MANCHESTER-BOSTON REGIONAL AIRPORT
GREEN DRIVE CARGO FACILITY APRON AND ACCESS ROAD

ADDENDUM NO. 1

DATE: March 17, 2022

TO: ALL BIDDERS

FROM: McFarland-Johnson, Inc.
53 Regional Drive
Concord, NH 03301

PROJECT: Manchester-Boston Regional Airport
Manchester, New Hampshire
Green Drive Cargo Facility Apron and Access Road

This Addendum forms part of and modifies Bidding and Contract Documents for the project named above, March 2022. The Bidder is to acknowledge receipt of this Addendum on the Bid Proposal Documents to be in compliance with the bidding requirements.

Where any original item called for in the Project Manual or indicated on the Drawings is supplemented hereby, the supplemental requirements shall be considered as added hereto.

Where any original item is amended, voided, or superseded hereby, the other provisions of such items not specifically amended, voided, or superseded shall remain in effect.

PRE-BID MEETING

Addendum Item 1.01
PRE-BID MEETING DISCLAIMER AND CLARIFICATION NOTE: The topics covered in the Pre-bid meeting were not intended to cover every requirement contained within the project specifications and plans. It shall be understood that the written word contained within the project specifications and the project plan set shall have precedent over what was verbally spoken in the Pre-bid meeting. It was not the intent to deviate from the written word, but if later the Bidder discovers a conflict, the written word governs.

Addendum Item 1.02
PRE-BID MEETING ATTENDEES
Refer to the attached list of "in-person" and virtual website attendees.

PROJECT MANUAL DOCUMENTS

Addendum Item 1.03

INFORMATION TO BIDDERS

1.01 RECEIPT AND OPENING OF BIDS - MODIFICATIONS to the first Paragraph of to change the Bid Opening time as follows:

DELETE: The City of Manchester, Department of Aviation, Manchester, New Hampshire (herein called the Owner), invites bids on the form attached hereto, all blanks of which must be appropriately filled in. Bids will be received by the Manchester-Boston Regional Airport Administration Office at One Airport Road Manchester, NH until **April 6, 2022 at ~~2:30 pm~~** and then at said office publicly opened and read aloud.

INSERT: The City of Manchester, Department of Aviation, Manchester, New Hampshire (herein called the Owner), invites bids on the form attached hereto, all blanks of which must be

appropriately filled in. Bids will be received by the Manchester-Boston Regional Airport Administration Office at One Airport Road Manchester, NH until ***April 6, 2022 at 10:00 AM*** and then at said office publicly opened and read aloud.

Addendum Item 1.04

INFORMATION TO BIDDERS

1.10 ADDENDA AND INTERPRETATIONS - MODIFICATIONS to the second sentence of to change the receipt of questions time as follows:

DELETE: … Every request for such interpretation shall be in writing addressed to David Brouillet, Project Manager with McFarland Johnson, 53 Regional Drive, Concord, NH 03301, by fax at (603) 225-0095 or email dbrouillet@mjinc.com and to be given consideration, **must be received no later than ~~5:00 PM~~ (EDT) on Tuesday, March 29, 2022**. …

INSERT: … Every request for such interpretation shall be in writing addressed to David Brouillet, Project Manager with McFarland Johnson, 53 Regional Drive, Concord, NH 03301, by fax at (603) 225-0095 or email dbrouillet@mjinc.com and to be given consideration, **must be received no later than 12:00 PM (Noon) (EDT) on Tuesday, March 29, 2022**. …

Addendum Item 1.05

BID PROPOSAL

PROPOSAL FORM - MODIFICATIONS to the Schedule B – Base Bid – Proposal Form as follows:

Item No. M-300-5A: **Change Description** from Snow Melter Utility – 2" Polyethylene Line to Snow Melter Utility – *Snow Melter System Water Service*
Item No. M-300-5C: **Eliminate Item:** Snow Melter Utility – 2" Service Tap (Saddle & Corporation)
Item No. M-400-5.8a: **Eliminate Item:** Utility Supplier Relocation Work – Allowance
Item No. P-101-5.6: **Modify Quantity:** Cold Milling quantity change from 2830 SY to 3630 SY
Item No. P-403-8.1: **Modify Quantity:** P-403 pavement quantity change from 300 Ton to 410 Ton

DELETE: Schedule B – Base Bid - Proposal Form
Page BP-18 of 44 through Page BP-26 of 44

INSERT: Schedule B - Base Bid - Proposal Form
Addendum #1 - Page BP-18 of 44 through Page BP-26 of 44

PROJECT MANUAL TECHNICAL SPECIFICATIONS

Addendum Item 1.06

M-300 SNOW MELTER SYSTEM AND ASSOCIATED SITE IMPROVEMENTS

MODIFICATIONS to the Technical Specification as follows:

Section 300-2.8 Water Line and Fitting Materials, 3): **Replace 3) Material:** Remove Polyethylene Service Tubing and Replace with Copper Service Tubing
Section 300-2.8 Water Line and Fitting Materials: **Add 4) Material:** Add Polyethylene Wrap for Ductile Iron Pipe
Section 300-2.8 Water Line and Fitting Materials: **Add 14) Material:** Add Copper Meter Setters and Check Valves (No Lead Brass)
Section 300-4.7A Snow Melter Utility – Snow Melter System Water Service: **Add 300-4.7A:** Add language to the Method of Measurement
Section 300-5.7A Snow Melter Utility – Snow Melter System Water Service: **Add 300-457A:** Add language to the Basis of Payment
Payment Item M-300-5A: **Revise Description:** Change from 2" Polyethylene Line to System Water Service

Payment Item M-300-5C: **Eliminate Item:** Delete 2" Service Tap as a payment Item

DELETE: Entire Technical Specification M-300 Snow Melter System and Associated Site Improvement (Pages M-300-1 to M-300-22)

INSERT: Entire Technical Specification M-300 Snow Melter System and Associated Site Improvement – Addendum #1 (Pages M-300-1 to M-300-24)

Addendum Item 1.07

M-400 NON-AIRFIELD SITE ELECTRICAL

MODIFICATIONS to the Technical Specification as follows:
Section 400-3.28 Electric Supply Facility Removal and Relocation Coordination: **Eliminate Item:** Remove item from this Contract. Work to be performed by the Owner outside of the Contract.

DELETE: **400-3.28 Electric Supply Facility Removal and Relocation Coordination.** All existing utility-owned electrical supply wires, poles, transformers and associated supply appurtenances shall be removed by the Utility Supplier as shown on the plans, or as directed by the Utility Supplier. The relocation of any aerial electrical supply facilities shall be disconnected and relocated to the proposed modified layout by the Utility Supplier (Eversource) in accordance with their requirements.

INSERT: **400-3.28 Electric Supply Facility Removal and Relocation Coordination.** ~~All existing utility-owned electrical supply wires, poles, transformers and associated supply appurtenances shall be removed by the Utility Supplier as shown on the plans, or as directed by the Utility Supplier. The relocation of any aerial electrical supply facilities shall be disconnected and relocated to the proposed modified layout by the Utility Supplier (Eversource) in accordance with their requirements.~~ ***Eliminated from this Contract.***

PLANS

Addendum Item 1.08

REPLACE the plan sheets as follows:
DELETE: The sheets listed in the table below.

Sheet Number	Sheet Title
DE-01	DEMOLITION PLAN – BASE BID
GE-01	GEOMETRY LAYOUT PLAN – BASE BID
GE-02	GEOMETRY LAYOUT PLAN – BASE BID
GE-02A	GEOMETRY LAYOUT PLAN – ADD ALT 4
GE-03A	GEOMETRY LAYOUT PLAN – ALT 1 & ADD ALT 3
GE-03B	GEOMETRY LAYOUT PLAN – ALT 2 & ADD ALT 3
TS-01	TYPICAL SECTIONS (1 OF 2)
MD-02	SNOWMELTER DETAILS (2 OF 2)
MD-03	UTILITY DETAILS
GR-01	GRADING, DRAINAGE, AND EROSION CONTROL PLAN – BASE BID
GR-02	GRADING, DRAINAGE, AND EROSION CONTROL PLAN – BASE BID
GR-02A	GRADING, DRAINAGE, AND EROSION CONTROL PLAN – ADD ALT 4
GR-08	DRAINAGE DETAILS (3 OF 5)
MK-01	MARKING PLAN – BASE BID
MK-02	MARKING PLAN – BASE BID
MK-02A	MARKING PLAN – ADD ALT 4

INSERT: The attached sheets listed in the table below with Revision Date 3/17/22 – Addendum No. 1.

Sheet Number	Sheet Title
DE-01	DEMOLITION PLAN – BASE BID
GE-01	GEOMETRY LAYOUT PLAN – BASE BID
GE-02	GEOMETRY LAYOUT PLAN – BASE BID
GE-02A	GEOMETRY LAYOUT PLAN – ADD ALT 4
GE-03A	GEOMETRY LAYOUT PLAN – ALT 1 & ADD ALT 3
GE-03B	GEOMETRY LAYOUT PLAN – ALT 2 & ADD ALT 3
TS-01	TYPICAL SECTIONS (1 OF 2)
MD-02	SNOWMELTER DETAILS (2 OF 2)
MD-03	UTILITY DETAILS
GR-01	GRADING, DRAINAGE, AND EROSION CONTROL PLAN – BASE BID
GR-02	GRADING, DRAINAGE, AND EROSION CONTROL PLAN – BASE BID
GR-02A	GRADING, DRAINAGE, AND EROSION CONTROL PLAN – ADD ALT 4
GR-08	DRAINAGE DETAILS (3 OF 5)
MK-01	MARKING PLAN – BASE BID
MK-02	MARKING PLAN – BASE BID
MK-02A	MARKING PLAN – ADD ALT 4

QUESTIONS AND CLARIFICATIONS

Addendum Item 1.09

What is the county jurisdiction for the Davis-Bacon Wage Schedule to be used for the Project?

Answer: As presented in the Davis-Bacon Wage Schedule in the Project Manual Documents, the county of jurisdiction is Rockingham County since work will occur in the Town of Londonderry.

Addendum Item 1.10

What is the Engineer's Estimate?

Answer: The Engineer's Estimate will not be provided for this project.

Addendum Item 1.11

What is the anticipated Notice to Proceed Date?

Answer: It is anticipated that the Notice to Proceed will be issued for early May.

END OF ADDENDUM NO. 1

Manchester·Boston
REGIONAL AIRPORT

MEETING ATTENDEES

DATE: March 15, 2022

MEETING: Green Drive Cargo Facility Apron and Access Road Construction
Pre -Bid Meeting

NAME	COMPANY	PHONE NUMBER	E-MAIL ADDRESS
Chris Bowler	Weaver Bros	603-496-4639	chris@wbcc.biz
Brett Frears	MJ	(315) 955-4031	bfrears@mjinc.com
MIKE MACDONALD	RSA	603 224 7724	MMACDONALD@AUDLEY CONSTRUCTION.COM
ERIC FRINC	RSA	" " "	
Dave Brouillet	MJ	603 731 7239	dbrouillet@mjinc.com
Brian Bennett	MJ	603 225 2978	bbennett@mjinc.com
Robert Law	MJ	603-225-2978	rlaw@mjinc.com
Attending Virtually:			
Bethany Huckins	Pike Industries	603-527-5125	bhuckins@pikeindustries.com
Fred Kenison	R. S. Audley, Inc.	603-224-7724	fkenison@audleyconstruction.com
Carol Niewola	NHDOT- Aeronautics	603-271-1675	cniewola@dot.nh.gov
Rick Dyment	NHDOT- Aeronautics	603-271-1677	richard.j.dyment@dot.nh.gov

Manchester-Boston Regional Airport
GREEN DRIVE CARGO FACILTY APRON AND ACCESS ROAD CONSTRUCTION
SCHEDULE B – BASE BID – PROPOSAL FORM

ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
C-102-5.1	9 EA	INSTALLATION AND REMOVAL OF INLET PROTECTION FILTER BAGS _____Dollars and _____ Cents				
C-102-5.2	100 LF	INSTALLATION AND REMOVAL OF EROSION CONTROL LOGS _____Dollars and _____ Cents				
M-300-1	1 LS	SNOW MELTER EQUIPMENT PACKAGE _____Dollars and _____ Cents				
M-300-2A	1 LS	SNOW MELTER EQUIPMENT MANUFACTURER INSTALLATION ASSISTANCE _____Dollars and _____ Cents				
M-300-2B	1 LS	CONTRACTOR SNOW MELTER EQUIPMENT FINAL DESIGN AND INSTALLATION _____Dollars and _____ Cents				
M-300-3	1 LS	CONTRACTOR SNOW MELTER SITE PREPARATION AND SITE INFRASTRUCTURE WORK _____Dollars and _____ Cents				
M-300-4	1 LS	SNOW MELTER BUILDING AND INSTALLATION _____Dollars and _____ Cents				

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ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
M-300-5A	***1 LS***	SNOW MELTER UTILITY – ***SNOW MELTER SYSTEM WATER SERVICE*** _____Dollars and _____ Cents				
M-300-5B	300 LF	SNOW MELTER UTILITY – 8" DUCTILE IRON WATER LINE _____Dollars and _____ Cents				
~~***M-300-5C***~~	~~***2 EA***~~	~~***SNOW MELTER UTILITY – 2" SERVICE TAP (SADDLE & CORPORATION)***~~ ~~_____***Dollars and***~~ ~~_____***Cents***~~				
M-300-5D	2 EA	SNOW MELTER UTILITY – 2" CURB STOP WITH CURB BOX _____Dollars and _____ Cents				
M-300-5E	1 EA	SNOW MELTER UTILITY – 12" X 8" TAPPING SLEEVE AND 8" GATE VALVE _____Dollars and _____ Cents				
M-300-5F	1 EA	SNOW MELTER UTILITY – HYDRANT AND 6" GATE VALVE ASSEMBLY _____Dollars and _____ Cents				
M-300-6A	1 LS	SNOW MELTER UTILITY – NATURAL GAS SERVICE SUPPLIER COORDINATION AND INSTALLATION _____Dollars and _____ Cents				

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ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
M-300-6B	350 LF	SNOW MELTER UTILITY – NATURAL GAS SERVICE PIPE TRENCHING _____Dollars and _____ Cents				
M-400-5.2a	2,500 LF	144 STAND FIBER CABLE WITH INNERDUCT, INSTALLED IN DUCT BANK OR CONDUIT, INCLUDING CONNECTIONS AND TERMINATIONS _____Dollars and _____ Cents				
M-400-5.3a	1 LS	DEMARC ROOM FIBER EQUIPMENT & FIBER CABLE INTERCONNECTIONS _____Dollars and _____ Cents				
M-400-5.3b	1 LS	SNOW MELTER BUILDING FIBER EQUIPMENT & FIBER CABLE INTERCONNECTIONS _____Dollars and _____ Cents				
M-400-5.4a	1,600 LF	CONCRETE ENCASED 5” CONDUIT – TYPE III SCH 40 PVC _____Dollars and _____ Cents				
M-400-5.4b	60 LF	EVERSOURCE RISER 5” CONDUIT – RIGID _____Dollars and _____ Cents				
M-400-5.4c	1,250 LF	CONCRETE ENCASED DUCT BANK 2-WAY X 4” – TYPE III, SCH 40 PVC _____Dollars and _____ Cents				

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ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
M-400-5.4d	320 LF	CONCRETE ENCASED DUCT BANK 2-WAY X 3" – TYPE III, SCH 40 PVC _____Dollars and _____ Cents				
M-400-5.7a	1 EA	500 kVA EVERSOURCE TRANSFORMER PAD _____Dollars and _____ Cents				
M-400-5.7b	4 EA	ELECTRICAL MANHOLE (H-20 RATED) _____Dollars and _____ Cents				
M-400-5.7c	5 EA	FIBER/ELECTRICAL HANDHOLE (H-20 RATED) _____Dollars and _____ Cents				
M-400-5.7d	3 EA	EXISTING HANDHOLE REMOVAL _____Dollars and _____ Cents				
~~M-400-5.8a~~	~~1 ALL~~	~~UTILITY SUPPLIER RELOCATION WORK – ALLOWANCE~~ ~~Zero Dollars and~~ ~~Zero Cents~~	**$0**	**00**	**$0**	**00**
M-400-5.8b	1 ALL	UTILITY SUPPLIER CABLE INSTALLATION - ALLOWANCE Twenty Thousand Dollars and Zero Cents	**$20,000**	**00**	**$20,000**	**00**
M-400-5.9a	1 LS	LOT D (NORTH) SITE LIGHTING REMOVAL _____Dollars and _____ Cents				
M-400-5.9c	1 LS	ACCESS ROADWAY SITE LIGHTING REMOVAL _____Dollars and _____ Cents				

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ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
M-600-1	390 TON	NHDOT HOT BITUMINOUS PAVEMENT – ½" WEARING COURSE _____Dollars and _____ Cents				
M-600-2	480 TON	NHDOT HOT BITUMINOUS PAVEMENT – ¾" BINDER COURSE _____Dollars and _____ Cents				
M-700-5.1a	160 CY	BASE COURSE MATERIAL _____Dollars and _____ Cents				
M-700-5.2a	100 LF	GRANTITE CURB (STRAIGHT) _____Dollars and _____ Cents				
M-700-5.2b	30 LF	GRANTITE SLOPE CURB (STRAIGHT AND RADIAL) _____Dollars and _____ Cents				
M-700-5.2c	200 LF	REMOVE, SALVAGE AND RESET GRANTITE CURB (STRAIGHT) _____Dollars and _____ Cents				
M-700-5.2d	280 LF	REMOVE, SALVAGE AND RESET GRANTITE SLOPE CURB (STRAIGHT AND RADIAL JOINTS) _____Dollars and _____ Cents				
M-700-5.3b	5 EA	WAYFINDING SIGNAGE – NHDOT TYPE C _____Dollars and _____ Cents				

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ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
M-700-5.4	1 LS	WALKWAY MODIFICATION _____Dollars and _____ Cents				
M-700-5.5	1 LS	OLD ACCESS GATE AND ISLAND AREA REMOVAL _____Dollars and _____ Cents				
M-700-5.9a	1 LS	1" COPPER WATER SERVICE REMOVAL & DECOMMISSIONING _____Dollars and _____ Cents				
M-700-5.9b	1 LS	8" CAST IRON WATER SERVICE REMOVAL & DECOMMISSIONING _____Dollars and _____ Cents				
M-750-1	1 LS	STORMWATER INFILTRATION TREATMENT SYSTEM _____Dollars and _____ Cents				
M-800-5.1	2,400 SY	RECLAIMED BASE COURSE _____Dollars and _____ Cents				
M-800-5.2	140 TON	SUPPLEMENTAL AGGREGATE MATERIAL _____Dollars and _____ Cents				
P-101-5.1	1,420 SY	PAVEMENT REMOVAL _____Dollars and _____ Cents				

Manchester-Boston Regional Airport

GREEN DRIVE CARGO FACILTY APRON AND ACCESS ROAD CONSTRUCTION

SCHEDULE B – BASE BID – PROPOSAL FORM

ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
P-101-5.2	330 LF	JOINT AND CRACK REPAIR _____Dollars and _____ Cents				
P-101-5.6	***3630 SY***	COLD MILLING _____Dollars and _____ Cents				
P-101-5.7A	100 LF	REMOVAL OF PIPE _____Dollars and _____ Cents				
P-101-5.7B	2 EA	REMOVAL OF DRAIN INLET/MANHOLE _____Dollars and _____ Cents				
P-154-5.1	120 CY	SUBBASE COURSE _____Dollars and _____ Cents				
P-403-8.1	***410 TON***	ASPHALT BASE COURSE/SHOULDER PAVEMENT _____Dollars and _____ Cents				
P-603-5.1	370 GAL	EMULSIFIED ASPHALT TACK COAT _____Dollars and _____ Cents				
P-605-5.1	190 LF	JOINT SEALING FILLER _____Dollars and _____ Cents				
P-620-5.2b	830 SF	MARKING _____Dollars and _____ Cents				

Manchester-Boston Regional Airport
GREEN DRIVE CARGO FACILTY APRON AND ACCESS ROAD CONSTRUCTION
SCHEDULE B – BASE BID – PROPOSAL FORM

ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
P-620-5.3c	60 LBS	REFLECTIVE MEDIA _____Dollars and _____ Cents				
F-162-5.1a	320 LF	10-FT. HEIGHT CHAIN-LINK FENCE WITH BARBED WIRE _____Dollars and _____ Cents				
F-162-5.1b	230 LF	4-FT HEIGHT CHAIN-LINK FENCE _____Dollars and _____ Cents				
F-162-5.3	530 LF	REMOVAL OF FENCE _____Dollars and _____ Cents				
D-701-5.1B	390 LF	15-INCH CLASS V REINFORCED CONCRETE PIPE _____Dollars and _____ Cents				
D-701-5.1C	30 LF	18-INCH CLASS V REINFORCED CONCRETE PIPE _____Dollars and _____ Cents				
D-701-5.1E	30 LF	12-INCH HIGH-DENSITY POLYETHYLENE PIPE _____Dollars and _____ Cents				
D-751-5.2B	3 EA	CATCH BASIN – H-20 RATED _____Dollars and _____ Cents				

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ITEM NO.	ESTIMATED QUANTITY/ UNIT	DESCRIPTION AND UNIT PRICE (IN WORDS)	FIGURES			
			UNIT PRICE		EXTENSION	
			Dollars	Cents	Dollars	Cents
D-751-5.4	1 EA	ADJUST STRUCTURE RIM/GRATE ELEVATION _____Dollars and _____ Cents				
D-751-5.6	1 EA	INSTALL DIVERSION WEIR IN EXISTING CATCH BASIN _____Dollars and _____ Cents				
T-901-5.1	20 KSF	SEEDING _____Dollars and _____ Cents				
T-905-5.2	80 CY	TOPSOIL (FURNISHED FROM OFF THE SITE) _____Dollars and _____ Cents				
T-908-5.1	1,440 SY	MULCHING _____Dollars and _____ Cents				

SCHEDULE B – BASE BID SUBTOTAL (Pages BP-18 to BP-26)
(Transfer the Amount to Page BP-41)

$ _____

ITEM M-300
SNOW MELTER SYSTEM AND ASSOCIATED SITE IMPROVEMENTS

CONTRACT DOCUMENTS

300-0.1 This section of these Specifications is a part of the Contract Documents as defined in the General Provisions. All applicable parts of the balance of the Contract Documents are equally as binding for this section as for all other sections.

DESCRIPTION

300.-1.0 General. The purpose of the requirements is to ensure that the contract work does not damage any existing property/utilities or create any hazard to aircraft operations, and to bring to the Contractor's attention special coordination that the Contractor should be aware of that may be unique to airfield construction or unique to the proposed Owner's Facility. It is Contractor's responsibility to conduct all work in strict accordance with the requirements set forth herein and to fully cooperate with the Resident Project Representative (RPR) in every way necessary to fulfill the purposes of these requirements as set forth above.

300-1.1 Under this item, the Contractor shall coordinate with the RPR to perform the work under this section.

a. It is the intent to install the snow melter system and all components necessary for a complete and functionally operating system as a Design/Build basis and using this section as a performance-based procurement and installation specification. The following is intended as a performance-based specification and does not necessary cover every aspect of the materials and requirements of the Snow Melter system with all associated components to provide the completely functioning system. The requirements of this specification includes, but is not limited to the snow melter system equipment and associated component procurement, snow melter system equipment installation by the Contractor with assistance from the manufacturer, pre-engineered precast concrete snow melter building, all associated site infrastructure final design and installation, site utilities necessary for the snow melter system, and other miscellaneous incidental work required for a completed in-place and functioning installation.

b. Refer to the related Basis of Design Intent and Dimensional Drawings and Specifications for additional information regarding Work to be included as part of a furnished, installed and functioning snow melter system, building, and associated work. It is noted that and all associated site work components for the completed snow melter system is part of this performance-based specification, excluding the site utility line extension work defined under other sections of the Contract Documents (i.e. fiber optic network systems outlined in Section M-400 *Non-Airfield Site Electrical*). The basis of design for the snow melter system equipment uses the Trecan Combustion Model 300-SG system equipment consisting of 5 individual burner units (Trecan Model 60-SG), but any equal system shall be reviewed and potentially approved by the RPR and Owner for use at this location.

MATERIALS

300-2.0 General.

a. All material and equipment covered by the following referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specifications when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the Contractor's responsibility to

provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not materially comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify pertinent products or models applicable wire to this project. Indicate all optional equipment and delete non-pertinent data. Markings shall be boldly and clearly made with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in PDF format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

300-2.1 Snow Melter Equipment Package. As noted, the equipment will be procured under a performance-based specification and the overall system shall be able to perform the minimum requirements:

Equipment Snow Melting Rating:	300 tons/hour	
Equivalents:	750 Cubic Yards/Hour @ 30 lbs/cubic foot 1500 Cubic Yards/Hour @ 15 lbs/cubic foot	
Typical Area Serviced by System:	27 to 33 acres	
Water Outflow (Average):	1200 US gallons/minute @ 38°F	
Water Outflow (Maximum):	1800 US gallons/minute @ 38°F	
Natural Gas Supply Requirements: (to each unit with basis of design of 5 units)	Pressure Range	5.25 psig (min) *[a] 6.5 psig (max) *[a]
	Fuel Flow	67,500 SCFH
Burner Rating (to each unit)	13.5 mm BTU/hour	
Combustion Air Fan Motor (Soft Start Not Required)	50 HP @ 3600 RPM	

* Natural gas supply piping must be designed such that the supply pressure does not drop below 5.0 psig at 13,500 SCFH. Additionally, the gas supply must be protected against risign above 6.5 psig at any time.

