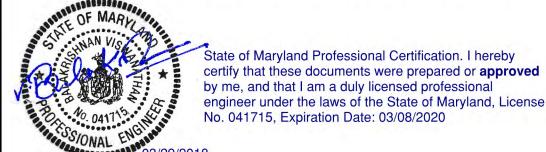
WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY



State of Maryland Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License

No. 025124, Expiration Date: 06/22/2018

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by me, and that I am a duly licensed professional



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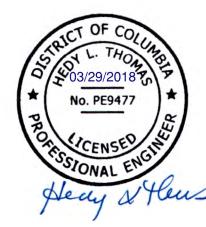
















engineer under the laws of the State of Maryland, License REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS

CONTRACT FQ-18102 PACKAGE 1 - FINAL SUBMITTAL, MARCH 2018

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

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PLUMBING

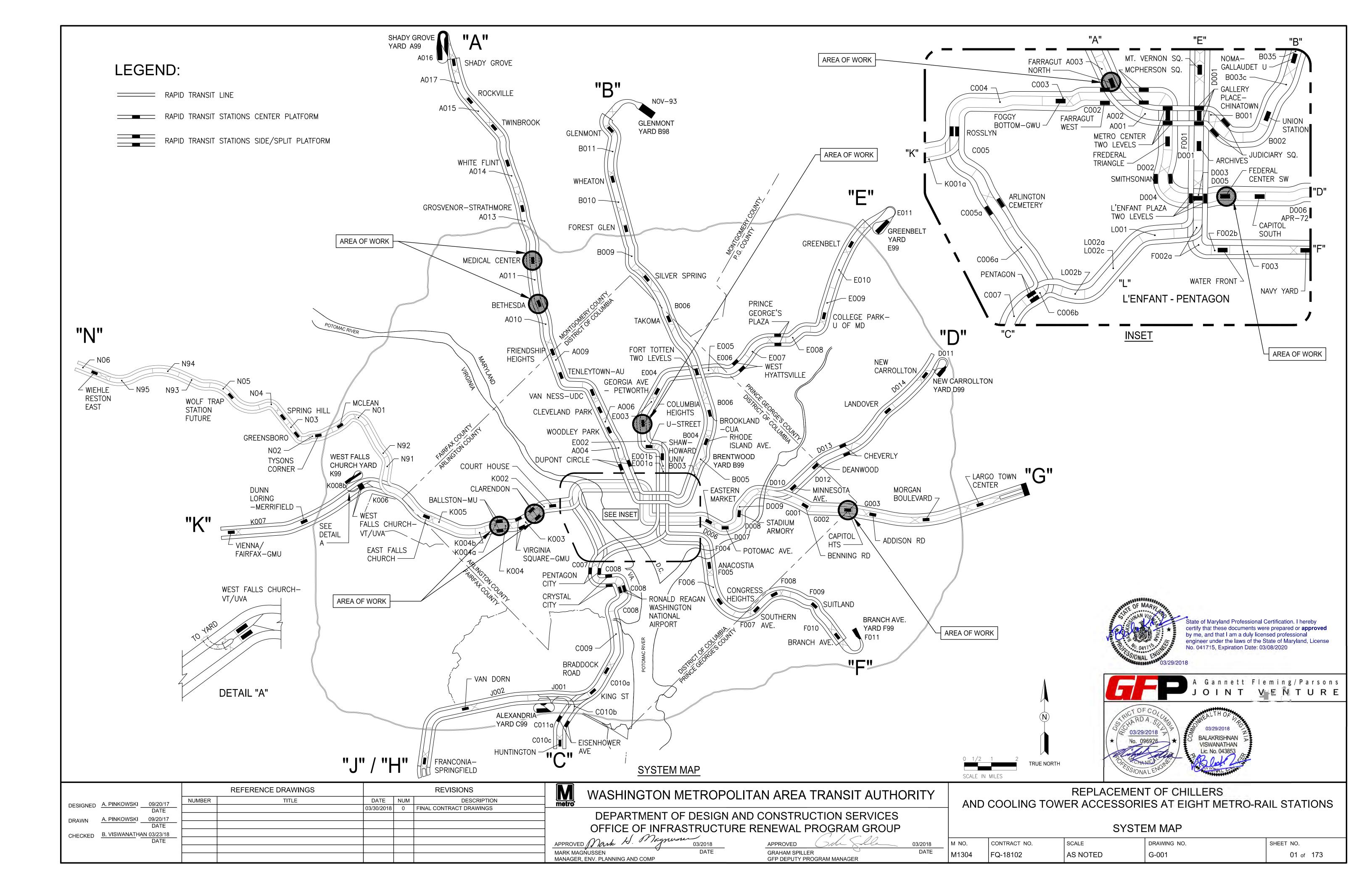
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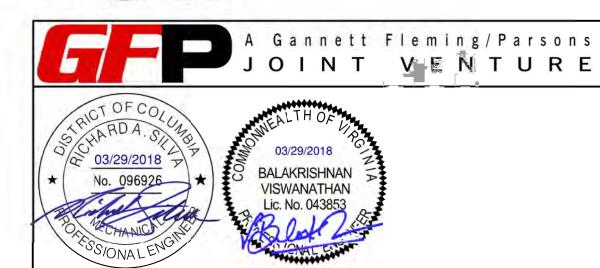
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THIS DOCUMENT WAS CREATED USING THE 2016
WMATA CAD STANDARDS MANUAL AND GFP 2017 CAD
MANUAL REV #: 0

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		REFERENCE DRAWINGS			REVISIONS	
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DESIGNED B. VISWANATHAN 09/20/17 DATE			03/30/2018	0	FINAL CONTRACT DRAWINGS	
DRAWN A. PINKOWSKI 09/20/17						1
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CHECKED B. VISWANATHAN 03/23/18						1
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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED Mark H. 18/10	03/2018	APPROVED Silver	Ille	03/2018
MARK MAGNUSSEN	DATE	GRAHAM SPILLER		DATE
MANAGER, ENV. PLANNING AND COMP		GFP DEPUTY PROGRAM MANAG	ER	

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NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
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REPLACEMENT OF CHILLERS

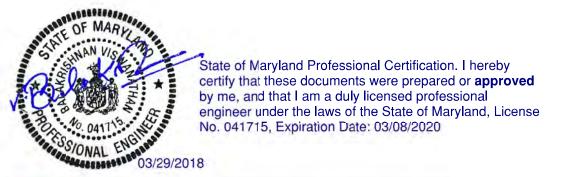
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS

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DD-ME-HVAC-007	CHILLED WATER PLANT — CHILLED WATER TREATMENT SYSTEM
DD-ME-HVAC-008	CHILLED WATER PLANT — CONDENSER WATER TREATMENT SYSTEM
DD-ME-HVAC-009	CHILLER WATER PLANT - CONDENSER WATER TREATMENT CONTROL PANEL
(SHEET 1 THROUGH 6)	
FA11-E-33 (M334-182)	BETHESDA TRACTION POWER S.S. & CHILLER PLANT - LTG & PWR
E3a-E-28 (M905-529)	COLUMBIA HEIGHTS - NORTH SERVICE ROOMS - MEZZANINE LEVEL





