



State of Utah

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Department of Administrative Services

KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management

RICH AMON
Interim Director

Addendum No. 8

Date: June 19, 2013

To: Contractors

From: Rick James - Project Manager

Reference: George S. Eccles Student Life Center
University of Utah – Salt Lake City, Utah
DFCM Project No. 08015750

Subject: **Addendum No. 8**

Pages	Addendum Cover Sheet	1 page
	Revised Project Schedule	1 page
	Architect's Questions Addendum	22 pages
	<u>Architect's Addendum No. 7</u>	<u>37 pages</u>
	Total	61 pages

Note: *This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.*

8.1 SCHEDULE CHANGES: See attached Revised Project Schedule. Changes are highlighted.

8.2 GENERAL ITEMS:

8.2.1 See attached Architect's Question Addendum dated June 19, 2013.

8.2.2 See attached Architect's Addendum No. 7 dated June 19, 2013.



STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES
Division of Facilities Construction and Management

DFCM

**PROJECT SCHEDULE – REVISED
PER ADDENDUM NO. 8 DATED JUNE 19, 2013**

**PROJECT NAME: GEORGE S. ECCLES STUDENT LIFE CENTER
UNIVERSITY OF UTAH – SALT LAKE CITY, UTAH**
DFCM PROJECT NO: 08015750

Event	Date	Date	Time	Place
Request for Proposals Available	Friday	April 19, 2013	3:00 PM	DFCM web site *
Mandatory Pre-Proposal Site Meeting	Wednesday	May 1, 2013	10:00 AM	First Floor Auditorium State Office Building 350 North State Street SLC, UT
Last Day to Submit Questions prior to submittal of Statements of Qualifications	Friday	May 3, 2013	4:00 PM	Rick James – DFCM E Mail: rjames@utah.gov
Addendum Deadline	Monday	May 6, 2013	3:00 PM	DFCM web site *
Prime Contractors submit References, Statements of Qualifications, Management Plans (including Schedule), and Termination/Debarment Certifications	Thursday	May 9, 2013	12:00 NOON	DFCM 4110 State Office Bldg 350 North State Street SLC, UT
Short Listing by Selection Committee (Planning on no Interviews) and Announcement	Thursday	May 16, 2013	TBD	TBD
Bid Documents (Specs/Drawings)	Friday	May 17, 2013	12:00 NOON	DFCM web site *
Last Date to Submit Questions for Final Addendum	Monday	June 10, 2013	4:00 PM	Rick James – DFCM E Mail: rjames@utah.gov
Final Addendum Deadline (exception for bid delays)	Wednesday	June 19, 2013	3:00 PM	DFCM web site *
Prime Contractors Submit Cost Proposals	Thursday	June 20, 2013	2:00 PM	DFCM 4110 State Office Bldg 350 North State Street SLC, UT
Subcontractor List Due and Cost Reduction Proposals	Friday	June 21, 2013	2:00 PM	Email marlaworkman@utah.gov
Interviews	Wednesday	June 26, 2013	TBD	TBD
Announcement	Friday	June 28, 2013	4:00 PM	DFCM web site *

* DFCM's web site address is <http://dfcm.utah.gov>.

Addenda Questions

Owner: DFCM
 Project Name: George S. Eccles SLC
 Project Number: 2010562/08015750

Principal: Peggy McDonough
 Project Manager: Brent Agnew
 Technical Manager: Angelica Pavoni
 Design Manager: Rui Morais
 Prepared on: 6/19/2013

QUESTIONS Continuation from previous addenda questions

Date	Who's Asking	Question	Comments	Action
6/5/13	Jacobsen Construction	181. Sheet EL102.A room 200M has a light in the middle of the room with no designation. I have assumed this fixture to be a type M2. Please confirm this is the correct type required or provide the type desired.	In Addendum #5.	
6/5/13	Jacobsen Construction	182. Sheet EL102.A room in the bottom right corner of the drawing shows two fixtures without a fixture type. Please clarify what type fixture is required.	In Addendum #5.	
6/5/13	Jacobsen Construction	183. Sheet EL102.A room in the bottom left corner of the drawing shows two fixtures without a fixture type. Please clarify what type fixture is required.	In Addendum #5.	
6/5/13	Jacobsen Construction	184. Sheet EL102.B room in the top left corner of the drawing shows three fixtures without a fixture type. Please clarify what type fixture is required.	In Addendum #5.	
6/5/13	Jacobsen Construction	185. Sheet ES100.5 shows new light fixtures with out a fixture type designated. Please provide desired fixture type.	In Addendum #5.	
6/5/13	Jacobsen Construction	186. EP600 the feed that goes form the 12470 transformer to LMDP doesn't have a cable or conduit designation. Please provide what size, type of cable and conduit are required.	In Addendum #5.	
6/5/13	Jacobsen Construction	187. Sheet EP600 the feed from HMDL to HRM2 doesn't have a cable designation. Please provide the required cable and conduit size.	In Addendum #5.	
6/5/13	Jacobsen Construction	188. Sheet EL701 detail A3 please clarify what specific types of fixtures this detail is applicable to. Also is this a detail for each fixture location or just the power connection locations.	In Addendum #5.	

Addenda Questions

6/5/13	Jacobsen Construction	189. Sheet ED100.1 key note 7 makes reference to removing both the electrical and the telecomm in another project. However later in the paragraph it says that the rerouting of the Telecomm is part of this package. Please clarify if the rerouting of either the telecomm or the electrical part of the scope of work. If it is please provide the desired routing, conduit and cables desired.	In Addendum #5.	
6/5/13	Jacobsen Construction	190. Sheet ES500 MH.36A detail shows a note four, for one of the feeds leaving the man hole. Is this detail supposed to be a note three? Please clarify.	In Addendum #5.	
6/5/13	Jacobsen Construction	191. Sheet EY302 has no identifiable cable tray shown. Please verify that there is no cable tray on level 2 of this project.	In Addendum #5.	
6/5/13	Jacobsen Construction	192. Sheet ES100.2 in addendum #2 it shows a UGT type duct bank from the top of the page to the center. I am unable to decipher what I am supposed to do with this. Please provide a narrative as to what the intention is for this run.	In Addendum #5.	
6/5/13	Jacobsen Construction	193. Sheet ES100.2 note 5 at the end of the sentence is says that the "cable and cable install by NETCOM" Is this supposed to say conduit and cable? If not please clarify if this was simply a text error, or if there is something to be added.	In Addendum #5.	
6/5/13	Jacobsen Construction	194. Sheet EP501 enlarged lower level transformer vault show the new dielectric switch as a 5KV switch (3-way), but the one-line on EP600 shows this same switch as a 15KV switch (4-way). Please clarify which is correct.	In Addendum #5.	
6/5/13	Jacobsen Construction	195. Please make the electronic Revit files available to bidders.	In Addendum #5.	
6/5/13	Jacobsen Construction	196. For alternate #3 on sheet AE630... We believe that frames 25(ALT3), 26(ALT3), 28(ALT3) are supposed to replace 25,26,27 on sheet AE622 on the base bid. Will you please confirm this?	In Addendum #5.	
6/5/13	Jacobsen Construction	197. What type of low E coating is required in spec. 088000? Solarban 60 or VE1-2M on surface #2 ?	In Addendum #5.	
6/5 /2 013	Jacobsen Construction	198. In 088000 3.6 Glazing schedule... What are the expected silkscreen patterns? The % coverage is indicated, but are these glass silkscreen types expected to be dots, lines, or gradients in each case?	In Addendum #5.	
6/5/13	Jacobsen Construction	199. Is AL-125 fire-rated or non-rated? On window schedule AE616 it is listed as 1hr fire-rated, but on the door schedule AE610, there is no rating. Please clarify?	In Addendum #5.	
6/5/13	Jacobsen Construction	200. Spec. 088810-1.03.A.2 (page 2 of the spec) mentions 120 min rating. However, all indications on AE615, 616 & AE630ALT3 appear to be 1hr rated. Is there any 120-min. rated glass and framing on this project?	In Addendum #5.	

Addenda Questions

6/5/13	Jacobsen Construction	201. Clarify material for "translucent canopy". At A1/SF402, steel material is shown. However, architectural A4/AE311 calls for stainless steel (also A2/AE503). Which is correct?	In Addendum #5.	
6/5/13	Jacobsen Construction	202. We have received a request from El Dorado Climbing Walls that their product be considered for approval in the bidding process (see attached specification). The request: Our HighPerformance system would be an equivalent to the product description but section 116640-1.3 C states that no paint work is allowed on site. Can I request approval for our system which is painted on site?	Documentation was not provided for Eldorado. Information on the Web Site does not provide a comparable product to system 2.	
6/5/13	Jacobsen Construction	203. At Grid lines F-10, there are (8) pendant-type fixtures drawn without a type-designation. Please identify these light fixtures. (Located at Café 117.)	In Addendum #5.	
6/5/13	Jacobsen Construction	204. On Alternate #1 drawings in the electrical plans, an Alternate 1A and Alternate 1B are described (see, for example, drawings EP200.C1 and EP200.C2). We assume that these are both meant to be part of Alternate #1. Please confirm this assumption.	1A and 1B references part A and part B of Alternate 1.	
6/5/13	Jacobsen Construction	205. Regarding the match line on drawing EL200.C2: there is no corresponding match line on drawing EL200.C1. Please clarify the match line so that we can tell which light fixtures fall on which page and so that we can get an accurate count of fixtures.	In Addendum #5.	
6/5/13	Jacobsen Construction	206. EL200.C2: could the view of the floor plan be extended farther to the east of gridline 7? It's difficult to tell what's different between the base bid (drawing EL100.C) and the alternate at this location the way the plan cuts off at EL200.C2 right now.	In Addendum #5.	
6/5/13	Jacobsen Construction	207. What material is the counter top in Staff Rm 340F (B1, B2/AE448)?	Plam-70 noted on drawings.	
6/5/13	Jacobsen Construction	208. What material is the counter top in Lobby 150 (D1/AE445)?	In Addendum #5.	
6/5/13	Jacobsen Construction	209. Please clarify the scope of chilled water piping that is to be provided as part of this project between the chilled water plant, through the existing HPER East Building to the new Student Life Center and then to the cooling tower. Some pipes are labelled "future" and others are labelled "existing" in the details and there is confusion as to what is the scope of this bid.	The scope of this bid, per the mechanical drawings is the new chilled water piping from the central plant, through HPER, into the tunnel, and into the Student Life Building.	
6/5/13	Jacobsen Construction	210. There is no schedule for Cooling Tower 'CT-1'. Please issue a schedule for 'CT-1'. Not enough information for pricing at this time.	In Addendum #5.	
6/5/13	Jacobsen Construction	211. Please clarify the type of material to be used for underground chilled water piping.	In Addendum #5.	

Addenda Questions

6/5/13	Jacobsen Construction	212. Enlarged Mechanical Room plan 1/MH401 shows HTWS & HTWR piping entering/leaving the building and going into the tunnel. See also MH703. However, there is no continuation for HTWS & HTWR piping in the mechanical site plans or tunnel plans. Is HTWS & HTWR piping outside the building footprint part of this scope of work? If yes, please provide information on routing of this piping beyond the building footprint. Does it follow the same routing to the central plant as the chilled water piping shown on MS100? Or does it connect to existing HTWS & HTWR piping in the existing tunnel in Node #8 as seems to be indicated on MS100 and MS202? Please clarify.	The HTWS and HTWR are shown in the new tunnel section which is shown in the MS drawings and details. It is shown connecting to Node #8 in MS100 and MS202.	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	213. Where the new Student Life Center tunnel connects with the existing tunnel, will what size opening will need to be cut into the existing tunnel for access between new and existing? Will there be access for personnel? Or will we only core drill holes for pipes? Please clarify.	It will be full access to the existing tunnel.	
6/5/13	Jacobsen Construction	214. Please identify construction of existing tunnel walls (i.e. concrete thickness and reinforcing).	Contractor will be responsible to field verify tunnel conditions and evaluate tunnel's ability to support construction traffic.	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	215. Please issue details for the connection/interface of new tunnel to existing tunnel.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	216. Regarding the chilled water equipment room shown at A4/MS301: is this the "existing chilled water plant" shown at Keyed Notes #1 and #2 on drawing MS100?	This was modified in the MHTN Addendum No. 4	
6/5/13	Jacobsen Construction	217. Please show where new chilled water piping should connect to existing on A4/MS401.		
6/5/13	Jacobsen Construction	218. The civil drawings show an Alternate #5. This alternate does not show up in the alternates spec or on the bid form. Is Alternate #5 supposed to be part of this bid?	In Addendum #5.	
6/5/13	Jacobsen Construction	219. Please issue a specification for the pervious pavers / concrete paving shown at the east parking lot. There is no specification for this system.	In Addendum #5.	
6/5/13	Jacobsen Construction	220. General Structural Note #1.7.C: this note appears to require that the ground beneath all footings that are 4'-0" wide and wider shall be improved with rammed aggregate piers. Is this the intent of this note? Where are rammed aggregate pier systems required? Please clarify.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	221. If rammed aggregate pier soil improvement is required, please issue a specification and indicate actual live and dead loads for each footing requiring aggregate piers.	Clarified in Addendum No. 7	MHTN Addendum No. 7

Addenda Questions

6/5/13	Jacobsen Construction	222. Footing & Foundation Plan Note #9 indicates that compacted structural fill shall be provided under <u>all</u> footings. However, the geotechnical report and General Structural Note #1.7.C on SG001 seem to indicate that if a footing is at such an elevation that it can bear on undisturbed natural granular soils, over excavation and replacement with compacted structural fill is not necessary. Please clarify whether compacted structural fill is required under <u>all</u> footings or just beneath those that do not bear on native granular soils. If it is not required under all footings, please identify which footings will have this requirement.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	223. Page 9 of the RFP document: we assume the target completion date is meant to be December 12, 2014. Please confirm the target completion date.	In Addendum #5.	
6/5/13	Jacobsen Construction	224. In Addendum #2 (item A1.4), we are told that custom images for decorative cast vinyl film will be "provided by Owner". We assume this to mean that the Owner will only furnish electronic image files to the successful contractor and that the printing and fabrication of these images will be part of the construction contract. Please confirm.	Yes.	
6/5/13	Jacobsen Construction	225. Please define "COM (Customer's Own Material)". Does this mean that such material is Owner-Furnished and Contractor-Installed? Or is this material Contractor-Furnished and Contractor-Installed? Please clarify.	No answer needed; found answer in "Finish Abbreviations" schedule on AE606.	
6/5/13	Jacobsen Construction	226. At most locations with exposed acoustical deck, the deck is indicated to be painted. However, this is not indicated at Rock Climbing 75. Is exposed acoustical deck over Rock Climbing 75 to receive paint? If yes, what paint type & color?	Refer to AE605 Finish Color Schedule	
6/5/13	Jacobsen Construction	227. The Life Safety plans indicate that fire extinguishers are "by fire alarm contractor (Division 28). However, fire extinguishers are specified in Division 10 and not Division 28. Will it be acceptable if an entity other than the fire alarm contractor provides fire extinguishers?	In Addendum #5.	
6/5/13	Jacobsen Construction	228. Is signage described on the Life Safety plans to be Owner Furnished and Owner Installed?	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	229. Will you please extend the deadline for submitting pre-bid questions? Could it be extended to Wednesday, June 12, 2013 at 4:00 pm?	In Addendum #5.	
6/5/13	Jacobsen Construction	230. We assume that this project is sales tax exempt. Please confirm.	In Addendum #5.	