[a] Additional manufacturer supplied equipment should be available to accommodate a natural gas supply pressure outside of the 5.25 to 6.5 psig range. It is identified that the equipment will affect the design and price of the Snow Melter system. Coordination with natural gas supply company (Liberty Utilities) shall be performed to determine if the natural gas supply is outside the standard range.

Gas Compressor with VFD (each) (Quantity = 2 for Full Redundancy)	Not included in basis of design, but include as required if there are natural gas supplier restrictions
Maximum Electrical Load (Complete System – 5 Units)	Approximately 440 kVA
Power Supply (to the Complete System)	480 V/3 PH/60 Hz 600 Amp (fused)

NOTE: Additional Building Loads or Optional Equipment not included

300-2.1.1 Burner/Weir/Downcomer Assembly. Each of the units shall be in conformance with the following specifications:

Immersion Heater (Shipped Installed)		6 kW Prevents water in melting pit from freezing between operations
Safety Components	High Temp Switch	Prevents snowmelter from operating when water temperature is above set point
	Water Probe Level	Prevents snowmelter/immersion heater from operating when water level is low
Weight		Approximately 2600 pounds
Weir		Integral Part
Downcomer Shell		Shipped Installed
Downcomer Insert		Shipped Installed
Burner		Shipped Installed

300-2.1.2 Burner (Part of Burner/Weir/Downcomer Assembly). Each of the burner units shall be in conformance with the following specifications:

Capacity:	13,500 SCFH Submerged-combustion direct contact high heat release Ignition is by spark-ignited pilot Automatic shutoff in case of electrical failure
Materials & Finish:	Carbon steel, painted black Refractory lined
Components Installed on Burner:	Flame scanner Sight glass Pilot

300-2.1.3 Equipment Skid. Each of the unit's equipment skids be in conformance with the following specifications:

Base Dimensions:	5' Wide x 7' Length
Weight:	Approximately 3,000 pounds
Components Installed on Skid:	Centrifugal blower with TEFC motor Air control valve and actuator Gas Train Control Panel Power Panel

300-2.1.4 Gantry Spars for Attachment to Steel Equipment Enclosure. Each of the unit's gantry spars be in conformance with the following specifications:

Materials & Finish:	Carbon steel, painted yellow
Components Installed on Gantry Spar:	Safety chain – secures cover in the open position in the event of hoist failure Burner On Light – indicates when burner is operating (2) High CO lights and (2) CO detectors (Over Burner 2 & 4) – indicates high CO concentration
Components Shipped Loose for Install:	Melting it cover hoist – Chain hoist that opens and closes melting pit cover. Actuated from hoist control panel.

300-2.1.5 Melting Pit Cover Embedded Frame and Melting Pit Cover. Each of the unit's melting pits shall have the following components for field installation and shall be in conformance with the following specifications:

Embedded Frame Materials & Finish:	Galvanized carbon steel
Melting Pit Cover Materials & Finish:	Cover Top – Aluminum tread plate or approved equal Cover Frame - Carbon steel, galvanized
Optional Melting Pit Cover Equipment:	Protective pipe bollard – bollard mounted on melting pit cover that helps prevent vehicles from driving onto cover

300-2.1.6 Equipment Enclosure. The snow melter equipment manufacturer will supply a steel container type enclosure for the five (5) equipment skids. The enclosure will have all the equipment skids installed, including all internal piping and wiring by the snow melter equipment manufacturer prior to shipment. The enclosure has air inlet louvers and connections for external piping and wiring. At one end there is the Master Control Panel and Power Distribution Panel.

Weight:	Approximately 55,000 pounds

300-2.1.7 Overflow Shields. The snow melter equipment manufacturer will supply six (6) overflow shields which shall be in conformance with the following specifications:

Features:	Hinged cover to assist cleanout
Materials & Finish:	Carbon steel, painted black

300-2.1.8 If required due to Natural Gas Supply Constraints, Optional Natural Gas Compressor Skids. If determined during the Design/Build process by the Contractor in coordination with the Equipment vendor and the Natural Gas Supplier to be necessary, the snow melter equipment manufacturer will supply two (2) Natural Gas compressor skids. Each gas compressor is rated at 100% capacity of the full snow melter configuration (i.e. all 5 units), thus providing full redundancy. Each gas compressor will be supplied with a Variable Frequency Drive (VFD) in order to maintain sufficient flow based on the number of burners operating. The installation of this equipment, if required due to any natural gas system constraints, shall also include any additional piping, valving, filtering, and all other incidentals to provide the compressor skids.

300-2.1.9 Miscellaneous Materials and Equipment to be supplied and installed by the Contractor. The Contractor will verify with snow melter equipment manufacturer that the Contractor will be supplying the following miscellaneous materials:

1.) Cast-In-Place Reinforced Concrete Materials for System Pit, Pads, and Overflow Box. Thes materials shall include all materials necessary for the complete installation of any concrete structure, including the sealant materials required for the concrete surfaces.
2.) Anchoring Bolts and Other Hardware per Equipment vendor requirements.
3.) Vent Piping from the equipment unit vent pipes to connection points as required by local codes.
4.) 2" Water Supply Piping for Units including valving, heat tracing, insulation, and auto dumping

per Equipment vendor requirements.

5.) 8" Overflow Drain Materials per Equipment vendor requirements.
6.) Natural Gas supply piping and venting to units per Equipment vendor requirements
7.) Conduits not provided by the Equipment vendor for power supply and units, as well as for all building electrical requirements.
8.) Electrical Field wiring materials for the snow melter equipment as required for a complete installation to pre-wired unit snow melter equipment connection locations provided by the Equipment vendor, including but not limited to: Burner junction box, melting pit cover hoist, etc.
9.) Electrical Field wiring and other associated materials to the snow melter equipment and building electrical services for the power feeds using the Basis of Design Assumptions for the system include: Equipment: 600 A - 480V/3 PH/60 Hz and Building:100 A – 120/240V/1 PH/60 Hz. These assumptions need to be verified as par to the Design/Build Final Design by the Contractor for the Electrical Layout.
10.) Electrical Field wiring materials for the building as required for a complete installation per the Design/Build Electrical Layout.
11.) All other incidental items, not provided by the Snow Melter Equipment Manufacturer, but required for a complete, installed and functioning snow melter system.

300-2.1.9 Optional Snow Melter Equipment and Materials. Several pieces of optional equipment were mentioned throughout this Materials Section to be provided by the snow melter equipment manufacturer. This section collects all of the optional equipment in one place and includes several other pieces of optional equipment and material finishes available. The Owner may decide if any of these pieces of additional optional equipment should be included.

Optional Equipment and Materials TO BE INCLUDED as part of the Snow Melter Equipment Package Base Bid:

Melting Pit Immersion Heater (above in 300-2.1.1)

CO Monitoring System (above in 300-2.1.4)

Surface Snow/Ice Melt System in Pit Loading Area to minimize slips/falls – Options Include:
In-ground electrical heating cables or Overhead Snow Clear Lamps mounted on a pipe gantry spanning length of the pit.

Optional Equipment and Materials to be supplied as part of the Snow Melter Equipment Package Base Bid, if determined by the Contractor during bidding process to be necessary to provide a complete and operating system:

Gas Compressor(s) for supply pressure below standard range

Available Optional Equipment and Materials, but NOT TO BE INCLUDED as part of the Snow Melter Equipment Package Base Bid, but the Contractor may provide an optional price for the Owners consideration:

Stainless Steel – Substitute for embedded frame material

Protective Pipe Bollard for Melting Pit Cover

Remote Operator Interface Tablet

Extended Warranty beyond the Standard Warranty

Spring and Fall Maintenance Packages by the Equipment Manufacturer

300-2.2 Snow Melter System Final Design and Installation Requirements – Design Not Performed by the Snow Melter Equipment Manufacturer but required by the Contractor for a complete system installation. The submittal package(s) for the final design calculations and drawings shall be stamped by

a Professional Engineer licensed in the State of New Hampshire. These final design and installation requirements shall include, but may not be limited to the following, based on the Contractor's Design/Build of the Final Layout and performance-based installation of the work:

1.) Final Structural Design and Calculations of the Snow Melter System Concrete Pad, Pit and Overflow Box Layouts based on the Basis of Design Layout or as modified by the Equipment vendor. Approximate inside plan dimensions of the pit are 42'-6" long by 10' wide and are to be verified by the Equipment vendor as part of the final design coordination.
2.) Final Design and calculations of Snow Melter System Site Electrical Layout based on the Equipment vendor and building requirements. The final design shall also include a short circuit study as part of the submission.
3.) Final Design and calculations of Snow Melter System Site Plumbing Layout for the equipment based on the Equipment vendor requirements.
4.) Final Design and calculations of Snow Melter System Site Natural Gas Supply and Equipment Distribution Layout for the equipment based on the Equipment vendor requirements.
5.) Final Overall Layout Coordinated Design Plan with trade coordination and all other incidental items for a completed installation.

300-2.3 Snow Melter Building. This Specification shall provide requirements for the Pre-Engineered Precast Concrete Snow Melter Building. The Item shall consist of furnishing and constructing a Pre-Engineered Precast Concrete Building in accordance with these specifications, and in accordance with the design, dimensions, and at the location shown in the plans. All work shall meet applicable State of New Hampshire and the local building codes. The following is intended as a performance-based specification and does not necessary cover every aspect of the materials and requirements of the Pre-Engineered Precast Concrete Snow Melter building.

The Contractor shall provide a complete submittal package on the Precast Concrete Snow Melter Building which will also accommodate the Owner's fiber optic network materials as described under Section M-400 *Non-Airfield Site Electrical*. The submittal shall include a summary of all applicable code requirements and design loads with calculations and drawings used for the building design. All HVAC and electrical system submittals shall indicate the performance rating of the unit provided versus the design loads required of the building, as well as the operational needs for the Snow Melter equipment and other equipment. The building submittal package(s) for the shall be stamped by a Professional Engineer licensed in the State of New Hampshire.

300-2.3.1 Snow Melter Building Basis of Design. The basis for design for the Pre-Engineered Precast Concrete Building is Easi-Set Precast Concrete Building System Model 1012 or an approved equal. The building may be either Pre-Assembled (plant assembled transportable building delivered and placed at the site) or Field Assembled (transportable plant precast concrete components and delivered to the site for placing and assembly by the Building Manufacturer or other approved Building subcontracted representative). Building shall be provided by manufacturer with all necessary openings as specified by Contractor's Design/Build requirements and in conformance with manufacturer's structural requirements.

Codes and Standards. The building shall meet current applicable State of New Hampshire and local building code requirements and the following codes listed below. In areas of conflict between codes, the more stringent shall apply:

1.) ACI-318-11 "Building Code Requirements for Structural Concrete."
2.) ASCE/SEI-7-10 "Minimum Design Loads in Buildings and Other Structures"
3.) IBC 2012: International Building Code
4.) PCI Design Handbook, 7th Edition
5.) Concrete Reinforcing Institute, "Manual for Standard Practice"
6.) Bullet Resistant: Meets and/or exceeds UL 752 Level 5 Standards
7.) Fire Resistant: Walls or panels shall have a 2-Hour Fire Rating

8.) Producer shall be certified by the Prestressed Concrete Institute (PCI) Plant Certification Program. Manufacturer shall be certified at the time of bidding.

Dimensions and Design Loads.

1.) Building Dimension: Exterior: 12' x 10' x 8'-8"
2.) Standard Live Roof Load: 60 psf (Snow) minimum
3.) Standard Live Wind Load*: 115 MPH minimum
4.) Standard Floor Load: 150 psf minimum
5.) Walls: 4" min. thick
6.) Monolithic Construction: Roof, floor, and wall panels must each be produced as single component monolithic panels. No roof, floor, or vertical wall joints will be allowed, except at corners and along perimeter. Wall panels shall be set on top of floor panel.
7.) Roof: Roof panel shall have a tapered slope ½" from front to back in 10-foot direction. The roof shall extend a minimum of 2 ½" beyond the wall panel on each side and have a turndown design which extends ½" below the top edge of the wall panels to prevent water migration into the building along top of wall panels.
8.) Floor: Floor panel must have ½" step-down around the entire perimeter to prevent water migration into the building along the bottom of wall panels.

*Note: Design loads relate to precast components only, not accessories (i.e. doors, vents, etc.)

Building Materials.

1.) Concrete: 5000 psi minimum compressive strength

2.) Reinforcement: Rebar shall meet ASTM A615, grade 60 and Welded Wire Fabric shall meet ASTM 185.

3.) Post-tensioning Strand: 41K Polystrand CP50, ½" 270 ksi Seven-Wire strand, enclosed within a greased plastic sheath (ASTM A416). Roof and floor each shall be post-tensioned by a proprietary, second-generation design using a single, continuous tendon. Said tendon is placed in the concrete slab to form a perimeter loop starting from one corner of the slab to a point where the cable entered the slab. The tendon then turns 90 degrees and follows the cable member(s) in the periphery to a point midway along the "X" axis of the concrete building panel and then turns 90 degrees along the "Y" axis of the concrete building panel. This bisects the concrete building panel and crosses the opposite parallel portion of the cable member and exits from an adjacent side of the concrete building panel. This creates a cable pattern with no less than 2.5 parallel cables in any direction. To ensure a watertight design, no alternate methods shall be substituted for the post-tensioning.

4.) Sealant: All joints between panels shall be caulked on the exterior and interior surface of the joints. Caulking shall be DOW CORNING 790 silicone sealant or equal. Exterior caulk reveal to be 3/8"x 3/4" deep so that sides of the joint are parallel for proper caulk adhesion. Back of the joint to be taped with bond breaking tape to ensure adhesion of caulk to parallel sides of joint and not the back.

5.) Vents: Two screened aluminum vents to be cast in rear wall. Vents shall be SUNVENT INDUSTRIES Model FL-164 or equal.

6.) Panel Connections: All panels shall be securely fastened together with 3/8" thick steel brackets. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A36 and hot dipped galvanized after fabrication. All fasteners to be ½" diameter bolts complying with ASTM A325 for carbon steel bolts. Cast-in anchors used for panel connections to be Dayton-Superior F-63 coil inserts, or equal. All inserts for corner

connections must be secured directly to form before casting panels. No floating-in of connection inserts shall be allowed.

Finishes

1.) Interior of Building: Smooth form finish on all interior panel surfaces, unless exterior finish is produced using a form liner, then smooth hand-troweled finish.

2.) Standard Exterior of Building: Architectural precast concrete brick finish: Finish must be imprinted in top face of panel while in form using an open grid impression tool similar to typical brick size shall be 2 3/8" x 7 5/8" with vertical steel float or light broom finish. Joints between each brick must be 3/8" wide x 3/8" deep. Back of joint shall be concave to simulate a hand-tooled joint. Each brick face shall be coated with the following water-based acrylic, water repellent penetrating concrete stain: A) Canyon Tone stain by United Coatings, B) Sherwin Williams (H&C concrete stain) or equal. Stain shall be applied per manufacturer's recommendation. Joints shall be kept substantially free of stain to maintain a gray concrete color. Stain color shall be selected by the RPR/Owner during the submittal review, unless specified otherwise herein.

3.) Floor surface shall be finished concrete.

Door and Hardware Materials.

Doors and Frames: Shall comply with Steel Door Institute (SDI) "Recommended Specifications for Standard Steel Doors and Frames" (SDI-100) and as herein specified. All door and frame galvanizing shall be in accordance with ASTM A924 and A653, A60 minimum coating thickness.

1.) The buildings shall be equipped with double 3'-0" x 6'-8" x 1-3/4" thick insulated, 18-gauge, metal doors with 16-gauge frames (to meet wall thickness). Doors to have flush top cap. 12-gauge flat astragals shall be applied to the active leaf to protect against the elements or forced opening.

2.) Doors and frames shall meet SDI standard Level 2, 1¾" heavy duty.
Approved manufacturers: Republic, Steelcraft, Ceco, Black Mountain, Pioneer, Curries, Mesker, MPI, Door components or equal. Approved distributor: Integrated Entry System.

3.) Door & Frame Coating System: Doors and frames shall be factory bonderized and painted with one coat of rust inhibitive primer and one finish coat of enamel paint; color to be selected by the RPR/Owner during the submittal review, unless specified otherwise herein. Coating system shall be Sherwin Williams Industrial Enamel, Color as Selected by Owner or approved equal.

Door Hardware:

1.) Pull Handle: Shall meet requirements of ANSI A156.2. Shall be thru bolt attached and constructed of a minimum ¾" diameter stainless pull handle sized 8" center to center with a stainless backer plate, minimum 0.053" on both sides.
Approved manufacturers: Design Hardware, Don-Jo, or equal

2.) Hinges: Shall comply with ANSI A156.1 and be of the ball bearing, non-removable pin type (3 per door minimum). Hinges shall be 4 ½" x 4 ½" US26D (652) brushed chrome finish. Manufacturer shall provide a lifetime limited warranty.
Approved manufacturers: Design Hardware, or equal

3.) Deadbolt: Commercial Grade Deadbolt conforming to ANSI 156.5 furnished with a 2 ¼" face plate and a 1" projecting deadbolt with hardened steel pins. Dead bolts shall be UL and ADA approved. Finish shall be US26D (626) brushed chrome finish. Manufacturer

shall provide a lifetime limited warranty.
Approved manufacturers: Design Hardware, Dorma, or equal

4.) Surface Bolt: 8" Surface bolt UL listed. Finish US26D (626) brushed chrome finish. (2 per inactive leaf)
Approved manufacturers: Don-Jo, Design Hardware, or equal

5.) Threshold: Bumper Seal type threshold with a maximum 1" rise to prevent water intrusion. Thresholds shall be approved for UL 10B suitable for use with fire doors rated up to three hours.
Approved manufacturers: National Guard Products or equal

6.) Overhead Door Holder: Heavy duty surface mounted hold open device with hold open/stop angle of 85 to 110 degrees. Construction shall be stainless steel. Finish US32D (630) satin stainless steel finish.
Approved manufacturers: ABH, Rockwood, or equal

7.) Drip Cap: Aluminum drip cap with minimum projection of 2 ½" shall be furnished.
Approved Manufacturers: Design Hardware, National Guard Products, or equal

8.) Door Stop: ANSI 156.16 approved wall mounted door stop with keeper constructed of a corrosion resistant cast brass material. Finish US26D (626) brushed chrome finish.
Approved manufacturers: Don-Jo, Rockwood, or equal

Foundation Materials

Crushed Stone Material shall conform to ASTM C33 Size 67 or Size 7 (i.e. approximately 3/8" diameter median stone size) stone gradation.

300-2.3.2 Snow Melter Building HVAC Systems Basis of Design. The HVAC systems shall be electric and UL listed. The HVAC systems shall include, but not be limited to:

- Heating and Cooling Systems

The HVAC systems shall be cable of heating the building to 68° F with an outside temperature of -20°F and cooling the building to 72°F with and outside temperature of 100°F. The Contractor shall provide complete and operational HVAC systems to the satisfaction of the RPR.

300-2.3.3 Snow Melter Building Lighting and Interior Electrical Basis of Design. The Contractor shall provide an electrical service design to calculate the loading requirements for this building, including but not limited to: the HVAC, lighting and outlet requirements. The final Design/Build electrical layout for the building shall be provided as part of the submittal review.

The precast concrete building shall have interior ceiling lighting cable of elimination the entire building interior at a sufficient level for task work. The lighting control shall be operated with an internal on/off switch located adjacent to the door. The interior lighting shall be LED fixtures.

Exterior lighting shall be a wall pack type provided above the door to the precast concrete building and on the middle of each exterior wall. The light shall be UL listed for exterior use. The exterior light control shall operate using a photocell sensor and an internal override on/off switch located adjacent to the door. The light shall be LED fixtures.

The building interior shall be provided with duplex electrical service outlets (NEMA 5-20R GFCI) on the walls meeting the current National Electrical Code. The layout shall include be at least two (2) different circuits of electrical outlets rated at 20 amps per circuit**.** The proposed fiber optic system and other Owner equipment installed in the building shall occupy at least one (1) of the circuits. Each outlet shall be forty-eight inches (48") above finish floor and spaced no more than four feet (4') apart on each wall and

coordinated with the snow melter equipment electrical requirements and the fiber optic network layout requirements and placement.

300-2.4 Snow Melter Equipment Layout and Site Work Concrete. Refer to Section P-610 for cast-in-place concrete materials and installation specifications.

300-2.5 Cable Materials. Refer to Section L-108 for the basis of design for cable/conductor materials and installation specifications. If other cable/conductors are necessary for the snow melter equipment or building services, this cable/conductor materials and sizing shall be performed as part of the Design/Build and Electrical Layout Plan to be performed by the Contractor and shall conform to the Utility Supplier and National Electric Code requirements.

300-2.6 Conduit Materials. Refer to Section L-110 for the basis of design for conduit materials and installation specifications.

300-2.7 Underground Warning Tape. Refer to Section L-110 Paragraph 110-2.9 Detectable warning tape for the tape material specification. The tape color shall be: Blue for waterlines, Yellow for natural gas, Red for electrical, and Orange for Communications/Data.

300-2.8 Water Line and Fitting Materials. Refer to Manchester Water Works standard materials and installation specifications. All pipe and fitting materials shall be included on the Manchester Water Works approved vendor list for the various pipes and fitting manufacturers.

1.) **Ductile Iron Pipe**: ductile iron pipe shall be class 52 and manufactured in the United States of America and shall conform to ANSI 21.51 (AWWA C-151) for "pipe centrifugally cast in metal molds for water". Cement linings shall be double the standard thickness and shall conform to ANSI A21.4. Seal coating shall be applied inside and out. All pipe shall be *push-on* type joint, in accordance with ANSI A21.11. In addition, all pipe purchased may be subject to inspection and acceptance by the Manchester Water Works or its agent. The supplier and/or manufacturer shall be responsible for such accommodations and handling as are required to allow for proper inspection, if so requested by the Manchester Water Works.

2.) **Ductile Iron Fittings**: Unless otherwise specified, all mechanical joint fittings shall be complete with accessories and shall conform to AWWA C104/ANSI A21.4, C111/A21.11 or C153/A21.53. All fittings shall be pressure rated for 350 psi, ductile iron with double cement-lining thickness and seal coated inside and out, or two-part epoxy coated, and shall be manufactured in the United States of America. Fittings 4"-12" shall be *compact* pattern per AWWA C153. In addition, all fittings purchased may be subject to inspection and acceptance by the Manchester Water Works or its agent. The supplier and/or manufacturer shall be responsible for such accommodations and handling as are required to allow for proper inspection if so requested by the Manchester Water Works. Additional Requirements The fittings, in addition to meeting all of the appropriate requirements of ANSI and AWWA, shall conform to the following:

   a. All fittings shall be free of all significant casting flaws both inside and out, including slag holes, slag inclusions, laps, lamination, mold splash, and pin holes.
   b. All linings shall be of uniform thickness with no significant waving and/or roughness.
   c. Mechanical joint bells and glands shall be dimensionally correct and free of all slag and rough edges at bolt holes
   d. All fittings shall arrive with their appropriate mechanical joints accessories.

   Fitting manufacturers shall be approved by Manchester Water Works and include: U.S. Pipe, Tyler Fitting and Griffin Fitting.

3.) ~~**Polyethylene Service Tubing (1" to 2" diameter)**: Tubing shall be constructed of ASTM D3350 polyethylene with Copper Tube Size (CTS) designed for 200 psi working pressure and shall conform to AWWA C901. Insert stiffeners shall be used on all compression joint connections.~~

~~PE tubing shall be supplied in 100 ft. coils with at least four stiffeners per coil.~~

Copper Service Tubing (up to 2" diameter)*: Copper tubing shall be TYPE "K" soft, manufactured in the United States of America. Copper tubing shall be delivered in sixty (60) foot coils in sizes 3/4" and 1" and 20 ft. straight lengths in sizes 1-1/2" and 2".*

Manufacturer: The manufacturer's name and place of manufacture shall be declared. The manufacturer must be a member of the Copper Development Inc., 405 Lexington Avenue, New York, New York.

Measurements:	*Size*	*OD Measurements*	*Wall Thickness*
(in inches)	*¾"*	*0.875*	*0.065*
	1"	*1.125*	*0.065*
	1½"	*1.63*	*0.072*
	2"	*2.13*	*0 .083*

4.) ***Polyethylene Wrap for Ductile Iron****: Polyethylene wrap shall be 8 mil minimum, lineal low density, flat tube virgin polyethylene film. Polyethylene film shall prevent contact between the pipe and any potentially corrosive soils. The film shall be marked showing trademark, year of manufacture, type of resin, specification conformance, applicable pipe size and a corrosion protection warning. The polyethylene wrap shall meet or exceed the AWWA C105-10, ANSI A21.5-10, ASTM D4976 and NT 4112-10.*

Requirements:

Tensile Strength:	*3600 psi, minimum - ASTM D882*
Elongation:	*800%, minimum - ASTM D882*
Dielectric Strength:	*800 v/mil, minimum - ASTM D149*
Impact Resistance:	*600g minimum - ASTM D1709-B*
Propagation Tear Resistance:	*2550 gf. Minimum - ASTM D1922*

Affidavit of Compliance
The manufacturer shall furnish an affidavit stating that all delivered material complies with the requirements of these standards and of the purchaser.

300-2.9 Water Appurtenance Materials. Refer to Manchester Water Works standard materials and installation specifications. All appurtenance materials shall be included on the Manchester Water Works approved vendor list for the various manufacturers.