			REFERENCE DRAWINGS			REVISIONS	
DE01011ED	B. VISWANATHAN 09/20/17	NUMBER	TITLE	DATE	NUM	DESCRIPTION	me
DESIGNED	DATE			03/30/2018	0	FINAL CONTRACT DRAWINGS	
DRAWN	A. PINKOWSKI 09/20/17 DATE						
CHECKED	B. VISWANATHAN 03/23/18 DATE						
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WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

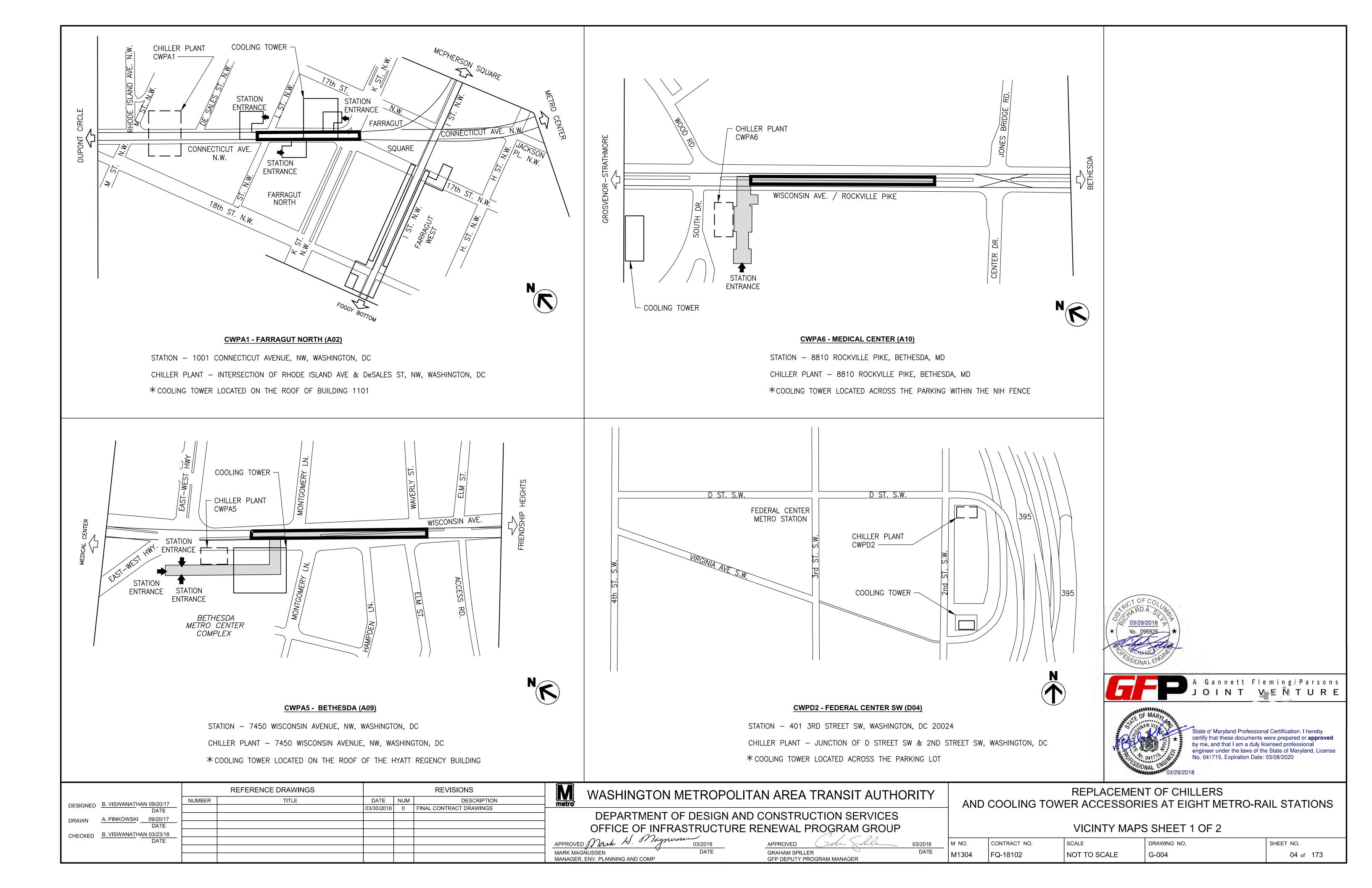
DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

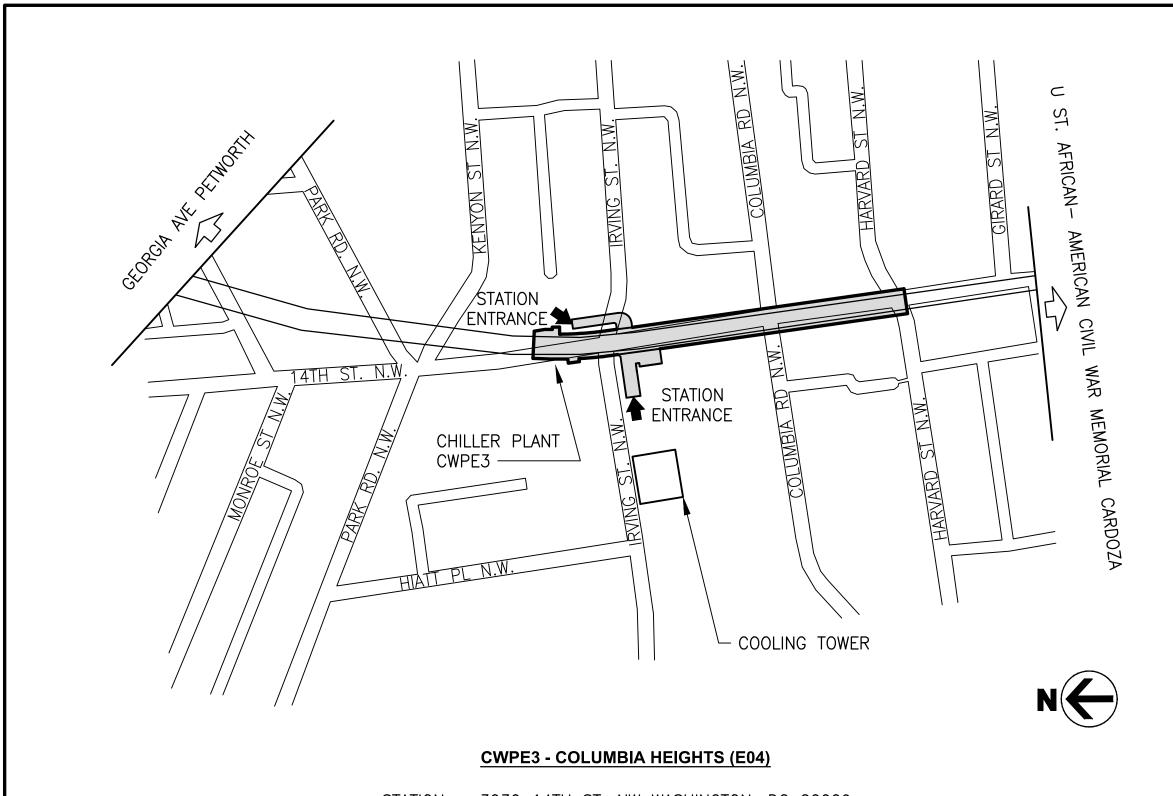
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP						
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MARK MAGNUSSEN	DATE	GRAHAM SPILLER	DATE			
MANAGER, ENV. PLANNING AND COMP		GFP DEPUTY PROGRAM MANAGER				