Addenda Questions

6/5/13	Jacobsen Construction	231. Specification 051200-1.5.B indicates that the steel erector must be an AISC-Certified Erector, Category ACSE(Advanced Certified Steel Erector). It seems like this requirement is often relaxed after the bid. Please confirm that this requirement will be upheld throughout the construction of the building. (There is a potential cost difference between an ACSE erector, a CSE erector and a non certified erector, and if one of the bidding general contractors includes a non-certified erector in its bid, it leaves the project vulnerable to dispute after bid.) This needs to be clearly identified and upheld.	In Addendum #5.	
6/5/13	Jacobsen Construction	232. Specification 064023-1.4.D.3 indicates that the mill must be certified for chain of custody by an FSC-accredited certification body. Does this refer to the woodwork fabricator's shop? Do woodwork fabricators bidding the project also need to be certified for chain of custody?	Yes	
6/5/13	Jacobsen Construction	233. Please issue a specification for chain link fencing (i.e. see Storage 01 & Storage 02 at Outdoor Recreation Storage on AE101A and MAC Storage 65A on AE100A).	In Addendum #5.	
6/5/13	Jacobsen Construction	234. Please issue a specification for the desired color for Integrally Colored Concrete Colors #1 and #2. The price for the final color selected can vary significantly based on the dosage of pigments required to achieve the desired color.	The colored concrete Colors will be chosen from the Davis Colors "Standard Group" and "Premium Group" Range of Colors	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	235. Tunnel alignment shown on SB100A does not match the alignment shown on CU301, MS100 (Preferred Option #1), or ES100.5. Which alignment is correct?	Civil Drawings.	
6/5/13	Jacobsen Construction	236. In the Addendum #2 version of drawing ES100.2, there appears to be a missing callout note for the new 'UGT' line. What is this note meant to be?	In Addendum #5.	
6/5/13	Jacobsen Construction	237. Site light fixture type 'S5' on ES100 is a stainless steel railing with built-in LED lights. The "AS" site drawings show these railings to be standard stainless steel railings. Please indicate on the "AS" site drawings which railings are railings with built-in LEDs as per electrical plans and which railings are standard railings per standard architectural details.	No LED railing lights. S5 has been removed from project in MHTN Addendum #4.	
6/5/13	Jacobsen Construction	238. Drawing EP600: PAD 35B (E) shows a callout for Keyed Note #12, but there is no such note on this sheet. Please issue this Keyed Note.	Keyed Note 12 shall be removed from sheet.	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	239. Multiple callouts on drawing MS100 to drawings MS200 and MS300 which appear to be incorrect. Please correct these callouts.	MS200 was not issued in the bid set, MS300 should be MS301. Clarified in MHTN Addendum#7	MHTN Addendum No. 7

Addenda Questions

6/5/13	Jacobsen Construction	240. PP101A, approx. gridline V/11: Sheet Keynote #9 appears next to the gas line. This does not appear to be correct. Please revise and issue the correct Sheet Keynote for the gas line at this location.	In Addendum #5.	
6/5/13	Jacobsen Construction	241. There is a 1" gas line shown leaving the building at approx. gridline V/11 on PP101A and continuing onto drawing PP101C. Is this the gas line for the fire pit? Is this gas line to be provided under the base bid with connection to the fire pit to be priced under Alternate #4?	That gas line is for the fire pit and should be part of the pricing for Alternate #4. Clarified in MHTN Addendum #7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	242. Sheet Keynote #10 on drawing PP101C refers to Kitchen Equipment Drawings. Is this meant to reference to drawing AE455?	Correct.	
6/5/13	Jacobsen Construction	243. For items on the Equipment Schedule on drawing AE455, please show rough-in requirements on drawing PP101C.	The contractor will need to coordinate rough-in requirements for equipment shown on AE455.	
6/5/13	Jacobsen Construction	244. Ballif Road: Is this a fire lane? Please describe the owner's requirement for road closures and sequencing. Will one lane of traffic need to be left open at all times?	Bailiff road will require 2 way traffic thru construction for students , fire access, and general parking	
6/5/13	Jacobsen Construction	245. Where is construction parking available? What are parking permit costs (if any)? Will the owner pay for and issue construction parking permits?	Parking will be on site only for contractors, all permits will be the contractors responsibility to obtain for the lots or on Wasatch drive.	
6/5/13	Jacobsen Construction	246. Regarding form liners to create the board-formed look: there is no specified manufacturer or product given in the specs. We are only told to "match design reference sample" (033000-2.2.F). Please issue manufacturer and product data for the "design reference sample".	Basis of design Pattern - Random Weathered Woodgrain by Symons.	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	247. Outdoor Recreation Storage 155 is to receive floor finish "CONC-BF" (see AE605). What is "CONC-BF"? No description in the finish legends.	It's in the "Finish Abbreviations" on AE606. No answer from architect required.	N/A
6/5/13	Jacobsen Construction	248. Lobby 150 and Control Desk 155A receive floor finish "CONC-ST 54". Please show the location of transition between "CONC-ST 54" and adjacent floor finishes.	The transition between the different finishes will occur along the East-West cmu wall at the north wall of Office 155H.	
6/5/13	Jacobsen Construction	249. Lobby 150 and Control Desk 155A receive floor finish "CONC-ST 54". Please issue a detail for the transition from "CONC-ST 54" to adjacent floor finishes.	A control joint will work for the transition.	

Addenda Questions

6/5/13	Jacobsen Construction	250. Intumescent fireproofing: Life Safety Plan Keynote #6 seems to indicate that fireproofing is not required for the structure above the climbing wall or at the 3-Court Gym. However, wall sections A1/AE313 & A2/AE320 and reflected ceiling plan AC103C indicate that the steel joists above the 3-Court Gym shall receive intumescent paint. Wall section A4/AE320 also indicates fireproofing. Please clarify whether or not intumescent fireproofing is required for steel joists above the 3-Court Gym. If it is required, please identify the desired UL Assembly and whether the steel roof deck with no concrete on top will need to be fireproofed, too.	Keyed note 6 is specific on the structural elements that are not required to be fireproofed.	
6/5/13	Jacobsen Construction	251. If intumescent fireproofing is required on steel joists above the 3-Court Gym, should the detail at A4/AE320 call out <u>intumescent</u> fireproofing?	Refer to Life Safety plans - clarification made in MHTN Addendum No. 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	252. Please confirm fireproofing is not required for steel roof structure over the climbing wall area (i.e. Life Safety Plan Keynote #6).	Not required for roof deck and secondary structure as described by note #6	
6/5/13	Jacobsen Construction	253. The General Notes on the Life Safety plans indicate that exposed columns and floor beams shall receive intumescent paint. Wall section A5/AE322 calls out fireproofing for steel structure above Outdoor Recreation Storage 155 but does not specifically call out intumescent. Is intumescent fireproofing required over the Outdoor Recreation Storage area or will spray-applied cementitious fireproofing be acceptable at this location?	All exposed steel shall receive intumescent paint per clarification made in MHTN Addendum #4 and further clarified in MHTN Addendum No. 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	254. The General Notes on the Life Safety plans indicate that exposed columns and floor beams shall receive intumescent paint. Is intumescent fireproofing required over the General Storage area (drawing AC100A) or will spray-applied cementitious fireproofing be acceptable at this location?	Correct general note 8 added in MHTN Addendum #4: All exposed steel shall be fire protected with intumescent paint except for enclosed storage, communication, electrical and mechanical rooms or unless specifically noted by keynote #6. Include intumescent coating in pool equipment room. Refer to floor plans, reflected ceiling plans, interior elevations and sections for locations of steel exposed to view.	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	255. Reference wall section A5/AE313. At Roof 2 level (+146'-0"), there is a steel beam that does not appear to be exposed to view. However, intumescent fireproofing is called out for this beam. Does this beam require intumescent fireproofing or can spray-applied cementitious fireproofing be used on this beam?	Yes. Cementitious Fireproofing would be acceptable.	

Addenda Questions

6/5/13	Jacobsen Construction	256. Intumescent fireproofing is shown for a perimeter steel beam over the Natatorium (C2/AE316). Is intumescent fireproofing required for steel trusses over the Natatorium (AC101C, C4/AE440, & sim.)? These steel trusses are only called out to be painted.	All exposed steel shall receive intumescent paint per clarification made in MHTN Addendum #4 and Addendum #7 to meet requirements of the construction type.	
6/5/13	Jacobsen Construction	257. Intumescent fireproofing is shown for a perimeter steel column at E2/AE510 (see AE101C, gridline G/3). Is this the only column in the Natatorium that receives intumescent fireproofing?	Refer to Life Safety Plan for Fire proofing requirement. Refer to MHTN Addendum 4	
6/5/13	Jacobsen Construction	258. Intumescent fireproofing: Two steel columns on AE102A are required to receive intumescent fireproofing (grids 14 & 16). Are there any other similar locations where steel columns will need intumescent paint?	Refer to Life Safety Plan for Fire proofing requirement. Refer to MHTN Addendum 4 and MHTN Addendum 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	259. At A3/AE323, it appears that intumescent fireproofing is required for steel structure above Fitness Center 235. Please confirm.	Refer to Life Safety Plan for Fire proofing requirement. Refer to MHTN Addendum 4 and MHTN Addendum 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	260. Intumescent fireproofing: To confirm and clarify scope, we request that the architect issue a short narrative indicating each location where intumescent fireproofing will be required.	Refer to Life Safety Plan for Fire proofing requirement. Refer to MHTN Addendum 4 and MHTN Addendum 7	MHTN Addendum No. 7
6/5/13	Jacobsen Construction	261. Is fireproofing required for tube steel supports for curtain wall along grids B/1-6 and 1/B-F on SF101C? There does not appear to be room for it the way the curtain wall has been detailed (i.e. see D1/AE521).	Load bearing conditions will need to be fireproofed per structural general notes.	
6/6/13	Jacobsen Construction	262. Please issue a specification for GFRC column covers (i.e. D2 & E2/AE502).	Added in MHTN Addendum no. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	263. It is difficult to tell the difference between GFRC column covers and metal column covers on the plans. The only location that specifically calls out a metal column cover appears to be at A4/AE510. Please confirm this detail is correct and is not meant to be GFRC. What other locations receive metal column covers? Please differentiate between the two material types.	Interior Columns have metal cover not including 50M Pool Alternate-1 as noted.	
6/6/13	Jacobsen Construction	264. Details B2/AE501 and A5/AE503 seem to show different types of insulation for a similar cavity space. Why the difference?	They are two different conditions	
6/6/13	Jacobsen Construction	265. Detail C2/AE502 calls for 2-1/2" rigid insulation behind metal panel. Is this extruded polystyrene (XPS) or mineral wool?	XPS	
6/6/13	Jacobsen Construction	266. Detail C2/AE502 calls for 2-1/2" rigid insulation behind metal panel. Please confirm thickness is 2-1/2" and is not meant to be 3".	2 1/2"	

Addenda Questions

6/6/13	Jacobsen Construction	267. Detail D5/AE503 also calls for rigid insulation behind a composite metal panel. However, details C2 & D2 & E2/AE503 call for RIGID INSULATION (MINERAL WOOL). What defines when the "rigid" behind metal panels is XPS or mineral wool? Please clarify.	They are two different conditions.	
6/6/13	Jacobsen Construction	268. Waterproofing spec 071413 describes custom growing media, garden roof plants, and other green roof assembly components. Where does this occur on this project?	Above Natatorium Mechanical Room on Alternate-1.	
6/6/13	Jacobsen Construction	269. At 071413-2.2.A.3, two types of rigid insulation are called out: 40 psi and 60 psi. Where is each type of insulation required?	40 psi for pedestrian and 60 psi for vehicular traffic.	
6/6/13	Jacobsen Construction	270. Detail A1/AE502: is the high density rigid insulation in this detail the insulation called for at 071413-2.2.A.3? Is it 40 psi or 60 psi?	40psi.	
6/6/13	Jacobsen Construction	271. Detail B4/AE502: please identify the appropriate specification for the high density rigid insulation shown beneath the topping slab in this detail.	40psi.	
6/6/13	Jacobsen Construction	272. We assume that EFVM Testing is by owner (ref. 071413-3.16). Please confirm this assumption. Please clarify what the contractor's responsibilities are vs. the responsibilities of the owner's testing agent.	Contractor to have testing performed.	
6/6/13	Jacobsen Construction	273. Some details on drawing AE631 show 3" thick rigid mineral wool insulation behind exterior cladding and some details show 5" thick. Please define where 2", 3", and 5" thick insulation is to be applied on exterior assemblies.	Different Locations	
6/6/13	Jacobsen Construction	274. Gridline 10 at Racquetball Court 44: is the interior wall built along the exterior concrete foundation wall supposed to receive thermal insulation? If yes, what type?	See Detail C3/AE 513	
6/6/13	Jacobsen Construction	275. Exterior foundation wall along gridline 10 at Racquetball Court 44: is this "drainage board rigid insulation" different from rigid insulation that is to be applied to foundations on the rest of the building as specified in 072100? Or is this part of the waterproofing system? If part of the waterproofing system, please identify a material specification in 071413.	No, rigid insulation is similar to foundation wall	
6/6/13	Jacobsen Construction	276. Please identify the extent of this foundation wall insulation along gridline 10 at Racquetball Court 44.	To top of footing as shown on drawings	
6/6/13	Jacobsen Construction	277. Refer to AE100B, exterior foundation walls at Staff 25D and Study 25C: should spray foam insulation be applied to the foundation walls at these locations (along grids N and F)?	Yes, between exterior concrete wall and interior CMU.	
6/6/13	Jacobsen Construction	278. What is the "typical" wall type we should include where stud walls have no label?	Question needs to be more specific	

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6/6/13	Jacobsen Construction	279. Gridline 13.5 on AE101B: no sound insulation is shown at the framed walls above glass walls at the MAC Gym (i.e. A1/AE321 and A3/AE322). Is sound insulation meant to be provided at these framed walls?	Provide sound insulation at those walls.	
6/6/13	Jacobsen Construction	280. Details A4/AE523 and A3/AE525 appear to be nearly identical except A3/AE525 shows spray foam insulation in the horizontal studs above the soffit (inside the gypsum sheathing) and A4/AE523 does not have this horizontal spray foam insulation. Please clarify which detail is correct in regards to this horizontal spray foam insulation.	They are both correct.	
6/6/13	Jacobsen Construction	281. Please issue a specification for foam fill where used as structural fill beneath slabs and in other similar applications.	Changed to Earth Fill	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	282. Please define the specification for the exterior mineral wool behind the metal panel and terracotta. The product that is in the specs has a facing and is not for exterior metal or terracotta rain screen systems (ref. 072100-2.2.D).	Addressed on MHTN Addendum # 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	283. Where does the condenser piping go once it enters the building? Piping is only shown outside the building.	Condenser piping was deleted in MHTN addendum #4.	
6/6/13	Jacobsen Construction	284. Where condenser piping is shown outside the building is it above grade, in the ground direct buried, or in a tunnel?	Condenser piping was deleted in MHTN addendum #4.	
6/6/13	Jacobsen Construction	285. What is the insulation requirement for the high temp piping? It is not in the specifications.	It is in Specification Section 237510	
6/6/13	Jacobsen Construction	286. Supply air duct is not shown serving the registers in the Natatorium. Is there duct there? If there is duct there, will it be direct buried or will it be in a tunnel and require wrap insulation? Or is it a tunnel/plenum? And if it is a tunnel/plenum does it require acoustical liner?	In the base bid, it is a tunnel/plenum, and does not require acoustical liner.	
6/6/13	Jacobsen Construction	287. Same question as above only this sheet shows the duct but it appears to be underground—Is it direct buried or in a tunnel and does it require wrap insulation?	It is direct buried, the specification for this duct was issued in addendum #1	
6/6/13	Jacobsen Construction	288. Locker exhaust air duct from EAU-4 to inlets—does this duct need wrapped around exterior of duct?	No wrap is required.	
6/6/13	Jacobsen Construction	289. Supply air duct from AH-3 which serves the Natatorium: the duct in the Natatorium is a duct sock. However does the duct in the fan room to the transition to duct sock need wrapped or will it be lined?	The duct will need to be wrapped.	
6/6/13	Jacobsen Construction	290. Supply air duct from AH-9 to rock wall area—Will this duct be lined or wrapped? Please clarify.	Wrapped,	
6/6/13	Jacobsen Construction	291. Supply air duct from AH-1—Will this duct be wrapped or	Wrapped,	

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	Construction	lined? Please clarify.		
6/6/13	Jacobsen Construction	292. Alternate #3: No roof drain piping is shown for the bridge other than the riser on sheet PP101B. Please clarify?	The bridge is open and does not require any roof drain piping.	
6/6/13	Jacobsen Construction	293. Domestic water piping in floor of Natatorium feeding hose bibs: Is this piping direct buried or in a tunnel?	Piping is buried.	
6/6/13	Jacobsen Construction	294. Sheet EP502 shows a single conduit going from the VFD to the supply fan as well as a single conduit going from the VFD to the relief fan for AH-1, AH-2 and AH-9. However on sheet EP609 it gives a cable and conduit designation for each supply and relief fan. Do each supply and relief fan require their own conduit and wire or is it a single point connection to each bank of fans? Please clarify.	The air handler specifications in the bid set require that the air handler manufacturer factory wire all of the fans to the VFD so that there is single point elec connection to the VFD. In Addendum #5.	
6/6/13	Jacobsen Construction	295. Sheet EP502 shows two redundant VFDs next to the VFDs for AH-9 with no panel designation for their power feed. There is also no reference to them on the panel schedule for HLM2 which is the panel feeding all the other VFDs in this area. Please provide the panel that is to feed these VFDs.	In Addendum #5.	
6/6/13	Jacobsen Construction	296. Sheet EP502 the designation for PHP-01 and PHP-02 does not match with the panel schedule for HLM3. Please clarify that the home runs are going to the proper panel.	In Addendum #5.	
6/6/13	Jacobsen Construction	297. Sheet EP502 enlarged pool equipment room. 11B, 1B and 31B do not have home run designations. Please provide which panels and circuits these items are fed from.	In Addendum #5.	
6/6/13	Jacobsen Construction	298. Sheet EP502 mechanical room. How many light fixtures will need to be mounted per air handler unit?	In Addendum #5.	
6/6/13	Jacobsen Construction	299. Sheet EP502 EC-1 doesn't have a home run designation. Please provide what panel it is fed from.	In Addendum #5.	
6/6/13	Jacobsen Construction	300. Sheet EP503 shows a single conduit going from the VFD to the supply fan as well as a single conduit going from the VFD to the relief fan for AH-3 and AH-4. However on sheet EP609 it gives a cable and conduit designation for each supply and relief fan. Do each supply and relief fan require their own conduit and wire or is it a single point connection to each bank of fans? Please clarify.	The air handler specifications in the bid set require that the air handler manufacturer factory wire all of the fans to the VFD so that there is single point elec connection to the VFD. In Addendum #5.	
6/6/13	Jacobsen Construction	301. ES100.5 the fixtures shown in the new tunnel do not have a fixture designation. Please provide what fixture type is required.	In Addendum #5.	
6/6/13	Jacobsen Construction	302. Could you please provide the contact information of the rigging installer for the rock wall equipment? I would like to talk	This is a question directed to GC.	

