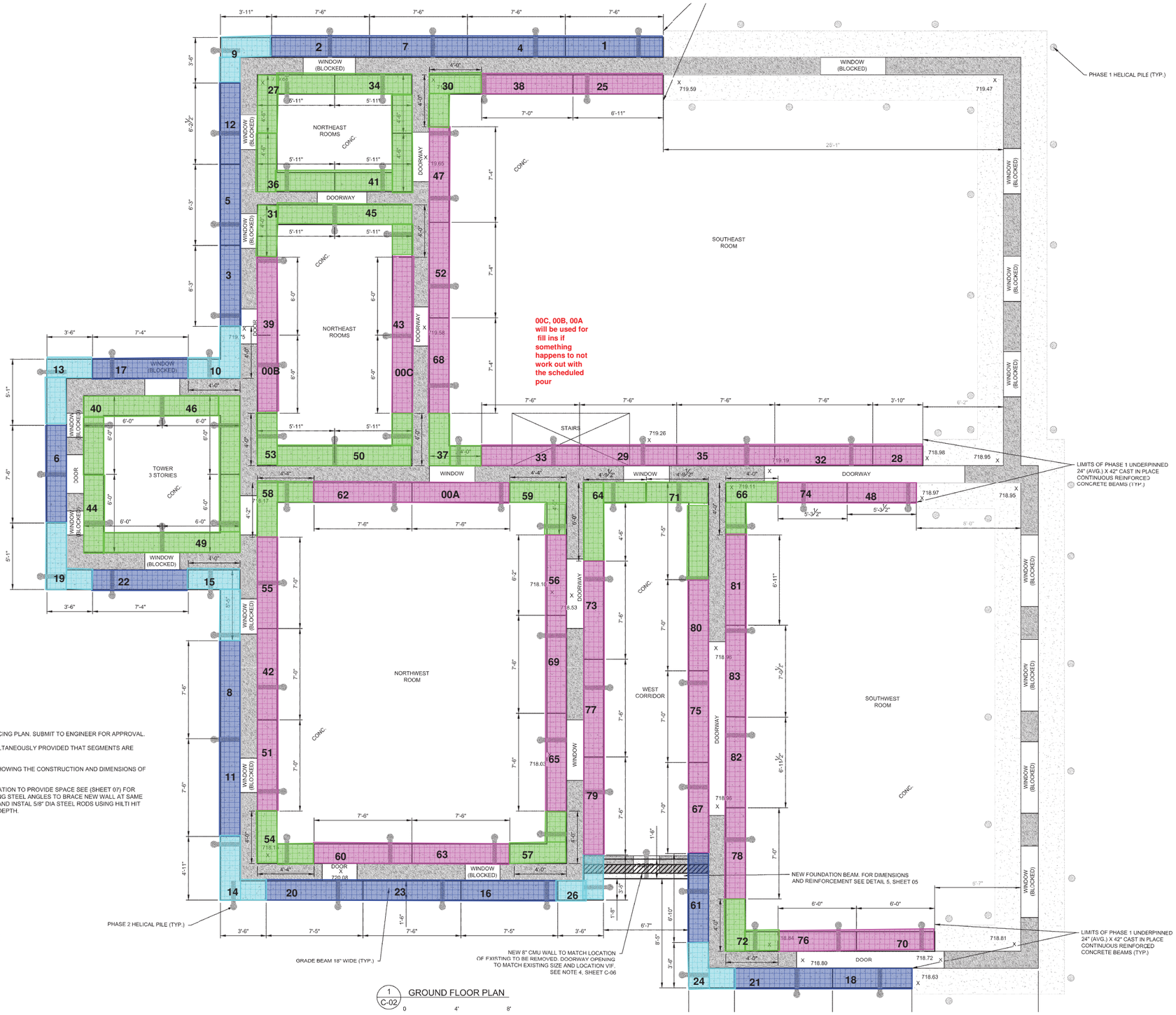
Excavation/Backfill Sequence

Larger rooms (SE, NW & SW rooms) will be performed in 3rds (ex. Southeast room: North 1/3rd, Middle 1/3rd, Southern 1/3rd of room).

- Southeast Room
- Northwest Room
- West Corridor
- Southwest Room
- Northeast Rooms
- Tower Room

Appendix A

Grade beam & Helical Pile Sequencing Plan



1 C-02 GROUND FLOOR PLAN

0 4' 8'

NOTES:

1. CONTRACTOR SHALL DEVELOP A GRADE BEAM SEQUENCING PLAN. SUBMIT TO ENGINEER FOR APPROVAL.
2. GRADE BEAMS SEGMENTS CAN BE CONSTRUCTED SIMULTANEOUSLY PROVIDED THAT SEGMENTS ARE SEPARATED BY AT LEAST 15 FEET (EDGE TO EDGE).
3. CONTRACTOR SHALL PROVIDE AN AS-BUILT DRAWING SHOWING THE CONSTRUCTION AND DIMENSIONS OF GRADE BEAM SEGMENTS.
4. REMOVE EXISTING CMU WALL AND SUPPORTING FOUNDATION TO PROVIDE SPACE SEE (SHEET 07) FOR NEW FOUNDATION BEAM AND NEW 8" CMU WALL. EXISTING STEEL ANGLES TO BRACE NEW WALL AT SAME LOCATIONS. FOR EACH ANGLE LEG ANCHORAGE, DRILL AND INSTAL 5/8" DIA STEEL RODS USING HILTI HIT HY 200 ADHESIVE ANCHORING SYSTEM. 4" EMBEDMENT DEPTH.
5. FOR PILE LAYOUT INFORMATION SEE SHEET C-03.

SES/CMI Notes
-Colors represent interior and exterior wall and corners beam segments and are not used for any particular sequencing.
-Sequence to follow numerical number assigned to each grade beam.
-Typically (4) beam segments cast each day (e.g. Day 1, cast beam segments #1,2,3,4)

PROJECT

BUILDING INTERIOR REMEDIATION AND WALL UNDERPINNING DESIGN
WATER STREET MANUFACTURED GAS PLANT
VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CLIENT

NYSEG
New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

ISSUE/REVISION

I/R	DATE	DESCRIPTION
0	01-09-2018	ISSUED FOR CONSTRUCTION

KEY PLAN

SHEET TITLE

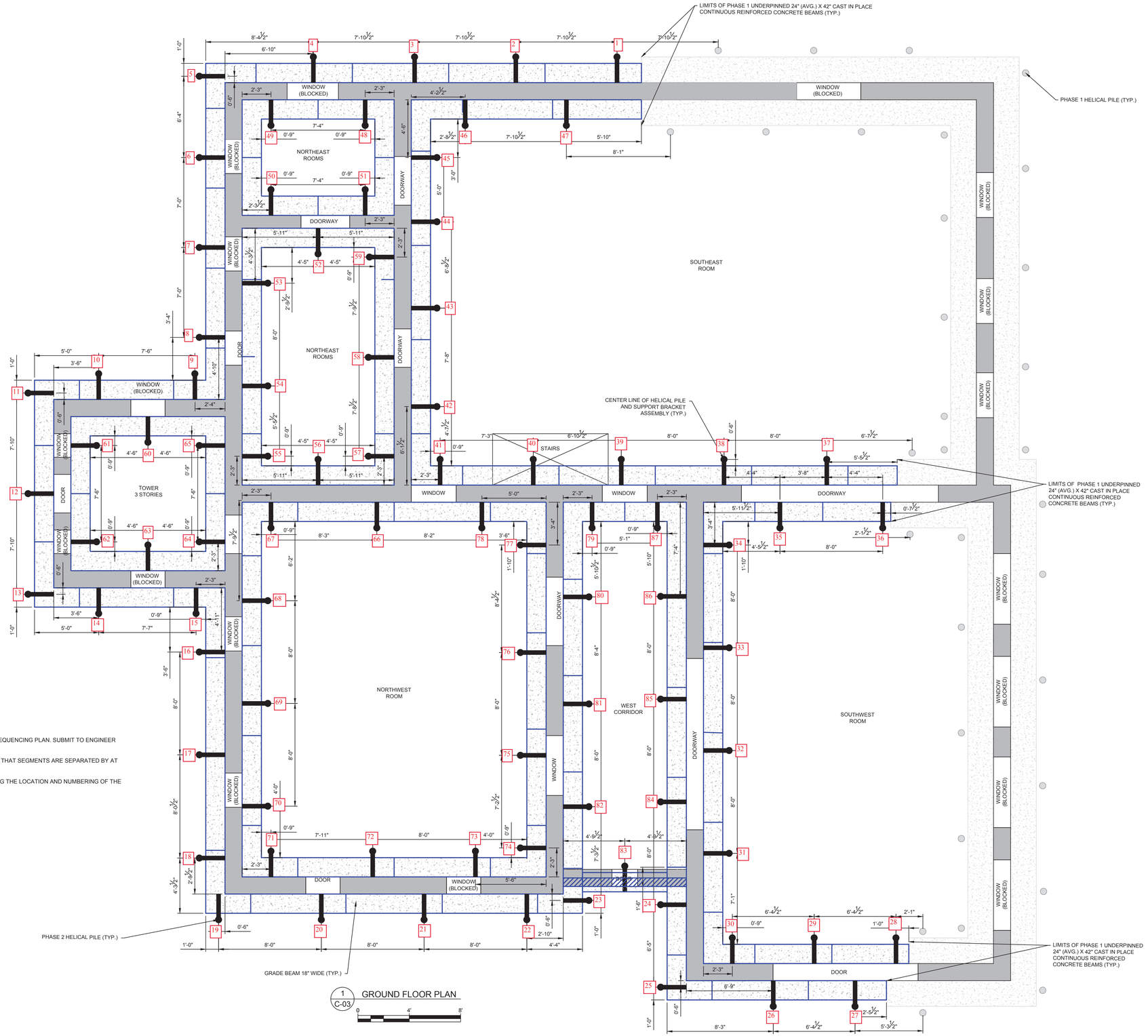
WALL UNDERPINNING BEAM LAYOUT

SHEET NUMBER

Project Management Initials: Designer:_____ Checked:_____ Approved:_____ A

ved by: MEISTERK (2018-01-09) Last Plotted: 2018-01-09
e: P:\60284725_NYSEG PENN YAN RD7.2 CADD\500\CIVIL\DESIGN\BUILDING\UNDERPIN-2\PENN-YAN_BUILDING_UNDERPIN-PLAN-2.DWG

Helical Pile Sequencing Plan



1 C-03 GROUND FLOOR PLAN

0 4' 8'

NOTES:

1. CONTRACTOR SHALL DEVELOP A HELICAL PILE INSTALLATION SEQUENCING PLAN. SUBMIT TO ENGINEER FOR APPROVAL.
2. HELICAL PILES CAN BE INSTALLED SIMULTANEOUSLY PROVIDED THAT SEGMENTS ARE SEPARATED BY AT LEAST 15 FEET.
3. CONTRACTOR SHALL PROVIDED AN AS-BUILT DRAWING SHOWING THE LOCATION AND NUMBERING OF THE HELICAL PILES.
4. FOR BEAM LAYOUT INFORMATION SEE SHEET C-02.