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS

DRAWING INDEX SHEET 2 OF 2

	BIOWING HABEN CHEET 2 OF 2					
M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.		
M1304	FQ-18102	NONE	G-003	03 of 173		

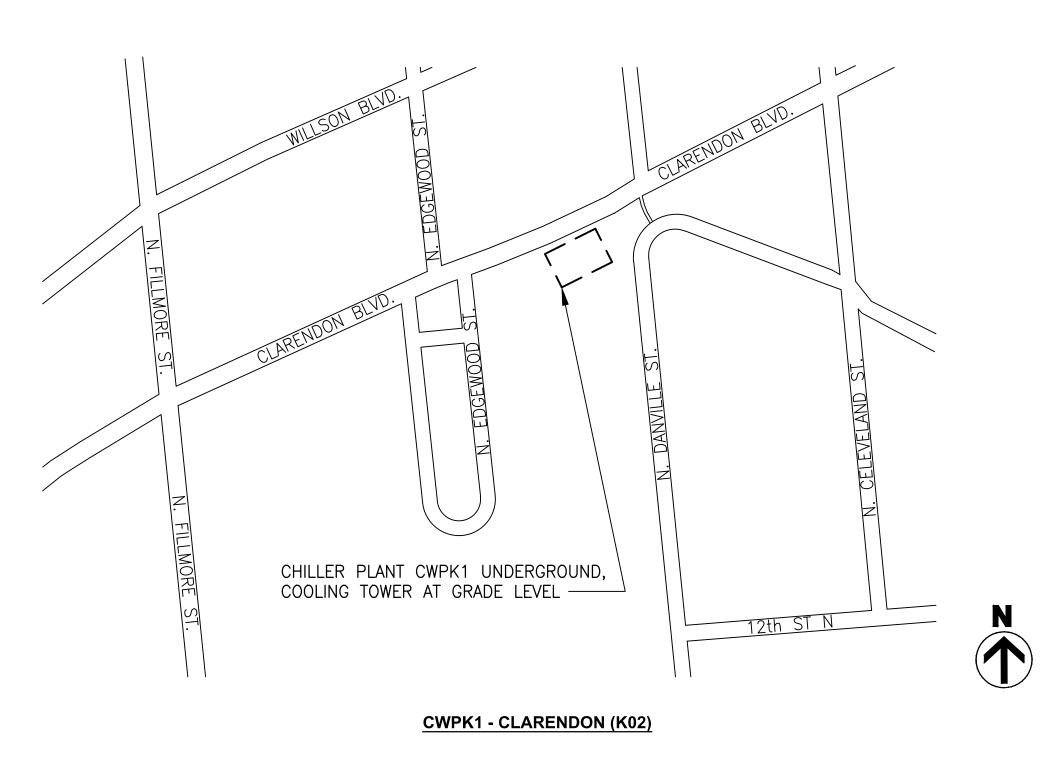




STATION - 3030 14TH ST. NW WASHINGTON, DC 20009

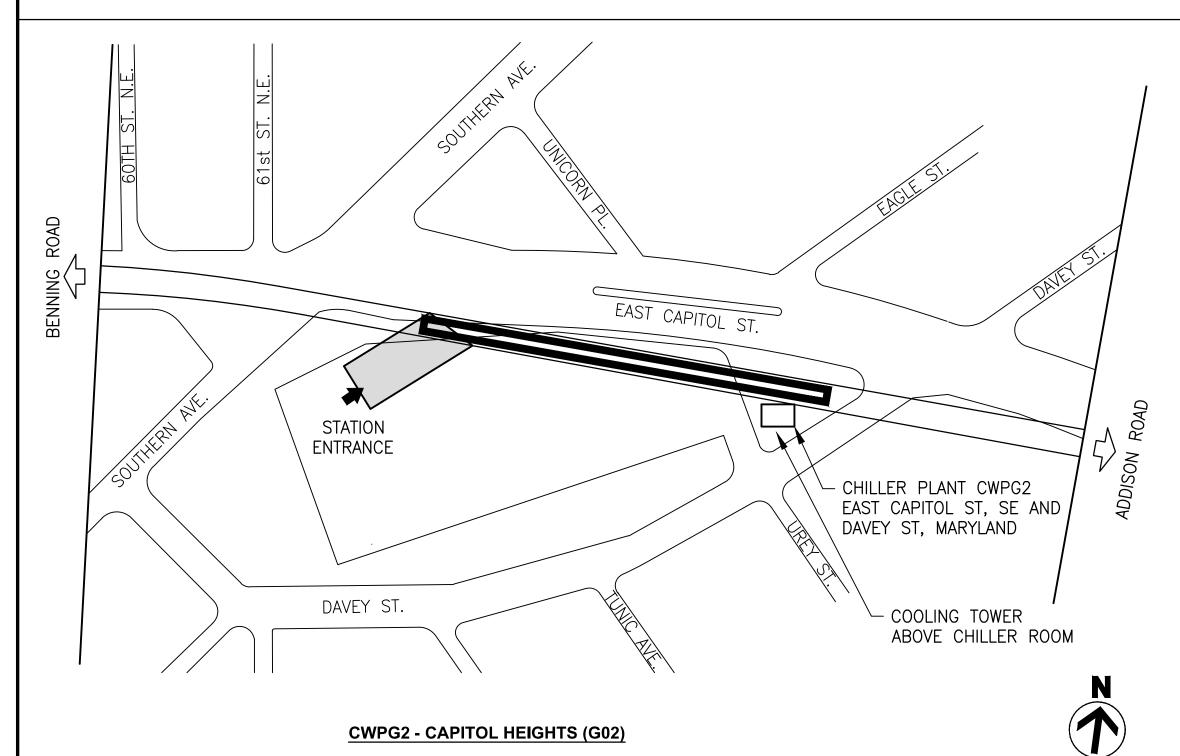
CHILLER PLANT - 3030 14TH ST. NW WASHINGTON, DC 20009

