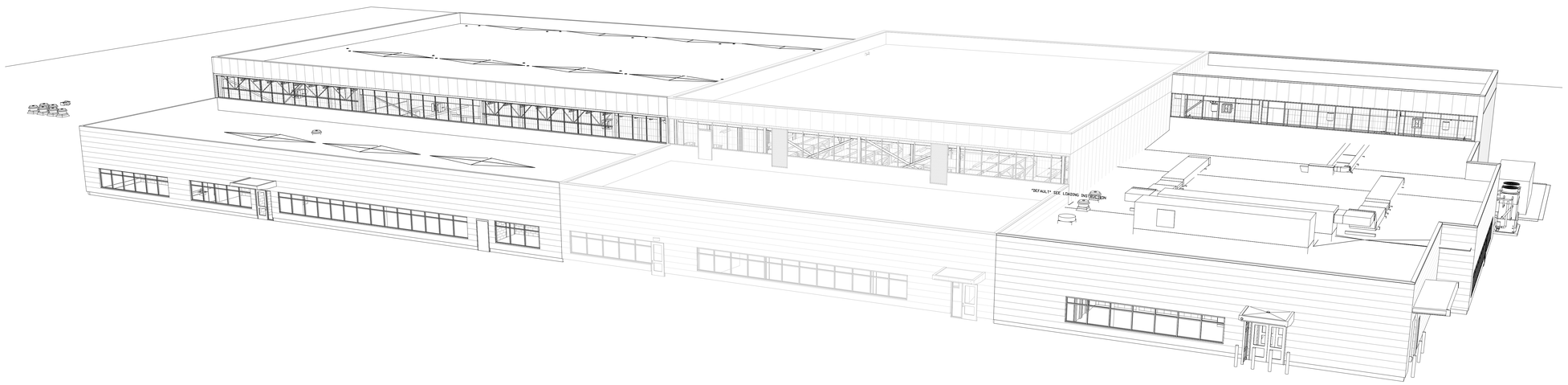
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER

FY14 B351 WAREHOUSE ADDITION

351 CRYOGENIC ROAD
CLEVELAND, OHIO 44135

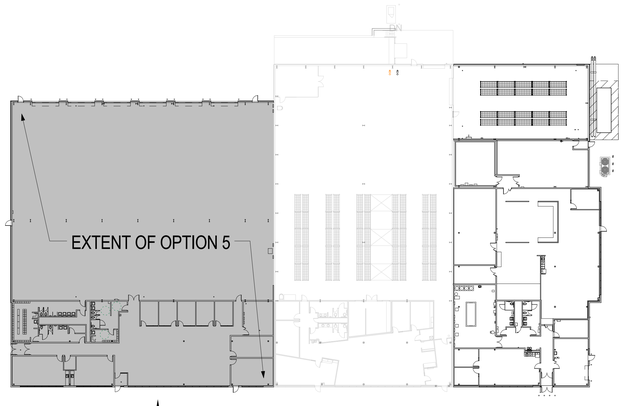
100% CONSTRUCTION DOCUMENTS

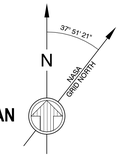
June 9, 2014



BID OPTIONS

BID OPTION 01: WEST AREA GATED STORAGE
BID OPTION 02: PARKING NORTH OF CRYOGENIC ROAD
BID OPTION 03: REMOVE EXCESS SOIL FROM GRC CAMPUS
BID OPTION 04: VIDEO EXISTING SANITARY AND STORM SEWERS
BID OPTION 05: WEST WAREHOUSE ADDITION





OVERALL PLAN

CONSTRUCTION GENERAL NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST.
2. SEE FAR CLAUSE 52.211-6 FOR ITEMS IDENTIFIED BY BRAND NAMES.
3. CONTRACTOR IS RESPONSIBLE FOR FOLLOWING ALL APPLICABLE SAFETY CODES. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS PRIOR TO COMMENCEMENT OF WORK AND SHALL NOTIFY THE GOVERNMENT OF ANY DISCREPANCIES.
4. CONTRACTOR IS RESPONSIBLE FOR FOLLOWING NASA SAFETY STANDARD FOR FIRE PROTECTION 8719.11A.
5. THE NASA APPOINTED AUTHORITY HAVING JURISDICTION (AHJ) IS RESPONSIBLE FOR IMPLEMENTING THE FIRE PROVISIONS OF NPR 8715.3 AND COMPLYING WITH PUBLIC LAW 100-678 REQUIRING ALL FEDERAL AGENCIES TO FOLLOW THE LATEST EDITIONS OF NATIONALLY RECOGNIZED FIRE AND LIFE SAFETY CODES. THE AHJ HAS THE FINAL AUTHORITY FOR APPROVING / CONCURRING WITH DESIGN ASSOCIATED INSTALLATIONS, PROCEDURES, AND EQUIPMENT. THE AHJ OR HIS DESIGNEE SHALL WITNESS AND INPSECT ALL INSTALLATIONS OF FIRE / LIFE SAFETY ASSEMBLIES AND /OR EQUIPMENT, TO INCLUDE THE INSTALLATION OR MODIFICATION OF DOMESTIC WATER USED FOR THE PURPOSE OF FIRE PROTECTION. THE AHJ OR HIS DESIGNEE SHALL BE PRESENT AND WITNESS ALL FLUSHING, HYDROSTATIC AND ACCEPTANCE TESTING OF ALL FIRE / LIFE SAFETY EQUIPMENT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE AHJ OF THE COMPLETION OF THE INSTALLATION PRIOR TO COVERING. IF INSTALLATIONS ARE COVERED PRIOR TO INSPECTION, THE CONTRACTOR WILL BE REQUIRED TO UNCOVER THE INSTALLATION AT NO COST TO THE GOVERNMENT. INSPECTION REQUEST SHALL BE PRIOR TO WITH A MINIMUM OF 24 HOUR NOTICE. THE CONTRACTOR IS TO SUBMIT ALL REQUIRED FLUSHING, TESTING AND ACCEPTANCE DOCUMENTATION AT THE TIME OF THE FINAL INSPECTION.
6. COMMERCIAL / INDUSTRIAL FILL: EXCESS EXCAVATED MATERIALS HAVE BEEN DESIGNATED AS COMMERCIAL / INDUSTRIAL FILL SOILS AND SHALL BE REFUSED ON SITE OR REMOVED FROM GOVERMNENT PROPERTY AND TRANSPORTED TO A COMMERCIAL OR INDUSTRIAL FILL SITE MEETING THE DEFINITIONS FOUND IN THE OHIO VOLUNTARY ACTION PROGRAM OAC 3745-300. IN NO CASE SHALL EXCESS EXCAVATED SOIL BE ALLOWED TO COME INTO CONTACT WITH A WATERWAY. NO EXCESS EXCAVATED SOIL SHALL BE REMOVED FROM THE SITE WITHOUT THE WRITTEN AUTHORIZATION FROM THE GOVERNMENT IN THE FORM OF COMPLETED AND SIGNED MANIFESTS AND PROPERTY PASSES.
7. WASTE MANAGEMENT AND RECYCLING: ALL MATERIALS LEAVING GOVERNMENT PROPERTY FOR RECYCLING OR DISPOSAL SHALL BE COORDINATED WITH NASA WASTE MANAGEMENT IN ACCORDANCE WITH SPECIFICATION SECTION 01 35 43 98 ENVIRONMENTAL PROTECTION PROCEDURES. ANY REMOVED OR DEMOLISHED ITEM THAT MEETS THE DEFINITION OF CONSTRUCTION AND DEMOLITION DEBRIS (C&DD) SHALL BE EVALUATED FOR REUSE AND / OR RECYCLING. THE CONTRACTOR SHALL REUSE OR RECYCLE ANY ITEM THAT CAN BE SEGREGATED FROM THE WASTE STREAM AND REUSED OR RECYCLED IN A COST EFFECTIVE MANNER. NASA WASTE MANAGEMENT (WM) MANAGES THE CONSTRUCTION WASTE MANAGEMENT PROGRAM. ALL REUSE, RECYCLING AND DISPOSAL ACTIVITIES SHALL BE COORDINATED WITH NASA WM. THE CONTRACTOR SHALL SUBMIT A MANIFEST FOR ANY C&DD MATERIALS THAT WILL BE REUSED OFF SITE, RECYCLED OR DISPOSED OF TO THE COTR, WHICH WILL THEN BE REVIEWED AND APPROVED BY NASA WM FOR TRANPSORTATION OFF SITE. MATERIALS THAT WILL BE REUSED OR RECYCLED SHALL BE SEGREGATED AND MANIFESTED INDIVIDUALLY. NASA HAS SPECIFICALLY TARGETED THE FOLLOWING MATERIALS FOR REUSE OR RECYCLING: ASPHALT, CONCRETE, GRAVEL / STONE, COMMERCIAL / INDUSTRIAL FILL SOIL, TOPSOIL, TREES / BUSHES, FERROUS AND NON-FERROUS METALS, CONCRETE BLOCK, BRICKS, CARPETING AND CERAMIC TILES.
8. CONCRETE WASHOUT: WASHING OUT CONCRETE TRUCKS ONTO PAVEMENT OR ANYWHERE THAT IT CAN FLOW INTO A STORM SEWER, SANITARY SEWER OR AN ADJACENT WATERWAY IS STRICTLY PROHITIED. A DESIGNATED CONCRETE WASHOUT CONTAINER IS LOCATED ADJACENT TO BUILDING 215 FOR THE SOLE PURPOSE OF WASHING OUT CONCRETE TRUCKS. THE USE OF THIS CONTAINER SHALL BE COORDINATED PRIOR TO ALL CONCRETE PLACEMENT. THE CONTRACTOR SHALL NOTIFY THE NASA CONSTRUCTION MANGER 24 HOURS IN ADVANCE OF ANY CONCRETE PLACEMENT ACTIVITY.
9. LEED CERTIFICATION: THIS PROJECT HAS BEEN DESIGNED TO ACHIEVE A LEED SILVER CERTIFICATION LEVEL. CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPLIANT MATERIALS AND FOLLOWING PROCEDURES THAT MEET THE REQUIREMENTS OF SPECIFICATION SECTION 01 33 29 LEED DOCUMENTATION. COMPLIANT MATERIALS INCLUDE BUT ARE NOT LIMITED TO; MATERIALS WITH RECYCLED CONTENT, MATERIALS SOURCED AND PRODUCED LOCALLY, WOOD WITH FSC CONTENT, COMPOSITE WOOD AND AGRIFIBER PRODUCTS WITH NO ADDED UREA-FORMALDEHYDE, AND ALL ADHESIVES, SEALANTS, PAINTS, AND COATINGS APPLIED ONSITE AND INSIDE THE WEATHERPROOFING SYSTEM THAT DO NOT EXCEED ALLOWABLE VOC LIMITS. FOLLOW CONSTRUCTION PROCEDURES AND DOCUMENT COMPLIANCE THROUGHOUT THE PROJECT FOR PROCEDURES INCLUDING BUT NOT LIMITED TO; CONSTRUCTION WASTE MANAGEMENT, EROSION AND SEDIMENTATION CONTROL (ESC) PLAN, AND INDOOR AIR QUALITY (IAQ) PLANS DURING CONSTRUCTION AND BEFORE OCCUPANCY. REFER TO THE APPROVED LEED IMPLEMENTATION PLAN FOR SPECIFIC REQUIREMENTS AND THRESHOLDS THAT MUST BE MET.

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED		TECH LEAD: / FAC-SYS MGR:	REV DATE:
EDMS REVISION			

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

COVER SHEET

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	G-	001

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

G-001

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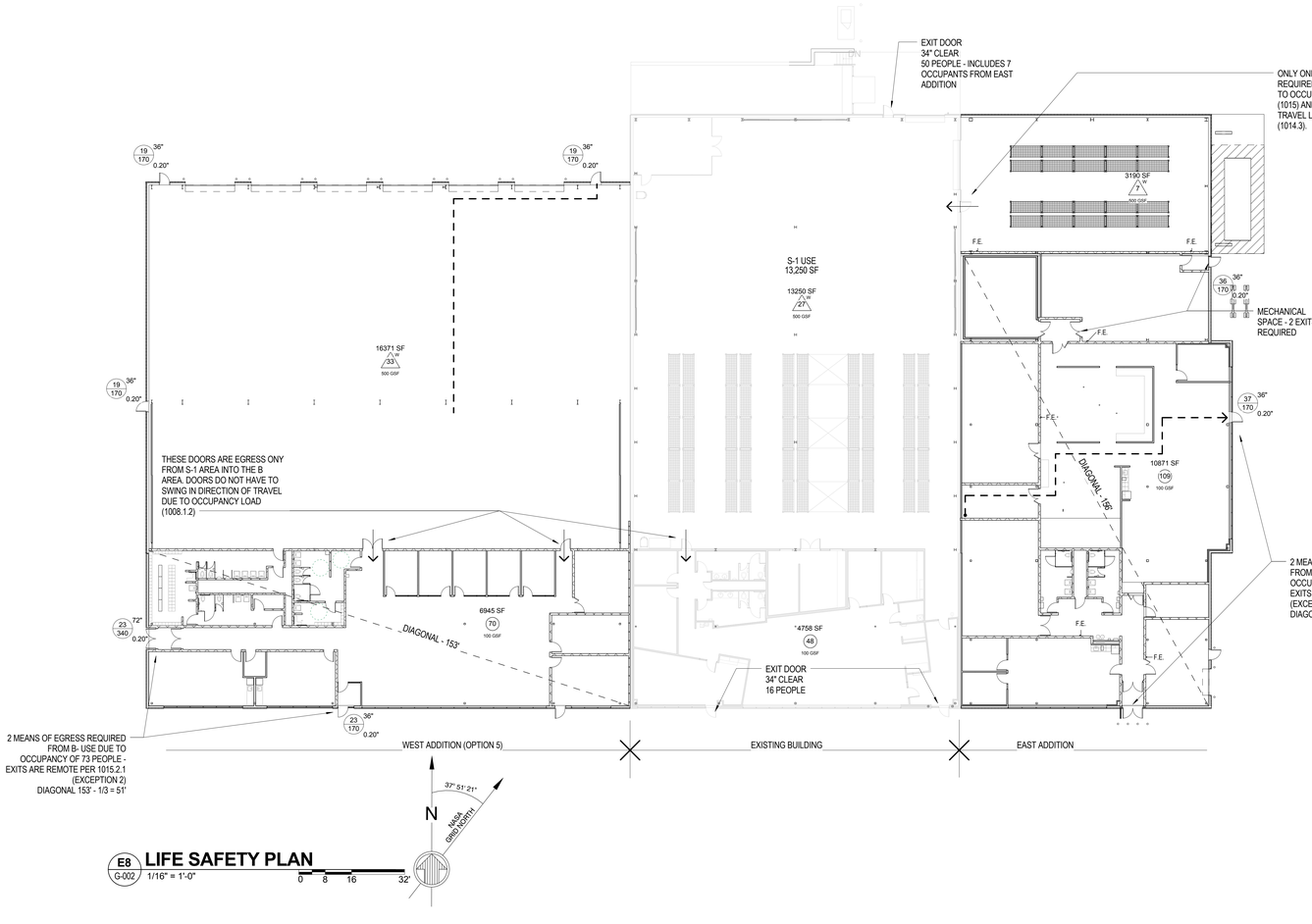

E8 / G-002 LIFE SAFETY PLAN

1/16" = 1'-0"

0 8 16 32'

CODE SUMMARY

BUILDING CODE SUMMARY

ACCESSIBILITY:
ADA ACCESSIBILITY GUIDELINES FOR BUILDINGS AND FACILITIES, 28 CFR PART 36 APPENDIX A2010
ADA: AS REFERENCED BY THE OHIO BUILDING CODE (OBC).

BUILDING:
2011 OHIO BUILDING CODE (OBC), BASED ON THE 2009 EDITION OF THE INTERNATIONAL BUILDING CODE (IBC), WITH OHIO STATE AMENDMENTS, EFFECTIVE MARCH 1, 2013.

ELECTRICAL:
NFPA 70, NATIONAL ELECTRICAL CODE (NEC), 2011 EDITION, EFFECTIVE NOVEMBER 1, 2011.

ELEVATORS:
OHIO ELEVATOR CODE, BASED ON THE SAFETY CODE FOR ELEVATORS AND ESCALATORS (ASME A17.1), 2011 EDITION, WITH ALL APPLICABLE SUPPLEMENTS INCLUDING MARCH 15, 2012 AMENDMENTS .

FIRE PREVENTION:
2011 OHIO FIRE CODE (OFC) BASED ON THE 2009 EDITION OF THE INTERNATIONAL FIRE CODE (IFC), WITH OHIO STATE AMENDMENTS, EFFECTIVE NOVEMBER 1, 2011.

MECHANICAL:
2011 OHIO MECHANICAL CODE (OMC) BASED ON THE 2009 EDITION OF THE INTERNATIONAL FIRE CODE (IFC), WITH OHIO STATE AMENDMENTS, EFFECTIVE NOVEMBER 1, 2011.

PLUMBING:
2011 OHIO PLUMBING CODE (OPC) BASED ON THE 2009 EDITION OF THE INTERNATIONAL PLUMBING CODE (IPC), WITH OHIO STATE AMENDMENTS, EFFECTIVE MARCH 15, 2012.

FUEL GAS CODE:
2009 INTERNATIONAL FUEL GAS CODE (IFGC), EFFECTIVE NOVEMBER 1, 2011.

ENERGY CONSERVATION CODE:
2009 INTERNATIONAL ENERGY CONSERVATION CODE (IECC), EFFECTIVE NOVEMBER 1, 2011. ASHRAE 90.1, 2007 AS REFERENCED BY THE IECC AND OMC.

OTHER:
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS, AS REFERENCED BY THE OBC AND OFC.

CHAPTER 2 DEFINITIONS
STORIES ABOVE GRADE:
OBC: ONE STORY ABOVE GRADE

CHAPTER 3 USE AND OCCUPANCY
USE GROUPS:
OBC: 302.3.1 EXISTING BUILDING IS NONSEPARATED MIXED USE OF B AND S-1 USES PER CODESECTIONS 304.1 AND 311.1 PER 508.3
NFPA 101: BUSINESS AND STORAGE, LOW AND ORDINARY HAZARD

CHAPTER 4 SPECIAL USE AND OCCUPANCY
NO SPECIAL OCCUPANCY

CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS -
BUILDING IS NON-SEPARATED MIXED USE PER 508.3 - SINCE S-1 USE IS THE MOST RESTRICTIVE, AREA AND HEIGHT CALCULATIONS ARE BASED ON THOSE TABULAR VALUES.

ALLOWABLE BUILDING AREA:

17,500 SF/ FLOOR	ALLOWABLE AREA PER TABLE 503 (USING S-1 USE AS MOST RESTRICTIVE)
52,200 SF/ FLOOR	SPRINKLER INCREASE (506.3 - 300% FOR 1 STORY BUILDING)
0 SF/ FLOOR	NO FRONTAGE INCREASE CONSIDERED (506.2)
70,000 SF/ FLOOR	**ADJUSTED ALLOWABLE INCREASE**

ACTUAL BUILDING AREA:

18,000 SF/ FLOOR	EXISTING BUILDING
23,360 SF/ FLOOR	WEST ADDITION
13,500 SF/ FLOOR	EAST ADDITION
54,860 SF	**TOTAL AREA**

ALLOWABLE BUIDLING HEIGHT:

2 STORIES / 55 FEET	ALLOWABLE HEIGHT PER TABLE 503 (USING S-1 USE)
1 STORY / 20 FEET	ALLOWABLE INCREASE DUE TO SPRINKLER (504.2)
3 STORIES / 75 FEET	**ADJUSTED ALLOWABLE BUILDING HEIGHT**

ACTUAL BUILDING HEIGHT:
1 STORY / 29' - 7"

CHAPTER 6 TYPES OF CONSTRUCTION
TYPE OF CONSTRUCTION - 2B:

OBC; TABLES 601 & 602:

BUILDING ELEMENTS	**FIRE RATING**
STRUCTURAL FRAME (COLUMNS, GIRDERS, TRUSSES)	0 HOURS
BEARING WALLS (INTERIOR & EXTERIOR)	0 HOURS
NONBEARING WALLS (EXTERIOR)	0 HOURS > 30 FT.
NONBEARING WALLS (INTERIOR)	0 HOUR
FLOOR CONSTRUCTION	0 HOURS
ROOF CONSTRUCTION	0 HOUR

CHAPTER 7 FIRE-RESISTANCE-RATED CONSTRUCTION:
NO RATED CONSTRUCTION IS REQUIRED

CHAPTER 8 INTERIOR FINISHES:
OBC; TABLE 803.5 (FOR FULLY SPRINKLERED **S-1**)

LOCATION	**CLASS**	**FLAME SPREAD**	**SMOKE DEVELOPED**
EXITS & PASSAGEWAY	CLASS A	0-25	0-450
EXIT ACCESS	CLASS A	0-25	0-450
ROOMS & ENCLOSED	CLASS A	0-25	0-450

OBC; TABLE 803.5 (FOR FULLY SPRINKLERED **B**)

LOCATION	**CLASS**	**FLAME SPREAD**	**SMOKE DEVELOPED**
EXITS & PASSAGEWAY	CLASS A	0-25	0-450
EXIT ACCESS	CLASS A	0-25	0-450
ROOMS & ENCLOSED	CLASS A	0-25	0-450

CHAPTER 9 FIRE PROTECTION SYSTEMS
OBC SECTION 903 FIRE PROTECTION SYSTEM
OBC SECTION 906 STANDPIPE SYSTEM IS NOT REQUIRED

CHAPTER 10 MEANS OF EGRESS
OBC SECTION 1004 OCCUPANT LOAD (TABLE 1004)

	S-1 USE (1 P/ 500 SF)		**B USE (1P/ 100 SF)**		**TOTAL**
	AREA	**PEOPLE**	**AREA**	**PEOPLE**	**PEOPLE**
EXISTING BUILDING	13,250 SF	27	4,758 SF	48	75
WEST ADDITION	16,371 SF	33	6,952 SF	70	103
EAST ADDITION	3,191 SF	7	10,333 SF	108	115
TOTALS:		67		226	293

OBC SECTION 1005 EGRESS WIDTH: NO STAIRS
OTHER EGRESS .2" PER OCCUPANT

OBC SECTION 1007.2.1 ACCESSIBLE MEANS OF EGRESS
TWO ACCESSIBLE MEANS OF EGRESS ARE REQUIRED FROM THE BUILDING

COMMON PATH OF TRAVEL (1014.3)
100 FEET PER EXCEPTION 1 DUE TO FULLY SPRINKLERED BUILDING

EXIT TRAVEL DISTANCE (TABLE 1016.1 WITH SPRINKLER SYSTEM)
S-1 - OCCUPANCY 250 FT. MAX
B - OCCUPANCY 300 FT. MAX

OBC SECTION 1017 CORRIDORS
0 HOUR ENCLOSURE RATING WITH SPRINKLERS
MIN. WIDTH 44"
DEAD END CORRIDOR 50FT. FOR B OCCUPANCY AREAS
20 FT IN STORAGE

CHAPTER 29 - PLUMBING SYSTEMS
PLUMBING FIXTURE COUNT: BASED ON B USE AS THE MORE RESTRICTIVE REQUIREMENTS

OCCUP.	W. CLOSETS REQ'D	W. CLOSETS PROV.	LAVATORIES REQ'D	LAVATORIES PROV.
MEN (145)	3	12	2	10
WOMEN (145)	3	7	2	7

	D. FOUNT. REQ'D	D. FOUNT. PROV.	SERV. SINK REQ'D	SERV. SINK PROV.
COMBINED (289)	3	3	1	1

DRAWING INDEX

Rev. No.	
GENERAL	
G-001	COVER SHEET
G-002	LIFE SAFETY / CODE SUMMARY / DRAWING INDEX
G-003	ENVIRONMENTAL, HEALTH AND SAFETY NOTES
CIVIL	
C-105	LAYOUT CONTROL PLAN
C-106	LAYOUT CONTROL PLAN BID OPTION 01
C-107	GEOMETRIC PLAN
C-108	GEOMETRIC PLAN BID OPTION 01
C-109	GRADING PLAN
C-110	GRADING PLAN BID OPTION 01
C-111	SWPP PLAN
C-112	SWPP PLAN BID OPTION 01
C-113	UTILITY PLAN
C-114	UTILITY PLAN BID OPTION 01
C-115	UTILITY PROFILE PLAN
C-501	SWPP NOTES & DETAILS
C-502	SWPP NOTES & DETAILS
C-503	SWPP NOTES & DETAILS
C-504	SITE DETAILS
C-505	SITE DETAILS
C-506	SITE DETAILS
C-507	SITE DETAILS
C-508	SITE DETAILS
C-509	SITE DETAILS
C-510	BORING LOG
C-511	BORING LOG
C-512	BORING LOG
CD-101	SITE DEMOLITION PLAN
CD-102	SITE DEMOLITION PLAN BID OPTION 01
CD-103	UTILITY DEMOLITION PLAN
CD-104	UTILITY DEMOLITION PLAN BID OPTION 1
V-101	EXISTING CONDITIONS
V-102	EXISTING CONDITIONS BID OPTION 01
V-103	EXISTING CONDITIONS UNDERGROUND UTILITIES
V-104	EXISTING CONDITIONS UNDERGROUND UTILITIES BID OPTION 01
LANDSCAPE	
L-101	LANDSCAPE PLAN
L-102	LANDSCAPE PLAN BID OPTION 01
L-501	LANDSCAPE DETAILS
STRUCTURAL	
S-001	GENERAL NOTES
S-002	GENERAL NOTES
S-101	FOUNDATION PLAN - EAST ADDITION
S-102	ROOF FRAMING PLANS - EAST ADDITION
S-501	FOUNDATION DETAILS
S-502	FOUNDATION DETAILS
S-503	FRAMING DETAILS
S-504	FRAMING DETAILS
S-505	FRAMING DETAILS
ARCHITECTURE	
A-001	ARCHITECTURAL SYMBOLS, MATERIALS & ABBREVIATIONS
A-002	PARTITION TYPES
A-101	FIRST FLOOR CONTROL PLAN
A-102	FLOOR PLAN EAST
A-104	REFLECTED CEILING PLANS
A-105	ROOF CONTROL PLAN
A-106	ROOF PLANS
A-201	EXTERIOR ELEVATIONS
A-202	EXTERIOR ELEVATIONS
A-301	BUILDING SECTIONS
A-302	EAST ADDITION - WALL SECTIONS AND DETAILS
A-303	EAST ADDITION - WALL SECTIONS AND DETAILS
A-304	EAST ADDITION - WALL SECTIONS AND DETAILS
A-305	EAST ADDITION - WALL SECTIONS AND DETAILS
A-306	EAST ADDITION - WALL SECTIONS AND DETAILS
A-401	ENLARGED EAST ADDITION TOILET ROOM PLANS, ELEVATIONS, LEGENDS & SCHEDULES
A-501	EAST ADDITION - PLAN DETAILS
A-502	TYPICAL ROOF DETAILS
A-601	DOOR SCHEDULE
A-602	OPENING DETAILS
A-603	EXTERIOR FRAME TYPE ELEVATIONS
X-101	SHIELDING DETAILS
X-102	SHIELDING DETAILS
INTERIORS	
I-101	FIRST FLOOR FINISH AND FURNITURE PLAN
I-601	INTERIOR ELEVATIONS AND DETAILS

DRAWING INDEX

Rev. No.	
HVAC	
M-001	MECHANICAL COVER SHEET
M-002	HVAC TESTING AND IDENTIFICATION TABLES
M-101	FIRST FLOOR MECHANICAL DUCT PLAN EAST
M-102	ROOF MECHANICAL DUCT PLAN EAST
M-103	FIRST FLOOR MECHANICAL PIPING PLAN EAST
M-104	FIRST FLOOR MECHANICAL DUCT PLAN WEST
M-105	ROOF MECHANICAL DUCT PLAN WEST
M-106	FIRST FLOOR MECHANICAL PIPING PLAN WEST
M-401	MECHANICAL ENLARGED PLANS AND SECTIONS
M-402	GEOTHERMAL BOREHOLE PLAN
M-501	HVAC DETAILS
M-502	HVAC DETAILS
M-503	HVAC AIR HANDLING UNIT DETAILS
M-601	HVAC DIAGRAMS
M-602	MECHANICAL SCHEDULES
M-603	MECHANICAL SCHEDULES
M-701	HVAC CONTROLS
M-702	HVAC CONTROLS
M-703	HVAC CONTROLS
M-704	HVAC CONTROLS
M-705	HVAC CONTROLS
M-706	HVAC CONTROLS
M-707	HVAC CONTROLS
M-708	HVAC CONTROLS
PLUMBING	
P-001	PLUMBING SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES
P-101	PLUMBING PLAN - COMPLETE
P-102	PLUMBING PLAN - ROOF
P-103	PLUMBING PLAN - SUB SLAB
P-104	PLUMBING PLAN - EAST ADDITION
P-501	PLUMBING DETAILS
P-502	PLUMBING DETAILS
P-601	PLUMBING RISER DIAGRAMS
P-602	PLUMBING SCHEDULES
ELECTRICAL	
E-001	ELECTRICAL COVER SHEET
ED-101	ELECTRICAL DEMOLITION
E-100	ELECTRICAL SITE PLAN
E-102	FIRST FLOOR - LIGHTING - PART A
E-103	FIRST FLOOR - LIGHTING - PART B
E-104	ROOF - LIGHTING - PART A
E-105	ROOF - LIGHTING - PART B
E-106	FIRST FLOOR - POWER - PART A
E-107	FIRST FLOOR - POWER - PART B
E-108	ROOF - POWER - PART A
E-109	ROOF - POWER - PART B
E-110	FIRST FLOOR EAST - SYSTEMS - PART A
E-111	FIRST FLOOR WEST - SYSTEMS - PART B
E-112	ROOF - SYSTEMS
E-501	ELECTRICAL DETAILS
E-502	ELECTRICAL DETAILS
E-503	ELECTRICAL DETAILS
E-505	ELECTRICAL DETAILS
E-506	ELECTRICAL DETAILS
E-600	ELECTRICAL SCHEDULES
E-601	ELECTRICAL SCHEDULES
E-602	ELECTRICAL SCHEDULES
E-801	ELECTRICAL RISER DIAGRAM
E-802	SYSTEM RISER DIAGRAMS
FIRE PROTECTION	
F-001	FIRE PROTECTION SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES
F-101	FIRE PROTECTION PLAN
F-501	FIRE PROTECTION DETAILS
F-601	FIRE PROTECTION RISER DIAGRAM
F-602	FIRE PROTECTION SCHEDULES

LIFE SAFETY LEGEND

X W / Y Z — EGRESS COMPONENT SYMBOL:
W = WIDTH OF LIMITING COMPONENT IN INCHES. DOOR CALCULATION = ACTUAL WIDTH - (DOOR THICKNESS x (2 x STOP DEPTH))
X = "ACTUAL EXIT CAPACITY" - PROPOSED NUMBER OF OCCUPANTS USING EXIT
Y = "CALCULATED EXIT CAPACITY" - MAX. NUMBER OF OCCUPANTS EXIT CAN ACCOMODATE = W / Z
Z = EGRESS WIDTH PER OCCUPANT SERVED (INCHES PER OCCUPANT) PER TABLE 1005.1

000 SF / 00 / 300 GSF — TOTAL AREA OF SPACE; NUMBER OF OCCUPANTS IN SPACE

TRAVEL DISTANCE - PATH OF TRAVEL

FC — FIRE EXTINGUISHER CABINET - SURFACE MOUNTED
FR — FIRE EXTINGUISHER CABINET - FULLY RECESSED
FE — FIRE EXTINGUISHER - BRACKET MOUNTED
FS — FIRE EXTINGUISHER CABINET - SEMI-RECESSED

TABLE 1004.1.1
MAX. FLOOR AREA ALLOWANCES PER OCCUPANT
FUNCTION OF SPACES SYMBOL LEGEND

000 SF / 00 / 100 GSF — BUSINESS AREAS 100 SF GROSS/OCC	000 SF / 00 / 500 GSF — WAREHOUSES 500 SF GROSS/OCC

AREA SCHEDULE	
EAST ADDITION	
S-1 USE	3,190 SF
B USE	10,871 SF
	14,061 SF
EXISTING BUILDING	
S-1 USE	13,250 SF
B USE	4,758 SF
	18,008 SF
WEST ADDITION	
S-1 USE	16,371 SF
B USE	6,945 SF
	23,316 SF
Grand total	55,386 SF

EGRESS PATH OF TRAVEL DISTANCE	
AREA	DISTANCE
EAST ADDITION EGRESS	109'-2"
WEST ADDITION EGRESS	113'-0"

CONSTRUCTION GENERAL NOTES

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3. CONTRACTOR IS RESPONSIBLE FOR FOLLOWING ALL APPLICABLE SAFETY CODES. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS PRIOR TO COMMENCEMENT OF WORK AND SHALL NOTIFY THE GOVERNMENT OF ANY DISCREPANCIES.
4. CONTRACTOR IS RESPONSIBLE FOR FOLLOWING NASA SAFETY STANDARD FOR FIRE PROTECTION 8719.11A.
5. THE NASA APPOINTED AUTHORITY HAVING JURISDICTION (AHJ) IS RESPONSIBLE FOR IMPLEMENTING THE FIRE PROVISIONS OF NPR 8715.3 AND COMPLYING WITH PUBLIC LAW 100-678 REQUIRING ALL FEDERAL AGENCIES TO FOLLOW THE LATEST EDITIONS OF NATIONALLY RECOGNIZED FIRE AND LIFE SAFETY CODES. THE AHJ HAS THE FINAL AUTHORITY FOR APPROVING / CONCURRING WITH DESIGN ASSOCIATED INSTALLATIONS, PROCEDURES, AND EQUIPMENT. THE AHJ OR HIS DESIGNEE SHALL WITNESS AND INPSECT ALL INSTALLATIONS OF FIRE / LIFE SAFETY ASSEMBLIES AND /OR EQUIPMENT, TO INCLUDE THE INSTALLATION OR MODIFICATION OF DOMESTIC WATER USED FOR THE PURPOSE OF FIRE PROTECTION. THE AHJ OR HIS DESIGNEE SHALL BE PRESENT AND WITNESS ALL FLUSHING, HYDROSTATIC AND ACCEPTANCE TESTING OF ALL FIRE / LIFE SAFETY EQUIPMENT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE AHJ OF THE COMPLETION OF THE INSTALLATION PRIOR TO COVERING. IF INSTALLATIONS ARE COVERED PRIOR TO INSPECTION, THE CONTRACTOR WILL BE REQUIRED TO UNCOVER THE INSTALLATION AT NO COST TO THE GOVERNMENT. INSPECTION REQUEST SHALL BE PRIOR TO WITH A MINIMUM OF 24 HOUR NOTICE. THE CONTRACTOR IS TO SUBMIT ALL REQUIRED FLUSHING, TESTING AND ACCEPTANCE DOCUMENTATION AT THE TIME OF THE FINAL INSPECTION.
6. COMMERCIAL / INDUSTRIAL FILL: EXCESS EXCAVATED MATERIALS HAVE BEEN DESIGNATED AS COMMERCIAL / INDUSTRIAL FILL SOILS AND SHALL BE REFUSED ON SITE OR REMOVED FROM GOVERMNENT PROPERTY AND TRANSPORTED TO A COMMERCIAL OR INDUSTRIAL FILL SITE MEETING THE DEFINITIONS FOUND IN THE OHIO VOLUNTARY ACTION PROGRAM OAC 3745-300. IN NO CASE SHALL EXCESS EXCAVATED SOIL BE ALLOWED TO COME INTO CONTACT WITH A WATERWAY. NO EXCESS EXCAVATED SOIL SHALL BE REMOVED FROM THE SITE WITHOUT THE WRITTEN AUTHORIZATION FROM THE GOVERMNENT IN THE FORM OF COMPLETED AND SIGNED MANIFESTS AND PROPERTY PASSES.
7. WASTE MANAGEMENT AND RECYCLING: ALL MATERIALS LEAVING GOVERNMENT PROPERTY FOR RECYCLING OR DISPOSAL SHALL BE COORDINATED WITH NASA WASTE MANAGEMENT IN ACCORDANCE WITH SPECIFICATION SECTION 01 35 43 .98 ENVIRONMENTAL PROTECTION, PROCEDURES. ANY REMOVED OR DEMOLISHED ITEM THAT MEETS THE DEFINITION OF CONSTRUCTION AND DEMOLITION DEBRIS (C&DD) SHALL BE EVALUATED FOR REUSE AND / OR RECYCLING. THE CONTRACTOR SHALL REUSE OR RECYCLE ANY ITEM THAT CAN BE SEGREGATED FROM THE WASTE STREAM AND REUSED OR RECYCLED IN A COST EFFECTIVE MANNER. NASA WASTE MANAGEMENT (WM) MANAGES THE CONSTRUCTION WASTE MANAGEMENT PROGRAM. ALL REUSE, RECYCLING AND DISPOSAL ACTIVITIES SHALL BE COORDINATED WITH NASA WM. THE CONTRACTOR SHALL SUBMIT A MANIFEST FOR ANY C&DD MATERIALS THAT WILL BE REUSED OFF SITE, RECYCLED OR DISPOSED OF TO THE COTR, WHICH WILL THEN BE REVIEWED AND APPROVED BY NASA WM FOR TRANPSORTATION OFF SITE. MATERIALS THAT WILL BE REUSED OR RECYCLED SHALL BE SEGREGATED AND MANIFESTED INDIVIDUALLY. NASA HAS SPECIFICALLY TARGETED THE FOLLOWING MATERIALS FOR REUSE OR RECYCLING: ASPHALT, CONCRETE, GRAVEL / STONE, COMMERCIAL / INDUSTRIAL FILL SOIL, TOPSOIL, TREES / BUSHES, FERROUS AND NON-FERROUS METALS, CONCRETE BLOCK, BRICKS, CARPETING AND CERAMIC TILES.
8. CONCRETE WASHOUT: WASHING OUT CONCRETE TRUCKS ONTO PAVEMENT OR ANYWHERE THAT IT CAN FLOW INTO A STORM SEWER, SANITARY SEWER OR AN ADJACENT WATERWAY IS STRICTLY PROHITIED. A DESIGNATED CONCRETE WASHOUT CONTAINER IS LOCATED ADJACENT TO BUILDING 215 FOR THE SOLE PURPOSE OF WASHING OUT CONCRETE TRUCKS. THE USE OF THIS CONTAINER SHALL BE COORDINATED PRIOR TO ALL CONCRETE PLACEMENT. THE CONTRACTOR SHALL NOTIFY THE NASA CONSTRUCTION MANGER 24 HOURS IN ADVANCE OF ANY CONCRETE PLACEMENT ACTIVITY.
9. LEED CERTIFICATION: THIS PROJECT HAS BEEN DESIGNED TO ACHIEVE A LEED SILVER CERTIFICATION LEVEL. CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPLIANT MATERIALS AND FOLLOWING PROCEDURES THAT MEET THE REQUIREMENTS OF SPECIFICATION SECTION 01 33 29 LEED DOCUMENTATION. COMPLIANT MATERIALS INCLUDE BUT ARE NOT LIMITED TO; MATERIALS WITH RECYCLED CONTENT, MATERIALS SOURCED AND PRODUCED LOCALLY, WOOD WITH FSC CONTENT, COMPOSITE WOOD AND AGRIFIBER PRODUCTS WITH NO ADDED UREA-FORMALDEHYDE, AND ALL ADHESIVES, SEALANTS, PAINTS, AND COATINGS APPLIED ONSITE AND INSIDE THE WEATHERPROOFING SYSTEM THAT DO NOT EXCEED ALLOWABLE VOC LIMITS. FOLLOW CONSTRUCTION PROCEDURES AND DOCUMENT COMPLIANCE THROUGHOUT THE PROJECT FOR PROCEDURES INCLUDING BUT NOT LIMITED TO; CONSTRUCTION WASTE MANAGEMENT, EROSION AND SEDIMENTATION CONTROL (ESC) PLAN, AND INDOOR AIR QUALITY (IAQ) PLANS DURING CONSTRUCTION AND BEFORE OCCUPANCY. REFER TO THE APPROVED LEED IMPLEMENTATION PLAN FOR SPECIFIC REQUIREMENTS AND THRESHOLDS THAT MUST BE MET.