1.) **Hydrants**: All hydrants shall have the following features as a minimum:

Color: YELLOW

Flange: Break type

Head: Swivel

Opening: Hydrants shall open right (clockwise).

Inlet Connection: Mechanical joint 6"- shoe casting shall be coated with a fusion bonded epoxy coating.

Nozzle: Hose: (2) 2½"

Pump: (1) 4½"

Threads: National Standard Thread (NST)

Operating Nut: Pentagon MWW approved size

Main Valve Opening: 5¼"

Size: Hydrant sizes represent "depth of trench" measurement, that is to say, the distance from

the bottom of the trench to ground line just below the break flange.

Note: All hydrant risers and break flange kits shall be original manufactured parts. Any after-market material will not be acceptable.

Hydrant manufacturers shall be approved by Manchester Water Works and include: Clow Corporation (Eddy) or U.S. Pipe, Valve & Hydrant, Inc., (Metropolitan).

2.) **Tapping sleeves**: Tapping sleeves 4" through 12" sizes shall be US Pipe and Foundry ductile iron T-28, dual compression.
Tapping sleeves 16" through 24" sizes shall be US Pipe and Foundry T-9 or Mueller ductile iron, mechanical joint.

3.) **Gate Valve – Resilient Seated Valves (4" – 12")**: Mechanical joint resilient seated gate valves shall be manufactured in the United States of America and tested in full compliance with the latest revision of AWWA standard C-509-01 or AWWA C515-01(reduced wall, resilient seated). Valves shall have a minimum design working pressure of 200 psi and a minimum test pressure of 400 psi. The pressure rating shall be cast on the outside of the valve. Valve body and bonnet shall be of cast or ductile iron coated on all exterior and interior surfaces with a two-part fusion bonded epoxy conforming to the latest revision of AWWA standard C-550, applied with a minimum thickness of eight (8) mils. The manufacturer shall certify that the coating is suitable for use in a potable water system, and the interior coating certified to be holiday-free.

The gate shall be completely covered with rubber over all ferrous surfaces. The rubber shall be securely bonded to the gate body. The "O" ring stem seal shall be replaceable with the valve under pressure in the full open position. Valves shall be full port opening, open to the right (clockwise) and be the non-rising stem type with standard accessories for buried application. **Exposed bolts and nuts shall be stainless steel.**

Gate valve manufacturers shall be approved by Manchester Water Works and include: Clow, Kennedy, U.S. Pipe, M&H, Mueller, and AFC.

4.) **Tapping Gate Valve – Resilient Seated Valves (4" – 12")**: Tapping valves shall have enlarged ports, open right, and end connections of mechanical joint x flange with lip, and shall be manufactured in the USA and tested in full compliance with the latest revision of AWWA standard C-509-01 or AWWA C515-01. The valves shall meet all the requirements listed in the previous paragraph " **Gate Valve – Resilient Seat Valves 4" through 12".**

Tapping gate valve manufacturers shall be approved by Manchester Water Works and include: Clow, Kennedy, U.S. Pipe, M&H, Mueller, and AFC

5.) **Retainer Glands**: Retainer glands shall be wedge action retainer glands with the following features:
   a. Glands shall be of ductile iron.
   b. Set screws shall be of ductile iron and must be designed for 70 ft lbs. of torque.
   c. Retainer glands shall be UL approved.
   d. Mechanical Joint bolts and gaskets are not included.
   e. Glands shall be free of excess bituminous coating.
   f. Retainer glands shall be manufactured in the USA.
   g. Retainer glands shall be EBBAA Iron Sales Inc. Megalug or Uni-Flange Series 1400.

6.) **Gate Valve Box**: Gate valve boxes shall be cast iron and for water use only (marked "WATER"), and shall have the following characteristics:
   a. Flange shall be located at top of top section.
   b. Bottom section shall be bell base.
   c. Boxes shall be two-piece with covers; thirty-six (36) inch bottoms and twenty (26) inch

tops.

d. Boxes shall have slip-tight shaft; five and one-quarter (5-1/4) inches.
e. Gate box covers shall fit properly and seat flush in the gate valve box top section.
f. Gate box shall be made in the United States of America or Canada.
g. Gate box extensions shall accept standard gate box cover
h. Gate box extensions shall properly fit the gate valve box top section and be Buffalo #B-5181 or equal.

Special Note: A typical sample of a complete gate valve box must be available for evaluation by Manchester Water Works, if requested. All gate valve boxes shall be approved by Manchester Water Works.

7.) **Service and Repair Saddles**: Service and repair saddles shall have bodies of ductile iron, fusion bonded epoxy coating and the outlet shall be tapped with CC female thread per AWWA C800. Gaskets shall provide a tight seal by both mechanical and hydrostatic pressure. Saddles shall have stainless steel straps, bolts and hex nuts. Saddles shall be a single strap style for all 3/4" and 1" line services and double strap style on all 1-1/2" and 2" line services on nominal size mains 4" through 12". Nominal sizes which are required are for ductile iron pipe and cast iron pipe. The service saddles shall be Smith Blair model 317 and repair saddles shall be Smith Blair model 331.

8.) **Corporation Stop (No Lead Brass)**: Corporation stop shall be compliant with AWWA C800 and shall be cast with No Lead Brass, with PTFE coated ball type and double O-ring design. The inlet side shall have AWWA tapered threads. The outlet side shall have CTS pack joint fittings for use with Type K copper tubing or CTS Polyethylene. The corporation shall be adaptable to the drill and tap combinations used in the Mueller A-3, B-100 and D-5 type tapping machines, or the Reed CDTM 1000.

Corporation stops shall be 300 Ball Type Corporation Valve by Mueller Company of Decatur, Illinois; Series FB1000-NL by Ford Meter Box Company Inc. of Wabash, Indiana; or equal as determined by MWW.

9.) **Curb Stop (No Lead Brass)**: Curb stops shall be compliant with AWWA C800 and shall be cast with No Lead Brass, with PTFE coated ball, double O-ring design and CTS pack joint fittings for use with Type K copper tubing. Upper extension shall be one inch in diameter.

Curb stops shall be 300 Ball Curb Valve by Mueller Company of Decatur, Illinois; Model 76000-22 by A.Y. McDonald Manufacturing Company of Dubuque, Iowa; Series B44-NLby Ford Meter Box Company Inc. of Wabash, Indiana; **no substitutions**.

10.) **Unions (3-Piece) (No Lead Brass):** 3-piece unions shall be equipped with CTS pack joint fittings: body shall be heavy cast brass and compatible with copper tubing (type K soft). Unions shall be McDonald MAC-PAK 74758-22, Ford C44 or approved equal. See additional requirements below.

NOTE: Additional Requirements (For No Lead Brass)

Casting: Curb stops and corporations shall meet the requirements set in the "Reduction of Lead in Drinking Water Act" and are to be cast from red brass having the following compositions: Cu-86-91%, Sn-4-6%, Zn-2-6%, Bi-1.7-2.7%, Pb-.09% max. **

Tests: All curb stops and corporations shall be tested for tightness, and have the ability to withstand one hundred fifty (150) pounds working pressure.

Threads: Shall be standard threads and finished in a workmanlike manner, i.e., free of excessive burrs. Nuts shall start freely in assembly.

Fittings: Compression type fittings on all copper connections unless otherwise specified.

Trademark: The manufacturer's identifying mark shall be stamped on the brass service

material.

Other: The corporations shall be adaptable to the drill and tap combinations used in the Mueller B-100 and A-3 type tapping machines, and Reed TM 1000 tapping machine.

** ASTM specifications allow 86% to 90% copper content. AWWA C-800

11.) **Curb Stop Box**: All curb stop boxes shall have the following features as a minimum:

Adjustment: Twelve (12) inches minimum.

Cover: Heavy duty, slotted, with counter sunk pentagon solid brass plug, coarse thread.

Length: Adjustable, 5ft. to 6ft.

Pattern: Arch type to be used with curb stop sizes three-quarter (3/4) and one (1) inch. The box bottom section foot piece shall have a heavy-duty arch pattern that will accommodate a 2" curb stop.

Rod: One-half (1/2) inch offset stainless steel rod with stainless steel yoke, thirty (30) inches in length.

Upper Extension: One (1) inch for 1-inch or less curb stops. Two and one-half (2.5) inch for 2-inch diameter curb stops.

Special Note: A typical sample of a complete gate valve box must be available for evaluation by Manchester Water Works, if requested. All curb stop boxes shall be approved by Manchester Water Works.

12.) **Repair Clamps**: The full circle repair clamps shall be made of a type 304 (18-8) stainless steel. They shall be a minimum of 15" in width, except clamps for 2" pipe.

The lugs shall be made of a high strength ductile iron per ASTM A536 GR 80-55-06 and have a fusion bonded epoxy coating.

The gasket shall be made of nitrile (Buna N) a special compound to resist water, oil, acids, alkalis, hydrocarbon fluids and many other chemicals.

All bolts, nuts and washers shall be 304 stainless steel. At least one 5/8" x 6-7/8" bolt with a taller nut shall be furnished to help facilitate installation of the clamps.

Repair clamps shall be Smith Blair 226.

13.) **Couplings:** Couplings shall be **Hymax Coupling**. The body and rings shall be carbon steel with a fusion bonded epoxy coating. The bolts and nuts shall be stainless steel with the nuts coated with an anti-seize compound. The gasket shall be made in two layers with a removable inner layer that allows for diameter range expansion. Gasket shall be rubber recommended for water and have superior resistance to set. Gasket performance shall not be affected within a temperature range of -40F to +140F. OD range for nominal pipe sizes shall be sufficient for use with cast iron and class 52 ductile iron pipe.

14.) ***Copper Meter Setters and Check Valves (No Lead Brass)****: Copper meter setter shall be Ford Copperhorn, McDonald Series 40 "C" style or equal and shall be furnished with one male and female IP union inlet/outlet connectors. Solder connections on the setter, if required shall be "lead free", and meet the "Reduction of Lead in Drinking Water Act" limit of 0.25% lead content.*

Dual check valves shall be Ford HHC11 or A.Y. McDonald 711. Check assemblies shall be made of acetal plastic with stainless steel springs and both cartridges are to be identical and interchangeable. Inlet and outlet are to be FIP. Dual check valves shall meet ASSE std. 1024-1988, NSF61 and ASTM B62-93-B05.05. Brass shall meet the "Reduction of Lead in Drinking Water Act"

limit of 0.25% lead content.

Dual check valves shall be cast from red brass composition Cu-86-91%, Sn-4-6%, Zn-2-6%, Bi-1.7-2%, Pb-.09% max. Check valve specifications and a sample must be furnished with the bid for valves claimed to be equal to those identified as acceptable in these specifications.

15.) **Bollards**: Refer to the details in the plans.

300-2.10 Gas Line Materials. All gas main piping, valving and appurtenances shall be supplied by the Natural Gas Supplier (Liberty Utilities).

300-2.11 Sand Bedding and Blanket. Sand bedding and blanket material required for installation of the water mains, services, and appurtenances shall meet the following material gradation requirements: 100% passing the 1/2" sieve and, of the material passing the #4 (4.75 mm) sieve, no more than 12% shall pass the #200 (0.075 mm) sieve.

300-2.12 Common Backfill Materials. It is anticipated that the existing materials will be adequate for backfill assuming the material is a granular material, consisting of hard sand and gravel so graded that, of the material passing the No. 4 (4.75 mm) sieve, not more than 35 percent shall pass the No. 200 (0.075 mm) sieve. Common backfill shall be free of organic matter, trash, roots, frost, or other deleterious material and shall contain no stone measuring greater in any dimension than two-thirds of the loose lift thickness or 6 inches (150 mm), whichever is smaller. Common backfill shall be capable of forming a firm, stable base when spread and compacted in accordance with this specification. In addition, common backfill shall be non-plastic (plasticity index zero, defined as liquid limit minus plastic limit). Common backfill may be obtained from either on-site excavations or off-site sources. Any materials excavated from the trench not conforming to this specification shall be disposed of as specified and replaced with approved material, as required, at no additional cost to the Owner.

CONSTRUCTION DETAILS

300-3.1 Snow Melter System Final Design and Equipment Installation.

300-3.1.1 Snow Melter System Final Design. The snow melter systems Final Design items identified above under paragraph 300-2.2 shall be performed under the direction of the Contractor and in coordination with the snow melter equipment requirements and their shop drawings, installation instructions and recommendations; using local codes and requirements; and as reviewed by the RPR. The snow melter equipment manufacturer will be able to provide technical assistance for the Final Design.

300-3.1.2 Snow Melter System Equipment Installation. All of the snow melter system equipment shall be installed by the Contractor in accordance with the snow melter equipment manufacturer's shop drawings, installation instructions and recommendations and the Final Design as performed by the Contractor under the Design/Build and performance-based specification. The snow melter equipment manufacturer will provide technical and oversight assistance as a separate scope of work line item for the installation process, but the equipment shall be installed by the Contractor and their subcontractors.

300-3.2 Site Preparation and Site Work Installation.

300-3.2.1 Snow Melter Site Work Installation. All of the snow melter site preparation and site installation work shall be coordinated with the snow melter equipment's installation instructions and recommendations, the Contractor's Final Design for Layouts, and the snow melter equipment manufacturer representatives or RPRs direction.

300-3.2.1 Site Work.

1.) **Site Concrete Snow Melter Pad/Apron.** Install the cast-in-place reinforced concrete pad/apron around the snow melter to the dimensions shown on the plans, or as modified during the Final

Design, and in conformance with the installation requirement in Section P-501, Section P-610, and the project details shown in the plans, as applicable to the installation. The Final Design and installation work shall include the Surface Snow/Ice Melt System as described herein.

2.) **Site Concrete Snow Melter Pits and Overflow.** Install the cast-in-place reinforced concrete snow melter pits and overflow for the snow melter system, to the dimensions determined during the Final Design process in coordination with the snow melter equipment manufacturer, and in conformance with the installation requirement in Section P-501, Section P-610, and the project details shown in the plans, as applicable to the installation.

3.) **Site Utility Trade Installations between Units and Site Utilities.** Install the site utility trades (i.e. gas connections from the utility supplier, electrical connections to the units, plumbing to site drainage structures, etc.) from the units to the site utilities. These utilities shall be installed in accordance with the Contractor's Final Design plans and the snow melter equipment manufacturer's shop drawings and installation requirements.

4.) **Miscellaneous Site Work.** Install all other miscellaneous site work required for a complete installation as outlined in the Contract Documents and as determined by the Contractor's Final Design as part of the Design/Build and performance specification for the site.

300-3.3 Snow Melter Building Installation.

300-3.3.1 General. The Contractor shall construct the Snow Melter precast concrete building at the location indicated in the plans.

The Contractor shall clear, grade, the area within the footprint and a minimum distance of 5 feet on all sides of the proposed precast concrete building and prepare the building foundation of compacted crushed stone. The slope shall be not less than ½-inch per foot away from the building all directions.

The precast concrete building shall provide adequate protection against weather elements, including rain, wind-driven dust, snow, ice and excessive heat. The building shall have sufficient filtered ventilation, to assure that the interior room temperatures and conditions do not exceed the recommended limits of the electrical equipment to be installed in the vault. Contractor is responsible for contacting the manufacturer of the equipment to be installed to obtain environmental limitations of the equipment to be installed.

If a crane is to be used to place the building, the Contractor shall file a FAA Form 7460 to the FAA for approved use of a crane within navigable air space. The Contractor shall submit this FAA Form 7460 at least 90 days prior to the date the crane is anticipated to be required.

300-3.3.2 Building Placement. The building shall be place in accordance with the building manufacturer's recommendations by the manufacturer or a manufacturer approved subcontractor.

1.) The precast concrete building floor slab shall bear fully on a crushed stone base that is at least two feet larger than the length and width of building.

2.) Crushed stone setting bed shall be a minimum of 6" thick upon a firm compacted non-frost susceptible subgrade. Between the crushed stone and the subgrade, a separation geotextile material (Mirafi 140N or equivalent) shall be placed. The vertical soil capacity under stone shall be compacted to have minimum bearing of 1,500 pounds per square foot. Stone shall be less than 3/4" (i.e. ASTM C33 No. 67 or No. 7) and must be screeded level within ¼" in both directions. Stone shall be placed within a perimeter form with flat and level top edge for screeding. Forming material shall remain around stone until after the building is set.

3.) The crushed stone base shall be kept within the confines of the soil or perimeter form. Do not allow the base to become unconfined so that it may wash, erode, or otherwise be undermined.

300-3.3.3 Building Systems Installation. All building systems shall be installed in the precast concrete building in the area as shown on the plans per the manufactures recommendations and code requirements.

In areas of conflict in the codes, the more stringent shall apply. Electrical connections shall be per National Electric Code. The Contractor shall provide and install a complete and working systems to the satisfaction of the RPR and Owner. *The final design laylout and installation of the water service meter shall be coordinated with the Manchester Water Works and their installation requirements.*

300-3.4 Water Works Installation.

300-3.4.1 Pipeline and Fitting Installations.

1.) Installation of all buried piping shall be in accordance with AWWA C 600 Standards for Installation of Ductile Iron Water Mains and their Appurtenances. Refer to the plan details and Manchester Water Works (MWW) Construction Standards and Details for additional installation requirements.

2.) Water service tubing shall be laid in a continuous sections unbroken section to the greatest extent possible.

3.) The water main tap shall be performed under pressure. The Contractor shall coordinate the tap with the MWW. *MWW shall perform the tapping services for the Contractor. MWW will furnish the tapping sleeve and valve as part of the water main tapping services. The Contractor shall provide the excavation for the tapping services.* ~~If required, the Contractor shall use only a MWW approved vendor/subcontractor for tapping the main~~. No separate measurement for payment will be made for *the coordination of the* tapping the main *by the Contractor or for scheduling and paying MWW for the tapping services,* rather it shall be considered incidental to the line item *for the cost of the tap, which includes the tapping services and materials performed by MWW.*

4.) The interior of pipe, fittings and valves shall be kept clean and free of foreign material or soils at all times during storage and installation, or the material may be rejected by the RPR.

5.) All pipes and appurtenances laid in open trench excavation shall be bedded and uniformly supported over their full-length on bedding of the types specified herein and shown on the drawings. All work shall be performed in a dry trench.

6.) Pipe and fittings shall be laid accurately to the line and grades. Care shall be taken to provide a firm bearing for the pipe along its entire length. Pipes shall not be laid in water, nor shall water be allowed to flow through them.

7.) Wherever it is necessary to deflect the main at joints or pipe tubing from a straight line, either in the vertical or horizontal plane, the amount of deflection allowed shall not exceed that permitted tolerance by the manufacturer and shall be subject to the approval of the Manchester Water Works and/or RPR.

8.) All mechanical joint fittings shall be installed with thrust blocks and restrained retainer joints glands as outlined herein and shown on the plans. *All joints within fifty feet (50') of a hydrant assembly will be required to have restrained joints*

9.) The piping/tubing and appurtenances shall be installed with a bedding and blanket material meeting the material specified herein. If the in-situ material meets the material specifications, it may be used. The bedding and blanket material shall be placed to a minimum of 12 inches above the pipe crown. The trench shall be backfilled by placing and compacting the sand in lifts of 6 inches or less. The blanket shall be carried up evenly on both sides of the pipe, so as not to disturb the pipe. Compact the blanket material to 95% standard proctor (in accordance with ASTM D 698 and ASTM D 2922) with approved hand-operated devices.

10.) Backfill material from 12 inches above the pipe to the underside of the pavement select material profile, or to the underside of loam and grassed areas, shall be backfilled with common backfill described herein and as approved by the RPR. Backfill shall be placed and compacted in layers of

6 inches or less. Compact the backfill material to 95% modified proctor (in accordance with ASTM D 157 and ASTM D 2922). Compaction shall be by hand-operated compactors or other approved method. Jetting and bucket compaction are not acceptable means of compaction.

11.) Trench areas improperly backfilled or having excessive settlement, as determined by the RPR, shall be reopened to the required grade, backfilled using proper techniques, and repaved as necessary. The Contractor shall receive no additional compensation for repair of trenches constructed under this Contract.

300-3.4.1.1 Water Line Meter and Service Installation. *The Contractor shall coordinate with the MWW for the installation of the water meter in the Snow Melter Building and the Snow Melter Manufacturer for the installation of the water service from the meter location to the equipment. All installations shall conform to the recommendations of the MWW and Snow Melter Manufacturer and all current codes.*

300-3.4.2 Water Line Leakage Testing and Disinfection.

Prior to final acceptance of the Work, all waterlines and appurtenances shall meet specific leakage requirements. These leakage requirements must be satisfied by the basic materials alone. Every test must be witnessed by RPR and any test not so witnessed will be considered as not having been performed. Contractor shall pretest the Work and shall not request RPR to witness the final test until the Contractor is reasonably certain that the test will yield results within the acceptable limits.

Testing Apparatus

1.) Provide all labor, pumps, plugs, measuring equipment and other apparatus, complete, and as required to perform all testing.
2.) Provide clean water as required to accomplish all testing.
3.) Provide plugs and caps capable of withstanding the test pressures, as applicable.
4.) Provide all necessary gauges. Gauges shall be standard pressure type with a minimum 6" diameter dial and a pressure range not in excess of 150% of the maximum required test pressure.
5.) Provide a hand or motor driven pump to maintain the required test pressure constant throughout the duration of the test. If a water pump is used, install water meter on supply side of pump

Pressure Pipe Leakage Test for Waterlines

1.) Leakage testing shall include the main pressure pipe, service connections, and all other appurtenances on the section of pipeline being tested.
2.) Provide and maintain at the site, a gauge stand with an approved laboratory calibrated test gauge. Periodically check test gauges used for testing against the test gauge, and whenever requested by RPR.
3.) Where it is absolutely necessary for testing, tap pipes and insert approved plugs after testing is completed. Install air release valves at high points for water testing, if hydrants or blowoffs are not available.
4.) All concrete thrust blocks and restraints shall be in place and cured at least 7 days.
5.) All buried pipe shall be backfilled.
6.) All water main testing shall be in accordance with the requirements of AWWA Standard C600.

<u>Pipe Hydrostatic Test</u>

a. Open all air release valves and fill pipe with water at a rate not to exceed venting capacity of the valves.
b. Raise pressure to 150 percent of the highest working pressure, or 100 psig, whichever is greater, adjusted to lowest point of the test section. Maintain a minimum of 125 percent of the working pressure at the highest point of the test section. In some instances, the lengths of test sections will have to be shortened to meet the above requirements.
c. Maintain pressure for a minimum of two (2) hours.

Nongaseous Pipe Leakage Test

a. Perform leakage test simultaneously with hydrostatic test.
b. Maintain pressure within a maximum variation of ± 5 psi for 2 hours minimum.
c. Record amount of leakage from water meter or other approved method.
d. Allowable leakage is:
   i. Exposed piping: Exposed piping with flanged, threaded or welded joints, or buried pipe in conflict with potable water lines: No leakage allowed.
   ii. Other pipe by the following formula:

$$L = [(S) \times (D) \times (\text{sqrt } P)] / 133{,}200$$

Where: L = Maximum allowable leakage in gallons per hour.
S = Length of pipe tested, in feet.
D = Nominal internal diameter of the pipe in inches
P = Average test pressure in pounds per square inch gage.

Flushing and Bacterial Testing/Disinfection Testing.

1.) Reference Standards
NSI/AWWA B300 – Hypo-chlorites; American Water Works Association; 2004
ANSI AWWA B301 - Liquid Chlorine; American Water Works Association; 2004
ANSI/AWWA C651 - Disinfecting Water Mains; American Water Works Association; 2005

2.) Test Reports Submittals: Indicate results comparative to specified requirements.

Disinfection report:
Type and form of disinfectant used.
Date and time of disinfectant injection start and time of completion.
Test locations.
Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
Date and time of flushing start and completion.
Disinfectant residual after flushing in ppm for each outlet tested.

Bacteriological report:
Date issued, project name, and testing laboratory name, address, and telephone number.
Time and date of water sample collection.
Name of person collecting samples.
Test locations.
Initial and 24-hour disinfectant residuals in ppm for each outlet tested.
Coliform bacteria test results for each outlet tested.
Certification that water conforms, or fails to conform, to bacterial standards of the governing authorities of the State of New Hampshire.

Quality Assurance Testing Firm:

Certify all testing work performed in accordance with AWWA C651.

Company specializing in testing potable water systems, certified by governing authorities of the State of New Hampshire.

300-3.5 Natural Gas Service Trenching Installation. The Natural Gas Supplier will be providing the labor and all materials for the installation of the gas service installation, including the tapping of the service onto the existing gas main. The Contractor shall be performing the trench excavation and backfill for the

materials to be installed in conjunction with the service tap and pipe installation being performed and under the direction of the Natural Gas Supplier or their representative. The excavation shall be performed in accordance with Liberty Utility installation standards and recommendations and the following:

1.) The piping/tubing and appurtenances shall be installed with a bedding and blanket material meeting the material specified herein. If the in-situ material meets the material specifications, it may be used. The bedding and blanket material shall be placed to a minimum of 12 inches above the pipe crown. The trench shall be backfilled by placing and compacting the sand in lifts of 6 inches or less. The blanket shall be carried up evenly on both sides of the pipe, so as not to disturb the pipe. Compact the blanket material to 95% standard proctor (in accordance with ASTM D 698 and ASTM D 2922) with approved hand-operated devices.