*COOLING TOWER LOCATED ON THE ROOF OF HIGHLAND PARK APARTMENT BUILDING



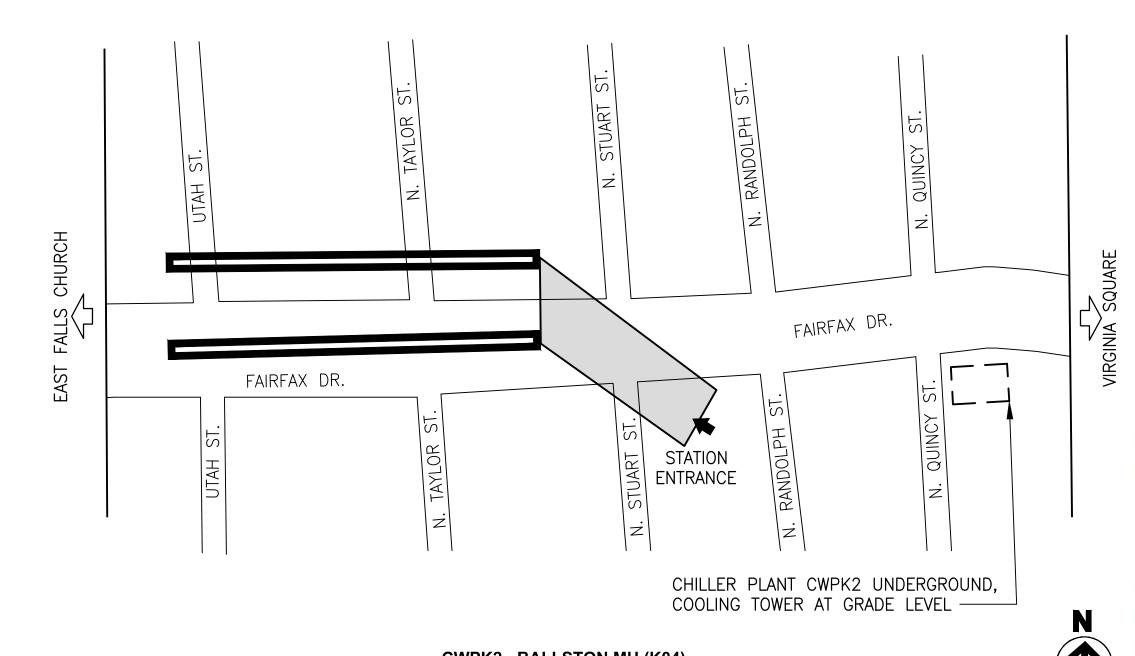
STATION - 3100 WILSON BLVD, ARLINGTON, VA

CHILLER PLANT - 2750 CLARENDON BLVD. ARLINGTON, VA 22201



STATION - 133 CENTRAL AVENUE, CAPITOL HEIGHTS, MD

CHILLER PLANT - INTERSECTION OF EAST CAPITOL ST, SE AND DAVEY ST, MD



CWPK2 - BALLSTON MU (K04)

STATION - 4230 FAIRFAX DRIVE, ARLINGTON, VA

CHILLER PLANT - INTERSECTION OF N. QUINCY ST & N FAIRFAX DR



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		REFERENCE DRAWINGS			REVISIONS
DESIGNED B. VISWANATHAN 09/20/17	NUMBER	TITLE	DATE	NUM	DESCRIPTION
DESIGNED B. VISWANATHAN 09/20/17 DATE			03/30/2018	0	FINAL CONTRACT DRAWINGS
DRAWN A. PINKOWSKI 09/20/17					
DATE					
CHECKED B. VISWANATHAN 03/23/18					
DATE					
	1				

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

03/2018 GRAHAM SPILLER MANAGER, ENV. PLANNING AND COMP GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS

VICINITY MAPS SHEET 2 OF 2

		VIOINITT WAT	JOHEET ZOT Z	
M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	NOT TO SCALE	G-005	05 of 173