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED:
APPROVED: | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

LIFE SAFETY / CODE SUMMARY / DRAWING INDEX

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	G-	002

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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GENERAL

1. HEREINAFTER, THE TERM "CONTRACTOR" IN THESE DESIGN DRAWINGS SHALL REFER TO THE ENTITIES (I.E. THE CONTRACTOR AND/OR ITS SUBCONTRACTOR(S)) IMPLEMENTING THE PROJECT.

2. THE CONTRACTOR SHALL COMPLETE ALL ACTIVITIES ASSOCIATED WITH THE PROJECT IN COMPLIANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS AND REQUIREMENTS.

3. THE CONTRACTOR SHALL EXECUTE ALL CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE PROJECT PLAN AND SPECIFICATIONS.

4. THE CONTRACTOR SHALL SUPPLY ALL EQUIPMENT, MATERIALS, AND LABOR TO PERFORM THE CONTRACT REQUIREMENTS INCLUDING ALL WORKER SAFETY EQUIPMENT.

5. THE CONTRACTOR SHALL COMPLY WITH NASA GRC SITE ACCESS PROTOCOLS.

6. ACCESS TO NASA GRC SHALL BE OFF OF BROOKPARK ROAD. ADDITIONAL TIME MAY BE REQUIRED TO GAIN ACCESS. THE CONTRACTOR SHALL BE REQUIRED TO ALLOW FOR DELAYS WITHOUT ADDITIONAL CHARGES TO THE NASA GRC.

7. NASA GRC TRAFFIC RULES SHALL BE STRICTLY ADHERED TO. SPEED LIMIT IS LIMITED TO 15 MILES PER HOUR (MPH) WHEN DRIVING THROUGH ANY GATE AND IN PARKING AREAS. THE SPEED LIMIT IS 25 MPH THROUGHOUT THE REMAINDER OF THE FACILITY.

8. THE USE OF HAND-HELD WIRELESS COMMUNICATION DEVICES SHALL BE PROHIBITED WHEN DRIVING A MOTOR VEHICLE AND CONSTRUCTION EQUIPMENT ON NASA PROPERTY. THIS INCLUDES CELL PHONES (TALKING AND TEXTING), UHF RADIOS, OR OTHER HAND-HELD WIRELESS COMMUNICATION DEVICES.

9. LOCAL TRAFFIC SHALL BE MAINTAINED ON AT LEAST HALF OF THE ROADWAY WIDTH AT ALL TIMES.

10. NASA ROADS SHALL NOT BE BLOCKED WITHOUT PRIOR APPROVAL.

11. THE CONTRACTOR SHALL KEEP THE PROJECT SITE CLEAN AT ALL TIMES. THE CONTRACTOR SHALL PROVIDE METAL CONTAINERS FOR WASTE AND SCRAP MATERIALS. THE CONTRACTOR SHALL REMOVE THE CONTAINERS FROM THE PROJECT SITE WHEN FULL AND IS RESPONSIBLE FOR FINAL CLEANING OF THE PROJECT SITE. THE CONTRACTOR SHALL REMOVE ALL TOOLS, SURPLUS MATERIALS, AND DEBRIS FROM THE PROJECT SITE AT THE COMPLETION OF THIS PROJECT.

12. THE CONTRACTOR SHALL COORDINATE ALL CONSTRUCTION ACTIVITIES WITH THE NASA CONSTRUCTION MANAGER SO PORTABLE EQUIPMENT AND DEBRIS CAN BE MOVED, ACCESS TO BUILDINGS CAN BE PROVIDED, AND INTERFERENCE WITH OTHER NASA OPERATIONS CAN BE KEPT TO A MINIMUM.

13. RED-LINED AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE NASA CONSTRUCTION MANAGER AT THE COMPLETION OF THE JOB. RED-LINED AS-BUILT DRAWINGS SHALL DOCUMENT EACH AND EVERY DEVIATION FROM THE CONSTRUCTION DRAWINGS. DEVIATIONS INCLUDE CHANGES IN LOCATION, ELEVATION, ALIGNMENTS, MATERIAL, AND CONFIGURATION. LOCATION OF ANY UNCHARTED UTILITY OR UNANTICIPATED CONDITION SHALL BE CAREFULLY AND COMPLETELY DOCUMENTED. RED-LINED AS-BUILT DRAWINGS SHALL BE MAINTAINED ON THE PROJECT SITE AND BE AVAILABLE FOR REVIEW BY THE NASA CONSTRUCTION MANAGER AND THE SURVEYOR.

14. NO WORK SHALL TAKE PLACE DURING INCLEMENT WEATHER (INCLUDING, BUT NOT LIMITED TO, EXCESSIVE PRECIPITATION, EXCESSIVE WINDS, APPROACHING INCLEMENT WEATHER, ETC.) AS DETERMINED BY THE NASA CONTRACTING OFFICER'S REPRESENTATIVE (COR).

WASTE MANAGEMENT AND ENVIRONMENTAL

1. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO INITIATION OF ANY CONSTRUCTION ACTIVITY THAT MAY CAUSE EROSION OR SEDIMENTATION. EROSION CONTROL MEASURES SHALL BE MAINTAINED, REPAIRED, AND REINSTALLED AS NECESSARY THROUGHOUT THE DURATION OF CONSTRUCTION AND RESTORATION ACTIVITIES.

2. THE CONTRACTOR SHALL DEVELOP A STORMWATER POLLUTION PREVENTION PLAN PRIOR TO INITIATING ANY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL COORDINATE WITH THE NASA FACILITIES ENVIRONMENTAL DIVISION.

3. CONTRACTOR SHALL PROVIDE ALL NECESSARY STORMWATER POLLUTION PREVENTION CONTROL MEASURES TO PREVENT SEDIMENT AND SPILLS FROM ENTERING THE STORM SEWER SYSTEM AND ULTIMATELY PLUM BROOK. THE CONTRACTOR SHALL PROTECT ALL INLET BASINS THAT MAY RECEIVE SEDIMENT OF SPILLS.

4. DURING INSTANCES OF HIGH WINDS, WHICH RESULT IN VISIBLE DUST, NASA RESERVES THE RIGHT TO REQUIRE ADDITIONAL DUST CONTROL OR TO STOP WORK. THE CONTRACTOR SHALL BE REQUIRED TO ALLOW FOR DELAYS WITHOUT ADDITIONAL CHARGES TO NASA GRC. THE CONTRACTOR SHALL CONTROL DUST AT ALL TIMES.

5. IF UNEXPECTED MATERIALS ARE DISCOVERED DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY THE NASA COR. THE CONTRACTOR SHALL NOT RESUME WORK UNTIL APPROVAL IS GRANTED BY THE COR.

6. CONTRACTOR SHALL INSURE THAT NO DIRECT DISCHARGE FROM A CONCRETE TRUCK IS PERMITTED TO DISCHARGE INTO THE STORM SEWER. NASA HAS MADE PROVISIONS FOR DISCHARGE FROM CONCRETE TRUCKS AT GRC. ALL CONCRETE TRUCKS MUST GO TO SOUTH AREA, ADJACENT TO BUILDING 215 AND DISCHARGE INTO THE DEDICATED CONCRETE WASHOUT CONTAINER AT THAT LOCATION.

7. THE CONTRACTOR IS RESPONSIBLE FOR IMMEDIATELY REMOVING ANY MATERIALS INCIDENTALLY SPILLED ON THE ROADWAY DURING THE REMOVAL AND TRANSPORTATION ACTIVITIES.

8. THE CONTRACTOR SHALL COORDINATE ALL WASTE MANAGEMENT ACTIVITIES WITH THE COR AND THE NASA WASTE MANAGEMENT (WM). WASTE HANDLING AND DISPOSAL ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS FOR WASTE MATERIAL. NASA WM WILL BE GIVEN 3 WEEKS NOTICE FOR WASTE SHIPPING. ALL MATERIAL FROM THE MECHANICAL FLOOR PREPARATION AND LEAD ABATEMENT SHALL BE CONTAINERIZED, LABELED AND TURNED OVER TO NASA WM FOR SAMPLING AND DISPOSAL. DEBRIS FROM DIFFERENT OPERATIONS SHALL BE CONTAINERIZED SEPARATELY.

9. ALL CONSTRUCTION DEBRIS NOT SCHEDULED FOR RECYCLING SHALL BE DISPOSED AT A LANDFILL APPROVED BY NASA GRC WASTE MANAGEMENT TEAM.

10. ALL HAUL TRUCKS TRAVELING ON PUBLIC ROADS SHALL HAVE A BILL OF LADING OR MANIFEST SIGNED BY THE APPROPRIATE NASA GRC PERSONNEL. BILLS OF LADING AND MANIFESTS MUST BE COORDINATED WITH WM 2 WEEKS PRIOR TO SHIPPING.

11. WASTE MANAGEMENT AND RECYCLING. ALL MATERIALS LEAVING GOVERNMENT PROPERTY FOR RECYCLING OR DISPOSAL SHALL BE COORDINATED WITH NASA WASTE MANAGEMENT IN ACCORDANCE WITH SPECIFICATION 01 35 43.98 ENVIRONMENTAL PROTECTION PROCEDURES. THE CONTRACTOR MUST OBTAIN THE PROPER MANIFESTS AND PROPERTY PASSES AND MUST HAVE APPROVAL FROM NASA BEFORE ANY MATERIAL LEAVES THE PROPERTY.

12. EXCESS EXCAVATED MATERIALS HAVE BEEN DESIGNATED AS COMMERCIAL/INDUSTRIAL FILL SOILS SHALL BE REUSED ON SITE OR REMOVED FROM GOVERNMENT PROPERTY AND TRANSPORTED TO A COMMERCIAL OR INDUSTRIAL FILL SITE MEETING THE DEFINITIONS FOUND IN THE OHIO VOLUNTARY ACTION PROGRAM OAC 3745-300. IN NO CASE SHALL EXCESS EXCAVATED SOIL BE ALLOWED TO COME INTO CONTACT WITH A WATERWAY. NO EXCESS EXCAVATED SOIL SHALL BE REMOVED FROM THE SITE WITHOUT THE WRITTEN AUTHORIZATION FROM THE GOVERNMENT IN THE FORM OF COMPLETED AND SIGNED MANIFESTS AND/OR BILL OF LADING.

13. THE CONTRACTOR SHALL LOOK FOR ANY CHANGE IN SOIL CONDITIONS, SOIL STAINS, ETC. ANY CHANGES SHALL BE BROUGHT TO THE ATTENTION OF THE NASA COR.

14. ANY REMOVED OR DEMOLISHED ITEM THAT MEETS THE DEFINITION OF CONSTRUCTION & DEMOLITION DEBRIS (C&DD) SHALL BE EVALUATED FOR REUSE AND/OR RECYCLING. THE CONTRACTOR SHALL REUSE OR RECYCLE ANY ITEM THAT CAN BE SEGREGATED FROM THE WASTE STREAM AND REUSED OR RECYCLED IN A COST EFFECTIVE MANNER. NASA WASTE MANAGEMENT (WM) MANAGES THE CONSTRUCTION WASTE MANAGEMENT PROGRAM. ALL REUSE, RECYCLING AND DISPOSAL ACTIVITIES SHALL BE COORDINATED WITH NASA WM. THE CONTRACTOR SHALL SUBMIT A MANIFEST FOR ANY C&DD MATERIALS THAT WILL BE REUSED OFF SITE, RECYCLED OR DISPOSED OF TO THE COR, WHICH WILL THEN BE REVIEWED AND APPROVED BY NASA WM FOR TRANSPORTATION OFF SITE. MATERIALS THAT WILL BE REUSED OR RECYCLED SHALL BE SEGREGATED AND MANIFESTED INDIVIDUALLY. NASA HAS SPECIFICALLY TARGETED THE FOLLOWING MATERIALS FOR REUSE OR RECYCLING: ASPHALT, CONCRETE, GRAVEL/STONE, COMMERCIAL/INDUSTRIAL FILL SOIL, TOPSOIL, TREES/BUSHES, FERROUS AND NON-FERROUS METALS, CONCRETE BLOCK, BRICKS, CARPETING, AND CERAMIC TILES.

15. THE CONTRACTOR SHALL ENSURE THAT LOADED TRUCKS DO NOT EXCEED ALLOWABLE WEIGHTS IN ACCORDANCE WITH DOT REGULATIONS. ALL TRUCKS AT GRC SHALL BE WEIGHED EMPTY AND FULL AT THE TRUCK SCALE LOCATED OFF WALCOTT ROAD AND CEDAR POINT ROAD.

OCCUPATIONAL HEALTH & SAFETY

1. THE CONTRACTOR RESPONSIBLE FOR IMPLEMENTING CONSTRUCTION ACTIVITIES IS REQUIRED TO PREPARE A SPECIFIC HEALTH AND SAFETY PLAN (HASP) IN ACCORDANCE WITH NASA GRC POLICY AND OSHA GUIDELINES. THE SITE SPECIFIC HASP SHALL BE SUBMITTED AT LEAST 15 BUSINESS DAYS PRIOR TO INITIATION OF ANY CONSTRUCTION ACTIVITIES. THE SITE SPECIFIC HASP SHALL BE REVIEWED AND ACCEPTED BY NASA GRC PRIOR TO INITIATION OF ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL HAVE A FULL TIME SITE SAFETY AND HEALTH OFFICER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FEDERAL, STATE, NASA GRC AND LOCAL HEALTH AND SAFETY REQUIREMENTS FOR THE PROTECTION OF ALL PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS ALSO THE CONTRACTOR'S RESPONSIBILITY TO INITIATE, MAINTAIN, AND SUPERVISE ALL HEALTH AND SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK UNDER THIS CONTRACT AND IN ACCORDANCE WITH THE SITE SPECIFIC HASP. ALL CONTRACTOR EMPLOYEES WORKING ON-SITE MUST ATTEND DAILY HEALTH AND SAFETY TAILGATE MEETINGS PRIOR TO THE START OF THE DAY'S CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL HAVE DAILY DOCUMENTED SITE SAFETY INSPECTIONS.

2. ALL PAINT IS ASSUMED TO BE LEAD BASED PAINT (LBP). THE REQUIREMENTS FOR THE HANDLING, USE, REMOVAL AND DISPOSAL OF LBP SHALL BE CONDUCTED IN ACCORDANCE WITH THE NASA GRC OCCUPATIONAL HEALTH PROGRAMS MANUAL CHAPTER 5 - LEAD AND ALL LOCAL, STATE (OHIO DEPARTMENT OF HEALTH) AND FEDERAL REGULATIONS. DISPOSAL SHALL BE COORDINATED WITH NASA GRC WM. ANY DISTURBANCE TO SURFACES WITH LBP SHALL BE PERFORMED BY TRAINED, MEDICALLY QUALIFIED, AND LICENSED PERSONNEL WHO WILL FOLLOW THE APPROVED WRITTEN SITE SPECIFIC HEALTH AND SAFETY PLAN AS COORDINATED WITH THE NASA SAFETY, HEALTH AND ENVIRONMENTAL DIVISION. HOT WORK ON PAINTED SURFACES IS PROHIBITED. THE PAINT MUST BE STRIPPED BACK 4" ON EITHER SIDE WHERE THE HOT WORK IS TO BE PERFORMED.

3. FALL PROTECTION: FALL PROTECTION SHALL BE PROVIDED FOR ANY WALKING WORKING SURFACE WHERE A PERSON IS EXPOSED TO A FALL TO A LOWER LEVEL. FALL PROTECTION PROGRAMS SHALL FOCUS ON ELIMINATING THE FALL HAZARD BEFORE AN INDIVIDUAL IS EXPOSED TO THE HAZARD. FALL PROTECTION PROGRAMS SHALL PROTECT WORKERS WHO MAY BE EXPOSED TO A FALL SIX FEET OR GREATER TO A LOWER LEVEL FOR ALL CONSTRUCTION ACTIVITIES. "FALL HAZARDS" FROM ANY HEIGHT TO LOWER LEVEL SHALL REQUIRE PROTECTION IF THE WORK IS OVER A COLLATERAL HAZARD (E.G. MOVING MACHINERY, CHEMICALS, ELECTRICAL HAZARDS, IMPALEMENT HAZARDS). EACH SITUATION WHERE WORKERS ARE WORKING AT HEIGHT REQUIRING FALL PROTECTION SHALL HAVE A COMPETENT PERSON WHO'S EDUCATION AND TRAINING HAS BEEN ADMINISTERED BY AN INDUSTRY-RECOGNIZED TRAINER. THE COMPETENT PERSON MUST BE ONSITE 100% WHEN FALL PROTECTION EQUIPMENT IS BEING USED. THE ROLE OF THE COMPETENT PERSON IS AS FOLLOWS: WORK DIRECTLY WITH THE FALL PROTECTION USERS TO ESTABLISH A C-979 FALL PREVENTION PLAN FOR EVERY INSTANCE THAT REQUIRES FALL PROTECTION EQUIPMENT. TRAIN USERS TO THE CONTENT OF THE C-979 FORM. VERIFY THROUGH INSPECTION THAT THE USERS HAVE AN ADEQUATE FALL PROTECTION SYSTEM. RETRAIN USERS AS NECESSARY. PERFORM ANNUAL INSPECTION OF USERS FALL PROTECTION EQUIPMENT. A WRITTEN FALL PROTECTION PLAN THAT ADDRESSES SPECIFIC FALL PROTECTION REQUIREMENTS, INCLUDING A WRITTEN RESCUE PLAN TO RETRIEVE A FALLEN OR SUSPENDED WORKER FROM THE AREA, SHALL BE DEVELOPED AND SUBMITTED TO NASA FOR APPROVAL, USING THE C-979 FALL PREVENTION PLAN FORM, AS AN APPENDIX TO THE HEALTH AND SAFETY PLAN.

4. ALL CRANE OPERATIONS SHALL BE IN ACCORDANCE WITH 1926 SUBPART CC - CRANES AND DERRICKS IN CONSTRUCTION.

5. ALL RIGGING SHALL BE PERFORMED BY CERTIFIED RIGGERS.

6. EMERGENCY RESPONSE SHALL REQUIRE THE CONTRACTOR TO CALL 911 ON A NASA PHONE OR 216-433-8888 ON AN OUTSIDE LINE. ANY UNSAFE CONDITIONS SHALL BE REPORTED TO EMERGENCY DISPATCH.

7. LOCKOUT/TAGOUT PROCEDURES SHALL FOLLOW NASA GRC POLICY AND COMPLY WITH OSHA REQUIREMENTS.

8. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF THE NATIONAL ELECTRIC CODE AND NASA GRC SAFETY MANUAL, CHAPTER 8. THE CONTRACTOR SHALL NOT USE ANY OF THE EXISTING OUTLETS LOCATED ON THE ROOF. ALL POWER FOR THIS PROJECT SHALL BE SUPPLIED BY A TEMPORARY POWER PANEL SET UP IN THE WORK AREA. ALL RECEPTACLES SHALL BE GROUND FAULT CIRCUIT INTERRUPTERS. ALL TEMPORARY POWER IS THE RESPONSIBILITY OF THE CONSTRUCTION CONTRACTOR.

9. ALL CONCRETE CUTTING SHALL BE PERFORMED UTILIZING WET METHODS OR OTHER APPROVED DUST FREE METHOD. NO VISIBLE EMISSIONS SHALL BE PERMITTED.

10. INDOOR ENVIRONMENTAL QUALITY (IEQ): GOOD WORK AND HOUSEKEEPING PRACTICES THAT MINIMIZE CONTAMINANT RELEASE AND ENSURE ACCEPTABLE IEQ ARE ESSENTIAL TO THE SUCCESS OF ANY CONSTRUCTION OR RENOVATION PROJECT. USE LOCAL EXHAUST VENTILATION WITH HIGH-EFFICIENCY PARTICULATE AIR (HEPA) FILTRATION WHERE DUST AND FUME GENERATION WILL OCCUR. ISOLATE WORK AREAS FROM OCCUPIED AREAS USING CRITICAL BARRIERS, NEGATIVE PRESSURIZATION, AND HEPA FILTRATION. NEGATIVELY PRESSURIZE WORK AREAS TO PREVENT MIGRATION OF AIR CONTAMINANTS FROM WORK AREAS TO OCCUPIED AREAS. USE WORK PRACTICES AND MATERIALS THAT RESULT IN LITTLE OR NO GENERATION OF AIRBORNE CONTAMINATES DURING CONSTRUCTION OR RENOVATION ACTIVITIES, SUCH AS WET METHODS TO SUPPRESS DUST GENERATION. USE HEPA VACUUMS AND DAMP MOP REGULARLY TO CLEAN FLOORS AND LEDGES DURING CONSTRUCTION OR RENOVATION ACTIVITIES. BLOCK OR SEAL RETURN AIR GRILLES IN CONSTRUCTION OR RENOVATION AREAS. LOCATE DUMPSTERS AND SALVAGE BINS AWAY FROM OPERATING HVAC OUTDOOR AIR INTAKES AND EXTERIOR DOORS TO OCCUPIED AREAS. ENSURE EXHAUST FROM AIR FILTRATION UNITS ARE VENTED TO THE OUTSIDE OF THE BUILDING AND AWAY FROM ANY BUILDING AIR INTAKES, EXTERIOR DOORS AND ADJACENT NASA PERSONNEL.

11. CUTTING AND WELDING SHALL FOLLOW NASA GRC POLICY AND COMPLY WITH OSHA REQUIREMENTS. NASA GRC POLICY REQUIRES THE CONTRACTOR TO OBTAIN A HOT WORKS PERMIT IN ACCORDANCE WITH CHAPTER 28 OF THE NASA GRC SAFETY MANUAL. COLLECT ANY RESIDUE OR DUST FROM SURFACES GENERATED BY THE WELDING/GRINDING/CUTTING OPERATIONS. USE WET METHODS OR HEPA VACUUMS. DISPOSE OF ANY RESIDUE WASTE THROUGH WASTE MANAGEMENT. CONTRACTOR SHALL PROVIDE MECHANICAL VENTILATION DURING WELDING/GRINDING/CUTTING OPERATIONS. THE CONTRACTOR SHALL CONTROL FUGITIVE EMISSIONS BY THE USE OF HEPA FILTER / "SMOKE EATER" VENTILATION IN ENCLOSED OCCUPIED AREAS. AREAS THAT HAVE MULTIPLE TRADES, OR ADJACENT NASA PERSONNEL. CONTRACTOR WILL PROVIDE FOR A VISUAL BARRIER BETWEEN THE IMMEDIATE WORK AREA AND THE GENERAL PUBLIC DURING WELDING OPERATIONS (UV LIGHT CONSIDERATIONS). RESPIRATORY PROTECTION IS REQUIRED DURING WELDING/GRINDING/CUTTING OPERATIONS UNLESS AIR MONITORING DATA IS PROVIDED AND ACCEPTED BY NASA DOCUMENTING A NEGATIVE EXPOSURE ASSESSMENT.

12. THE NASA APPOINTED AUTHORITY HAVING JURISDICTION (AHJ) IS RESPONSIBLE FOR IMPLEMENTING THE FIRE PROVISIONS OF NPR 8715.3 AND COMPLYING WITH PUBLIC LAW 100-678 REQUIRING ALL FEDERAL AGENCIES TO FOLLOW THE LATEST EDITIONS OF NATIONALLY RECOGNIZED FIRE AND LIFE SAFETY CODES. THE AHJ HAS THE FINAL AUTHORITY FOR APPROVING/CONCURRING WITH DESIGN ASSOCIATED INSTALLATIONS, PROCEDURES, AND EQUIPMENT. THE AHJ OR HIS DESIGNEE SHALL WITNESS AND INSPECT ALL INSTALLATIONS OF FIRE/LIFE SAFETY ASSEMBLIES AND/OR EQUIPMENT, TO INCLUDE THE INSTALLATION OR MODIFICATION OF DOMESTIC WATER USED FOR THE PURPOSE OF FIRE PROTECTION. THE AHJ OR HIS DESIGNEE SHALL BE PRESENT AND WITNESS ALL FLUSHING, HYDROSTATIC AND ACCEPTANCE TESTING OF ALL FIRE/LIFE SAFETY EQUIPMENT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE AHJ OF THE COMPLETION OF THE INSTALLATION PRIOR TO COVERING. IF INSTALLATIONS ARE COVERED PRIOR TO INSPECTION, THE CONTRACTOR WILL BE REQUIRED TO UNCOVER THE INSTALLATION AT NO COST TO THE GOVERNMENT. INSPECTION REQUEST SHALL BE PRIOR TO WITH A MINIMUM OF 24 HOUR NOTICE. THE CONTRACTOR IS TO SUBMIT ALL REQUIRED FLUSHING, TESTING AND ACCEPTANCE DOCUMENTATION AT THE TIME OF THE FINAL INSPECTION.

LIST OF REFERENCES

THE NASA GRC ENVIRONMENTAL MANAGEMENT MANUAL, OCCUPATIONAL HEALTH MANUAL. AND THE SAFETY MANUAL WERE PREPARED BY NASA GRC AND COVER THE GLENN RESEARCH CENTER. THESE POLICIES ARE INCLUDED BY REFERENCE.

NOTIFICATION/PERMIT REQUIREMENTS

1. NASA GRC AREA CLEARANCES FOR UTILITY DISCONNECTS.

2. DIGGING, TRENCHING, AND EXCAVATING PERMIT (NASA C-927 FORM)

3. HOT WORK AUTHORIZATION PERMIT AND HOT WORK PRE-OPERATIONS CHECKLIST (NASA C-7A AND C-7B FORMS)

4. FALL PREVENTION PLAN (NASA C-979 FORM)

5. CRANE PERMIT

6. CONFINED SPACE ENTRY PERMIT REQUIRED FOR ALL CONFINED SPACES (NASA C-199, C-199B, C-199C FORMS)

LIST OF SUBMITTALS

1. SITE SPECIFIC HEALTH AND SAFETY PLAN (HASP)

2. DIRT AND DUST CONTROL PLAN

3. IMPLEMENTATION PLAN AND SCHEDULE

4. IDENTIFY ALL DISPOSAL SITES (E.G. C&DD, SOLID WASTE, ACM, RECYCLABLES, HAZARDOUS WASTE LBP, ETC.) UTILIZING THE "FACILITY AND TRANSPORTER REQUEST FORM".

5. WASTE PROFILES AND DRAFT MANIFESTS

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

CHG	NUM	DESCRIPTION		APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD:	FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
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FY14 B351 WAREHOUSE ADDITION

ENVIRONMENTAL, HEALTH AND SAFETY NOTES

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Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	G-	003

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

G-003

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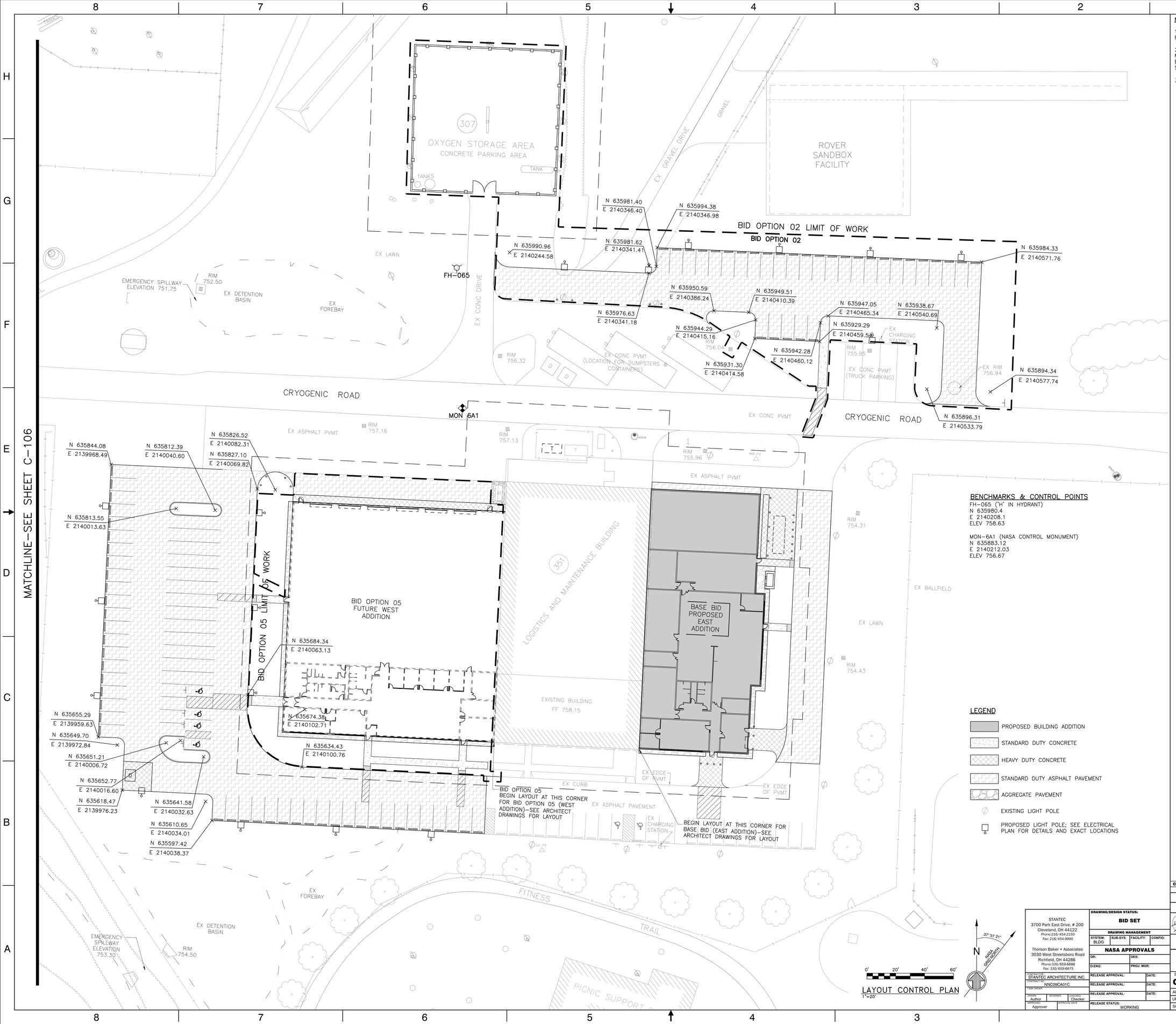

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE–0351–COF20244–G–001.
2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.
3. CONTRACTOR TO HAVE ALL STAKING/LAYOUT WORK FOR PROJECT TO BE COMPLETED BY A LICENSED OHIO PROFESSIONAL SURVEYOR.

GEOMETRY NOTES

1. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS FOR LAYOUT.
2. PRECISE LAYOUT SHALL BE DETERMINED ON THE GROUND AND APPROVED BY THE OWNER'S REPRESENTATIVE.
3. BENCHMARK AND CONTROL POINTS ARE SHOWN ON THE DRAWING. LAYOUT FROM THESE REFERENCE POINTS IS THE RESPONSIBILITY OF THE CONTRACTOR.