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		with them to coordinate installation responsibilities.		
6/6/13	Jacobsen Construction	303. Sheet EP609: we are unable to locate on either the plan drawings or the panel schedules for the following motors: CP-01, CP-02, CP-03, CP-04, CP-05, CP-09, CP-9, CP-10, CP-12, P-1, P-2, RCP-1, RCP-2, SCF-01 and SCF-02. Please confirm that the equipment list is accurate. Also if it is accurate, please provide the room designations where these devices are located. The locations designations on the equipment schedule appear to be incorrect.	DEF-4, DEF-5, DEF-6, RCP-2, SCF-01, SCF-02, HWP-5, HWP-6 were all deleted in the Bid set. ATC is still in the drawings, there should be an ATC panel in each mechanical room. RCP-1 is still in the drawings. It is in Mech room 85, DMV-1 is still in the drawings, it is also in Mech room 85, along the east wall. The air handler specifications in the bid set require that the air handler manufacturer factory wire all of the fans to the VFD so that there is single point elec connection to the VFD.	
6/6/13	Jacobsen Construction	304. On page SB100A, between grid 13.5 and 18 on grid W the wall type is hatched as CMU, however the plan denotes this wall to be CFW-1. This also found on grid 13.5 between W and X, Page SB100A. Grid 13, between U and V, page SB100A. Between grid S and T, running left to right on page, SB100C. We assume this concrete wall mark refers to the concrete wall beneath the masonry wall as per details C1 & C2/SB503. Please confirm.	In Addendum #5.	
6/6/13	Jacobsen Construction	305. Refer to SB100C, concrete wall running left-to-right between gridlines T and U (continues onto SB100B, running left-to-right towards grid 13). There is no wall type indicated for this concrete wall. Please issue this wall type.	In Addendum #5.	
6/6/13	Jacobsen Construction	306. Please show a wall type designation for exterior/perimeter walls at Mechanical 85, General Storage 65, Outdoor Recreation Storage 155, and Repair 155G. The hatch marks on these walls looks like the CMU wall hatch; please clarify.	Refer to Wall Sections A5/AE312, A3/AE313 AND A4/AE313	
6/6/13	Jacobsen Construction	307. Drawing MS100 shows 10" & 8" pipes East out of Area A making a 45 degree offset and going to CT-1. There is no CT-1 on the equipment schedule and we can't find where the piping enters the building or where they go. Please clarify.	In MHTN Addendum #3	

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6/6/13	Jacobsen Construction	308. The manufacturers for the high temp heat exchanger's lists. A. Howards Engineering B. Prior approved manufacturer of University's choice. We understand that Howards Engineering is being used on a current project at the U and they are having difficulty meeting the schedule & providing the equipment required for that project. Does the University have another manufacturer that can be used?	In Addendum #5.	
6/6/13	Jacobsen Construction	309. The chilled water piping from Area A lower level up through level three to AH-5 goes from 8" to 4" and then back to 6". Please clarify proper pipe sizes.	In Addendum #5.	
6/6/13	Jacobsen Construction	310. MH401 detail 1 shows 8" HAWS-1 Air Separator on the Hot Water Heat pipe inside the high temp Mechanical Room 10M and then again in Mechanical Room 85 by Pumps HWP-1 & 2. Is this correct? Are there two HWAS-1 Air Separators on the same system? Please clarify.	In Addendum #5.	
6/6/13	Jacobsen Construction	311. No trap primers are shown on the drawings but all drains are scheduled for trap primer connections. Are trap primers required on all floor drains, floor sinks, trench drains, and deck drains?	In Addendum #5.	
6/6/13	Jacobsen Construction	312. TP-1 is the only specified trap primer. These are electronic trap primers typically for mechanical room or multi-drain locations. Is there another option for bathroom trap primers? (I.E. flushometer tail pieces or Lav tail pieces that can be used?)	In Addendum #5.	
6/6/13	Jacobsen Construction	313. PP100C & PP105 (Alt#1) There is no venting shown for the FD-1 & DD-1 drains around the pool area. There is also no sizing for the waste piping serving these drains. Are trap primers required for these drains? Please clarify.	In Addendum #5.	
6/6/13	Jacobsen Construction	314. PP101A grid V & 7.5 Notes 8 & 9 do not correspond with piping. Please provide correct notes.	In Addendum #5.	
6/6/13	Jacobsen Construction	315. None of the mechanical referenced drawings for addendum # 2 are included in the addendum. Please provide.	In Addendum #5.	
6/6/13	Jacobsen Construction	316. MP105 drawing has note 1, and 2 but no schedule to tell what the notes are. Please clarify.	In Addendum #5.	
6/6/13	Jacobsen Construction	317. There are no details for piping the water softeners, domestic water heaters, or mixing station. Can a domestic water schematic be provided?	In Addendum #5.	

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6/6/13	Jacobsen Construction	318. Specifications call out for underground waste and vent, and underground roof drain piping to be PVC or ABS. However, it is our understanding per past projects at the University of Utah that all waste, vent, and roof drain piping must be cast iron, please clarify.	Cast iron only, in Addendum #2	
6/6/13	Jacobsen Construction	319. (2) Floor drains serving the men's and women's restroom are tagged as FD-3. No FD-3 is shown in the plumbing fixtures schedule issued for bid. Please specify manufacturer, and model number that would need to be included.	These should be FD-1.	See MHTN Addenda-4
6/6/13	Jacobsen Construction	320. • Tunnels: What extent of supports are existing in the tunnel system that runs back to the central plant? Are we to include all additional supports in our quote? Or will it be handled by the structural contractor?	Mechanical supports in the tunnel should be provided as new supports as shown on the details on the MS sheets.	
6/6/13	Jacobsen Construction	321. ES-1 appears to be an emergency shower/eyewash however none are shown on the plumbing fixtures schedule, only in specification section: 224500. Are these manufacturer's and models used as the basis of design in the occurrence shown on the referenced page?	The basis of design is the fixture models and manufacturers listed in section 224500, and is to be used for the fixtures shown on the drawings.	
6/6/13	Jacobsen Construction	322. Specification is vague as to who is furnishing and /or installing the variable frequency drives and controllers for the project. Please clarify.	The variable frequency drives and controllers are specified in Div 23, therefore Div 23 is responsible for furnishing and installing.	
6/6/13	Jacobsen Construction	323. Pool equipment, materials, and labor: As the mechanical contractor are we to supply a proposal for the pool equipment materials and labor? Specification section 237323 dictates the use of a custom indoor pool heat recovery unit. Are we to provide (furnish/install) this unit and all associated piping and appurtenances.	Pool equipment is not specified in Div 23, only the pool air handler and heat exchangers. AH-3 and AH-10 are specified in Div 23, and are shown on the mechanical drawings, and are therefore within the scope of Div 23.	
6/6/13	Jacobsen Construction	324. Does the base bid only include Elevator #1, and Alternate #3 is where Elevator #2 is designed in?	Yes	
6/6/13	Jacobsen Construction	325. We are requesting a clarification on the products called out on finish schedule page AE605 & AE606 designated as SSF-P and SSF-T. What product is intended to be SSF-P or (poured)? We can not find a specification that indicates what poured product is intended. Similarly, what product is specified as WD-V wood vinyl?	In Addendum #5.	
6/6/13	Jacobsen Construction	326. There is a specification section Special Rubber Safety Flooring (SSF-S). On the finish schedule AE605 & AE606 it does not clarify where this product is to be installed. Please clarify.	Per the Schedule: Rock climbing area.	

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6/6/13	Jacobsen Construction	327. We are also requesting to bid Robbins Galaxy Ultra (see specification & sales sheet attached) as an equal to that specified in section 096720 Special Sports Flooring (SSF-T) PART 2- PRODUCTS 2.1 ACCEPTABLE PRODUCTS A. We are also requesting to bid Robbins Durathon Classic (see specification and sales sheet attached) as an equal to that specified in section 096566 Resilient Athletic Track PART 2.2 RUBBER SHEET FLOOR COVERING Available Products A.	Robbins Galaxy Ultra is NOT accepted. Robbins Durathon Classic IS accepted as a substitution.	
6/6/13	Jacobsen Construction	328. Will all low-voltage HVAC Control wiring for this project be required to be installed in 3/4" Conduit? The current spec doesn't state it does but the U of U standard is all control wiring to be installed in conduit	Addendum #7 clarifies Spec Section 230900 to read: "Exposed wiring in mechanical and equipment rooms shall be routed in ¾" minimum conduit. Installation shall be square with the walls of the building. In return air ceiling plenums, follow applicable codes."	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	329. Workstation for Ambulatory Care Center - I think this must be a type error. Regardless, will a new computer workstation be required for this project or interface to the existing Supervisor Workstation?	Addendum #7 clarifies that the phrase "For Ambulatory care center" is deleted, but a workstation is still required.	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	330. The drawing show 2 laundry rooms with laundry equipment. Is this Owner provided? If the GC is to provide please provide a specification for this equipment.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	331. Sheet AE 515 shows a detail for scoreboards. There is no specifications for the scoreboards. If scoreboards are required please provide specification.	Basis of design was noted in MHTN Addendum No. 4 item A4.22	
6/6/13	Jacobsen Construction	332. Please confirm that all television screens will be provided by the Owner. If contractor provided please provide specifications.	Television screens are by owner, refer to interior elevations and details.	
6/6/13	Jacobsen Construction	333. Sheet AE442 B5 calls out for coat hooks. Are these required? What is the make and model of these hooks?	Addressed in MHTN Addendum No. 4 item A4.58	
6/6/13	Jacobsen Construction	334. AE455 contains an equipment schedule stating that equipment will be provided by IBS. Who does IBS refer to. Also a number of these items state that the equipment provider is TBD. Has this been determined?	IBS stands for Integrated Beverage Systems. Owner will purchase equipment separately Contractor installed.	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	335. Please provide a specification for the interior mirrors.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	336. Please clarify the expectations for BIM for this project. There are several notes, for example, on drawing MH001 that indicate that the contractor is to "coordinate the exact location" of certain components in relation to other construction. Is a BIM clash detection process required?	Coordination between trades is required to CG. BIM clash detection is to the discretion of contractor.	

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6/6/13	Jacobsen Construction	337. If a BIM clash detection process is required, which subcontractor BIM models will be required in the BIM clash detection process?	BIM clash detection is to the discretion of contractor.	
6/6/13	Jacobsen Construction	338. Deferred Submittal spec 013302 makes reference to interior GFRG column covers. Please issue a specification for GFRG and indicate where GFRG column covers are located on the plans (none found in drawings).	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	339. Deferred Submittal spec 013302 references segmental retaining walls. Does this refer to the boulder walls on the project site? Or does the reference to segmental retaining walls not apply to this project?	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	340. Spec 014533-1.2.D.6 makes reference to spec 316330 AGGREGATE PIER SOIL REINFORCEMENT (GEOPIER) DEFINITIONS. This spec is not included with the bid documents. If applicable to this project, please issue this specification.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	341. The Owner's Project Requirements Document describes the David Eccles School of Business project. Please reissue this document with information specific to the Student Life Center.	In Addendum #5.	
6/6/13	Jacobsen Construction	342. Please issue a narrative detailing mock-up requirements or provide a plan view, elevation view, and isometric view of the desired mock-up(s).	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/6/13	Jacobsen Construction	343. What is the intent of the "mock-up test chamber" described at 019117-1.3.B? Is this a separate structure built completely around the mock-up(s)? Please describe the mock-up test chamber required for this project.	In Addendum #5.	
6/6/13	Jacobsen Construction	344. There are at least three (3) trees directly to the east of the new Storage Building that will be seriously impacted by foundation construction of the new shed building. Can the bid documents be revised to show the three trees nearest the Storage Building to the east being demolished and replaced?	In Addendum #5.	
6/6/13	Jacobsen Construction	345. How far east beyond the new Storage Building can temporary earth retention be placed?	The existing hill side can be sloped back/retained as far as necessary to place the storage shed foundation. The existing trees will need to be protected.	
6/6/13	Jacobsen Construction	346. Running east-to-west paralleling Ballif Road, there is an abandoned water line shown to be demolished. Is this water line encased in concrete or in a tunnel? Or is it direct buried pipe?	The condition of this line is unknown.	

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6/6/13	Jacobsen Construction	347. Drawing ES100.2, regarding the existing ductbank indicated by Keyed Note #3 (coming northwest out of MH36A): this ductbank appears to conflict with the corner of the building at approx. gridlines Y/11. Will this ductbank need to be relocated in order to construct building foundations at this location? If yes, is there a way to backfeed the buildings that this ductbank powers? What will the utility shutdown procedure be?	Exact routing of ductbank unknown. Contractor shall field verify exact location prior to excavation.	
6/6/13	Jacobsen Construction	348. Is power and/or data required to service the new water meter shown on CU302? Not shown on electrical plans. If yes, please show on electrical plans.	To my knowledge, this does not require power or data. The Civil Engineer is to confirm the requirements of the equipment he specified. -(P.L. KGE)	
6/6/13	Jacobsen Construction	349. There are some electrical lines on sheet CD002 that "may need to be lowered". Is the elevation of these electrical lines known? For bidding purposes, may general contractors assume that these lines will <u>not</u> need to be lowered and that any adjustments to these lines will be addressed as they arise during construction?	Exact routing of ductbank unknown. Contractor shall field verify exact location prior to excavation.	
6/6/13	Jacobsen Construction	350. There is an existing light pole indicated to be demolished on CD002 that does not show up on drawing ED100.1. See the light pole at the lower left-hand corner of CD002 right next to a box labeled "EB" (this box is to the west of MH363 at the lower right-hand corner of ED100.1). This appears to be the large soccer field light pole at the northeast corner of the soccer field. Is this really meant to be demolished? Is reinstallation part of this contract? If yes, please show installation and circuiting details. It looks like this large existing soccer field pole will end up on the north side of the new retaining wall on CS104 and in the new concrete walkway. Please confirm.	This pole shall be demolished and not reinstalled.	
6/6/13	Jacobsen Construction	351. On ED100.1, there are three existing light poles indicated to be removed along the west side of the pedestrian walkway running north-south (Keyed Note #3). On CD002, there are four existing light poles along this same pathway. The quantity of four is correct. Please update ED100.1 to show four light poles to be demolished along this walkway.	Four poles are correct.	
6/10/3	Jacobsen Construction	352. No specification has been issued for a coordination study. Will one be required? If yes, please issue a specification.	In Addendum #5 (sort of).	
6/10/3	Jacobsen Construction	353. No specification has been issued for medium-voltage transformers. Please either issue this specification or identify whether transformers shown on the drawings are existing.	In Addendum #5.	