GENERAL NOTES

- A. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF WORK INCLUDED IN THE PROJECT. DO NOT SCALE THE DRAWINGS. THE CONTRACTOR SHALL ESTABLISH FINAL DIMENSIONS FROM THE FIELD MEASUREMENTS PRIOR TO STARTING WORK.
- B. THE WORD "PROVIDE" AS USED IN THE PROJECT SHALL BE DEFINED AS "FURNISH AND INSTALL"
- C. MECHANICAL EQUIPMENT AND PRODUCTS SHALL BE LISTED AND/OR LABELED BY AN APPROVED TESTING OR INSPECTION AGENCY IN ACCORDANCE WITH CODE REQUIREMENTS.
- D. EQUIPMENT AND PRODUCT MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS FOR INSTALLATION AND OPERATION SHALL BE FOLLOWED IN PERFORMING WORK.
- E. ALL EQUIPMENT, DUCTWORK, DAMPERS, VALVES, PANELS, AND ACCESSORIES SERVING EQUIPMENT SHALL BE INSTALLED TO ALLOW SERVICING AND/OR REMOVAL WITHOUT DISCONNECTING OTHER DUCTWORK, PIPING AND ACCESSORIES.
- F. ALL EQUIPMENT AND PIPING SHALL BE PROPERLY IDENTIFIED IN ACCORDANCE WITH WMATA SPECIFICATION 15075.
- G. NEW MECHANICAL WORK SHALL BE EXTENDED AND CONNECTED TO EXISTING SYSTEMS AS INDICATED. THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS FOR POINTS OF CONNECTION, CAPACITIES AND ELEVATIONS OF EXISTING SYSTEMS, IN ALL AREAS AFFECTED BY THE PROJECT. CUT, PATCH, REPAIR, AND/OR REPLACE ALL MATERIALS REQUIRED TO INCORPORATE WORK. THE EXTENT OF NEW WORK/DEMOLITION SHOWN ARE APPROXIMATE AND SHALL BE FIELD COORDINATED BY INSTALLING CONTRACTOR, TO PROVIDE A COMPLETE FUNCTIONAL SYSTEM.
- H. CONTRACTOR SHALL PROVIDE ALL NECESSARY FOUNDATIONS, SUPPORTS, PIPING, PADS AND BASES REQUIRED FOR MECHANICAL EQUIPMENT AND DUCTS. INSTALL EQUIPMENT AND DUCTWORK SO AS TO BE FREE FROM OBJECTIONABLE NOISE AND VIBRATION.
- I. STRUCTURAL COMPONENTS OF THE BUILDING AND EQUIPMENT SUPPORT SHALL NOT BE CUT. DRILLED. OR MODIFIED IN ANY WAY WITHOUT THE STRUCTURAL ENGINEER'S REVIEW AND PRIOR APPROVAL. PRIOR TO DRILL TO EXISTING CONCRETE SLAB/BEAM/WALL, CONTRACTOR SHALL IDENTIFY THE LOCATION OF EXISTING REINFORCEMENT. EXISTING REINFORCEMENT SHALL NOT BE DAMAGED.
- J. FINISHES DAMAGED AS A RESULT OF NEW WORK SHALL BE REPAIRED TO MATCH APPROPRIATE ADJACENT FINISHES. FILL VOIDS AROUND DUCTWORK PENETRATING WALLS/CEILING WITH FIRE STOPPING MATERIAL. (FIRE CAULKING SEALANT THERMAFIBER OR APPROVED EQUAL).
- K. CONTRACTOR SHALL COORDINATE INSTALLATION OF ALL NEW EQUIPMENT WITH EXISTING WORK OF MECHANICAL AND OTHER TRADES (PIPING, CONDUIT, WIRING, LIGHTING, SUPPORTS, ETC.). WHERE CONFLICTS ARISE BETWEEN NEW WORK AND EXISTING WORK OF MECHANICAL AND OTHER TRADES, CONTRACTOR SHALL FIELD MODIFY EXISTING WORK AND/OR FIELD ROUTE NEW WORK TO ACCOMODATE BOTH NEW AND EXISTING SUCH THAT BOTH ARE COMPLETE FUNCTIONAL SYSTEMS. MECHANICAL WORK SHALL BE COORDINATED WITH THE WORK OF ALL OTHER TRADES PRIOR TO INSTALLATION TO AVOID CONFLICTS AND ALLOCATE SPACE REQUIREMENTS.
- L. UNLESS OTHERWISE INDICATED OR DIRECTED, MATERIALS AND METHODS USED IN THE WORK SHALL BE COMPATIBLE WITH EXISTING BUILDING CONDITIONS AND COMPLY WITH CODE REQUIREMENTS.
- M. ALL WORK SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER BY SKILLED WORKMEN EXPERIENCED IN THEIR TRADE. THE WORK SHALL BE SUBJECT TO THE ACCEPTANCE OF THE AR.
- N. PROVIDE GALVANIZED DUCT HARDWARE FOR DUCT SUPPORTS. ANY ATTACHMENTS TO CONCRETE STRUCTURE SHALL BE STAINLESS STEEL.
- O. IN CASE OF ANY DISCREPANCY WITHIN THE DRAWINGS AND/OR SPECIFICATIONS THE MOST STRINGENT REQUIREMENT SHALL APPLY. CONTRACTOR SHALL CONFIRM WITH THE OWNER/ENGINEER FOR EXACT REQUIREMENT.
- P. CONTRACTOR SHALL FIELD COORDINATE TO PROVIDE DEMOLITION AND NEW WORK REQUIRED FOR A COMPLETE SYSTEM (EQUIPMENT, PIPING, DUCTWORK, CONTROLS, ETC.) INSTALLATION AS ACCEPTABLE TO THE ENGINEER/OWNER. EXTENT OF DEMOLITION/NEW WORK SHOWN ON DRAWINGS ARE APPROXIMATE.
- Q. PROVIDE VOLUME DAMPERS AT ALL AIR TERMINALS, BRANCH DUCTWORKS REGARDLESS OF WHETHER SHOWN ON DRAWINGS.
- R. ALL VALVES MAY NOT BE SHOWN ON THE PLANS FOR CLARITY. REFER TO FLOW DIAGRAMS FOR VALVE REQUIREMENTS. INSTALL SYSTEMS AND PROVIDE ISOLATION VALVES AS REQUIRED PER THE MANUFACTURER'S RECOMMENDATIONS.
- S. FOR COOLING TOWERS LOCATED ON TOP OF OTHER NON-WMATA COMMERCIAL BUILDINGS, CONTRACTOR SHALL COORDINATE ALL WORK ACCESS AND AUTHORIZATION WITH THE BUILDING MANAGEMENT AND WMATA.
- T. REFRIGERANT LEAK DETECTION AND CORRESPONDING EXHAUST SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ASHRAE 15.
- U. CONTROL PANEL SHALL BE PROVIDED AND INSTALLED PER REQUIREMENTS IN THE SPECIFICATIONS AND REFERENCE DRAWINGS ATTACHED WITH THIS PACKAGE.
- V. ALL PIPING AND DUCTWORK CONNECTING TO VIBRATING EQUIPMENT SHALL BE PROVIDED WITH FLEXIBLE CONNECTIONS.

- W. ALL POWER WIRING AND CONDUITS TO THE EQUIPMENT AND PANELS SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. ALL CONTROL WIRING AND CONDUITS FOR MECHANICAL EQUIPMENT SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR.
- X. CONTRACTOR SHALL COORDINATE ALL STAGING REQUIREMENTS FOR CONSTRUCTION WITH THE AR PRIOR TO STARTING ANY WORK.
- Y. COORDINATE THE WORK IN THIS CONTRACT WITH OTHER RELATED WMATA CONTRACTS, SPECIFICALLY FOR REFRIGERANT MONITORING SYSTEMS UPGRADE (FQ14114) AND THE WATER TREATMENT SYSTEM INSTALLATION.
- Z. CONTRACTOR SHALL PROVIDE LOW LEVEL AND UPPER LEVEL SAFETY PLATFORMS (FOR COMPONENT ACCESS SERVICING) AT ALL COOLING TOWERS, IF NOT ALREADY EXISTING. UPPER LEVEL SAFETY PLATFORMS SHALL BE PROVIDED FOR COOLING TOWERS AT BETHESDA AND FEDERAL CENTER SW. PLATFORM TYPE AND SUPPORTS SHALL BE AS RECOMMENDED PER COOLING TOWER MANUFACTURER AND FIELD INSTALLED BY CONTRACTOR. COORDINATE WITH WMATA AR.
- AA. ALL GENERAL NOTES HEREIN ARE CONTRACT SPECIFIC AND ARE APPLICABLE TO THIS PROJECT.
- AB. PROVIDE CHAIN ACTUATORS FOR ALL VALVES THAT ARE INACCESSIBLE FROM FLOOR LEVEL. IN GENERAL. PROVIDE CHAIN ACTUATORS FOR VALVES ABOVE 6'-0" FROM FINISHED FLOOR.
- AC. ALL RECOVERED REFRIGERANT SHALL BE CLEANED AND RETURNED TO WMATA PLANT MAINTENANCE IN 125 POUND BULLET CONTAINERS.

DISTRICT OF COLUMBIA STATIONS APPLICABLE CODES - NEW CONSTRUCTION

2012 INTERNATIONAL CODE COUNCIL WITH DC AMENDMENTS AS SET FORTH IN DC 2013 CONSTRUCTION CODE SUPPLEMENT. THIS INCLUDES ALL CODE REFERENCING TO BUILDING, MECHANICAL, PLUMBING, ELECTRICAL, AND ENERGY CODES.

2011 NFPA 70 NATIONAL ELECTRIC CODE

MARYLAND STATIONS APPLICABLE CODES - NEW CONSTRUCTION

STATE OF MARYLAND ADOPTS THE 2015 INTERNATIONAL CODE COUNCIL.