BENCHMARKS & CONTROL POINTS

FH–065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON–6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

- PROPOSED BUILDING ADDITION
- STANDARD DUTY CONCRETE
- HEAVY DUTY CONCRETE
- STANDARD DUTY ASPHALT PAVEMENT
- AGGREGATE PAVEMENT
- EXISTING LIGHT POLE
- PROPOSED LIGHT POLE; SEE ELECTRICAL PLAN FOR DETAILS AND EXACT LOCATIONS

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

LAYOUT CONTROL PLAN

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

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RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	105

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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C105

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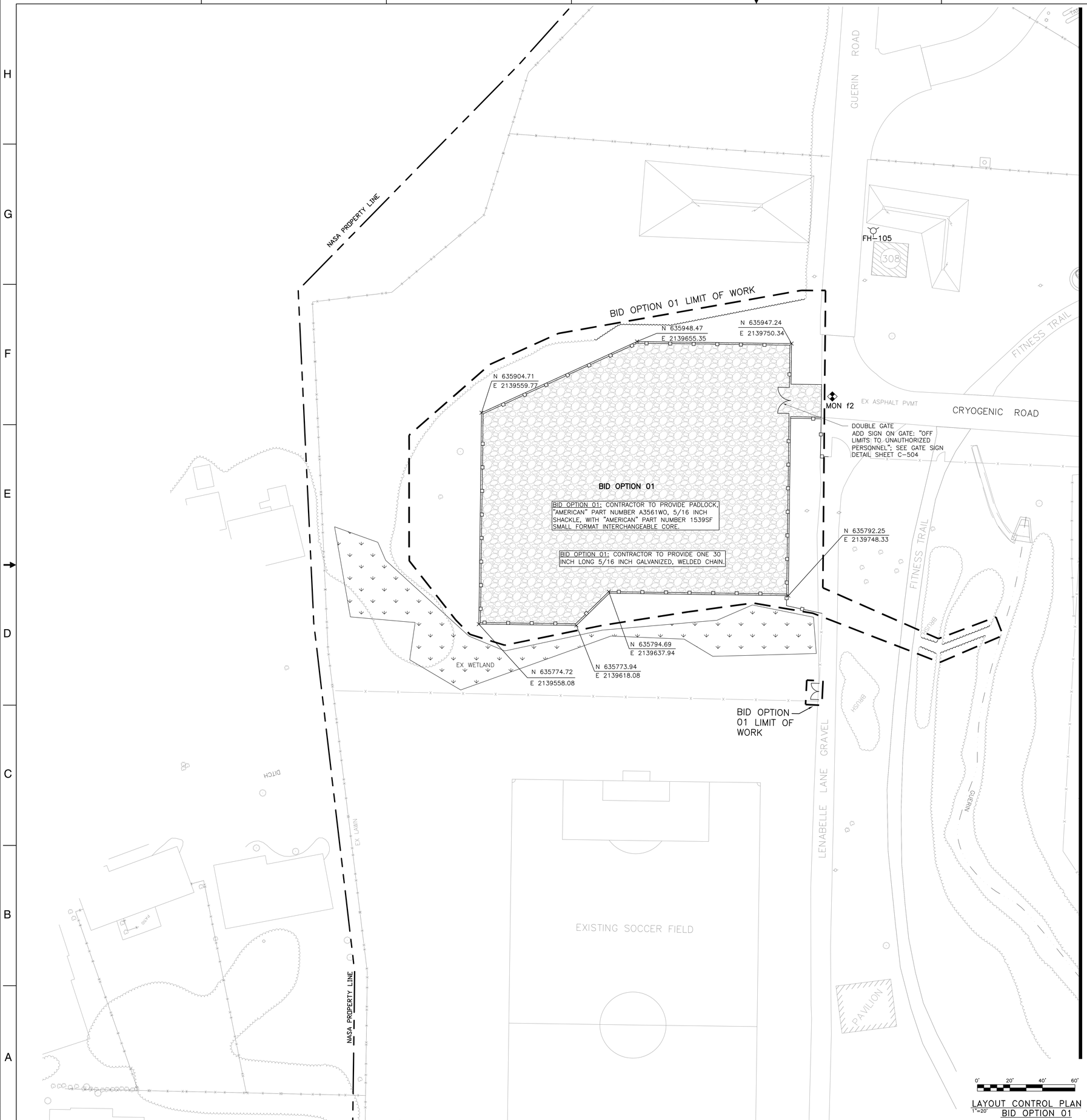

LAYOUT CONTROL PLAN
BID OPTION 01

NOTES

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GEOMETRY NOTES

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BENCHMARKS & CONTROL POINTS

FH-105 ('0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

- PROPOSED BUILDING ADDITION
- STANDARD DUTY CONCRETE
- HEAVY DUTY CONCRETE
- STANDARD DUTY ASPHALT PAVEMENT
- AGGREGATE PAVEMENT
- NEW TREE/BRUSH LINE

CHG	NUM	DESCRIPTION	APP/DATE
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LAST APPROVED EDMS REVISION	TECH LEAD:	FAC-SYS MGR:	REV DATE:

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DRAWING/DESIGN STATUS: BID SET

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NASA APPROVALS

DR:	DES:
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APPROVED: Approver / APPROVAL DATE:	RELEASE STATUS: WORKING	

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	106

AREA: | SHEET 1 OF 1

UNITS: ENGLISH	SOFTWARE: AUTOCAD 2013	REVISION	VER
SCALE: AS SHOWN	OFFICIAL DATE: 06-24-2014	-	1

C106

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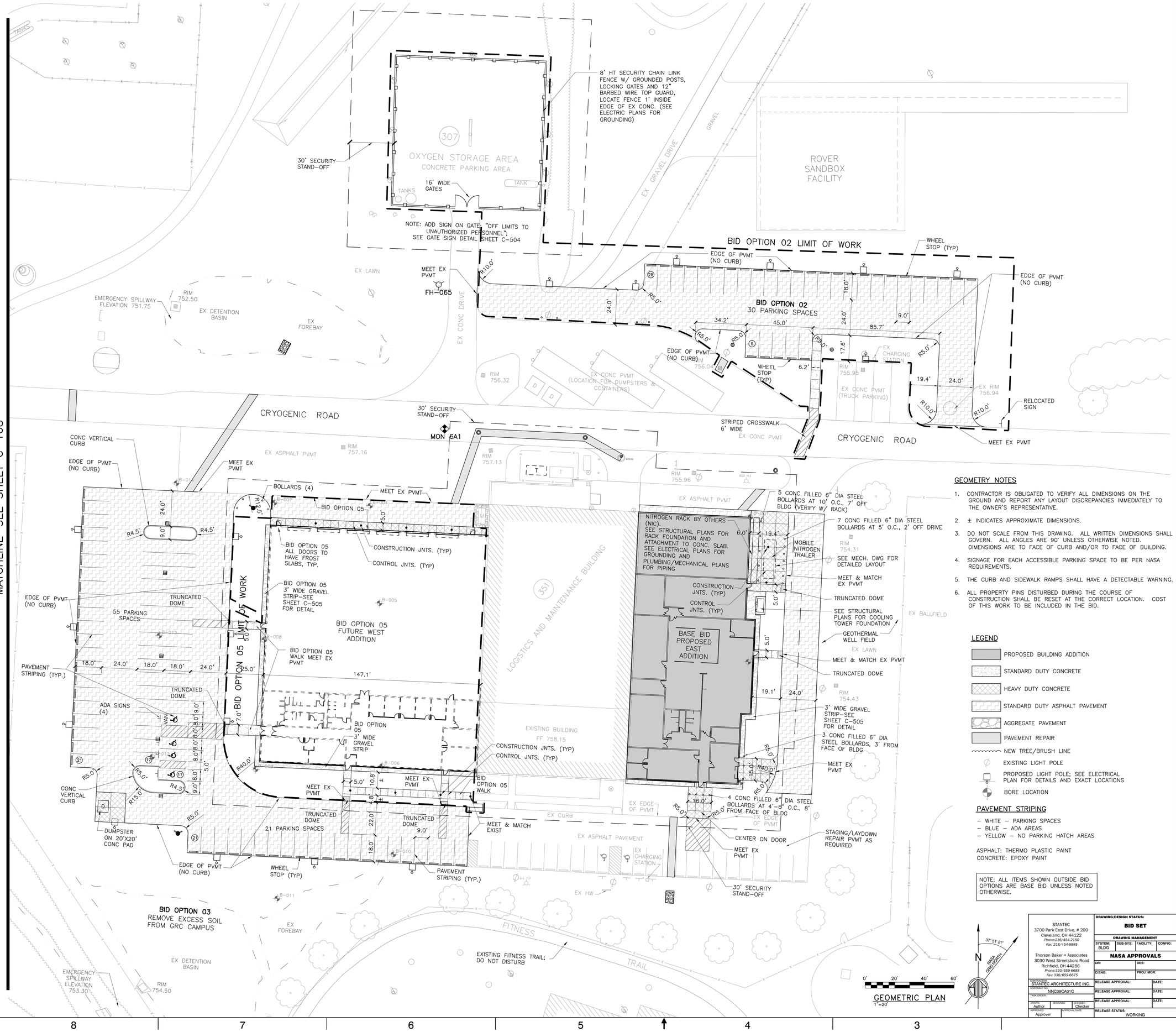

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3. CONTRACTOR TO HAVE ALL STAKING/LAYOUT WORK FOR PROJECT TO BE COMPLETED BY A LICENSED OHIO PROFESSIONAL SURVEYOR.
4. SEE ELECTRICAL SITE PLAN FOR LOCATION AND DETAIL OF ELETRIC AND TELECOMUNICATION LINES.
5. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE SOIL STOCKPILE AREA, AS REQUIRED BY THE GOVERNMENT.

TRAFFIC CONTROL NOTES

1. ALL TRAFFIC CONTROL DEVICES SHALL BE FURNISHED, ERECTED, MAINTAINED, AND REMOVED BY THE CONTRACTOR IN ACCORDANCE WITH THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (PART 7 CONSTRUCTION AND MAINTENANCE OPERATIONS). COPIES ARE AVAILABLE FROM THE ODOT, BUREAU OF TRAFFIC, 25 SOUTH FRONT STREET, COLUMBUS, OHIO 43215.
2. STEADY–BURNING, TYPE "C," LIGHTS SHALL BE REQUIRED ON ALL BARRICADES, DRUMS AND SIMILAR TRAFFIC DEVICES IN USE AT NIGHT. CONES ARE NOT PERMITTED TO BE USED FOR NIGHT WORK.
3. ACCESS TO ALL ADJOINING PROPERTIES SHALL BE MAINTAINED AT ALL TIMES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING DELIVERY SERVICE IN THE CONSTRUCTION AREA.
5. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ADEQUATELY BARRICADE THE STREET IN THE VICINITY OF THE WORK AREAS UNTIL SUCH TIME AS THE STREET IS OPEN TO TRAFFIC.

ROADWAY AND PAVEMENT NOTES

1. WHEN OPEN–CUTTING OF EXISTING PAVEMENT IS PERMITTED, CONTROLLED DENSITY BACKFILL MAY BE USED IN PLACE OF COMPACTED GRANULAR BACKFILL. ASPHALT SURFACES SHALL BE HEAT WELDED.
2. WHERE IT IS NECESSARY TO DISTURB EXISTING PAVEMENTS, THE PAVEMENT SHALL BE SAW CUT IN NEAT, STRAIGHT LINES. THE DEPTH OF THE SAWCUT SHALL BE FULL DEPTH OF PAVEMENT.
3. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING IN THE VICINITY OF EXISTING TREES TO BE PRESERVED, TAKING ALL PRACTICAL MEASURES TO PROTECT AND PRESERVE THEM.
4. ALL EARTHWORK CONSTRUCTION METHODS AND MATERIALS FOR EXCAVATION, EMBANKMENT, SUBGRADE COMPACTION, AND PROOF ROLLING SHALL FOLLOW AND MEET THE CURRENT OHIO DEPARTMENT OF TRANSPORTATION "CONSTRUCTION AND MATERIAL SPECIFICATIONS" MANUAL UNDER ITEMS 203 AND 204.
5. ALL PAVING OPERATIONS AND MATERIALS SHALL CONFORM TO AND MEET THE REQUIREMENTS AS OUTLINED WITHIN THE CURRENT OHIO DEPARTMENT OF TRANSPORTATION "CONSTRUCTION AND MATERIAL SPECIFICATIONS" MANUAL.
6. ALL ROAD SURFACES, BERMS, LAWN AREAS DISTURBED BY CONSTRUCTION OR NASA OF ANY PART OF THIS IMPROVEMENT ARE TO BE RESTORED COMPLETELY TO THE PRE–CONSTRUCTION CONDITION OR BETTER WHEN ORDERED BY THE CONTRACTING OFFICER TECHNICAL REPRESENTATIVE AND ALL ITEMS SHALL BE INCLUDED IN THE BID.

GEOMETRY NOTES

1. CONTRACTOR IS OBLIGATED TO VERIFY ALL DIMENSIONS ON THE GROUND AND REPORT ANY LAYOUT DISCREPANCIES IMMEDIATELY TO THE OWNER'S REPRESENTATIVE.
2. ± INDICATES APPROXIMATE DIMENSIONS.
3. DO NOT SCALE FROM THIS DRAWING. ALL WRITTEN DIMENSIONS SHALL GOVERN. ALL ANGLES ARE 90' UNLESS OTHERWISE NOTED. DIMENSIONS ARE TO FACE OF CURB AND/OR TO FACE OF BUILDING.
4. SIGNAGE FOR EACH ACCESSIBLE PARKING SPACE TO BE PER NASA REQUIREMENTS.
5. THE CURB AND SIDEWALK RAMPS SHALL HAVE A DETECTABLE WARNING.
6. ALL PROPERTY PINS DISTURBED DURING THE COURSE OF CONSTRUCTION SHALL BE RESET AT THE CORRECT LOCATION. COST OF THIS WORK TO BE INCLUDED IN THE BID.

LEGEND

- PROPOSED BUILDING ADDITION
- STANDARD DUTY CONCRETE
- HEAVY DUTY CONCRETE
- STANDARD DUTY ASPHALT PAVEMENT
- AGGREGATE PAVEMENT
- PAVEMENT REPAIR
- NEW TREE/BRUSH LINE
- EXISTING LIGHT POLE
- PROPOSED LIGHT POLE; SEE ELECTRICAL PLAN FOR DETAILS AND EXACT LOCATIONS
- BORE LOCATION

PAVEMENT STRIPING

– WHITE – PARKING SPACES
– BLUE – ADA AREAS
– YELLOW – NO PARKING HATCH AREAS

ASPHALT: THERMO PLASTIC PAINT
CONCRETE: EPOXY PAINT

NOTE: ALL ITEMS SHOWN OUTSIDE BID OPTIONS ARE BASE BID UNLESS NOTED OTHERWISE.

BENCHMARKS & CONTROL POINTS

FH–065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON–6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

STANTEC
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SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

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D.ENG:	PROJ. MGR:
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RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE STATUS: WORKING	

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

GEOMETRIC PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	107

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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C107

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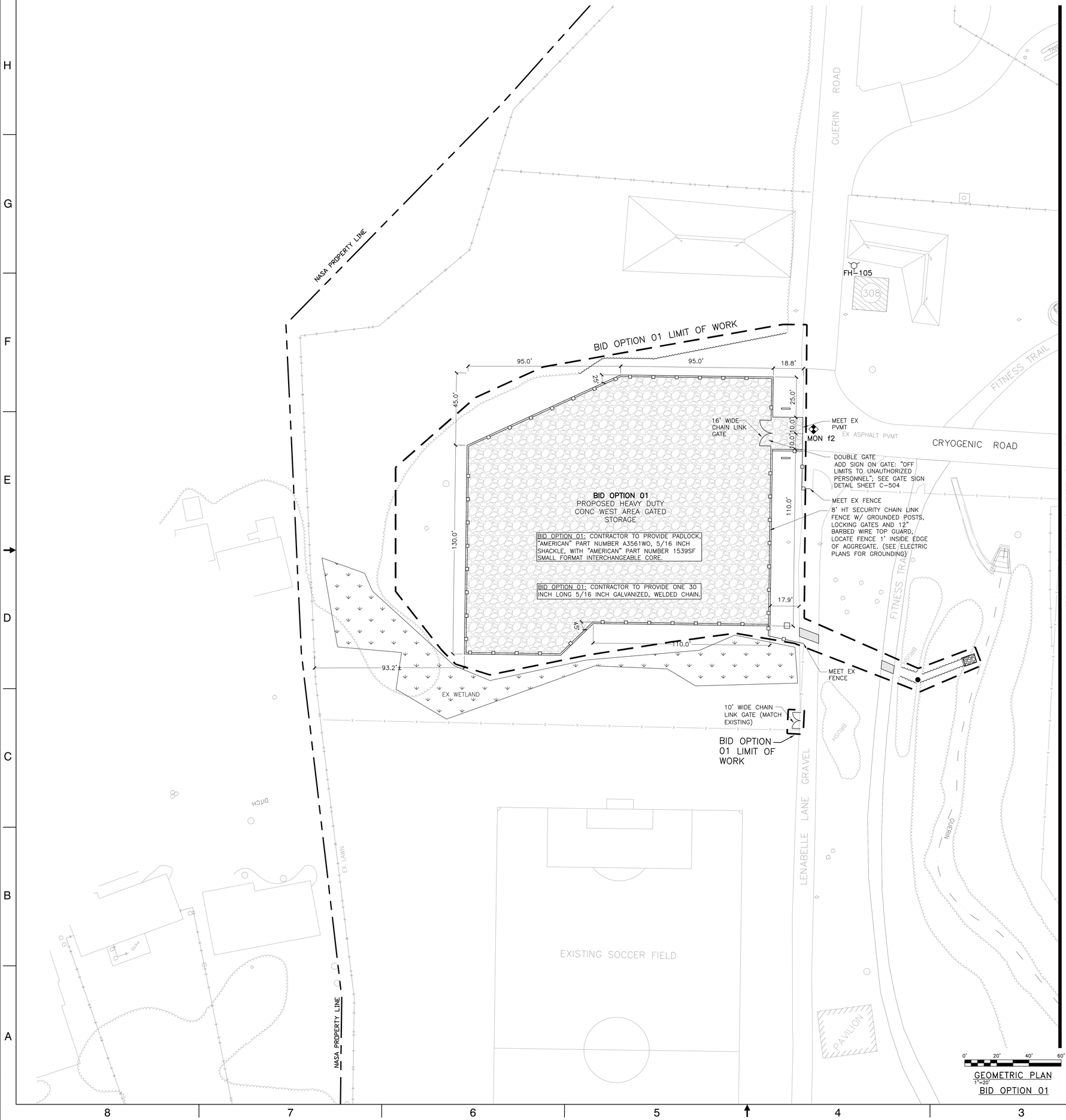

NOTES

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5. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE SOIL STOCKPILE AREA, AS REQUIRED BY THE GOVERNMENT.

BENCHMARKS & CONTROL POINTS

FH-105 ('0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

- PROPOSED BUILDING ADDITION
- STANDARD DUTY CONCRETE
- HEAVY DUTY CONCRETE
- STANDARD DUTY ASPHALT PAVEMENT
- AGGREGATE PAVEMENT
- PAVEMENT REPAIR
- NEW TREE/BRUSH LINE
- PROPOSED LIGHT POLE; SEE ELECTRICAL PLAN FOR DETAILS AND EXACT LOCATIONS

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JOHN H. GLENN RESEARCH CENTER
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FY14 B351 WAREHOUSE ADDITION

GEOMETRIC PLAN
BID OPTION 01

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3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
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RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	108

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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C108

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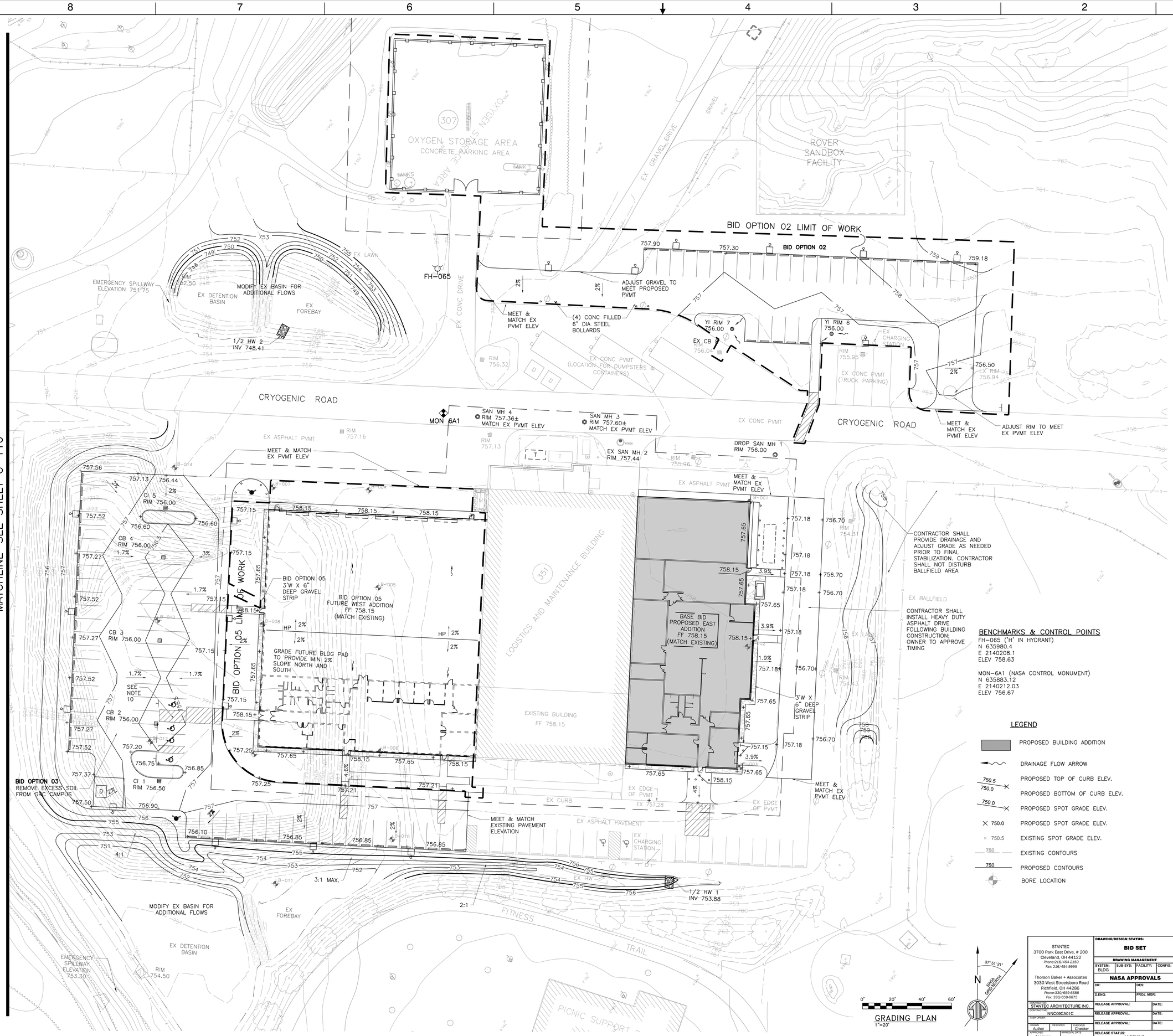

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GRADING NOTES

1. GRADES/SLOPES SHALL BE STRAIGHT LINE BETWEEN POINT ELEVATIONS AND CONTOURS SHOWN.
2. SPOT ELEVATIONS SHOWN ARE BOTTOM OF CURB UNLESS NOTED OTHERWISE. ALL POINTS SHOWN ARE INTENDED TO BE LOCATED AT PC's, PT's, MIDPOINTS OF CURB RADII, INTERSECTIONS, AND CORNER LOCATIONS. TOP OF CURB ELEVATIONS ARE 6" HIGHER THAN SHOWN, UNLESS NOTED OTHERWISE.
3. ALL EMBANKMENT UNDER PAVEMENTS AND STRUCTURES SHALL BE COMPACTED WITH SELECT SITE MATERIAL PER ODOT SPEC. 203.
4. ALL AREAS AFFECTED BY SITE WORK, EXCLUDING PAVED, LANDSCAPED AND STRUCTURE AREAS, SHALL BE SEEDED AND MULCHED PER ODOT SPEC. 659.
5. CONTRACTOR SHALL STRIP ANY TOPSOIL AND STOCKPILE PRIOR TO SITE GRADING OPERATION. CONTRACTOR SHALL REPLACE STOCKPILED TOPSOIL TO A MIN THICKNESS OF 6 INCHES PER ODOT SPEC. 653 IN ALL LANDSCAPED AREAS. STOCKPILE EXCESS SOIL ON EXISTING STOCKPILE, UNLESS NOTED OTHERWISE.
6. SLOPES INDICATED AS PERCENTAGES ARE APPROXIMATE.
7. ANY SLOPES GREATER THAN 2:1 SHALL BE STABILIZED PER ODOT 668 SEEDING AND JUTE MATTING.
8. SEE UTILITY PLAN FOR ADDITIONAL STORM STRUCTURE DATA.
9. SEE SHEET C–111 FOR SWPP PLAN.
10. SLOPES SHALL NOT EXCEED 2% IN ANY DIRECTION WITHIN HANDICAP PARKING AREA.
11. EXISTING SOILS ON SITE MAY BE USED AS SUBGRADE MATERIAL IF APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER.
12. THE CONTRACTOR SHALL PROVIDE A PROFESSIONAL GEOTECHNICAL ENGINEER TO VERIFY BEARING CAPACITY OF SOILS FOR FOOTER, SLAB AND PARKING AREAS.
13. THE CONTRACTOR SHALL PROVIDE A PROFESSIONAL GEOTECHNICAL ENGINEER TO PEFORM TESTING TO ENSURE THE ENGINEERED FILL MEETS SPECIFICATIONS AND IS A MINIMUM DENSITY OF 98% AND PLACED IN NOT MORE THAN 8 INCH LIFTS.
14. THE CONTRACTOR SHALL PROVIDE A PROFESSIONAL GEOTECHNICAL ENGINEER TO APPROVE THE PROOF ROLL. NASA MUST ALSO BE PRESENT AND APPROVE THE PROOF ROLL. A 20 TON TANDEM AXLE DUMP TRUCK WILL BE REQUIRED TO PROOF ROLL TESTING.
15. EXCAVATED MATERIALS HAVE BEEN DESIGNATED AS COMMERCIAL/INDUSTRIAL FILL SOILS AND SHALL BE REUSED ON SITE OR REMOVED FROM GOVERNMENT PROPERTY AND TRANSPORTED TO A COMMERCIAL OR INDUSTRIAL FILL SITE MEETING THE DEFINITIONS FOUND IN THE OHIO VOLUNTARY ACTION PROGRAM OAC 3745–300. IN NO CASE SHALL THE REPLACEMENT OF THE EXCESS EXCAVATED SOIL BE ALLOWED TO COME INTO CONTACT WITH A WATERWAY. NO EXCESS EXCAVATED SOIL SHALL BE REMOVED FROM THE SITE WITHOUT THE WRITTEN AUTHORIZATION FROM THE GOVERNMENT IN THE FORM OF COMPLETED AND SIGNED MANIFESTS AND PROPERTY PASSES.

BENCHMARKS & CONTROL POINTS

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ELEV 758.63

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N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

- PROPOSED BUILDING ADDITION
- DRAINAGE FLOW ARROW
- 750.5 / 750.0 — PROPOSED TOP OF CURB ELEV. / PROPOSED BOTTOM OF CURB ELEV.
- 750.0 — PROPOSED SPOT GRADE ELEV.
- × 750.0 — PROPOSED SPOT GRADE ELEV.
- × 750.5 — EXISTING SPOT GRADE ELEV.
- 750 — EXISTING CONTOURS
- 750 — PROPOSED CONTOURS
- BORE LOCATION

CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

GRADING PLAN

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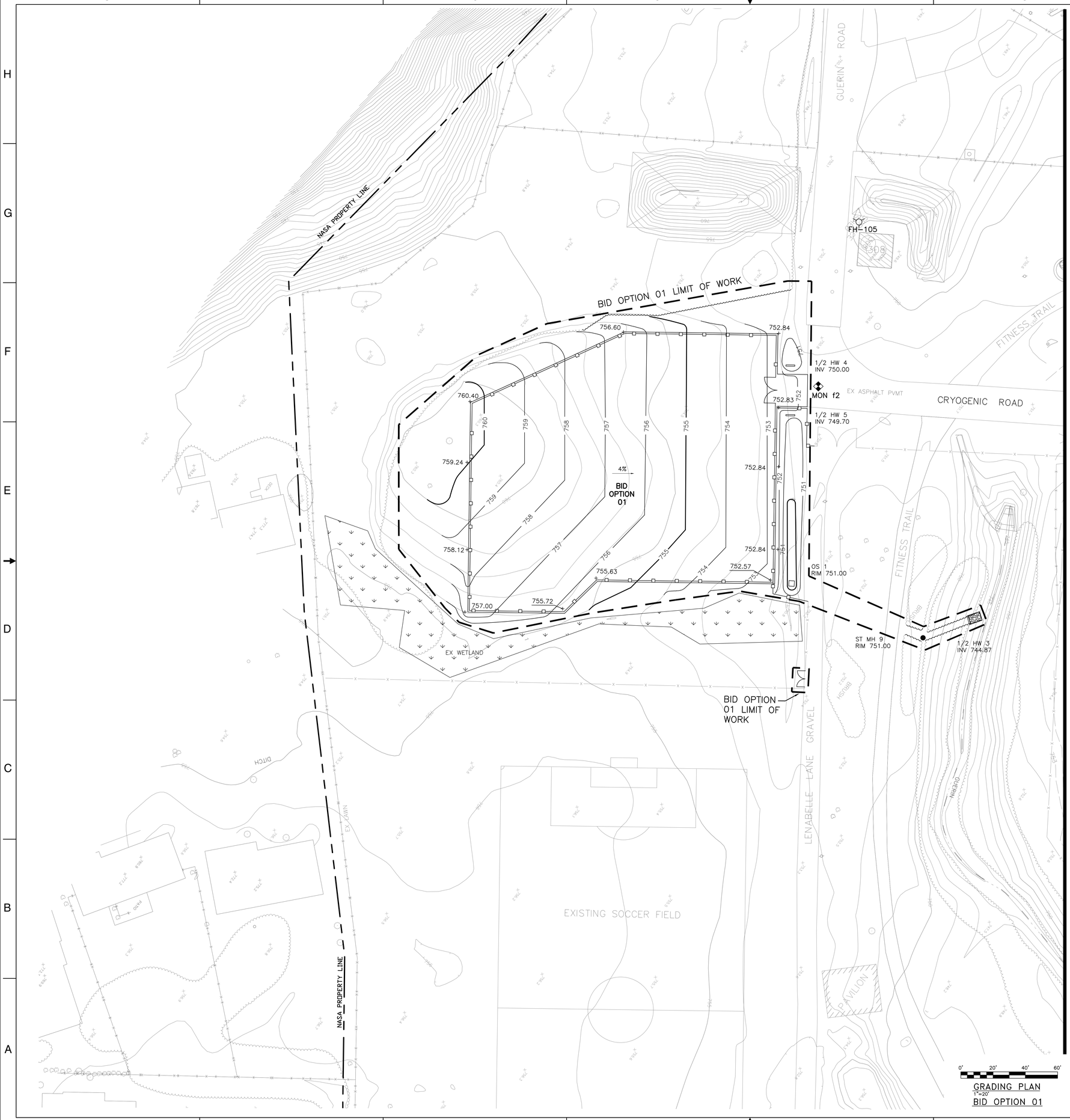

GRADING PLAN
1"=20'
BID OPTION 01

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.

3. CONTRACTOR TO HAVE ALL STAKING/LAYOUT WORK FOR PROJECT TO BE COMPLETED BY A LICENSED OHIO PROFESSIONAL SURVEYOR.

BENCHMARKS & CONTROL POINTS

FH-105 ('0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

- PROPOSED BUILDING ADDITION
- DRAINAGE FLOW ARROW
- 750.5 / 750.0 — PROPOSED TOP OF CURB ELEV. / PROPOSED BOTTOM OF CURB ELEV.
- 750.0 — PROPOSED SPOT GRADE ELEV.
- × 750.0 — PROPOSED SPOT GRADE ELEV.
- × 750.5 — EXISTING SPOT GRADE ELEV.
- 750 — EXISTING CONTOURS
- 750 — PROPOSED CONTOURS
- BORE LOCATION

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT #: NNC09CA01C
TASK ORDER
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE

REVISIONS

LAST APPROVED EDMS REVISION	TECH LEAD	FAC-SYS MGR:	REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

GRADING PLAN
BID OPTION 01

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	110

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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C110

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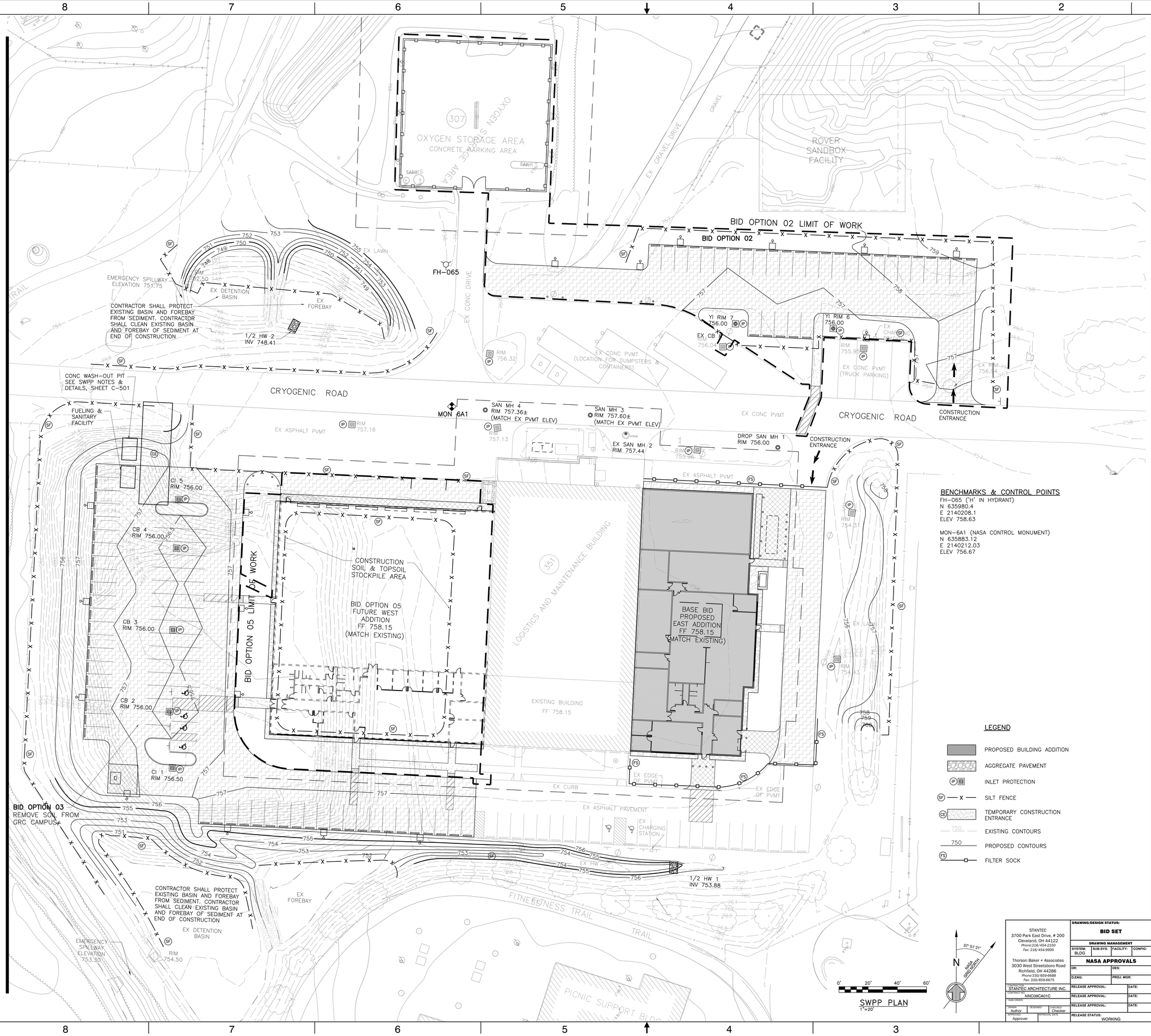
6/22/2013 11:36:45 AM



NOTES

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4. THE CONTRACTOR SHALL PROVIDE ACCESS TO THE SOIL STOCKPILE AREA, AS REQUIRED BY THE GOVERNMENT.

THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO EQUAL OR BETTER CONDITION THAN EXISTED BEFORE CONSTRUCTION. DRAINAGE DITCHES OR WATER COURSES THAT ARE DISTURBED BY CONSTRUCTION SHALL BE RESTORED TO THE GRADES AND CROSS SECTIONS THAT EXISTED BEFORE CONSTRUCTION.

1. NOTE THAT HANDICAP SPACES HAVE MAXIMUM SLOPE IN ANY DIRECTION OF 2%

BENCHMARKS & CONTROL POINTS

FH–065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON–6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

- PROPOSED BUILDING ADDITION
- AGGREGATE PAVEMENT
- INLET PROTECTION
- SILT FENCE
- TEMPORARY CONSTRUCTION ENTRANCE
- 750 EXISTING CONTOURS
- 750 PROPOSED CONTOURS
- FILTER SOCK

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SWPP PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	111

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1

SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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Fax: 216/454-9995

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

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C111

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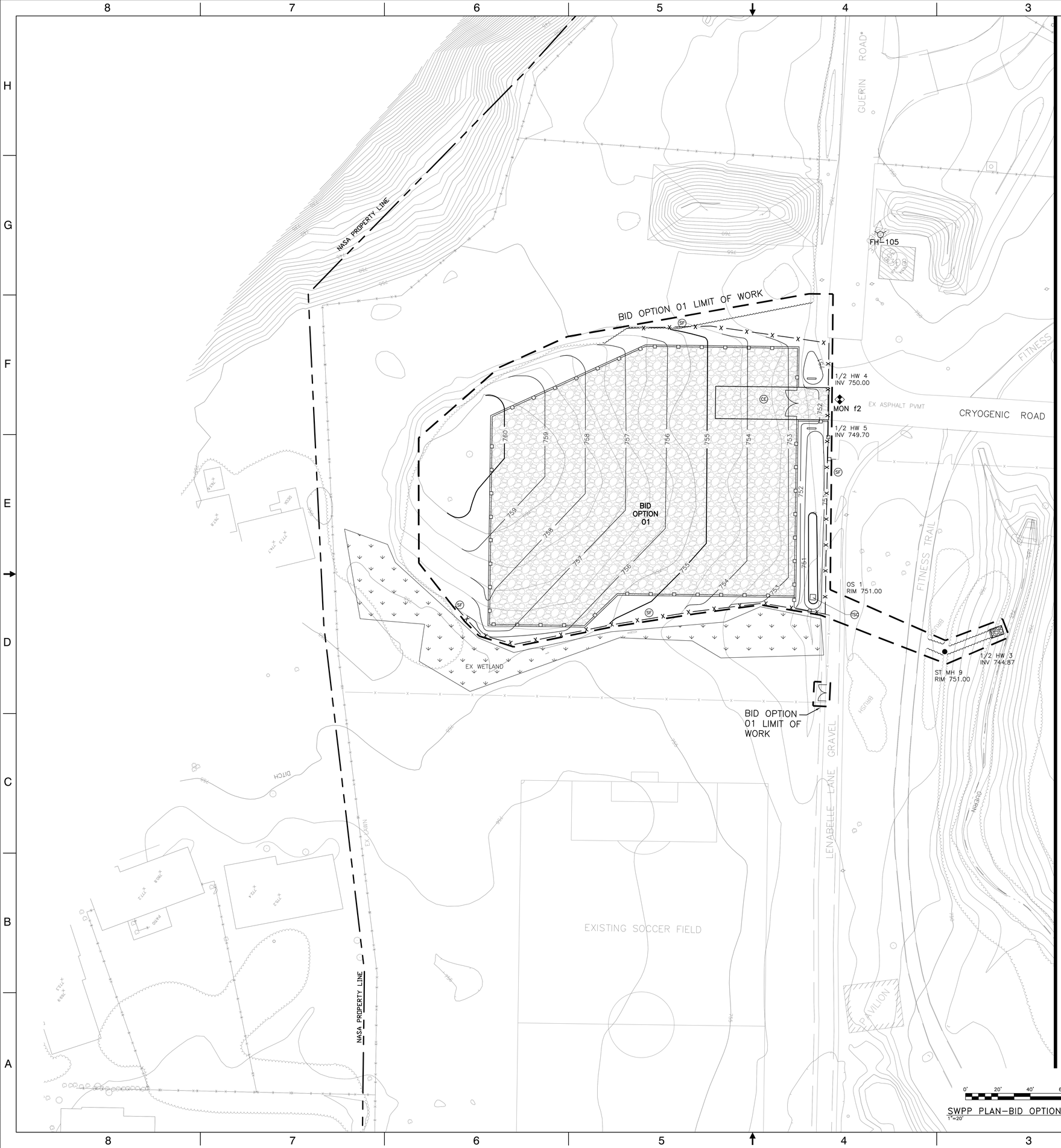

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1. NOTE THAT HANDICAP SPACES HAVE MAXIMUM SLOPE IN ANY DIRECTION OF 2%

BENCHMARKS & CONTROL POINTS

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N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

- PROPOSED BUILDING ADDITION
- AGGREGATE PAVEMENT
- IP INLET PROTECTION
- ED EXCAVATED DROP INLET
- SF — x — SILT FENCE
- CE TEMPORARY CONSTRUCTION ENTRANCE
- TSD TEMPORARY SEDIMENT CONTROL STRUCTURE
- 750 EXISTING CONTOURS
- 750 PROPOSED CONTOURS

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SWPP PLAN
BID OPTION 01

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DRAWING MANAGEMENT
SYSTEM: BLDG. | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	112

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

C112

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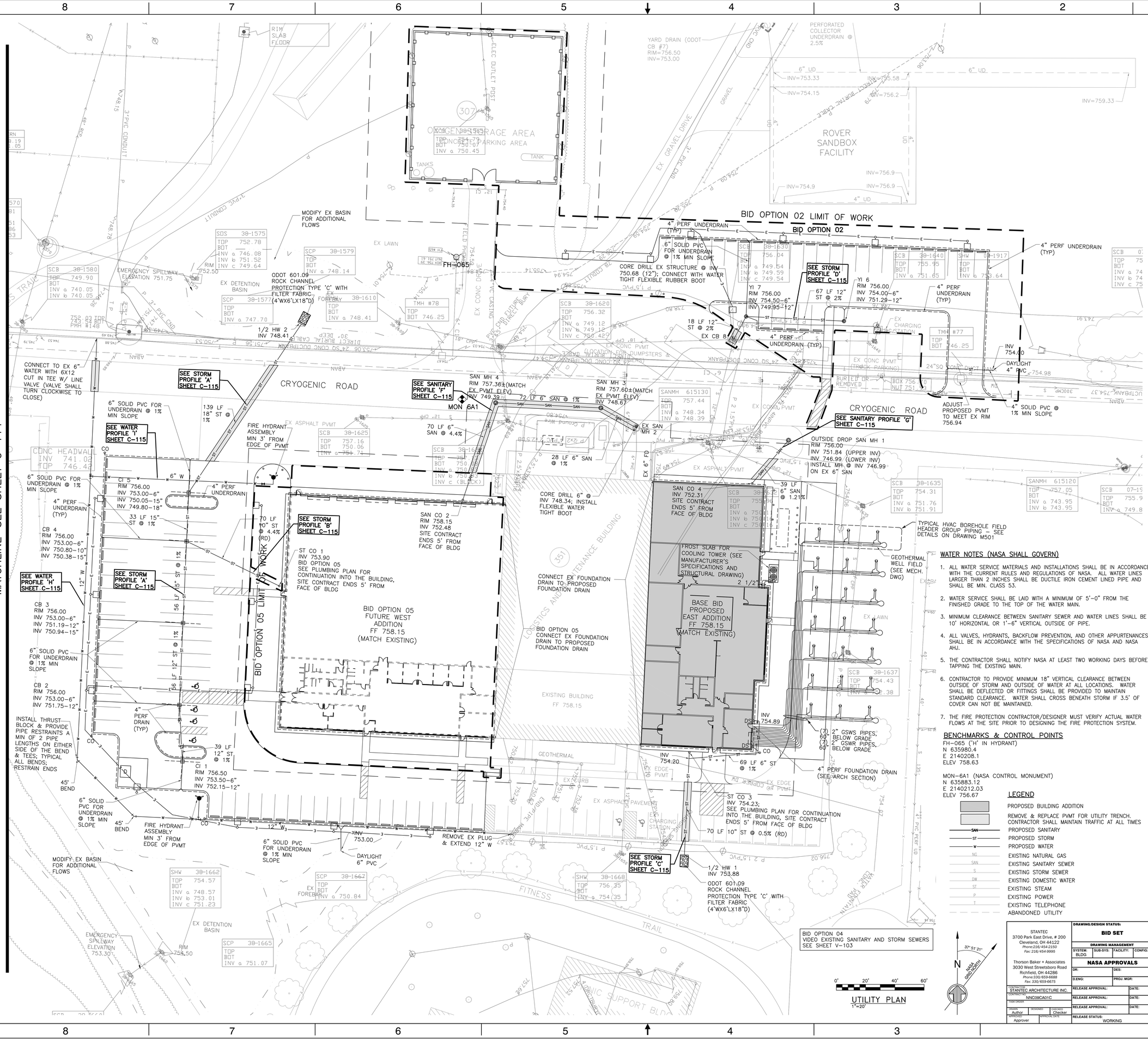

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3. CONTRACTOR TO HAVE ALL STAKING/LAYOUT WORK FOR PROJECT TO BE COMPLETED BY A LICENSED OHIO PROFESSIONAL SURVEYOR.
4. ELETRICAL & TELECOMUNICATION LINES SHOWN FOR REFERENCE. SEE ELECTRICAL PLAN FOR DETAILS & LOCATION.