AECOM

PROJECT

BUILDING INTERIOR REMEDIATION AND WALL UNDERPINNING DESIGN
WATER STREET MANUFACTURED GAS PLANT
VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CLIENT

NYSEG
New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

ISSUE/REVISION

0	01-09-2018	ISSUED FOR CONSTRUCTION
I/R	DATE	DESCRIPTION

KEY PLAN

SHEET TITLE

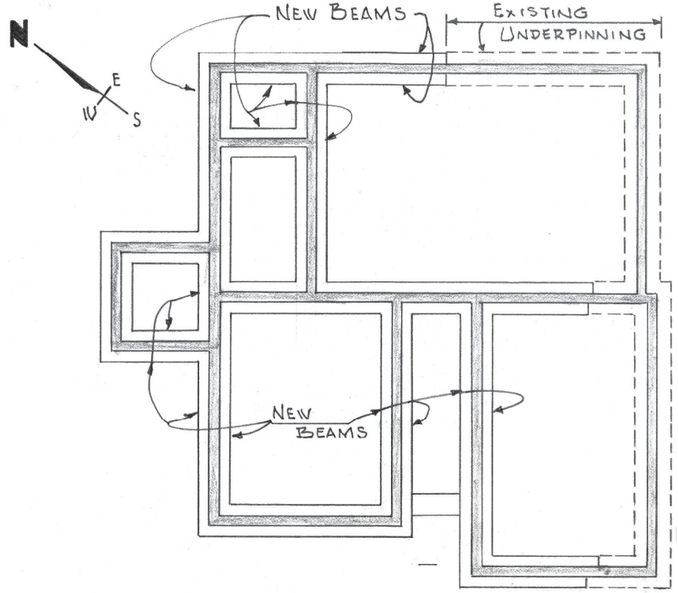
WALL UNDERPINNING PILE LAYOUT

SHEET NUMBER

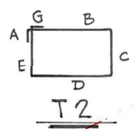
C-03

Appendix B

Grade beam reinforcing and tie-rod sleave detail



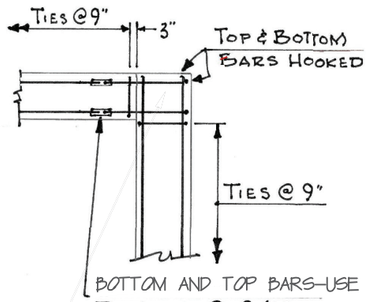
PLAN



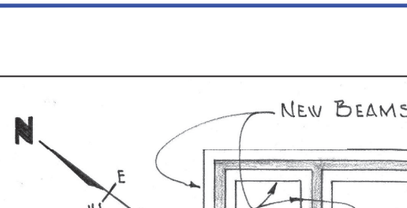
T2

BENDING SCHEDULE

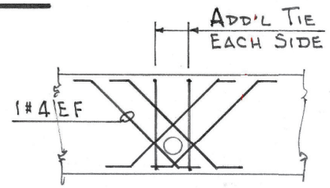
BIZE	TYPE	MARK	BENDING DETAILS A	B	C	D	E	F/R	G	H	J	K	O
4	T2	4R1	0-4 1/2	0-10	3-0	0-10	3-0		0-4 1/2				



TYPICAL CORNER DETAILS



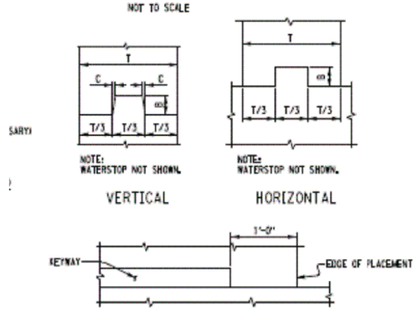
TYP. BEAM SECTION

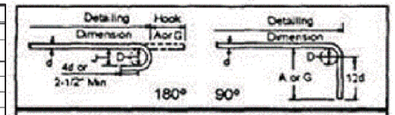


PIPE PENETRATION

REF. DRAWINGS
C-02, C-04
DATED 1-9-2018

KEYWAY DETAILS
NOT TO SCALE





SIZES OF 180-DEG HOOKS
D = 6d for #3 through #8
D = 8d for #9, #10, and #11
D = 10d for #14 and #18

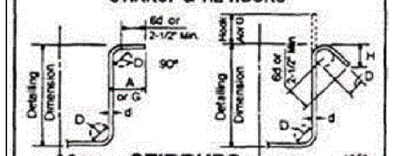
SIZES OF 90-DEG HOOKS
D = 6d for #3 through #8
D = 8d for #9, #10, and #11
D = 10d for #14 and #18

RECOMMENDED END HOOK DIMENSIONS

Bar Size	180° HOOKS All Grades A or G	180° HOOKS All Grades J	90° HOOKS All Grades A or G
#3	5	3	6
#4	6	4	8
#5	7	5	10
#6	8	6	1-0
#7*	10	7	1-2
#8*	11	8	1-4
#9*	1-3	11-1/4	1-7
#10*	1-5	10-1/4	1-10
#11	1-7	1-2-1/4	2-0
#14	2-2	1-6-1/2	2-7
#18	2-11	2-3	3-5

*These sizes - Grade 40 - check availability. Sizes #14 - #18, check availability; no Grade 40 under ASTM.

STIRRUP & TIE HOOKS



RECOMMENDED STIRRUP & TIE HOOK DIMENSIONS
Grades 40-50-60 ksi

Bar Size	D (in.)	90° HOOK Hook A or G	135° HOOK Hook A or G	135° HOOK Approx. H
#3	1-1/2	4	4	2-1/2
#4	2	4-1/2	4-1/2	3
#5	2-1/2	6	5-1/2	3-3/4

SWNP0323

ABBREVIATIONS
@ = EACH AT
B = BOTTOM
CB = CORNER BAR
DWG = DRAWING
DWLS = DOWELS
D & G = DRILL AND GROUT
E = EAST
EE = EACH END
EF = EACH FACE
EL = ELEVATION
EW = EACH WAY
FF = FAR FACE
FTG = FOOTING
H = HORIZONTAL
IF = INSIDE FACE
LG = LONGITUDINAL
MK = MARK
N = NORTH
NF = NEAR FACE
OF = OUTSIDE FACE
S = SOUTH
S.O.G. = SLAB ON GRADE
T = TOP
TR = TRANSVERSE
UON = UNLESS OTHERWISE NOTED
V = VERTICAL
W = WEST

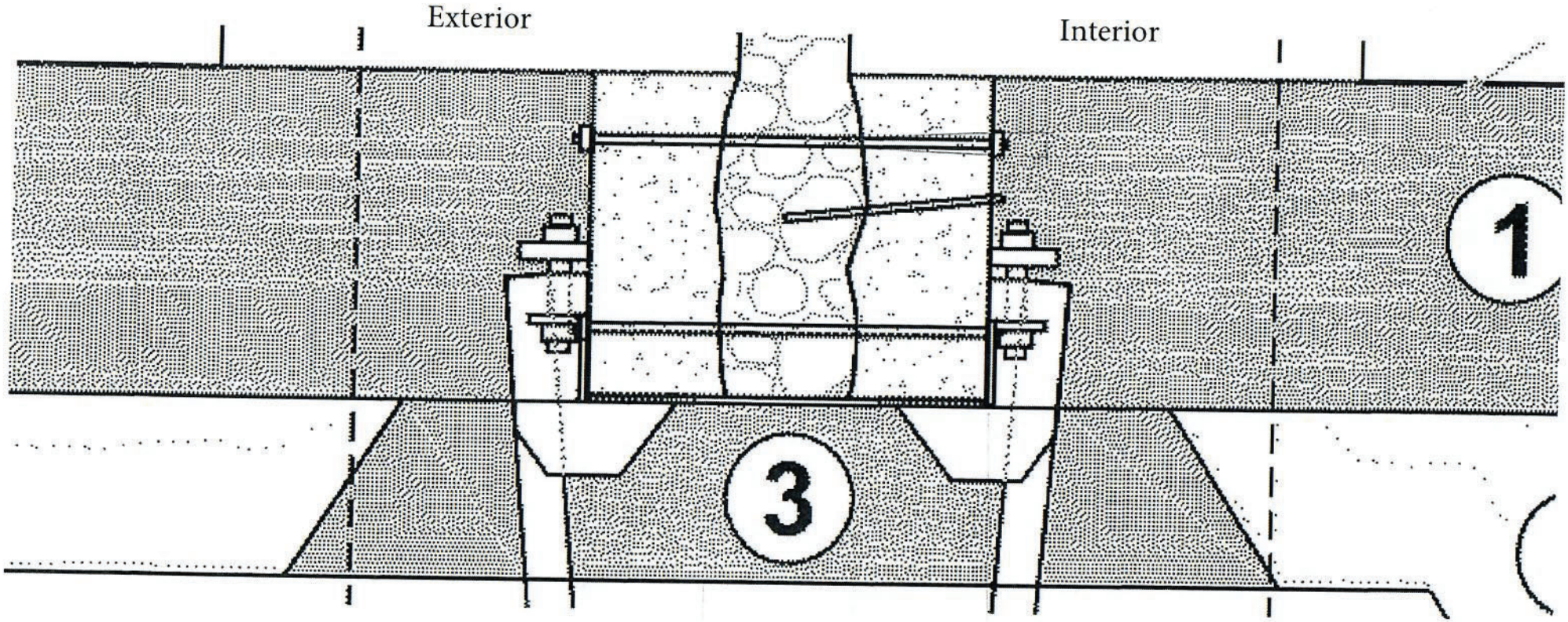
NOTES:
1. This drawing is to be used in conjunction with architectural and structural drawings.
2. Consult architectural and structural drawings for dimensions. Construction dimensions are not shown on this drawing.