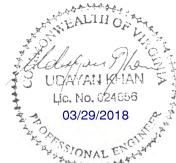
- 2015 INTERNATIONAL BUILDING CODE
- 2015 INTERNATIONAL MECHANICAL CODE
- 2015 INTERNATIONAL PLUMBING CODE
- 2015 INTERNATIONAL ENERGY CODE
- 2015 NFPA
- 2015 NFPA 70 NATIONAL ELECTRIC CODE

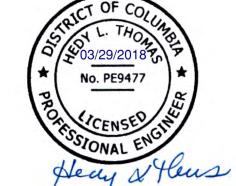
VIRGINIA STATIONS APPLICABLE CODES - NEW CONSTRUCTION

STATE OF VIRGINIA ADOPTS THE 2015 INTERNATIONAL CODE COUNCIL.

- 2015 INTERNATIONAL BUILDING CODE
- 2015 INTERNATIONAL MECHANICAL CODE
- 2015 INTERNATIONAL PLUMBING CODE 2015 INTERNATIONAL ENERGY CODE
- 2015 NFPA
- 2015 NFPA 70 NATIONAL ELECTRIC CODE











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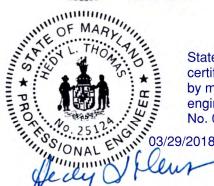
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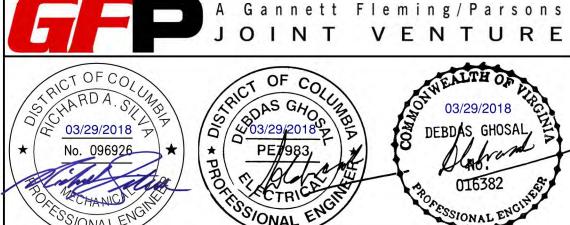
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State of Maryland Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 025124, Expiration Date: 06/22/2018



REFERENCE DRAWINGS REVISIONS DESCRIPTION DATE NUM NUMBER DESIGNED D. ROMNESS 03/30/2018 0 FINAL CONTRACT DRAWINGS A. PINKOWSKI B. VISWANATHAN 03/23/18

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

03/2018 MARK MAGNUSSEN DATE GRAHAM SPILLER MANAGER, ENV. PLANNING AND COMP GFP DEPUTY PROGRAM MANAGER

M NO. M1304 FQ-18102

CONTRACT NO. SCALE

NONE

DRAWING NO. SHEET NO. G-006

GENERAL NOTES

REPLACEMENT OF CHILLERS

AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS

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GENERAL NOTES:

- ALL DETAILS. SECTIONS, AND NOTES SHOWN ON THE DRAWINGS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR 1. SUBMITTALS: SITUATIONS, UNO.
- 2. NO CHANGE IN SIZE, DIMENSION OR POSITION OF STRUCTURAL ELEMENTS SHALL BE MADE WITHOUT THE APPROVAL OF WMATA.
- 3. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE STARTING CONSTRUCTION AND/OR SUBMITTING SHOP DRAWINGS. ANY DISCREPANCIES SHALL BE REPORTED TO THE WMATA. ALL EXISTING INFORMATION IS BASED ON SITE VISITS AND EXISTING DRAWINGS BY KCE STRUCTURAL ENGINEERS P.C. DATED AUGUST 13, 1976.
- 4. REFER TO ARCHITECTURAL, CIVIL, MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION DRAWINGS FOR DIMENSIONS AND LOCATIONS OF OPENINGS, INSERTS, DEPRESSIONS, EQUIPMENT PADS, DRIPS, REVEALS, FINISHES, AND OTHER SUCH PROJECT REQUIREMENTS NOT SHOWN ON STRUCTURAL DRAWINGS.
- 5. SUBMIT DIMENSIONED COORDINATED SHOP DRAWINGS SHOWING THE LOCATIONS OF ALL SLEEVES AND OPENINGS REQUIRED BY ALL TRADES THROUGH STRUCTURAL ELEMENTS. ANY ADDITIONAL OPENINGS NOT SHOWN ON SHOP DRAWINGS WILL REQUIRE WRITTEN APPROVAL OF WMATA.
- 6. TAKE ALL MEASURES NECESSARY TO PROTECT EXISTING AND NEW UTILITIES AND BUILDINGS AND ASSUME FULL RESPONSIBILITY FOR ANY DAMAGE DURING CONSTRUCTION. RESTORATION OF DAMAGED AREAS SHALL BE TO THE SATISFACTION OF THE OWNER, AT NO COST TO THE OWNER.
- 7. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR DETAILED INFORMATION REGARDING FINISHES, WATERPROOFING, LOCATIONS OF NON-LOAD BEARING PARTITIONS, EXTERIOR FACE OF BUILDING, ETC.
- 8. DO NOT REPRODUCE ANY PORTION OF THE STRUCTURAL CONTRACT DRAWINGS FOR RESUBMITTAL AS SHOP DRAWINGS. SHOP DRAWINGS PRODUCED IN SUCH A MANNER WILL BE REJECTED AND RETURNED.
- 9. WORK SHALL BE COORDINATED WITH THE VARIOUS TRADES TO AVOID CONFLICT INTERFERENCE WITH STRUCTURAL MEMBERS. IF THERE IS A DISCREPANCY BETWEEN DRAWINGS IT IS THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE AUTHORITY'S REPRESENTATIVE (A.R.) AND THE ENGINEER OF RECORD (E.O.R.) FOR APPLICABILITY BY SUBMITTING SHOP DRAWING FOR REVIEW.
- 10. AT ALL TIMES THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONDITIONS OF THE JOBSITE, INCLUDING SAFETY OF PERSONS AND PROPERTY. THE AUTHORITY'S REPRESENTATIVE OR ENGINEER'S PRESENCE OR REVIEW OF WORK DOES NOT INCLUDE THE ADEQUACY OF THE CONTRACTOR'S MEANS OR METHODS OF CONSTRUCTION.
- 11. SHORING, BRACING AND PROTECTION OF EXISTING AND ADJACENT STRUCTURES DURING CONSTRUCTION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. PROTECT AND MAINTAIN THE INTEGRITY OF ADJACENT STRUCTURAL MEMBERS WHILE PERFORMING WORK. ANY ALTERATION OTHER THAN SHOWN IN THE CONTRACT DRAWING SHALL BE CORRECTED AT ONCE, WITH NO EXPENSE TO THE OWNER.