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6/10/3	Jacobsen Construction	354. The Alternate #1 lighting sheets seem to show lighting duplicated over the Natatorium swimming pool (i.e. it appears that the same light fixtures appear on both the lower level lighting plans at EL200.C1 & EL200.C2 and the Level 1 lighting plans at EL201.C1 & EL201.C2). This is causing confusion with lighting vendors/suppliers regarding the correct quantities. Please clarify.	In Addendum #5.	
6/10/3	Jacobsen Construction	355. The General Notes on the Life Safety plans indicate that exposed columns and floor beams shall receive intumescent paint. Is intumescent fireproofing required over Rooms 40S, 45A, and 45B (drawing AC100C) or will spray-applied cementitious fireproofing be acceptable at these locations?	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/10/3	Jacobsen Construction	356. Detail D1/AE317 calls for a "mastic coating per UL design X633" at a structural steel tube concealed within a curtain wall system. This UL assembly is not identified in the code analysis on G1002.1. Is this "mastic coating" meant to be intumescent fireproofing?	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/10/3	Jacobsen Construction	357. Whether or not intumescent fireproofing is required in the concealed condition shown at D1/AE317, please identify any other concealed locations where intumescent fireproofing is required.	Clarified in Addendum No. 7	MHTN Addendum No. 7
6/10/3	Jacobsen Construction	358. B1/AE501: please either identify the size of the bent plate shown in this detail or confirm where it occurs on the structural drawings.	C5/SF511	
6/10/3	Jacobsen Construction	359. Refer to Addendum #3, page 8 of 10, item A2.49: this item indicates that we should "provide stamped and signed engineered calculations as deferred submittal if required ". There is discussion of engineering in the specification for the Movable Bulkhead, but it is not clear if this will be a deferred submittal. Please clarify what engineering will be required of the Contractor for the movable bulkhead.	Stamped structural engineering of the bulkhead would be the deferred submittal if required.	
6/10/3	Jacobsen Construction	360. Please confirm that the engineer who stamps and seals the movable bulkhead shop drawings needs to be licensed in the state of Utah.	Yes	
6/10/3	Jacobsen Construction	361. General Structural Note #5.13.C indicates that metal bar grating shall be provided with mill finish, unless otherwise noted. At D1/SB111, steel grating is called out to be galvanized. However, there is grating exposed to the exterior at SF101A, SF101C, and SF110 that just calls for steel grating. Is mill finish desired on steel grating at SF101A, SF101C, and SF110? Or is a galvanized finish desired? Please clarify.	Clarified in Addendum No. 7	MHTN Addendum No. 7

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6/10/3	Jacobsen Construction	362. Slab over metal deck at Level 3 is reinforced with rebar per SF103. Is WWF or fiber mesh also required at Level 3 as per General Structural Note #5.10.C on SG002, or will reinforcing steel be sufficient at Level 3 (i.e. no WWF or fiber mesh required at Level 3)?	Right.	
6/10/3	Jacobsen Construction	363. Detail B1/AS501 calls for "ARCH CONCRETE RED ON ALL WALLS OVER 6" TALL". Does this mean all site walls over 6" tall get painted red? Or does it mean that the ready mix shall be integrally colored red? Please clarify.	Delete note in detail B1/AS501 requiring Architectural Concrete Red on all Walls	MHTN Addendum No. 7
6/10/3	Jacobsen Construction	364. If site walls over 6" tall are to be integrally colored red, please specify the pigment color and dosage.	Delete note in detail B1/AS501 requiring Architectural Concrete Red on all Walls Over 6" Tall	MHTN Addendum No. 7
6/10/3	Jacobsen Construction	365. Is a cast in place concrete coping acceptable for the base and alternate skimmer pools? Creating custom molds for a precast coping on those skimmer pools will increase costs significantly. Each radius of the free form shapes would have to have a custom mold made. We have had great success pouring a reinforced concrete coping on free form skimmer pools.	In Addendum #5.	
6/10/3	Jacobsen Construction	366. Is a cast in place island and finger wall cap acceptable for the Alternate Activity Pool? We ask this question for the same reason as the previous question. The cost would be very high to create custom mold pieces for each of the stones illustrated on the finger wall caps.	In Addendum #5.	
6/10/3	Jacobsen Construction	367. Will Nemato Regenerative Filters for the swimming pools be accepted as equal to the specified Neptune Benson Defender Filters? We have successfully had these Nemato Filters approved as equals on past jobs by this same engineer. I have enclosed the Nemato Filter Submittals.	Not Accepted, see Addendum #5.	
6/10/3	Jacobsen Construction	368. Reference Addendum #2, page 12 of 16, Pool item A1.104: Addendum 2 says that the make and model for the Activity Pool CO2 bulk Container on sheet WF101 are revised, but I don't see where that new make and model # is listed. Please issue the revised make and model number.	In Addendum #5.	
6/10/3	Jacobsen Construction	369. Painting spec 099120 - 2.1.B.1 indicates that the only acceptable paint manufacturer is "Sherwin Williams to match Phase 1 work". Will other paint manufacturers be allowed on this project? What is Phase 1 of this project?	In Addendum #5.	
6/10/3	Jacobsen Construction	370. We have had concern expressed regarding the alkyd paints specified in the paint specification. Do alkyd paints work against LEED credits?	Paint products need to comply with 099120 2.2 B for VOC content	
6/10/3	Jacobsen Construction	371. On drawing AS101, Keynote #32	This is correct. For Sheets AS101, AS101A and AS102 Keynote #32 is to be	

Addenda Questions

		refers to E2/AS504 for "pool partition walls". Is this meant to refer to detail <u>E4/AS504</u> ?	revised to read: Pool Partition Wall - See E4/AS504	
6/10/3	Jacobsen Construction	372. On drawing A1/AS401, Keynote #5 refers to C4/AS501 for "pool partition walls". Is this meant to refer to detail <u>E4/AS504</u> ?	This is correct. For Sheets AS401, AS401A and AS402 Keynote #32 is to be revised to read: Pool Partition Wall - See E4/AS504	
6/10/3	Jacobsen Construction	373. Keynote #28 at enlarged plan B3/LI101A: we assume this "climbing tower" is future and not part of this contract (it is indicated to be "future" at Keynote #38 on AS102). Please confirm that this outdoor climbing tower is not part of this contract.	The Climbing tower is not part of this contract	
6/10/3	Jacobsen Construction	374. On CS101, CS103, and CS104, a 10' wide and a 12' wide colored concrete fire lane is shown. On AS101, Keynote #19 refers to these same locations as being asphalt. Please clarify which is correct and if it's colored concrete, please indicate the color.	The fire lane is to be concrete as shown on the Civil plans. This was answered in a previous addendum. The concrete color will be chosen by the Owner. In Addendum #5.	
6/10/3	Jacobsen Construction	375. Keynote #50 at AS102 refers to detail E5/AS402 for the trash enclosure. Please confirm this is meant to refer to drawing AS505.	This is correct. For Sheets AS101, AS101A and AS102 Keynote #50 is to be revised to read: Trash Enclosure - See E2/AS505	
6/10/3	Jacobsen Construction	376. Detail A1/CS403 shows some work to be performed along an existing fence on the north side of Ballif Road (see CS100). However, this work is outside the construction limit line. Is the new "cheek wall" shown at A1/CS403 part of this contract?	This cheek wall is included as part of this contract. The new grades along Ballif Road will be lower than the existing elevations requiring this detail. The demolition limit line was updated to include the sidewalk up to the mow strip but the construction limit line was not.	
6/10/3	Jacobsen Construction	377. If the new "cheek wall" shown at A1/CS403 is part of this contract, please indicate the extent of this detail (i.e. how long a section of existing fence line will this detail be applied to)? Please show on the site plans; not shown at this time.	Refer to the Demolition Limit Line on Sheet CD000. This detail shall be utilized from the east end of demo on Ballif Road to the new ADA ramp between grid lines 13 & 14.	
6/10/3	Jacobsen Construction	378. Regarding the new "cheek wall" shown at A1/CS403: the sidewalk next to this existing fence line is existing-and-to-remain. Will we need to sawcut the sidewalk along the existing wall to accommodate the new "cheek wall" extension?	This section of sidewalk as shown on CD000 to be retained & protected should be removed & replaced. The elevation of this sidewalk will need to be lowered to correspond with the new road/curb & gutter elevations.	MHTN Addendum No. 7

Addenda Questions

6/10/3	Jacobsen Construction	379. No rebar dowels are shown to be drilled & epoxied into the existing "mow strip" to connect the new "cheek wall" and the existing "mow strip". Are rebar dowels desired at this location to tie new and existing construction together?	Provide 6" long #4 tie bars drilled & epoxied into existing mow strip on 18" centers 6" from top of existing mow strip.	MHTN Addendum No. 7
6/10/3	Jacobsen Construction	380. The finish plans are "partial" (i.e. they only show certain portions of each floor). Will you please issue finish plans for each entire floor?	AF sheets included describe floor patterns. Other areas are described in the finish schedule or AE Floor Plan Sheets	



Addendum No. 7

Issued: 06/19/14

**Addendum No. Seven
for the
Student Life Center
Bid Package
MHTN Project No. 2010562**

All Contractors submitting proposals on the above captioned project shall be governed by the following addendum, changes and explanations to the bidding documents dated May 15, 2013 and shall submit their bids in accordance therewith:

Changes to the Project Manual:

A7.01 SECTION 013302 – delete deferred submittal list from the project manual. Refer to deferred submittal list on G1002.1 added by previous addendum and non-structural component check list on G1003.1 for deferred submittals required.

A7.02 SECTION 019117 Building Envelope Commissioning 1.3 A Add the following item #1:

1. Mock up description
 - a. Plan dimensions: 10'w x 5'd. Provide floor slab of same dimensions with minimum footing and foundation.
 - b. Construction cold formed structural stud and roof joist framing, wall height 12'h, roof elevation: top of joists 10'-0".
 - c. Provide air barrier over ½" glass mat sheathing over cold formed framed walls. Include anchor attachments for metal panel and terra cotta panels.
 - d. Provide complete roofing system, including vapor barrier over sheathing, specified roof deck over cold formed roof joist framing. Overlap roofing system and wall air barrier system as shown on details.
 - e. Curtain wall system: On one 10'-0" wide wall incorporate WT 29 and one aluminum curtain wall system 1'-6" w x 7'-10" h with sill height at 0' above floor.
 - f. Provide one 3'-0" x 7'-0" door opening to access interior of mock up – (metal door and frame), located on the back or side.
 - g. After testing mock up can be used to provide finish panel mock-ups as required by the specifications.

A7.03 SECTION 033000

1. 2.2-F add item 1: "1. Form Liner Pattern: Symons Random Weathered Woodgrain by Dayton Superior, Basis of Design."
2. 2.6-E add item 3. "3. Color for exterior concrete paving to be selected from Davis colors "premium" and "standard" group color selections."

A7.04 SECTION 034900 – GLASS FIBER REINFORCED CONCRETE. Add attached specification to the project manual.

A7.05 SECTION 034901 – GLASS FIBER REINFORCED CONCRETE (GFRC) BOULDERS
Is incorporated into the previous section and deleted from the project manual.

A7.06 SECTION 078123 Intumescent Fireproofing revise 2.1 A to the following:

- A. Available products complying to the requirements of the building code (product with current ICC ES-Report), specifications and project conditions (interior use, interior natatorium and exterior conditions) but not limited to the following:
 1. Carboline
 2. Cafco

A7.07 SECTION 088300 –MIRRORED GLASS. Add attached specification to the project manual.

A7.08 SECTION 095113 – 3.5 ACOUSTIC PANEL CEILING SCHEDULE paragraphs A, B, and C. Add the following new paragraph A:

“A. Refer to drawing finish schedule for references of “Basis of Design”.”

A7.09 SECTION 096566 RESILIENT ATHLETIC TRACK 2.2 A: Add Robbins Durathon Classic IS as an acceptable product.

A7.10 SECTION 230900 Instrumentation and Control For HVAC

1. Part 1.1.G. is modified to read: “Exposed wiring in mechanical and equipment rooms shall be routed in ¾” minimum conduit. Installation shall be square with the walls of the building. In return air ceiling plenums, follow applicable codes.”
2. Part 2.13. Only the phrase “FOR AMBULATORY CARE CENTER” is deleted, the rest of the section remains.
3. Part 2.17. This section is deleted.

A7.11 SECTION 316330 Aggregate Pier Ground Improvement. Add attached specification to the project manual. ***Note use of this system is optional and will require engineered submittal for building permit is issued for construction start.***

Changes to the Drawings:

A7.12 Sheet GI002.1 – add GFRC assemblies to deferred submittal schedule. Due date of initial submission is September 30, 2013.

A7.13 Sheet CD002 - See attached sketch AD-7-C1.0 for revisions.

A7.14 Sheet CS102 - See attached sketch AD-7-C2.0 for revisions.

A7.15 Sheet CS403- See attached sketch AD-7-C3.0 for revisions.

A7.16 Sheets AE001, AE010, AE011, AE012, AE013, AE014, AE015, AE016.

1. Correct general note 8 added in MHTN Addendum #4:

“8. All exposed steel shall be fire protected with intumescent paint except for enclosed storage, communication, electrical and mechanical rooms or unless specifically noted by keynote #6. Include intumescent coating in pool equipment

room. Refer to floor plans, reflected ceiling plans, interior elevations and sections for locations of steel exposed to view.”

2. Keynotes 2, 3, 4, 5 Add the following to each of these keyed notes: “OWNER FURNISHED, OWNER INSTALLED”.

A7.17 Sheet SG001: Revise 5.13 C. to the following:

“C. Metal bar grating shall be provided with mill finish, unless otherwise noted. ***At all locations exposed to the exterior provide galvanized.***”

A7.18 Sheet SB100A, SB100B and SB100C

1. **Revise Footing and Foundations Note #9 to read:** “Provide compacted structural fill extending to suitable natural granular soils or aggregate pier foundation system where foundations are not bearing on natural granular soils per Structural General Note 1.6 C”.

A7.19 Sheet SB100A

1. For footing and foundation connection of new tunnel to existing refer to epoxy dowel detail schedule A1/SB602.

A7.20 Sheet AS501:

1. Delete rope light from details C4 and E4.
2. Delete note in detail a1 requiring Architectural Concrete Red on all walls over 6” tall.

A7.21 Sheet AE100C: Laundry 24, washers and dryers shown on plans are by owner.

A7.22 Sheets AE311, AE312, AE313, AE314, AE315, AE316 and AE317: Revise notes calling for “RIGID INSULATION(MINERALFIBER - 12.9)” behind composite metal wall finish and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD - R-12.9)**”.

A7.23 Sheet A1/AE321: Add note “Provide sound batt insulation in gyp. bd walls between mac gym and corridor spaces. Provide rated walls above fire rated glass assemblies beyond, refer to life safety plans, typ.”

A7.24 Sheet A1/AE321: Add note “Provide sound batt insulation in gyp. bd walls between mac gym and corridor spaces. Provide rated wall construction above fire rated glass assemblies beyond, refer to life safety plans, typ.”

A7.25 Sheet A3/AE322: Add note “Provide sound batt insulation in gyp. bd walls between mac gym and corridor spaces. Provide rated wall construction above fire rated glass assemblies beyond, refer to life safety plans, typ.”

A7.26 Sheet AE323: Detail E1, change insulation under stairs to gravel and compacted earth fill.

A7.27 Sheet AE423: Detail D1, change insulation under stairs to gravel and compacted earth fill.

A7.28 Sheet AE455: Add General Note 13:

“13. IBS STANDS FOR INTEGRATED BEVERAGE SUPPLY, DISTRIBUTOR OF FRESHEN’S EQUIPMENT. OWNER WILL PURCHASE EQUIPMENT THROUGH IBS. CONTRACTOR TO INSTALL AND CONNECT EQUIPMENT AS NOTED ON THE

EQUIPMENT SCHEDULE.”

A7.29 Sheet AE501 Details E3, E5, D1, D3, D5, C5, B2, B4, B5: Revise notes calling for “RIGID INSULATION(MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.30 Sheet AE502 Details E4, E5, D3, D4, D5, C1, B1, B2, B3, A2, A3, A4, A5: Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.31 Sheet AE503 Details E2, D2, D5, C2, C5, A5: Revise notes calling for “RIGID INSULATION(MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.32 Sheet AE504 Details E1, E2, E4, D1, C1, C2, C3, C5, B4, A4: Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.33 Sheet AE505 Details E1, C1, A1, A5: Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.34 Sheet AE521 Details D3, D4, D5, B2, B3, B4: Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.35 Sheet AE522 Detail E5 Add note to insulation behind composite metal wall finish: “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.36 Sheet AE523 Details E1, E3, D1, D4, C2, B5, A1, A4 : Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.37 Sheet AE524 Details E1, E2, E3, E4, E5, D3, D4, D5, B5, A1, A5: Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

A7.38 Sheet AE525 Details E3, E5, D3, C4, A1, A3, : Revise notes calling for “RIGID INSULATION (MINERAL FIBER or MINERAL WOOL)” behind composite metal wall panels and terra cotta wall panels to “**RIGID INSULATION (ROCK-WOOL-FIBER BOARD)**”.

Mechanical

A7.39 MS100

4. The reference to MS200 is deleted.
5. The reference to MS300 is changed to MS301.

A7.40 MS202

1. All of the CHW in the tunnel is new piping, and the HTW is new piping at Node #8.

A7.41 MS401

1. Supplemental drawing AD07-MS001 is issued.

A7.42 MH401

1. Keynote #10 is added pointing to the CHWS/R and HTWS/R in the tunnel which reads: "SEE SHEET MS100, MS202, AND MS401 FOR CONTINUATION OF PIPING."
2. The HTWS/R piping from the tunnel into the building is changed to 4".

A7.43 MH601

1. On the filter schedule, all of the filter manufacturer and model numbers are to read: "FARR MERV-13". All of the filter efficiencies are to be 85%.

A7.44 MH603

1. On the plumbing fixture schedule, the following two fixtures are added:
 - A. ES-1, GUARDIAN G1950-TMV, WITH G3800 THERMOSTATIC MIXING VALVE.
 - B. ES-2, GUARDIAN GBF2170-TMV, RECESSED UNIT WITH THERMOSTATIC MIXING VALVE.