REV.NO.	DATE	DESCRIPTION

4		
3		
2	10-31-2018	APPROVAL
1	10-18-2018	APPROVAL
	DATE	SENT FOR

ACP ARCHITECTURAL CONCRETE PLUS

Structure	NYSEG WATER STREET MANUFACTURED GAS PLANT
Location	PENN YAN, NEW YORK
Architect	
Engineer	AECOM
Customer	
Made by	D.M.K. Date 10-18-2018
CONTRACT NO.	
DRAWING COVERS	UNDERPINNING BEAMS
DRAWING NO.	R1



1 1/8"

1 3/8" Tapered insert To be Removed Same day

Core drill existing From This side

Appendix C

Concrete Supplier Information and mix design

Lehigh Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates New York, LLC
6895 Ellicott St.
Pavilion, NY 14525
1-(585)-584-3132

October 15, 2018

Architectural Concrete Plus LLC.
69 Hollister St.
Dundee, New York 14837

Re: NYSEG Water St., Penn Yan, NY

Gentlemen:

The following are our proposed materials and mix designs for the above project.

MATERIALS:

Cement -	Lehigh Cement, Type I/II (Low Alkali), ASTM-C150, NYSDOT approved.
Fine Aggregate -	Natural Sand processed by Hanson Aggregates NY, Inc., Phelps, N.Y., ASTM C-33, NYSDOT approved source #4-8F.
Coarse Aggregate -	Crushed Stone, processed by Hanson Aggregates NY, Inc., Oaks Corners, N.Y., ASTM C-33, NYSDOT approved source #4-8R.
Water Reducing Agent -	MIRA 62 manufactured by GCP Applied Technologies, ASTM C-494, Type A and Type F.
Air Entraining Agent -	Darex II, manufactured by GCP Applied Technologies, ASTM C-260.

MIX DESIGNS:	**4000 PSI Mix No. 4740017**	**4000 PSI Mix No. 4740003**
Cement	564# (6.0 Bags)	611# (6.5 Bags)
Fine Aggregate	1450# (ssd)	1300# (ssd)
Coarse Aggregate	1830# (#1's)	1750# (#1's)
MIRA 62	33.8 oz/yd	36.7 oz/yd
Darex II (*)	----	5.5 oz/yd
Water	280# +/-	270# +/-
W/(C+P)Ratio	0.42	0.45
Slump	4.0" +/- 1.0"	4.0" +/- 1.0"
Air Content	Non Air Entrained	6.0% +/- 1.5%
Remarks	Interior	Exterior

(*) Dosage may require adjustment to meet field conditions.

Architectural Concrete Plus LLC.
October 15, 2018

Enclosed, please find a copy of the following:

1. Two Hanson Aggregates, Inc. statistical analyses covering our proposed mix designs with 7 and 28 day test results.

2. Hanson Technical Services Lab report covering the latest test results on the fine aggregate.

3. Hanson Technical Services Lab reports covering the latest test results on the coarse aggregate.

4. GCP Applied Technologies product data sheet for MIRA 62 and Darex II.

5. Lehigh mill test report with chemical and physical analysis of the cement.

6. Western New York Ready Mix Producers concrete testing compliance letter.

In the unlikely event we need to change constituent materials to insure prompt quantitative deliveries to this project, we will do so at our discretion and substitute equitable materials in regards to cement, aggregates and admixtures.

Please order by mix number.

Respectfully Submitted,
Hanson Aggregates NY LLC

Galen Stone
Quality Control Supervisor

Hanson
HEIDELBERGCEMENT Group

Hanson Aggregates New York LLC
P.O. Box A
5126 S. Onondaga Road
Nedrow, NY 13120

Tel 315 469 3217
Fax 315 469 3940

www.lehighhanson.com

Job Site Cylinder Handling

(Summary of Field Testing Procedures)

1. Technician should be ACI certified as a Grade I Field Technician.
2. Testing should include: Slump, air entrainment, unit weight and temperature.
3. A water tank or cure box should be used to maintain the required curing environment during the initial curing period.
4. Samples shall be covered or protected in the technicians wheel barrel from the elements: sun, wind, rain, and evaporation
5. Cylinders should be cast near the location they are to be stored during the initial curing period. Testing should begin within 5 minutes of taking the sample and cylinders should be made within 15 minutes of taking the sample.
6. Cylinders should then be placed in a controlled environment where the temperature is maintained in the range of 60 – 80 degrees. If the concrete being poured and tested is 6000 psi then the range of the environment should be between 68 – 78 degrees. Temperatures in storage units such as cure boxes or coolers should be controlled using heating or cooling devises as necessary.
7. The minimum and maximum temperatures during the initial curing period in the cure box or storage devises should be documented by means of a minimum / maximum thermometer. The results should appear on all test reports issued.
8. Cylinders should be transported back to the testing laboratory within 24 to 48 hours, but not less than 8 hours after initial set time. Cylinders shall be transported in a method to prevent damage. The laboratory should not be more than 4 hours away.
9. Test reports should include all data: air, slump, unit weight, temperature as well as the compressive strength and minimum / maximum initial curing environment temperature readings.
10. The above summary is based directly on ASTM C-31 "Making and Curing Concrete Specimens in the Field".

Hanson Aggregates New York, Inc.

STATISTICAL ANALYSIS

Mix No. 4740003

4000 PSI

13-Oct-18

DATE	(Truck) SLUMP	AIR CONTENT	CONCRETE Temp. (f)	AIR Temp. (f)	WET UNIT WEIGHT	7 DAY STRENGTH	28 DAY STRENGTH cyld 1	28 DAY STRENGTH cyld 2	28 DAY STRENGTH cyld 3	28 DAY AVERAGE STRENGTH	RUNNING AVG. of 3 (28 DAY STRENGTH)
10-Jan-17	4 1/2	5.3	77	30	142.6	3607	5319	4896	5053	5089	
11-Jan-17	3 1/2	5.3	69	33	142.6	3872	5283	5068	5229	5193	
17-Jan-17	4 1/2	5	68	36	143.4	3741	5510	5352	5466	5443	5371
18-Jan-17	4 1/2	7.1	64	37		2733	4238	4072	4014	4108	5010
19-Jan-17	3 3/4	6	67	35	141.4	3944	5385	5261	5443	5363	5044
19-Jan-17	4 1/4	6.8	65	37		3773	5469	5555	5403	5476	5031
20-Jan-17	4 1/4	5.8	65	36		3518	5205	4955	5001	5054	5353
23-Jan-17	3 1/4	4.5	57	39		3904	5890	5879	5936	5902	5521
26-Jan-17	5 1/2	6.3	71	36		2743	4363	4238	4302	4301	5153
23-Feb-17	5	5.6	70	60		3530	5296	5012	5113	5140	5183
27-Feb-17	3	4.2	66	45		4116	5231	5422	5357	5337	4963
13-Mar-17	5	7.2	57	18		3203	4550	4461	4426	4479	5026
20-Mar-17	6 1/4	6.1	68	27	141	3023	4197	4377	4230	4268	4659
28-Mar-17	3 3/4	5.8	74	46	142.2	3971	5489	5470	5442	5467	4745
29-Mar-17	4	7	60	38		3582	5274	5222	5193	5230	4987
5-Apr-17	5	6.8	71	39	141	3529	4570	4533	4470	4524	5111
10-Apr-17	4 3/4	7.6	71	60	139.4	3294	4847	4787	4770	4801	4897
24-Apr-17	3 3/4	6.2	67	45	141.8	4006	4690	4941	4974	4868	4702
24-Apr-17	5	6.3	57	45		2947	4106	4299	4177	4194	4548
10-May-17	3 1/2	4.8	67	52	143	4255	5706	5675	5649	5677	4834
11-May-17	4	5.0	64	53	143.8	3711	4855	5108	5233	5065	4889
12-May-17	5	6.4	63	54	141.8	3494	4513	4584	4430	4509	5025
17-May-17	2 1/2	4.2	68	72	147.8	4392	6175	6084	6232	6164	5181
19-May-17	3 1/2	5.7	68	59	146.6	3662	5580	5772	5537	5630	5423
22-May-17	4 1/4	6.4	66	63	141.6	3305	4811	4651	4610	4691	5522
24-May-17	3 1/2	6.6	69	61	140.6	3286	4426	4674	4813	4638	4939
24-May-17	3 1/4	6.2	70	64	142.2	3630	5027	4827	4823	4892	4755
											3151
											1676
											0
											0
											0
	27	27	27	27	17	27	27	27	27	27	
AVERAGE:											
	4.19	5.93	67	45	142.52	3584				**5019**	
STANDARD DEV.:											
	0.842	0.916	4.87	13.19	2.07	424				**538**	
RANGE (HIGH):											
RANGE (LOW	6.3	7.6	77	72	147.8	4392				6164	
	2.5	4.2	57	18	139.4	2733				4108	

CONCRETE TEST REPORT SUMMARY

Mix No. 4740003
4000 PSI

ACI 214 SUMMARY

Statistical Strength Summary

Average Strength based on	27	tests:	5019	psi
Overall Adjusted Standard Deviation: *Control is Fair*			538	psi
ACI 214 Minimum Recommended Strength:			4791	psi

Hanson
HEIDELBERGCEMENT Group
Hanson Aggregates
Northeast Region
Northeast Region
392 Rt. 96
Phelps, NY 14532
Tel. 315-548-4913
Fax. 315-548-4914
www.hansonplc.com

MATERIALS EVALUATION

Fine & Coarse Aggregates

Source: Hanson @ **Phelps**, New York Plant #431 — **Quality Control**

Type: **ASTM #33 Natural Sand** — Report: **2017-431**
Lab NO: TS-Weekly-17 — Date: 05-28-17
Date: Received: 04-01-17