GENERAL UTILITY NOTES

1. EXISTING UTILITIES SHOWN ARE FROM BEST AVAILABLE RECORDS AND FIELD INVESTIGATION, AND ARE NOT NECESSARILY COMPLETE OR EXACT. THE CONTRACTOR IS RESPONSIBLE FOR THE INVESTIGATION, LOCATION, SUPPORT, PROTECTION, AND RESTORATION OF ALL EXISTING UTILITIES AND APPURTENANCES WHETHER SHOWN ON THESE PLANS OR NOT. CONTRACTOR SHALL REPAIR ANY DAMAGE AT NO COST TO THE PROJECT. THE CONTRACTOR SHALL EXPOSE ALL UTILITIES OR STRUCTURES PRIOR TO CONSTRUCTION TO VERIFY THE VERTICAL AND HORIZONTAL LOCATIONS. MAKE SUCH ADJUSTMENTS IN ELEVATIONS AS ARE REQUIRED TO PROVIDE SUFFICIENT CLEARANCE BETWEEN THE EXISTING AND PROPOSED UTILITIES.
2. WHEN UNKNOWN OR INCORRECTLY LOCATED UNDERGROUND UTILITIES ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND ENGINEER.
3. ALL TRENCHES SHALL BE BACKFILLED OR SECURELY PLATED DURING NONWORKING HOURS.
4. AT UTILITY CROSSINGS WHERE THE EXISTING UTILITY IS EXPOSED IN THE TRENCH, BACKFILL SHALL CONSIST OF COMPACTED GRANULAR MATERIAL IN ACCORDANCE WITH CMS ITEM 603 BETWEEN THE DEEPER AND SHALLOWER PIPE. WHERE PROPOSED UTILITIES CROSS PROPOSED OR EXISTING PAVEMENT AREAS, BACKFILL SHALL BE LSM EXTENDING AT LEAST 3 FEET BEYOND THE BACK OF CURB OR EDGE OF PAVEMENT.
5. ALL DISTURBED AND/OR DAMAGED STORM SEWER PIPES, FIELD TILE AND APPURTENANCES, PAVEMENTS, BERMS AND DITCHES SHALL BE REPAIRED AND/OR REPLACED TO PRE-CONSTRUCTION CONDITION OR BETTER AT NO COST TO NASA.
6. COORDINATE LAYOUT OF ALL SITE UTILITIES WITH SITE LAYOUT PLANS.
7. REMOVE EXISTING ASPHALT/CONCRETE TO ALLOW FOR INSTALLATION OF UTILITIES – SAW CUT ALL EDGES. SEE SHEET CD-101 FOR TRENCH EXCAVATION INFORMATION.
8. EXCEPT AS MAY BE MODIFIED SPECIFICALLY BY THESE PLANS, OR NASA REQUIREMENTS, ALL UTILITY WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIALS SPECIFICATIONS, RECENT EDITION.

SEWER NOTES (NASA SHALL GOVERN)

1. ROOF DRAINS, FOUNDATION DRAINS, AND OTHER STORM WATER CONNECTIONS TO THE SANITARY SEWER SYSTEM ARE PROHIBITED.
2. ALL SEWERS CONSTRUCTED UNDER THIS PLAN SHALL MEET THE REQUIREMENTS OF CMS ITEM 603.
3. SANITARY SEWERS SHALL BE PVC PLASTIC SEWER PIPE, ASTM D-3034, SDR 26. SANITARY SEWER LATERALS SHALL BE LAID AT A MINIMUM GRADE OF 1.0% WITH PREMIUM JOINTS.
4. STORM DRAIN PIPE, OTHER THAN UNDERDRAINS, SHALL BE REINFORCED CONCRETE PIPE (RCP) PER ODOT ITEM 706.02 OR HDPE PER ODOT ITEM 707.33 OR PVC PER ODOT ITEM 707.41, AS SPECIFIED.
5. CURB INLETS, MANHOLES, AND CATCH BASINS SHALL BE CHANNELED AS DIRECTED.
6. ALL CATCH BASINS WITHIN PAVEMENT AREAS SHALL HAVE UNDERDRAINS AS DETAILED.
7. ARCHITECTURAL DRAWINGS SHOWING DOWNSPOUT LOCATIONS SHALL GOVERN WHEN IN CONFLICT WITH LOCATIONS SHOWN ON UTILITY PLAN. DOWNSPOUT TEE ELEVATIONS SHALL BE FIELD ADJUSTED IF NECESSARY TO PROVIDE 0.5% MINIMUM SLOPE ON ALL ROOF DRAINS. ALL DOWNSPOUT CONNECTION LINES SHALL BE RUN AT A MINIMUM OF 1% SLOPE INTO THE TEE. ELEVATIONS GIVEN FOR TEES ARE FOR THE BRANCH CONNECTIONS, NOT FOR THE ROOF DRAINS. SEE ARCHITECTS DRAWING FOR DOWNSPOUT BOOT DETAIL.
8. USE LOW STRENGTH MORTAR (FLOWABLE FILL) FOR ALL TRENCHES IN PAVED AREAS.

WATER NOTES (NASA SHALL GOVERN)

1. ALL WATER SERVICE MATERIALS AND INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE CURRENT RULES AND REGULATIONS OF NASA. ALL WATER LINES LARGER THAN 2 INCHES SHALL BE DUCTILE IRON CEMENT LINED PIPE AND SHALL BE MIN. CLASS 53.
2. WATER SERVICE SHALL BE LAID WITH A MINIMUM OF 5'-0" FROM THE FINISHED GRADE TO THE TOP OF THE WATER MAIN.
3. MINIMUM CLEARANCE BETWEEN SANITARY SEWER AND WATER LINES SHALL BE 10' HORIZONTAL OR 1'-6" VERTICAL OUTSIDE OF PIPE.
4. ALL VALVES, HYDRANTS, BACKFLOW PREVENTION, AND OTHER APPURTENANCES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS OF NASA AND NASA AHJ.
5. THE CONTRACTOR SHALL NOTIFY NASA AT LEAST TWO WORKING DAYS BEFORE TAPPING THE EXISTING MAIN.
6. CONTRACTOR TO PROVIDE MINIMUM 18" VERTICAL CLEARANCE BETWEEN OUTSIDE OF STORM AND OUTSIDE OF WATER AT ALL LOCATIONS. WATER SHALL BE DEFLECTED OR FITTINGS SHALL BE PROVIDED TO MAINTAIN STANDARD CLEARANCE. WATER SHALL CROSS BENEATH STORM IF 3.5' OF COVER CAN NOT BE MAINTAINED.
7. THE FIRE PROTECTION CONTRACTOR/DESIGNER MUST VERIFY ACTUAL WATER FLOWS AT THE SITE PRIOR TO DESIGNING THE FIRE PROTECTION SYSTEM.

BENCHMARKS & CONTROL POINTS

FH-065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON-6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

- PROPOSED BUILDING ADDITION
- REMOVE & REPLACE PVMT FOR UTILITY TRENCH. CONTRACTOR SHALL MAINTAIN TRAFFIC AT ALL TIMES
- SAN — PROPOSED SANITARY
- ST — PROPOSED STORM
- W — PROPOSED WATER
- NG — EXISTING NATURAL GAS
- SAN — EXISTING SANITARY SEWER
- S — EXISTING STORM SEWER
- DW — EXISTING DOMESTIC WATER
- ST — EXISTING STEAM
- P — EXISTING POWER
- T — EXISTING TELEPHONE
- ABANDONED UTILITY

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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FY14 B351 WAREHOUSE ADDITION

UTILITY PLAN

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DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT — SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

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CONTRACTOR: STANTEC ARCHITECTURE INC. | RELEASE APPROVAL: | DATE:
CONTRACT: NNC09CA01C | RELEASE APPROVAL: | DATE:
TASK ORDER | RELEASE APPROVAL: | DATE:
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE | RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	113

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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UTILITY PLAN-BID OPTION 01
1"=20'

NOTES

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4. ELETRICAL & TELECOMUNICATION LINES SHOWN FOR REFERENCE. SEE ELECTRICAL PLAN FOR DETAILS & LOCATION.

BID OPTION 04
VIDEO EXISTING SANITARY AND STORM SEWERS

BENCHMARKS & CONTROL POINTS
FH-105 ('O' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

	PROPOSED BUILDING ADDITION
	REMOVE & REPLACE PVMT FOR UTILITY TRENCH. CONTRACTOR SHALL MAINTAIN TRAFFIC AT ALL TIMES
G	PROPOSED GAS
SAN	PROPOSED SANITARY
ST	PROPOSED STORM
W	PROPOSED WATER
E	PROPOSED ELECTRICAL LINES, SEE ELECTRICAL PLANS FOR DETAILS
P	PROPOSED POWER LINES, SEE ELECTRICAL PLANS FOR DETAILS
T	PROPOSED TELEPHONE LINES, SEE ELECTRICAL PLANS FOR DETAILS
NG	EXISTING NATURAL GAS
SAN	EXISTING SANITARY SEWER
S	EXISTING STORM SEWER
DW	EXISTING DOMESTIC WATER
ST	EXISTING STEAM
P	EXISTING POWER
T	EXISTING TELEPHONE
	ABANDONED UTILITY

CHG	NUM	DESCRIPTION	APP/DATE
REVISIONS			
LAST APPROVED EDMS REVISION		TECH LEAD:	FAC-SYS MGR: / REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

UTILITY PLAN
BID OPTION 01

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3700 Park East Drive, # 200
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DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	114

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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C114

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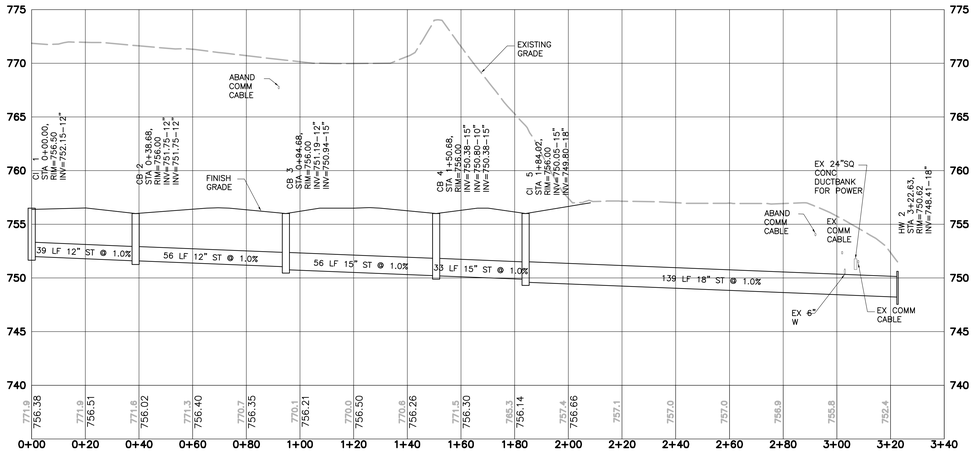

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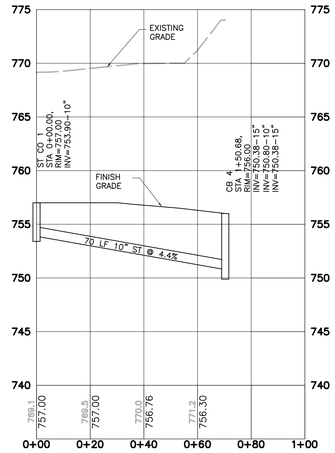
VERT. 1"=5'



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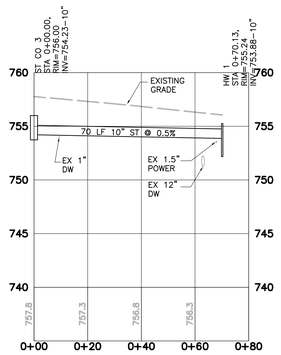
VERT. 1"=5'



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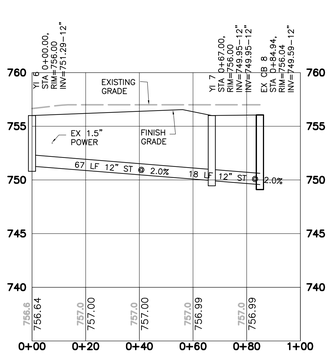
VERT. 1"=5'



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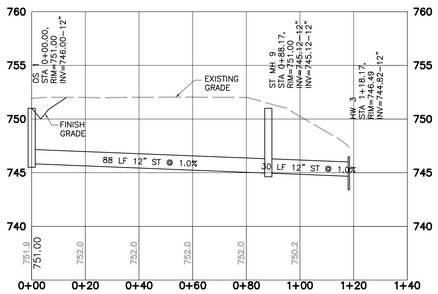
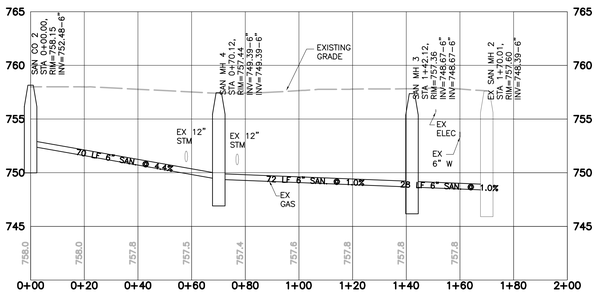
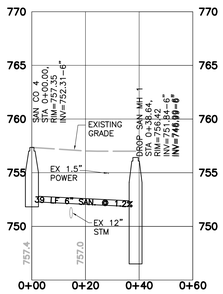
VERT. 1"=5'



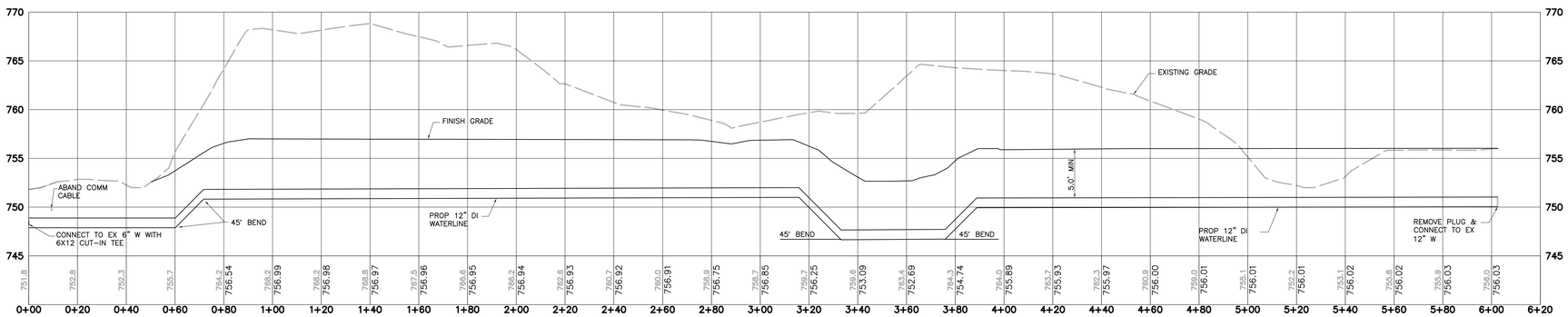
STORM PROFILE 'E'
SCALE: HORIZ. 1"=20'
VERT. 1"=5'



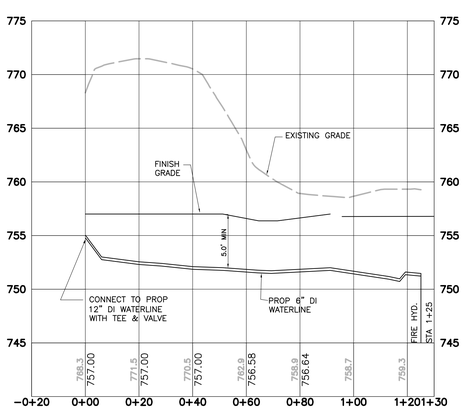
SANITARY PROFILE 'F'
SCALE: HORIZ. 1"=20'
VERT. 1"=5'



SANITARY PROFILE 'G'
SCALE: HORIZ. 1"=20'
VERT. 1"=5'



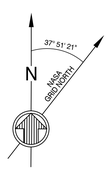
WATER PROFILE 'H'
SCALE: HORIZ. 1"=20'
VERT. 1"=5'



WATER PROFILE 'I'
SCALE: HORIZ. 1"=20'
VERT. 1"=5'

0' 20' 40' 60'

UTILITY PROFILE PLAN
1"=20'



NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.

KEY NOTES:

1. CONTRACTOR TO VERIFY DEPTH OF UTILITY PRIOR TO COMMENCING PROPOSED UTILITY INSTALLATION.

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
TASK ORDER:
DESIGN: Author | DESIGNED: | CHECKED: Checker
REPRESENTATIVE: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

UTILITY PROFILE PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	115

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

C115

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GENERAL EROSION AND SEDIMENT CONTROL NOTES:

EROSION CONTROL SHALL CONSIST OF TEMPORARY CONTROL MEASURES AS DETAILED ON THE PLANS OR ORDERED BY THE GOVERNING AGENCY DURING THE LIFE OF THE CONTRACT TO CONTROL SOIL EROSION AND SEDIMENTATION THROUGH USE OF EROSION CONTROL BEST MANAGEMENT PRACTICES (BMP'S).

SEDIMENT PONDS, SEDIMENT TRAPS, AND PERIMETER SEDIMENT CONTROLS, SHALL BE IMPLEMENTED AS THE FIRST STEP OF GRADING AND WITHIN 7 DAYS FROM THE START OF GRUBBING. THEY SHALL CONTINUE TO FUNCTION UNTIL DISTURBED AREAS ARE RE-ESTABLISHED WITH TEMPORARY VEGETATION. NO SEDIMENT CONTROLS SHALL BE PLACED IN A STREAM.

TRENCH DEWATERING OR GROUND WATER, WHICH CONTAINS SEDIMENT SHALL PASS THROUGH A SEDIMENT SETTLING POND OR EQUALLY EFFECTIVE SEDIMENT CONTROL DEVICE. ALTERNATIVES MAY INCLUDE DEWATERING INTO SUMP PIT, FILTER BAG OR EXISTING VEGETATED UPSLOPE AREA. SEDIMENT LADEN WATER SHALL NOT BE DISCHARGED TO STREAMS OR THE STORM SEWER SYSTEM.

THE SWP3, NOTES AND DETAILED DRAWINGS ARE INTENDED TO SERVE AS BASIC GUIDELINES. ALL EROSION CONTROL PRACTICES SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE ODNR RAINWATER AND LAND DEVELOPMENT MANUAL.

ADDITIONAL EROSION CONTROL BMP'S MAY BE MANDATED BY THE GOVERNING AGENCY AT ANY TIME DURING THIS PROJECT AS UNFORESEEN SITUATIONS MAY ARISE THAT WARRANT FURTHER EROSION AND SEDIMENT CONTROL PRACTICES.

CONSTRUCT IN ACCORDANCE WITH THESE PLANS, THE OHIO DEPARTMENT OF TRANSPORTATION (ODOT) STANDARD CONSTRUCTION DRAWING MC-11, AND THE OHIO WATER MANAGEMENT AND SEDIMENT CONTROL MANUAL FOR URBANIZING AREAS. THE IMPLEMENTATION OF SOIL EROSION AND SEDIMENT CONTROL SHALL ALSO CONFORM TO THE REQUIREMENTS OF LOCAL EROSION AND SEDIMENT CONTROL REGULATIONS. IF CONFLICTS EXIST REGARDING THE SOIL AND SEDIMENT CONTROL PRACTICES, THE MORE RESTRICTIVE SHALL APPLY.

CONSTRUCTION MUST COMPLY WITH ALL LOCAL EROSION AND SEDIMENT CONTROL REGULATIONS. DISTURBED AREAS REMAINING DORMANT FOR OVER ONE YEAR OR AT FINAL GRADE, WILL HAVE PERMANENT EROSION CONTROLS APPLIED WITHIN SEVEN DAYS.

CLEARING AND GRUBBING

LIMITS OF CLEARING AND GRADING SHALL BE CLEARLY MARKED ON THE SITE WITH SIGNAGE, FLAGGING AND/OR CONSTRUCTION FENCING.

THE CONTRACTOR SHALL LIMIT THE SURFACE AREA OF ERODABLE EARTH MATERIAL EXPOSED BY EXCAVATION, BORROW, AND FILL OPERATIONS AND PROVIDE IMMEDIATE PERMANENT OR TEMPORARY CONTROL MEASURES TO PREVENT CONTAMINATION OF ADJACENT STREAMS OR OTHER WATER COURSES, LAKES, PONDS, WETLANDS OR OTHER AREAS OF WATER IMPOUNDMENT.

CONSTRUCTION ENTRANCE

A STONED CONSTRUCTION ENTRANCE SHALL BE INSTALLED FOR ALL INGRESS & EGRESS TO THE SITE. THE MINIMUM DIMENSIONS OF THE DRIVE SHALL BE 20 FT. WIDE AND 70 FT. LONG. THE STONE SHALL BE 6 INCHES DEEP WITH AN UNDERLAIN GEOTEXTILE FABRIC. THE DRIVE SHALL BE INSTALLED PRIOR TO ANY CLEARING AND GRUBBING. SEDIMENTS SHALL BE REMOVED FROM ROADWAYS DAILY.

STABILIZATION

PERMANENT AND TEMPORARY STABILIZATION ARE DEFINED IN PART VII OF THE OEPA AUTHORIZATION FOR FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
OHIO EPA PERMIT NO. OH000003 EFFECTIVE DATE 4/21/13 – EXPIRATION DATE 4/20/18
DISTURBED AREAS MUST BE STABILIZED AS SPECIFIED IN THE FOLLOWING TABLES BELOW:

TABLE 1: PERMANENT STABILIZATION

AREA REQUIRING PERMANENT STABILIZATION	TIME FRAME TO APPLY EROSION CONTROL
ANY AREA THAT WILL LIE DORMANT FOR ONE YEAR OR MORE	WITHIN SEVEN DAYS OF THE MOST RECENT DISTURBANCE
ANY AREA WITHIN 50 FT. OF A STREAM AND AT FINAL GRADE	WITHIN TWO DAYS OF REACHING FINAL GRADE
ANY OTHER AREAS AT FINAL GRADE	WITHIN SEVEN DAYS OF REACHING FINAL GRADE WITHIN THAT AREA

DITCHES WITH SLOPES GREATER THAN 1.5% SHALL HAVE EROSION CONTROL BLANKETS OR MATTING INSTALLED AS PART OF STABILIZATION MEASURES.

EROSION CONTROL BLANKETS SHALL BE USED TO AID IN ESTABLISHING VEGETATION ON DISTURBED SLOPES STEEPER THAN 6%.

SIDE SLOPES OF ROADS AND DRIVES SHALL BE SEEDED AND BLANKETED IMMEDIATELY UPON COMPLETION.

SEEDING AND MULCHING: ALL SITE AREAS NOT OTHERWISE COVERED BY PROPOSED BUILDINGS, PAVEMENTS, OR LANDSCAPE PLANTINGS SHALL BE SEEDED AND MULCHED IN ACCORDANCE WITH THE SPECIFICATIONS. CONTRACTOR TO COORDINATE WITH THE LANDSCAPE PLAN.

A SITE IS NOT CONSIDERED TO BE STABLE UNTIL THE FOLLOWING ITEMS ARE COMPLETED:

1) A PERENIAL, VEGETATIVE COVER (OR OTHER PERMANENT STABILIZATION PRACTICE) HAS GROWN TO A 75% DENSITY THROUGHOUT THE ENTIRE DISTURBED AREA.

2) ALL TEMPORARY EROSION AND SEDIMENT CONTROLS HAVE BEEN REMOVED AND DISPOSED OF PROPERLY.

3) ALL TRAPPED SEDIMENT HAS BEEN PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION OR RE-SUSPENSION.

4) ALL CONSTRUCTION ACTIVITIES HAVE CEASED.

TEMPORARY SEEDING

SEEDING AREAS SHALL BE INSPECTED AND WHERE THE SEED HAS NOT PRODUCED 80% COVER SHALL BE RESEEDED AS NECESSARY BY THE CONTRACTOR. AREAS SHALL BE STABILIZED WITH MULCH WHEN CONDITIONS PROHIBIT SEEDING.

STRAW MULCHING SHALL BE APPLIED AT A RATE 2-3 STANDARD 45 LB. BALES PER 1000 SQ.FT. OF DISTURBED AREA OR 2 TONS PER ACRE. ALL HYDROSEEDING MUST BE STRAW MULCHED ACCORDING TO THE ABOVE SPECIFICATIONS UNLESS IT IS WATERED WEEKLY.

ALL DETENTION PONDS, RETENTION PONDS, WATER QUALITY STRUCTURES, SEDIMENT PONDS, SEDIMENT TRAPS, EARTHEN DIVERSIONS OR EMBANKMENTS SHALL BE SEEDED AND MULCHED WITHIN 7 DAYS OF COMPLETED CONSTRUCTION.

TABLE 2: TEMPORARY STABILIZATION

AREA REQUIRING TEMPORARY STABILIZATION	TIME FRAME TO APPLY EROSION CONTROL
ANY DISTURBED AREAS WITHIN 50 FT. OF A STREAM AND NOT AT FINAL GRADE	WITHIN TWO DAYS OF THE MOST RECENT DISTURBANCE IF THE AREA WILL REMAIN IDLE FOR MORE THAN 14 DAYS
FOR ALL CONSTRUCTION ACTIVITIES, ANY DISTURBED AREAS THAT WILL BE DORMANT FOR MORE THAN 14 DAYS BUT LESS THAN ONE YEAR, AND NOT WITHIN 50 FT. OF STREAM	WITHIN SEVEN DAYS OF THE MOST RECENT DISTURBANCE WITHIN THE AREA FOR RESIDENTIAL SUBDIVISIONS, DISTURBED AREAS MUST BE STABILIZED AT LEAST SEVEN DAYS PRIOR TO TRANSFER OF PERMIT COVERAGE FOR THE INDIVIDUAL LOT(S)
DISTURBED AREAS THAT WILL BE IDLE OVER WINTER	PRIOR TO ONSET OF WINTER WEATHER (NOV.1) STRAW MULCH 2 TO 3 BALES PER 1000 SQ.FT. AND OR 2 TONS PER ACRE.

WINTERIZATION – ANY DISTURBED AREA THAT IS NOT GOING TO BE WORKED FOR 21 DAYS OR MORE MUST BE SEEDED AND MULCHED BY NOVEMBER 1 OR MUST HAVE A DORMANT SEEDING OR MULCH COVER APPLIED BETWEEN NOVEMBER 1 AND MARCH 1.

WHEN SEASONAL CONDITIONS PROHIBIT THE APPLICATION OF TEMPORARY OR PERMANENT SEEDING, NON-VEGETATIVE SOIL STABILIZATION PRACTICES SUCH AS MULCHING AND MATTING SHALL BE USED.

MAINTENANCE

ALL TEMPORARY AND PERMANENT CONTROL PRACTICES SHALL BE MAINTAINED AND REPAIRED AS NEEDED TO ENSURE CONTINUED PERFORMANCE OF THEIR INTENDED FUNCTION. ALL SEDIMENT CONTROL PRACTICES MUST BE MAINTAINED IN A FUNCTIONAL CONDITION UNTIL ALL UP SLOPE AREAS THEY CONTROL ARE PERMANENTLY STABILIZED. THE CONTRACTOR SHALL COMPLY WITH THE MAINTENANCE SCHEDULE INCLUDED IN THE APPROVED PLANS FOR THE PROPOSED EROSION CONTROLS. A WRITTEN DOCUMENT CONTAINING THE SIGNATURES OF ALL CONTRACTORS AND SUB-CONTRACTORS INVOLVED IN THE IMPLEMENTATION OF THE BMPS MUST BE MAINTAINED AS PROOF ACKNOWLEDGING THAT THEY REVIEWED AND UNDERSTAND THE CONDITIONS AND RESPONSIBILITIES OF THE SWP3.

INSPECTION

ALL STORMWATER CONTROLS ON THE SITE ARE INSPECTED AT LEAST ONCE EVERY SEVEN CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT GREATER THAN ONE-HALF INCH OF RAIN PER 24 HOUR PERIOD. A WRITTEN RECORD DOCUMENTING THE INSPECTION AND THE RESULTS OF THESE INSPECTIONS MUST BE CREATED AND MAINTAINED ON-SITE WITH THE SWP3. DISTURBED AREAS AND AREAS USED FOR STORAGE OF MATERIALS THAT ARE EXPOSED TO PRECIPITATION SHALL BE INSPECTED FOR EVIDENCE OF OR THE POTENTIAL FOR, POLLUTANTS ENTERING THE EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED IN THE SWP3 SHALL BE OBSERVED TO ENSURE THAT THOSE ARE OPERATING CORRECTLY. DISCHARGE LOCATIONS SHALL BE INSPECTED TO ASCERTAIN WHETHER EROSION AND SEDIMENT CONTROL MEASURES ARE EFFECTIVE IN PREVENTING SIGNIFICANT IMPACTS TO THE RECEIVING WATERS. LOCATIONS WHERE VEHICLES ENTER OR EXIT THE SITE SHALL BE INSPECTED FOR EVIDENCE OF OFF-SITE VEHICLE TRACKING.

I. WHEN PRACTICES REQUIRE REPAIR OR MAINTENANCE.
IF THE INSPECTION REVEALS THAT A CONTROL PRACTICE IS IN NEED OF REPAIR OR MAINTENANCE, WITH EXCEPTION OF A SEDIMENT SETTLING POND, IT MUST BE REPAIRED OR MAINTAINED WITHIN THREE DAYS OF INSPECTION. SEDIMENT SETTLING PONDS MUST BE REPAIRED OR MAINTAINED WITHIN 10 DAYS OF THE INSPECTION.

II. WHEN PRACTICES FAIL TO PROVIDE THEIR INTENDED FUNCTION.
IF THE INSPECTION REVEALS THAT A CONTROL PRACTICE FAILS TO PERFORM ITS INTENDED FUNCTION AND THAT ANOTHER, MORE APPROPRIATE CONTROL PRACTICE IS REQUIRED, THE SWP3, MUST BE AMENDED AND THE NEW CONTROL PRACTICE MUST BE INSTALLED WITHIN 10 DAYS OF INSPECTION.

III. WHEN PRACTICES DEPICTED ON THE SWP3 ARE NOT INSTALLED.
IF THE INSPECTION REVEALS THAT A CONTROL PRACTICE HAS NOT BEEN IMPLEMENTED IN ACCORDANCE WITH THE SWP3. THE SWP3 MUST BE AMENDED AND THE NEW CONTROL PRACTICE MUST BE INSTALLED WITHIN 10 DAYS OF THE INSPECTION. IF THE INSPECTION REVEALS THAT THE PLANNED CONTROL PRACTICE IS NOT NEEDED, THE RECORD MUST CONTAIN A STATEMENT OF EXPLANATION AS TO WHY THE CONTROL PRACTICE IS NOT NEEDED.

WASTE DISPOSAL

CONTAINERS (e.g., DUMPSTERS, DRUMS) SHALL BE AVAILABLE FOR DISPOSAL OF DEBRIS, TRASH, HAZARDOUS OR PETROLEUM WASTES. ALL CONTAINERS MUST BE COVERED AND LEAK-PROOF. ALL WASTE MATERIAL SHALL BE DISPOSED OF AT FACILITIES APPROVED FOR THE PERTINENT MATERIAL. NASA IS NOT TO PROVIDE DUMPSTERS.

COMERCIAL/INDUSTRIAL FILL

COMMERCIAL/INDUSTRIAL FILL SOIL SHALL BE REUSED ON SITE. IN NO CASE SHALL EXCESS EXCAVATED SOIL BE ALLOWED TO COME IN CONTACT WITH A WATERWAY. NO EXCESS EXCAVATED SOILS SHALL BE REMOVED FROM THE SITE WITHOUT WRITTEN AUTHORIZATION FROM THE GOVERNMENT IN THE FORM OF COMPLETED AND SIGNED MANIFESTS AND PROPERTY PASSES.

CLEAN HARD FILL

ALL WASTE MATERIAL SHALL BE DISPOSED OF OFF-SITE.

CONSTRUCTION & DEMOLITION DEBRIS

WASTE MANAGEMENT AND RECYCLING:

ALL MATERIALS LEAVING GOVERNMENT PROPERTY FOR RECYCLING OR DISPOSAL SHALL BE COORDINATED WITH NASA WASTE MANAGEMENT IN ACCORDANCE WITH SPECIFICATION SECTION 01 35 43.98 ENVIRONMENTAL PROTECTION PROCEDURES.
ANY REMOVED OR DEMOLISHED ITEM THAT MEETS THE DEFINITION OF CONSTRUCTION & DEMOLITION DEBRIS (C&DD) SHALL BE EVALUATED FOR REUSE AND/OR RECYCLING. THE CONTRACTOR SHALL REUSE OR RECYCLE ANY ITEM THAT CAN BE SEGREGATED FROM THE WASTE STREAM AND REUSED OR RECYCLED IN A COST EFFECTIVE MANNER. NASA WASTE MANAGEMENT (WM) MANAGES THE CONSTRUCTION WASTE MANAGEMENT PROGRAM. ALL REUSE, RECYCLING AND DISPOSAL ACTIVITIES SHALL BE COORDINATED WITH NASA WM. THE CONTRACTOR SHALL SUBMIT A MANIFEST FOR ANY C&DD MATERIALS THAT WILL BE REUSED OFF SITE, RECYCLED OR DISPOSED OF TO THE COTR, WHICH WILL THEN BE REVIEWED AND APPROVED BY NASA WM FOR TRANSPORTATION OFF SITE. MATERIALS THAT WILL BE REUSED OR RECYCLED SHALL BE SEGREGATED AND MANIFESTED INDIVIDUALLY. NASA HAS SPECIFICALLY TARGETED THE FOLLOWING MATERIALS FOR REUSE OR RECYCLING: ASPHALT, CONCRETE, GRAVEL/STONE, COMMERCIAL/INDUSTRIAL FILL SOIL, TOPSOIL, TREES/BUSHES, FERROUS AND NON-FERROUS METALS, CONCRETE BLOCK, BRICKS, CARPETING, AND CERAMIC TILES.