A7.45 MH703

1. A glycol feed unit is added to the schematic for HC-AH-3, HC-AH-4, and HC-AH-10.

A7.46 PP100c

1. Add a 2" waste line from ES-2 in CRS Storage and connect to the main waste line in the corridor.

A7.47 PP101A

1. Keynote #9 is to read: "SEE SHEET PP101C FOR CONTINUATION. THIS GAS PIPE IS TO BE PART OF BID ALTERNATE #4."

A7.48 PP105

1. Add a ball valve and Keynote #2 to the two water lines entering the Pool Mechanical Room. Keynote #2 reads: "CONNECT TO POOL EQUIPMENT."
2. Add the callout FD-2, to the three unlabeled drains in the Pool Mechanical Room.
3. The waste line for the three drains south of grid 9 in the pool mechanical room is to be a 4" line. The waste line for the drain just north of grid 9 is to be 8".

A7.49 PP402

1. Add two floor drains, FD-1, in Mens Toilet 118 where shown on the architectural background. Pipe with a 2" waste line to the 4" main in that room.

PRIOR APPROVALS

The following manufacturers, trade names and products are allowed to bid on a name brand only basis with the provision that they completely satisfy all and every requirement of the drawings, specifications and all addenda shall conform to the design, quality and standards specified, established and required for the complete and satisfactory installation and performance of the building and all its respective parts. Additionally, the manufacturer and product must meet the

approval of the University, especially when not listed specifically in the University Design Standards.

<u>Item</u>	<u>Manufacturer</u>	<u>Comments</u>
Variable Frequency Drives	ABB	

Electrical

A7.50 Sheet EP600: delete keyed note 12 from sheet.

A7.51 Sheet EY200.C1 replace keyed note 1 with the following:

1. THE CCTV SYSTEM IS TO BE PROVIDED AND INSTALLED BY THE BIDDING CONTRACTOR. THE BIDDING CONTRACTOR IS TO PROVIDE AND INSTALL ALL DEVICES, CABLE RACEWAY, ETC. FOR A COMPLETE OPERATING SYSTEM.

Attachments

Specifications

034900 Glass Fiber Reinforced Concrete
088300 Mirrored Glass
316330 Aggregate Pier Ground Improvement

Drawings

AD07-C1.0
AD07-C2.0
AD07-C3.0
AD07-MS001

End of Addendum No. 7

The Project Team Leader has reviewed this document and found it in compliance with internal standards

Angelica M. Pavoni

6/19/2013

Team Leader

Date

SECTION 034900 - GLASS FIBER REINFORCED CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes glass fiber reinforced concrete (GFRC) components consisting of GFRC, frames, anchors, and connection hardware.

- 1. GFRC column cover components as shown.
- 2. GFRC boulder consisting of GFRC boulder units, anchors, and connection hardware.

GFRC boulders is used to define simulated or artificial rock formations constructed on the site by skilled craftsmen utilizing the custom rock formations for assembling prefabricated, GFRC (glass fiber reinforced concrete) rockwork panels into a monolithic structure.

- B. Related Sections include the following:

- 1. Division 3 Section "Cast-in-Place Concrete" for placing connection anchors in concrete.
- 2. Division 3 Section "Plant-Precast Architectural Concrete."
- 3. Division 5 Section "Structural Steel" for connection attachment to structural steel framing.
- 4. Division 7 Section "Joint Sealants" for elastomeric joint sealants and sealant backings.

1.3 DEFINITIONS

- A. Design Reference Sample: Sample of approved GFRC color, finish, and texture; preapproved by Architect.

1.4 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide GFRC components, including panel frames, anchors, and connections, capable of withstanding the following design loads as well as the effects of thermal- and moisture-induced volume changes, according to load factors and combinations established in PCI MNL 128, "Recommended Practice for Glass Fiber Reinforced Concrete Panels."
 - 1. Design Loads: as indicated in General Structural Notes.
 - 2. Deflection: Design panel frames to withstand design loads without lateral deflections greater than 1/240 of wall span.
 - 3. Thermal Movements: Provide for thermal movements resulting from annual ambient temperature changes of 100 deg F (56 deg C)

4. Design panel frames and connections to accommodate deflections and other building movements including seismic story drifts.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include GFRC design mixes.
- B. Shop Drawings: Show fabrication and installation details for GFRC boulders and rockwork including the following:
 1. Structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 2. elevations, sections, and dimensions.
 3. Thickness of facing mix, GFRC backing, and bonding pads for typical panels.
 4. Finishes.
 5. Joint and connection details.
 6. Erection details.
 7. Panel frame details for typical panels including sizes, spacings, thickness, and yield strength of various members.
 8. Location and details of connection hardware attached to structure.
 9. Size, location, and details of flex, gravity, and seismic anchors for typical panels.
 10. Other items sprayed into panels.
 11. Erection sequence for special conditions.
 12. Relationship to adjacent materials.
 13. Description of loose, cast-in, and field hardware.
- C. Samples: Representative of finished exposed face of GFRC showing the full range of colors and textures specified, 12 by 12 inches (305 by 305 mm) and of actual thickness.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified GFRC manufacturer, including proof of current Precast/Prestressed Concrete Institute (PCI Plant Certification).
- B. Welding certificates.
- C. Steel Sheet Certification: For steel sheet used in cold-formed steel panel framing.
- D. Mill Certificates: For structural-steel shapes and hollow structural sections used in panel framing.
- E. Source Quality-Control Program: For GFRC manufacturer.
- F. Source Quality-Control Test Reports: For GFRC, inserts, and anchors.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer who participates in PCI's Plant Certification Program and is designated a PCI-Certified Plant for Group G - Glass Fiber Reinforced Concrete.

1. Manufacturer's responsibility includes fabricating and installing GFRC panels and providing professional engineering services needed to assume engineering responsibility for GFRC panels.
 2. Engineering responsibility includes preparation of Shop Drawings and comprehensive engineering analysis, based on GFRC production test values, by a qualified professional engineer experienced in GFRC design.
- B. Steel Sheet Certifications: Obtain mill certificates, signed by manufacturers of steel sheet, or test reports from a qualified testing agency indicating that steel sheet used in cold-formed metal panel framing complies with requirements including uncoated steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and galvanized-coating thickness.
- C. Mill Certificates: Obtain certified mill test report from manufacturer of structural-steel shapes and hollow structural sections used in panel framing indicating compliance of these products with requirements.
- D. Source Limitations: Obtain GFRC panels through one source from a single manufacturer.
- E. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel," and AWS D1.3, "Structural Welding Code - Sheet Steel."
- F. PCI Manuals: Comply with requirements and recommendations in the following PCI manuals unless more stringent requirements are indicated:
1. PCI MNL 128, "Recommended Practice for Glass Fiber Reinforced Concrete Panels."
 2. PCI MNL 130, "Manual for Quality Control for Plants and Production of Glass Fiber Reinforced Concrete Products."
- G. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members."
- H. AISC Specifications: Comply with AISC's "Specification for Structural Steel Buildings - Allowable Stress Design and Plastic Design."
- I. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical wall area as shown on Drawings separately from building.
 2. In addition to GFRC members, mockups include architectural precast concrete.
- J. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
- 1.8 DELIVERY, STORAGE, AND HANDLING
- A. Handle and transport GFRC to avoid damage.
1. Place nonstaining resilient spacers between pieces.
 2. Support pieces during shipment on nonstaining material.
 3. Protect pieces from dirt and damage during handling and transport.
- B. Store GFRC members to protect from contact with soil, staining, and physical damage.

1. Store with nonstaining resilient supports in same positions as when transported.
2. Store on firm, level, and smooth surfaces.
3. Place stored pieces so identification marks are clearly visible.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The term "Rockwork" as used in the Drawings, for this project is used to mean simulated or artificial rock formations constructed on the site by skilled craftsmen utilizing a molding system and fabrication to simulate sandstone formations

Custom Rock Formations system Custom Rock international

Unlimited Designs, Salt Lake City

- B. Available Manufacturers - Columns: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Architectural Reproductions Inc.
2. Formglas Inc.
3. Hansen precast
4. Molded Fiber Glass/Union City.
5. WCI, Inc.
6. Unlimited Designs

2.2 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, nonabsorptive material, warp and buckle free, that will provide continuous and true GFRC surfaces; nonreactive with GFRC and capable of producing required finish surfaces.

1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain, or adversely affect GFRC surfaces and will not impair subsequent surface or joint treatments of GFRC.

- B. Form Liners: Units of face design, texture, arrangement, and configuration to match GFRC design reference sample. Provide solid backing and form supports to ensure that form liners remain in place during GFRC application. Use with manufacturer's recommended liquid-release agent that will not bond with, stain, or adversely affect GFRC surfaces and will not impair subsequent surface or joint treatments of GFRC.

2.3 GFRC MATERIALS

- A. Portland Cement: ASTM C 150, Type I, II, or III.

1. For surfaces exposed to view in finished structure, use white of same type, brand, and source throughout GFRC production.
2. Metakaolin: ASTM C 618, Class N.

- B. Glass Fibers: Alkali resistant, with a minimum zirconia content of 16 percent, **1 to 2 inches (25 to 50 mm)** long, specifically produced for use in GFRC, and complying with PCI MNL 130.
- C. Sand: Washed and dried silica, complying with composition requirements of ASTM C 144; passing **No. 20 (0.85-mm)** sieve with a maximum of 2 percent passing **No. 100 (0.15-mm)** sieve.
- D. Facing Aggregate: ASTM C 33, except for gradation, and PCI MNL 130, **1/4-inch (6-mm)** maximum size.
 - 1. Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match sample.
- E. Coloring Admixture: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
- F. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of GFRC and complying with chemical limits of PCI MNL 130.
- G. Polymer-Curing Admixture: Acrylic thermoplastic copolymer dispersion complying with PCI MNL 130.
- H. Air-Entraining Admixture: ASTM C 260, containing not more than 0.1 percent chloride ions.
- I. Chemical Admixtures: ASTM C 494/C 494M, containing not more than 0.1 percent chloride ions.

2.4 ANCHORS, CONNECTORS, AND MISCELLANEOUS MATERIALS

- A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M. Finish steel shapes and plates less than **3/16 inch (4.76 mm)** thick as follows:
 - 1. Finish: Zinc coated by hot-dip process according to ASTM A 123/A 123M, after fabrication, or ASTM A 153/A 153M, as applicable
- B. Bolts: **ASTM A 307 or ASTM A 325 (ASTM F 568M or ASTM A 325M)**.
 - 1. Finish: Zinc coated by hot-dip process according to ASTM A 123/A 123M, after fabrication, and ASTM A 153/A 153M, as applicable
- C. Reglets: PVC extrusions.

2.5 COMPONENT FRAME MATERIALS

- A. Cold-Formed Steel Framing: Manufacturer's standard C-shaped steel studs, complying with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," minimum uncoated steel thickness of **0.0538 inch (1.37 mm)** or of web depth indicated, with stiffened flanges, U-shaped steel track, and of the following steel sheet:
 - 1. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, structural-steel sheet, **G60 or G90 (Z275)** zinc coating, of grade required by structural performance of framing.

- B. Hollow Structural Sections: Steel tubing, ASTM A 500, Grade B, or ASTM A 513. Finish hollow structural sections with wall thickness less than **3/16 inch (4.76 mm)** as follows:
 - 1. Organic Zinc-Rich Primer: SSPC-Paint 25 on surfaces prepared to comply with SSPC-SP 2, "Hand Tool Cleaning," or better
- C. Steel Channels and Angles: ASTM A 36/A 36M, finished as follows:
 - 1. Primer: SSPC-Paint 25 on surfaces prepared to comply with SSPC-SP 2, "Hand Tool Cleaning," or better.

2.6 GFRC MIXES

- A. Backing Mix: Proportion backing mix of portland cement, glass fibers, sand, and admixtures to comply with design requirements. Provide nominal glass-fiber content of not less than 5 percent by weight of total mix.
- B. Face Mix: Proportion face mix of portland cement, sand, facing aggregates, and admixtures to comply with design requirements.
- C. Mist Coat: Portland cement, sand slurry, and admixtures; of same proportions as backing mix without glass fibers.
- D. Polymer-Curing Admixture: 6 to 7 percent by weight of polymer-curing admixture solids to dry portland cement.
- E. Air Content: 8 to 10 percent; ASTM C 185.
- F. Coloring Admixture: Not to exceed 10 percent of cement weight.

2.7 COMPONENT FABRICATION

- A. Fabricate frames and accessories plumb, square, true to line, and with components securely fastened, according to Shop Drawings and requirements in this Section.
 - 1. Fabricate frames using jigs or templates.
 - 2. Cut cold-formed metal framing members by sawing or shearing; do not torch cut.
 - 3. Fasten cold-formed metal framing members by welding. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 4. Fasten framing members of hollow structural sections, steel channels, or steel angles by welding. Comply with AWS D1.1 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
 - 5. Weld flex, gravity, and seismic anchors to panel frames.
- B. Reinforce, stiffen, and brace framing assemblies, if necessary, to withstand handling, delivery, and erection stresses. Lift fabricated assemblies in a manner that prevents damage or significant distortion.
- C. Galvanizing Repair: Touch up accessible damaged galvanized surfaces according to ASTM A 780.
- D. Painting Repair: Touch up accessible damaged painted surfaces using same primer.

2.8 MOLD FABRICATION

- A. Construct molds that will result in finished GFRC complying with profiles, dimensions, and tolerances indicated, without damaging GFRC during stripping. Construct molds to prevent water leakage and loss of cement paste.
 - 1. Coat contact surfaces of molds with form-release agent.
 - 2. Coat contact surfaces of molds with surface retarder.
- B. Place form liners accurately to provide finished surface texture indicated. Provide solid backing and supports to maintain stability of liners during GFRC application. Coat form liner with form-release agent.
- C. Locate, place, and secure flashing reglets accurately.

2.9 GFRC FABRICATION

- A. Proportioning and Mixing: For backing mix, meter sand/cement slurry and glass fibers to spray head at rates to achieve design mix proportions and glass-fiber content according to PCI MNL 130 procedures.
- B. Spray Application: Comply with general procedures as follows:
 - 1. Spray or place face mix in thickness indicated on Shop Drawings.
 - 2. Proceed with spraying backing mix before face mix has set, using procedures that produce a uniform thickness and even distribution of glass fibers and matrix.
 - 3. Consolidate backing mix by rolling or other technique to achieve complete encapsulation of glass fibers and compaction.
 - 4. Measure thickness with a pin gage or other acceptable method at least once for each **5 sq. ft. (0.5 sq. m)** of component surface. Take not less than six measurements per panel.
- C. Hand form and consolidate intricate details, incorporate formers or infill materials, and over spray before material reaches initial set to ensure complete bonding.
- D. Attach member frame to GFRC before initial set of GFRC backing, maintaining a minimum clearance of **1/2 inch (13 mm)** from GFRC backing, and without anchors protruding into GFRC backing.
- E. Build up homogeneous GFRC bonding pads over anchor feet, maintaining a minimum thickness of **1/2 inch (13 mm)** over tops of anchor feet, before initial set of GFRC backing.
- F. Inserts and Embedments: Build up homogeneous GFRC bosses or bonding pads over inserts and embedments to provide sufficient anchorage and embedment to comply with design requirements.
- G. Curing: Employ initial curing method that will ensure sufficient strength for removing units from mold.
 - 1. After initial curing, remove panel from mold and place in a controlled curing environment.
 - 2. Keep GFRC panels continuously moist for a minimum of seven days unless polymer-curing admixture was used. Maintain temperature between **60 and 120 deg F (16 and 49 deg C)** during this period.
- H. Panel Identification: Mark each GFRC component or member to correspond with identification mark on Shop Drawings. Mark each panel with its casting date.

2.10 FABRICATION TOLERANCES

- A. Manufacturing Tolerances: Manufacture GFRC panels so each finished unit complies with the following dimensional tolerances. For dimensional tolerances not listed below, comply with PCI MNL 130.
1. Overall Height and Width of Units, Measured at the Face Adjacent to Mold: As follows:
 - a. 10 feet (3 m) or less, plus or minus 1/8 inch (3 mm).
 - b. More than 10 feet (3 m), plus or minus 1/8 inch per 10 feet (3 mm per 3 m); 1/4 inch (6 mm) maximum.
 2. Edge Return Thickness: Plus 1/2 inch (13 mm), minus 0 inch (0 mm).
 3. Architectural Facing Thickness: Plus 1/8 inch (3 mm), minus 0 inch (0 mm).
 4. Backing Thickness: Plus 1/4 inch (6 mm), minus 0 inch (0 mm).
 5. Panel Depth from Face of Skin to Back of Panel Frame or Integral Rib: Plus 3/8 inch (10 mm), minus 1/4 inch (6 mm).
 6. Angular Variation of Plane of Side Mold: Plus or minus 1/32 inch per 3 inches (0.8 mm per 75 mm) of depth or plus or minus 1/16 inch (1.5 mm) total, whichever is greater.
 7. Variation from Square or Designated Skew (Difference in Length of Two Diagonal Measurements): Plus or minus 1/8 inch per 72 inches (3 mm per 1800 mm) or plus or minus 1/4 inch (6 mm) total, whichever is greater.
 8. Local Smoothness: 1/4 inch per 10 feet (6 mm per 3 m).
 9. Bowing: Not to exceed L/240 unless unit meets erection tolerances using connection adjustments.
 10. Length and Width of Block Outs and Openings within One Unit: Plus or minus 1/4 inch (6 mm).
 11. Maximum Permissible Warpage of One Corner out of the Plane of the Other Three: 1/16 inch per 12 inches (1.5 mm per 300 mm) of distance from nearest adjacent corner.
- B. Position Tolerances: Measured from datum line locations, as indicated on Shop Drawings.
1. Panel Frame and Track: Plus or minus 1/4 inch (6 mm).
 2. Flashing Reglets at Edge of Panel: Plus or minus 1/4 inch (6 mm).
 3. Inserts: Plus or minus 1/2 inch (13 mm).
 4. Special Handling Devices: Plus or minus 3 inches (75 mm).
 5. Location of Bearing Devices: Plus or minus 1/4 inch (6 mm).
 6. Blockouts: Plus or minus 3/8 inch (10 mm).
- C. Panel Frame Tolerances: As follows:
1. Vertical and Horizontal Alignment: 1/4 inch per 10 feet (6 mm per 3 m).
 2. Spacing of Framing Member: Plus or minus 3/8 inch (10 mm).
 3. Squareness of Frame: Difference in length of diagonals of 3/8 inch (10 mm).
 4. Overall Size of Frame: Plus or minus 3/8 inch (10 mm).