ASTM METHOD	TEST DESCRIPTION	TEST RESULTS			ASTM C-33 Specification	
		% Retained	% Passing		% Passing	
C-136	3/8" (9.50 mm) Sieve	0	**100**		100	
C-136	#4 (4.75 mm) Sieve	0	**100**		95-100	
C-136	#8 (2.36 mm) Sieve	12	**88**		80-100	
C-136	#16 (1.18 mm) Sieve	31	**69**		50-85	
C-136	#30 (0.60 mm) Sieve	59	**41**		25-60	
C-136	#50 (0.30 mm) Sieve	84	**16**		5-30	
C-136	#100 (0.15 mm) Sieve	93	7		0-10	
C-136	Fineness Modulus	2.79			2.3 – 3.1	
C-117	Decant (- #200 Sieve Washed)	1.8	% Passing		5.0 % Max.	
C-127	Relative Bulk Specific Gravity,		SSD	2.631		
C-127	Relative Bulk Specific Gravity,		DRY	2.583		
C-127	Absorption,			1.85	%	
C-29	Unit Weight (Dry Rodded),			108.2	Lbs/Cu.Ft.	
C-29	Unit Weight (Dry Loose),			102.9	Lbs/Cu.Ft.	
C-29	Voids Content (Dry Rodded),			34.1	%	
C-40	Organic Matter (P,F),			P		Liter Than #3
D-2419	Sand Equivalent Value,			87		
C-88	Soundness by Sodium Sulfate (5 cycles),	.....		4.30	% Loss	10.0 % Max.
C-88	Soundness by Magnesium Sulfate (5 cycles),	.....		6.50	% Loss	15.0 % Max.
C-25	Calcium Carbonate EQV,			0.5	%	
C-25	Acid Insoluble Residue,			99.5	%	

CC:
Craig Green
Quality Control Manager

Vartan Babakhanian, PE, FACI
Technical Services LAB Manager

Hanson
HEIDELBERGCEMENT Group
Hanson Aggregates
Northeast Region
2046 Pre-Emption Road
Oaks Corners, NY 14518
Tel. 315-789-6202
Fax. 315-789-1030
www.hansonplc.com

MATERIALS EVALUATION

Fine & Coarse Aggregates

Source: Hanson @ **Oaks Corners**, New York Plant #353 **(Size #1)** — **Quality Control**
Type: **ASTM #7(1/2"-#4)** Crushed Lime Stone — Report: **2017-353**
Lab NO: TS-Weekly-17 — Date: 05-28-17
Date: Received: 04-01-17

ASTM METHOD	TEST DESCRIPTION	TEST RESULTS			ASTM C-33 Specification	**New York DOT Specification**
C-136	1-1/2" Sieve	100	% Passing		100	**(Size #1)**
C-136	1" Sieve	100	% Passing		100	100
C-136	3/4" Sieve	100	% Passing		100	-------
C-136	1/2" Sieve	95	% Passing		90-100	90-100
C-136	3/8" Sieve	47	% Passing		4 0-70	--------
C-136	1/4" Sieve	8	% Passing		-------	0-15
C-136	#4 Sieve	4	% Passing		0-15	--------
C-136	#8 Sieve	1	% Passing		0-5	--------
C-117	Decant, (- #200 Sieve Washed)	0.90	% Passing		1.0% Max.	1.0 Max
C-127	Relative Bulk Specific Gravity,		SSD	2.671		
C-127	Relative Bulk Specific Gravity,		DRY	2.649		
C-127	Absorption,			0.80	%	
C-29	Unit Weight (Dry Rodded),			96.1	Lbs/Cu.Ft.	
C-29	Unit Weight (Dry Loose),			85.2	Lbs/Cu.Ft.	
C-29	Voids Content (Dry Rodded),			42.3	%	
C-131	L.A. Abrasion,			18.7	% Loss	50% Max.
D-6928	Micro Deval,			10.1	% Loss	
C-88	Soundness by Sodium Sulfate (5 cycles), ...			1.30	% Loss	12% Max.
C-88	Soundness by Magnesium Sulfate (5 cycles), ...			1.60	% Loss	18% Max.
C-123	Light Weight Pieces,			0.01	%	0.5% Max.
C-142	Clay Lumps and Friable Particles,			0.1	%	3.0% Max.
C-25	Calcium Carbonate EQV,			97.0	%	
C-25	Acid Insoluble Residue,			3.0	%	

CC:
Craig Green
Quality Control Manager

Vartan Babakhanian, PE, FACI
Technical Services LAB Manager

GCP Applied Technologies Inc.
62 Whittemore Avenue
Cambridge, MA 02140-1692
T 617-876-1400
gcpat.com/construction

Date: 1/8/2018

Craig Green
Hanson Aggregates
6895 Ellicott St.
Pavilion, NEW YORK 14525

Project Name: **Product Certification**
Product Selected: **MIRA® 62**

This is to certify that **MIRA 62**, a **Mid-Range Water Reducer**, as manufactured and supplied by GCP Applied Technologies Inc., is formulated to comply with the Specifications for Chemical Admixtures for Concrete, ASTM: **C494, Type A, F**, AASHTO: **M194, Type A, F**.

MIRA 62 does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in manufacturing.

Robert J. Hoopes
Product Development Engineer

MIRA® 62

Water-reducing and mid-range water-reducing admixture ASTM C494 Type A and F

Product Description

MIRA® 62 is a linear dose water-reducing and mid-range water-reducing admixture manufactured under rigorous quality control to ensure uniform, predictable performance. MIRA® 62 does not contain added calcium chloride. MIRA® 62 weighs approximately 8.8 lbs/gal (1.06 kg/L).

The superior dispersion capability of MIRA® 62 produces concrete with significantly improved early and ultimate compressive strength while maintaining near-neutral set times even in lower temperatures. The linear dose water reduction capability of MIRA® 62 also produces less permeable, more durable concrete.

Uses

MIRA® 62 is recommended for use with a wide range of concrete slumps including 3 to 8 in. (75 to 200 mm) where superior finishing characteristics is desired, particularly in commercial and residential flatwork and formed concrete applications.

MIRA® 62 may be used in a wide variety of applications including ready mix, job site and concrete paving plants for normal and lightweight concrete, and in block and precast products.

Product Advantages

MIRA® 62 offers significant advantages over conventional water reducers:

- Linear water reduction capability. The neutral set capability of MIRA® 62 throughout a wide range of dosage rates allows the producer to have "peace of mind" by knowing they can utilize a single admixture to meet all their water reducer and mid-range water reducer needs and requirements. The versatile water reduction capability of MIRA® 62 may be used to produce high quality, workable concrete over a wide range of water/cement ratios.
- Superior strength performance. The superior water reduction properties (up to 15%) and excellent dispersion characteristics allow the production of lower water to cement ratio concrete with more complete cement hydration. This combined effect results in increased compressive and flexural strengths at all ages.
- Near-Neutral set times. With MIRA® 62 concrete, near-neutral setting times can be maintained over a wide range of dosage rates and temperature conditions.
- Superior workability and finishability. The exceptional water-reducing performance allows for concrete production at 3 to 8 in. (75 to 200 mm) slumps, providing smooth flowing concrete with improved placement properties. Formulated with proven finishing enhancing components, MIRA® 62 controls bleeding while bringing the mortar to the surface. Floating and troweling, by machine or by hand, easily imparts a smooth, close tolerance surface with less machine time and labor
- Improved performance for use with pozzolans. MIRA® 62 improves the quality of lean, harsh concrete mixes and concrete that contains fly ash (both Class C and Class F) and GGBF slag, delivering superior workability, finishability and pumpability. The neutral set characteristics allow incremental cement replacement with pozzolans.

Finishability

Finishers have stated that the cement paste or mortar in MIRA 62 concrete has improved trowelability. Floating or troweling by hand or machine imparts a smooth, close tolerance surface.

Addition Rates

Addition rate may be varied to achieve the desired water reduction and set time. Typically, addition rates range from 2.5–15 fl oz/100 lbs (160–1000 mL/ 100 kg) of cementitious materials. Addition rates may vary depending on materials, job conditions and desired performance characteristics. Please consult your GCP Applied Technologies representative for information and assistance.

Compatibility with Other Admixtures and Batch Sequencing

MIRA® 62 is compatible with most GCP admixtures as long as they are added separately to the concrete mix, usually through the water holding tank discharge line. However MIRA® 62 is not recommended for use in concrete containing naphthalenebased admixtures including Daracem® 19 and Daracem® 100, and melamine-based admixtures including Daracem® 65. In general, it is recommended that MIRA® 62 be added to the concrete mix near the end of the batch sequence for optimum performance. Please see GCP Technical Bulletin TB-0110, *Admixture Dispenser Discharge Line Location and Sequencing for Concrete Batching Operations* for further recommendations. For optimum performance, different sequencing may be used if local testing shows better performance.

Pretesting of the concrete mix should be performed before use, as conditions and materials change in order to assure compatibility, and to optimize dosage rates, addition times in the batch sequencing and concrete performance. For concrete that requires air entrainment, the use of an ASTM C260 air-entraining agent (such as Daravair® or Darex® product lines) is recommended to provide suitable air void parameters for freeze-thaw resistance. Please consult your GCP Applied Technologies representative for guidance.

Packaging & Handling

MIRA® 62 is available in bulk, delivered by metered tank trucks, or in totes and drums.

MIRA® 62 will begin to freeze at approximately 25°F (-4°C) but will return to full strength after thawing and thorough agitation. In storage and for proper dispensing, the temperature of MIRA® 62 should be maintained above 32°F (0°C).

Dispensing Equipment

A complete line of accurate, automatic dispensing equipment is available.

Specifications

Concrete shall be designed in accordance with *Standard Recommended Practice for Selecting Proportions for Concrete*, ACI 211.

The mid-range water-reducing admixture shall be MIRA® 62 as manufactured by GCP Applied Technologies, or its equivalent. It shall be manufactured to meet all the requirements of *Specification for Chemical Admixtures for Concrete*, ASTM Designation C494 as a Type A and Type F admixture.

The admixture shall be delivered as a ready-to use, liquid product and shall not require mixing at the batching plant or job site. The admixture shall not contain added calcium chloride. It shall be used in strict accordance with manufacturers' recommendations.