CONSTRUCTION CHEMICAL COMPOUNDS

AREA SHALL BE DESIGNATED FOR MIXING OR STORAGE OF COMPOUNDS SUCH AS FERTILIZERS, LIME ASPHALT, OR CONCRETE, THESE DESIGNATED AREAS SHALL BE LOCATED AWAY FROM WATERCOURSES, DRAINAGE DITCHES, FIELD DRAINS, OR OTHER STORMWATER DRAINAGE AREA.

EQUIPMENT FUELING & MAINTENANCE

EQUIPMENT FUELING & MAINTENANCE SHALL BE IN DESIGNATED AREAS ONLY.

A SPILL PREVENTION CONTROL AND COUNTERMEASURES

SEE SPECIFICATION SECTION 01 35 43.98 ENVIRONMENTAL PROTECTION PROCEDURES.

CONCRETE WASH OUT

WASHING OUT CONCRETE TRUCKS ONTO PAVEMENT OR ANYWHERE THAT IT CAN FLOW INTO A STORM SEWER, SANITARY SEWER, OR AN ADJACENT WATERWAY IS STRICTLY PROHIBITED. A DESIGNATED CONCRETE WASHOUT CONTAINER WILL BE LOCATED NEAR THE SITE FOR THE SOLE PURPOSE OF WASHING OUT CONCRETE TRUCKS. NASA CONSTRUCTION MANAGER/QAT SHALL COORDINATE THE LOCATION OF CONCRETE WASH OUT DUMPSTER LOCATION WITH WASTE MANAGEMENT. THE USE OF THIS CONTAINER SHALL BE COORDINATED PRIOR TO ALL CONCRETE PLACEMENT. THE CONTRACTOR SHALL NOTIFY THE NASA CONSTRUCTION MANAGER 24 HOURS IN ADVANCE OF ANY CONCRETE PLACEMENT ACTIVITY.

SPILL REPORTING REQUIREMENTS

SPILL ON PAVEMENT SHALL BE ABSORBED WITH SAWDUST, KITTY LITTER, OR OTHER ABSORBANT MATERIAL AND DISPOSED OF WITH THE TRASH AT A LICENSED LANDFILL. HAZARDOUS OR INDUSTRIAL WASTES SUCH AS MOST SOLVENTS, GASOLINE, OIL-BASED PAINTS AND CEMENT CURING COMPOUNDS REQUIRE SPECIAL HANDLING. SPILLS SHALL BE REPORTED TO NASA WITHIN ONE HOUR OF DISCOVERY OF THE RELEASE. THE CONTRACTOR SHALL HAVE ON-SITE A 20 GALLON OVER PACK SPILL KIT BY EXCEL EQUIPMENT OR APPROVED EQUAL AT THE SITE NEXT TO THE DESIGNATED MAINTENANCE REPAIR AND FUELING AREA THROUGHOUT CONSTRUCTION. A RESPONSE GUIDELINE BOOK SHALL BE SUPPLIED BY THE MANUFACTURER. THIS BOOK AND INFORMATION SHALL BE POSTED AT THE SITE. THE CONTRACTOR SHALL CONTACT NASA, THE LOCAL FIRE DEPARTMENT, AND THE LOCAL EMERGENCY PLANNING COMMITTEE IN THE EVENT OF A PETROLEUM SPILL (>25 GALLONS) OR THE PRESENCE OF SHEEN WITHIN 30 MINUTES OF A SPILL 25 GALLONS OR MORE. THIS INFORMATION MUST BE POSTED AT THE SITE. THE CONTRACTOR SHALL SUBMIT A SPILL PREVENTION CONTROL AND COUNTER MEASURES (SPCC) PLAN TO NASA FOR APPOVAL. CONSTRUCTION SHALL NOT START UNTIL AFTER PLANS ARE APPROVED BY NASA. CALL EMERGENCY DEPARTMENT AT 216-433-8888 TO REPORT ALL SPILLS.

OPEN BURNING

OPEN BURNING IS NOT PERMITTED.

DUST CONTROLS/SUPPRESSANTS

USED OIL MAY NOT BE USED AS A DUST SUPPRESSANT. NO DUST SUPPRESSANT SHALL BE APPLIED NEAR CATCH BASINS, STORM SEWERS OR OTHER DRAINAGE WAYS.

STREAM CROSSINGS

STREAM CROSSINGS SHALL BE CONSTRUCTED ENTIRELY OF STONE, ROCK, OR CLEAN RECYCLED CONCRETE. SOIL OR EARTHEN MATERIAL MAY NOT BE USED. A 20 FT. STONE APRON ON EITHER SIDE OF THE STREAM SHALL BE CONSTRUCTED TO PREVENT LOCALIZED SEDIMENTATION. ALL DISTURBED AREAS OF THE BANK WITHIN 50 FT. OF THE STREAM SHALL BE STABILIZED WITH SEED AND MULCH WITHIN 2 DAYS OF THE DISTURBANCE.

PERMITS

THE CONDITIONS OF THE NPDES CONSTRUCTION STORM WATER GENERAL PERMIT SHALL BE MET DURING ALL STAGES OF CONSTRUCTION.

SITE CONDITIONS

EXISTING: COMMERCIAL

PROPOSED: COMMERCIAL

TOTAL SITE AREA DISTURBED: 5.03 Ac.

IMMEDIATE RECEIVING STREAM IS ABRAM CREEK

PRE-DEVELOPMENT: IMPERVIOUS = 0.46 Ac.
PERVIOUS = 4.57 Ac.

POST-DEVELOPMENT: IMPERVIOUS = 2.30 Ac.
PERVIOUS = 2.73 Ac.

PERMANENT STABILIZATION OF CONVEYANCE CHANNELS

OPERATORS SHALL UNDERTAKE SPECIAL MEASURES TO STABILIZE CHANNELS AND OUTFALLS AND PREVENT EROSIVE FLOWS. MEASURES MAY INCLUDE SEEDING, DORMANT SEEDING (AS DEFINED IN THE LATEST EDITION OF ODNR RAINWATER AND LAND DEVELOPMENT MANUAL), MULCHING, EROSION CONTROL MATTING, SODDING, RIPRAP NATURAL CHANNEL DESIGN WITH BIO ENGINEERING TECHNIQUES OR ROCK CHECK DAMS.

TIMING

SEDIMENT CONTROL STRUCTURES SHALL BE FUNCTIONAL THROUGHOUT THE COURSE OF EARTH DISTURBING ACTIVITY. SEDIMENT BASINS AND PERIMETER SEDIMENT BARRIERS SHALL BE IMPLEMENTED PRIOR TO GRADING AND WITHIN SEVEN DAYS FROM THE START OF GRUBBING. THEY SHALL CONTINUE TO FUNCTION UNTIL THE SLOPE DEVELOPMENT AREA IS PERMANENTLY RESTABILIZED. AS CONSTRUCTION PROGRESSES AND THE TOPOGRAPHY IS ALTERED, APPROPRIATE CONTROLS MUST BE CONSTRUCTED TO ADDRESS THE CHANGING DRAINAGE PATTERNS.

SILT FENCE & DIVERSIONS

SHEET FLOW RUNOFF FROM DENUDED AREAS SHALL BE INTERCEPTED BY SILT FENCE OR DIVERSIONS TO PROTECT ADJACENT PROPERTIES AND WATER RESOURCES FROM SEDIMENT TRANSPORTED VIA SHEET FLOW. WHERE INTENDED TO PROVIDE SEDIMENT CONTROL, SILT FENCES SHALL BE PLACED ON A LEVEL CONTOUR. THE EPA PERMIT No. OHC000003 DOES NOT PRECLUDE THE USE OF OTHER SEDIMENT BARRIERS DESIGNED TO CONTROL SHEET FLOW RUNOFF. SILT FENCE IS NOT PERMITTED TO BE USED FOR CONTROLLING CONCENTRATED SURFACE WATER FLOW (ONLY SHEET FLOW).

STORMWATER DIVERSION PRACTICES SHALL BE USED TO KEEP RUNOFF AWAY FROM DISTURBED AREAS AND STEEP SLOPES WHERE PRACTICAL. SUCH DEVICES, WHICH INCLUDE SWALES, DIKES OR BERMS, MAY RECEIVE FROM AREAS UP TO 10 ACRES.

IF SMALL RILLS OR GULLIES DEVELOP, TEMPORARY DIVERSIONS SHALL BE INSTALLED UNTIL SATISFACTORY SEEDING IS ESTABLISHED.

INLET PROTECTION

OTHER EROSION AND SEDIMENT CONTROL PRACTICES SHALL MINIMIZE SEDIMENT LADEN WATER ENTERING ACTIVE STORM DRAIN SYSTEMS, UNLESS THE STORM DRAIN SYSTEM DRAINS TO A SEDIMENT POND. INLET PROTECTION IS MANDATORY WHERE SEDIMENT SETTLING PONDS WILL NOT BE IMPLEMENTED.

NON-SEDIMENT POLLUTANTS CONTROLS

NO SOLID (OTHER THAN SEDIMENT) OR LIQUID WASTE, INCLUDING BUILDING MATERIALS, SHALL BE DISCHARGED IN STORMWATER RUNOFF. ALL NECESSARY BMP'S MUST BE IMPLEMENTED TO PREVENT THE DISCHARGE OF NON-SEDIMENT POLLUTANTS TO THE DRAINAGE SYSTEM OF THE SITE OR SURFACE WATERS OF THE STATE. UNDER NO CIRCUMSTANCE SHALL CONCRETE TRUCKS WASH OUT DIRECTLY INTO A DRAINAGE CHANNEL, STORM SEWER OR SURFACE WATERS OF THE STATE. NO EXPOSURE OF STORMWATER TO WASTE MATERIALS IS RECOMMENDED.

OFF-SITE TRAFFIC

OFF-SITE VEHICLE TRACKING OF SEDIMENTS AND DUST GENERATION SHALL BE MINIMIZED.

ADJACENT ROADS SHALL BE KEPT FREE OF DIRT AND DEBRIS AT ALL TIMES. TRACKING OR SPILLAGE OF MUD, DIRT, OR DEBRIS UPON STREETS IS PROHIBITED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY SUCH OCCURRENCE, BE IT ON STREETS OR ADJACENT PROPERTY(S), AND SHALL CLEAN UP DEBRIS IMMEDIATELY AND AS DIRECTED BY THE OWNER OR MUNICIPAL ENGINEER AT THE END OF EACH WORK DAY. IF THE CONTRACTOR FAILS TO KEEP THE WORK AREA CLEAN OF DEBRIS, OR FAILS TO CLEAN THE STREETS OF MUD AND DIRT FROM THIS CONSTRUCTION SITE, NASA MAY TAKE ACTION AND ASSESS THE CONTRACTOR FOR ANY COSTS THAT ARE INCURRED.

TRENCH AND GROUND WATER CONTROL

THERE SHALL BE NO TURBID DISCHARGES TO SURFACE WATERS OF THE STATE RESULTING FROM DEWATERING ACTIVITIES. IF TRENCH OR GROUND WATERS CONTAIN SEDIMENT, IT MUST PASS THROUGH A SEDIMENT SETTLING POND OR OTHER EQUALLY EFFECTIVE SEDIMENT CONTROL DEVICE, PRIOR TO BEING DISCHARGED FROM THE CONSTRUCTION SITE. ALTERNATIVELY, SEDIMENT MAY BE REMOVED BY SETTLING IN PLACE OR DEWATERING INTO INTO A SUMP PIT, FILTER BAG OR COMPARABLE PRACTICE. GROUND WATER DEWATERING WHICH DOES NOT CONTAIN SEDIMENT OR OTHER POLLUTANTS ARE NOT REQUIRED TO BE TREATED PRIOR TO DISCHARGE, HOWEVER, CARE MUST BE TAKEN WHEN DISCHARGING GROUND WATER TO ENSURE THAT IT DOES NOT BECOME POLLUTANT-LADEN BY TRAVERSING OVER DISTURBED SOILS OR OTHER POLLUTANT SOURCES.

SEQUENCE OF MAJOR CONSTRUCTION OPERATIONS

1. AT THE START OF CONSTRUCTION ACTIVITIES, CONTRACTOR TO INSTALL TEMPORARY CONSTRUCTION ENTRANCE.
2. CONTRACTOR TO INSTALL CONSTRUCTION FENCE AND SILT SOCK.
3. CONTRACTOR TO INSTALL SILT FENCE TO PROTECT EXISTING PONDS AND AROUND PERIMETER OF PROPOSED DISTURBED AREAS AND MAINTAIN UNTIL FINAL STABILIZATION OF UPLAND AREAS.
4. CONTRACTOR TO CLEAR AND GRUB PROPOSED SITE.
5. CONTRACTOR TO ROUGH GRADE SITE.
6. CONTRACTOR TO INSTALL TEMPORARY WASHOUT CONTAINER FOR CONCRETE TRUCK WASHOUT AND MAINTAIN UNTIL NO LONGER REQUIRED.
7. CONTRACTOR TO BEGIN CONSTRUCTION OF BUILDING ADDITIONS.
8. CONTRACTOR TO INSTALL UTILITIES.
9. CONTRACTOR TO INSTALL INLET PROTECTION AT ALL INLETS AND MAINTAIN THEM UNTIL UPLAND AREAS ARE STABILIZED.
10. CONTRACTOR TO FINAL GRADE SITE.
11. CONTRACTOR TO BEGIN PAVING OPERATIONS.
12. CONTRACTOR TO INSTALL PERMANENT SEEDING IN ALL NONPAVED AREAS.
13. CONTRACTOR TO REMOVE EROSION CONTROL DEVICES AFTER UPLAND AREAS HAVE BEEN STABILIZED.
14. CONTRACTOR TO INSPECT STORM SEWER AND REMOVE ALL DEBRIS FROM THE SYSTEM CAUSED BY CONSTRUCTION.

POST CONSTRUCTION MAINTENANCE PROCEDURE AT OWNER'S EXPENSE

DETENTION BASIN

1. THE OWNER SHALL VISUALLY INSPECT BASIN FOREBAY EVERY 6 MONTHS AND REPAIR ERODED AREAS.
2. THE OWNER SHALL ANNUALY INSPECT SEDIMENT ACCUMULATION IN BASIN AND FOREBAY. REMOVE SEDIMENT FROM FOREBAY EVERY 5 TO 7 YEARS AND AS NEEDED. REMOVE SEDIMENT FROM BASIN WHEN VOLUME HAS BEEN REDUCED BY 25 PERCENT, (TYPICALLY EVERY 25 TO 50 YEARS).
3. THE OWNER SHALL ANNUALLY INSPECT INLETS AND OUTLET DEVICES TO ENSURE DEVICES ARE FREE OF DEBRIS AND OPERATIONAL. CLEAN AND REPAIR AS NEEDED.
4. THE OWNER SHALL SEED OR SOD TO RESTORE DEAD OR DAMAGED GROUND COVER ONCE PER YEAR.
5. THE OWNER SHALL VISUALLY INSPECT BASIN ONCE PER MONTH AND AFTER EVERY STORM EVENT GREATER THAN 0.5 IN. IN 24 HOURS AND REMOVE DEBRIS AND LITTER.
6. INSPECTION REPORTS SHALL BE SUBMITTED TO THE LOCAL GOVERNING AUTHORITY.

SWPP NOTES & DETAILS
N.T.S.

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

SWPP NOTES & DETAILS

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NASA APPROVALS
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SIZE	BLDG/SYS		PROJECT ID		DISCP	TYP SEQ
CE	0351	-	COF20244	-	C-	501

AREA: | SHEET 1 OF 1
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TEMPORARY SEEDING NEEDS TO BE ESTABLISHED WITHIN SEVEN (7) DAYS ON ALL BARE AREAS THAT ARE NOT GOING TO BE DISTURBED FOR 14 OR MORE DAYS. ALSO, TEMPORARY SEEDING NEEDS TO BE ESTABLISHED WITHIN 2 DAYS ON AREAS WITHIN FIFTY FEET OF A STREAM.

TEMPORARY SEEDING SPECIES SELECTION

SEEDING DATES	SPECIES	LB./1,000FT.	PER AC.
MARCH 1– AUGUST 15	OATS	3	4 BUSHEL
	TALL FESCUE	1	40LBS.
	ANNUAL RYEGRASS	1	40LBS.
	PERENNIAL RYEGRASS	1	40LBS.
	TALL FESCUE	1	40LBS.
	ANNUAL RYEGRASS	1	40LBS.
AUGUST 16 – NOVEMBER 1	RYE	3	2 BUSHEL
	TALL FESCUE	1	40LBS.
	ANNUAL RYEGRASS	1	40LBS.
	WHEAT	3	2 BUSHEL
	TALL FESCUE	1	40LBS.
	ANNUAL RYEGRASS	1	40LBS.
	PERENNIAL RYEGRASS	1	40LBS.
	TALL FESCUE	1	40LBS.
	ANNUAL RYEGRASS	1	40LBS.
NOVEMBER 1 – SPRING SEEDING	USE MULCH ONLY, SODDING PRACTICES OR DORMANT SEEDING.		
NOTE: OTHER APPROVED SEED SPECIES MAY BE SUBSTITUTED			

SEEDING:

APPLY AS EARLY IN THE DAY AS POSSIBLE, BUT NO LATER THAN AT THE END OF THE DAY TO BENEFIT FROM MOISTURE STILL IN THE SURFACE LAYER.

APPLY UNIFORMLY OVER THE AREA TO BE PROTECTED WITH A CYCLONE SEEDER, DRILL. HYDROSEEDER OR CULTIPACKER SEEDER.

IMMEDIATELY PROTECT WITH STRAW MULCH.

APPLY ON AREAS THAT ARE NOT TO BE GRADED OR REWORKED FOR 21 OR MORE DAYS.

LIME AND FERTILIZE BASED ON SOIL TESTS FOR NUTRIENT REQUIREMENTS FOR ADEQUATE GROWTH.

MULCHING:

APPLY STRAW AT THE RATE OF 90LBS. PER 1,000 SQUARE FEET (2–3 BALES) OR 2 TONS PER ACRE OR OTHER MULCHES ACCORDING TO MANUFACTURERS SPECIFICATIONS.

LIME & FERTILIZER:

TAKE A SOIL TEST TO DETERMINE ACTUAL AMOUNTS OF NITROGEN, PHOSPHOROUS AND POTASH NEEDED.

OR APPLY 15 POUNDS OF 10–10–10 PER 1,000 SQUARE FEET.

ADD LIME AT THE RATE OF 100 POUNDS PER 1,000 SQUARE FEET.

TIMELINESS:

IMMEDIATELY AFTER THE WORK IS COMPLETED. NO LATER THAN AT THE END OF THE DAY.

TEMPORARY SEEDING (TS)

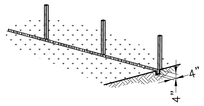
SILT FENCE

CONSTRUCTION SPECIFICATIONS

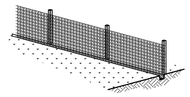
1. SILT FENCE SHALL BE CONSTRUCTED BEFORE UPSLOPE DISTURBANCE BEGINS OR WITHIN 7 DAYS OF FIRST GRUBBING.
2. THE HEIGHT OF THE SILT FENCE SHALL NOT EXCEED 36–INCHES, OR BE LESS THAN 16–INCHES. STORAGE HEIGHT SHALL NEVER EXCEED 18–INCHES, OR HALF OF THE TOTAL HEIGHT ABOVE THE ORIGINAL GROUND.
3. THE FENCE LINE SHALL FOLLOW LEVEL CONTOURS AS CLOSELY AS POSSIBLE.
4. IF POSSIBLE, THE FILTER FABRIC SHALL BE CUT FROM A CONTINUOUS ROLL TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SECURELY WRAPPED AROUND A POST.
5. POST SPACING SHALL NOT EXCEED 6 FEET. WHERE POSSIBLE, VEGETATION SHALL BE PRESERVED FOR ± 5 FEET UPSLOPE FROM THE SILT FENCE. IF VEGETATION IS REMOVED, IT SHALL BE RESTORED WITHIN 7 DAYS FROM INSTALLATION OF THE SILT FENCE.
6. SEAMS BETWEEN SECTIONS OF SILT FENCE SHALL BE OVERLAPPING WITH THE STAKES OF EACH SECTION WRAPPED TOGETHER BEFORE DRIVING INTO THE GROUND.
7. TURN THE ENDS OF THE FENCE UPHILL APPROXIMATELY 2 FEET. A TRENCH SHALL BE EXCAVATED APPROXIMATELY 4–INCHES WIDE AND 6–INCHES DEEP ALONG THE LINE OF THE POSTS AND UPSLOPE FROM THE BARRIER.
8. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
9. THE TRENCH SHALL BE BACKFILLED AND THE SOIL COMPACTED OVER THE TOE OF THE FILTER FABRIC.
10. SILT FENCES PLACED AT THE TOE OF A SLOPE SHALL BE SET AT LEAST 10 FEET FROM THE TOE IN ORDER TO INCREASE PONDING VOLUME. SILT FENCES ARE TO BE USED ONLY IN SITUATIONS IN WHICH SHEET FLOW IS EXPECTED, BUT NOT IN DRAINAGE DITCHES, CHANNELS, OR RAVINES IN WHICH CHANNELIZED FLOW OCCURS. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE EXCEEDED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED AND SEDIMENT STORED BEHIND THE SILT FENCE HAS BEEN REMOVED.

MAINTENANCE AND INSPECTION

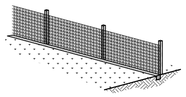
1. SILT FENCE SHALL BE INSPECTED DAILY, WEEKLY AND AFTER EACH SIGNIFICANT STORM (1/2–INCH IN 24 HOURS). ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY. SEDIMENT MAY BE REMOVED AFTER EACH STORM, BUT MUST BE REMOVED WHEN IT REACHES 1/3± HEIGHT OF THE FENCE (9–INCHES MAXIMUM). THE FABRIC SHALL BE REPLACED WHEN IT IS TORN, HAS HOLES, DECOMPOSES OR IS NO LONGER DETAINING WATER FOR SEDIMENTATION AND THE BARRIER IS STILL REQUIRED. THE POSTS SHALL BE REPLACED IF THEY ARE BENT OR BROKEN. FENCES THAT ARE KNOCKED DOWN OR HAVE JOINTS THAT ARE SEPARATED OR ARE BEING UNDERCUT BY FLOWS SHALL BE REPLACED IMMEDIATELY.
2. SEDIMENT REMOVED SHALL BE DISPOSED OF IN AN AREA PREVIOUSLY APPROVED BY THE LOCAL AUTHORITIES AND OWNER. AT NO TIME SHALL SEDIMENT BE PLACED IN AN AREA THAT WILL CONTRIBUTE SEDIMENT OFF–SITE AND IS NOT PERMANENTLY STABLE.



1. SET POSTS AND EXCAVATE A 4" TRENCH UPSLOPE ALONG THE LINE OF POSTS.



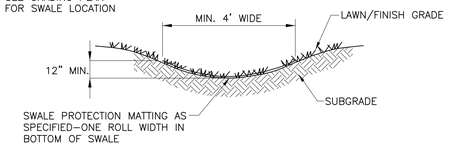
2. ATTACH THE FILTER FABRIC TO THE POSTS AND EXTEND IT IN THE TRENCH



3. BACKFILL AND COMPACT THE EXCAVATED SOIL.

SILT FENCE (SF)

NOTE:
SEE GRADING PLAN FOR SWALE LOCATION



SWALE PROTECTION MATTING DETAIL

NOTES

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CE	0351 -	COF20244	- C-	502

AREA: | SHEET 1 OF 1
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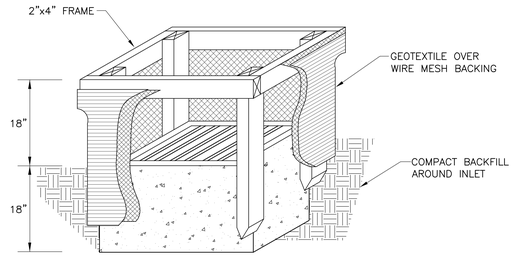


1. INLET PROTECTION SHALL BE CONSTRUCTED EITHER BEFORE UPSLOPE LAND DISTURBANCE OR BEFORE THE STORM DRAIN BECOMES OPERATIONAL.

2. THE EARTH AROUND THE INLET SHALL BE EXCAVATED COMPLETELY TO A DEPTH OF AT LEAST 18".

3. THE WOODEN FRAME & POSTS SHALL BE CONSTRUCTED OF 2 BY 4 IN. CONSTRUCTION GRADE LUMBER. POSTS SHALL BE DRIVEN 2 FT. INTO THE GROUND AT EACH CORNER OF THE INLET. SECURE FRAME TO POSTS USING THE OVERLAP JOINT METHOD AS SHOWN. THE TOP OF THE FRAME SHALL BE AT LEAST 6 IN. BELOW ADJACENT ROADS IF PONDED WATER WOULD POSE A SAFETY HAZARD TO TRAFFIC.

4. WIRE MESH SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT FABRIC WITH WATER FULLY IMPOUNDED AGAINST IT. IT SHALL BE STRETCHED TIGHTLY AROUND THE FRAME AND FASTENED SECURELY TO THE FRAME.

5. GEOTEXTILE SHALL HAVE AN EQUIVALENT OPENING SIZE OF 20–40 SIEVE AND BE RESILIENT TO SUNLIGHT. IT SHALL BE STRETCHED TIGHTLY AROUND THE FRAME AND FASTENED SECURELY. IT SHALL EXTEND FROM THE TOP OF THE FRAME TO 18 IN. BELOW THE INLET NOTCH ELEVATION. THE GEOTEXTILE SHALL OVERLAP ACROSS ONE SIDE OF THE INLET SO THE ENDS OF THE CLOTH ARE NOT FASTENED TO THE SAME POST.

6. BACKFILL SHALL BE PLACED AROUND THE INLET IN COMPACTED 6 IN. LAYERS UNTIL THE EARTH IS EVEN WITH NOTCH ELEVATION ON ENDS AND TOP ELEVATION ON SIDES.

7. A COMPACTED EARTH DIKE OR A CHECK DAM SHALL BE CONSTRUCTED IN THE DITCH LINE BELOW THE INLET IF THE INLET IS NOT IN A DEPRESSION AND IF RUNOFF BYPASSING THE INLET WILL NOT FLOW TO A SETTLING POND. THE TOP OF THE EARTH DIKES SHALL BE AT LEAST 6 IN. HIGHER THAN THE TOP OF THE FRAME.

INLET PROTECTION (IP)

THE PATENTED DANDY BAG IS DESIGNED FOR USE WITH FLAT GRATES (INCLUDING ROUND) AND MOUNTABLE CURBS TO DETAIN SEDIMENT–LADEN STORM WATER. THE SUSPENDED SOLIDS ARE ALLOWED TO SETTLE OUT OF THE SLOWED FLOW PRIOR TO ENTERING THE DANDY BAG.

INSTALLATION

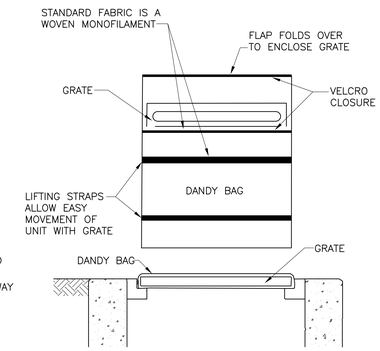
1. STAND THE GRATE ON END
2. PLACE THE DANDY BAG OVER THE GRATE
3. ROLL THE GRATE OVER SO THAT THE OPEN END IS UP
4. PULL UP THE SLACK
5. TUCK THE FLAP IN
6. PRESS THE VELCRO STRIPS TOGETHER
7. BE SURE THAT THE END OF THE GRATE IS COMPLETELY COVERED BY THE FLAP OR THE DANDY BAG WILL NOT WORK PROPERLY
8. HOLDING THE HANDLES, CAREFULLY PLACE THE DANDY BAG WITH THE GRATE INSERTED INTO THE CATCH BASIN FRAME

MAINTENANCE

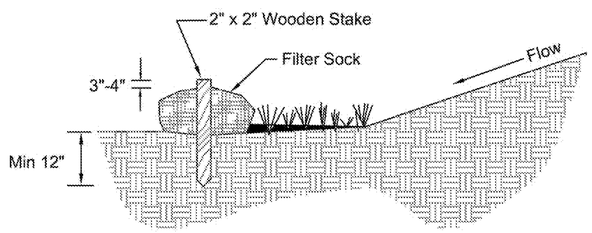
TO INSURE PROPER OPERATION REMOVE SILT, SEDIMENT, AND DEBRIS FROM THE SURFACE AND THE VICINITY OF THE UNIT WITH A SQUARE POINT SHOVEL OR STIFF BRISTLE BROOM AWAY FROM ENVIRONMENTALLY SENSITIVE AREAS AND WATERWAYS IN MANNER SATISFACTORY TO THE ENGINEER/INSPECTOR. REMOVE FINE MATERIAL FROM INSIDE DANDY BAG AS NEEDED. DISPOSE OF DANDY BAG NO LONGER IN USE AT AN APPROPRIATE RECYCLING OR SOLID WASTE FACILITY.

INLET INSPECTION

TO INSPECT INLET, REMOVE DANDY BAG WITH GRATE INSIDE, INSPECT CATCH BASIN AND REPLACE DANDY BAG BACK INTO GRATE FRAME.



INLET PROTECTION IN EXISTING PAVEMENT (IP)



SECTION

1. MATERIALS– COMPOST USED FOR FILTER SOCKS SHALL BE WEED, PATHOGEN AND INSECT FREE AND FREE OF ANY REFUSE, CONTAMI- NANTS OR OTHER MATERIALS TOXIC TO PLANT GROWTH. THEY SHALL BE DERIVED FROM A WELL–DECOMPOSED SOURCE OF ORGANIC MATTER AND CONSIST OF A PARTICLES RANGING FROM 3/8" TO 2".

2. FILTER SOCKS SHALL BE 3 OR 5 MIL CONTINUOUS, TUBULAR, HOPE 3/8" KNITTED MESH NETTING MATERIAL, FILLED WITH COMPOST PASSING THE ABOVE SPECIFICATIONS FOR COMPOST PRODUCTS.

INSTALLATION:

3. FILTER SOCKS WILL BE PLACED ON A LEVEL LINE ACROSS SLOPES, GENERALLY PARALLEL TO THE BASE OF THE SLOPE OR OTHER AFFECTED AREA. ON SLOPES APPROACHING 2:1, ADDITIONAL SOCKS SHALL BE PROVIDED AT THE TOP AND AS NEEDED MID- SLOPE.

4. FILTER SOCKS INTENDED TO BE LEFT AS A PERMANENT FILTER OR PART OF THE NATURAL LANDSCAPE, SHALL BE SEEDED AT THE TIME OF INSTALLATION FOR ESTABLISHMENT OF PERMANENT VEGETATION.

5. FILTER SOCKS ARE NOT TO BE USED IN CONCENTRATED FLOW SITUATIONS OR IN RUNOFF CHANNELS.

MAINTENANCE:

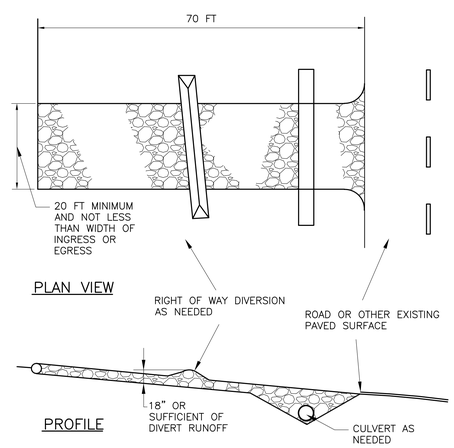
6. ROUTINELY INSPECT FILTER SOCKS AFTER EACH SIGNIFICANT RAIN, MAINTAINING FILTER SOCKS IN A FUNCTIONAL CONDITION AT ALL TIMES.

7. REMOVE SEDIMENTS COLLECTED AT THE BASE OF THE FILTER SOCKS WHEN THEY REACH 1/3 OF THE EXPOSED HEIGHT OF THE PRACTICE.

8. WHERE THE FILTER SOCK DETERIORATES OR FAILS, IT WILL BE REPAIRED OR REPLACED WITH A MORE EFFECTIVE ALTERNATIVE.

9. REMOVAL – FILTER SOCKS WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED IN SUCH AS WAY AS TO FACILITATE AND NOT OBSTRUCT SEEDINGS.

FILTER SOCK



CONSTRUCTION ENTRANCE NOTES:

1. STONE SIZE – ODOT #2 (1.5–2.5 INCH) STONE SHALL BE USED, OR RECYCLED CONCRETE EQUIVALENT

2. LENGTH – THE CONSTRUCTION ENTRANCE SHALL BE AS LONG AS REQUIRED TO STABILIZE HIGH TRAFFIC AREAS BUT NOT LESS THAN 70 FT. (EXCEPTION: APPLY 30 FT. MINIMUM TO SINGLE RESIDENCE LOTS).

3. THICKNESS – THE STONE LAYER SHALL BE AT LEAST 6 INCHES THICK FOR LIGHT DUTY ENTRANCES OR AT LEAST 10 INCHES FOR HEAVY DUTY USE.

4. WIDTH – THE ENTRANCE SHALL BE AT LEAST 20 FEET WIDE, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.

5. GEOTEXTILE – A GEOTEXTILE SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE. IT SHALL BE COMPOSED OF STRONG ROT–PROOF POLYMERIC FIBERS AND MEET THE FOLLOWING SPECIFICATIONS:

MINIMUM TENSILE STRENGTH	200 LBS
MINIMUM PUNCTURE STRENGTH	80 PSI
MINIMUM TEAR STRENGTH	50 LBS
MINIMUM BURST STRENGTH	320 PSI
MINIMUM ELONGATION	20%
EQUIVALENT OPENING SIZE	EOS<0.6MM
PERMITTIVITY	1X10–3 CM/SEC

6. TIMING – THE CONSTRUCTION ENTRANCE SHALL BE INSTALLED AS SOON AS IS PRACTICABLE BEFORE MAJOR GRADING ACTIVITIES.

7. CULVERT – A PIPE OR CULVERT SHALL BE CONSTRUCTED UNDER THE ENTRANCE IF NEEDED TO PREVENT SURFACE WATER FROM FLOWING ACROSS THE ENTRANCEOT TO PREVENT RUNOFF FROM BEING DIRECTED OUT ONTO PAVED SURFACES.

8. WATER BAR – A WATER BAR SHALL BE CONSTRUCTED AS PART OF THE CONSTRUTION ENTRANCE IF NEEDED TO PREVENT SURFACE RUNOF FROM FLOWING THE LENGTH OF THE CONSTRUCTION ENTRANCE AND OUT ONTO PAVED SURFACES.

9. MAINTENANCE – TOP DRESSING OF ADDITIONAL STONE SHALL BE APPLIED AS CONDITIONS DEMAND. MUD SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADS, OR ANY SURFACE WHERE RUNOFF IS NOT CHECKED BY SEDIMENT CONTROLS, SHALL BE REMOVED IMMEDIATELY. REMOVAL SHALL BE ACCOMPLISHED BY SCRAPING OR SWEEPING.

10. CONSTRUCTION ENTRANCES SHALL NOT BE RELIED UPON TO REMOVE MUD FROM VEHICLES AND PREVENT OFF–SITE TRACKING. VEHICLES THAT ENTER AND LEAVE THE CONSTRUCTION SITE SHALL BE RESTRICTED FROM MUDDY AREAS.

11. REMOVAL – THE ENTRANCE SHALL REMAIN IN PLACE UNTIL THE DISTURBED AREA IS STABILIZED OR REPLACED WITH A PERMANENT ROADWAY OR ENTRANCE.