2.11 FINISHES

- A. Finish exposed-face surfaces of GFRC as follows to match approved design reference sample and mockups. Panel faces shall be free of joint marks, grain, or other obvious defects.
1. Abrasive-Blast Finish: Use abrasive grit, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.
or

2. Acid-Etched Finish: Use acid and hot-water solution equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.

2.12 SOURCE QUALITY CONTROL

- A. Quality-Control Testing: Establish and maintain a quality-control program for manufacturing GFRC panels according to PCI MNL 130.
 1. Test materials and inspect production techniques.
 2. Quality-control program shall monitor glass-fiber content, spray rate, unit weight, product physical properties, anchor pull-off and shear strength, and curing period and conditions.
 3. Prepare test specimens and test according to ASTM C 1228, PCI MNL 130, and PCI MNL 128 procedures.
 4. Test GFRC inserts and anchors according to ASTM C 1230 to validate design values.
 5. Produce test boards at a rate not less than one per work shift per operator for each spray machine and for each mix design.
 - a. For each test board, determine glass-fiber content according to ASTM C 1229, and flexural yield and ultimate strength according to ASTM C 947.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine structure and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance.
 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

- A. Install clips, hangers, and other accessories required for connecting GFRC panels to supporting members and backup materials.
- B. Lift GFRC pieces and install without damage.
- C. Install GFRC pieces level, plumb, square, and in alignment. Provide temporary supports and bracing as required to maintain position, stability, and alignment until permanent connections are completed.
 1. Maintain horizontal and vertical joint alignment and uniform joint width.
 2. Remove projecting hoisting devices.
- D. Connect GFRC members in position by bolting or welding, or both, as indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as possible after connecting is completed.
- E. Welding: Comply with applicable AWS D1.1 and AWS D1.3 requirements for welding, appearance, quality of welds, and methods used in correcting welding work.

1. Protect GFRC from damage by field welding or cutting operations, and provide noncombustible shields as required.
- F. At bolted connections, use lock washers or other acceptable means to prevent loosening of nuts.

3.3 ERECTION TOLERANCES

- A. Erect GFRC components to comply with the following noncumulative tolerances:

1. Plan Location from Building Grid Datum: Plus or minus **1/2 inch (13 mm)**.
2. Top Elevation from Nominal Top Elevation: As follows:
 - a. Exposed Individual Panel: Plus or minus **1/4 inch (6 mm)**.
 - b. Nonexposed Individual Panel: Plus or minus **1/2 inch (13 mm)**.
 - c. Exposed Panel Relative to Adjacent Panel: **1/4 inch (6 mm)**.
 - d. Nonexposed Panel Relative to Adjacent Panel: **1/2 inch (13 mm)**.
3. Support Elevation from Nominal Elevation: As follows:
 - a. Maximum Low: **1/2 inch (13 mm)**.
 - b. Maximum High: **1/4 inch (6 mm)**.
4. Maximum Plumb Variation over the Lesser of Height of Structure or **100 Feet (30 m)**: **1 inch (25 mm)**.
5. Plumb in Any **10 Feet (3 m)** of Element Height: **1/4 inch (6 mm)**.
6. Maximum Jog in Alignment of Matching Edges: **1/4 inch (6 mm)**.
7. Maximum Jog in Alignment of Matching Faces: **1/4 inch (6 mm)**.
8. Face Width of Joint: As follows (governs over joint taper):
 - a. Panel Dimension **20 Feet (6 m)** or Less: Plus or minus **1/4 inch (6 mm)**.
 - b. Panel Dimension More Than **20 Feet (6 m)**: Plus or minus **5/16 inch (8 mm)**.
9. Maximum Joint Taper: **3/8 inch (10 mm)**.
10. Joint Taper in **10 Feet (3 m)**: **1/4 inch (6 mm)**.
11. Differential Bowing, as Erected, between Adjacent Members of Same Design: **1/4 inch (6 mm)**.

3.4 REPAIRS

- A. Repairs will be permitted provided structural adequacy of GFRC and appearance are not impaired, as approved by Architect.
- B. Mix patching materials and repair GFRC so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces.
- C. Prepare and repair accessible damaged galvanized coatings with galvanizing repair paint according to ASTM A 780.
- D. Wire brush, clean, and paint accessible weld areas on prime-painted components with same type of shop primer.

- E. Remove and replace damaged GFRC members when repairs do not comply with requirements.

3.5 CLEANING AND PROTECTION

- A. Perform cleaning procedures, if necessary, according to GFRC manufacturer's written instructions. Clean soiled GFRC surfaces with detergent and water, using soft fiber brushes and sponges, and rinse with clean water. Prevent damage to GFRC surfaces and staining of adjacent materials.

END OF SECTION 034900

SECTION 088300 - MIRRORED GLASS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Silvered mirrored glass – wall mounted in areas indicated.
- B. Related Sections include the following:
 - 1. Division 6 Section "Miscellaneous Carpentry" for concealed blocking.

1.3 DEFINITIONS

- A. Deterioration of Silvered Mirrored Glass: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning silvered mirrored glass contrary to mirrored glass manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

1.4 PERFORMANCE REQUIREMENTS

- A. Provide mirrored glass that will not fail under normal usage. Failure includes glass breakage and deterioration attributable to defective manufacture, fabrication, and installation.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Silvered mirrored glass. Include description of materials and process used to produce mirrored glass that indicates source of glass, glass coating components, edge sealer, and quality-control provisions.
 - 2. Mirror mastic.
 - 3. Mirror hardware.
 - 4. Acrylic mirrors
- B. Shop Drawings: Include elevations, sections, details, and attachments to other Work.

- C. Mirror Mastic Glass Coating Compatibility Test Reports: From an organic protective coating manufacturer indicating that mirror mastic has been tested for compatibility and adhesion with organic protective coating applied to silvered mirrored glass. Include organic coating manufacturers' interpretation of test results relative to performance and recommendations for use of mastics with organic protective coating.
- D. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in mirrored glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association's Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
- B. Installer Qualifications: An experienced installer who has completed mirrored glass installations similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Source Limitations for Mirrored Glass: Obtain mirrored glass from one source for each type of mirrored glass indicated.
- D. Source Limitations for Glazing Accessories: Obtain glazing accessories from one source for each type of accessory indicated.
- E. Glazing Publications: Comply with published recommendations in GANA's "Glazing Manual," unless more stringent requirements are indicated. Refer to this publication for definitions of glass and glazing terms not otherwise defined in this Section or in referenced standards.
- F. NAAMM's Publication: For silvered mirrored glass, comply with recommendations in NAAMM's "Mirrors, Handle with Extreme Care, Tips for the Professional on the Care and Handling of Mirrors."
- G. Preconstruction Mirror Mastic Glass Coating Compatibility Test: Submit mirror mastic products to organic protective coating manufacturer for testing to determine compatibility of adhesive with mirrored glass coating.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to mirrored glass manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
- B. For silvered mirrored glass, comply with mirrored glass manufacturer's written instructions for shipping, storing, and handling mirrored glass as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install mirrored glass until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.9 WARRANTY

- A. General Warranty: Special **warranty** specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Manufacturer's Special Warranty for Silvered Mirrored Glass: Written warranty, made out to Owner and signed by mirrored glass manufacturer agreeing to replace silvered mirrored glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below:
1. Warranty Period: **Five years from date of Substantial Completion**

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Mirror Company, Inc.
 2. Carolina Mirror Company.
 3. Lenoir Mirror Company.
 4. VVP America, Inc.; Binswanger Mirror Products.
 5. Walker Glass Co., Ltd.

2.2 FLOAT GLASS

- A. Clear Glass Mirrors: ASTM C 1503, Mirror **Select** Quality.
1. Nominal Thickness: **4.0 mm**.
- B. Annealed Float Glass for Inner Lite of Laminated Mirrors: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; Class 1 (clear).

2.3 MIRRORING GLASS

- A. At Contractors option, provide one of the following:
- B. Laminated Safety Mirrors: Provide laminated mirrors fabricated to produce units complying with ASTM C 1172, Kind LM, and the following:
1. Glass Lites: Outer lite of mirror glass with silver coating on second surface and inner lite of clear float glass.

2. Interlayer Material: Mirror manufacturer's standard 0.030-inch- (0.76-mm-) thick, polyvinyl-butyral interlayer with a proven record of showing no tendency to delaminate from, or cause damage to, silver coating.
 3. Laminating Process: Laminate glass using laminator's standard heat-plus-pressure process to produce glass free from foreign substances, air or glass pockets, and other defects.
 4. Seal edges of laminated units to comply with written requirements of interlayer manufacturer.
- C. Film-Backed Safety Mirrors: Apply film backing with pressure-sensitive adhesive coating over mirror backing paint as recommended in writing by film-backing manufacturer to produce a surface free of bubbles, blisters, and other imperfections. Use adhesives and film backing compatible with mirror backing paint as certified by mirror manufacturer.

2.4 FABRICATION

- A. Mirrored Glass Sizes: Cut mirrored glass to final sizes and shapes to suit Project conditions.
- B. Cutouts: Fabricate cutouts for notches and holes in mirrored glass without marring visible surfaces. Locate and size cutouts so they fit closely around penetrations in mirrored glass.
- C. Mirrored Glass Edge Treatment: Treat edges as indicated below.
1. Flat polished edge.
 2. Seal edges of silvered mirrored glass after edge treatment to prevent chemical or atmospheric penetration of glass coating.
 3. Require mirrored glass manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

2.5 MISCELLANEOUS MATERIALS

- A. Edge Sealer: Coating compatible with glass coating and approved by mirrored glass manufacturer for use in protecting against silver deterioration at mirrored glass edges.
- B. Mirror Mastic: An adhesive setting compound, produced specifically for setting mirrored glass by spot application, certified by both mirrored glass manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrored glass will be installed.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Gunther Mirror Mastics.
 - b. Palmer Products Corporation.
- C. Mirror Clips spaced as required at top and bottom of mirror glass.
- D. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.
- E. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, over which mirrored glass units are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance.
 - 1. Verify compatibility with and suitability of substrates, including compatibility of mirror mastic with existing finishes or primers.
 - 2. Proceed with mirrored glass installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

- A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating surfaces with mastic manufacturer's special bond coating where applicable.

3.3 GLAZING

- A. General: Install mirrored glass units to comply with written instructions of mirrored glass manufacturer and with referenced GANA and NAAMM publications. Mount mirrored glass accurately in place in a manner that avoids distorting reflected images.
- B. Provide space for air circulation between back of mirrored glass units and face of mounting surface.
- C. For wall-mounted mirrored glass units, install permanent means of support at bottom and top edges with bottom support designed to withstand mirrored glass weight and top support designed to prevent mirrored glass from coming away from wall along top edges.
 - 1. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrored glass units.
 - 2. Apply barrier coat to mirrored glass backing where approved in writing by manufacturers of mirrored glass and backing material.
 - 3. Apply mastic in spots to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrored glass units and face of mounting surface.
 - 4. After mastic is applied, align mirrored glass units and press into place while maintaining a minimum air space of **1/8 inch (3 mm)** between back of mirrored glass and mounting surface.
 - 5. For metal or plastic clips, place a felt or plastic pad between mirrored glass and each clip to prevent spalling of mirrored glass edges.
 - 6. Where indicated, install bottom and top clips **symmetrically placed and evenly spaced**.

3.4 PROTECTION AND CLEANING

- A. Protect mirrored glass from breakage and contaminating substances resulting from construction operations.
 - 1. Do not permit edges of silvered mirrored glass to be exposed to standing water.
 - 2. Maintain environmental conditions that will prevent silvered mirrored glass from being exposed to moisture from condensation or other sources for continuous periods of time.

- B. Wash mirrored glass not more than four days before date scheduled for inspections intended to establish date for Substantial Completion. Wash mirrored glass by methods recommended in NAAMM publication and in writing by mirrored glass manufacturer. Use water and glass cleaners free from substances capable of damaging mirrored glass edges or coatings.

END OF SECTION 08830

SECTION 316330 - SPECIFICATION FOR AGGREGATE PIER GROUND IMPROVEMENT

PART 1: GENERAL REQUIREMENTS

1.01 Description

Work shall consist of designing, furnishing and installing aggregate pier ground improvement to the lines and grades designated on the project foundation plan and as specified herein. Aggregate pier ground improvement as referenced in this specification shall be constructed by either vibro stone columns or Rammed Aggregate Pier[®] systems. The aggregate piers shall be in a columnar-type configuration and shall be used for support of foundation loads.

1.02 Work Included

- A. Provision of all equipment, material, labor, and supervision to design and install aggregate piers. Design shall rely on subsurface information presented in the project geotechnical report. Layout of aggregate piers, spoil removal (as required), footing excavations, and subgrade preparation following aggregate pier installation is not included.
- B. The aggregate pier design and installation shall adhere to all methods and standards described in this Specification.
- C. Drawings and General Provisions of the Contract, including General and Supplemental Conditions, and Division 1 Specifications, apply to the work in this specification.

1.03 Basis of Design

- A. Geopier Foundation Company "Rammed Aggregate Piers"; www.geopier.com
- B. Alternate systems shall be submitted for review by the Architect, Structural Engineer, and Geotechnical Engineer prior to the receipt of bids. Alternate systems are subject to all requirements of these specifications. Documentation shall verify compliance with design criteria outlined herein and as shown on the Drawings.

1.04 Approved Installers

- A. The Aggregate Pier Installer (the Installer) shall be approved by the Owner's Engineer prior to bid opening. Without exception, no alternate installer will be accepted unless approved by the Owner's Engineer at least two (2) weeks prior to bid opening.
- B. Installers of aggregate pier foundation systems shall have a minimum of 5 years of experience with the installation of aggregate pier systems and shall have completed at least 50 projects.
- C. Installers licensed by the Geopier Foundation Company, Inc. (www.geopier.com) will be accepted as approved installers.

1.05 Reference Standards

- A. Design

1. "Control of Settlement and Uplift of Structures Using Short Aggregate Piers," by Evert C. Lawton (Assoc. Prof., Dept. of Civil Eng., Univ. of Utah), Nathaniel S. Fox (President, Geopier Foundation Co., Inc.), and Richard L. Handy (Distinguished Prof. Emeritus, Iowa State Univ., Dept. of Civil Eng.), reprinted from *IN-SITU DEEP SOIL IMPROVEMENT, Proceedings of sessions sponsored by the Geotechnical Engineering Division/ASCE in conjunction with the ASCE National Convention held October 9-13, 1994, Atlanta, Georgia*.
 2. "Settlement of Structures Supported on Marginal or Inadequate Soils Stiffened with Short Aggregate Piers," by Evert C. Lawton and Nathaniel S. Fox. *Geotechnical Special Publication No. 40: Vertical and Horizontal Deformations of Foundations and Embankments*, ASCE, 2, 962-974.
 3. "Behavior of Geopier[®]-Supported Foundation Systems during Seismic Events," by Kord Wissmann, Evert C. Lawton, and Tom Farrell. Geopier Foundation Company, Inc. Blacksburg, VA ©1999.
 4. "The design of vibro replacement." H.J. Priebe. *Ground Engineering*, London. Dec 1995.
- B. Modulus Testing
1. ASTM D 1143 - Pile Load Test Procedures
 2. ASTM D 1194 - Spread Footing Load Test
- C. Materials and Inspection
1. ASTM D 1241 - Aggregate Quality
 2. ASTM D 422 - Gradation of Soils
- D. Where specifications and reference documents conflict, the Aggregate Pier Designer shall make the final determination of the applicable document.
- 1.06 Certifications and Submittals
- A. Design Calculations - The Installer shall submit detailed design calculations and construction drawings prepared by the Aggregate Pier Designer (the Designer) for review and approval by the Owner or Owner's Engineer. All plans shall be sealed by a Professional Engineer in the State in which the project is constructed.
 - B. Professional Liability Insurance - The Aggregate Pier Designer shall have Errors and Omissions design insurance for the work. The insurance policy should provide a minimum coverage of \$3 million per occurrence.
 - C. Building Code Acceptance – The Aggregate Pier Installer shall demonstrate that the Aggregate Pier system has been evaluated by the International Code Council (formerly ICBO).
 - D. Modulus Test Reports – A modulus test(s) is performed on a non-production Aggregate Pier element as required by the Aggregate Pier Designer to verify the design assumptions. The Installer shall furnish the General Contractor a description of the installation equipment, installation records, complete test data, analysis of the test data

and verification of the design parameter values based on the modulus test results. The report shall be prepared under direction of a Registered Professional Engineer.