Last Updated: 2018-01-19

gcpat.com/solutions/products/mira-mid-range-water-reducers/mira-62

GCP Applied Technologies Inc.
62 Whittemore Avenue
Cambridge, MA 02140-1692
T 617-876-1400
gcpat.com/construction

Date: 1/8/2018

Craig Green
Hanson Aggregates
6895 Ellicott St.
Pavilion, NEW YORK 14525

Project Name: **Product Certification**
Product Selected: **Darex® II AEA**

This is to certify that **Darex II AEA**, a **Air Entraining Agent**, as manufactured and supplied by GCP Applied Technologies Inc., is formulated to comply with the Specifications for Chemical Admixtures for Concrete, ASTM: **C260**, AASHTO: **M154**.

Darex II AEA does not contain calcium chloride or chloride containing compounds as a functional ingredient. Chloride ions may be present in trace amounts contributed from the process water used in manufacturing.

Robert J. Hoopes
Product Development Engineer

DAREX® II AEA

Air-entraining admixture

ASTM C260

Product Description

Darex® II AEA is an air-entraining admixture which generates a highly stable air void system for increased protection against damage from freezing and thawing, severe weathering, or de-icer chemicals. Darex II AEA is a complex mixture of organic acid salts in an aqueous solution specifically formulated for use as an air-entraining admixture for concrete and is manufactured under rigid control which provides uniform, predictable performance. It is supplied ready-to-use and does not require pre-mixing with water. Darex II AEA is a dark brown liquid. One gallon weighs 8.7 lbs (1.04 kg/L). Darex II AEA complies to ASTM C260 *Standard Specifications for Air-Entraining Admixtures for Concrete.*

Uses

Darex II AEA is used in ready-mix, block, and concrete products plants to improve air entrainment stability. It is particularly effective in maintaining air content during longer haul times. Darex II AEA performs well in conventional concrete and is effective in plasticizing mixes and with slag, lightweight, or manufactured aggregates which tend to produce harsh concrete.

Darex II AEA entrains air effectively with microsilica concrete and with fly ash concrete.

Performance

By agitation of concrete mixers, Darex II AEA disperses and generates millions of discrete semi-microscopic bubbles throughout the concrete composite. Once thoroughly mixed, the concrete contains a stable network of bubbles which act much like ball bearings increasing mobility, or plasticity, of the concrete. This aids workability to the mix and permits a reduction of water with no loss of slump. Placeability is improved. Bleeding, segregation and green shrinkage are minimized.

Through the purposeful entrainment of air, Darex II AEA markedly increases the durability of concrete to all exposures.

Product Advantages

- Air stability makes it particularly useful for longer transit times
- Produces excellent air void systems in concretes that are traditionally difficult to air entrain

Addition Rates

There is no standard addition rate for Darex II AEA. The amount to be used will depend upon the amount of air required under job conditions, usually in the range of 4 to 7%. Typical factors which might influence the amount of air entrained are temperature, cement, sand gradation, and use of extra fine materials such as fly ash. Typical Darex II AEA addition rates generally range from ½ to 5 fl oz/100 lbs (30 to 320 mL/100 kg) of cement.

The air-entraining efficiency of Darex II AEA becomes even greater when used with water-reducing and set-retarding agents. This may allow a reduction of up to ⅔ in the amount of Darex II AEA required for the specified air content.

Mix Adjustment

Entrained air results in increased yields with a consequent decrease in the cement content of the placed concrete. This condition calls for a mix adjustment, usually accomplished by reducing the fine aggregate content. This is in addition to the reduction in water content brought about by the increase in plasticity.

Compatibility with Other Admixtures and Batch Sequencing

Darex II AEA is compatible with most Grace admixtures as long as they are added separately to the concrete mix. In general, it is recommended that Darex II AEA be added to the concrete mix near the beginning of the batch sequence for optimum performance, preferably by "dribbling" on the sand. Different sequencing may be used if local testing shows better performance. Please see Grace Technical Bulletin TB-0110, *Admixture Dispenser Discharge Line Location and Sequencing for Concrete Batching Operations* for further recommendations. Darex II AEA should not be added directly to heated water.

Pretesting of the concrete mix should be performed before use, and as conditions and materials change in order to assure compatibility, and to optimize dosage rates, addition times in the batch sequencing and concrete performance. Please consult your Grace representative for guidance.

Packaging & Handling

Darex II AEA is available in bulk, delivered by metered tank trucks, totes and drums. **Darex II AEA will freeze at about 30°F (-1°C), but its air-entraining properties are completely restored by thawing and thorough mechanical agitation.**

Dispensing Equipment

A complete line of accurate dispensing equipment is available. These dispensers can be located to discharge into the water line, the mixer, or on the sand.

Specifications

Concrete shall be air entrained concrete, containing 4 to 7% entrained air. The air contents in the concrete shall be determined by the pressure method (ASTM Designation C231), gravimetric method (ASTM Designation C138) or volume metric method (ASTM Designation C173). The air-entraining admixture shall be Darex II AEA as manufactured by Grace Construction Products, or equal. The air-entraining admixture shall be added at the concrete mixer or batching plant at approximately ½ to 5 fl oz/100 lbs (30 to 320 mL/100 kg) of cement, or in such quantities as to give the specified air contents.

www.graceconstruction.com

North American Customer Service: 1-877-4AD-MIX1 (1-877-423-6491)

AIR-3H Printed in U.S.A. 11/07 FA/LI/1M

GRACE

LEHIGH
HEIDELBERGCEMENT Group

Mill Test Certificate Report

Type: II ASTM

Grind Number: May-18

Test Period: 05-03-18 **to:** 05-25-18

Certification

Lehigh Cement Company, LLC certifies that at time of shipment, the portland cement designated as Type II manufactured at the Picton, Ontario plant conforms to the standard composition and physical requirements of the current Standard Specification for Portland Cement of ASTM C 150 for Type II portland cement. This certification carries no other express or implied warranties and Lehigh Cement Company LLC, is not responsible for improper use or workmanship of the described cement.

General Information

Supplier:	**Supplier:**	Lehigh Cement Company LLC	**Source Location:** Picton Plant
Address:	**Address:**	1370 Highway 49 South Picton, ON, K0K 2T0	**Contact:** Mike Stanzel
Telephone:	**Telephone:**	613-476-3233	1-226-868-4422

Test Data on ASTM "Standard" Requirements

Chemical Requirements (ASTM C-150, Table 1)

Item	Limit	Results	
SiO_2	A	21.47	
Al_2O_3	6.0 Max	4.78	
Fe_2O_3	6.0 Max	3.43	
CaO	A	64.00	
MgO	6.0 max	2.01	
SO_3	D	3.03	
Loss on Ignition	3.5 max	2.01	
Na_2O	A	0.10	
K_2O	A	0.66	
Insoluble Residue	1.5 max	-	
CO_2	A	1.47	
Limestone %	5.0 max	3.82	
$CaCO_3$ in Limestone	70% Min	87.5	
Potential Compounds:		Adjusted	Base
C_3S	A	43.73	45.46
C_2S	A	27.29	28.38
C_3A	8 max	6.71	6.97
C_4AF	A	10.23	10.64
$C_3S+4.75*C_3A$	<100	76	

Physical Requirements (ASTM C-150, Table 3)

Item	Limit	Results
Fineness:		
% Retained 45µm (No. 325)	A	3.51
Blaine Fineness (m^2/Kg)	260 min	352
Autoclave Expansion (%)	0.8 max	-0.01
Vicat Setting Time:		
Initial Set (minutes)	45 min	135
Normal Consistency		25.4
Air Content (%)	12 max	7.2
Compressive Strengths Mpa:		
1-Day	A	13.58
3-Day	10.0 min	23.30
7-Day	17.0 min	31.60
28-Day	A	46.34
Compressive Strengths, PSI:		
1-Day	A	1969
3-Day	1450 min	3379
7-Day	2470 min	4582
28-Day	A	6720
Mortar Bar Expansion, C-1038, %	Max 0.020	-

Test Data on ASTM Optional Requirement

Chemical Requirements (ASTM C-150, Table 2)

Item	Limit	Results
Equivalent Alkalies	0.6 max	0.54
Cl		0.000

Physical Requirements (ASTM C-150, Table 4)

Item	Limit	Result
False Set	Min 50	90
Heat of Hydration, 3-day C-1702, cal/g (2/17)		355.22

Notes

Footnotes: A: no limit applicable SG=3.15
D: if SO3 exceeds 3.0%, C-1038 shall not be more than 0.020%

July 17, 2018
Date

Quality Control Manager:

Western New York Ready Mix Producers

Lafarge A & C	United Materials LLC	Hanson Aggregates NY, LLC
Manitou Concrete	Northrup Materials	Cleason Concrete
	American Concrete	
	Great Lakes Concrete Products LLC	

Dear Sir or Madam:

We are confident you agree that compliance with accepted standards and codes is a critical issue in quality assurance and maintaining public safety in today's climate of corporate legal liability. Strict adherence to industry accepted construction standards and codes will protect owners, builders, engineers and suppliers and are not optional requirements.

As our industry continues to evolve, we have been required to make investments in equipment, R & D and quality assurance in order to comply with revisions to the building codes, meet increased expectations of project owners and to take advantage of current technology. As we have undertaken this transition, we have directed our efforts on maintaining compliance with the appropriate standards and specifications in order to ensure performance of our products. As ready mix producers, we are concerned about the impact of continued deviations from nationally accepted testing standards and codes and in accordance with ACI we cannot accept responsibility for the consequences associated with these non-conforming practices.

We assure the quality of our products only when tested in strict compliance with the agreed upon standards. As stipulated in ACI 301, results from tests which are not in compliance with the agreed upon standards are not valid in determining the acceptability of our products.

"ACI 301-10 1.6.5.1 - ***Evaluation is valid only if tests have been conducted in accordance with procedures specified.***"

We bring this to your attention as a result of the recent changes to the Building Code of New York State. As stated in 19 NYCRR 1221 - Building Code of New York State (BCNYS) Structural Tests and Special Inspections "The project owner or the RDP acting as the owner's agent is responsible for employing the SI." It is our intention to inform and assist you, utilizing the attached checklist, when we observe and document non-conforming testing procedures. Thus, corrective measures can be implemented expeditiously and validity of the test results can be restored. We encourage you to review the checklist with all appropriate parties to insure the validity of the test results being provided.