TEMPORARY CONSTRUCTION ENTRANCE (CE)

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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

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FY14 B351 WAREHOUSE ADDITION

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AREA: | SHEET 1 OF 1

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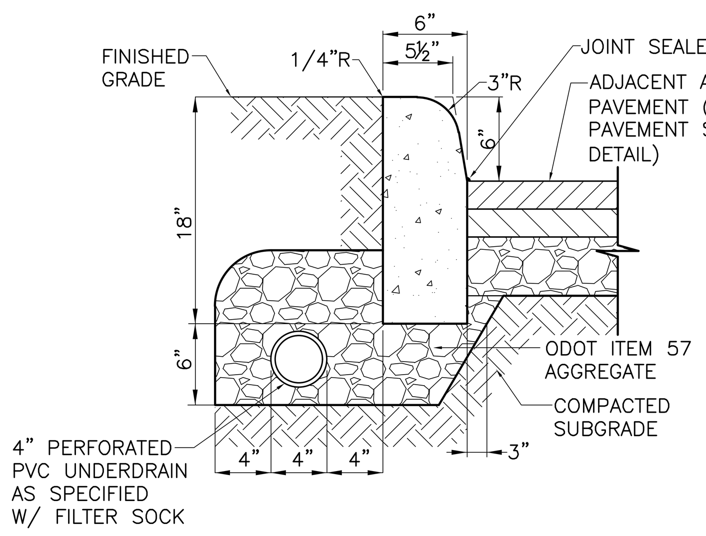
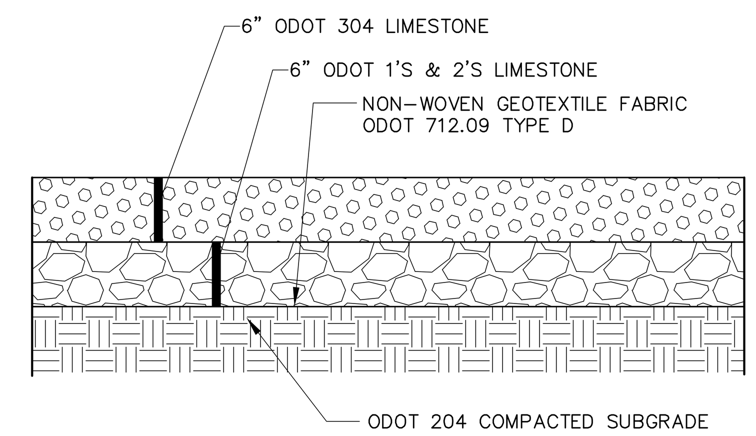
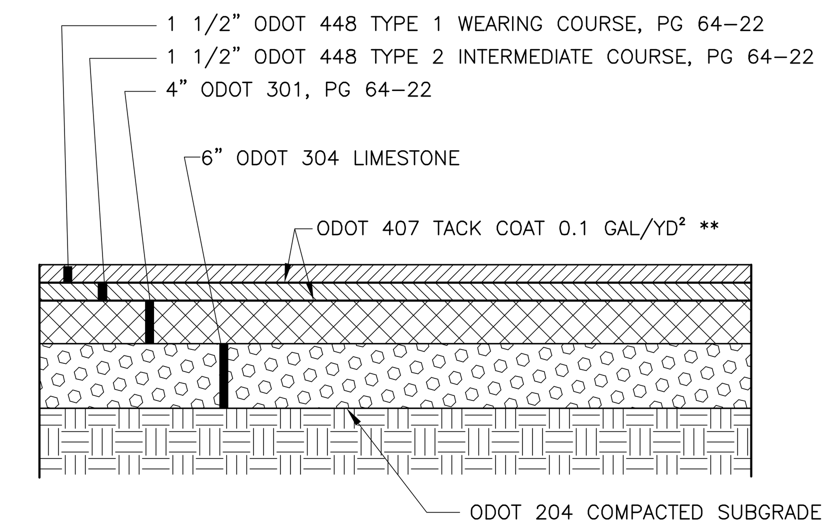


CONCRETE CURB
(ODOT TYPE 6 WITH UNDERDRAIN)

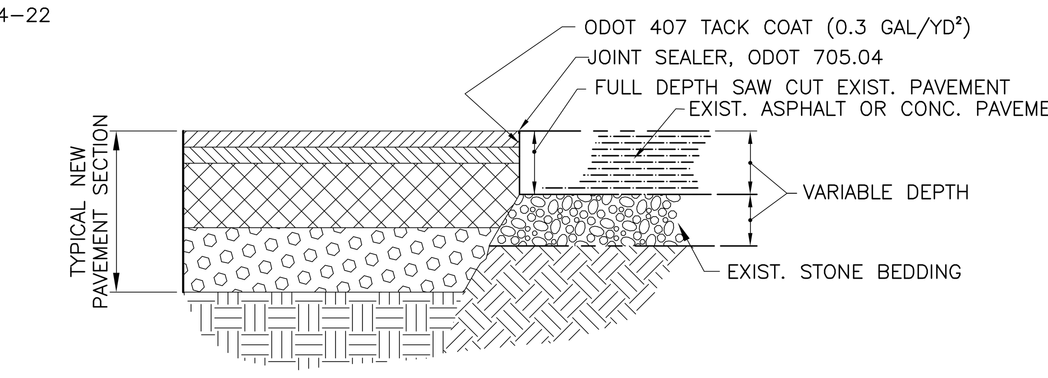


GRAVEL PAVEMENT SECTION – DRIVES & PARKING AREAS
(DETAIL PVMT-A-4)

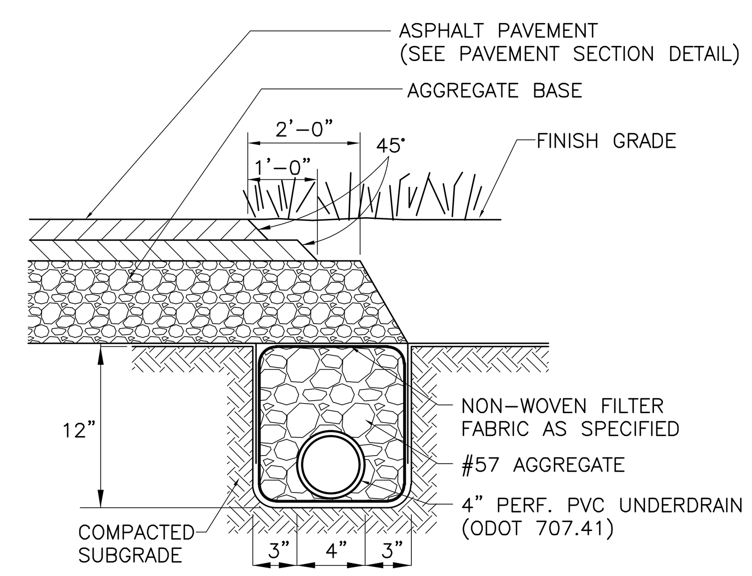


** ODOT 407 TACK COAT REQUIRED– APPLICATION RATE TO BE ADJUSTED IN FIELD AND APPROVED BY NASA TO ENSURE A THIN UNIFORM COATING OF SURFACE.

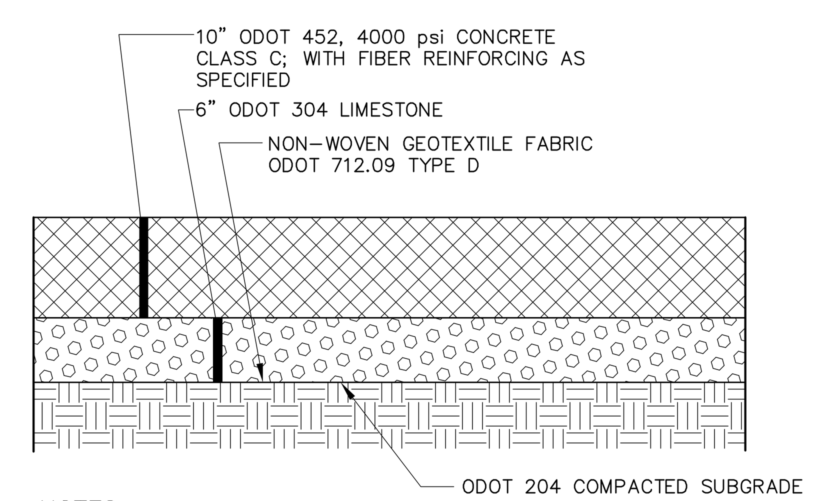
TYPICAL STANDARD DUTY ASPHALT PAVEMENT SECTION
(DETAIL PVMT-A-2)



TYPICAL PAVEMENT BUTT JOINT
(DETAIL PVMT-B-2)



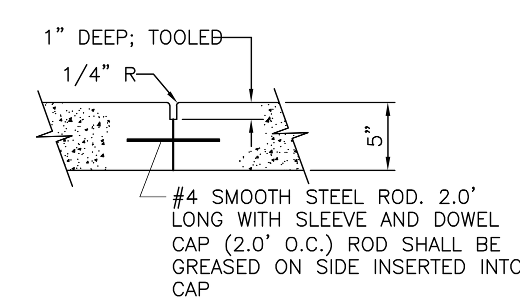
ASPHALT CONCRETE EDGE



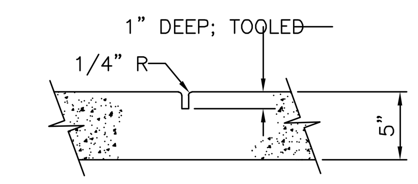
NOTES:

1. 1/2" PREMOLDED EXPANSION JOINT PER O.D.O.T. 705.03 – 30' O.C. MAX. UNLESS SHOWN OTHERWISE ON DRAWINGS AND AT ALL CURBS, WALKS, WALLS AND OTHER FIXED OBJECTS.
2. CONTROL JOINT – 5' O.C. MAX OR AS SHOWN ON DRAWINGS.
3. CROSS SLOPE AT 1/8" PER FOOT MIN. TO DRAIN.
4. USE EDGING TOOL AT PERIMETER.
5. SIDEWALK PER O.D.O.T. 608.03.
6. PROVIDE HEAVY BROOM FINISH ON ALL RAMPS PERPENDICULAR TO RAMP SLOPE.
7. SURFACE TO BE SEALED PER ODOT ITEM 512.

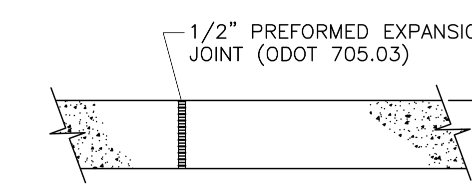
TYPICAL HEAVY DUTY CONCRETE PAVEMENT SECTION
(DETAIL PVMT-A-3)



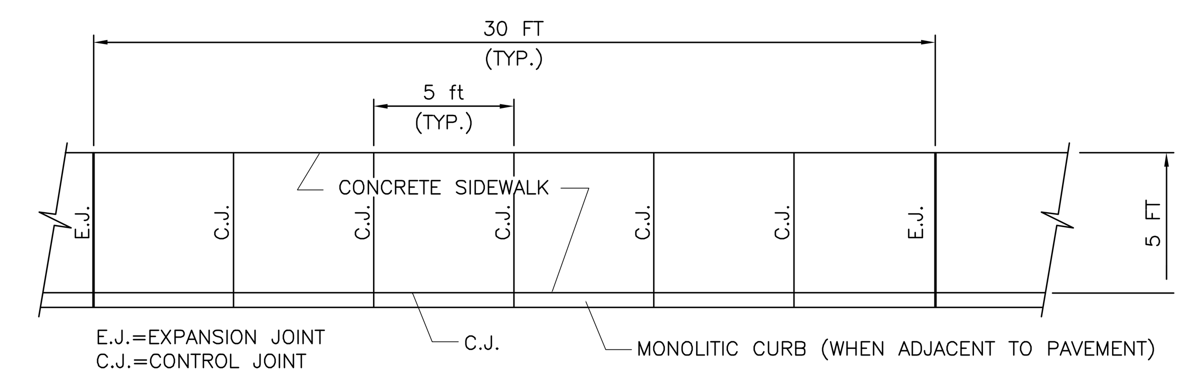
SIDEWALK COLD JOINT



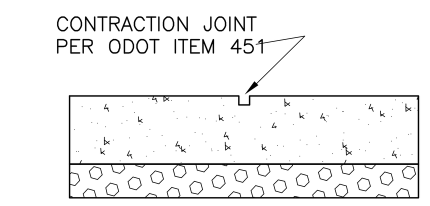
SIDEWALK CONTROL JOINT



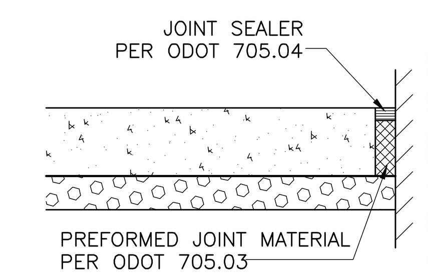
SIDEWALK CONTROL JOINT



CONCRETE SIDEWALK PLAN



CONTRACTION CONTROL JOINT

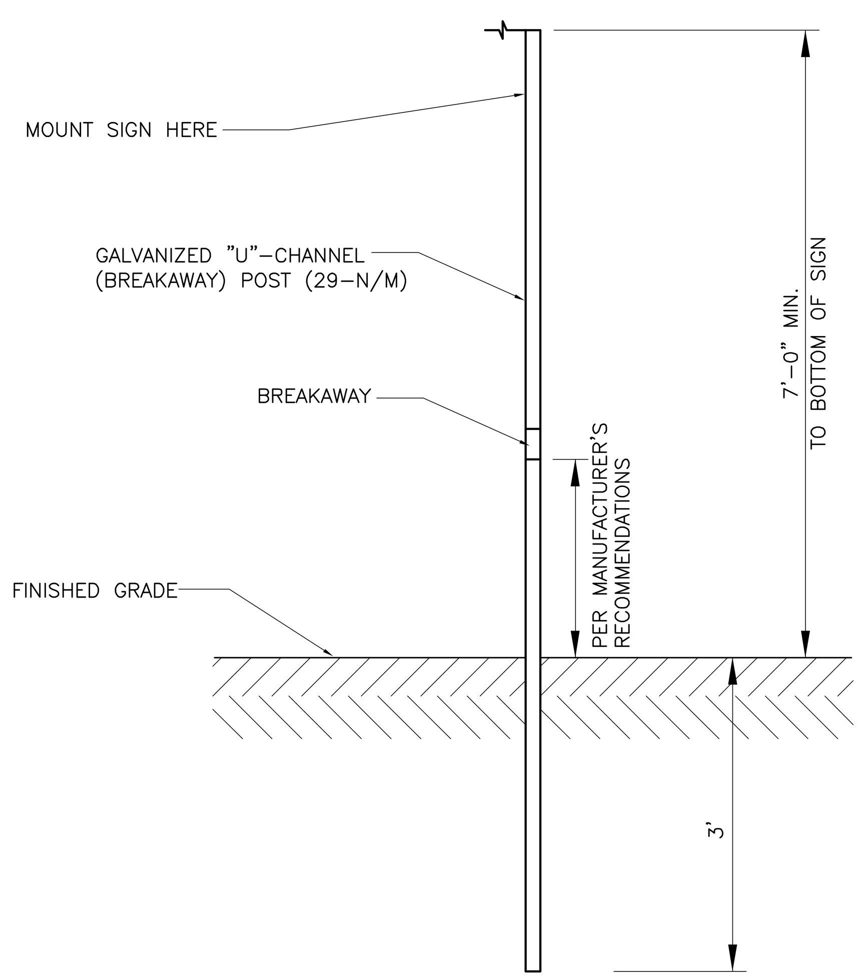


EXPANSION JOINT

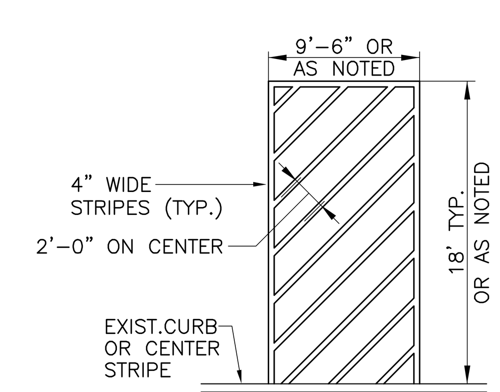
ALL SIGNS SHALL COMPLY WITH OHIO DEPARTMENT OF TRANSPORTATION, "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES", LOCAL CODES AND AS SPECIFIED.

THE SIGN SHEETING MATERIAL SHALL BE TYPE "G" REFLECTIVE SHEETING. ALL DIRECTIONAL SIGNAGE SHALL HAVE A 7'-0" CLEARANCE TO THE BASE.

MOUNT SIGN IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.



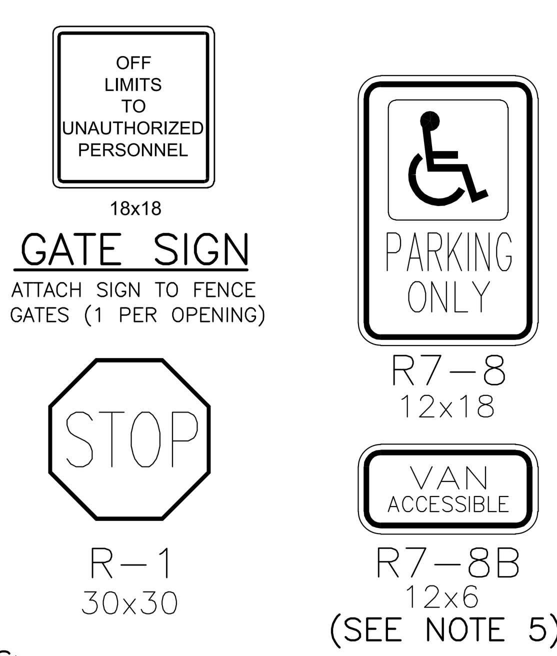
HIGH INTENSITY STANDARD SIGN BASE



NOTES:

1. STRIPE COLOR TO BE BLUE FOR ADA OR MATCH OTHER PARKING SPACE STRIPING
2. IF NO CURB OR CENTER STRIPE, PAINT 4" STRIPE CONNECTING SIDE STRIPES; TERMINATE AT END OF PARKING STALL OR WHEELSTOP
3. PAINT TO BE PER ODOT ITEM 642 TYPE 1 PAINT

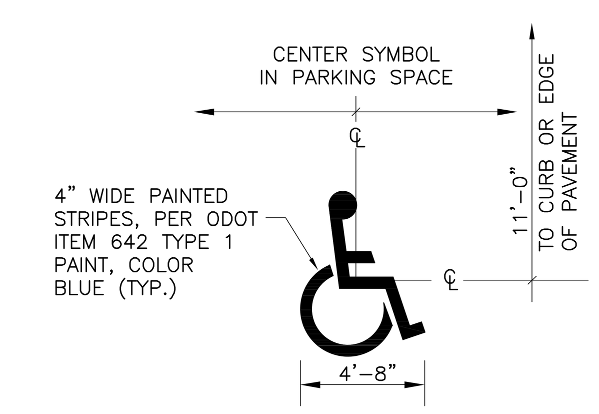
STRIPING DETAIL



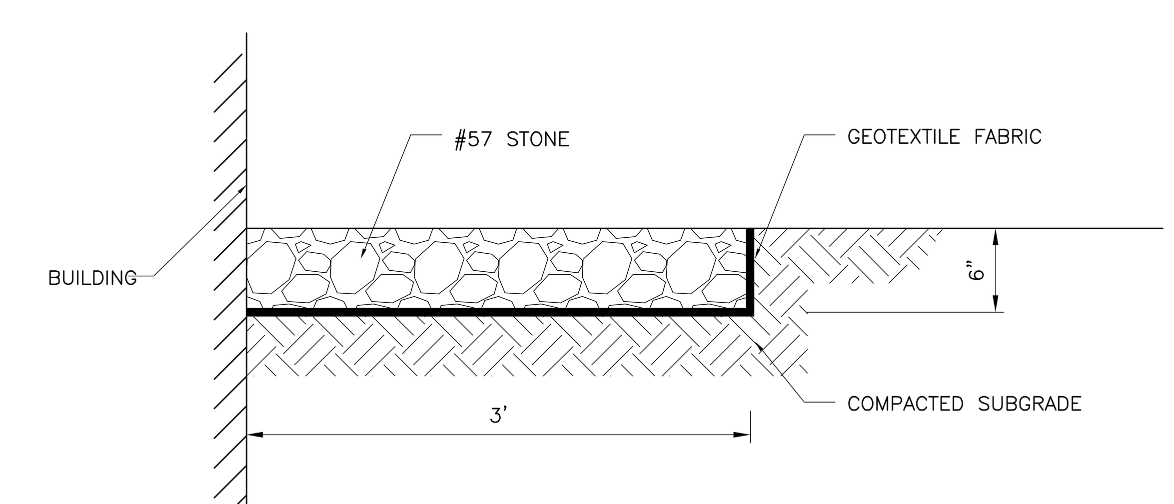
NOTES:

1. SEE SITE LAYOUT PLAN FOR SIGN LOCATIONS. LOCATIONS TO BE FIELD VERIFIED.
2. SIGN SHALL BE SINGLE POST DESIGN.
3. SIGN POST SHALL BE U CHANNEL TYPE PER ODOT SECTION 730.015. DRAWING TC-41.20.
4. FIELD OF SIGNS SHALL BE BLUE RETROREFLECTIVE AND LEGEND SHALL BE WHITE RETROREFLECTIVE.
5. SEE PLAN FOR LOCATION OF VAN SPACE.
6. STOP SIGN SHALL HAVE WHITE RETROREFLECTIVE LEGEND AND BORDER ON RED BACKGROUND. SIGN SHALL MEET REQUIREMENTS OF OMUTCD 2012 EDITION.
7. OFF LIMITS TO UNAUTHORIZED PERSONNEL SIGN SHALL BE OF COLORS AND REFLECTIVITY AS DETERMINED BY THE OWNER.

SIGNS



ACCESSIBLE SYMBOL DETAIL



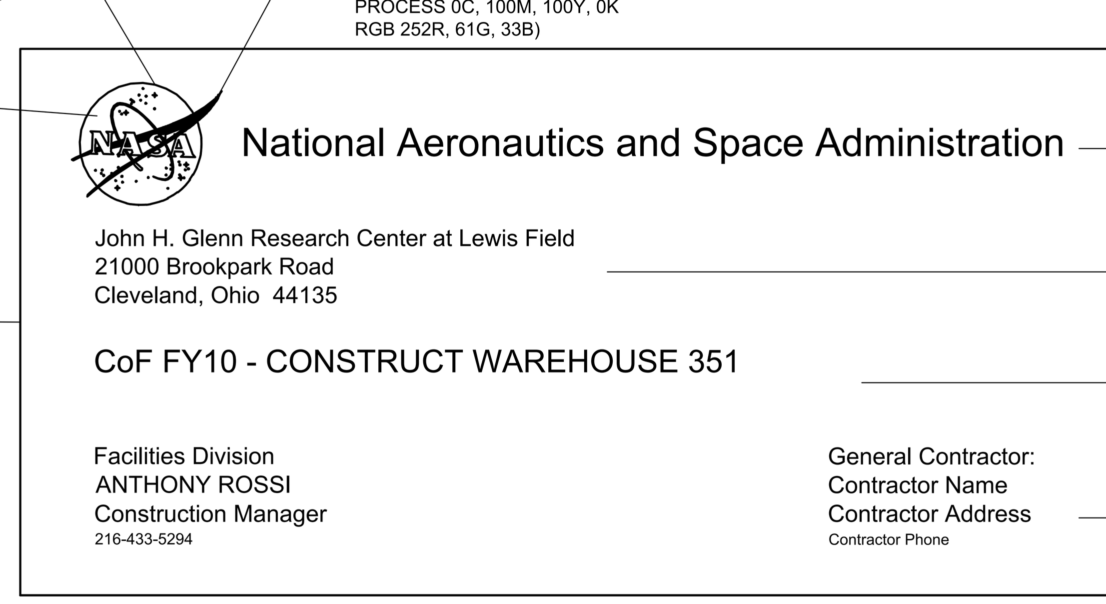
GRAVEL STRIP DETAIL

NASA INSIGNIA, ±10" (±250mm) dia,

NASA RED (PANTON 185 PROCESS 0C, 100M, 100Y, 0K RGB 252R, 61G, 33B)

THE "MEATBALL" SHALL BE NASA BLUE (PANTON 285 PROCESS 100C, 60M, 0Y, 0K RGB 11R, 61G, 145B)

CONSTRUCTION SIGN SHALL BE COMPRISED OF A FACE SHEET OF 4' BY 8' EXTERIOR GRADE PLYWOOD, ½ INCH THICK, MOUNTED ON A SUBSTANTIAL FRAME OF TREATED LUMBER. FRAME AND SIGN SHALL BE GIVEN ONE COAT OF LEAD-FREE ALKYD PRIMER PAINT AND TWO COATS OF EXTERIOR TYPE WHITE ENAMEL. THE LOCATION OF THE SIGN SHALL BE COORDINATED WITH THE NASA CONSTRUCTION MANAGER



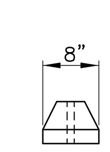
THE LETTERING STYLE USED IN THE AGENCY NAME IS ARIAL, 2½" (63mm) TALL, UPPER AND LOWER CASE, FLUSH LEFT AND RAGGED RIGHT. THE LETTERING SHALL BE NASA BLUE (PANTON 285, PROCESS 100C, 60M, 0Y, 0K; RGB 11R, 61G, 145B)

THE LETTERING STYLE USED IN THE CENTER NAME IS ARIAL, 1½" (38mm) TALL, UPPER AND LOWERCASE, FLUSH LEFT AND RAGGED RIGHT. THE LETTERING SHALL BE NASA BLUE (PANTON 285, PROCESS 100C, 60M, 0Y, 0K; RGB 11R, 61G, 145B)

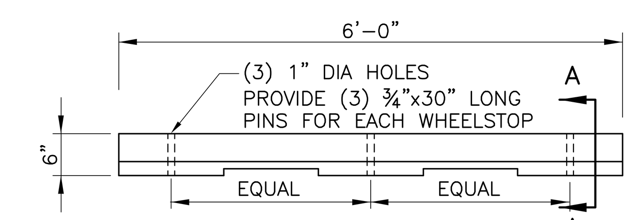
THE LETTERING STYLE USED IN THE PROJECT NAME IS ARIAL, 2" (50mm) TALL, UPPER AND LOWERCASE, FLUSH LEFT AND RAGGED RIGHT. THE LETTERING SHALL BE NASA BLUE (PANTON 285, PROCESS 100C, 60M, 0Y, 0K; RGB 11R, 61G, 145B)

THE LETTERING STYLE USED IN THE DIVISION NAME AND CONTRACTOR NAME IS ARIAL, 1½" (38mm) TALL, UPPER AND LOWERCASE, FLUSH LEFT AND RAGGED RIGHT. THE LETTERING SHALL BE NASA BLUE (PANTON 285, PROCESS 100C, 60M, 0Y, 0K; RGB 11R, 61G, 145B)

PROJECT SIGN DETAIL
NOT TO SCALE



SECTION 'A-A'



WHEELSTOP

SITE DETAILS
N.T.S.

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR	STANTEC ARCHITECTURE INC.
CONTRACT NO.	NNC09CA01C
TASK ORDER	
DRAWN: Author	DESIGNED:	CHECKED: Checker
APPROVED: Approver	APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET			
DRAWING MANAGEMENT			
SYSTEM: BLDG	SUB-SYS:	FACILITY:	CONFIG:
NASA APPROVALS			
DR:		DES:	
D.ENG:		PROJ. MGR:	
RELEASE APPROVAL:		DATE:	
RELEASE APPROVAL:		DATE:	
RELEASE APPROVAL:		DATE:	
RELEASE STATUS: WORKING			

CHG	NUM	DESCRIPTION	APP/DATE
REVISIONS			
LAST APPROVED EDMS REVISION	TECH LEAD:	FAC-SYS MGR:	REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SITE DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	C-	504
AREA:		SHEET 1 OF 1		
UNITS: ENGLISH	SOFTWARE: AUTOCAD 2013		REVISION	VER
SCALE: AS SHOWN	OFFICIAL DATE: 06-24-2014		-	1

C504

0351-COF20244-C- 504_CE_ 01.dwg

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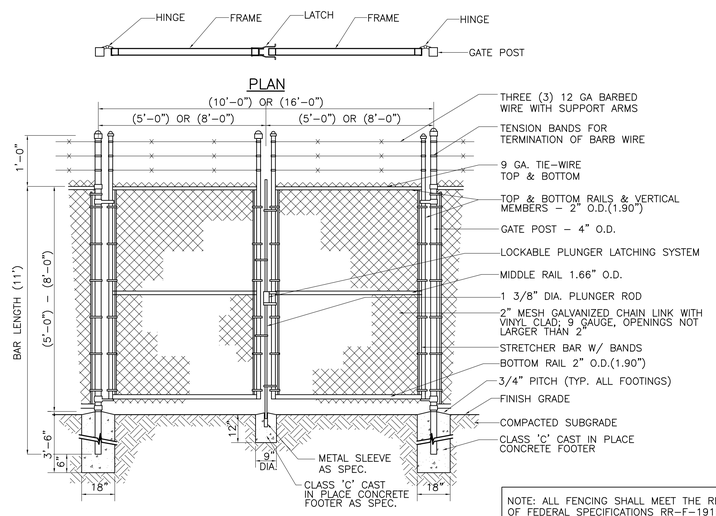
5/22/2013 11:36:45 AM



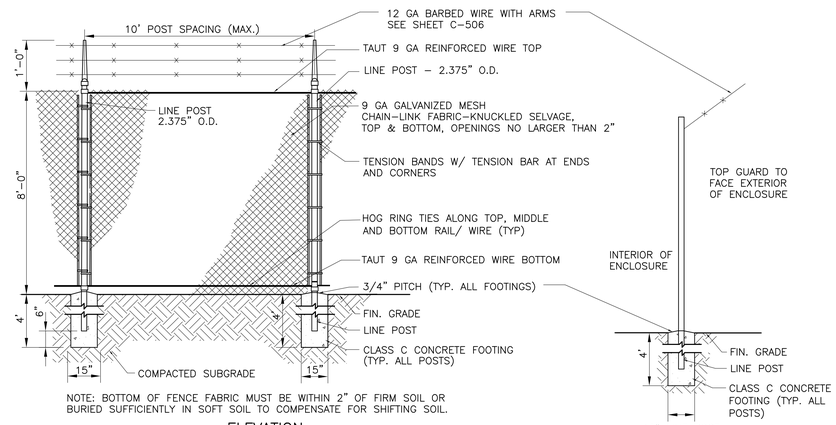
NOTE: ON ENTRANCE GATES, INSTALL SIGN "OFF LIMITS TO UNAUTHORIZED PERSONNEL"

ELEVATION

NOTE: ALL FENCING SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATIONS RR–F–191K & MEET NPR 1603A, CHAPTER 6. ALL FENCING SHALL BE GROUNDED FOR FENCE ELECTRICAL GROUNDING DETAIL, REFER TO E3/E0501

CHAIN LINK FENCE–DOUBLE SWING GATE

FOR BASE BID AND ALL OPTIONS: AT ALL CHAIN LINK FENCE SINGLE AND DOUBLE GATES, CONTRACTOR TO PROVIDE PADLOCK, "AMERICAN" PART NUMBER A3561WO, 5/16 INCH SHACKLE, WITH "AMERICAN" PART NUMBER 1539SF SMALL FORMAT INTERCHANGEABLE CORE. CONTRACTOR TO PROVIDE ONE 30 INCH LONG 5/16 INCH GALVANIZED, WELDED CHAIN PER GATE. LOCKS, LOCK CORES AND CHAIN TO BE DELIVERED TO NASA SECURITY FOR CONFIGURATION AND INSTALLATION.



NOTE: BOTTOM OF FENCE FABRIC MUST BE WITHIN 2" OF FIRM SOIL OR BURIED SUFFICIENTLY IN SOFT SOIL TO COMPENSATE FOR SHIFTING SOIL.

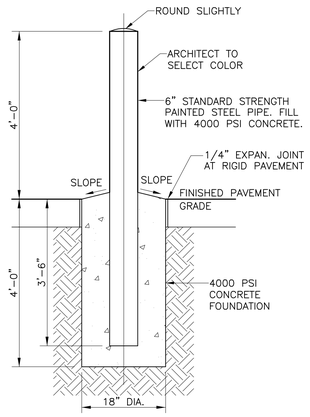
ELEVATION

NOTE: ON CHAIN LINK FENCE, CONTRACTOR TO PROVIDE AND INSTALL CFE SECURITY SIGNAGE PER COTR.

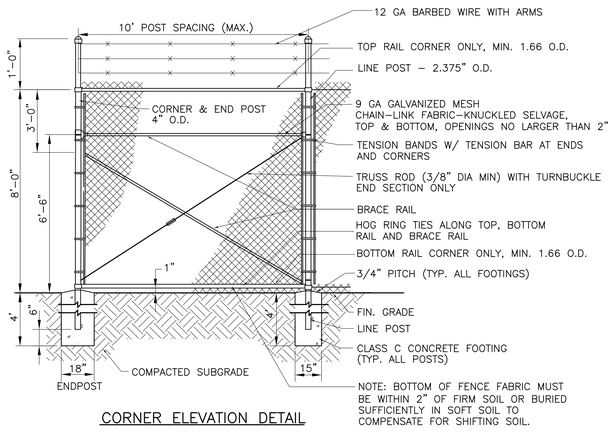
CHAIN LINK FENCE

FENCE SECTION

NOTE: FENCE DETAILS ON SHEET C–506 SHALL TAKE PRECEDENCE OVER DETAILS SHOWN ON THIS SHEET IF A DISCREPANCY OCCURS.



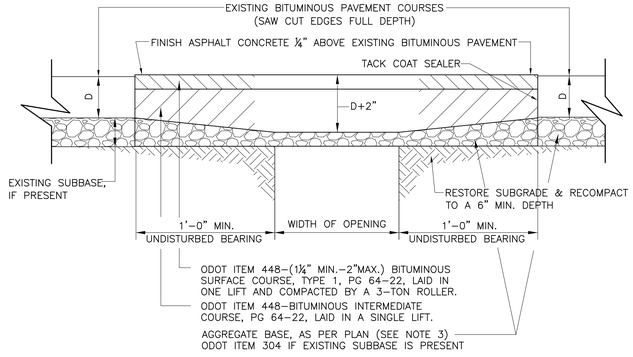
6" BOLLARD DETAIL



CORNER ELEVATION DETAIL

NOTE: ALL FENCING SHALL MEET THE REQUIREMENTS OF FEDERAL SPECIFICATIONS RR–F–191K & MEET NPR 1603A, CHAPTER 6. ALL FENCING SHALL BE GROUNDED FOR FENCE ELECTRICAL GROUNDING DETAIL, REFER TO E3/E0501

CHAIN LINK FENCE



NOTES:

1. TRENCH BACKFILL SHALL BE PREMIUM MATERIAL IN ACCORDANCE WITH THE TYPICAL TRENCH DETAIL, THIS SHEET. SLAG SHALL NOT BE PERMITTED AS BACKFILL MATERIAL. NONGRANULAR BACKFILL MATERIAL SHALL, TO THE EXTENT POSSIBLE, EXHIBIT THE SAME PHYSICAL PROPERTIES AS THE SOUND SUBGRADE MATERIAL ADJACENT TO THE TRENCH.

   IN LIEU OF THE ABOVE, ODOT ITEM 613–LOW STRENGTH MORTAR BACKFILL (TYPE 1) MAY BE USED FOR TRENCH BACKFILLING.
2. ODOT ITEMS 301, 448, TYPE 2, AND 448, TYPE 1, SHALL BE AS SPECIFIED ON THE PLAN.
3. WHERE LESS THAN THREE (3) INCHES OF ODOT ITEM 304, IS REPLACED, USE SCREENINGS GRADED IN ACCORDANCE WITH ODOT ITEM 703.10 EXCEPT THAT THE MINIMUM PERCENT PASSING THE No. 100 SIEVE SHALL FIVE (5) PERCENT.
4. TRAFFIC SHALL BE MAINTAINED IN A SAFE AND SATISFACTORY MANNER DURING PAVEMENT REPAIR OPERATIONS.

FLEXIBLE PAVEMENT REPAIR DETAIL

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE–0351–COF20244–G–001.

SITE DETAILS
N.T.S.

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE

REVISIONS
LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SITE DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	C	505

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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C505

0351-COF20244-C- 505_CE_ 01.dwg

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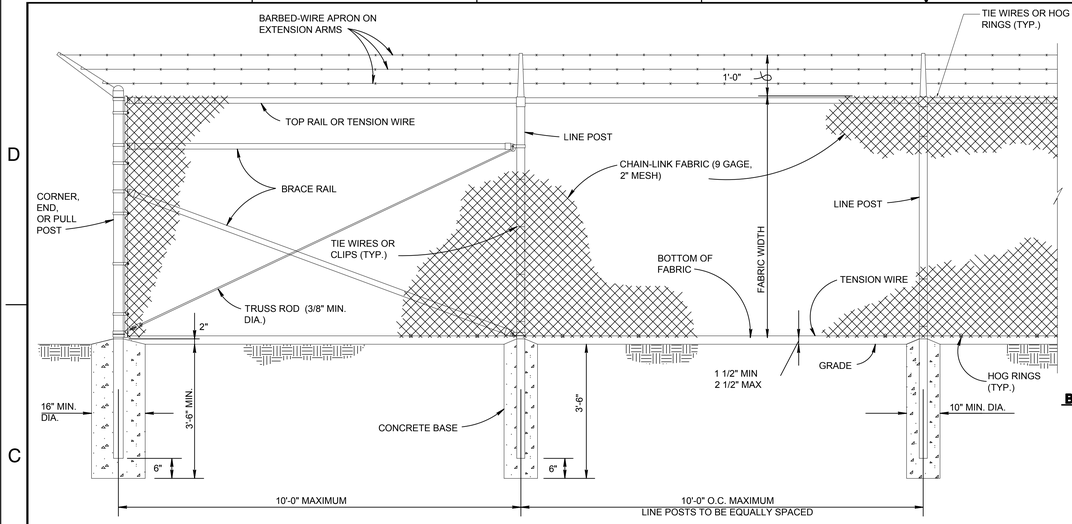
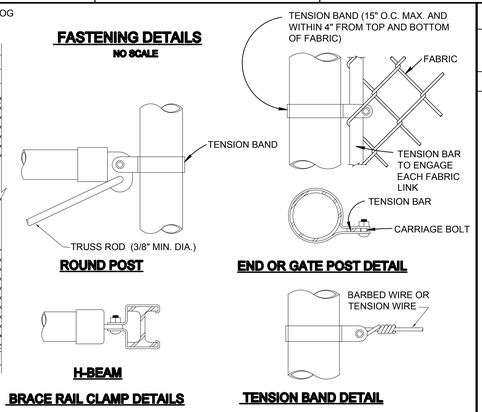
NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.