2.) Backfill material from 12 inches above the pipe to the underside of the pavement select material profile, or to the underside of loam and grassed areas, shall be backfilled with common backfill described herein and as approved by the RPR. Backfill shall be placed and compacted in layers of 6 inches or less. Compact the backfill material to 95% modified proctor (in accordance with ASTM D 698 and ASTM D 2922). Compaction shall be by hand-operated compactors or other approved method. Jetting and bucket compaction are not acceptable means of compaction. The warning tape shall also be placed as shown on the plans.

3.) Trench areas improperly backfilled or having excessive settlement, as determined by the RPR, shall be reopened to the required grade, backfilled using proper techniques, and restored to grade and repaved as necessary. The Contractor shall receive no additional compensation for repair of trenches constructed under this Contract.

METHOD OF MEASUREMENT

300-4.1 Snow Melter Equipment Package. Measurement for the Snow Melter Equipment Package will be based on the actual lump sum quote proposal from the Snow Melter Manufacturer. The exact amount of reimbursement to the Contractor will be indicated on the Snow Melter Manufacturer Company's quote proposal and will be the basis of measurement without any additional mark-up by the Contractor. There shall be no separate measurement for the Contractor's cost to procure the equipment and any coordination and administration and these items shall be considered incidental to the overall cost of the equipment package and overall completed project.

300-4.2 Snow Melter Equipment Manufacturer Installation Assistance. Measurement for the assistance of the Snow Melter Manufacturer shall be a lump sum price. The exact amount of reimbursement to the Contractor will be indicated on the Snow Melter Manufacturer Company's proposal quote to perform the installation technical assistance and oversight work. This proposal quote will be the basis of measurement without any additional mark-up by the Contractor. There shall be no separate measurement for the Contractor's cost for the coordination and administration and these items shall be considered incidental to the overall cost of the equipment package installation and completed project.

300-4.3 Contractor Snow Melter System Final Design and Equipment Installation. Measurement for the Contractor Snow Melter System Final Design and Equipment Installation shall be a lump sum price. The Contractor shall coordinate and perform the Final Design of the Layout and Materials for a completed system installation with coordination with the snow melter equipment manufacturer and as reviewed by the RPR. The Contractor shall also perform the installation work for the snow melter equipment as outlined within this Design/Build specification and as determined through the Final Design performed by the Contractor. There shall be no separate measurement for the Contractor's cost for the coordination and administration of this item and that work shall be considered incidental to the overall cost of the equipment installation and completed project.

300-4.4 Contractor Snow Melter System Site Preparation and Site Infrastructure Work. Measurement

for the Contractor Snow Melter Site Preparation and Site Infrastructure Work shall be a lump sum price. The Contractor shall coordinate and perform all site preparation and site infrastructure work for a completed system installation as identified above in paragraph 300-3.2.1 with coordination with the snow melter equipment manufacturer, the Owner and the RPR. The Contractor shall also perform the installation for the snow melter system site preparation and site infrastructure work as outlined within this Design/Build specification and as determined through the Final Design performed by the Contractor. There shall be no separate measurement for the Contractor's cost for the coordination and administration of this item and that work shall be considered incidental to the overall cost of the equipment installation and completed project.

300-4.5 Snow Melter Building and Installation. Measurement for the Snow Melter Building and Installation shall be made at the lump sum price for the Snow Melter Building and Installation as outlined on the plans, specifications, and as noted herein. Measurement will also include the performance-based design and review of the building and all items for a completed and accepted Pre-Engineered Precast Concrete Building installation.

300-4.6 Snow Melter Utility – Water Pipe and Fittings. Measurement for water pipe hall be per linear foot along the length of the installed water pipe (including fittings) computed to the nearest one tenth (0.1) of a foot. Measurements shall commence and terminate at (1) connection to existing watermain and (2) end of pipe. Do not deduct for adapters, fittings, and other pipe appurtenances.

No separate measurement for payment will be made for; excavation, dewatering, shoring, purchasing the pipe and fittings, laying the pipe and fittings, pipe bedding and blanket materials, thrust blocks, placing and compacting back fill material, inspections, testing, coordination with the water utility supplier and RPR, and all other incidental work as required to have a complete and working water pipe as required by the Manchester Water Works.

300-4.7 Snow Melter Utility – Water Line Appurtenances. Measurement for water line appurtenances shall be per each, including all associated accessories to the appurtenance.

The item or work shall include, but not be limited to: excavation, dewatering, shoring, purchasing the appurtenance and any associated accessories, installing the appurtenance and any associated accessories, bedding and blanket materials, connections to existing watermain (as applicable) with all associated fittings and appurtenances, in-line connections of fittings and appurtenances with all accessories to the new water pipe (as applicable), ductile iron pipe to connect an appurtenance assembly (as required), placing and compacting back fill material, , inspections, testing, and all other work as required to have a complete and working water line as required by the Manchester Water Works.

300-4.7A Snow Melter Utility – Snow Melter System Water Service. *Measurement for the water service shall be per lump sum, including all associated piping, appurtenances, and accessories.*

The item or work shall include, but not be limited to: excavation, dewatering, shoring, coordinating with the MWW for MWW furnished materials; furnishing the piping, appurtenance and any associated accessories; furnishing and installing other service materials; furnishing and installing bedding and blanket materials; connections to the proposed watermain with all associated fittings and appurtenances; in-line connections of fittings and appurtenances with all appurtenances and accessories for the new water service; placing and compacting back fill materials; coordination with inspections with MWW; testing, and all other work as required to have a complete and working water service as required by the Manchester Water Works.

300-4.8 Snow Melter Utility – Natural Gas Service Supplier Coordination & Installation. Measurement for the coordination with and installation work by the Natural Gas Service Supplier (Liberty Utilities) shall be a lump sum price. The exact amount of reimbursement will be for any proposal quote from the Gas Service Supplier (Liberty Utilities) to perform the installation of the gas service materials (i.e. pipe, valves, tapping materials, etc.) and installation labor, which includes the tap to the existing gas main. This proposal quote will be the basis of measurement without any additional mark-up by the

Contractor. There shall be no separate measurement for the Contractor's cost for the coordination and administration and these items shall be considered incidental to the overall cost of the installation and completed project.

300-4.9 Snow Melter Utility – Natural Gas Service Pipe Trenching. Measurement for gas main pipe installation trenching shall be per linear foot along the length of the installed gas service piping computed to the nearest one tenth (0.1) of a foot.

No separate measurement for payment will be made for; excavation, dewatering, shoring, pipe bedding and blanket materials (if necessary), placing and compacting back fill material, inspections, testing, coordination with the gas service utility supplier (Liberty Utilities) and RPR, and all other incidental work as required to have a complete and working gas service pipe as required by the Liberty Utilities.

BASIS OF PAYMENT

300-5.1 Snow Melter Equipment Package. The amount paid to the Contractor shall be the exact amount indicated on the quote proposal from the Snow Melter Manufacturer's company without mark-up. There shall be no separate payment to the Contractor for the procurement and coordinate with the scheduling of the Snow Melter Manufacturer and these costs are considered incidental to the equipment package and overall completed project.

300-5.2 Snow Melter Equipment Manufacturer Installation Assistance. The amount paid to the Contractor shall be the exact amount indicated on the proposal quote from the Snow Melter Manufacturer's company without mark-up. There shall be no separate payment to the Contractor for the administration and coordination with the scheduling of the Snow Melter Manufacturer installation work and these costs are considered incidental to the equipment installation and overall completed project.

300-5.3 Contractor Snow Melter System Final Design and Equipment Installation. Payment shall be made at the lump sum price for the Contractor Snow Melter System Final Design and Equipment Installation as outlined on the plans, specifications, and as noted herein. The price for payment shall be full compensation for the Final Design for the snow melter system as performed under the direction of the Contractor with technical assistance from the snow melter equipment manufacturer and as reviewed by the RPR. There shall be no separate payment for the Contractor's cost for the coordination and administration of this item and that work shall be considered incidental to the overall cost of the equipment installation and completed project. Payment for the installation shall also be for furnishing all labor, materials and equipment, transporting, tools, excavation, backfill, waste material removals and proper disposal, and all other items and incidentals necessary to satisfactorily complete the item to the satisfaction of the RPR.

300-5.4 Contractor Snow Melter Site Preparation and Site Infrastructure Work. Payment shall be made at the lump sum price for the Contractor Snow Melter Site Preparation and Site Infrastructure Work as outlined on the plans, specifications, and as noted herein. This price shall be full compensation for the Final Design for the snow melter system as performed under the direction of the Contractor with technical assistance from the snow melter equipment manufacturer and as reviewed by the RPR. There shall be no separate payment for the Contractor's cost for the coordination and administration of this item and that work shall be considered incidental to the overall cost of the equipment installation and completed project. Payment shall also be for furnishing all labor, materials and equipment, transporting, tools, excavation, backfill, waste material removals and proper disposal, and all other items and incidentals necessary to satisfactorily complete the item to the satisfaction of the RPR.

300-5.5 Snow Melter Building and Installation. Payment shall be made at the lump sum price for the Snow Melter Building and Installation as outlined on the plans, specifications, and as noted herein. Payment will be made at the contract lump sum price for the completed and accepted Pre-Engineered

Precast Concrete Building installation. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item to the satisfaction of the RPR.

300-5.6 Snow Melter Utility – Water Pipe and Fittings. Payment shall be made at the linear foot price for the water pipe (including fittings) as outlined on the plans, specifications, and as noted herein or as field modified by the RPR. The payment shall constitute full compensation for all labor, materials, equipment, incidentals and expenses necessary to the satisfactory completion of the installation to the satisfaction of the RPR and Manchester Water Works.

300-5.7 Snow Melter Utility – Water Line Appurtenance. Payment shall be made at the each price for the water line appurtenance and associated accessories as outlined on the plans, details, specifications, and as noted herein. The payment shall constitute full compensation for all labor, materials, equipment, incidentals and expenses necessary to the satisfactory completion of the installation to the satisfaction of the RPR and Manchester Water Works.

300-5.7A Snow Melter Utility – Snow Melter System Water Service. *Payment shall be made at the lump sum price for the water service and associated piping, appurtenance, and accessories as outlined on the plans, details, specifications, and as noted herein. The payment shall constitute full compensation for all labor, materials, equipment, incidentals and expenses necessary to the satisfactory completion of the installation to the satisfaction of the RPR and Manchester Water Works.*

300-5.8 Snow Melter Utility – Natural Gas Service Supplier Coordination & Installation. The amount paid to the Contractor shall be the exact amount indicated on the proposal quote from the natural gas supplier's company (Liberty Utilities) without mark-up. There shall be no separate payment to the Contractor for the administration and coordination with the scheduling of the natural gas supplier's installation work and these costs are considered incidental to the project installation and overall completed project.

300-5.9 Snow Melter Utility – Natural Gas Service Pipe Trenching. Payment shall be made at the linear foot price for the natural gas service pipe as outlined on the plans, specifications, and as noted herein or as field modified by the Natural Gas Service Supplier or RPR. The payment shall constitute full compensation for all labor, materials, equipment, incidentals and expenses necessary to the satisfactory completion of the installation to the satisfaction of the RPR and Natural Gas Supplier (Liberty Utilities).

Payment will be made under:

Project Item M-300-1	Snow Melter Equipment Package per Lump Sum
Project Item M-300-2A	Snow Melter Equipment Manufacturer Installation Assistance per Lump Sum
Project Item M-300-2B	Contractor Snow Melter System Final Design and Equipment Installation per Lump Sum
Project Item M-300-3	Contractor Snow Melter Site Preparation and Site Infrastructure Work per Lump Sum
Project Item M-300-4	Snow Melter Building and Installation per Lump Sum
Project Item M-300-5A	***Snow Melter Utility – Snow Melter System Water Service per Lump Sum***
Project Item M-300-5B	Snow Melter Utility – 8" Ductile Iron Water Line per Liner Foot
~~**Project Item M-300-5C**~~	~~**Snow Melter Utility – 2" Service Tap (Saddle & Corporation) per each**~~
Project Item M-300-5D	Snow Melter Utility – 2" Curb Stop with Curb Box per each
Project Item M-300-5E	Snow Melter Utility – 12" x 8" Tapping Sleeve and 8" Gate Valve per each

Project Item M-300-5F Snow Melter Utility – Hydrant and 6" Gate Valve Assembly per each

Project Item M-300-6A Snow Melter Utility – Natural Gas Service Supplier Coordination and Installation per Lump Sum

Project Item M-300-6B Snow Melter Utility – Natural Gas Service Pipe Trenching per Linear Foot

END OF ITEM M-300

REMOVE EXISTING CABLE FROM CONDUIT TO REMAIN (ITEM L-110-5.5)

REMOVE EXISTING CABLE AND CONDUIT (TYP) (ITEM L-110-5.4)

REMOVE EXISTING ELEVATED TAXIWAY EDGE LIGHT AND BASE CAN (TYP) SEE NOTE 17 (ITEMS L-125-5.5 & L-125-5.6)

FULL DEPTH UNCLASSIFIED EXCAVATION FOR PROPOSED TAXIWAY PAVEMENT BOX (TYP) SEE SHEET TS-01 FOR TYPICAL SECTIONS (ITEM P-152-4.1)

MILL EXISTING PAVEMENT SEE SHEET CL-01 (ITEM P-101-5.6)

REMOVE, STORE, AND REINSTALL EXISTING ELEVATED TAXIWAY EDGE LIGHT ON EXISTING BASE CAN(TYP) (ITEM L-125-5.4)

SAWCUT EXISTING PAVEMENT (TYP) (INCIDENTAL TO ITEM P-101-5.1)

PROTECT EXISTING UNDERDRAIN (TYP)

REMOVE EXISTING CHAIN LINK SECURITY FENCE (TYP) SEE SHEET CS-00 TO CS-08 FOR PHASING OF THIS WORK (ITEM F-162-5.3)

BITUMINOUS PAVEMENT REMOVAL (TYP) SEE NOTE 16 (ITEM P-101-5.1)

REMOVE EXISTING ELECTRIC MAHOLE (TYP) REPLACE WITH AIRCRAFT RATED ELECTRIC MANHOLE SEE DETAIL ON SHEET EP-05 (ITEM L-115-5.2)

MILL EXISTING PAVEMENT AS NEEDED TO TRANSITION GRADE FROM PROPOSED APRON TO TIE IN SEE SHEET GE-01 FOR LAYOUT POINTS SEE DETAIL ON SHEET TS-01 (ITEM P-101-5.6)

REMOVE EXISTING OVERHEAD WIRE (TYP) (ITEM M-400-5.9A & M-400-5.9B)

REMOVE EXISTING LIGHT POLE (TYP) (ITEM M-400-5.9A & M-400-5.9B)

REMOVE EXISTING DRAIN STRUCTURE (TYP) (ITEM P-101-5.7B)

REMOVE EXISTING DRAIN PIPE (TYP) (ITEM P-101-5.7A)

EXISTING UTILITY POLE AND ASSOCIATED OVERHEAD WIRE TO BE REMOVED BY OTHERS (TYP)

FULL DEPTH PAVEMENT REMOVAL AND UNCLASSIFIED EXCAVATION FOR PROPOSED SNOWMELTER PAD (ITEMS P-101-5.1 & P-152-4.1)

FULL DEPTH PAVEMENT REMOVAL AND UNCLASSIFIED EXCAVATION (TYP) SEE SHEETS TS-01 AND TS-02 FOR TYPICAL SECTIONS (ITEMS P-101-5.1 & P-152-4.1)

MATCH LINE (SEE SHEET DE-02)

MATCH LINE (SEE SHEET DE-03A)

0 40 80 120 FT
SCALE

NOTES:

1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. SEE SHEET CS-00 TO CS-08 FOR CONSTRUCTION SAFETY AND PHASING PLANS.
3. CONTRACTOR TO PROTECT ALL EXISTING OBJECTS NOT SCHEDULED TO BE REMOVED.
4. CONTRACTOR TO DE-ENERGIZE TAXIWAY LIGHT CIRCUITS AND IMPLEMENT LOCK OUT/TAG OUT PROCEDURE PRIOR TO ELECTRICAL DEMOLITION (INCIDENTAL TO ITEM M-200-1).
5. CONTRACTOR TO INSTALL ANY NECESSARY JUMPERS REQUIRED TO KEEP OPEN TAXIWAY LIGHT CIRCUIT OPERATIONAL DURING CONSTRUCTION (INCIDENTAL TO ITEM M-200-1).
6. CONTRACTOR SHALL SAW-CUT ALL PAVEMENT EDGES PRIOR TO REMOVAL OF PAVEMENT (INCIDENTAL TO ITEM P-101-5.1).
7. ALL LIGHTS NOT TO BE REUSED SHALL BE REMOVED AND SALVAGED. THE AIRPORT SHALL HAVE FIRST RIGHT OF REFUSAL FOR ALL REMOVED LIGHTS.
8. REMOVE AND SALVAGE ALL AIRFIELD GUIDANCE SIGNS SCHEDULED FOR RELOCATION AND STORE IN A LOCATION AS DIRECTED BY MHT OPERATIONS (ITEM L-125-5.3).
9. PATCH ABANDONED INVERTS WITH BRICK AND MORTAR WHERE DRAIN PIPES ARE REMOVED FROM CATCH BASINS TO REMAIN (INCIDENTAL TO ITEM P-101-5.7A).
10. THE AIRPORT SHALL HAVE FIRST RIGHT OF REFUSAL FOR ALL REMOVED CATCH BASIN FRAME AND GRATES NOT TO BE REUSED.
11. BEFORE DEMOLITION, CONTRACTOR TO VERIFY EXISTING CIRCUITRY WITH GUIDANCE FROM MHT. CONTRACTOR SHALL PROPOSE NEW WIRE AND CONDUIT LAYOUT TO ENGINEER IF NEEDED PRIOR TO STARTING DEMOLITION.
12. SEE SHEET EP-01 TO EP-04B FOR LOCATION OF NEW ELECTRIC MANHOLES.
13. SEE SHEET GR-01 TO GR-04B FOR STRUCTURE ADJUSTMENTS.
14. FOR CONDUIT/DUCT BANK REMOVALS UNDER ITEM L-110-5.4, AND CABLE REMOVAL IN CONDUIT/DUCT BANKS TO REMAIN UNDER ITEM L-110-5.5, THERE SHALL BE NO SEPARATE MEASUREMENT OR PAYMENT WHETHER THERE IS ONLY ONE CONDUIT AND OR MULTIPLE CONDUITS FOR THE LINEAR SECTION OF DUCT BANK OR CONDUIT BEING REMOVED, OR WHETHER THERE IS ONLY ONE OR MULTIPLE CABLES REMOVED FROM A CONDUIT TO REMAIN, AND SHALL BE CONSIDERED INCIDENTAL TO THE CONDUIT/DUCT BANK OR CABLE REMOVAL ITEM.
15. PLACE TOPSOIL, SEED, AND MULCH TO ALL PAVEMENT REMOVAL AREAS NOT SCHEDULED TO BE RE-PAVED.
16. FOR PAVEMENT REMOVAL AREAS WITH GREATER THAN 2" OF PAVEMENT, REFILL WITH P-154 FILL, MIN. 2" TOPSOIL, SEED AND MULCH. REGRADE AS REQUIRED TO ALLOW FOR POSITIVE DRAINAGE. SEE SHEET TS-01 FOR DETAIL. (ITEMS P-154-5.1, T-901-5.1, T-905-5.1, T-908-5.1)
17. ALL TEN (10) EXISTING 14" ELEVATED TAXIWAY EDGE LIGHTS SCHEDULED FOR REMOVAL SHALL BE REMOVED AND SALVAGED. SIX (6) OF THE TEN (10) REMOVED 14" ELEVATED TAXIWAY EDGE LIGHTS SHALL BE REINSTALLED ON NEW BASE CANS. ELEVATED TAXIWAY EDGE LIGHTS REMOVED, STORED AND REINSTALLED ON NEW BASE CANS SHALL BE PAID FOR UNDER ITEM L-125-5.5. ELEVATED TAXIWAY EDGE LIGHTS REMOVED SHALL BE PAID FOR UNDER ITEM L-125-5.6. SEE SHEETS EP-01 AND EP-02.

LEGEND

- BITUMINOUS PAVEMENT REMOVAL
- FULL DEPTH UNCLASSIFIED EXCAVATION
- BITUMINOUS PAVEMENT REMOVAL AND UNCLASSIFIED EXCAVATION
- MILL EXISTING PAVEMENT
- SAWCUT EXISTING PAVEMENT
- REMOVE EXISTING ELECTRICAL CONDUIT AND CABLE
- REMOVE EXISTING PIPE
- REMOVE EXISTING OVERHEAD WIRE
- REMOVE EXISTING FENCE
- REMOVE EXISTING CURB
- REMOVE AND SALVAGE EXISTING ELEVATED TAXIWAY EDGE LIGHT AND BASE CAN
- REMOVE, STORE AND RELOCATE EXISTING AIRFIELD GUIDANCE SIGN ON NEW FOUNDATION
- REMOVE EXISTING DRAINAGE STRUCTURE
- REMOVE EXISTING ELECTRIC STRUCTURE
- REMOVE EXISTING LIGHT POLE
- EXISTING UTILITY POLE TO BE REMOVED BY OTHERS
- REMOVE, STORE AND REINSTALL EXISTING ELEVATED TAXIWAY EDGE LIGHT

ENGINEER'S SEAL
THE STATE OF NEW HAMPSHIRE
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No. 7416
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CHECKED BY: BMB
DRAWN BY: RHL
DESIGNED BY: DPB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

DEMOLITION PLAN - BASE BID

SCALE: 1" = 40'
DATE: MARCH 2022

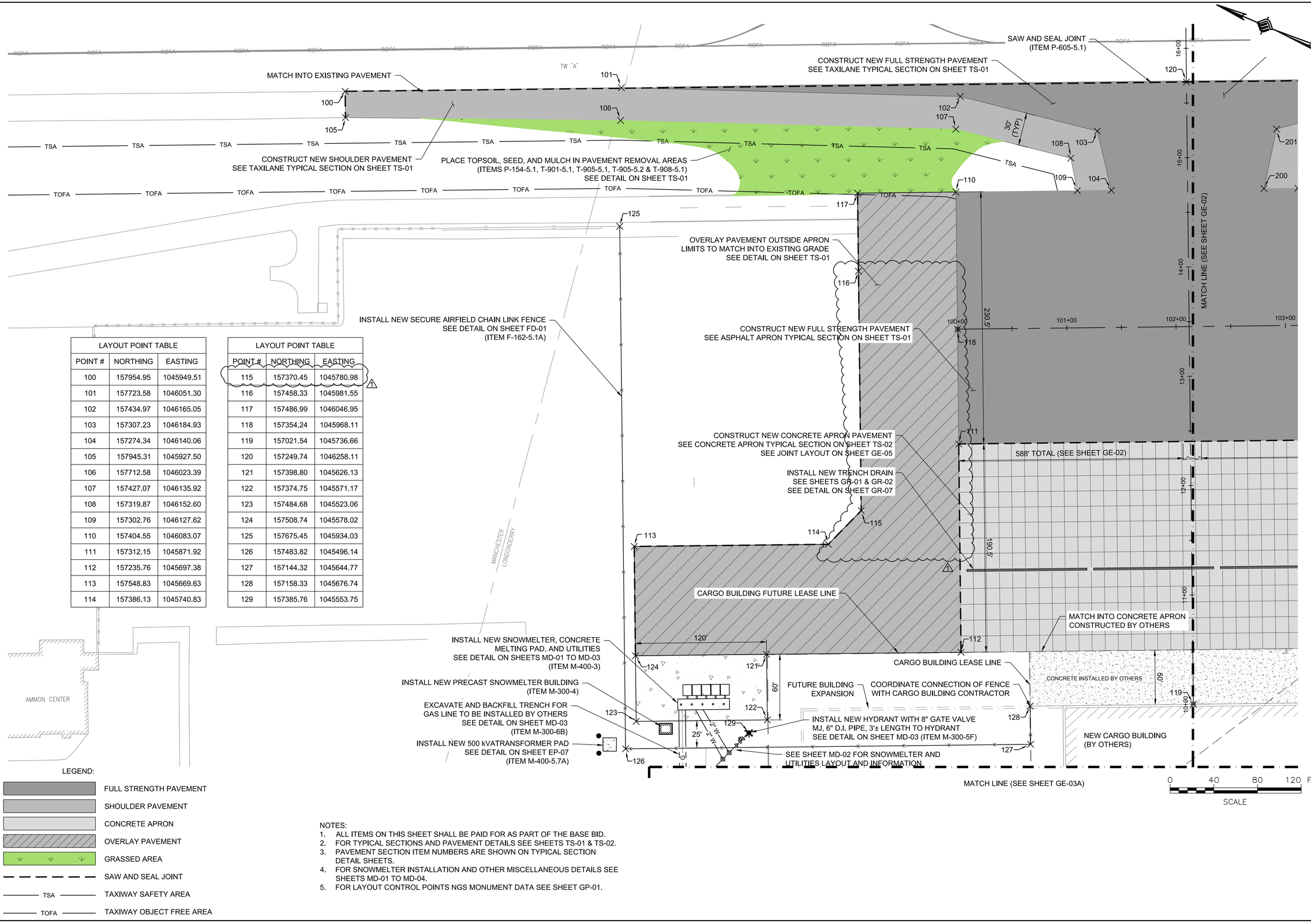
REVISIONS

REV NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
DE-01

SHEET 21 OF 90
REV 1



LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
100	157954.95	1045949.51
101	157723.58	1046051.30
102	157434.97	1046165.05
103	157307.23	1046184.93
104	157274.34	1046140.06
105	157945.31	1045927.50
106	157712.58	1046023.39
107	157427.07	1046135.92
108	157319.87	1046152.60
109	157302.76	1046127.62
110	157404.55	1046083.07
111	157312.15	1045871.92
112	157235.76	1045697.38
113	157548.83	1045669.63
114	157386.13	1045740.83

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
115	157370.45	1045780.98
116	157458.33	1045981.55
117	157486.99	1046046.95
118	157354.24	1045968.11
119	157021.54	1045736.66
120	157249.74	1046258.11
121	157398.80	1045626.13
122	157374.75	1045571.17
123	157484.68	1045523.06
124	157508.74	1045578.02
125	157675.45	1045934.03
126	157483.82	1045496.14
127	157144.32	1045644.77
128	157158.33	1045676.74
129	157385.76	1045553.75

LEGEND:

- FULL STRENGTH PAVEMENT
- SHOULDER PAVEMENT
- CONCRETE APRON
- OVERLAY PAVEMENT
- GRASSED AREA
- SAW AND SEAL JOINT
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA

NOTES:
1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. FOR TYPICAL SECTIONS AND PAVEMENT DETAILS SEE SHEETS TS-01 & TS-02.
3. PAVEMENT SECTION ITEM NUMBERS ARE SHOWN ON TYPICAL SECTION DETAIL SHEETS.
4. FOR SNOWMELTER INSTALLATION AND OTHER MISCELLANEOUS DETAILS SEE SHEETS MD-01 TO MD-04.
5. FOR LAYOUT CONTROL POINTS NGS MONUMENT DATA SEE SHEET GP-01.