Finally, we ask that you specifically enforce ACI 318-11, Section 5.6.1 whereby all reports of acceptance testing of the concrete are required to be provided to all parties, including the concrete producer, in a timely manner. Given this information we can react quickly before a problem develops into a major concern.

If we can be of any assistance, or if you would like further information, please do not hesitate to contact us. We are confident that we can work cooperatively to continue to raise the standard of professionalism of our industry.

Sincerely,
Hanson Aggregates New York, LLC

READY MIX CONCRETE INSPECTION CHECKLIST

Project: _____ Date: _____
Testing Agency: _____ Mix Code: _____
Technician's Name: _____

Testing performed by ACI Certified Personnel _____
(Certification status can be verified at http://www.concrete.org/certification/cert_search.asp)

Sampling in accordance with ASTM C-172 _____
NCDD noted _____

Slump test in accordance with ASTM C-143 _____
NCDD noted _____

Air test in accordance with ASTM C-231 or C-173 _____
NCDD noted _____

Cylinders cast in accordance with ASTM C-31 _____
NCDD noted _____

Single use Molds Re-Used ASTM C-470 _____
NCDD noted _____

Is Power (110V outlet) available for the laboratories use? _____

Specimens stored in temperature controlled curing box? _____

Min/Max thermometer used in curing box? _____

Were photographs taken? _____

NOTE: As stipulated in ACI 301, results from tests which are not in compliance with the agreed upon standards are not valid in determining the acceptability of our products. To be a valid test, the following procedures and others stated by ASTM C-31 **MUST** be adhered to.

> ***"Specimens will be stored on-site for initial curing 60-80 degrees (68-78 for 6000 psi+) with protection from moisture loss. Specimens will be transported to lab with protection from moisture loss. Specimens will be cured until specific test age at proper temperature and moisture conditions."***
>
> ***ASTM C31 - 11.1 "Prior to transporting, cure and protect the specimens as required in Section 10. Specimens shall not be transported until at least 8 h after final set. . During transporting, protect the specimens with suitable cushioning material to prevent damage from jarring. During cold weather, protect the specimens from freezing with suitable insulation material. Prevent moisture loss during transportation by wrapping the specimens in plastic, wet burlap, by surrounding them with wet sand, or tight fitting plastic caps."***

ADDITIONAL NOTES / COMMENTS:

Who was notified of these observations on site?

Inspection Agency _____

Contractor _____

Engineer _____

Prepared by: _____

Preparer's Signature: _____ Date: _____

Lehigh Hanson
HEIDELBERGCEMENT Group

Appendix D

Mechanical Connector Data Sheets

D250SCA BAR LOCK COUPLER

TECHNICAL DATA SHEET

DESCRIPTION

The D250SCA Bar Lock is a Type 1 rebar coupler consisting of a thick walled tube, specially designed lock shear bolts, serrated grip rails, and a center stop pin. The D250SCA is made from USA melted and rolled steel.

APPLICATION

The D250SCA Bar Lock Coupler is used to provide a continuous path of mechanical reinforcing between two pieces of the same diameter rebar.

PRODUCT SPECIFICATION

- Rebar sizes #3 (13mm) through #18 (57mm)
- Available in plain, epoxy coated or galvanized finish (call for availability for galvanized finish)
- Designed to achieve type I splice when used with grade 60 rebar

FEATURES

- Quick and easy installation
- No bar end preparation
- Installation at the job site
- Used in tension, compression and seismic applications

BENEFITS

- Saves time and money
- No fabrication required
- One product for all applications

TECHNICAL DATA

Product Code		Bar Size Designation			Product Specifications			
Black	Epoxy	US	Metric (mm)	CN (M)	Outside Diameter (in.)	Length (in.)	Weight (lbs.)	Coupler Designation
400200	400210	#3	[10]	-	1.3	3.9	1.24	3 S/CA
400200	400210	#4	[13]	[10]	1.3	3.9	1.24	4 S/CA
400201	400211	#5	[16]	[15]	1.7	4.5	2.11	5 S/CA
400202	400212	#6	[19]	[20]	1.9	6.3	3.57	6 S/CA
400203	400213	#7	[22]	-	1.9	8.0	4.30	7 S/CA
400204	400214	#8	[25]	[25]	2.4	10.2	6.10	8 S/CA
400205	400215	#9	[29]	[30]	2.9	9.0	11.88	9 S/CA
400206	400216	#10	[32]	-	2.9	11.5	15.17	10 S/CA
400207	400217	#11	[36]	[35]	3.1	14.0	20.50	11 S/CA
400208	400218	#14	[43]	[45]	3.5	16.5	27.57	14 S/CA
400209	400219	#18	[57]	[55]	4.3	27.2	62.00	18 S/CA

Product Code		Bolt Specifications			Meets or Exceeds			
Black	Epoxy	Bolt Qty.	Head Size (in.)	Nominal Shear Torque*	Min % Fy**	CAL TRANS Service	ICC Type 1	Barrel Stamp Identification
400200	400210	4	0.5	40	135	YES	YES	3S...CA
400200	400210	4	0.5	40	135	YES	YES	4S...CA
400201	400211	4	0.5	80	135	YES	YES	5S...CA
400202	400212	6	0.5	80	135	YES	YES	6S...CA
400203	400213	8	0.5	80	135	YES	YES	7S...CA
400204	400214	8	0.625	180	135	YES	YES	8S...CA
400205	400215	6	0.75	350	135	YES	YES	9S...CA
400206	400216	8	0.75	415	135	YES	YES	10S...CA
400207	400217	10	0.75	415	135	YES	YES	11S...CA
400208	400218	12	0.75	475	135	YES	YES	14S...CA
400209	400219	20	0.75	475	135	YES	YES	18S...CA

Note in place of the "...", each Bar Lock Coupler is marked with a tracking code used for full manufacturing traceability.

* Foor pounds

** When used in conjusction w/ epoxy-coated Grade 60 rebar, 125% Fy strength is developed. Galvanized Finish available. Call for details.

APPROVALS / COMPLIANCE

- ACI 318-II Type 1 (ASTM Gr. 60bar)
- ICC AC-133
- Army Corps of Engineers CW 03210
- AASHTO
- International Build Code (IBC)

INSTALLATION

1. Insert the end of the first rebar halfway into the coupler until it contacts the center stop pin.
2. Holding the first rebar in place, tighten all the bolts on that half until they are hand tight against the rebar.
3. Insert the end of the second rebar halfway into the coupler until it contacts the center stop pin.
4. Holding the second rebar in place, tighten all the bolts on that half until they are hand tight against the rebar.
5. In a random alternating pattern, tighten all bolts to approximately 50% of the specified bolt torque value
6. In a random alternating pattern, tighten all bolts to approximately 75% of the specified bolt torque value.
7. In a random alternating pattern, tighten all bolts until all the heads of the bolts shear off.
8. Prior to bolt tightening, the serrated rails MUST remain aligned in the same position as they were manufactured. If they are damaged or knocked out of alignment while positioning, installation MUST cease and a new coupler used.

File Date: 8/2/2017

TECHNICAL DATA SHEET

9. Bolt tightening MUST be done in a random alternating pattern similar to tightening the lug nuts on an automobile wheel.
10. A high quality 1” pneumatic drive impact wrench, with at least 100 psig air flow and 185 CFM of delivered air through a no less than 0.75” hose MUST be used for installation.

HOW TO ORDER

Specify: (1) quantity, (2) name, (3) bar size, (4) finish
Example: 500, D250SCA Bar Lock Rebar Couplers, #18, Epoxy Coated

ORDERING INFORMATION

BLACK (MADE IN USA)

Product Code	Description	Weight
400200	#3 [10MM]	1.22 LB
400200	#4 [13MM]	1.22 LB
400201	#5 [16MM]	2.10 LB
400202	#6 [19MM]	3.50 LB
400203	#7 [22MM]	4.30 LB
400204	#8 [25MM]	7.48 LB
400205	#9 [29MM]	11.81 LB
400206	#10 [32MM]	15.07 LB
400207	#11 [36MM]	20.50 LB
400208	#14 [43MM]	27.50 LB
400209	#18 [57MM]	64.00 LB

EPOXY (MADE IN USA)

Product Code	Description	Weight
400210	#3 [10MM]	1.25 LB
400210	#4 [13MM]	1.25 LB
400211	#5 [16MM]	2.12 LB
400212	#6 [19MM]	3.59 LB
400213	#7 [22MM]	4.38 LB
400214	#8 [25MM]	6.15 LB
400215	#9 [29MM]	11.90 LB
400216	#10 [32MM]	15.1 LB
400217	#11 [36MM]	20.14 LB
400218	#14 [43MM]	27.5 LB
400219	#18 [57MM]	62.0 LB

MANUFACTURER

Dayton Superior Corporation
1125 Byers Road
Miamisburg, OH 45342
Customer Service: 888-977-9600
Technical Services: 877-266-7732
Website: www.daytonsuperior.com

WARRANTY (ACCESSORIES)

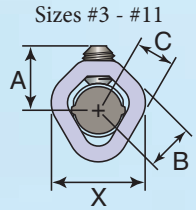
Limited Warranty. Dayton warrants, for a period of 60 days from the date of shipment (three years from the date of shipment in the case of formwork, excluding any consumable Products included with such formwork), that Products and any associated application drawings and engineering services provided by Dayton (“Ancillary Services”) will be free from defects in material and workmanship and, in the case of custom designed formwork, that the formwork will meet the specifications set forth in the design drawings approved by Dayton and Customer. Any claim under this warranty must be made in writing within such warranty period. If any Product and/or Ancillary Service covered by a timely claim are found to be defective, Dayton will, within a reasonable time, make any necessary repairs or corrections or, at Dayton’s option, replace the Product. Unless pre-authorized by Dayton in writing, Dayton will not accept any charges for correcting defects or accept the return of any Product. This warranty will not apply to any Products that have been subjected to misuse, neglect, storage damage, misapplication, accident or any other damage caused by any person other than Dayton, or that have not been maintained in accordance with Dayton’s specifications. THIS LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES AS TO THE PRODUCTS AND ANCILLARY SERVICES. DAYTON MAKES NO OTHER WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE. THE REMEDIES SET FORTH IN THIS SECTION ARE CUSTOMER’S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY.