- E. Daily Aggregate Pier Progress Reports – The Installer shall furnish a complete and accurate record of Aggregate Pier installation to the General Contractor. The record shall indicate the pier location, length, volume of aggregate used or number of lifts, densification forces during installation, and final elevations or depths of the base and top of piers. The record shall also indicate the type and size of the installation equipment used, and the type of aggregate used. The Installer shall immediately report any unusual conditions encountered during installation to the General Contractor, to the Designer and to the Testing Agency.

1.07 DESIGN REQUIREMENTS

A. Aggregate Pier Design

- 1. The design of the Aggregate Pier system shall be based on the service load bearing pressure and the allowable total and differential settlement criteria of all footings indicated by the design team for support by the Aggregate Pier system. The Aggregate Pier system shall be designed in accordance with generally-accepted engineering practice and the methods described in Section 1 of these Specifications. The design life of the structure shall be 50 years.
- 2. The design shall meet the following criteria.

Maximum Allowable Bearing Pressure for Footings Supported by Aggregate Pier Reinforced Soils	5,000 psf
Increase in bearing pressure for seismic and wind loads:	33%
Soil site class per IBC Table 1613.5.2:	D or better.
Minimum coefficient of sliding friction:	0.45
Estimated Total Long-Term Settlement for Footings:	≤ 1-inch
Estimated Long-Term Differential Settlement of Adjacent Footings:	≤ ½-inch
Estimated Total Seismic Settlement for Footings:	≤ 1-inch

Maximum footing loads are shown in the CONCRETE FOOTING SCHEDULE

B. Design Submittal

- 1. The Installer shall submit detailed design calculations, construction drawings, and shop drawings, (the Design Submittal), for approval at least two(2) week(s) prior to the beginning of construction. A detailed explanation of the design parameters for settlement calculations shall be included in the Design Submittal. Additionally, the quality

control test program for Aggregate Pier system, meeting these design requirements, shall be submitted. All computer-generated calculations and drawings shall be prepared and sealed by a Professional Engineer, licensed in the State or Province where the piers are to be built. Submittals will be submitted electronically only unless otherwise required by specific submittal instructions.

1.08 QUALITY ASSURANCE

A. Independent Engineering Testing Agency (Owner's Quality Assurance)

The Aggregate Pier Installer shall provide full-time Quality Control monitoring of Aggregate Pier construction activities. The Owner or General Contractor is responsible for retaining an independent engineering testing firm to provide Quality Assurance services.

B. Responsibilities of Independent Engineering Testing Agency

1. The Testing Agency shall monitor the modulus test pier installation and testing. The Installer shall provide and install all dial indicators and other measuring devices.
2. The Testing Agency shall monitor the installation of Aggregate Piers to verify that the production installation practices are similar to those used during the installation of the modulus test elements.
3. The Testing Agency shall report any discrepancies to the Installer and General Contractor immediately.
4. The Testing Agency shall observe the excavation, compaction and placement of the foundations as described in Section 7.05. Dynamic Cone Penetration testing may be performed to evaluate the footing bottom condition as determined by the Testing Agency.

1.9 RESPONSIBILITIES OF THE GENERAL CONTRACTOR

A. Site Preparation and Protection

1. The General Contractor shall locate and protect underground and aboveground utilities and other structures from damage during installation of the Aggregate Piers.
2. Site grades for aggregate pier installation shall be within 1 foot of the top of footing elevation or finished grade elevation to minimize aggregate pier installation depths. Ground elevations and bottom of footing elevations shall be provided to the Rammed Aggregate Pier Installer in sufficient detail to estimate installation depth elevations to within 3 inches.
3. The General Contractor will provide site access to the Installer, after earthwork in the area has been completed. A working surface shall be established and maintained by the General Contractor to provide wet weather protection of the subgrade and to provide access for efficient operation of the Aggregate Pier installation.
4. Prior to, during and following Aggregate Pier installation, the General Contractor shall provide positive drainage to protect the site from wet weather and surface ponding of water.
5. If spoils are generated by aggregate pier installation, spoil removal from the aggregate pier work area in a timely manner to prevent interruption of aggregate pier installation is required.

B. Aggregate Pier Layout

The location of aggregate pier-supported foundations for this project, including layout of individual aggregate pier elements, shall be marked in the field using survey stakes or similar means at locations shown on the drawings.

C. Contractor's / Owner's Independent Testing Agency (Owner's Quality Assurance)

General Contractor is responsible for acquiring an Independent Testing Agency (Quality Assurance) as required. Testing Agency roles are as described in Part 6 of this specification. The Aggregate Pier Installer will provide Quality Control services as described in Part 5 of this specification.

D. Excavations for Obstructions

1. Should any obstruction be encountered during Aggregate Pier installation, the General Contractor shall be responsible for promptly removing such obstruction, or the pier shall be relocated or abandoned. Obstructions include, but are not limited to, boulders, timbers, concrete, bricks, utility lines, etc., which shall prevent placing the piers to the required depth, or shall cause the pier to drift from the required location.
2. Dense natural rock or weathered rock layers shall not be deemed obstructions, and piers may be terminated short of design lengths on such materials.

E. Utility Excavations

The General Contractor shall coordinate all excavations made subsequent to Aggregate Pier installations so that excavations do not encroach on the piers as shown in the Aggregate Pier construction drawings. Protection of completed Aggregate Piers is the responsibility of the General Contractor. In the event that utility excavations are required in close proximity to the installed Aggregate Piers, the General Contractor shall contact the Aggregate Pier Designer immediately to develop construction solutions to minimize impacts on the installed Aggregate Pier elements.

F. Footing Bottoms

1. Excavation and surface compaction of all footings shall be the responsibility of the General Contractor.
2. Foundation excavations to expose the tops of Aggregate Piers shall be made in a workman-like manner, and shall be protected until concrete placement, with procedures and equipment best suited to (1) avoid exposure to water, (2) prevent softening of the matrix soil between and around the Aggregate Piers before pouring structural concrete, and (3) achieve direct and firm contact between the dense, undisturbed Aggregate Piers and the concrete footing.
3. All excavations for footing bottoms supported by Aggregate Pier foundations shall be prepared in the following manner by the General Contractor. Recommended procedures for achieving these goals are to:
 - a. Limit over-excavation below the bottom of the footing to 3-inches (including disturbance from the teeth of the excavation equipment).
 - b. Compaction of surface soil and top of Aggregate Piers shall be prepared using a motorized impact compactor ("Wacker Packer," "Jumping Jack," or similar). Sled-type tamping devices shall only be used in granular soils and when approved by the designer. Loose or soft surficial soil over the entire footing bottom shall be

recompacted or removed, respectively. The surface of the aggregate pier shall be recompacted prior to completing footing bottom preparation.

- c. Place footing concrete immediately after footing excavation is made and approved, preferably the same day as the excavation. Footing concrete must be placed on the same day if the footing is bearing on moisture-sensitive soils. If same day placement of footing concrete is not possible, open excavations shall be protected from surface water accumulation. A lean concrete mud-mat may be used to accomplish this. Other methods must be pre-approved by the Designer.
4. The following criteria shall apply, and a written inspection report sealed by the project Testing Agency shall be furnished to the Installer to confirm:
- a. That water has not been allowed to pond in the footing excavation at any time.
 - b. That all Aggregate Piers designed for each footing have been exposed in the footing excavation.
 - c. That immediately before footing construction, the tops of Aggregate Piers exposed in each footing excavation have been inspected and recompacted as necessary with mechanical compaction equipment.
 - d. That no excavations or drilled shafts (elevator, etc) have been made after installation of Aggregate Pier elements within the excavation limits described in the Aggregate Pier construction drawings, without the written approval of the Installer or Designer.
- G. Failure to provide the above inspection and certification by the Testing Agency, which is beyond the responsibility of the Aggregate Pier Installer, may void any written or implied warranty on the performance of the Aggregate Pier system.

1.10 QUALITY CONTROL

A. Control Technician

The Installer shall have a full-time, on-site Control Technician to verify and report all installation procedures. The Installer shall immediately report any unusual conditions encountered during installation to the Aggregate Pier Designer, the General Contractor, and to the Testing Agency. The quality control procedures shall include the preparation of Aggregate Pier Progress Reports completed during each day of installation containing the following information:

1. Footing and Aggregate Pier location.
2. Pre-auger diameter and soil conditions encountered during drilling (if required).
3. Aggregate Pier length.
4. Planned and actual Aggregate Pier elevations at the top and bottom of the Aggregate Pier.
5. Average lift thickness of each Aggregate Pier.
6. Volume of aggregate used in each Aggregate Pier.
7. Documentation of any unusual conditions encountered.
8. Type and size of densification equipment used.

B. Aggregate Pier Modulus Test

When authorized, an Aggregate Pier Modulus Test(s) shall be performed at locations agreed upon by the Aggregate Pier Designer and the Testing Agency to verify or modify Aggregate Pier

designs. Modulus Test Procedures shall utilize appropriate portions of ASTM D 1143 and ASTM D 1194, as outlined in the Aggregate Pier design submittal. Aggregate Piers shall be tested to 150 percent of the maximum design stress as shown in the aggregate pier design submittal. The modulus tests shall be of the type and installed in a manner specified herein.

1. A telltale shall be installed at the bottom of the test pier so that bottom-of-pier deflections may be determined. Acceptable performance is indicated when the bottom of the pier deflection is no more than 30% of the top of pier deflection at the design stress level.
2. ASTM D-1143 general test procedures shall be used as a guide to establishing load increments, load increment duration, and load decrements. As a minimum, the following loading increments, decrements and duration shall be used.

<u>Increment</u>	<u>Approximate Load (percent design)</u>	<u>Minimum Duration (min)</u>	<u>Maximum Duration (min)</u>
Seat	< 9	0	N/A
1	17	15	60
2	33	15	60
3	50	15	60
4	67	15	60
5	83	15	60
6	100	15	60
7	117	60	120
8	133	15	60
9	150	15	60
10	100	N/A	N/A
11	66	N/A	N/A
12	33	N/A	N/A
13	0	N/A	N/A

- C. With the exception of the load increment representing approximately 117% of the design maximum top of Aggregate Pier stress, all load increments shall be held for a minimum of 15 minutes. Loads are then maintained until the rate of deflection reduces to 0.01 inch per hour or for the maximum of 1 hour, whichever is occurs first.
- D. The load increment that represents approximately 117% of the design maximum stress on the Aggregate Pier shall be held for a minimum of 15 minutes. Loads are then maintained until the rate of deflection reduces to 0.01 inch per hour or for the maximum of 4 hours, whichever is occurs first.
- E. A seating load equal to 5 percent of the total load shall be applied to the loaded steel plate prior to application of load increments and prior to measurement of deflections to compensate for surficial disturbance.
- F. Bottom Stabilization Testing (BSTs) / Crowd Stabilization Testing (CSTs)

Bottom stabilization testing (BSTs) or Crowd stabilization testing (CSTs) shall be performed by the Control Technician during the installation of the modulus test pier. The tests are performed by applying downward vertical energy to the tamper, mandrel or probe following lift construction and monitoring the amount of additional deflection from the applied energy. Additional testing as required by the Aggregate Pier Designer

(typically 10% of the production Aggregate Piers) shall be performed on selected production Aggregate Pier elements to compare results with the modulus test pier.

PART 2: MATERIALS

2.01 Aggregate

- A. Aggregate used by the Aggregate Pier Installer for pier construction shall be pre-approved by the Designer and shall demonstrate suitable performance during modulus testing. Typical aggregate consists of Type 1 Grade B in accordance with ASTM D-1241-68, No. 57 stone, recycled concrete or other graded aggregate approved by the Designer.
- B. Potable water or other suitable source shall be used to increase aggregate moisture content where required. The General Contractor shall provide such water to the Installer.

PART 3: EXECUTION

3.01 Approved Installation Procedures

The following sections provide general criteria for the construction of the Aggregate Piers. Unless otherwise approved by the Designer, the installation method used for Aggregate Pier construction shall be that as used in the construction of the successful modulus test.

- A. Aggregate Piers Installed using augered Rammed Aggregate Pier systems –
 - 1. Augered Rammed Aggregate Pier systems shall be pre-augered using mechanical drilling or excavation equipment.
 - 2. If cave-ins occur during excavation such that the sidewalls of the hole are deemed to be unstable, steel casing shall be used to stabilize the cavity or a displacement Rammed Aggregate Pier system may be used.
 - 3. Aggregate shall be placed in the augered cavity in compacted lift thicknesses no greater than 24 inches as determined by the Aggregate Pier Designer.
 - 4. Should cave-ins occur on top of a lift of aggregate such that the volume of the caved soil is greater than 10 percent of the volume of the aggregate in the lift, then the aggregate shall be considered contaminated and shall be removed and replaced with uncontaminated aggregate.
 - 5. A specially-designed beveled tamper and high-energy impact densification apparatus shall be employed to densify lifts of aggregate during installation. The tamper diameter shall be at least 80% of the pre-augered hole diameter. The apparatus shall apply direct downward impact energy to each lift of aggregate.
- B. Aggregate Piers Installed using Displacement Rammed Aggregate Pier systems –

1. Displacement Rammed Aggregate Pier systems shall be constructed by advancing a specially designed mandrel with a minimum 15 ton static force augmented by dynamic vertical ramming energy to the full design depth. The hollow-shaft mandrel, filled with aggregate, is incrementally raised, permitting the aggregate to be released into the cavity, and then lowered by vertically advancing and/or ramming to densify the aggregate and force it laterally into the adjacent soil. The cycle of raising and lowering the mandrel is repeated to the top of pier elevation. The cycle distance shall be determined by the Rammed Aggregate Pier designer.
 2. Special high-energy impact densification apparatus shall be employed to vertically densify the Rammed Aggregate Pier elements during installation of each approximate 1-foot thick constructed lift. The tamper diameter shall be at least 50% of the Aggregate Pier design diameter.
 3. Downward crowd pressure shall be applied to the mandrel during installation.
- C. Aggregate Piers Installed using Vibroflot Stone Columns
1. If vibroflot stone column construction is used to construct the Aggregate Piers, the Installer shall use an electric down-hole vibroflot (probe) capable of providing at least 200 HP of rated energy and a centrifugal force of 30 tons. The vibroflot diameter must be at least 60% of the Aggregate Pier design diameter. An appropriate metering device should be provided at such a location that inspection of amperage build-up may be verified during the operation of the equipment. Metering device may be an ammeter directly indicating the performance of the vibroflot tip of the eccentric. Complete equipment specifications should be submitted to the Engineer prior to commencement of the fieldwork.
 2. The probe and follower tubes shall be of sufficient length to reach the elevations shown on the installer's approved construction drawings. The probe, used in combination with the available pressure to the tip jet, shall be capable of penetration to the required tip elevation. Pre-augering shall be used to aid penetration.
 3. The probe shall penetrate into the foundation soil layer to the minimum depths required in the installer's construction plans. After penetration to the required depth, the probe shall not be withdrawn more than 2 feet at any time unless the stone stops flowing to the bottom of the probe.
 4. Redriving the probe into the treated depth shall be attempted at approximately 12 to 18-inch intervals to observe resistance to penetration and amperage build-up. During redriving, the probe tip shall penetrate to within 1 foot of the previous redriving depth.
 5. Amperage build-up and backfill quantities will be contingent upon the type of probe used and procedures. Prior to commencement of work, the contractor shall discuss the equipment capabilities with the Engineer to determine if trial probes will be necessary.
 6. The Installer shall provide a full-time quality control technician on-site during the installation process.

3.02 Plan Location and Elevation of Aggregate Piers

The as-built center of each pier shall be within 6 inches of the locations indicated on the plans.

Piers installed outside of the above tolerances and deemed not acceptable shall be rebuilt at no additional expense to the Owner.

3.03 Rejected Aggregate Piers

Aggregate Pier elements installed beyond the maximum allowable tolerances shall be abandoned and replaced with new piers, unless the Designer approves the condition or provides other remedial measures. All material and labor required to replace rejected piers shall be provided at no additional cost to the Owner, unless the cause of rejection is due to an obstruction or mislocation.