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CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GEOMETRY LAYOUT PLAN – BASE BID

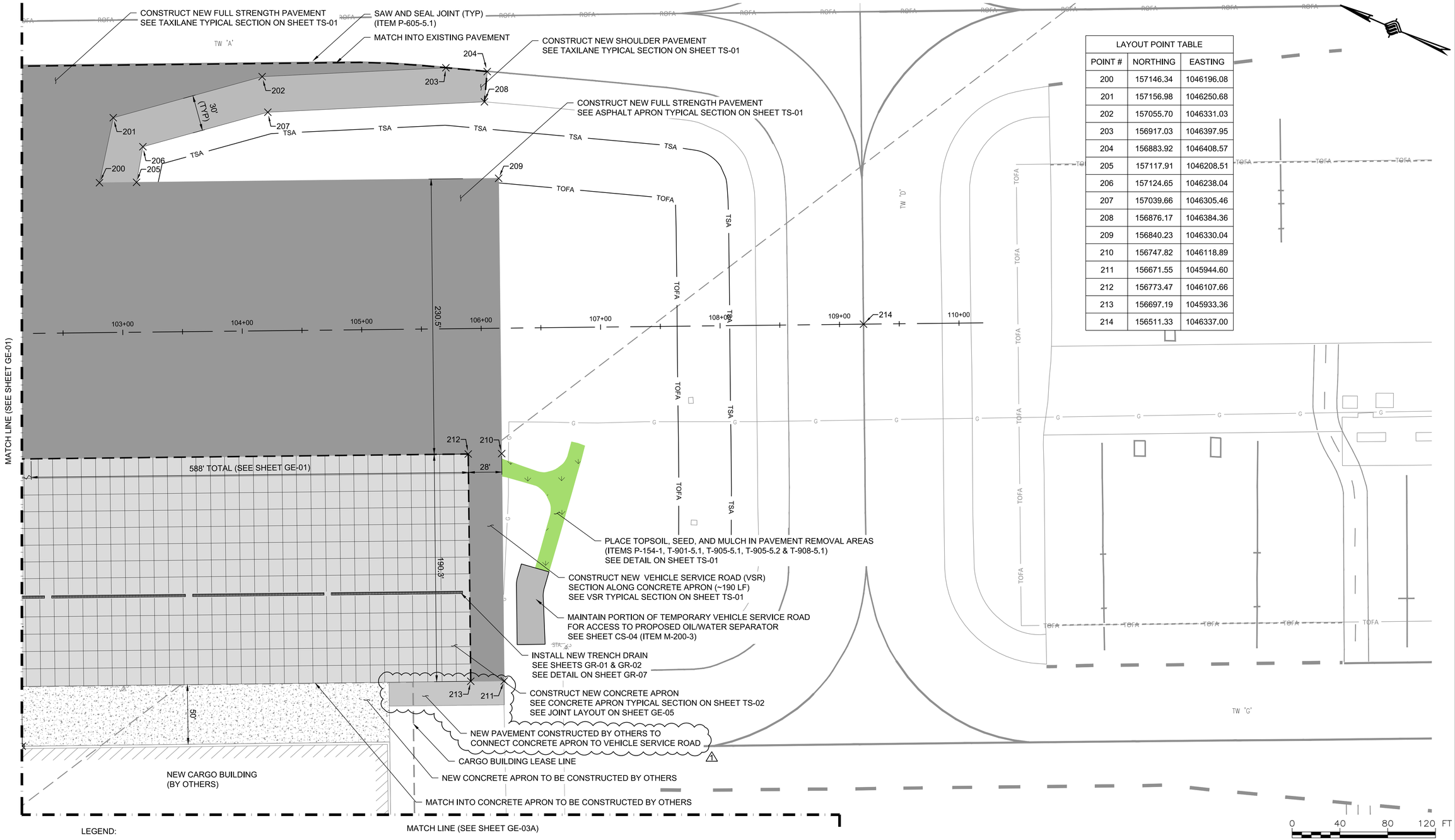
SCALE: 1" = 40'
DATE: MARCH 2022

REVISIONS			
REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GE-01

SHEET 27 OF 90
REV 1



LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
200	157146.34	1046196.08
201	157156.98	1046250.68
202	157055.70	1046331.03
203	156917.03	1046397.95
204	156883.92	1046408.57
205	157117.91	1046208.51
206	157124.65	1046238.04
207	157039.66	1046305.46
208	156876.17	1046384.36
209	156840.23	1046330.04
210	156747.82	1046118.89
211	156671.55	1045944.60
212	156773.47	1046107.66
213	156697.19	1045933.36
214	156511.33	1046337.00

LEGEND:

- FULL STRENGTH PAVEMENT
- SHOULDER PAVEMENT
- CONCRETE APRON
- GRASSED AREA
- SAW AND SEAL JOINT
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA

NOTES:
1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. SEE SHEET GE-01 FOR GEOMETRY LAYOUT NOTES.

ENGINEER'S SEAL
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DESIGNED BY DPB | DRAWN BY RHL | CHECKED BY BMB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GEOMETRY LAYOUT PLAN – BASE BID

SCALE: 1" = 40' | DATE: MARCH 2022

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GE-02

SHEET 28 OF 90 REV 1

CONSTRUCT NEW FULL STRENGTH PAVEMENT
SEE TAXILANE TYPICAL SECTION ON SHEET TS-01

SAW AND SEAL JOINT (TYP)
(ITEM P-605-5.1)

MATCH INTO EXISTING PAVEMENT

CONSTRUCT NEW SHOULDER PAVEMENT
SEE TAXILANE TYPICAL SECTION ON SHEET TS-01

CONSTRUCT NEW FULL STRENGTH PAVEMENT
SEE ASPHALT APRON TYPICAL SECTION ON SHEET TS-01

CONSTRUCT NEW SHOULDER PAVEMENT
SEE TAXILANE TYPICAL SECTION ON SHEET TS-01

CONSTRUCT NEW FULL STRENGTH PAVEMENT
SEE TAXILANE TYPICAL SECTION ON SHEET TS-01

MATCH INTO EXISTING PAVEMENT

PLACE TOPSOIL, SEED, AND MULCH IN PAVEMENT REMOVAL AREAS
(ITEMS P-154-1, T-901-5.1, T-905-5.1, T-905-5.2 & T-908-5.1)
SEE DETAIL ON SHEET TS-01

CONSTRUCT NEW VEHICLE SERVICE ROAD (VSR)
SECTION ALONG CONCRETE APRON (~190 LF)
SEE VSR TYPICAL SECTION ON SHEET TS-01

MAINTAIN PORTION OF TEMPORARY VEHICLE SERVICE ROAD
FOR ACCESS TO PROPOSED OIL/WATER SEPARATOR
SEE SHEET CS-04 (ITEM M-200-3)

INSTALL NEW TRENCH DRAIN
SEE SHEETS GR-01 & GR-02
SEE DETAIL ON SHEET GR-07

CONSTRUCT NEW CONCRETE APRON
SEE CONCRETE APRON TYPICAL SECTION ON SHEET TS-02
SEE JOINT LAYOUT ON SHEET GE-05

NEW PAVEMENT CONSTRUCTED BY OTHERS TO
CONNECT CONCRETE APRON TO VEHICLE SERVICE ROAD

CARGO BUILDING LEASE LINE

NEW CONCRETE APRON TO BE CONSTRUCTED BY OTHERS

MATCH INTO CONCRETE APRON TO BE CONSTRUCTED BY OTHERS

NEW CARGO BUILDING
(BY OTHERS)

MATCH LINE (SEE SHEET GE-01)

588' TOTAL (SEE SHEET GE-01)

MATCH LINE (SEE SHEET GE-03A)

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
200	157146.34	1046196.08
201	157156.98	1046250.68
202	157055.70	1046331.03
203	156917.03	1046397.95
204	156883.92	1046408.57
205	157117.91	1046208.51
206	157124.65	1046238.04
207	157039.66	1046305.46
208	156876.17	1046384.36
209	156840.23	1046330.04
210	156747.82	1046118.89
211	156671.55	1045944.60
212	156773.47	1046107.66
213	156697.19	1045933.36
214	156511.33	1046337.00
215	156808.16	1046256.77
216	156720.04	1046299.35

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
217	156619.33	1046379.25
218	156627.96	1046434.68
219	156759.85	1046146.37
220	156680.61	1046209.23
221	156553.58	1046229.00
222	156510.58	1046174.80
223	156820.20	1046284.27
224	156736.09	1046324.92
225	156651.66	1046391.89
226	156657.12	1046426.95
227	156640.03	1046446.34
228	156747.41	1046117.94
229	156668.17	1046180.81
230	156566.22	1046196.67
231	156525.75	1046145.65
232	156502.45	1046155.49

LEGEND:

- FULL STRENGTH PAVEMENT
- SHOULDER PAVEMENT
- CONCRETE APRON
- GRASSED AREA
- SAW AND SEAL JOINT
- TSA — TAXIWAY SAFETY AREA
- TOFA — TAXIWAY OBJECT FREE AREA

NOTES:
1. THIS SHEET SHALL REPLACE SHEET GE-02 IF ADD ALTERNATE 4 IS AWARDED.
2. ALL WORK ASSOCIATED WITH THE CONSTRUCTION OF THE TAXIWAY D TAXILANE CONNECTOR SHALL BE PAID FOR AS PART OF ADD ALTERNATE 4. ALL OTHER WORK SHOWN SHALL BE PAID FOR AS PART OF THE BASE BID.
3. SEE SHEET GE-01 FOR GEOMETRY LAYOUT NOTES.

0 40 80 120 FT
SCALE

ENGINEER'S SEAL
THE STATE OF NEW HAMPSHIRE
BRIAN M. BOYNTON
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CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GEOMETRY LAYOUT PLAN - ADD ALT 4

SCALE: 1" = 40'
DATE: MARCH 2022

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GE-02A

SHEET 29 OF 90
REV 1

MATCH LINE (SEE SHEET GE-01)

MATCH LINE (SEE SHEET GE-02)

CARGO BUILDING FUTURE LEASE LINE

EXCAVATE AND BACKFILL TRENCH FOR GAS LINE TO BE INSTALLED BY OTHERS SEE DETAIL ON SHEET MD-03 (ITEM M-300-6B)

INSTALL NEW 8" D.I. WATER PIPE SEE DETAIL ON SHEET MD-03 (ITEM M-300-5B)

NEW LINE ON EXISTING WATER MAIN. EXCAVATION FOR NEW TAPPING. MANCHESTER WATER WORKS (MWW) TO PROVIDE AND INSTALL THE 12"x8" TAPPING SLEEVE AND 8" GATE VALVE, MJ. COORDINATE WORK WITH MWW FOR COSTS AND SCHEDULING (ITEM M-300-5E)

MATCH EXISTING ROADWAY EDGE

PLACE TOPSOIL, SEED, AND MULCH IN PAVEMENT REMOVAL AREAS (TYP) (ITEMS P-154-1, T-901-5.1, T-905-5.1 & T-908-5.1)

NEW CARGO BUILDING (BY OTHERS)

NEW CARGO BUILDING PARKING AREA (BY OTHERS)

CARGO BUILDING LEASE LINE (TYP)

CONSTRUCT NEW SIDEWALK. CONTRACTOR TO LAYOUT PAVEMENT LIMITS TO THE APPROVAL OF THE RPR (ITEM M-700-5.4)

RECONSTRUCT DUMPSTER ACCESS PAVEMENT AND PROVIDE LARGER TURN RADIUS. CONTRACTOR TO LAYOUT PAVEMENT LIMITS TO THE APPROVAL OF THE RPR

INSTALL NEW SECURE AIRFIELD CHAIN LINK FENCE. MATCH EXISTING FENCE LAYOUT. RE-USE EXISTING GATES SEE DETAIL ON SHEET FD-01 (ITEM F-162-5.1A)

SAW AND SEAL JOINT (TYP) (ITEM P-605-5.1)

CONSTRUCT NEW ACCESS ROAD SEE TYPICAL SECTION A-A ON SHEET TS-01

ADD ALTERNATE 3 LIMITS

EXCAVATION FOR GAS SERVICE TAP. TAPPING SERVICE TO BE PERFORMED BY LIBERTY UTILITIES. COORDINATE WORK WITH LIBERTY UTILITIES. (ITEMS M-300-6A & M-300-6B)

BASE BID ALTERNATE 1

ADD ALT 3 BASE BID

ACCESS ROAD SHOULDER (TYP)

INSTALL NEW 4' CHAIN LINK FENCE SEE DETAIL ON SHEET FD-01 (ITEM F-162-5.1B)

RESET SALVAGED SLOPED GRANITE CURB (ITEM M-700-5.2D)

INSTALL NEW DETECTABLE WARNING PANEL SEE DETAIL ON SHEET MD-04 (INCLUSIVE TO ITEM M-700-5.4)

END OF MILL AND OVERLAY LIMIT

STABILIZE SLOPE BETWEEN ACCESS ROAD AND PARKING AREA WITH 1 ½" CRUSHED STONE (6" DEPTH) (INCLUSIVE TO ITEM M-700-5.4)

OVERLAY 2" PAVEMENT ON MILLED SURFACE AND MATCH EXISTING GRADES SEE DETAIL ON SHEET TS-01 (ITEMS P-101-5.2 & M-600-1)

MAINTAIN ACCESS TO CROSSWALK

RESET SALVAGED OR INSTALL NEW STRAIGHT GRANITE CURB SEE DETAIL ON SHEET MD-04 (ITEM M-700-5.2A & M-700-5.2C)

CONSTRUCT NEW PAVEMENT SEE TYPICAL SECTION A-A ON SHEET TS-01

TERMINAL BUILDING

LEGEND:

- PAVEMENT
- OVERLAY PAVEMENT
- GRASSED AREA
- SAW AND SEAL JOINT
- GRANITE CURB

NOTES:
1. THIS SHEET SHALL ONLY BE INCLUDED IF ALTERNATE 1 IS AWARDED.
2. ALL WORK ASSOCIATED WITH THE MILLING AND OVERLAY OF THE TERMINAL LOADING DOCK PAVEMENT SHALL BE PAID FOR AS PART OF ADD ALTERNATE 3.
3. SEE SHEET GE-01 FOR GEOMETRY LAYOUT NOTES.

0 40 80 120 FT
SCALE

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
300	157002.65	1045334.92
301	156964.38	1045351.68
302	156921.49	1045347.96
303	156690.43	1045449.07
304	156679.81	1045476.37
305	156644.05	1045492.04
306	156608.13	1045481.81
307	156544.10	1045474.52
308	156556.74	1045468.84
309	156598.50	1045459.82
310	156700.90	1045415.02
311	156698.10	1045407.27
312	156721.26	1045396.82
313	156722.93	1045399.92

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
314	156926.99	1045310.63
315	156941.94	1045288.80
316	156974.10	1045274.73
317	156937.07	1045388.40
318	156724.77	1045478.15
319	156614.88	1045526.30
320	156916.97	1045287.72
321	156305.09	1045601.32
322	156926.74	1045262.75
323	156912.77	1045255.33
324	156920.93	1045239.96
325	156888.89	1045222.94
326	156854.26	1045224.51
327	156851.90	1045193.56

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
328	156885.16	1045144.31
329	156921.48	1045161.62
330	156988.48	1045197.31
331	156981.40	1045210.53
332	156960.41	1045199.29
333	157018.19	1045289.28
334	157116.33	1045299.47
335	157160.14	1045330.71
336	157258.22	1045340.92
337	157360.41	1045296.30
338	156977.80	1045273.12
339	157005.57	1045278.42
340	157012.17	1045275.54
341	157125.03	1045287.25

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
342	157168.85	1045318.49
343	157252.21	1045327.18
344	157263.30	1045352.56
345	157056.31	1045443.89
346	157050.07	1045429.64
347	157202.27	1045363.17
348	157151.43	1045342.92
349	157107.62	1045311.68
350	157005.05	1045333.85
351	157218.20	1045249.28
352	157074.32	1045405.98
353	157058.27	1045380.89
354	156995.55	1045255.52

ENGINEER'S SEAL
THE STATE OF NEW HAMPSHIRE
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CHECKED BY: BMB
DRAWN BY: RHL
DESIGNED BY: DPB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GEOMETRY LAYOUT PLAN – ALT 1 & ADD ALT 3

SCALE: 1" = 40'
DATE: MARCH 2022

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GE-03A

SHEET 30 OF 90
REV 1

MATCH LINE (SEE SHEET GE-01)

MATCH LINE (SEE SHEET GE-02)

MATCH LINE (SEE INSET A ON SHEET GE-04B)

CARGO BUILDING FUTURE LEASE LINE

EXCAVATE AND BACKFILL TRENCH FOR GAS LINE TO BE INSTALLED BY OTHERS SEE DETAIL ON SHEET MD-03 (ITEM M-300-6B)

INSTALL NEW 8" D.I. WATER PIPE SEE DETAIL ON SHEET MD-03 (ITEM M-300-5B)

NEW LINE ON EXISTING WATER MAIN. EXCAVATION FOR NEW TAPPING. MANCHESTER WATER WORKS (MWW) TO PROVIDE AND INSTALL THE 12"x8" TAPPING SLEEVE AND 8" GATE VALVE, MJ. COORDINATE WORK WITH MWW FOR COSTS AND SCHEDULING (ITEM M-300-5E)

PLACE TOPSOIL, SEED, AND MULCH IN PAVEMENT REMOVAL AREAS (TYP) (ITEMS T-901-5.1, T-905-5.1 & T-908-5.1)

NEW CARGO BUILDING (BY OTHERS)

NEW CARGO BUILDING PARKING AREA (BY OTHERS)

CARGO BUILDING LEASE LINE (TYP)

CONSTRUCT NEW SIDEWALK. CONTRACTOR TO LAYOUT PAVEMENT LIMITS TO THE APPROVAL OF THE RPR (ITEM M-700-5.4)

RECONSTRUCT DUMPSTER ACCESS PAVEMENT AND PROVIDE LARGER TURN RADIUS. CONTRACTOR TO LAYOUT PAVEMENT LIMITS TO THE APPROVAL OF THE RPR

INSTALL NEW SECURE AIRFIELD CHAIN LINK FENCE. MATCH EXISTING FENCE LAYOUT. RE-USE EXISTING GATES SEE DETAIL ON SHEET FD-01 (ITEM F-162-5.1A)

SAW AND SEAL JOINT (TYP) (ITEM P-605-5.1)

CONSTRUCT NEW ACCESS ROAD SEE TYPICAL SECTION A-A ON SHEET TS-01

ADD ALTERNATE 3 LIMITS

EXCAVATION FOR GAS SERVICE TAP. TAPPING SERVICE TO BE PERFORMED BY LIBERTY UTILITIES. COORDINATE WORK WITH LIBERTY UTILITIES. (ITEMS M-300-6A & M-300-6B)

BASE BID ALTERNATE 2

ADD ALT 3 BASE BID

ACCESS ROAD SHOULDER (TYP)

INSTALL NEW 4' CHAIN LINK FENCE SEE DETAIL ON SHEET FD-01 (ITEM F-162-5.1B)

RESET SALVAGED SLOPED GRANITE CURB (ITEM M-700-5.2D)

INSTALL NEW DETECTABLE WARNING PANEL SEE DETAIL ON SHEET MD-04 (INCLUSIVE TO ITEM M-700-5.4)

END OF MILL AND OVERLAY LIMIT

STABILIZE SLOPE BETWEEN ACCESS ROAD AND PARKING AREA WITH 1 ½" CRUSHED STONE (6" DEPTH) (INCLUSIVE TO ITEM M-700-5.4)

OVERLAY 2" PAVEMENT ON MILLED SURFACE AND MATCH EXISTING GRADES SEE DETAIL ON SHEET TS-01 (ITEMS P-101-5.2 & M-600-1)

MAINTAIN ACCESS TO CROSSWALK

RESET SALVAGED OR INSTALL NEW STRAIGHT GRANITE CURB SEE DETAIL ON SHEET MD-04 (ITEM M-700-5.2A & M-700-5.2C)

CONSTRUCT NEW PAVEMENT SEE TYPICAL SECTION A-A ON SHEET TS-01

CONSTRUCT NEW PAVEMENT OVER EXISTING GRASS ISLAND SEE TYPICAL SECTION B-B ON SHEET TS-01

TIE IN TO EXISTING FENCE

RELOCATE EXISTING LOT C TICKET DISPENSERS INCLUDING ELECTRIC AND COMMUNICATIONS SERVICE (ITEM M-700-5.6)

CENTER OF RADIUS (NOT SHOWN)

MATCH LINE (SEE SHEET GE-04B)

LEGEND:

- PAVEMENT
- OVERLAY PAVEMENT
- GRASSED AREA
- SAW AND SEAL JOINT
- GRANITE CURB

NOTES:
1. THIS SHEET SHALL ONLY BE INCLUDED IF ALTERNATE 2 IS AWARDED.
2. ALL WORK ASSOCIATED WITH THE MILLING AND OVERLAY OF THE TERMINAL LOADING DOCK PAVEMENT SHALL BE PAID FOR AS PART OF ADD ALTERNATE 3.
3. SEE SHEET GE-01 FOR GEOMETRY LAYOUT NOTES.