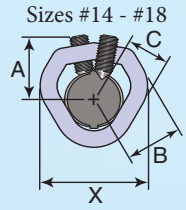
ZAP SCREWLOK® DATA SHEET

Dimensions & Data

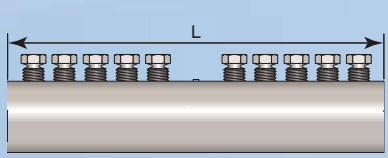
[inch-pound units]

END VIEW
(AFTER ASSEMBLY)



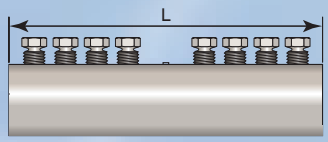


ZAP SCREWLOK TYPE 2 / EPOXY



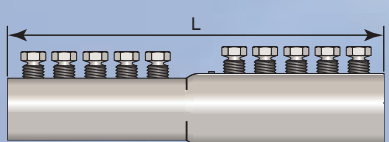
REBAR SIZE	PRODUCT CODE TYPE 2	PRODUCT CODE EPOXY	COUPLER WEIGHT (LB)	LENGTH 'L' (IN)	'A' (IN)	'B' (IN)	'C' (IN)	'X' (IN)	NUMBER SCREWS PER BAR	AVERAGE SCREW TORQUE (FT-LB)	MIN.IMPACT WRENCH RATING (FT-LB)
3	03ZBA	03ZEA	1.0	5	13/16	5/8	7/16	1 1/8	2	60	250
4	04ZBA	04ZEA	2.2	7	1 1/16	11/16	1/2	1 3/8	3		
5	05ZBA	05ZEA	3.4	9	1 1/8	3/4	5/8	1 5/8	4		
6	06ZBA	06ZEA	4.7	11	1 3/16	15/16	11/16	1 3/4	5		
7	07ZBA	07ZEA	7.6	13	1 1/4	1 1/16	13/16	2 1/16	5	105	500
8	08ZBA	08ZEA	10.9	15 1/4	1 5/16	1 1/16	7/8	2 1/4	6		
9	09ZBA	09ZEA	17.6	16 3/4	1 5/8	1 1/4	1 1/16	2 5/8	6	215	750
10	10ZBA	10ZEA	21.4	19 1/8	1 11/16	1 7/16	1 1/8	2 3/4	7		
11	11ZBA	11ZEA	25.4	21 1/2	1 13/16	1 1/2	1 1/4	2 15/16	8		
14	14ZBA	14ZEA	37.2	18	2 5/16	1 3/4	1 1/2	3 3/4	10	350	1000
18	18ZBA	18ZEA	74.0	29 1/2	2 1/2	2 1/4	1 13/16	4 3/8	21		

ZAP SCREWLOK SL



REBAR SIZE	PRODUCT CODE SL	COUPLER WEIGHT (LB)	LENGTH 'L' (IN)	'A' (IN)	'B' (IN)	'C' (IN)	'X' (IN)	NUMBER SCREWS PER BAR	AVERAGE SCREW TORQUE (FT-LB)	MIN.IMPACT WRENCH RATING (FT-LB)
4	04SZBA	1.5	5	1 1/16	11/16	1/2	1 3/8	2	60	250
5	05SZBA	2.6	7	1 1/8	3/4	5/8	1 5/8	3		
6	06SZBA	3.8	9	1 3/16	15/16	11/16	1 3/4	4		
7	07SZBA	6.2	10 3/4	1 1/4	1 1/16	13/16	2 1/16	4	105	500
8	08SZBA	9.3	13	1 5/16	1 1/16	7/8	2 1/4	5		
9	09SZBA	14.3	13 7/8	1 5/8	1 1/4	1 1/16	2 5/8	4	215	750
10	10SZBA	18.2	16 1/2	1 11/16	1 7/16	1 1/8	2 3/4	5		
11	11SZBA	22.3	19 1/8	1 13/16	1 1/2	1 1/4	2 15/16	6		
14	14SZBA	32.0	15 3/8	2 5/16	1 3/4	1 1/2	3 3/4	8	350	1000
18	18SZBA	58.4	23 1/2	2 1/2	2 1/4	1 13/16	4 3/8	16		

ZAP SCREWLOK TRANSITION



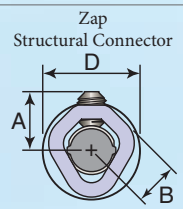
REBAR SIZE	PRODUCT CODE TRANSITION	COUPLER WEIGHT (LB)	LENGTH 'L' (IN)	'A' (IN)	'B' (IN)	'C' (IN)	'X' (IN)	NUMBER SCREWS PER BAR	AVERAGE SCREW TORQUE (FT-LB)	MIN.IMPACT WRENCH RATING (FT-LB)
5/4	05/04ZBA	3.0	8	1 1/8	3/4	5/8	1 5/8	3	60	250
6/4	06/04ZBA	4.3	10	1 3/16	15/16	11/16	1 3/4	4		
6/5	06/05ZBA									
7/5	07/05ZBA	6.8	12	1 1/4	1 1/16	13/16	2 1/16	4	105	500
7/6	07/06ZBA									
8/5	08/05ZBA	9.9	14 1/8	1 5/16	1 1/8	7/8	2 1/4	5		
8/6	08/06ZBA									
8/7	08/07ZBA									
9/6	09/06ZBA	16.2	15 9/16	1 5/8	1 1/4	1 1/16	2 5/8	5	215	750
9/7	09/07ZBA									
9/8	09/08ZBA									
10/7	10/07ZBA	20.1	17 15/16	1 11/16	1 7/16	1 1/8	2 3/4	6		
10/8	10/08ZBA									
10/9	10/09ZBA									
11/7	11/07ZBA	20.1	17 15/16	1 13/16	1 1/2	1 1/4	2 13/16	6		
11/8	11/08ZBA									
11/9	11/09ZBA									
11/10	11/10ZBA	22.8	20 5/16	1 13/16	1 1/2	1 1/4	2 13/16	7		
14/10	14/10ZBA	34.3	15 3/8	2 5/16	1 3/4	1 1/2	3 3/4	8	350	1000
14/11	14/11ZBA									
18/11	18/11ZBA	53.2	18 9/16	2 1/2	2 1/4	1 13/16	4 3/8	12		
18/14	18/14ZBA									

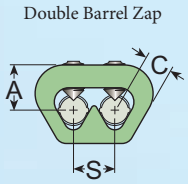
ZAP SCREWLOK® DATA SHEET

Dimensions & Data (page 2)

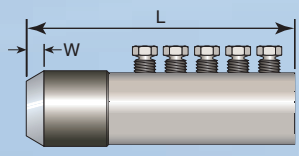
[inch-pound units]

END VIEW
(AFTER ASSEMBLY)



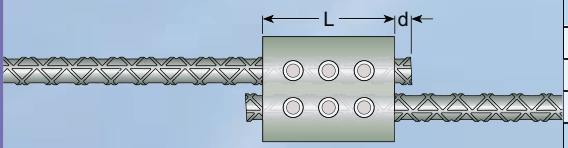


ZAP STRUCTURAL CONNECTOR



REBAR SIZE	PRODUCT CODE Structural Conn	CONNECTOR WEIGHT (LB)	LENGTH 'L' (IN)	'A' (IN)	'B' (IN)	'D' (IN)	'W' (IN)	NUMBER SCREWS PER BAR	AVERAGE SCREW TORQUE (FT-LB)	MIN.IMPACT WRENCH RATING (FT-LB)
4	04SZSC	0.9	3 1/8	1 1/16	11/16	1 7/16	3/16	2	60	250
5	05SZSC	1.5	4 1/8	1 1/8	3/4	1 11/16	1/4	3		
6	06SZSC	2.3	5 3/8	1 3/16	15/16	1 7/8	1/4	4		
7	07SZSC	3.6	6 3/8	1 1/4	1 1/16	2 1/8	5/16	4	105	500
8	08SZSC	5.5	7 7/8	1 5/16	1 1/16	2 5/16	3/8	5		
9	09SZSC	7.6	8	1 5/8	1 1/4	2 11/16	7/16	4	215	750
10	10SZSC	9.6	9 1/2	1 11/16	1 7/16	2 7/8	1/2	5		
11	11SZSC	12.1	11 1/8	1 13/16	1 1/2	3	9/16	6		
14	14SZSC	18.0	8 7/8	2 5/16	1 3/4	3 13/16	11/16	7	350	1000
18	18SZSC	37.5	15 3/8	2 1/2	2 1/4	4 1/2	7/8	16		

DOUBLE BARREL ZAP



REBAR SIZE	PRODUCT CODE Double Barrel	COUPLER WEIGHT (LB)	LENGTH 'L' (IN)	'A' (IN)	'C' (IN)	'S' (IN)	'd' (IN)	NUMBER SCREWS PER BAR	AVERAGE SCREW TORQUE (FT-LB)	MIN.IMPACT WRENCH RATING (FT-LB)
3	03DBZA	1.3	2 1/8	1 1/8	3/8	15/16	3/8	2	60	250
4	04DBZA	1.3	2 1/8	1 1/16	1/2	15/16	1/2	2		
4/3	04/03DBZA									
5	05DBZA	2.3	3	1 1/8	5/8	15/16	5/8	3		
5/4	05/04DBZA									
6	06DBZA	3.2	3 7/8	1 3/16	3/4	15/16	3/4	4		
6/4	06/04DBZA									
6/5	06/05DBZA									
7	07DBZA	7.1	5 3/8	1 5/16	7/8	1 3/8	7/8	4	105	500
7/5	07/05DBZA									
7/6	07/06DBZA									
8	08DBZA	10.7	6 1/2	1 3/4	1	1 1/8	1	5		
8/7	08/07DBZA									

ZAP SCREWLOK® Mechanical Splices and Connectors for Reinforcing Bars - Review...