END OF SECTION



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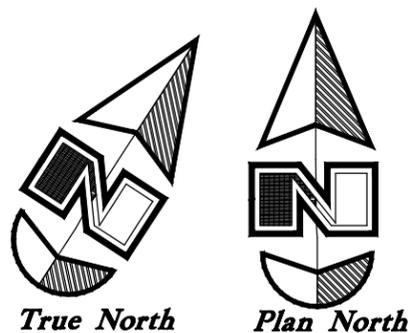
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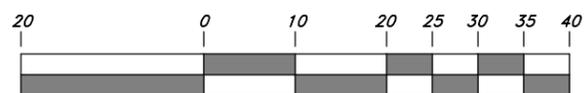
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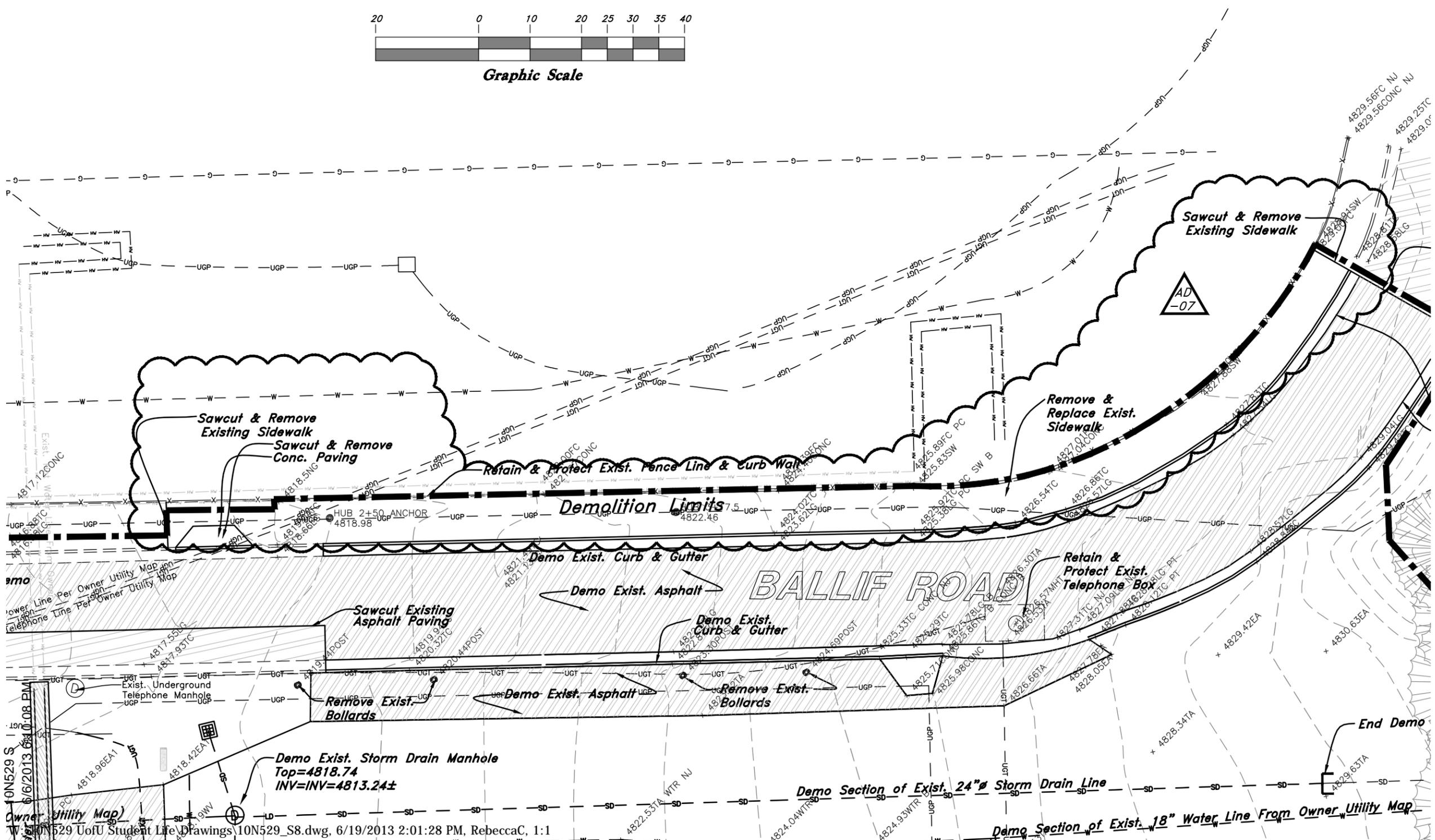


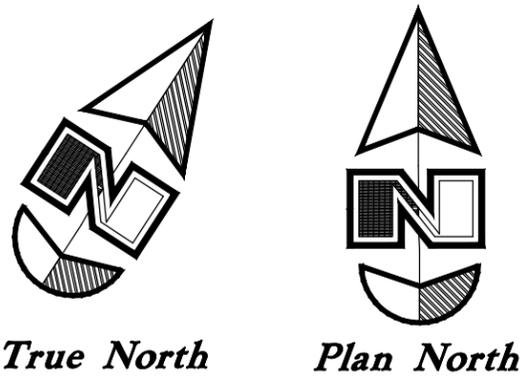
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Scale: 1" = 20'



Graphic Scale

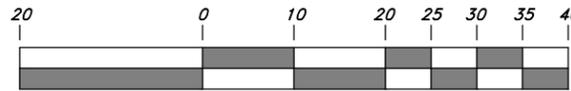




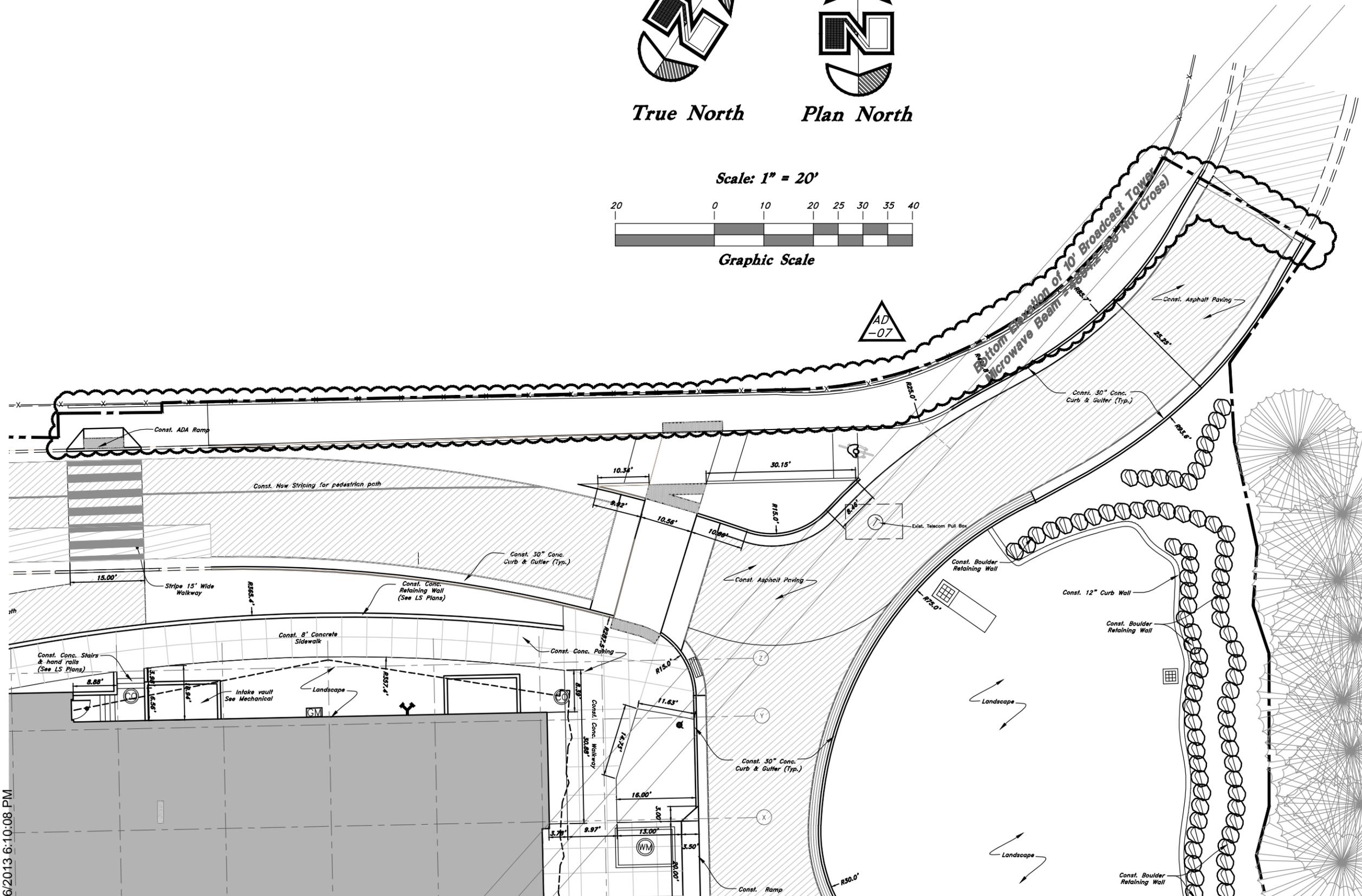
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Graphic Scale



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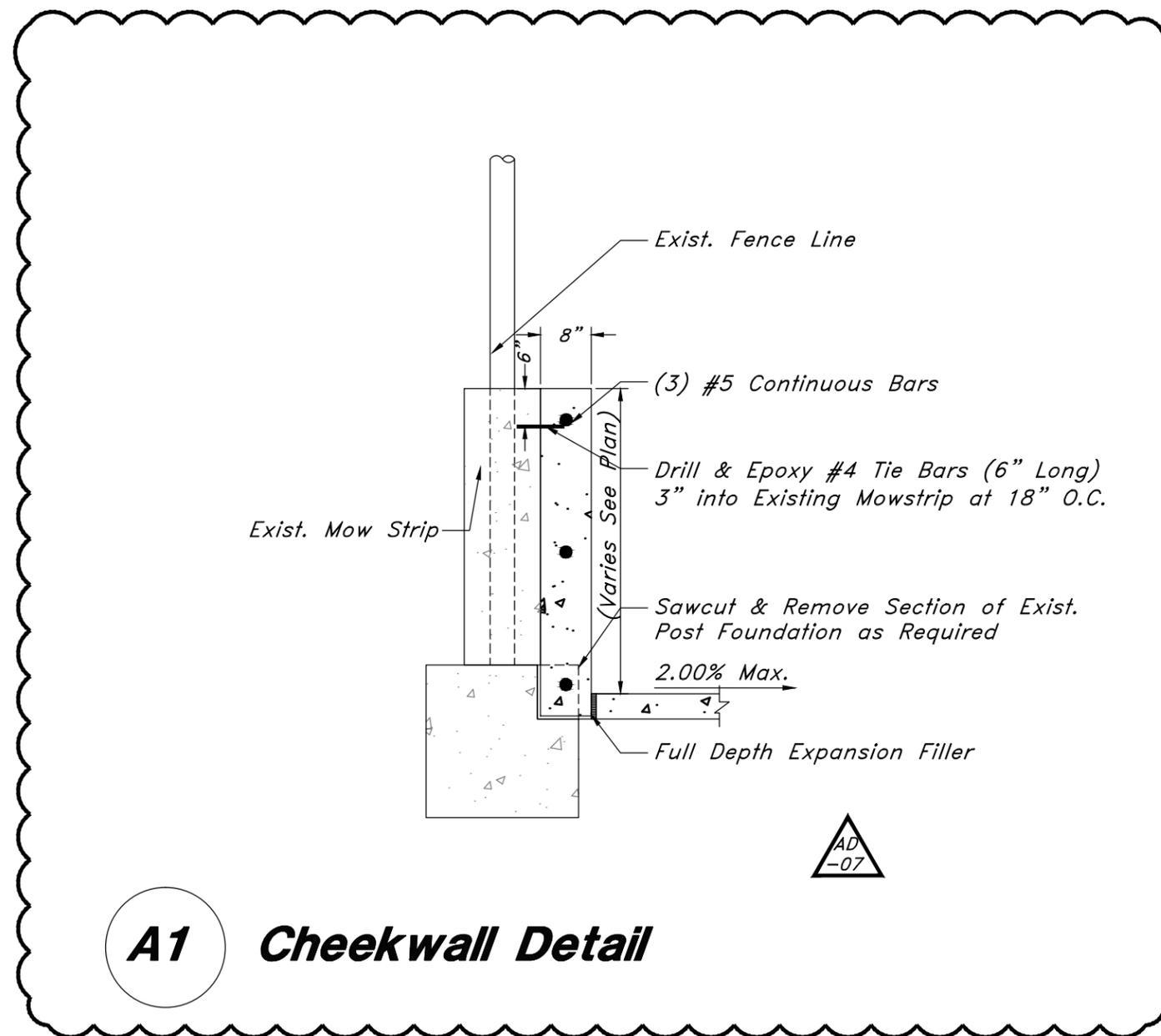
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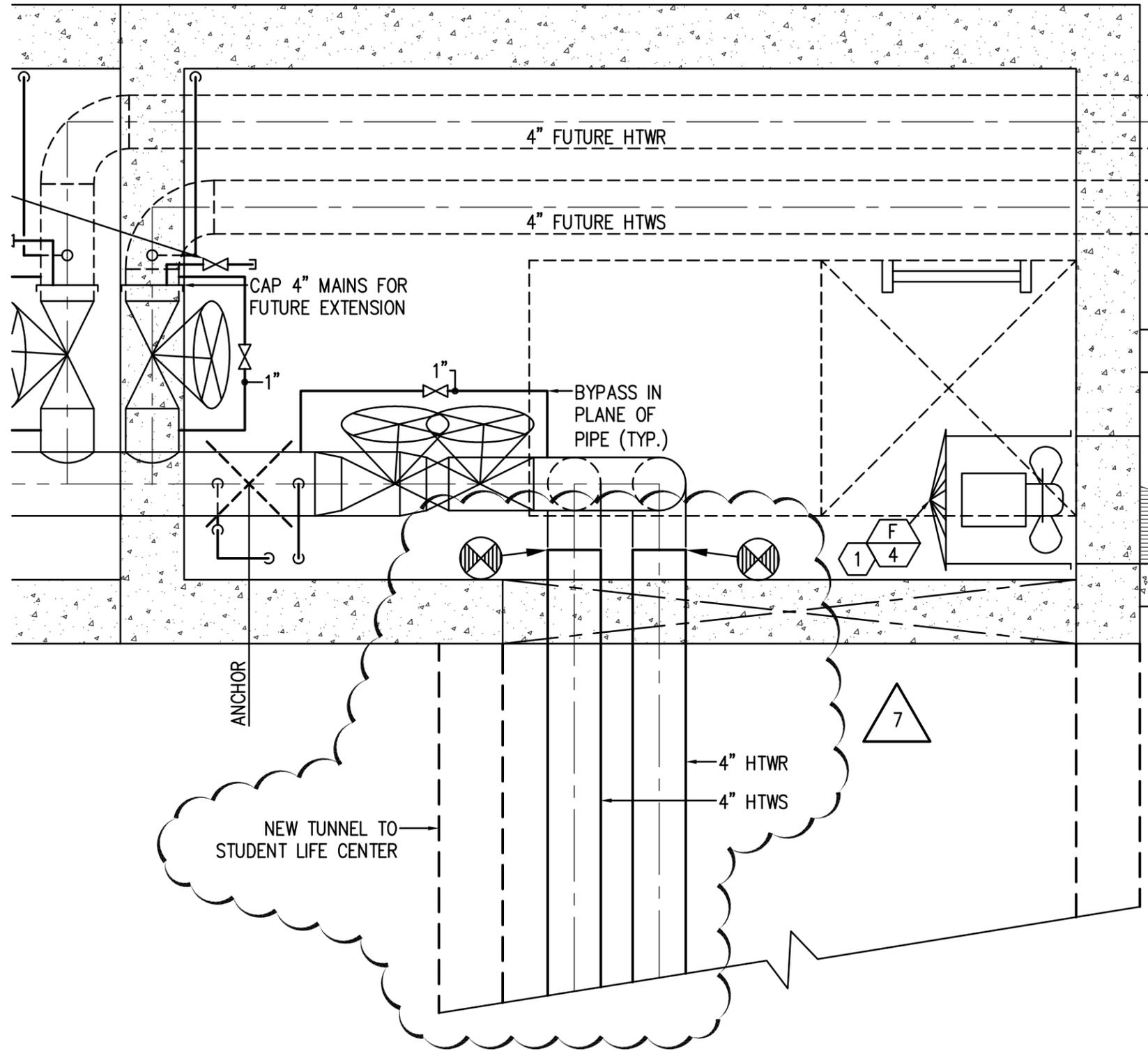
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CS403

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 MS401 SCALE: 1/2" = 1'-0"
 0' 2' 4'



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