0 40 80 120 FT
SCALE

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
300	157002.65	1045334.92
301	156964.38	1045351.68
302	156921.49	1045347.96
303	156690.43	1045449.07
304	156679.81	1045476.37
305	156644.05	1045492.04
306	156608.13	1045481.81
307	156544.10	1045474.52
308	156556.74	1045468.84
309	156598.50	1045459.82
310	156700.90	1045415.02
311	156698.10	1045407.27
312	156721.26	1045396.82
313	156722.93	1045399.92

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
314	156926.99	1045310.63
315	156941.94	1045288.80
316	156974.10	1045274.73
317	156937.07	1045388.40
318	156724.77	1045478.15
319	156614.88	1045526.30
320	156916.97	1045287.72
321	156305.09	1045601.32
322	156926.74	1045262.75
323	156912.77	1045255.33
324	156920.93	1045239.96
325	156888.89	1045222.94
326	156854.26	1045224.51
327	156851.90	1045193.56

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
328	156885.16	1045144.31
329	156921.48	1045161.62
330	156988.48	1045197.31
331	156981.40	1045210.53
332	156960.41	1045199.29
355	157000.28	1045278.56
356	156990.26	1045255.65
357	157024.49	1045267.96
358	157095.37	1045098.56
359	157087.66	1045021.77
360	157097.58	1044962.38
361	157115.05	1044911.12
362	157143.27	1044926.21
363	157129.15	1044967.65

LAYOUT POINT TABLE		
POINT #	NORTHING	EASTING
364	157119.22	1045027.04
365	157125.26	1045087.11
366	157013.18	1045307.84
367	157031.30	1045283.54
368	157111.25	1045092.48
369	157104.43	1045024.57
370	157114.35	1044965.18
371	157130.04	1044919.14
372	157047.61	1045336.82
373	156971.17	1045146.12
374	157232.65	1045045.99
375	157262.30	1044989.90

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CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GEOMETRY LAYOUT PLAN – ALT 2 & ADD ALT 3

SCALE: 1" = 40' | DATE: MARCH 2022

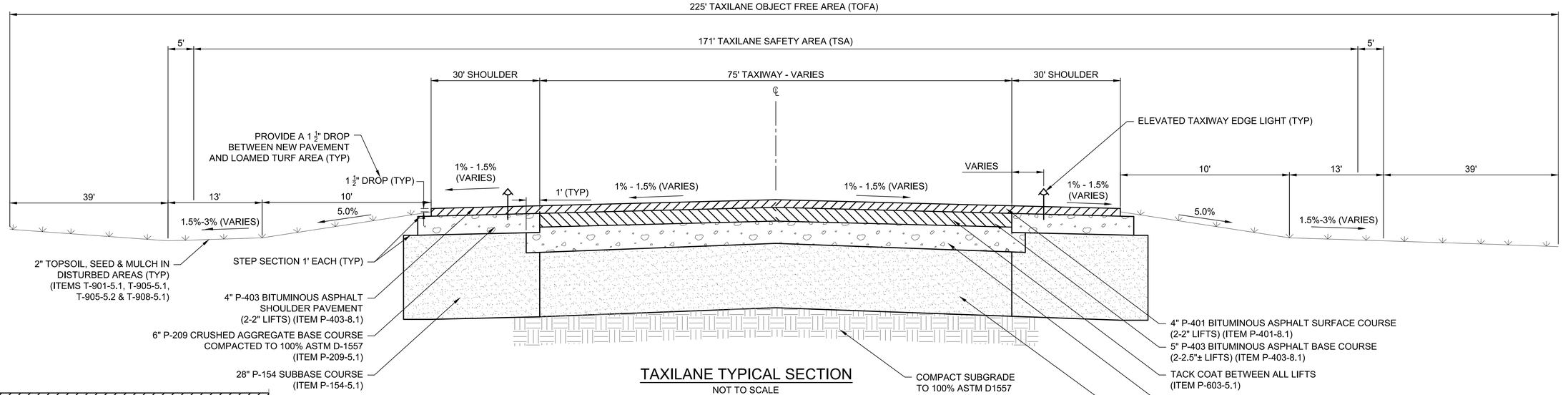
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

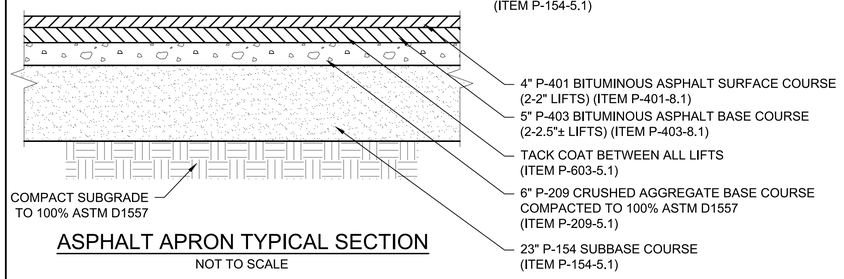
DRAWING NO.
GE-03B

SHEET 31 OF 90 REV 1



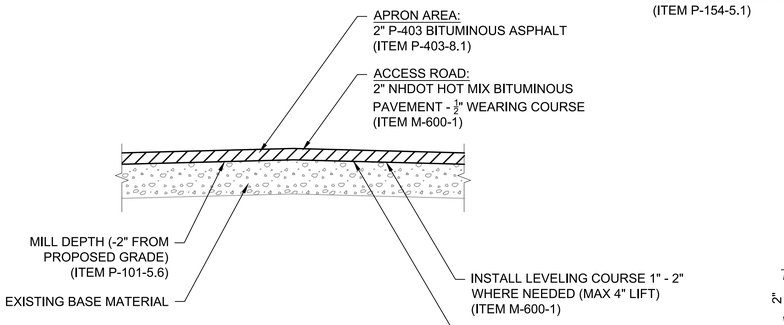
TAXILANE TYPICAL SECTION

NOT TO SCALE



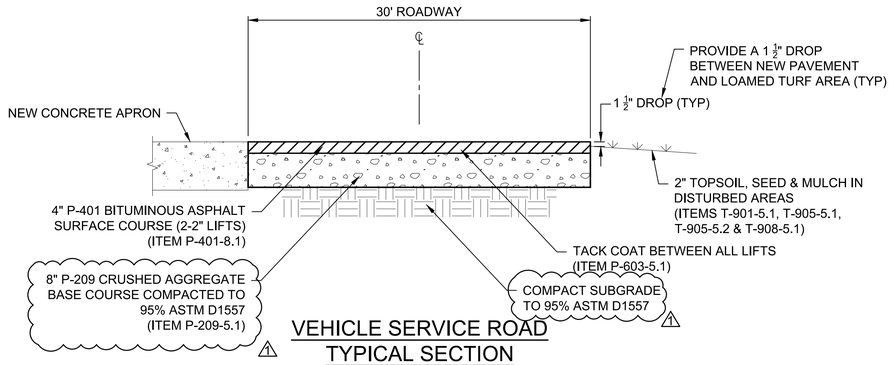
ASPHALT APRON TYPICAL SECTION

NOT TO SCALE



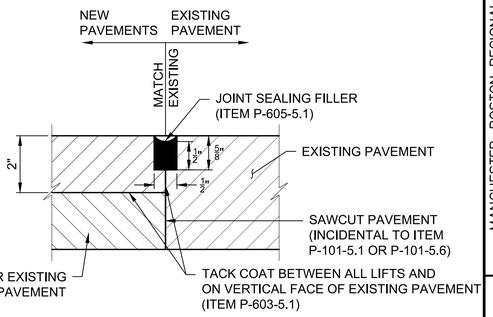
COLD MILLING DETAIL

NOT TO SCALE



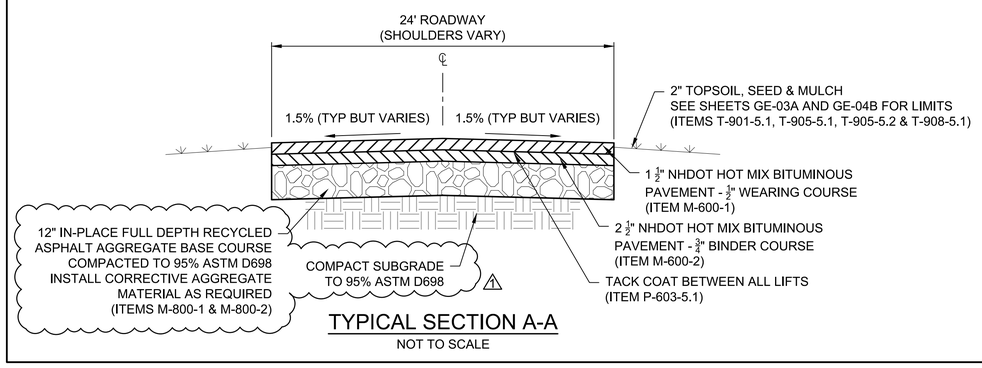
VEHICLE SERVICE ROAD TYPICAL SECTION

NOT TO SCALE



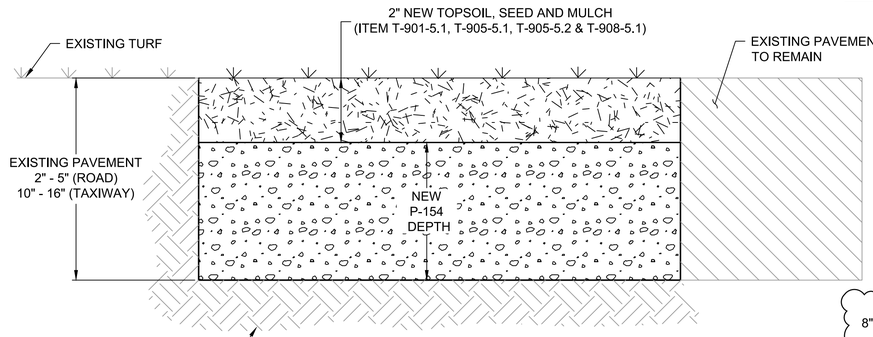
PAVEMENT TIE-IN AND JOINT SEALING FILLER DETAIL

NOT TO SCALE
(ITEM P-605-5.1)



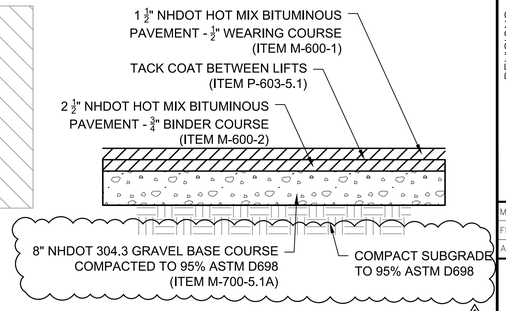
TYPICAL SECTION A-A

NOT TO SCALE



PAVEMENT REMOVAL TO TURF

NOT TO SCALE
(ITEM P-101-5.1, P-154-5.1, T-901-5.1, T-905-5.2, T-908-5.1)



TYPICAL SECTION B-B

NOT TO SCALE

ENGINEER'S SEAL
THE STATE OF NEW HAMPSHIRE
BRIAN M. BURNETT
No. 7416
LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER
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53 REGIONAL DRIVE, CONCORD, NH 03301-5022
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DESIGNED BY DPB | DRAWN BY RHL | CHECKED BY BMB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

TYPICAL SECTIONS (1 OF 2)

SCALE: NTS | DATE: MARCH 2022

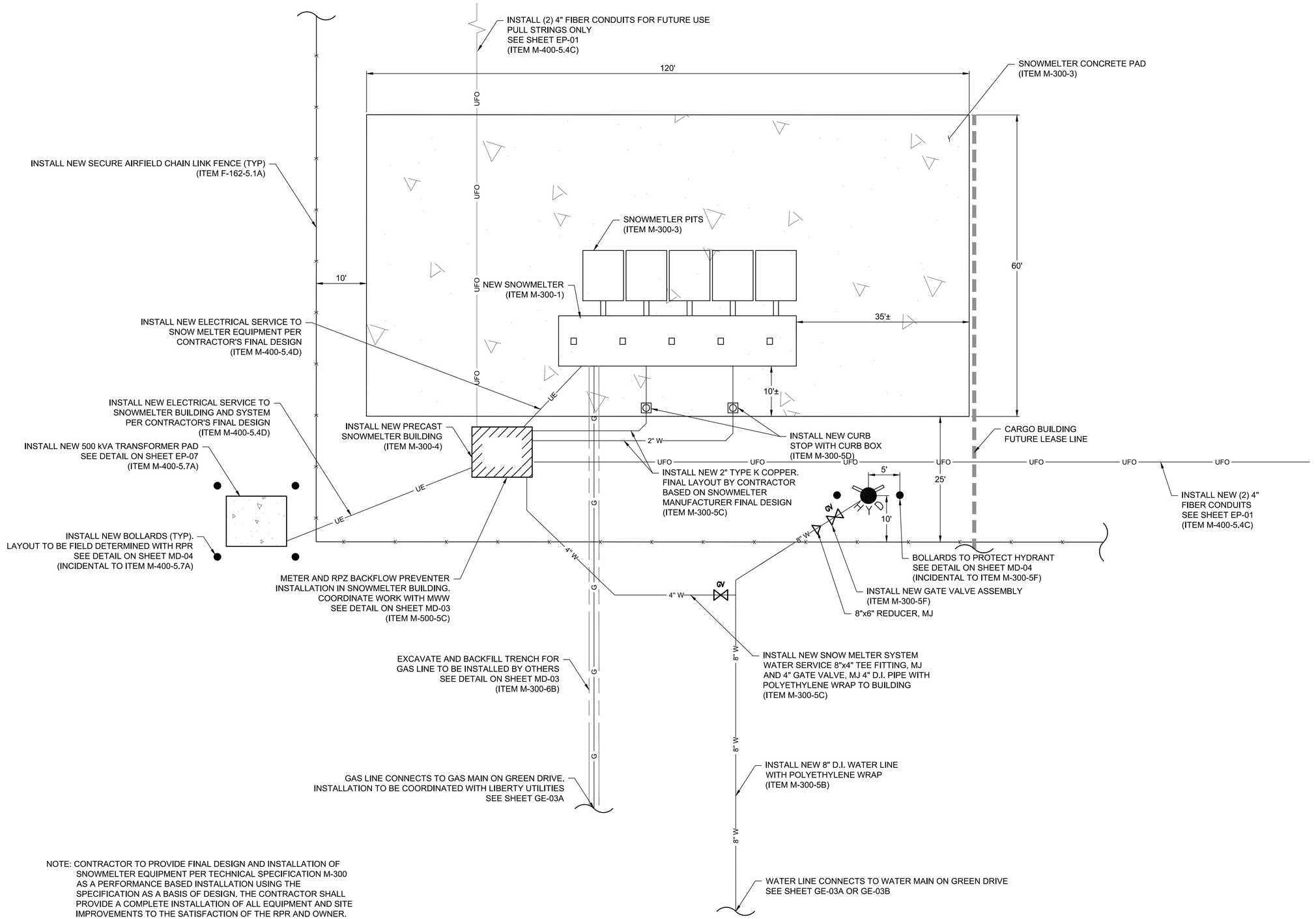
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
TS-01

REV



NOTE: CONTRACTOR TO PROVIDE FINAL DESIGN AND INSTALLATION OF SNOWMELTER EQUIPMENT PER TECHNICAL SPECIFICATION M-300 AS A PERFORMANCE BASED INSTALLATION USING THE SPECIFICATION AS A BASIS OF DESIGN. THE CONTRACTOR SHALL PROVIDE A COMPLETE INSTALLATION OF ALL EQUIPMENT AND SITE IMPROVEMENTS TO THE SATISFACTION OF THE RPR AND OWNER.

SNOWMELTER LAYOUT AND UTILITIES DETAIL

NOT TO SCALE

ENTIRE SHEET REISSUED WITH ADDENDUM NO. 1 ⚠1

ENGINEER'S SEAL
THE STATE OF NEW HAMPSHIRE
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CITY OF MANCHESTER
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MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

SNOWMELTER DETAILS (2 OF 2)

SCALE: NTS | DATE: MARCH 2022

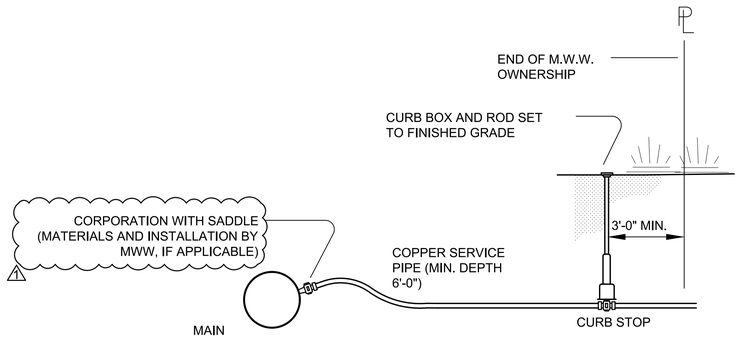
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
⚠1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
MD-02

SHEET 37 OF 90 | REV ⚠1

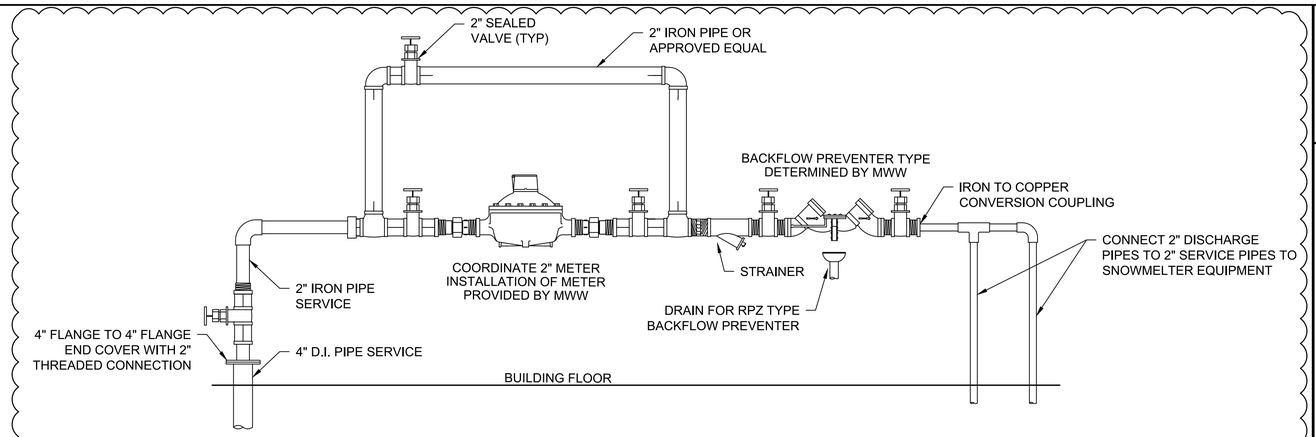


MANCHESTER WATER WORKS STANDARD DETAIL

WATER SERVICE CONNECTION DETAIL

NOT TO SCALE
(INCIDENTAL TO ITEM M-300-5D)

NOTES:
1. CORPORATIONS SHALL BE TAPPED DIRECTLY TO THE MAIN IN SIZES UP TO 1" Ø (INCLUSIVE).
2. CORPORATIONS 1-1/2"Ø AND GREATER SHALL BE INSTALLED USING A TAPPING SADDLE AND SHELL CUTTER.
3. CURB STOP TO BE FIELD LOCATED WITH RPR.

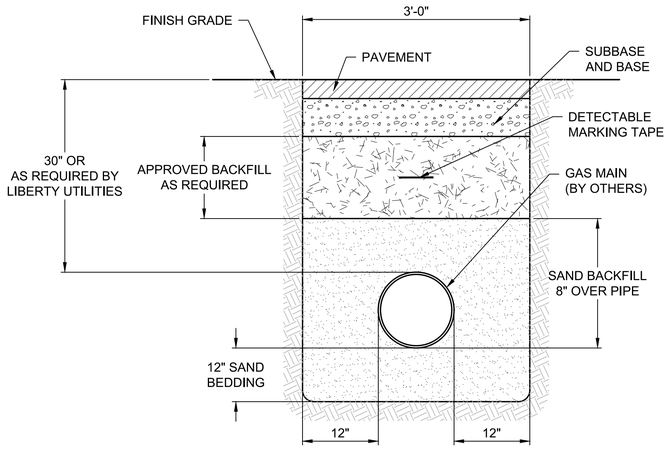


NOTES:
1. FINAL DESIGN OF METER AND RPZ BACKFLOW PREVENTER INSTALLATION TO BE DETERMINED BY THE CONTRACTOR AS PART OF THE FINAL DESIGN OF THE SNOWMELTER SYSTEM USING THIS DETAIL AS A BASIS OF DESIGN AND CONFORMING TO ALL MWW SPECIFICATIONS. MWW TO APPROVE ALL FINAL DESIGN AND MATERIALS TO BE USED.
2. CONTRACTOR TO PROVIDE SUPPORTS FOR METER AND BACKFLOW PREVENTER TO THE FLOOR.
3. 24/4 TELEPHONE CABLE (SOLID COPPER) MUST BE RUN FROM METER LOCATION TO DRIVEWAY OR ENTRY WAY. LOCATION TO BE FIELD COORDINATED WITH MWW.

MANCHESTER WATER WORKS STANDARD DETAIL

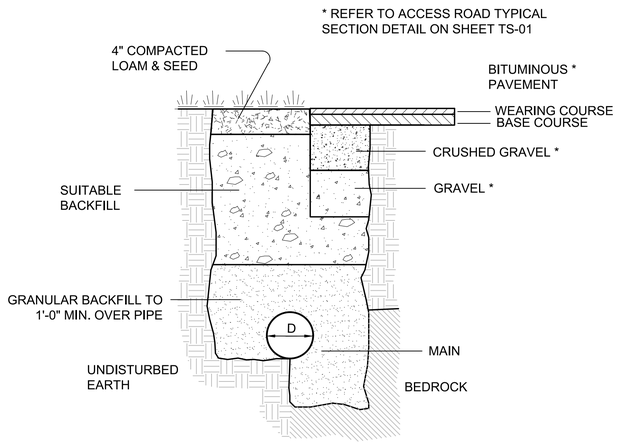
METER/BACKFLOW DETAIL

NOT TO SCALE
(INCIDENTAL TO ITEM M-300-5F)



GAS TRENCH DETAIL

NOT TO SCALE
(ITEM M-300-6B)

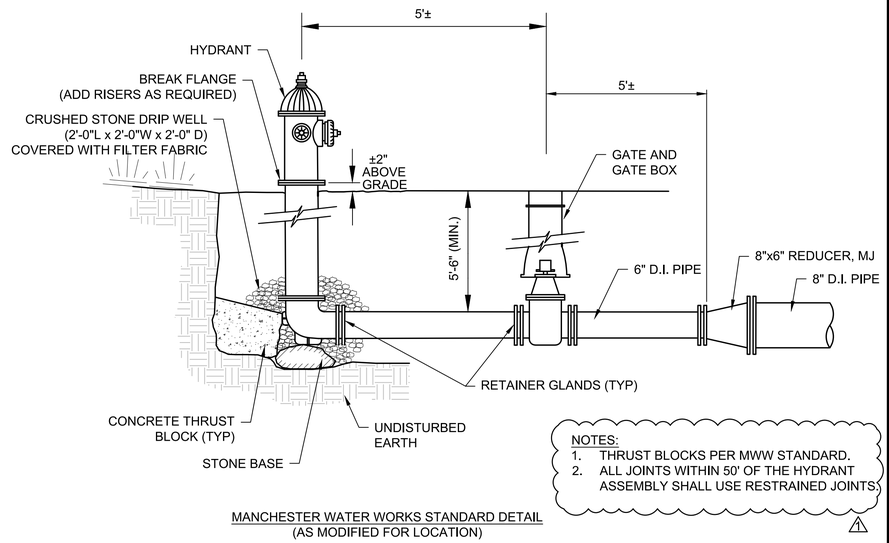


MANCHESTER WATER WORKS STANDARD DETAIL

NOTES:
1. 5'-6" MIN. PIPE DEPTH.
2. PIPE SHALL HAVE 1'-0" MIN. CLEARANCE TO BEDROCK.
3. TRENCH WIDTH FOR ROCK EXCAVATION = D + 2'-0".
4. MAIN TO BE 8' NORTH OR WEST OF CENTERLINE.
5. ALL DUCTILE IRON PIPE SHALL HAVE AN 8 MIL (MIN.) POLYETHYLENE WRAP.

WATER LINE TRENCH DETAIL

NOT TO SCALE
(ITEM M-300-5B)



NOTES:
1. THRUST BLOCKS PER MWW STANDARD.
2. ALL JOINTS WITHIN 50' OF THE HYDRANT ASSEMBLY SHALL USE RESTRAINED JOINTS.