ZAP SCREWLOK® mechanical splices and connectors are compatible with reinforcing bars that comply with ASTM A615, ASTM A706, ASTM A996, or equal and consist of smooth, shaped, steel sleeves with converging sides. A series of cone-pointed hex-head screws are arranged along the longitudinal axes in one or two rows. In the case of butt splices, reinforcing bars are inserted from each end to a center stop. No special bar-end preparation is required, so ends can be sheared, sawed, or flame-cut. *Installation instructions are normally supplied with orders and are also available at www.barsplice.com.*

During mechanical splice assembly, the screws are tightened and embed themselves into the rebar surface whereupon the heads twist off at a prescribed tightening torque. Forces from the screws cause rebar deformations to interlock within the coupling wedge. This DUAL mechanical action, results in a full positive connection for transferring tension or compression forces from bar-to-bar. Screws can be tightened using suitable impact wrenches. Linear alignment is preserved across the splice by using reinforcing bars with straight ends and securing the continuation bar in the desired position at the time of assembly.

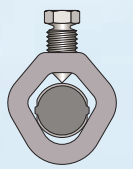
When making splices between fixed points, a coupler sleeve without a center stop can be slipped entirely onto one bar and subsequently repositioned over the two bar ends being spliced.

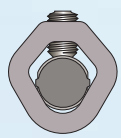
Mechanical butt splices *and connectors are available for reinforcing bar sizes No. 3 through 18 (Ø10 through 57 mm) per BPI's* ***Dimensions & Data*** *charts. Transition splices are used to connect rebars of different sizes.*

Mechanical lap splices *are available for bar sizes No. 3 through 8 (Ø10 through 25 mm).*

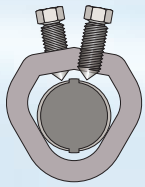
Epoxy-coated steel reinforcing bars that comply with ASTM A775 can be spliced by means of Epoxy-coated Zap Screwlok® coupling sleeves without shielding or removing the epoxy coating from the bar. Zinc-coated (galvanized) bars can be mechanically spliced by means of galvanized Zap Screwlok® coupling sleeves.

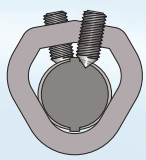
Single Row
#3 - #11
BEFORE
AND
AFTER ASSEMBLY





Double Row
#14 - #18
BEFORE
AND
AFTER ASSEMBLY





ZAP SCREWLOK® is an engineered mechanical splice system whose strength is independent of the concrete which surrounds it, thereby providing true structural continuity. Applications include new construction, field repair of reinforcement, splicing of column steel, beam reinforcement, concrete piles and deck steel, and splicing of older types of reinforcing bars. The Zap Screwlok® system is used for rehab and retrofit projects, strengthening and up-grading concrete elements, extending deck steel to widen bridges, highway patch and repair projects, splicing of bars across closure pours. Zap Screwlok® Type 2 splices are used for mechanically splicing reinforcement in members resisting earthquake induced forces. Benefits of Zap Screwlok® include a field installed splice with easy visual inspection, no specialized equipment, minimal clearance requirements, a positive rebar center-stop and no rebar end preparation.

BarSplice Products, Inc., 4900 Webster Street, Dayton OH 45414, USA
●Tel: (937) 275-8700 ●Fax: (937) 275-9566 ●E-mail: bar@barsplice.com

aci MEMBER

CRSI MEMBER

REV. L 3/02/2017

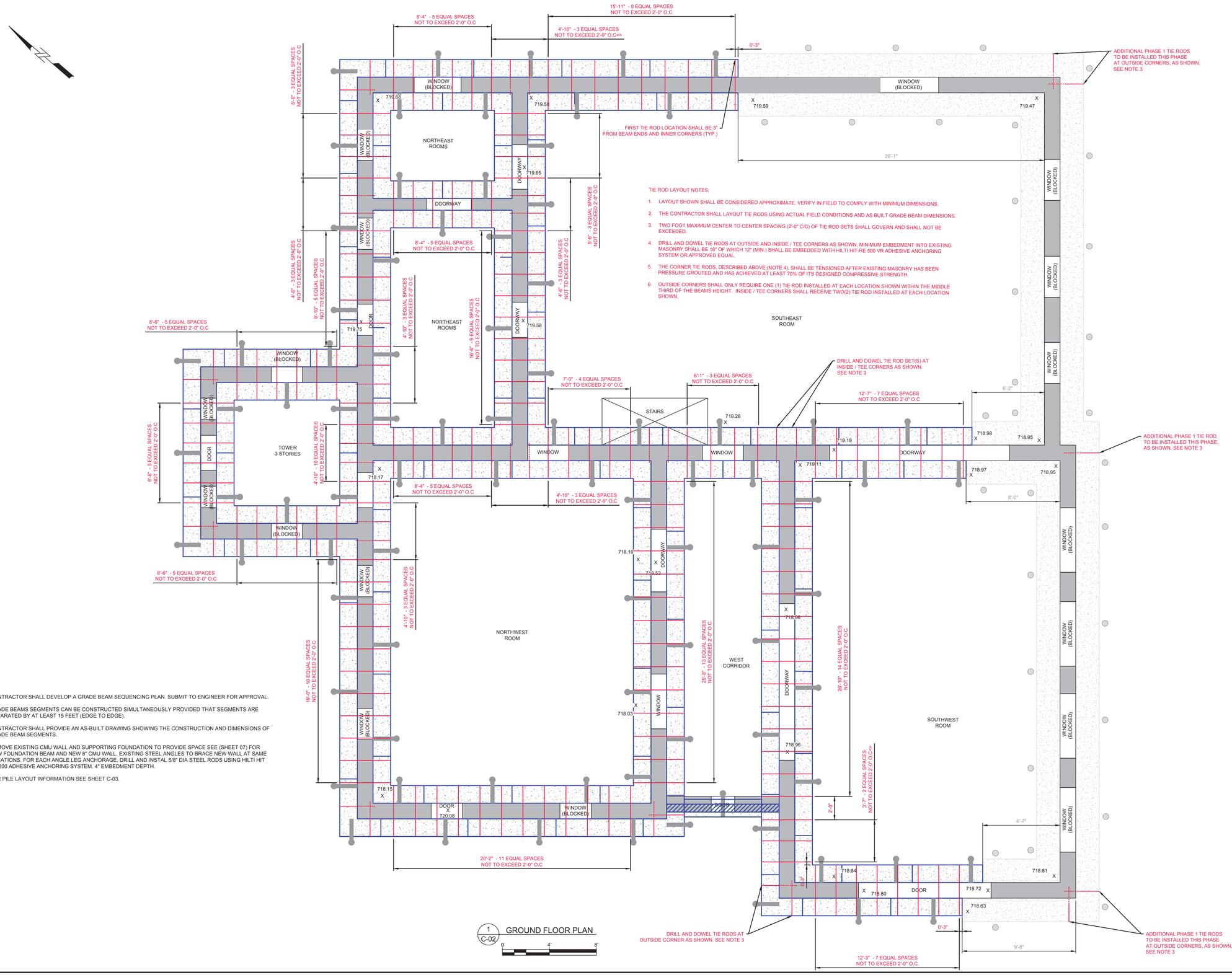
Appendix E

Portland Cement Grout

Specified as “Portland Cement Grout. Thicken or thin grout mix and add masonry sand as needed based on field conditions” on Sheet T-02 Note 3 under Pressure Grouting, is to be a neat Portland grout of Portland Cement mixed with potable water (no sand admixtures) to the consistency required to allow pumping with low pressure (5 PSI or less) and filling all internal wall voids as completely as possible. The water cement ratio of said grout is to be overseen by a competent supervisor and the project engineer, the objective is to keep the grout as stiff as is possible yet still achieve good pumping and flow characteristics.

Appendix F

Wall Underpinning Tie Rod Example Layout



NOTES:

1. CONTRACTOR SHALL DEVELOP A GRADE BEAM SEQUENCING PLAN. SUBMIT TO ENGINEER FOR APPROVAL.
2. GRADE BEAMS SEGMENTS CAN BE CONSTRUCTED SIMULTANEOUSLY PROVIDED THAT SEGMENTS ARE SEPARATED BY AT LEAST 15 FEET (EDGE TO EDGE).
3. CONTRACTOR SHALL PROVIDE AN AS-BUILT DRAWING SHOWING THE CONSTRUCTION AND DIMENSIONS OF GRADE BEAM SEGMENTS.
4. REMOVE EXISTING CMU WALL AND SUPPORTING FOUNDATION TO PROVIDE SPACE SEE (SHEET 07) FOR NEW FOUNDATION BEAM AND NEW 8" CMU WALL. EXISTING STEEL ANGLES TO BRACE NEW WALL AT SAME LOCATIONS. FOR EACH ANGLE LEG ANCHORAGE, DRILL AND INSTAL 5/8" DIA STEEL RODS USING HILTI HIT HY 200 ADHESIVE ANCHORING SYSTEM. 4" EMBEDMENT DEPTH.
5. FOR PILE LAYOUT INFORMATION SEE SHEET C-03.

1 C-02 GROUND FLOOR PLAN

0 4' 8'

AECOM

PROJECT

BUILDING INTERIOR REMEDIATION AND WALL UNDERPINNING DESIGN
WATER STREET MANUFACTURED GAS PLANT
VILLAGE OF PENN YAN
YATES COUNTY, NEW YORK
NYSDEC SITE # 8-62-009

CLIENT

NYSEG
New York State Electric and Gas Corp.
18 Link Drive
P.O. Box 5224
Binghamton, New York 13905

REGISTRATION

EXAMPLE

ISSUE/REVISION

I/R	DATE	DESCRIPTION

KEY PLAN

SHEET TITLE

WALL UNDERPINNING
TIE ROD EXAMPLE LAYOUT

SHEET NUMBER

RFI-51

Project Management Initials: Designer:____ Checked:____ Approved:____ ANSI D 22" x 34"

Last saved by: MEISTERK(2018-11-07) Last Plotted: 2018-11-07
Filename: I:\60284725_NYSEG-PENN YAN RD\7.2 CADD\500\CIVIL\DESIGN\BUILDING\UNDERPIN-2\POST-DESIGN\TIE-ROD_LAYOUT\PENN-YAN_BUILDING_UNDERPIN-PLAN-2-TIE-ROD_LAYOUT-2.DWG

Printed on ___% Post-Consumer Recycled Content Paper