CODES & STANDARDS:

- . THE FOLLOWING CODES AND STANDARDS, INCLUDING ALL SPECIFICATIONS REFERENCED WITHIN, APPLY TO THE DESIGN AND CONSTRUCTION OF THIS PROJECT:
 - a. ICC, INTERNATIONAL BUILDING CODE 2012
 - b. ASCE 7-10, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
- c. ACI 318-11, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
- d. AISC, SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, JUNE 22, 2010
- e. AISC, CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES, APRIL 14, 2010

DESIGN LOADS:

SUPERIMPOSED DEAD AND LIVE LOADS AS NOTED ON EXISTING DRAWINGS:

COLEMNIA COLD PER FIND LIVE LONDO NO TROTED ON EXICI			
LOAD TABLE	DEAD LOAD	LIVE LOAD	
STAIR	_	100 PSF	
HAND RAIL	3 PLF	200 LB OR 50 PLF	
GRATING	10 PSF		
PLATFORM FOR		60 PSF OR 2000 LB	
MAINTENANCE ACCESS		00 PSF OR 2000 LB	

SEISMIC (FOR BOTH LOCATIONS, NORTH FARRAGUT AND BETHESDA)

a. BUILDING RISK CATEGORY

1.0

b. IMPORTANCE FACTOR, le c. SITE CLASS

D (ASSUMED)

d. MAPPED SPECTRAL ACCELERATION SHORT PERIOD, Ss

0.119 q 0.051 g

e. LONG-PERIOD TRANSITION PERIOD. TL SEISMIC DESIGN CATEGORY

1-SECOND PERIOD, S1

8 sec

STRUCTURAL STEEL:

a. DRAWINGS:

- ERECTION PLANS SHOWING TYPE, SIZE, WEIGHT AND IDENTIFICATION MARKS OF MEMBERS, DIMENSIONS LOCATING MEMBERS RELATIVE TO COLUMN GRID LINES, ELEVATIONS OF MEMBERS, AND CLEAR CROSS REFERENCE WITH OTHER RELATED DRAWINGS. ERECTION PLANS SHALL INCLUDE NECESSARY INFORMATION AND INSTRUCTIONS REGARDING FIELD WELDS AND FIELD BOLTS INCLUDING TYPE, SIZE AND EXTENT OF FIELD WELDS, TYPES OF ELECTRODES, WELDING PROCEDURES, WELDING SEQUENCE, SIZE AND TYPE OF FIELD BOLTS. DETAIL DRAWINGS SHOWING COMPLETE DETAILS OF MEMBERS AND COMPONENTS INCLUDING IDENTIFICATION MARKS, DIMENSIONS, SIZE, TYPE, WEIGHT, GRADE OF STEEL, REQUIREMENTS FOR INSTALLATION OF OTHER MATERIALS OR PARTS OF CONSTRUCTION, SUCH AS PUNCH OR DRILLED HOLES, CLEATS, OPENINGS, TYPE, SIZE AND EXTENT OF SHOP AND FIELD WELDS, TYPE OF ELECTRODES, JOINT WELDING PROCEDURES, AND SIZE AND TYPE OF SHOP AND FIELD BOLTS, USE WELDING SYMBOLS ADOPTED BY AMERICAN WELDING SOCIETY.
- 2. FABRICATOR AND ERECTOR SHALL BE CURRENTLY CERTIFIED IN THE AISC QUALITY CERTIFICATION PROGRAM. CATEGORY STD.
- WELDING PROCEDURES AND QUALIFICATIONS OF OPERATORS SHALL BE AS PRESCRIBED IN AMERICAN WELDING SOCIETY (AWS) D1.1., "STRUCTURAL WELDING CODE. STEEL". WELDERS SHALL BE QUALIFIED TO PERFORM TYPE OF WORK REQUIRED.
- 4. STRUCTURAL STEEL WORK SHALL COMPLY WITH THE AISC "CODE OF STANDARD PRACTICE" AND AISC "SPECIFICATION FOR STRUCTURAL STEEL FOR BUILDINGS".
- 5. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING DESIGNATIONS, UNO:

a. W SHAPES — ASTM A992.

- b. CHANNELS. ANGLES. AND PLATES ASTM A36.
- c. HOLLOW STRUCTURAL SECTIONS ASTM A500, GRADE B.
- d. PIPES ASTM A53, GRADE B.

6. BOLTS, NUTS, AND WASHERS:

- a. BOLTS AND NUTS SHALL BE PRODUCED BY A DOMESTIC MANUFACTURER.
- BOLTS SHALL CONFORM TO REQUIREMENTS OF ASTM A325.
- c. NUTS SHALL CONFORM TO ASTM A563, GRADE TO MATCH BOLT SPECIFIED
- d. WASHERS SHALL CONFORM TO ASTM F436. WASHERS SHALL BE PROVIDED BY SAME MANUFACTURER AS BOLTS.
- 7. ANCHOR RODS SHALL COMPLY WITH ASTM F1554, GRADE 36, GALVANIZED.
- 8. WELDING EQUIPMENT AND MATERIALS SHALL CONFORM TO REQUIREMENTS OF THE AWS D1.1 WITH THE EXCEPTION THAT E70XX ELECTRODES SHALL BE USED FOR ASTM A 36/A 36M STEEL.
- 9. EXTERIOR EXPOSED STEEL SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123, AND AS NOTED.
- 10. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR DESIGN, STRENGTH, SAFETY AND ADEQUACY OF TEMPORARY BRACING AND METHODS OF CONSTRUCTION.

11. FABRICATION:

- a. DRILL OR PUNCH BOLT HOLES. DRILL HOLES IN MATERIAL THICKER THAN 7/8 INCH AND THAN BOLT DIAMETER.
- CONTACT SURFACES AT HIGH-STRENGTH BOLT GROUPS SHALL BE CLEANED AND FREE OF
- c. HOT-DIP GALVANIZE ALL STEEL.
- 12. ERECTION TOLERANCES SHALL BE AS SPECIFIED IN AISC "CODE OF STANDARD PRACTICE".
- 13. PROVIDE TEMPORARY BRACING TO RESIST ALL LOADS, INCLUDING CONSTRUCTION LOADS TO WHICH STRUCTURE MAY BE SUBJECTED.
- 14. TAKE PRECAUTIONS NECESSARY TO AVOID DAMAGE TO EXISTING STRUCTURES.
- 15. BOLTED CONNECTIONS:
 - a. PROVIDE A MINIMUM OF 2 HIGH STRENGTH BOLTS IN EACH FACE OF EACH BOLTED CONNECTION.
 - b. BOLTS SHALL BE MINIMUM OF 3/4 INCH.
 - c. BOLTED SHEAR CONNECTIONS MAY BE TIGHTENED TO THE SNUG TIGHT CONDITION, UNO.

16. WELDED CONNECTIONS:

- a. FILLET WELDS SHALL HAVE A MINIMUM SIZE OF 1/4", UNO.
- b. IF PARTS JOINED BY FILLET WELDS ARE SEPARATED BY MORE THAN 1/16 INCH. THE LEG OF THE FILLET WELD SHALL BE INCREASED BY THE AMOUNT OF THE ROOT OPENING. ROOT OPENING SHALL NOT EXCEED 3/16".
- 17. AFTER ERECTION, TOUCH-UP SHOP FINISH WHERE MISSING OR DAMAGED. IN ACCORDANCE WITH ASTM A780.
- 18. DO NOT FIELD CUT STRUCTURAL STEEL MEMBERS WITHOUT THE WRITTEN APPROVAL OF WMATA.