MANCHESTER WATER WORKS STANDARD DETAIL
(AS MODIFIED FOR LOCATION)

HYDRANT INSTALLATION DETAIL

NOT TO SCALE
(ITEM M-300-5F)

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MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

UTILITY DETAILS

SCALE: NTS | DATE: MARCH 2022

REVISIONS

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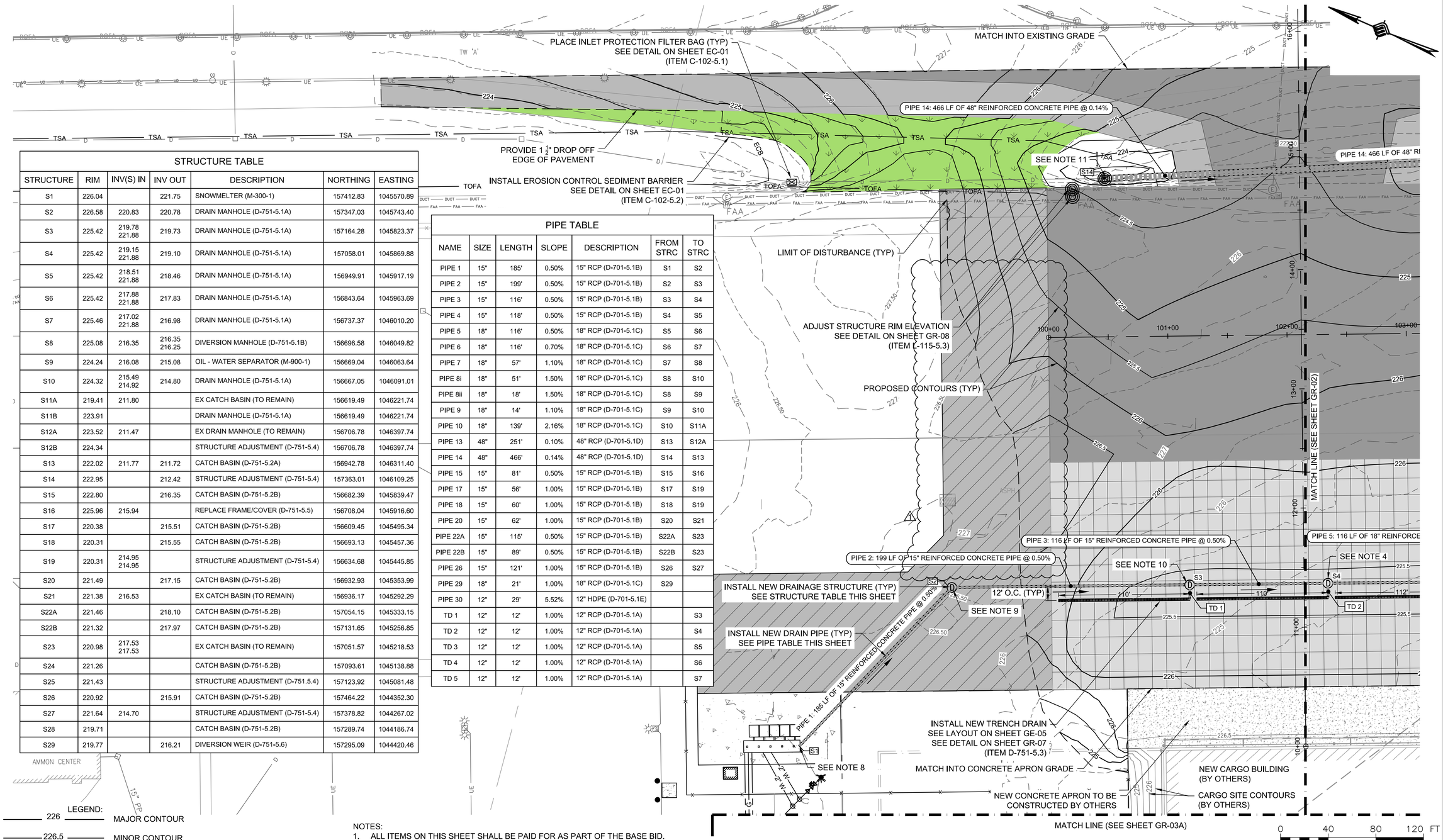
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
MD-03

SHEET 38 OF 90 | REV 1



STRUCTURE TABLE

STRUCTURE	RIM	INV(S) IN	INV OUT	DESCRIPTION	NORTHING	EASTING
S1	226.04		221.75	SNOWMELTER (M-300-1)	157412.83	1045570.89
S2	226.58	220.83	220.78	DRAIN MANHOLE (D-751-5.1A)	157347.03	1045743.40
S3	225.42	219.78 221.88	219.73	DRAIN MANHOLE (D-751-5.1A)	157164.28	1045823.37
S4	225.42	219.15 221.88	219.10	DRAIN MANHOLE (D-751-5.1A)	157058.01	1045869.88
S5	225.42	218.51 221.88	218.46	DRAIN MANHOLE (D-751-5.1A)	156949.91	1045917.19
S6	225.42	217.88 221.88	217.83	DRAIN MANHOLE (D-751-5.1A)	156843.64	1045963.69
S7	225.46	217.02 221.88	216.98	DRAIN MANHOLE (D-751-5.1A)	156737.37	1046010.20
S8	225.08	216.35	216.35 216.25	DIVERSION MANHOLE (D-751-5.1B)	156696.58	1046049.82
S9	224.24	216.08	215.08	OIL - WATER SEPARATOR (M-900-1)	156669.04	1046063.64
S10	224.32	215.49 214.92	214.80	DRAIN MANHOLE (D-751-5.1A)	156667.05	1046091.01
S11A	219.41	211.80		EX CATCH BASIN (TO REMAIN)	156619.49	1046221.74
S11B	223.91			DRAIN MANHOLE (D-751-5.1A)	156619.49	1046221.74
S12A	223.52	211.47		EX DRAIN MANHOLE (TO REMAIN)	156706.78	1046397.74
S12B	224.34			STRUCTURE ADJUSTMENT (D-751-5.4)	156706.78	1046397.74
S13	222.02	211.77	211.72	CATCH BASIN (D-751-5.2A)	156942.78	1046311.40
S14	222.95		212.42	STRUCTURE ADJUSTMENT (D-751-5.4)	157363.01	1046109.25
S15	222.80		216.35	CATCH BASIN (D-751-5.2B)	156682.39	1045839.47
S16	225.96	215.94		REPLACE FRAME/COVER (D-751-5.5)	156708.04	1045916.60
S17	220.38		215.51	CATCH BASIN (D-751-5.2B)	156609.45	1045495.34
S18	220.31		215.55	CATCH BASIN (D-751-5.2B)	156693.13	1045457.36
S19	220.31	214.95 214.95		STRUCTURE ADJUSTMENT (D-751-5.4)	156634.68	1045445.85
S20	221.49		217.15	CATCH BASIN (D-751-5.2B)	156932.93	1045353.99
S21	221.38	216.53		EX CATCH BASIN (TO REMAIN)	156936.17	1045292.29
S22A	221.46		218.10	CATCH BASIN (D-751-5.2B)	157054.15	1045333.15
S22B	221.32		217.97	CATCH BASIN (D-751-5.2B)	157131.65	1045256.85
S23	220.98	217.53 217.53		EX CATCH BASIN (TO REMAIN)	157051.57	1045218.53
S24	221.26			CATCH BASIN (D-751-5.2B)	157093.61	1045138.88
S25	221.43			STRUCTURE ADJUSTMENT (D-751.5.4)	157123.92	1045081.48
S26	220.92		215.91	CATCH BASIN (D-751-5.2B)	157464.22	1044352.30
S27	221.64	214.70		STRUCTURE ADJUSTMENT (D-751-5.4)	157378.82	1044267.02
S28	219.71			CATCH BASIN (D-751-5.2B)	157289.74	1044186.74
S29	219.77		216.21	DIVERSION WEIR (D-751-5.6)	157295.09	1044420.46

PIPE TABLE

NAME	SIZE	LENGTH	SLOPE	DESCRIPTION	FROM STRC	TO STRC
PIPE 1	15"	185'	0.50%	15" RCP (D-701-5.1B)	S1	S2
PIPE 2	15"	199'	0.50%	15" RCP (D-701-5.1B)	S2	S3
PIPE 3	15"	116'	0.50%	15" RCP (D-701-5.1B)	S3	S4
PIPE 4	15"	118'	0.50%	15" RCP (D-701-5.1B)	S4	S5
PIPE 5	18"	116'	0.50%	18" RCP (D-701-5.1C)	S5	S6
PIPE 6	18"	116'	0.70%	18" RCP (D-701-5.1C)	S6	S7
PIPE 7	18"	57'	1.10%	18" RCP (D-701-5.1C)	S7	S8
PIPE 8i	18"	51'	1.50%	18" RCP (D-701-5.1C)	S8	S10
PIPE 8ii	18"	18'	1.50%	18" RCP (D-701-5.1C)	S8	S9
PIPE 9	18"	14'	1.10%	18" RCP (D-701-5.1C)	S9	S10
PIPE 10	18"	139'	2.16%	18" RCP (D-701-5.1C)	S10	S11A
PIPE 13	48"	251'	0.10%	48" RCP (D-701-5.1D)	S13	S12A
PIPE 14	48"	466'	0.14%	48" RCP (D-701-5.1D)	S14	S13
PIPE 15	15"	81'	0.50%	15" RCP (D-701-5.1B)	S15	S16
PIPE 17	15"	56'	1.00%	15" RCP (D-701-5.1B)	S17	S19
PIPE 18	15"	60'	1.00%	15" RCP (D-701-5.1B)	S18	S19
PIPE 20	15"	62'	1.00%	15" RCP (D-701-5.1B)	S20	S21
PIPE 22A	15"	115'	0.50%	15" RCP (D-701-5.1B)	S22A	S23
PIPE 22B	15"	89'	0.50%	15" RCP (D-701-5.1B)	S22B	S23
PIPE 26	15"	121'	1.00%	15" RCP (D-701-5.1B)	S26	S27
PIPE 29	18"	21'	1.00%	18" RCP (D-701-5.1C)	S29	
PIPE 30	12"	29'	5.52%	12" HDPE (D-701-5.1E)		
TD 1	12"	12'	1.00%	12" RCP (D-701-5.1A)		S3
TD 2	12"	12'	1.00%	12" RCP (D-701-5.1A)		S4
TD 3	12"	12'	1.00%	12" RCP (D-701-5.1A)		S5
TD 4	12"	12'	1.00%	12" RCP (D-701-5.1A)		S6
TD 5	12"	12'	1.00%	12" RCP (D-701-5.1A)		S7

LEGEND:

- 226 — MAJOR CONTOUR
- 226.5 — MINOR CONTOUR
- LIMIT OF DISTURBANCE
- ECB — EROSION CONTROL SEDIMENT BARRIER
- DRAIN PIPE
- INLET PROTECTION FILTER BAG
- CATCH BASIN
- (D) MANHOLE
- ADJUST RIM ELEVATION

NOTES:

1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. SEE LAYOUT PLANS ON SHEETS GE-01 TO GE-04B
3. SEE DRAINAGE DETAILS ON SHEETS GR-06 TO GR-10.
4. SEE EROSION CONTROL DETAILS ON SHEET EC-01
5. STABILIZED CONSTRUCTION ENTRANCE SHALL BE INSTALLED IN A LOCATION AS DIRECTED BY THE RESIDENT PROJECT REPRESENTATIVE AND SHALL BE PAID UNDER ITEM C-102-5.3.
6. PLACE TOPSOIL, SEED, AND MULCH IN ALL DISTURBED TURF AREAS TO BE PAID UNDER ITEMS T-901-5.1, T-905-5.1 & T-908-5.1.
7. PLACE INLET PROTECTION FILTER BAGS IN EXISTING CATCH BASINS SCHEDULED FOR REMOVAL PRIOR TO DEMOLITION WORK AS DIRECTED BY RPR (C-102-5.1).
8. S1: INSTALL NEW SNOWMELTER (ITEM M-300-1).
9. S2: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE (ITEM D-751-5.1A).
10. S3: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE FOR TRENCH DRAIN OUTLET (ITEM D-751-5.1A).
11. S12: ADJUST STRUCTURE RIM ELEVATION (ITEM D-751-5.4). CONNECT NEW 48" RCP DRAIN LINE TO EXISTING CATCH BASIN. CONNECTION INCIDENTAL TO PIPE INSTALLATION ITEM D-701-5.1D.

ENGINEER'S SEAL
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CHECKED BY: BMB
DRAWN BY: BRF
DESIGNED BY: DPB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GRADING, DRAINAGE, AND EROSION CONTROL PLAN – BASE BID

SCALE: 1" = 40'
DATE: MARCH 2022

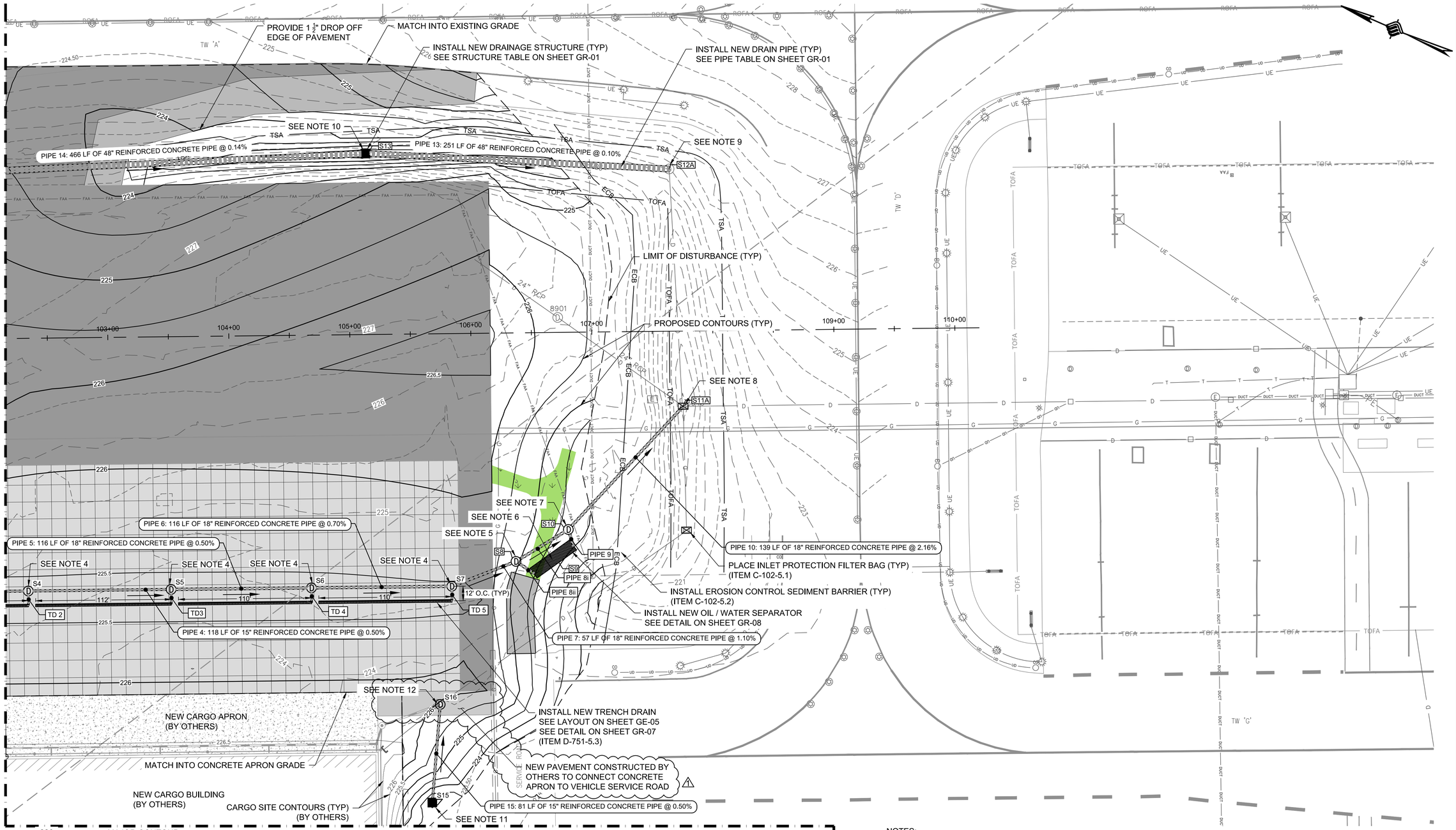
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GR-01

SHEET 43 OF 90
REV 1



226	MAJOR CONTOUR
226.5	MINOR CONTOUR
	LIMIT OF DISTURBANCE
ECB	EROSION CONTROL SEDIMENT BARRIER
	DRAIN PIPE
	INLET PROTECTION FILTER BAG
	CATCH BASIN
D	MANHOLE
	ADJUST RIM ELEVATION

NOTES:
1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. SEE SHEET GR-01 FOR GRADING, DRAINAGE & EROSION CONTROL NOTES.
3. SEE SHEET GR-01 FOR PIPE AND STRUCTURE TABLE.
4. S3 - S7: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE FOR TRENCH DRAIN OUTLET (ITEM D-751-5.1A).
5. S8: INSTALL NEW DRAINAGE DIVERSION MANHOLE (ITEM D-751-5.1B).
6. S9: INSTALL NEW OIL / WATER SEPARATOR (ITEM M-900-1).
7. S10: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE (ITEM D-751-5.1A)
8. S11A: CONNECT NEW 15" RCP DRAIN LINE TO EXISTING CATCH BASIN. CONNECTION INCIDENTAL TO PIPE INSTALLATION ITEM D-701-5.1B.
9. S12A: CONNECT NEW 48" RCP DRAIN LINE TO EXISTING DRAIN MANHOLE. CONNECTION INCIDENTAL TO PIPE INSTALLATION ITEM D-701-5.1D.
10. S13: INSTALL NEW AIRCRAFT RATED CATCH BASIN (ITEM D-751-5.2A).
11. S15: INSTALL NEW AIRCRAFT RATED CATCH BASIN (ITEM D-751-5.2A).
12. S16: REPLACE EXISTING CATCH BASIN FRAME & COVER WITH DRAIN MANHOLE FRAME & COVER AND ADJUST STRUCTURE RIM ELEVATION (ITEM D-751-5.5).

ENGINEER'S SEAL
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CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GRADING, DRAINAGE, AND EROSION CONTROL PLAN - BASE BID

SCALE: 1" = 40'
DATE: MARCH 2022

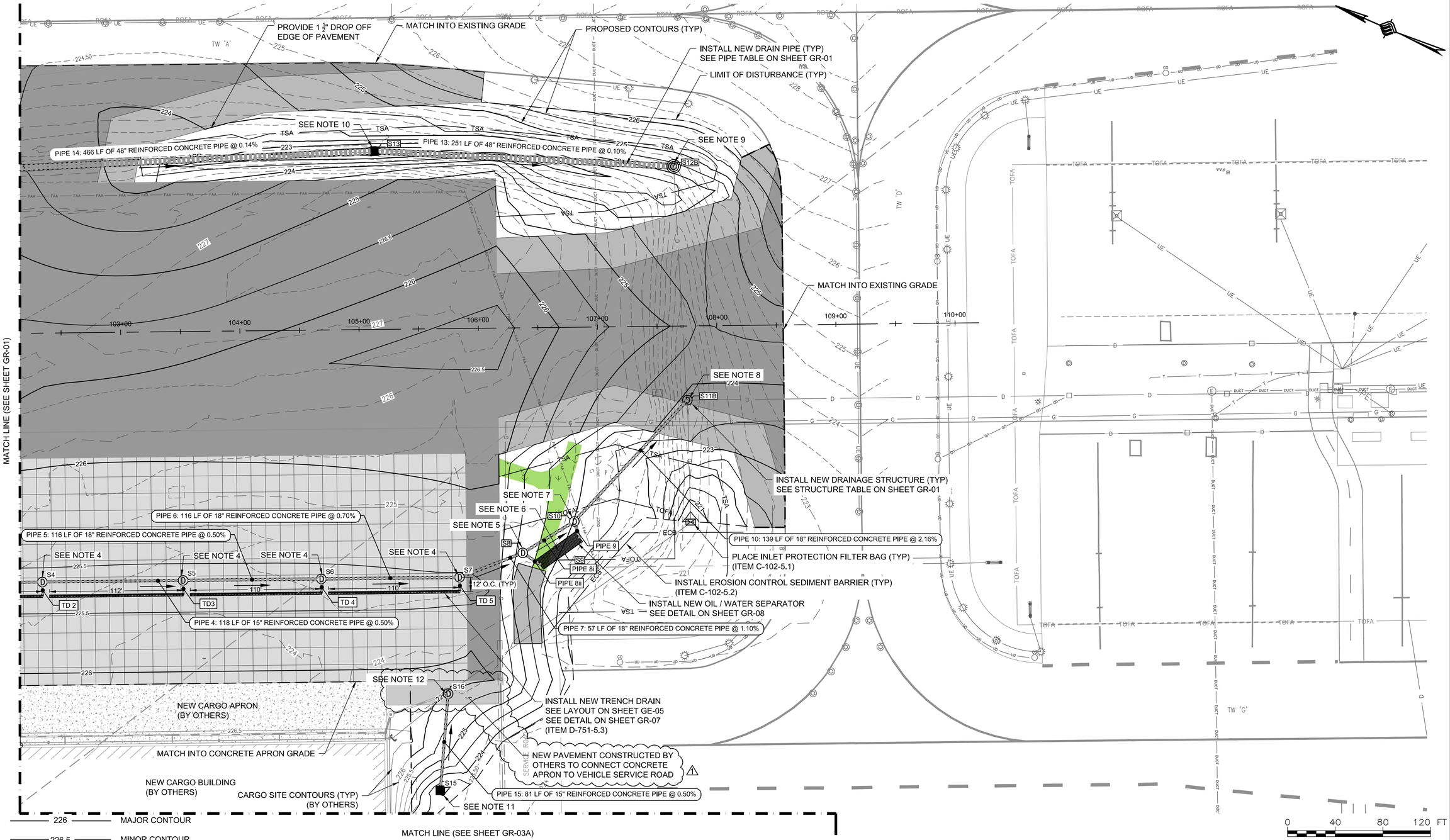
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GR-02

SHEET 44 OF 90
REV 1



226 MAJOR CONTOUR

226.5 MINOR CONTOUR

LIMIT OF DISTURBANCE

ECB EROSION CONTROL SEDIMENT BARRIER

DRAIN PIPE

INLET PROTECTION FILTER BAG

CATCH BASIN

MANHOLE

ADJUST RIM ELEVATION

NOTES:

1. THIS SHEET SHALL REPLACE SHEET GR-02 IF ADD ALTERNATE 4 IS AWARDED.
2. SEE SHEET GR-01 FOR GRADING, DRAINAGE & EROSION CONTROL NOTES.
3. SEE SHEET GR-01 FOR PIPE AND STRUCTURE TABLE.
4. S3 - S7: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE FOR TRENCH DRAIN OUTLET (ITEM D-751-5.1A).
5. S8: INSTALL NEW DRAINAGE DIVERSION MANHOLE (ITEM D-751-5.1B).
6. S9: INSTALL NEW OIL / WATER SEPARATOR (ITEM M-900-1).
7. S10: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE (ITEM D-751-5.1A)
8. S11B: INSTALL NEW AIRCRAFT RATED DRAIN MANHOLE. CONNECT NEW AND EXISTING PIPES TO NEW DRAIN MANHOLE. CONNECTIONS INCIDENTAL TO STRUCTURE INSTALLATION ITEM D-751-5.1A.
9. S12B: ADJUST STRUCTURE RIM ELEVATION (D-751-5.4). CONNECT NEW 48" RCP DRAIN LINE TO EXISTING DRAIN MANHOLE. CONNECTION INCIDENTAL TO PIPE INSTALLATION ITEM D-701-5.1D.
10. S13: INSTALL NEW AIRCRAFT RATED CATCH BASIN (ITEM D-751-5.2A).
11. S15: INSTALL NEW AIRCRAFT RATED CATCH BASIN (ITEM D-751-5.2A).
12. S16: REPLACE EXISTING CATCH BASIN FRAME & COVER WITH DRAIN MANHOLE FRAME & COVER AND ADJUST STRUCTURE RIM ELEVATION (ITEM D-751-5.5).
13. ALL WORK ASSOCIATED WITH THE CONSTRUCTION OF THE TAXIWAY D TAXILANE CONNECTOR SHALL BE PAID FOR AS PART OF ADD ALTERNATE 4. ALL OTHER WORK SHOWN SHALL BE PAID FOR AS PART OF THE BASE BID.

ENGINEER'S SEAL
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DESIGNED BY DPB | DRAWN BY BRF | CHECKED BY BMB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

GRADING, DRAINAGE, AND EROSION CONTROL PLAN – ADD ALT 4

SCALE: 1" = 40' | DATE: MARCH 2022

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08

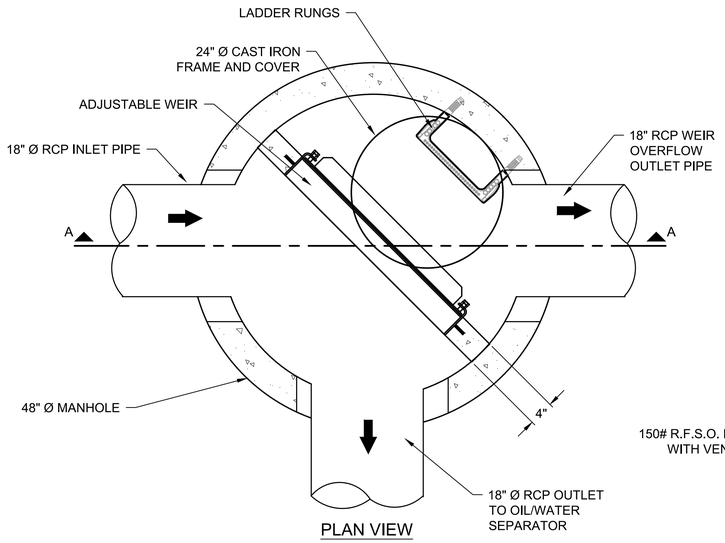
FILE NAME:

AIP No.: 3-33-0011-XXX-2021

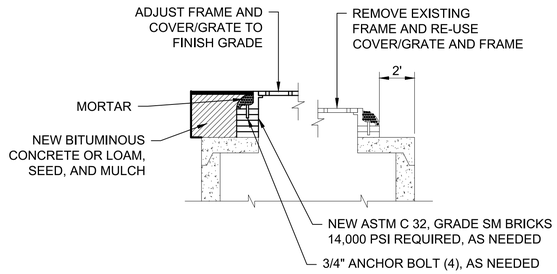
DRAWING NO.