CHAIN-LINK SECURITY FENCE DETAIL

NO SCALE



FASTENING DETAILS

NO SCALE

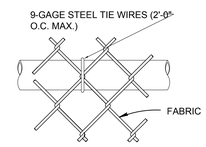
ROUND POST

END OR GATE POST DETAIL

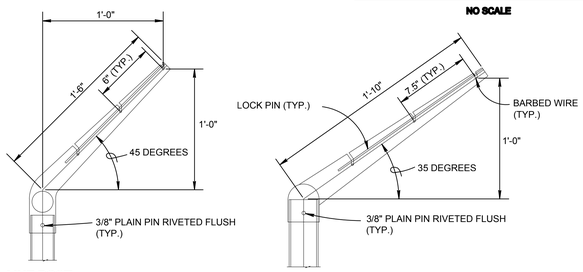
H-BEAM

BRACE RAIL CLAMP DETAILS

TENSION BAND DETAIL



TOP OR BRACE RAIL ATTACHMENT

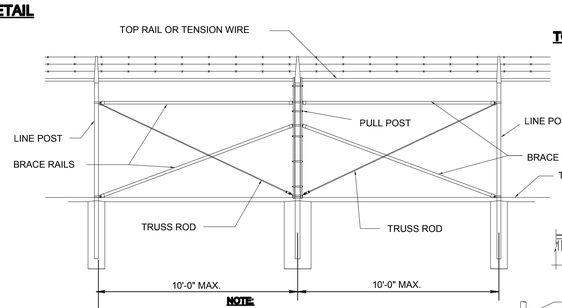


LINE POST

CORNER POST

EXTENSION ARM DETAILS

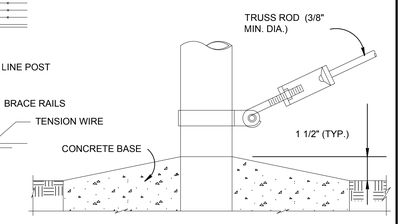
NO SCALE



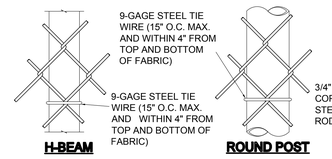
NOTE:
PROVIDE BRACE PANEL WHENEVER STRAIGHT RUNS EXCEED 500 FEET.

BRACE PANEL DETAIL

NO SCALE



TRUSS ROD AND BAND

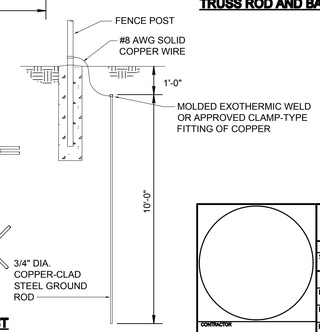


H-BEAM

ROUND POST

LINE POST ATTACHMENTS

NO SCALE



GROUNDING DETAIL

NO SCALE

STEEL POST SCHEDULE	
USE AND SECTION	MINIMUM OUTSIDE DIMENSIONS (NOMINAL) FABRIC WIDTH 84" TO 96"
CORNER, END & PULL POSTS TUBULAR - ROUND	4.00" O.D.
LINE POSTS TUBULAR - ROUND	2.375" O.D.
TOP, BOTTOM & BRACE RAILS TUBULAR - ROUND	1.66" O.D.

GENERAL NOTES

1. REFER TO SHEET G-001 FOR LIST OF DRAWINGS

CONSTRUCTION NOTES

1. DETAILS SHOWN ARE TO CLARIFY REQUIREMENTS AND ARE NOT INTENDED TO LIMIT OTHER TYPES OF FENCE SECTIONS AND METHODS OF INSTALLATION THAT COMPLY WITH THE SPECIFICATIONS.
2. WIRE TIES, RAILS, POSTS, AND BRACES SHALL BE CONSTRUCTED ON THE SECURE SIDE OF THE FENCE ALIGNMENT. CHAIN-LINK FABRIC SHALL BE PLACED ON THE SIDE OPPOSITE THE SECURE AREA.
3. UNLESS SPECIFICALLY SHOWN OR SPECIFIED, ALL FENCE SHALL HAVE AN APRON EXTENDED OUTWARD FROM THE AREA BEING PROTECTED.
4. C-SECTION POSTS SHALL BE INSTALLED SO THAT THE VOID INSIDE THE POST IS COMPLETELY FILLED WITH CONCRETE UP TO THE TOP OF THE FOUNDATION.
5. INSTALL GFE "RESTRICTED AREA" SIGNAGE ON THE EXTERIOR SIDE OF PERIMETER FENCING. SIGNS SHALL BE PLACED A MINIMUM OF EVERY 100 FEET, AT EVERY CHANGE IN DIRECTION, AND AT EACH ENTRY POINT CENTERED ON THE GATE(S). SIGNAGE SHALL BE PLACED SO THE TOP EDGE IS POSITIONED 7 FEET AND WHERE POSSIBLE, CENTERED ON THE FENCE FABRIC PANEL.

CHG	NUM	DESCRIPTION	APP/DATE

REVISIONS

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

WEST AREA FENCING

CHAIN LINK FENCING DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CD	PVMT -	WON20266	- C-	501

AREA: SHEET 01 OF 01
UNITS: ENGLISH SOFTWARE: AUTOCAD 2012 REVISION - VER 1
SCALE: OFFICIAL DATE: 08/17/2012

CONTRACTOR: CONTRACT NO.: TASK ORDER: DRAWN: DESIGNED: CHECKED: APPROVED: APPROVAL DATE:

DRAWING/DESIGN STATUS:
DRAWING MANAGEMENT
SYSTEM: SUB-SYS: FACILITY: CONFIG:
NASA APPROVALS
DR: DES:
D.ENG: JPR PROJ. MGR: D. EBNER
RELEASE APPROVAL: DATE:
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RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

TEMPLATE DATE: 02/28/2011

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author DESIGNED: CHECKED: Checker
APPROVED: Approver APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT
SYSTEM: BLDG SUB-SYS: FACILITY: CONFIG:
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RELEASE APPROVAL: DATE:
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RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE

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FY14 B351 WAREHOUSE ADDITION

SITE DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	506

AREA: SHEET 1 OF 1
UNITS: ENGLISH SOFTWARE: AUTOCAD 2013 REVISION - VER 1
SCALE: AS SHOWN OFFICIAL DATE: 06-24-2014

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C506

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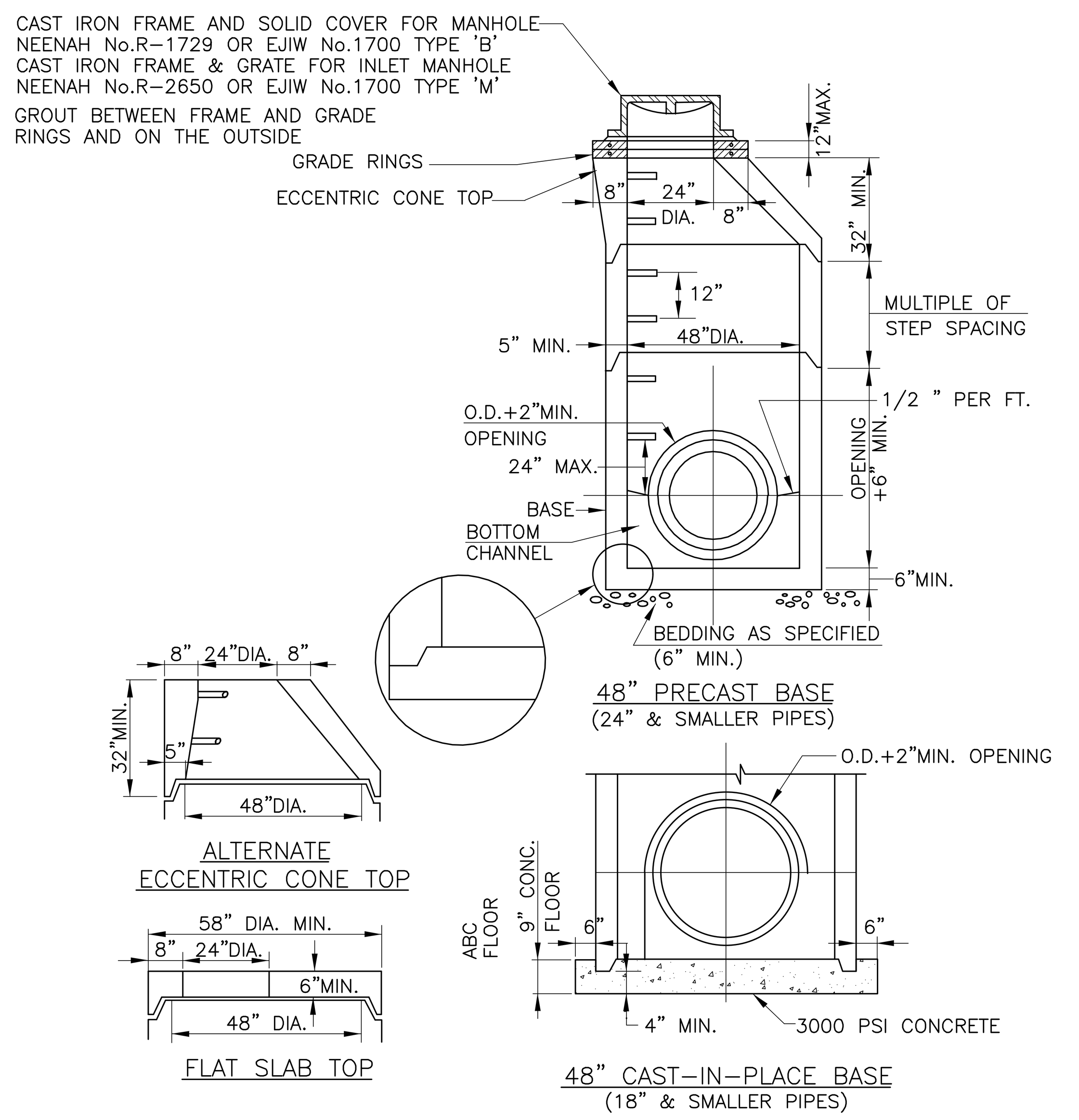


NOTES:

SECTIONS OF THE PRECAST MANHOLE SHALL BE CAST AND ASSEMBLED WITH EITHER ALL TONGUE OR ALL GROOVE ENDS UP. LIFT HOLES MAY BE PROVIDED IN EACH SECTION FOR HANDLING.

TOP AND TRANSITION OR REDUCER SECTIONS MAY BE EITHER ECCENTRIC CONE, CONCENTRIC CONE OR FLAT SLAB.

BASES FOR MANHOLES ARE SHOWN WITH MONOLITHIC FLOOR AND RISER WHICH MAY BE CAST IN ONE OR TWO OPERATIONS. A PERMISSIBLE ALTERNATE IS TO CAST AND SHIP THE FLOOR AND BARREL SEPARATELY. OPENINGS FOR INLET AND OUTLET PIPES SHALL BE PROVIDED, EITHER WHEN THE UNIT IS CAST OR LATER, TO MEET PROJECT REQUIREMENTS. BOTTOM CHANNELS MAY BE FORMED OF CONCRETE, PRECAST IN THE BASE OR BY FIELD CONSTRUCTION. FLOORS MAY ALSO BE POURED IN PLACE.

OPENINGS IN RISER SECTIONS FOR 18" AND SMALLER INLET PIPES SHALL BE PREFABRICATED. FLEXIBLE CONNECTIONS SHALL BE PROVIDED FOR SANITARY AND COMBINED SEWERS. PREMIUM SEALS SHALL MEET ASTM C 923.

JOINT SEALS BETWEEN PRECAST MANHOLE SECTIONS AND SEWERS SHALL BE RESILIENT AND FLEXIBLE GASKET JOINTS SHALL MEET ASTM C 443, FEDERAL SPECIFICATIONS SS–S–00210 (210 A) AND AASHTO M–198.

MANHOLE JOINTS AND GRADE RINGS SHALL BE SEALED EXTERNALLY AND BETWEEN THE GRADE RINGS WITH A LAYER OF MASTIC COMPOUND SUCH AS FABERLINE, KENT SEAL OR APPROVED EQUIVALENT.

MATERIALS FOR BASES AND OTHER PRECAST SECTIONS, INCLUDING REINFORCEMENT NOT SPECIFIED HEREON, SHALL COMPLY WITH THE SPECIFICATIONS.

PRECAST MANHOLES SHALL CONFORM TO THE REQUIREMENTS OF ASTM C 478.

SEAL ALL LIFT HOLES WITH APPROVED CONCRETE PLUGS.

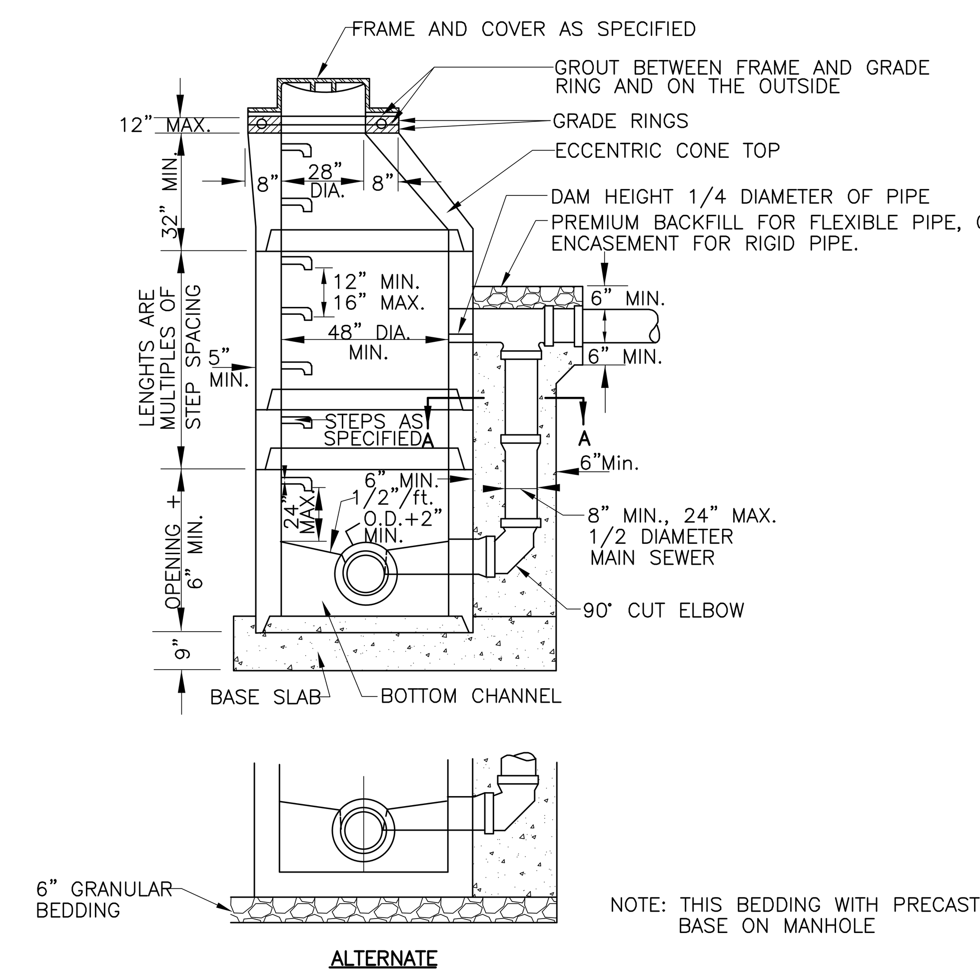
LANDING PLATFORMS AS SHOWN ON THE LANDING DETAILS SHALL BE INSTALLED IN MANHOLES THAT ARE OVER 28 FEET DEEP TO THE INVERT WITH A MAXIMUM VERTICAL SPACING OF 20 FEET.

MANHOLE FRAMES – CHIMNEY SEALS WILL BE REQUIRED ON ALL NEW SANITARY MANHOLES

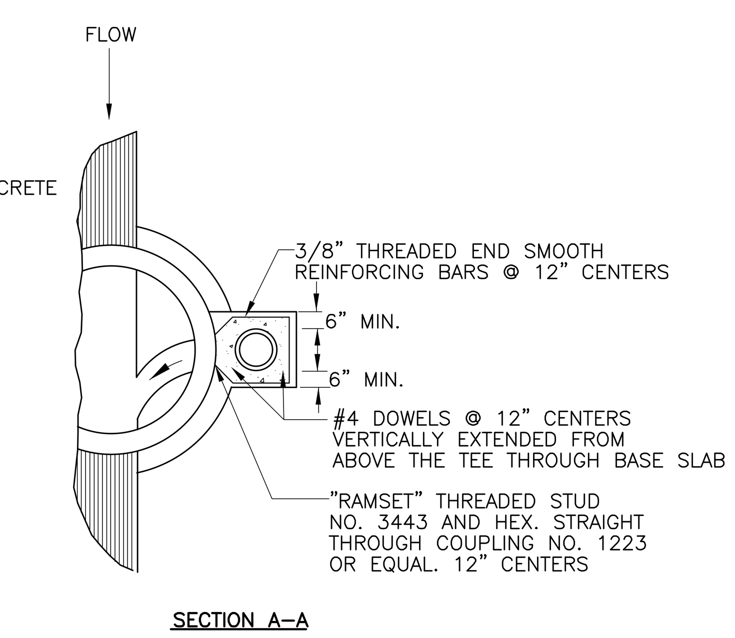
A MINIMUM OF 3" VERTICAL WALL IS REQUIRED BELOW THE CASTING FOR INSTALLATION OF CHIMNEY SEALS.

STANDARD PRECAST CONCRETE MANHOLE

24" PIPE OR SMALLER



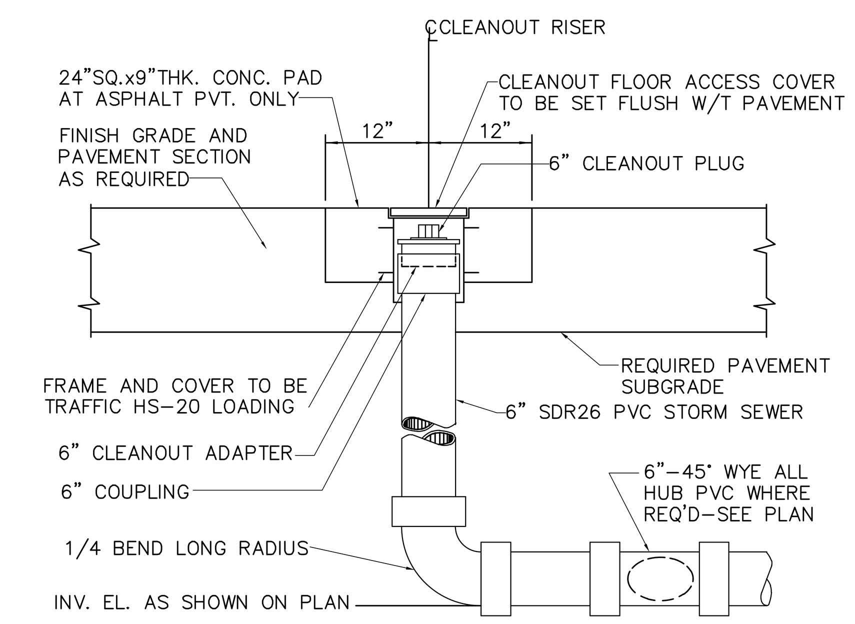
NOTE: THIS BEDDING WITH PRECAST BASE ON MANHOLE



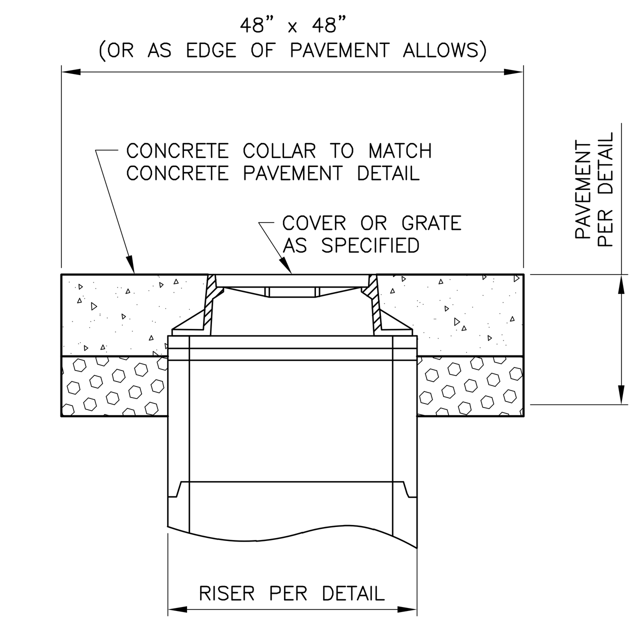
SECTION A–A

NOTE:
A DROP MANHOLE SHALL BE CONSTRUCTED IN SANITARY SEWERS WHEREVER THE DISTANCE BETWEEN THE INVERTS IS 2.0 FT. OR GREATER. POURED IN PLACE CONCRETE SHALL BE 3000 PSI CONCRETE. CORE BORE SEALS SHALL MEET ASTM C–923 AND C–167.

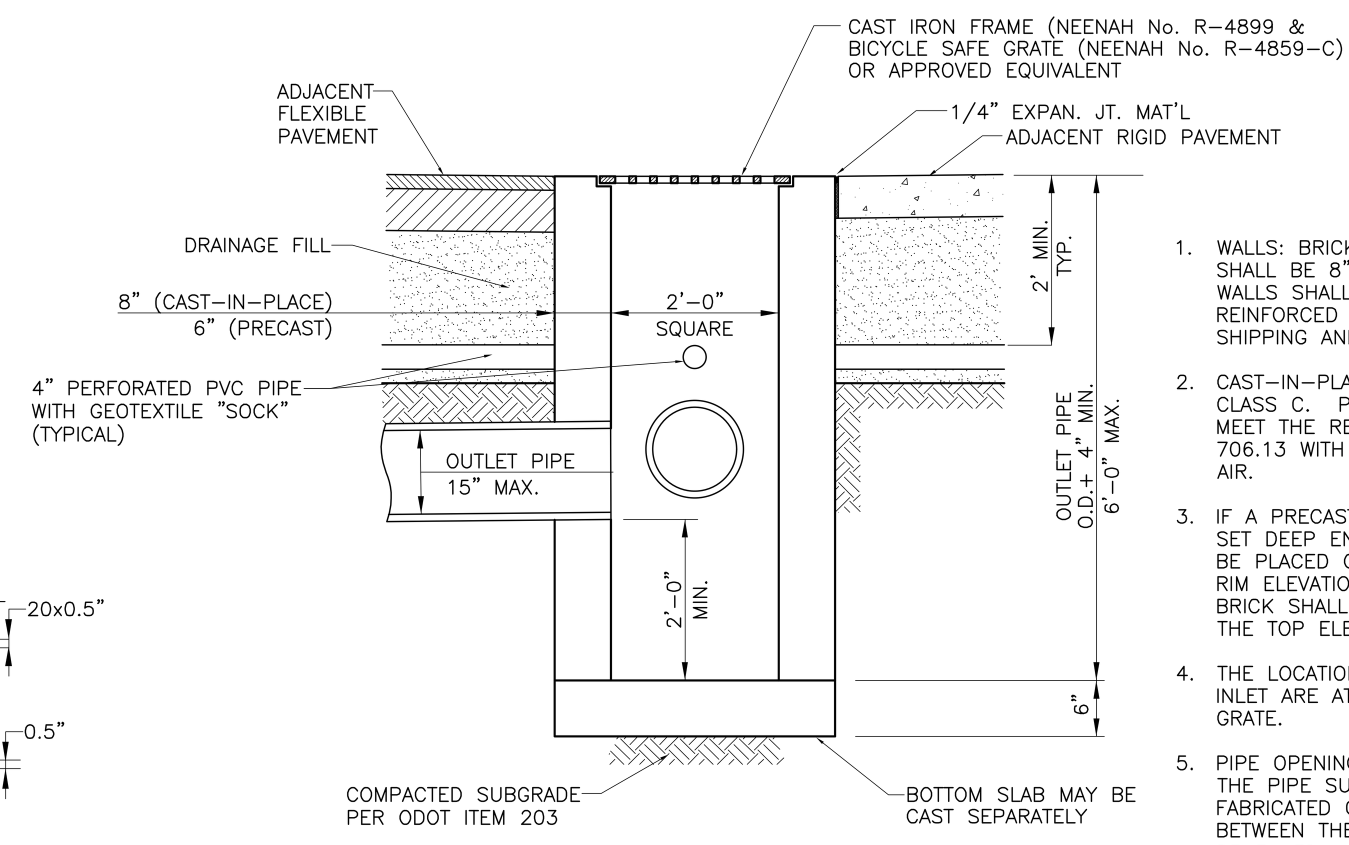
PRECAST DROP MANHOLE



UNDERDRAIN CLEANOUT
(SECTION UD–4)

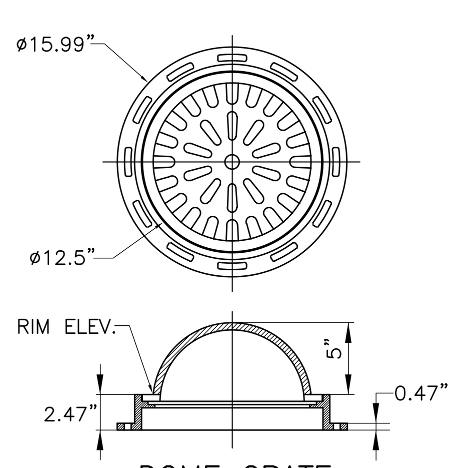


TYPICAL CONCRETE AT UTILITY CASTING
(DETAIL PVMT–B–1)



CATCH BASIN
WITH PERFORATED DRAIN
(SIM. TO ODOT 2–2B)

1. WALLS: BRICK OR CAST–IN–PLACE WALLS SHALL BE 8" THICK (MIN.) PRECAST WALLS SHALL BE 6" THICK (MIN.) AND BE REINFORCED SUFFICIENTLY TO PERMIT SHIPPING AND HANDLING WITHOUT DAMAGE.
2. CAST–IN–PLACE CONCRETE SHALL BE CLASS C. PRECAST CONCRETE SHALL MEET THE REQUIREMENTS OF ODOT ITEM 706.13 WITH A MINIMUM OF 4% ENTRAINED AIR.
3. IF A PRECAST BASE IS USED, IT SHALL BE SET DEEP ENOUGH SO THAT THE TOP CAN BE PLACED ON THE BASE TO PROVIDE THE RIM ELEVATION SHOWN ON THE PLANS. BRICK SHALL NOT BE USED TO ADJUST THE TOP ELEVATION.
4. THE LOCATION AND ELEVATION OF THE INLET ARE AT THE TOP/CENTER OF THE GRATE.
5. PIPE OPENINGS SHALL BE THE O.D. OF THE PIPE SUPPLIED PLUS 2" WHEN FABRICATED OR FIELD CUT. THE SPACE BETWEEN THE PIPE AND THE WALL SHALL BE FILLED WITH NON–SHRINK GROUT.
6. "DUMP NO WASTE – DRAINS TO WATERWAY" SHALL BE CAST IN GRATE.

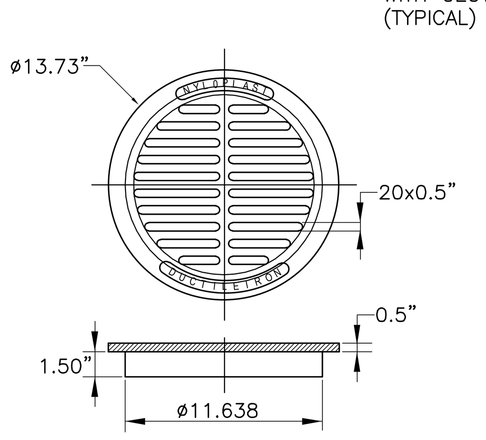


DOME GRATE

MODEL 1299CGD

NOTES:
1. QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70–50–05
2. MATERIAL: DUCTILE IRON FRAME & GRATE
3. PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT
4. LOCKING DEVICE AVAILABLE UPON REQUEST
5. PRICE INCLUDES FRAME & GRATE

APPROX. DRAIN AREA = 70.34 SQ. IN.

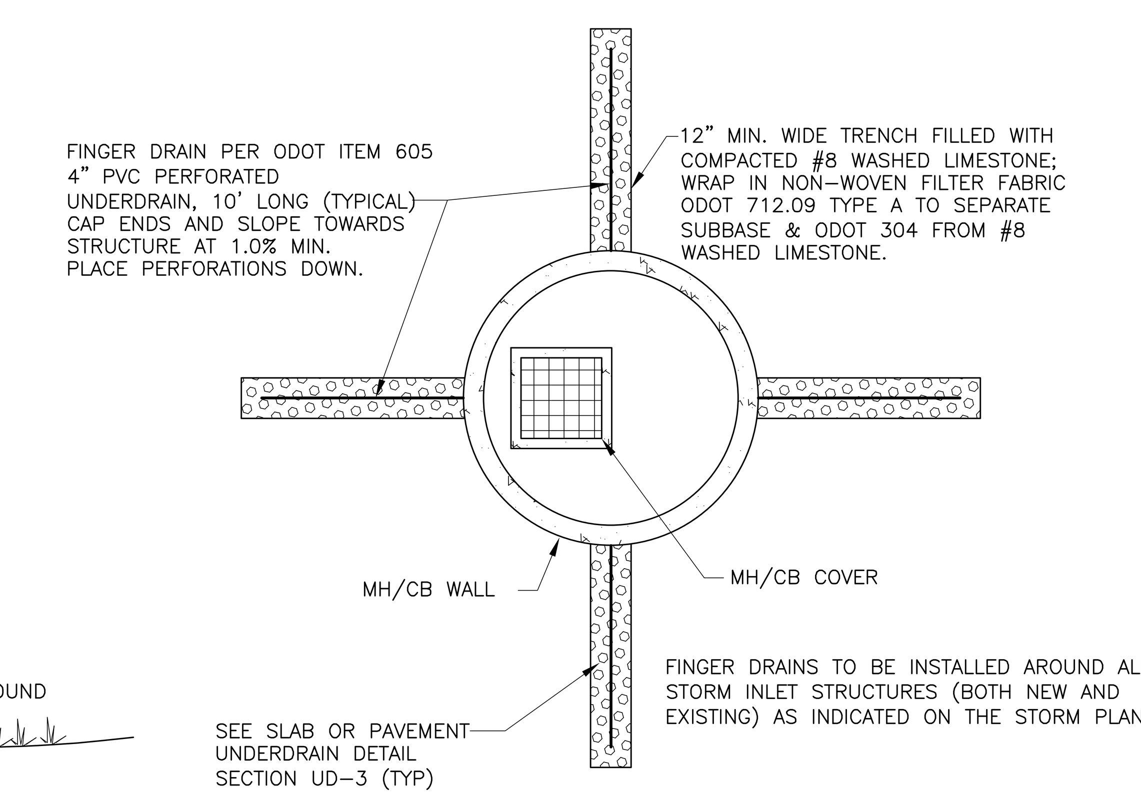


DROP–IN GRATE

MODEL 1201DI

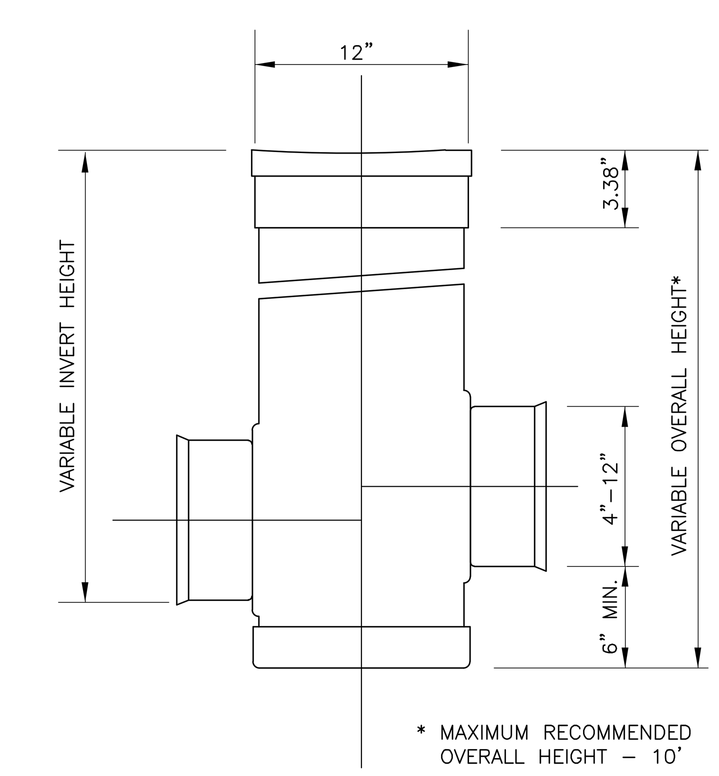
NOTES:
1. QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70–50–05
2. MATERIAL: DUCTILE IRON FRAME & GRATE
3. PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT

APPROX. DRAIN AREA = 39.75 SQ. IN.
APPROX. WEIGHT = 20.15 LBS.



PLAN

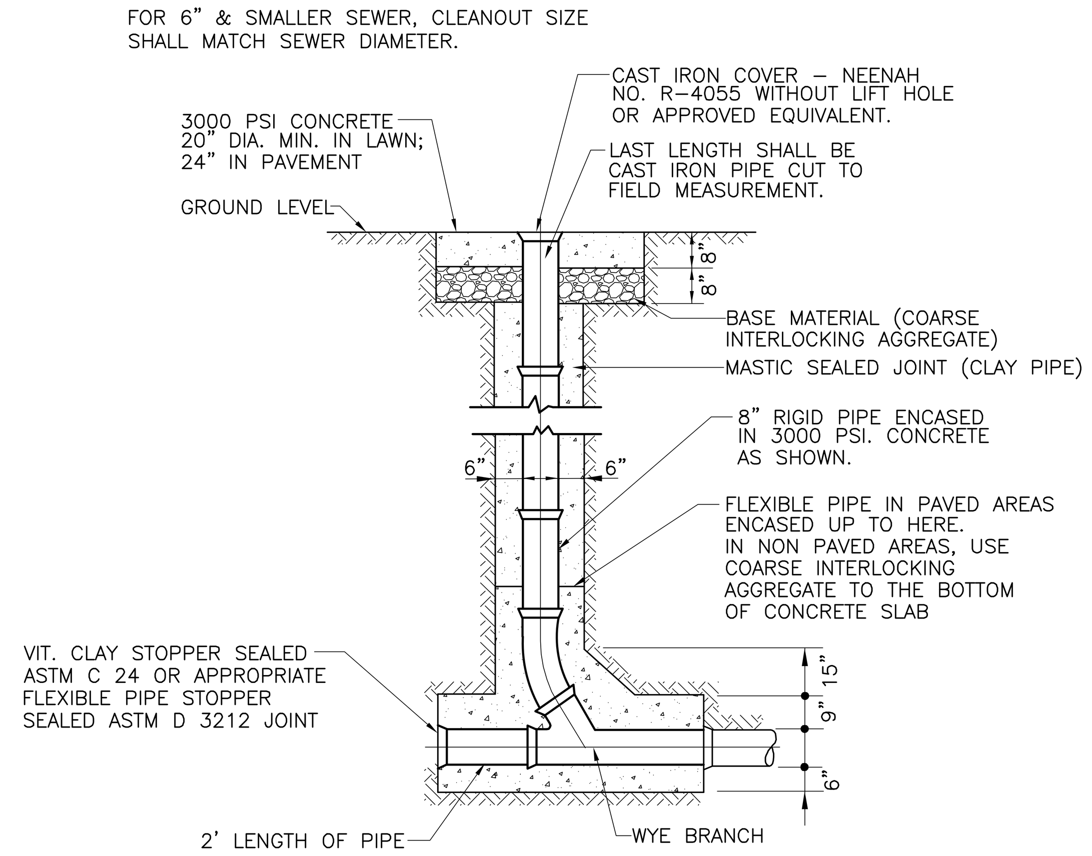
STORM STRUCTURE FINGER DRAIN



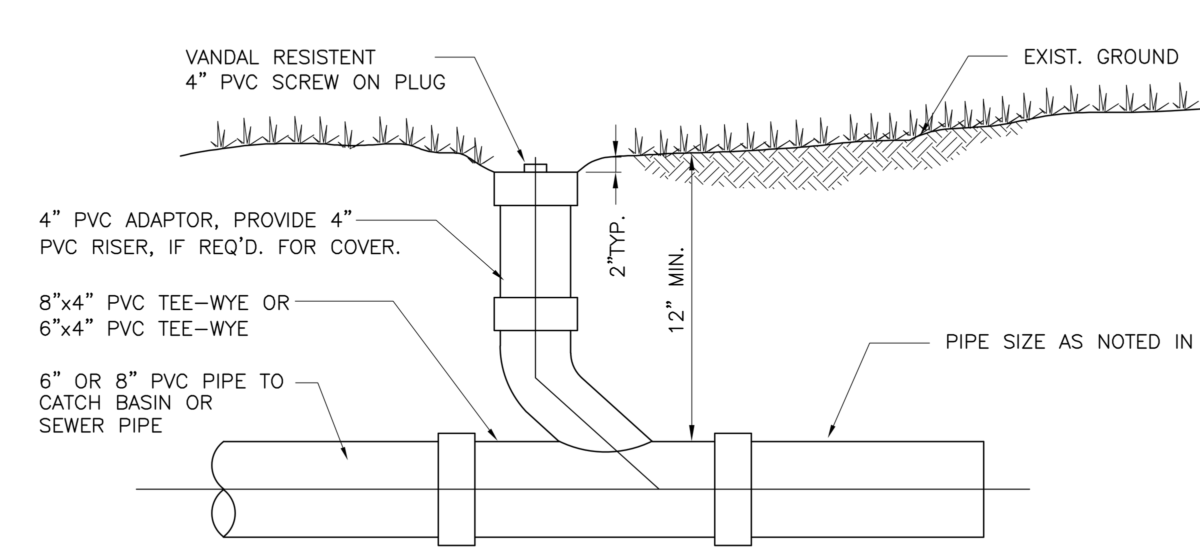
* MAXIMUM RECOMMENDED OVERALL HEIGHT – 10'

NYLOPLAST OR APPROVED EQUAL 12" YARD DRAIN

NOTE:
USE 8" CLEANOUT FOR 8" & LARGER SEWER.
FOR 6" & SMALLER SEWER, CLEANOUT SIZE SHALL MATCH SEWER DIAMETER.