19. DO NOT SPLICE STEEL MEMBERS EXCEPT WHERE SPECIFICALLY DETAILED ON THE DRAWINGS WITHOUT THE WRITTEN APPROVAL OF WMATA.

STRUCTURAL TESTS AND INSPECTIONS:

1. STRUCTURAL TESTS AND INSPECTIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE IBC 2012, CHAPTER 17. AND THE PROJECT SPECIFICATIONS.

POST INSTALLED ANCHORS

- THE SUITABILITY OF THE POST-INSTALLED ANCHORS FOR USE IN CONCRETE SHALL HAVE BEEN DEMONSTRATED TO EXHIBIT PULLOUT FAILURES WITH AN ACCEPTABLE LOAD-DISPLACEMENT CHARACTERISTIC OR THAT PULLOUT FAILURES ARE PRECLUDED BY ANOTHER FAILURE MODE.
- ANCHORS, ADHESIVE, AND RELATED MATERIALS SHALL BE CERTIFIED BY ICC-ES TO COMPLY WITH CURRENT APPLICABLE ICC ES ACCEPTANCE CRITERIA.
- ADHESIVE ANCHORS: ANCHORS CONSISTING OF AN INSERT AND EPOXY OR HYBRID ADHESIVE.
- 1. REINFORCING DOWEL ASTM A 615 OR A 706, GRADE 60
 - ACCEPTABLE PRODUCTS, EQUIVALENT PRODUCTS OF OTHER MANUFACTURERS WILL BE **EVALUATED AS SUBSTITUTIONS:**
 - 1. RE 500-SD, HILTI, INC 2. ET-XP, SIMPSON STRONG-TIE
- INSTALL ANCHORS IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS.
- PROVIDE MINIMUM EFFECTIVE EMBEDMENT DEPTH PER MANUFACTURER RECOMMENDATION, U.N.O.
- ALL ANCHORS SHALL BE STAINLESS STEEL.
- SPECIAL INSPECTION: SPECIAL INSPECTION SHALL BE PROVIDED BY AN INDEPENDENT TESTING AND INSPECTION AGENCY IN ACCORDANCE WITH CHAPTER 17 OF THE IBC & AS FOLLOWS:
 - THE SPECIAL INSPECTOR SHALL INSPECT THE INSTALLATION OF 100% OF THE POST-INSTALLED
- FOR PERIODIC INSPECTION THE SPECIAL INSPECTOR SHALL VERIFY THE INITIAL INSTALLATIONS OF EACH TYPE AND CONSTRUCTION PERSONNEL SHALL BE PERMITTED TO BE PERFORMED IN THE ABSENCE OF THE SPECIAL INSPECTOR. ANY CHANGE IN THE ANCHOR PRODUCT BEING INSTALLED OR THE PERSONNEL PERFORMING THE INSTALLATION SHALL REQUIRE A REPEAT OF THE INITIAL INSPECTION. FOR ONGOING INSTALLATIONS OVER AN EXTENDED PERIOD THE SPECIAL INSPECTOR SHALL MAKE REGULAR INSPECTIONS TO CONFIRM CORRECT HANDLING AND INSTALLATION OF THE PRODUCT.
- THE SPECIAL INSPECTOR SHALL VERIFY THE FOLLOWING ITEMS:
 - HOLE DRILLING METHOD IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS
 - HOLE LOCATION, DIAMETER AND DEPTH
 - HOLE CLEANING IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS
 - ANCHOR ELEMENT TYPE, MATERIAL, DIAMETER AND LENGTH
 - ADHESIVE IDENTIFICATION AND EXPIRATION DATE
 - ADHESIVE INSTALLATION IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS
- d. A PROGRAM FOR ON-SITE TORQUE OR PROOF LOADING SHALL BE CONDUCTED AS PART OF THE SPECIAL INSPECTION AS FOLLOWS:
 - TEST 10% OF EACH COMBINATION OF ANCHOR TYPE, SIZE, EMBEDMENT, AND LOCATION (HORIZONTAL, VERTICAL, AND OVERHEAD INSTALLATION)
 - WEDGE ANCHORS SHALL BE TESTED TO THE FULL INSTALLATION TORQUE SPECIFIED BY THE ANCHOR MANUFACTURER USING A CALIBRATED TORQUE WRENCH
 - ADHESIVE ANCHORS SHALL BE PROOF LOAD TESTED IN TENSION USING A CALIBRATED RAM. PROOF LOAD LEVELS SHALL NOT EXCEED THE LESSER OF 50% OF EXPECTED ULTIMATE LOAD BASED ON ADHESIVE BOND STRENGTH NOR 80% OF THE ANCHOR YIELD STRENGTH. THE PROOF LOAD SHALL BE MAINTAINED AT THE REQUIRED LOAD LEVEL FOR A MINIMUM OF 10 SECONDS. DISPLACEMENT OF THE ANCHOR AT THE PROOF LOAD SHALL NOT EXCEED D/10. WHERE D IS THE NOMINAL ANCHOR DIAMETER
 - IF MORE THAN 10% OF THE TESTED ANCHORS FAIL TO ACHIEVE THE SPECIFIED TORQUE OR MAXIMUM DISPLACEMENT AT PROOF LOAD ALL ANCHORS OF THE SAME TYPE AND SIZE AS THI FAILED ANCHORS SHALL BE TESTED AND PERMANENT LOADS SHALL NOT BE APPLIED TO ANY ANCHOR FAILING TO MEET THE SPECIFIED REQUIREMENTS UNTIL WMATA EITHER ACCEPTS THE INSTALLATION IN WRITING OR THE CONDITION IS REINFORCED TO HIS/HER SATISFACTION.



LEUTERIO THOMAS LLC **ARCHITECTS + ENGINEERS** 6710 Oxon Hill Road, Suite 310 National Harbor, MD 20745

A Gannett Fleming/Parsons JOINT VENTURE

SONAL EN 03/29/2018

State of Maryland Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 025124, Expiration Date: 06/22/2018

REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS STRUCTURAL ABBREVIATIONS AND NOTES

M NO. CONTRACT NO. SCALE DRAWING NO. SHEET NO. M1304 FQ-18102 AS NOTED S-001 07 of 173

REFERENCE DRAWINGS REVISIONS DATE | NUM | DESCRIPTION NUMBER DESIGNED E PEREZ 08/11/17 03/30/2018 0 FINAL CONTRACT DRAWINGS 08/11/17 DATE 03/23/18 DATE CHECKED J. OZUSTA

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

Magnuser MARK MAGNUSSEN MANAGER. ENV. PLANNING AND COMP

03/2018 DATE GRAHAM SPILLER GFP DEPUTY PROGRAM MANAGER