GR-02A

SHEET 45 OF 90 REV 1

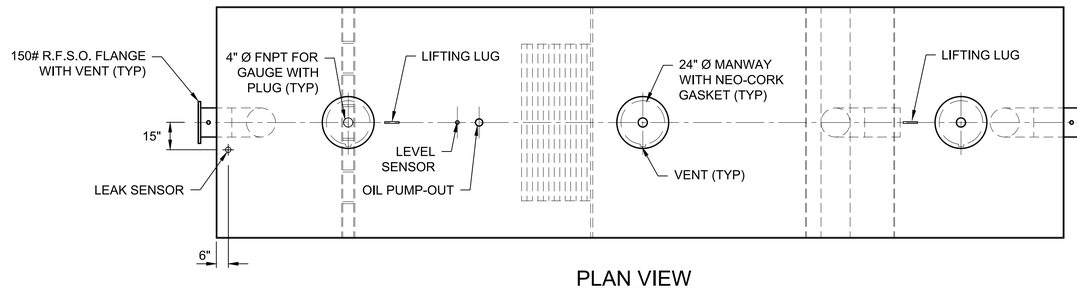


PLAN VIEW

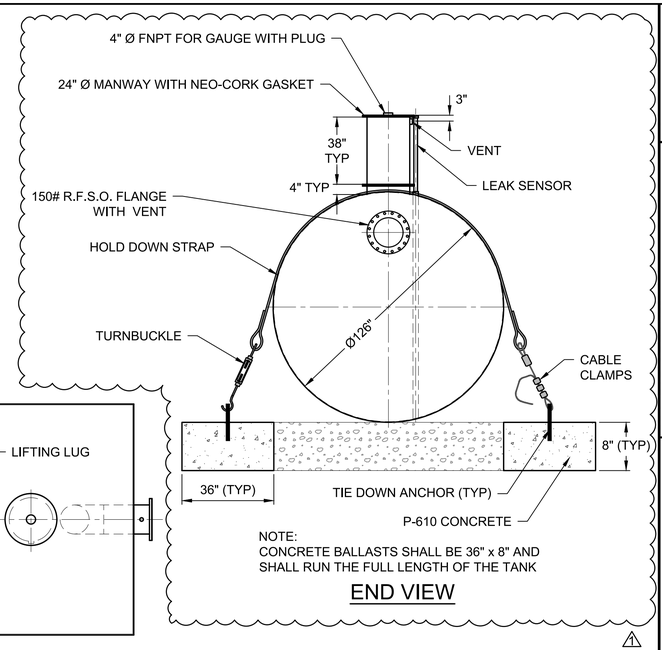


STRUCTURE ADJUSTMENT DETAIL

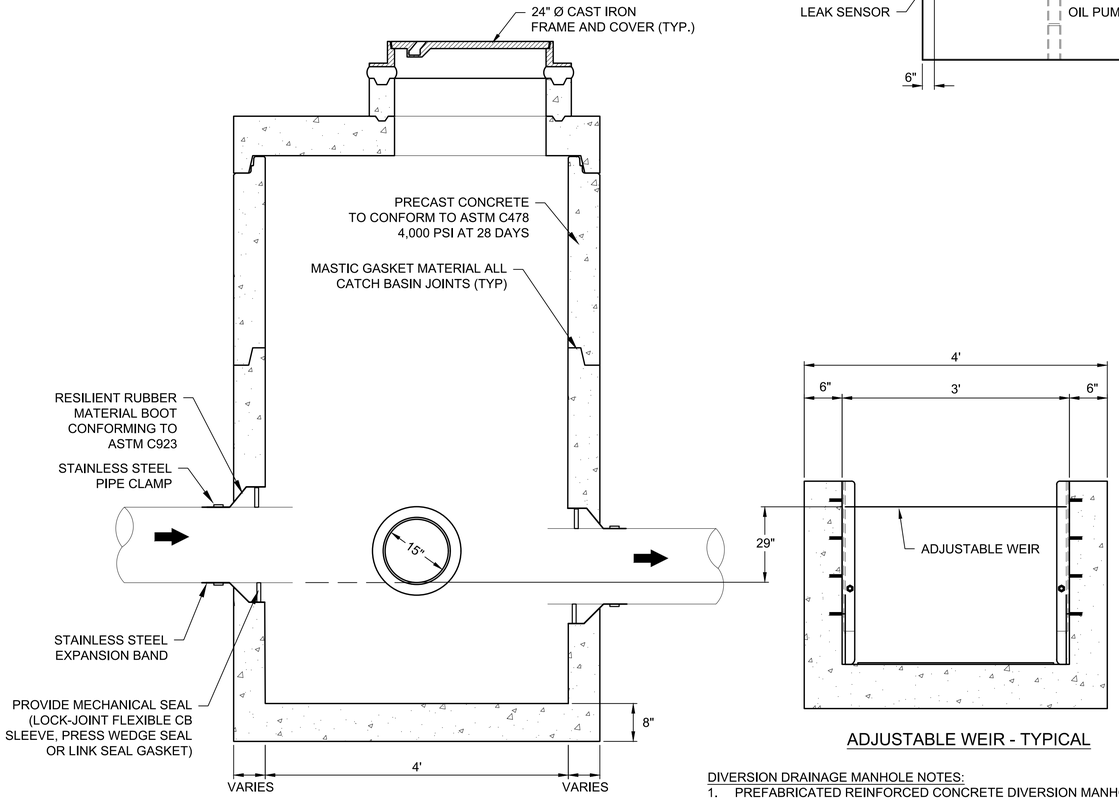
NOT TO SCALE
(ITEM D-751-5.4 OR L-115-5.3)



PLAN VIEW



END VIEW



SECTION A-A - ADJUSTABLE WEIR NOT SHOWN FOR CLARITY

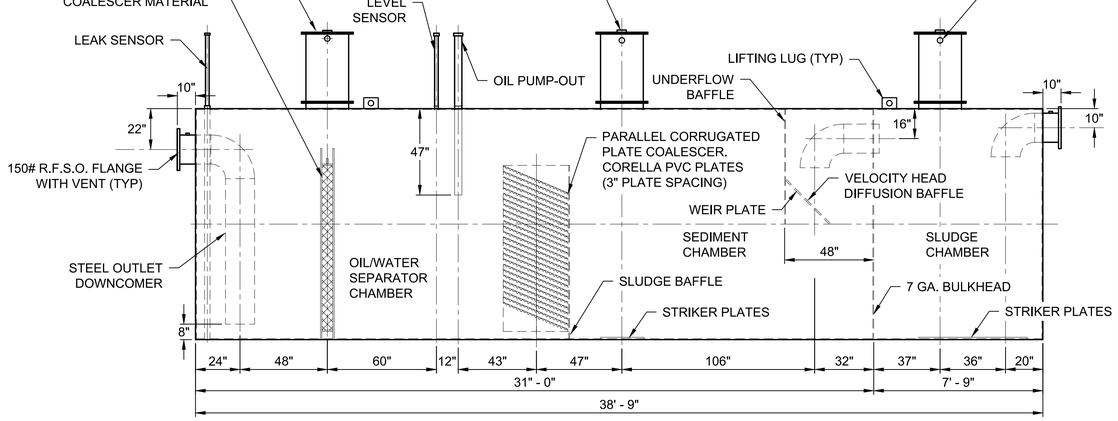
ADJUSTABLE WEIR - TYPICAL

DRAINAGE DIVERSION MANHOLE DETAIL

NOT TO SCALE
(ITEM D-751-5.1B)

DIVERSION DRAINAGE MANHOLE NOTES:

1. PREFABRICATED REINFORCED CONCRETE DIVERSION MANHOLE AND FRAME AND GRATE SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A MINIMUM OF A 100,000 LB SINGLE WHEEL LOADING. THE CONTRACTOR IS REQUIRED TO SUBMIT SHOP DRAWINGS AND MANUFACTURER CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION. SHOP DRAWINGS FOR LOADING SHALL BE STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN NEW HAMPSHIRE.
2. THE WALL THICKNESS SHALL INCREASE IN SIZE TO CONFORM WITH THE REQUIREMENTS OF THE MANUFACTURER OF THE RESILIENT RUBBER BOOT AND BE SIZED ACCORDING TO THE DIAMETER OF THE STRUCTURE AND THE SIZE AND TYPE OF PIPE. THE WALL THICKNESS SHALL NOT BE LESS THAN 6" FOR STEEL COVER REQUIREMENTS AND SHALL BE DESIGNED TO MEET ALL REQUIREMENTS INCLUDING THE REQUIRED LOADING IN NOTE 1.
3. CONTRACTOR SHALL COMPACT THE EXCAVATED SUBGRADE TO 100% OF ASTM D-1557 WITHIN 10' OF ALL EDGES OF PAVEMENT EVEN IN TURF.
4. ALL PREFAB-CONCRETE STRUCTURES SHALL HAVE COURSE, FINE, AND CONCRETE MATERIALS TESTED FOR ALKALI-SILICA REACTION (ASR) USING AASHTO T303 MODIFIED.



SECTION VIEW

OIL / WATER SEPARATOR NOTES:

1. SEPARATOR SHALL BE 20,000 GALLON WITH A DESIGN FLOW RATE OF 2,000 GPM.
2. STRUCTURE SHALL BE HIGHLAND TANK HTC-G, HIGHGUARD, DW TYPE I 360, OR APPROVED EQUAL.
3. SEPARATOR SHALL BE PREFABRICATED AND SHALL BE INSTALLED UNDERGROUND BY CONTRACTOR WITH TOP ACCESS AT GROUND LEVEL.
4. SEPARATOR SHALL BE FURNISHED WITH OIL LEVEL ALARM AND LEAK DETECTION SYSTEM HAVING TOTAL VOLUME OF 2,000 GALLONS TO COMPLY WITH ANY SPILL PREVENTION CONTROL AND COUNTERMEASURE (SPCC) REQUIREMENTS.
5. MATERIAL SHALL BE DURABLE AND RESIST CORROSION.
6. ALL PARTS, NOT SPECIFICALLY MENTIONED HERIN, WHICH ARE NECESSARY IN ORDER TO FURNISH A COMPLETE UNIT, SHALL BE PROVIDED AND SHALL CONFORM TO THE BEST PRACTICES KNOW TO THE TRADE.
7. UNLESS OTHERWISE SPECIFIED, EQUIPMENT FURNISHED UNDER THIS SECTION SHALL BE FABRICATED AND INSTALLED IN ~~COMPLIANCE WITH THE INSTRUCTIONS OF THE MANUFACTURER.~~
8. CONTRACTOR SHALL PROVIDE AND INSTALL AN ALARM SYSTEM PER SPECIFICATION AND AS RECOMMENDED BY MANUFACTURER.
9. WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE, AND LOCAL FIRE PROTECTION, ENVIRONMENTAL, BUILDING, AND SAFETY CODES AND REGULATIONS. 1
10. ALL MATERIALS, EQUIPMENT, AND LABOR REQUIRED FOR THE INSTALLATION OF A COMPLETE AND USABLE SYSTEM SHALL BE PAID FOR UNDER ITEM M-900-1.

OIL / WATER SEPARATOR DETAIL

NOT TO SCALE
(ITEM M-900-1)

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DRAWN BY BRF
CHECKED BY BMB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

DRAINAGE DETAILS (3 OF 5)

SCALE: NTS
DATE: MARCH 2022

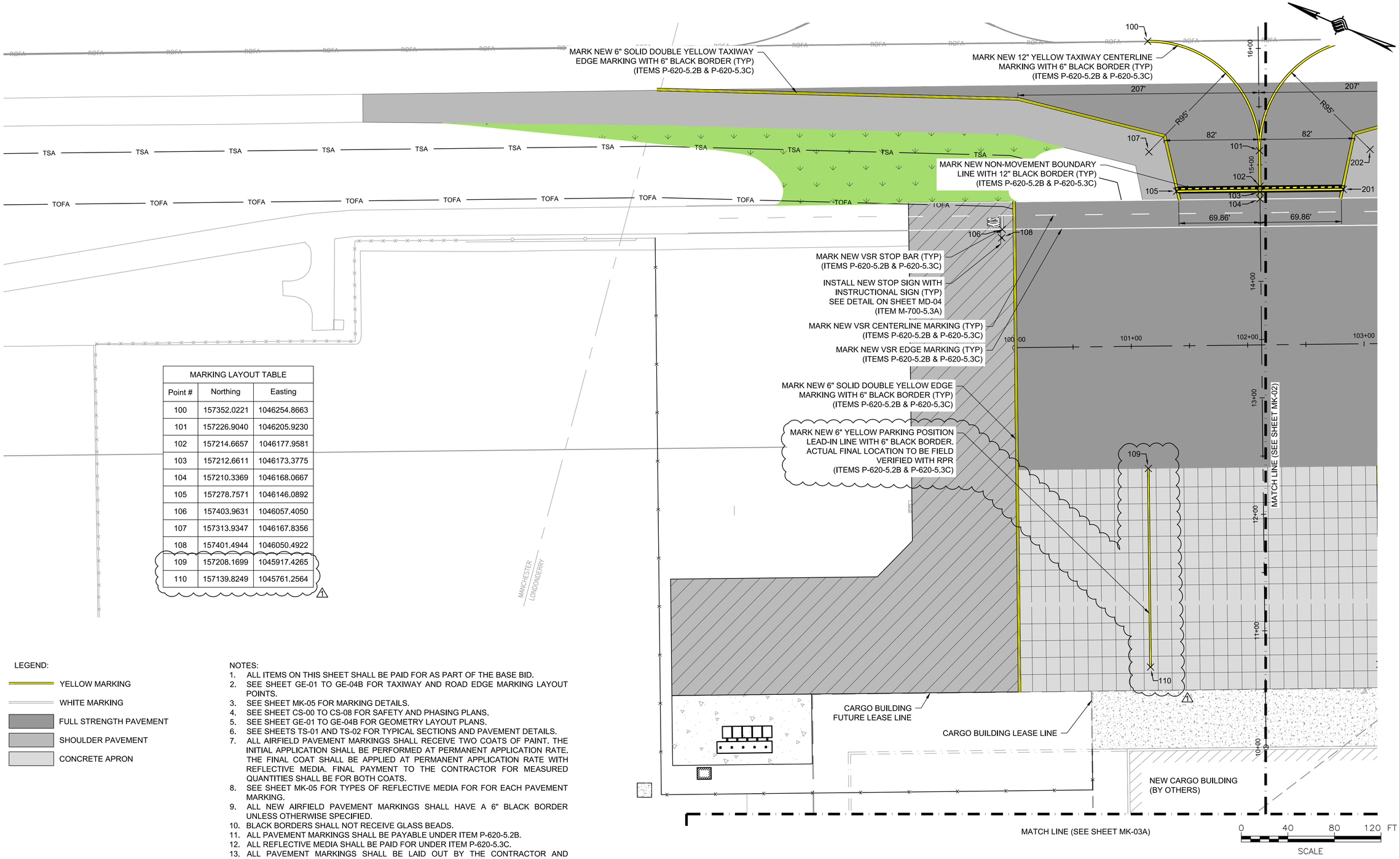
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	BRF

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
GR-08

SHEET 52 OF 90
REV 1



MARKING LAYOUT TABLE		
Point #	Northing	Easting
100	157352.0221	1046254.8663
101	157226.9040	1046205.9230
102	157214.6657	1046177.9581
103	157212.6611	1046173.3775
104	157210.3369	1046168.0667
105	157278.7571	1046146.0892
106	157403.9631	1046057.4050
107	157313.9347	1046167.8356
108	157401.4944	1046050.4922
109	157208.1699	1045917.4265
110	157139.8249	1045761.2564

LEGEND:

- YELLOW MARKING
- WHITE MARKING
- FULL STRENGTH PAVEMENT
- SHOULDER PAVEMENT
- CONCRETE APRON

NOTES:

1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. SEE SHEET GE-01 TO GE-04B FOR TAXIWAY AND ROAD EDGE MARKING LAYOUT POINTS.
3. SEE SHEET MK-05 FOR MARKING DETAILS.
4. SEE SHEET CS-00 TO CS-08 FOR SAFETY AND PHASING PLANS.
5. SEE SHEET GE-01 TO GE-04B FOR GEOMETRY LAYOUT PLANS.
6. SEE SHEETS TS-01 AND TS-02 FOR TYPICAL SECTIONS AND PAVEMENT DETAILS.
7. ALL AIRFIELD PAVEMENT MARKINGS SHALL RECEIVE TWO COATS OF PAINT. THE INITIAL APPLICATION SHALL BE PERFORMED AT PERMANENT APPLICATION RATE. THE FINAL COAT SHALL BE APPLIED AT PERMANENT APPLICATION RATE WITH REFLECTIVE MEDIA. FINAL PAYMENT TO THE CONTRACTOR FOR MEASURED QUANTITIES SHALL BE FOR BOTH COATS.
8. SEE SHEET MK-05 FOR TYPES OF REFLECTIVE MEDIA FOR FOR EACH PAVEMENT MARKING.
9. ALL NEW AIRFIELD PAVEMENT MARKINGS SHALL HAVE A 6" BLACK BORDER UNLESS OTHERWISE SPECIFIED.
10. BLACK BORDERS SHALL NOT RECEIVE GLASS BEADS.
11. ALL PAVEMENT MARKINGS SHALL BE PAYABLE UNDER ITEM P-620-5.2B.
12. ALL REFLECTIVE MEDIA SHALL BE PAID FOR UNDER ITEM P-620-5.3C.
13. ALL PAVEMENT MARKINGS SHALL BE LAID OUT BY THE CONTRACTOR AND APPROVED BY THE RPR PRIOR TO MARKING.

ENGINEER'S SEAL

THE STATE OF NEW HAMPSHIRE
BRIAN
MCDERMOTT
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DESIGNED BY DPB | DRAWN BY RHL | CHECKED BY BMB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

MARKING PLAN – BASE BID

SCALE: 1" = 40' | DATE: MARCH 2022

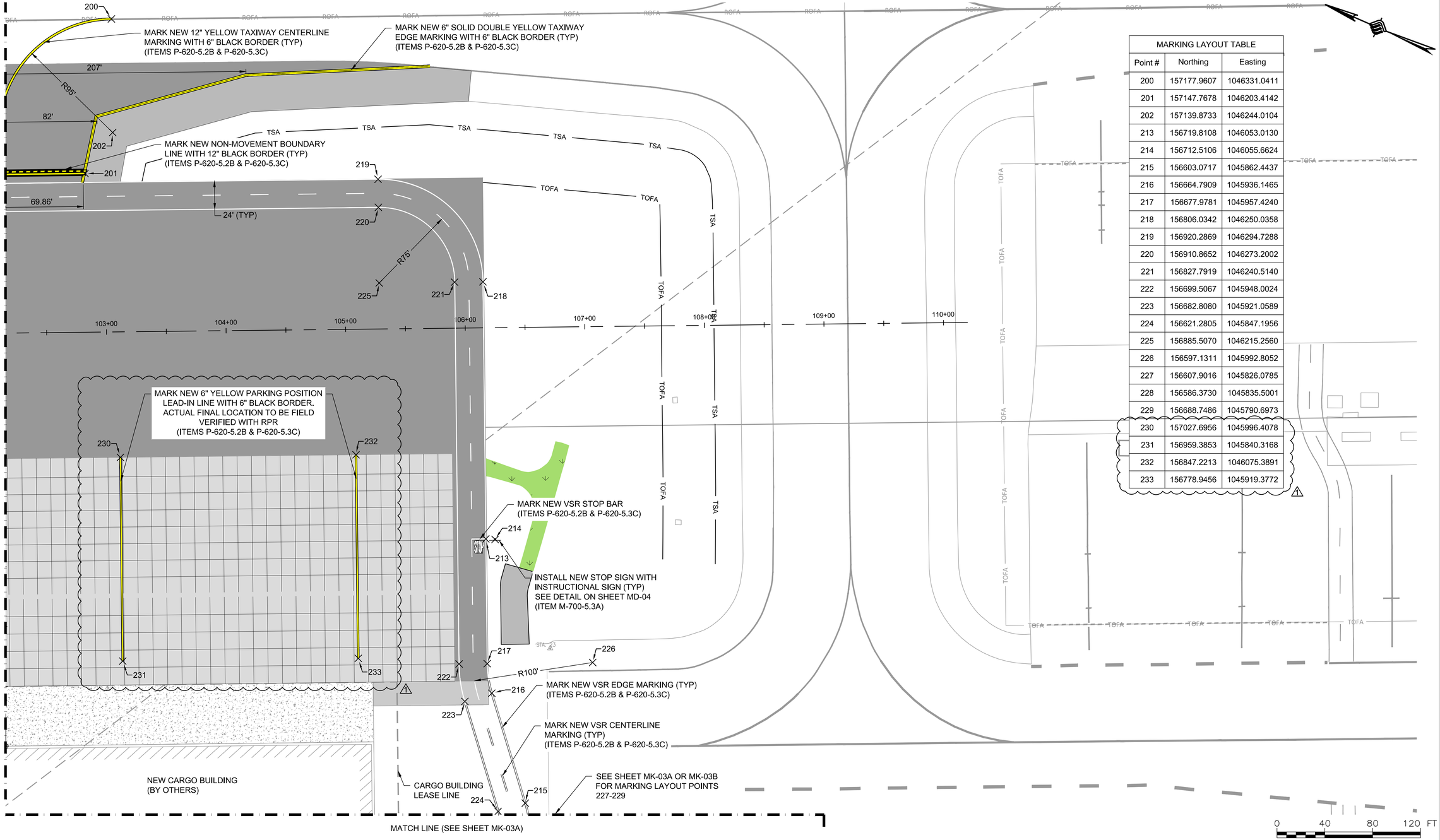
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
MK-01

SHEET 74 OF 90 REV 1



MARKING LAYOUT TABLE		
Point #	Northing	Easting
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201	157147.7678	1046203.4142
202	157139.8733	1046244.0104
213	156719.8108	1046053.0130
214	156712.5106	1046055.6624
215	156603.0717	1045862.4437
216	156664.7909	1045936.1465
217	156677.9781	1045957.4240
218	156806.0342	1046250.0358
219	156920.2869	1046294.7288
220	156910.8652	1046273.2002
221	156827.7919	1046240.5140
222	156699.5067	1045948.0024
223	156682.8080	1045921.0589
224	156621.2805	1045847.1956
225	156885.5070	1046215.2560
226	156597.1311	1045992.8052
227	156607.9016	1045826.0785
228	156586.3730	1045835.5001
229	156688.7486	1045790.6973
230	157027.6956	1045996.4078
231	156959.3853	1045840.3168
232	156847.2213	1046075.3891
233	156778.9456	1045919.3772

LEGEND:

- YELLOW MARKING
- WHITE MARKING
- FULL STRENGTH PAVEMENT
- SHOULDER PAVEMENT
- CONCRETE APRON

NOTES:
1. ALL ITEMS ON THIS SHEET SHALL BE PAID FOR AS PART OF THE BASE BID.
2. SEE SHEET MK-01 FOR MARKING NOTES.

ENGINEER'S SEAL
THE STATE OF NEW HAMPSHIRE
BRIAN M. BURNETT
No. 7416
LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER
McFarland Johnson
53 REGIONAL DRIVE, CONCORD, NH 03301-5022
PH: 603-225-2978 FAX: 603-225-0095
DESIGNED BY: DPB | DRAWN BY: RHL | CHECKED BY: BMB

CITY OF MANCHESTER
DEPARTMENT OF AVIATION
MANCHESTER, NEW HAMPSHIRE

MANCHESTER-BOSTON REGIONAL AIRPORT
CARGO APRON AND ACCESS

MARKING PLAN – BASE BID

SCALE: 1" = 40'
DATE: MARCH 2022

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	3/17/22	ADDENDUM NO. 1	RHL

MJ PROJ. No.: 18700.08
FILE NAME:
AIP No.: 3-33-0011-XXX-2021

DRAWING NO.
MK-02

SHEET 75 OF 90
REV 1

MARK NEW 12" YELLOW TAXIWAY CENTERLINE MARKING WITH 6" BLACK BORDER (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW 6" SOLID DOUBLE YELLOW TAXIWAY EDGE MARKING WITH 6" BLACK BORDER (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW NON-MOVEMENT BOUNDARY LINE WITH 12" BLACK BORDER (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW NON-MOVEMENT BOUNDARY LINE WITH 12" BLACK BORDER (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW 6" YELLOW TAXIWAY CENTERLINE MARKING WITH 6" BLACK BORDER (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW 6" YELLOW PARKING POSITION LEAD-IN LINE WITH 6" BLACK BORDER. ACTUAL FINAL LOCATION TO BE FIELD VERIFIED WITH RPR (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW VSR STOP BAR (ITEMS P-620-5.2B & P-620-5.3C)

INSTALL NEW STOP SIGN WITH INSTRUCTIONAL SIGN (TYP) SEE DETAIL ON SHEET MD-04 (ITEM M-700-5.3A)

MARK NEW VSR EDGE MARKING (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

MARK NEW VSR CENTERLINE MARKING (TYP) (ITEMS P-620-5.2B & P-620-5.3C)

NEW CARGO BUILDING (BY OTHERS)

CARGO BUILDING LEASE LINE

SEE SHEET MK-03A OR MK-03B FOR MARKING LAYOUT POINTS 227-229

MATCH LINE (SEE SHEET MK-01)

MATCH LINE (SEE SHEET MK-03A)

MARKING LAYOUT TABLE		
Point #	Northing	Easting
200	157177.9607	1046331.0411
201	157147.7678	1046203.4142
202	157139.8733	1046244.0104
203	156789.9184	1046215.0813
204	156655.1722	1046274.0505
205	156650.5916	1046276.0551
206	156598.3631	1046298.9120
207	156549.4197	1046424.0301
208	156473.2449	1046249.9686
209	156679.1002	1046332.4680
210	156628.4959	1046216.8358
211	156636.4505	1046385.9427
212	156560.2757	1046211.8812
213	156719.8108	1046053.0130
214	156712.5106	1046055.6624
215	156603.0717	1045862.4437
216	156664.7909	1045936.1465

MARKING LAYOUT TABLE		
Point #	Northing	Easting
217	156677.9781	1045957.4240
218	156806.0342	1046250.0358
219	156920.2869	1046294.7288
220	156910.8652	1046273.2002
221	156827.7919	1046240.5140
222	156699.5067	1045948.0024
223	156682.8080	1045921.0589
224	156621.2805	1045847.1956
225	156885.5070	1046215.2560
226	156597.1311	1045992.8052
227	156607.9016	1045826.0785
228	156586.3730	1045835.5001
229	156688.7486	1045790.6973
230	157027.6956	1045996.4078
231	156959.3853	1045840.3168
232	156847.2213	1046075.3891
233	156778.9456	1045919.3772

0 40 80 120 FT
SCALE

LEGEND:
- PROPOSED MARKING
- FULL STRENGTH PAVEMENT
- SHOULDER PAVEMENT
- CONCRETE APRON

NOTES:
1. THIS SHEET SHALL REPLACE SHEET MK-02 IF ADD ALTERNATE 4 IS AWARDED.
2. ALL WORK ASSOCIATED WITH THE CONSTRUCTION OF THE TAXIWAY D TAXILANE CONNECTOR SHALL BE PAID FOR AS PART OF ADD ALT 4. ALL OTHER WORK SHOWN SHALL BE PAID FOR AS PART OF THE BASE BID.
3. SEE SHEET MK-01 FOR MARKING NOTES.

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MARKING PLAN – ADD ALT 4

SCALE: 1" = 40'

DATE: MARCH 2022

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AIP No.: 3-33-0011-XXX-2021

DRAWING NO.

MK-02A

SHEET 76 OF 90 REV 1