HEAVY DUTY STORM CLEANOUT



NOTES:
1. PROVIDE A CLEANOUT ON EACH DRAIN CONNECTION. THE PRICE BID FOR EACH CLEANOUT SHALL INCLUDE THE PVC TEE–WYE, 4" PVC PIPE, 4" PVC PLUG (SCREW TYPE) AND INSTALLATION.
2. LOCATION OF CLEANOUT SHALL BE AS SHOWN ON THE UTILITY PLAN.
3. CLEANOUT PLUG SHALL BE COORDINATED WITH ITS LOCATION AND PVC SHALL NOT BE USED IN LOCATIONS OF HIGH TRAFFIC. HEAVY DUTY FLUSH PLUGS SHALL BE USED IN DRIVE AISLES AND ROADWAYS.

CLEANOUT

SITE DETAILS
N.T.S.

NOTES
1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE–0351–COF20244–G–001.

CHG	NUM	DESCRIPTION	APP/DATE
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RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	C-	507

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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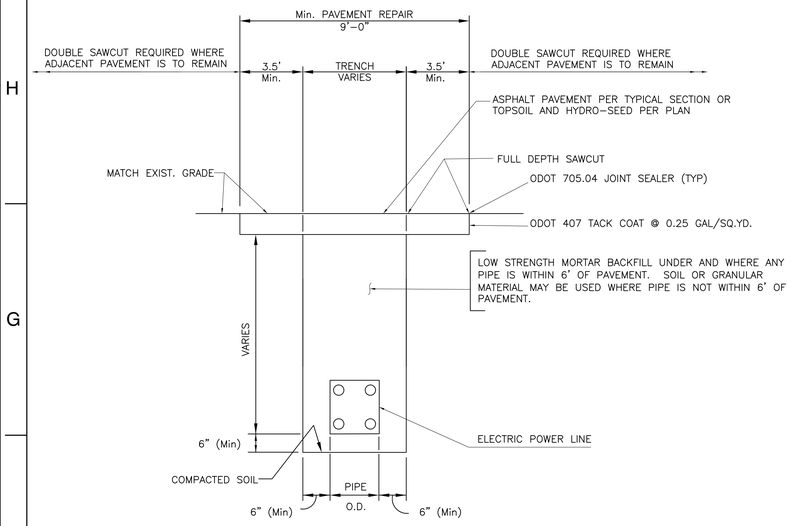
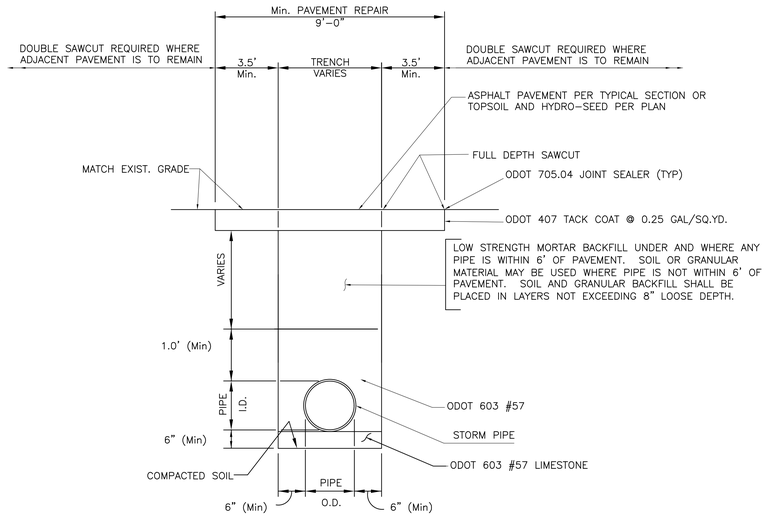
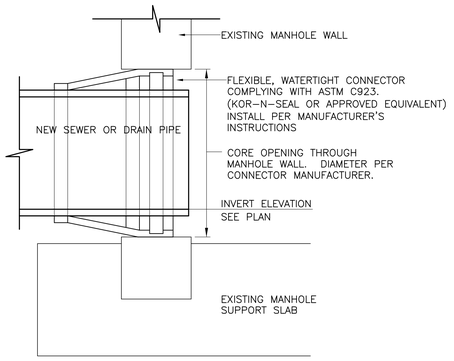


POWER LINE TRENCH DETAIL UNDER PAVEMENT



SEWER TRENCH DETAIL S-TR-1



CONNECTION TO EXISTING MANHOLE

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

DIMENSIONS			QUANTITIES ONE HEADWALL	
DIAMETER	H	L	CONCRETE CU. YDS.	REINFORCING STEEL LBS.
15"	5'-2"	7'-0"	1.7	41
18"	5'-5"	8'-4"	2.2	57
21"	5'-8"	9'-8"	2.8	62
24"	5'-11"	11'-0"	3.3	69
30"	6'-5"	13'-8"	4.7	92
36"	7'-0"	16'-4"	6.5	105

L CIRCULAR SECTIONS = 5D + Rt
L ELLIPTICAL OR PIPE-ARCH = 4R + 4t +3
H CIRCULAR SECTIONS = D + t + 44"
H ELLIPTICAL OR PIPE-ARCH = R + t + 44"

D= DIAMETER OF PIPE
R= RISE OF PIPE
S= SPAN OF PIPE
T= THICKNESS OF BARREL
L= LENGTH OF HEADWALL
H= HEIGHT OF HEADWALL

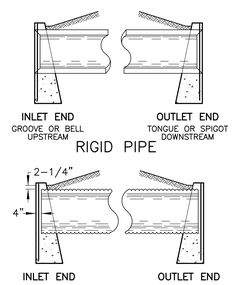
NOTES:

THIS HEADWALL WILL BE PROVIDED FOR NON SKEWED CULVERTS HAVING A DIAMETER OR RISE OF 36" OR LESS

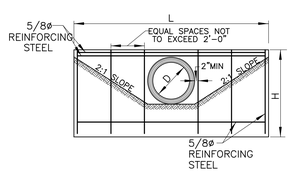
CONCRETE SHALL BE ODOT CLASS "C" REINFORCING STEEL BARS SHALL BE 5/8" ROUND.

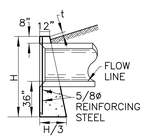
DIMENSIONS AND QUANTITIES ARE SHOWN FOR CIRCULAR SECTIONS ONLY. IT WILL BE NECESSARY TO DETERMINE DIMENSIONS REQUIRED FOR REINFORCED ELLIPTICAL CONCRETE PIPE OR CORRUGATED METAL PIPE ARCHES IN ACCORDANCE WITH THE EQUATIONS LISTED ON THIS DRAWING. CHAMFER ALL EXPOSED CORNERS 3/4"

FOUNDATION: WHERE THE SOIL BORINGS INDICATE A BEARING CAPACITY OF LESS THAN 2600 POUNDS PER SQUARE INCH, IT WILL BE NECESSARY TO INCREASE THE WIDTH OF THE BASE.

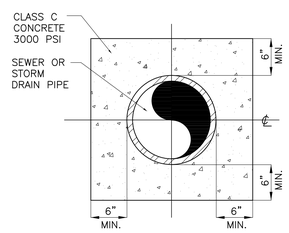


END TREATMENT AT HEADWALL



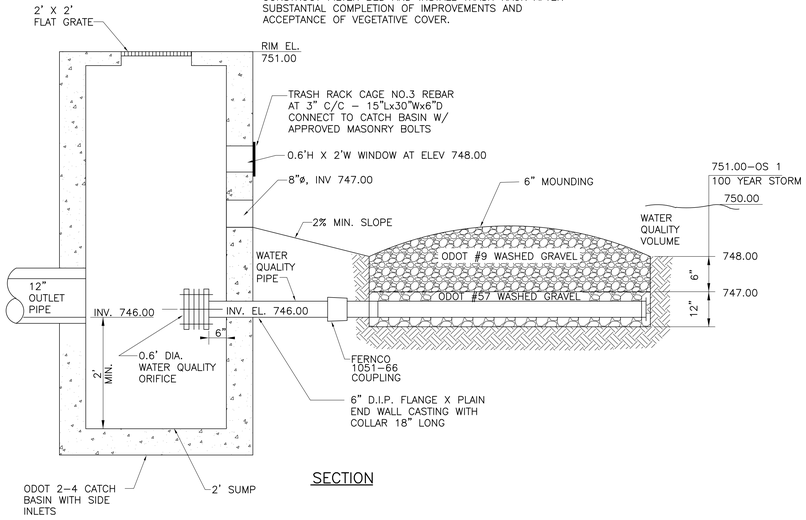


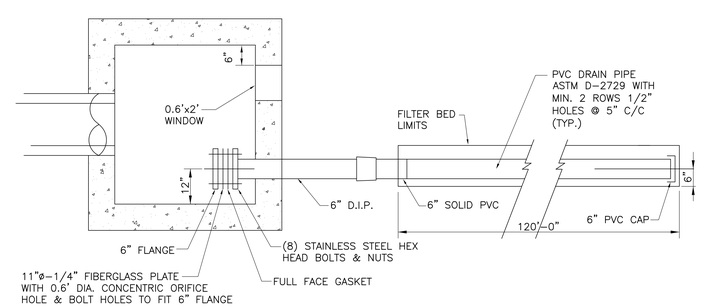
STANDARD No. 1 HEADWALL



CONCRETE PIPE ENCASEMENT

NOTE:
PROVIDE TEMPORARY CAP ON D.I.P. WATER QUALITY PIPE. CONSTRUCT FILTER BED AND INSTALL TRASH RACK AFTER SUBSTANTIAL COMPLETION OF IMPROVEMENTS AND ACCEPTANCE OF VEGETATIVE COVER.





BID OPTION 01 WATER QUALITY STRUCTURE-OS 1

SITE DETAILS
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		REVISIONS	

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DR: | DES:
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RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	508

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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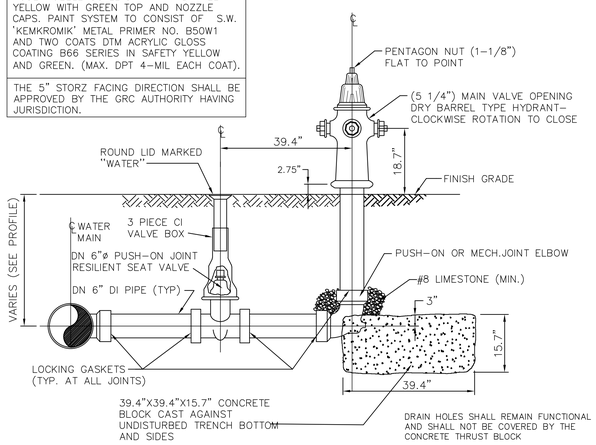
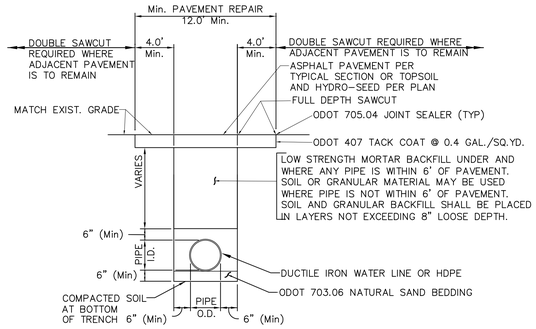
HYDRANT NOTES:
HYDRANT SHALL BE A THREE-WAY CLASS WITH ONE 5" STORZ PUMPER OUTLET AND TWO 2-1/2" "NATIONAL STANDARD THREAD" HOSE NOZZLE OUTLETS. PAINT BARREL YELLOW WITH GREEN TOP AND NOZZLE CAPS. PAINT SYSTEM TO CONSIST OF S.W. 'KEMKROMIK' METAL PRIMER NO. B50W1 AND TWO COATS DTM ACRYLIC GLOSS COATING B66 SERIES IN SAFETY YELLOW AND GREEN. (MAX. DPT 4-MIL EACH COAT).
THE 5" STORZ FACING DIRECTION SHALL BE APPROVED BY THE GRC AUTHORITY HAVING JURISDICTION.



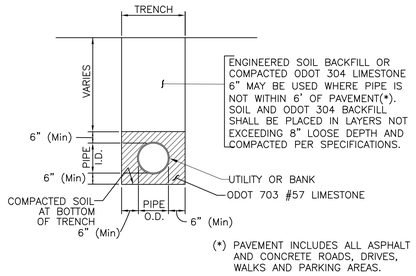
SLIP-ON PIPE WITH LOCKING GASKETS

FIRE HYDRANT INSTALLATION DETAIL



(*) PAVEMENT INCLUDES ALL ASPHALT AND CONCRETE ROADS, DRIVES, WALKS AND PARKING AREAS.

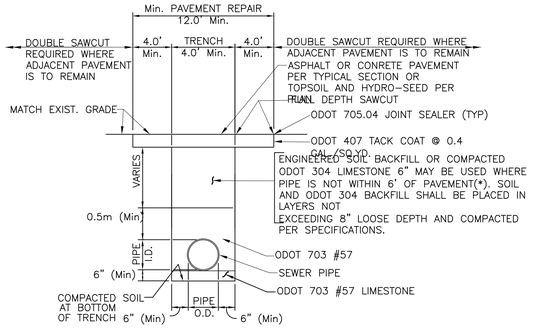
TYPICAL WATER LINE TRENCH WITHIN LIMITS OF PAVEMENT (DETAIL EXCV-A-2c)



(*) PAVEMENT INCLUDES ALL ASPHALT AND CONCRETE ROADS, DRIVES, WALKS AND PARKING AREAS.

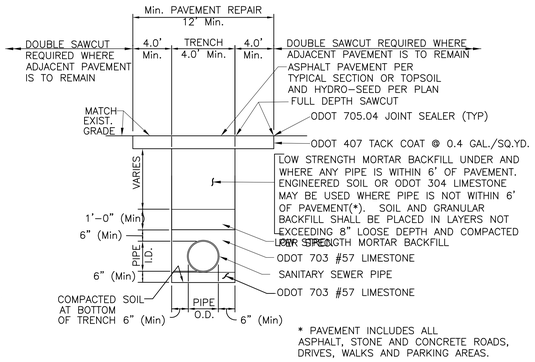
TYPICAL TRENCH OUTSIDE LIMITS** OF PAVEMENT (DETAIL EXCV-A-1a)

**OUTSIDE LIMITS DEFINED 6' FROM EDGE OF PAVEMENT



(*) PAVEMENT INCLUDES ALL ASPHALT AND CONCRETE ROADS, DRIVES, WALKS AND PARKING AREAS.

TYPICAL SEWER TRENCH WITHIN LIMITS OF PAVEMENT (DETAIL EXCV-A-2a)



* PAVEMENT INCLUDES ALL ASPHALT, STONE AND CONCRETE ROADS, DRIVES, WALKS AND PARKING AREAS.

TYPICAL TRENCH WITHIN LIMITS OF PAVEMENT (DETAIL EXCV-A-2b)

NOTES

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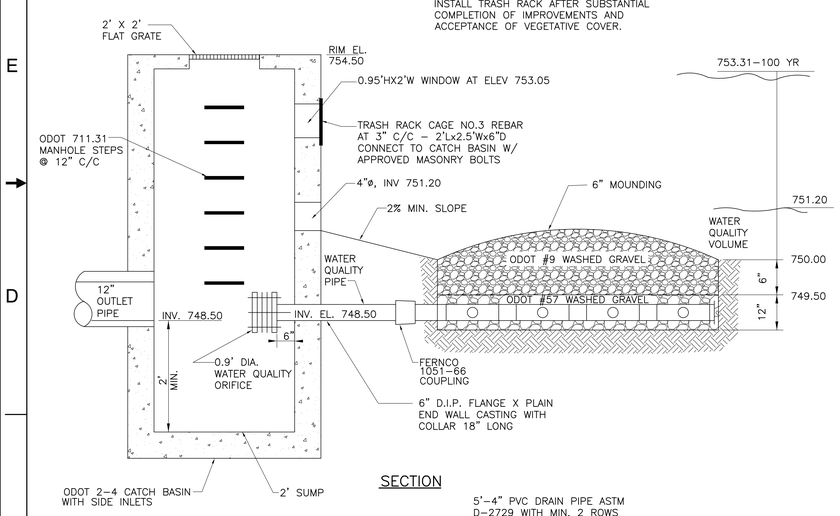
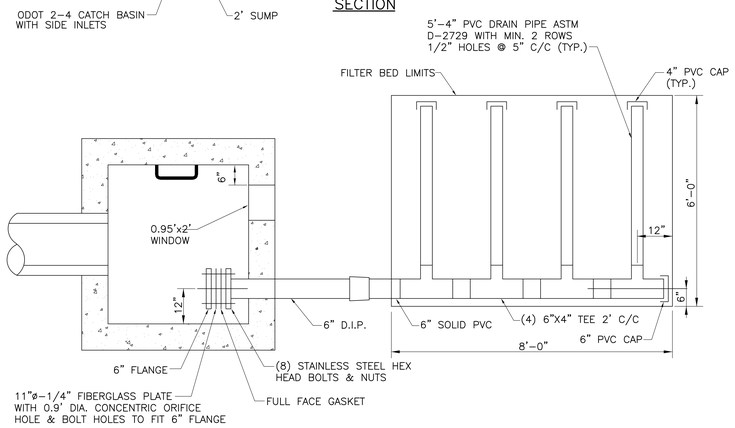
NOTE:
PROVIDE TEMPORARY CAP ON D.I.P. WATER QUALITY PIPE. CONSTRUCT FILTER BED AND INSTALL TRASH RACK AFTER SUBSTANTIAL COMPLETION OF IMPROVEMENTS AND ACCEPTANCE OF VEGETATIVE COVER.



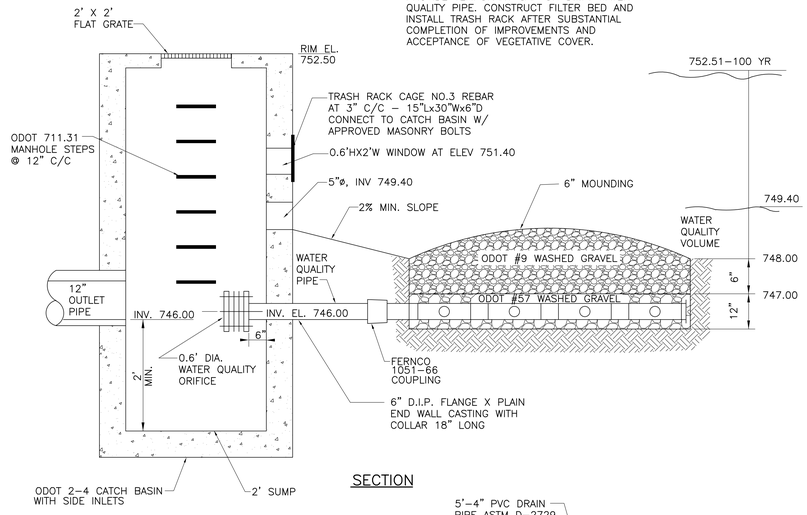
SECTION



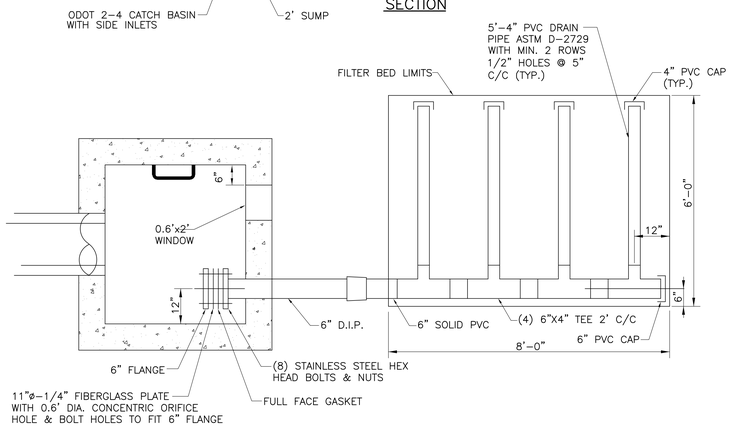
PLAN

EXISTING DRY DETENTION POND OUTLET STRUCTURE (SOUTH BASIN) (FOR REFERENCE ONLY)

NOTE:
PROVIDE TEMPORARY CAP ON D.I.P. WATER QUALITY PIPE. CONSTRUCT FILTER BED AND INSTALL TRASH RACK AFTER SUBSTANTIAL COMPLETION OF IMPROVEMENTS AND ACCEPTANCE OF VEGETATIVE COVER.

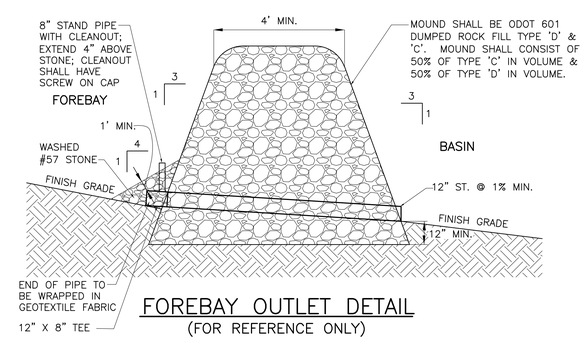


SECTION



PLAN

EXISTING DRY DETENTION POND OUTLET STRUCTURE (NORTH BASIN) (FOR REFERENCE ONLY)



FOREBAY OUTLET DETAIL (FOR REFERENCE ONLY)

SITE DETAILS
N.T.S.

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	
LAST APPROVED EDMS REVISION		TECH LEAD:	FAC-SYS MGR: REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SITE DETAILS

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:

ARCHITECT: STANTEC ARCHITECTURE INC.	RELEASE APPROVAL: DATE:
CONTRACT: NNC09CA01C	RELEASE APPROVAL: DATE:
TASK ORDER:	RELEASE APPROVAL: DATE:
DRAWN: Author DESIGNED: CHECKED: Checker	
APPROVED: Approver APPROVAL DATE:	RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	509

AREA: SHEET 1 OF 1

UNITS: ENGLISH SOFTWARE: AUTOCAD 2013 REVISION - VER 1

SCALE: AS SHOWN OFFICIAL DATE: 06-24-2014

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C509

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NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

B-001

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: Client: | START: 5/20/13 END: 5/20/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 757.2 (MSL) EOB: 28.92 ft. | COORD: 635823.774 N, 2140418.267 E
EXPLORATION ID B-001 | PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
7.0", ASPHALT	756.6																		
HARD, GRAY TO BROWN, SANDY LEAN CLAY, LITTLE GRAVEL, CONTAINS ASPHALT FRAGMENTS, DAMP (FILL)	754.2		4 5 6	16	67	SS-1	4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
HARD, BROWN MOTTLED WITH GRAY, SANDY LEAN CLAY, TRACE GRAVEL, DAMP			4 6 7	19	72	SS-2	4.5+	4	4	10	17	31	34	31	15	16	14	CL	
			6 10 14	36	78	SS-3	4.5+	-	-	-	-	-	-	-	-	-	15	CL (V)	
			5 10 12	33	83	SS-4	4.5+	6	5	8	13	35	33	30	15	15	9	CL	
	740.2		10 11 14	37	94	SS-5	4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
HARD, SILTY, CLAYEY SAND WITH GRAVEL, DAMP	735.7		20 50/4"	-	100	SS-6	4.0	23	11	19	11	25	11	22	16	6	9	SC-SM	
DARK GRAY, SHALE AND SILTSTONE			50/4"	-	100	SS-7	-	-	-	-	-	-	-	-	-	-	4	Rock (V)	
	728.3	EOB	50/5"	-	100	SS-8	-	-	-	-	-	-	-	-	-	-	5	Rock (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. CAVE DEPTH 27.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: PLACED .5 BAG ASPHALT PATCH; POURED 1 BAG BENTONITE CHIPS

B-002

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: Client: | START: 5/20/13 END: 5/20/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 758.0 (MSL) EOB: 23.7 ft. | COORD: 635726.085 N, 2140416.776 E
EXPLORATION ID B-002 | PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
VERY DENSE, BROWN MOTTLED WITH GRAY AND DARK GRAY, CLAYEY SAND, SOME SILT, TRACE GRAVEL, DAMP	755.0		2 2 4	9	67	SS-1	2.5-4.5+	5	5	12	29	27	22	32	18	14	16	SC	
VERY STIFF, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP			2 2 5	10	72	SS-2	2.5-3.75	-	-	-	-	-	-	-	-	-	13	CL (V)	
(POSSIBLE FILL)	751.0		2 1 5	9	78	SS-3	3.5-4.5+	3	3	8	14	34	38	30	16	14	16	CL	
BECOMES HARD			6 9 12	31	78	SS-4	4.5+	-	-	-	-	-	-	-	-	-	15	CL (V)	
@13.5'; CHANGES TO GRAY, SANDY LEAN CLAY, TRACE GRAVEL	741.0		6 4 12	24	83	SS-5	4.5+	4	3	8	12	34	39	28	14	14	12	CL	
HARD, GRAY TO DARK GRAY, SILTY CLAYEY SAND WITH GRAVEL, CONTAINS SHALE FRAGMENTS, DAMP	736.5		27 50/6"	-	87	SS-6	4.5	-	-	-	-	-	-	-	-	-	12	SC-SM (V)	
DARK GRAY, SHALE	734.3	EOB	50/2"	-	100	SS-7	-	-	-	-	-	-	-	-	-	-	3	Rock (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING. CAVE DEPTH 18.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED 1 BAG BENTONITE CHIPS; SHOVELED SOIL CUTTINGS

B-003

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: Client: | START: 5/20/13 END: 5/21/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 758.0 (MSL) EOB: 23.92 ft. | COORD: 635644.815 N, 2140411.678 E
EXPLORATION ID B-003 | PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
STIFF TO VERY STIFF, BROWN MOTTLED WITH GRAY AND ORANGE-BROWN, SANDY LEAN CLAY, TRACE GRAVEL, MOIST (POSSIBLE FILL)	752.0		1 2 3	7	67	SS-1	2.25-3.0	-	-	-	-	-	-	-	-	-	22	CL (V)	
			2 1 4	7	67	SS-2	1.0-3.0	2	2	12	20	33	31	36	17	19	20	CL	
BECOMES HARD			3 5 8	19	78	SS-3	4.0-4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
			3 6 6	18	72	SS-4	3.5-4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
@13.5'; SS-5 CHANGES TO GRAY		W	5 8 11	28	89	SS-5	4.5+	3	4	8	14	32	39	27	13	14	14	CL	
VERY STIFF TO HARD, GRAY, SILTY-CLAYEY SAND WITH GRAVEL, DAMP	741.0		22 50/5"	-	91	SS-6	3.5-4.5+	-	-	-	-	-	-	-	-	-	10	SC-SM (V)	
@23.5'; CHANGES TO, SILTY-CLAYEY SAND, TRACE GRAVEL	734.1	EOB	50/5"	-	100	SS-7	3.5-4.5+	-	-	-	-	-	-	-	-	-	13	SC-SM (V)	

NOTES: GROUNDWATER ENCOUNTERED 12.0' DURING DRILLING, 16.0' UPON COMPLETION. CAVE DEPTH 19.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: POURED .5 BAG BENTONITE CHIPS; PUMPED 20 GAL. BENTONITE GROUT

B-004

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: Client: | START: 5/21/13 END: 5/21/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 758.2 (MSL) EOB: 33.9 ft. | COORD: 635831.365 N, 2140161.886 E
EXPLORATION ID B-004 | PAGE 1 OF 2

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
STIFF TO VERY STIFF, BROWN MOTTLED WITH DARK GRAY, SANDY LEAN CLAY, TRACE GRAVEL, DAMP (POSSIBLE FILL)	752.2		1 5 6	16	67	SS-1	3.5-4.5+	5	7	12	25	30	21	31	16	15	15	CL	
			3 2 5	10	72	SS-2	2.25-4.0	-	-	-	-	-	-	-	-	-	15	CL (V)	
BECOMES HARD @6.0'; ST-3 BECOMES, LEAN CLAY WITH SAND, TRACE GRAVEL					100	ST-3	4.5+	2	3	9	14	37	35	30	16	14	14	CL	
			9 14 15	43	83	SS-4	4.5+	-	-	-	-	-	-	-	-	-	15	CL (V)	
	741.2		6 10 14	36	83	SS-5	4.5+	4	4	8	12	33	39	29	14	15	12	CL	
VERY DENSE, GRAY, SILTY-CLAYEY SAND WITH GRAVEL, DAMP	736.2		20 32 48	119	89	SS-6	-	-	-	-	-	-	-	-	-	-	6	SC-SM (V)	
DARK GRAY, SHALE			25 50/3"	-	100	SS-7	-	-	-	-	-	-	-	-	-	-	4	Rock (V)	
		W	35 50/4"	-	70	SS-8	-	-	-	-	-	-	-	-	-	-	5	Rock (V)	

B-004 (continued)

PID: | BR ID: | PROJECT: NASA B351 W.H. ADDITION | STATION / OFFSET: | START: 5/21/13 | END: 5/21/13 | PG 2 OF 2 | B-004

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/ RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
DARK GRAY, SHALE *(continued)*	724.3	EOB	50/5"	-	100	SS-9	-	-	-	-	-	-	-	-	-	-	13	Rock (V)	

BORING LOG

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC. | CONTRACT NO.: NNC09CA01C | TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker | APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT: SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS: DR: | DES: | D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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FY14 B351 WAREHOUSE ADDITION

BORING LOG

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	510

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

C510

0351-COF20244-C- 510_CE_ 01.dwg

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B-005

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: | Client: | START: 5/22/13 END: 5/22/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 755.9 (MSL) EOB: 26.7 ft. | COORD: 635765.658 N, 2140168.141 E
EXPLORATION ID B-005 | PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 755.9	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
VERY STIFF TO HARD, BROWN TO BROWN MOTTLED WITH GRAY, SANDY LEAN CLAY, TRACE GRAVEL, DAMP		10 7 5	18	56	SS-1	4.5+	2	6	15	23	33	21	26	15	11	8	CL	
		3 4 7	16	61	SS-2	2.25-3.75	-	-	-	-	-	-	-	-	-	15	CL (V)	
	750.4	3 7 8	22	67	SS-3	4.5+	-	-	-	-	-	-	-	-	-	19	CL (V)	
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP		3 7 9	24	72	SS-4	2.4-4.5+	2	4	7	12	35	40	29	15	14	13	CL	
		5 7 9	24	78	SS-5	4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
	738.9	7 14 30	65	83	SS-6	4.5+	4	4	8	12	40	32	26	14	12	11	CL	
HARD, DARK GRAY, SILTY CLAYEY SAND WITH GRAVEL, DAMP		27 50/4"	-	90	SS-7	4.5+	-	-	-	-	-	-	-	-	-	7	SC-SM (V)	
	734.7																	
DARK GRAY, SHALE		35 50/5"	-	100	SS-8	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
	729.2 EOB	50/2"	-	0	SS-9	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING, CAVE DEPTH 10.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH .5 BAG BENTONITE CHIPS

B-006

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: | Client: | START: 5/22/13 END: 5/22/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 753.1 (MSL) EOB: 24.2 ft. | COORD: 635655.794 N, 2140169.848 E
EXPLORATION ID B-006 | PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 753.1	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP TO MOIST		3 3 4	10	72	SS-1	3.5+-4.5+	-	-	-	-	-	-	-	-	-	19	CL (V)	
		2 5 5	15	78	SS-2	4.5+	2	2	5	16	52	23	21	13	8	14	CL	
@6.0'; SS-3 CHANGES TO GRAY		5 9 12	31	67	SS-3	4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
		7 9 12	31	83	SS-4	4.5+	4	4	9	12	35	36	28	14	14	13	CL	
	741.1																	
VERY DENSE, DARK GRAY, SILTY CLAYEY SAND WITH GRAVEL, CONTAINS SHALE FRAGMENTS, DAMP		17 26 32	86	78	SS-5	-	-	-	-	-	-	-	-	-	-	8	SC-SM (V)	
	736.1																	
DARK GRAY, SHALE		50/5"	-	100	SS-6	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
	728.9 EOB	25 50/2"	-	88	SS-7	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING, CAVE DEPTH 10.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH .5 BAG BENTONITE CHIPS

B-007

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: | Client: | START: 5/22/13 END: 5/23/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 757.8 (MSL) EOB: 28.92 ft. | COORD: 635833.393 N, 2140097.268 E
EXPLORATION ID B-007 | PAGE 1 OF 1

MATERIAL DESCRIPTION AND NOTES	ELEV. 757.8	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
MEDIUM DENSE TO DENSE, BROWN, CLAYEY GRAVEL WITH SAND, CONTAINS CONCRETE FRAGMENTS AND ROOTS, DAMP (FILL)		3 5 4	13	67	SS-1	-	-	-	-	-	-	-	-	-	-	15	GC (V)	
		8 10 13	34	56	SS-2	-	35	7	10	15	19	14	29	14	15	10	GC	
@3.5'; CONTAINS 1 1/2" GRAVEL		4 4 7	16	6	SS-3	-	-	-	-	-	-	-	-	-	-	13	GC (V)	
	752.3			75	ST-4	4.5+	1	3	6	14	36	40	31	16	15	15	CL	
HARD, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAY, DAMP																		
@8.5'; SS-5 CHANGES TO GRAY		5 10 13	34	94	SS-5	4.5+	-	-	-	-	-	-	-	-	-	14	CL (V)	
		3 8 10	27	89	SS-6	4.5+	4	4	7	11	37	37	29	13	16	12	CL	
	740.8																	
DARK GRAY, SHALE		13 32 50	122	67	SS-7	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
		50/4"	-	100	SS-8	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
	728.8 EOB	50/5"	-	100	SS-9	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	

NOTES: GROUNDWATER ENCOUNTERED AT 29.0' DURING DRILLING. CAVE DEPTH 13.0'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH .5 BAG BENTONITE CHIPS; PUMPED 20 GAL. BENTONITE GROUT

B-008 (Page 1 of 2)

PROJECT: NASA B351 W.H. ADDITION | TYPE: BUILDING | PID: | Client: | START: 5/23/13 END: 5/23/13
DRILLING FIRM / OPERATOR: B&P / R.WEBB | SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE | DRILLING METHOD: 3.25" HSA | SAMPLING METHOD: SPT
DRILL RIG: MOBILE B61 TRUCK | HAMMER: DIEDRICH AUTOMATIC | CALIBRATION DATE: 6/30/11 | ENERGY RATIO (%): 89
STATION / OFFSET: | ALIGNMENT: | ELEVATION: 769.3 (MSL) EOB: 38.75 ft. | COORD: 635740.925 N, 2140090.353 E
EXPLORATION ID B-008 | PAGE 1 OF 2

MATERIAL DESCRIPTION AND NOTES	ELEV. 769.3	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, SANDY LEAN CLAY WITH GRAVEL, DAMP TO MOIST (FILL)		7 5 4	13	78	SS-1	2.5-4.5+	-	-	-	-	-	-	-	-	-	13	CL (V)	
		4 5 5	15	22	SS-2	2.0-2.7	-	-	-	-	-	-	-	-	-	16	CL (V)	
		2 5 5	15	83	SS-3	4.0-4.5+	15	4	9	19	28	25	31	14	17	16	CL	
	756.3																	
APPROXIMATE BASE OF FILL @13.5'; SS-4 CHANGES TO GRAY		6 6 7	19	78	SS-4	3.0-4.5+	-	-	-	-	-	-	-	-	-	15	CL (V)	
	753.8																	
HARD, GRAY, SILTY SAND, SOME CLAY, TRACE GRAVEL, MOIST				79	ST-5	4.0-4.25	1	8	19	25	25	22	25	14	11	16	SC	
	751.7					3.8	2	4	8	9	35	42	29	15	14	18	CL	
VERY STIFF TO HARD, GRAY TO GRAY-BROWN, LEAN CLAY WITH SAND, TRACE GRAVEL, MOIST TO DAMP		3 7 11	27	89	SS-6	3.5-4.0	-	-	-	-	-	-	-	-	-	19	CL (V)	
				79	ST-7	4.5+	2	4	9	13	33	39	27	14	13	11	CL	
		10 14 17	46	78	SS-8	4.5+	-	-	-	-	-	-	-	-	-	12	CL (V)	
	741.3																	
DARK GRAY, SHALE		27 50/4"	-	100	SS-9	4.5+	-	-	-	-	-	-	-	-	-	8	CL (V)	

B-008 (Page 2 of 2)

PID: | BR ID: | PROJECT: NASA B351 W.H. ADDITION | STATION / OFFSET: | START: 5/23/13 END: 5/23/13 | PG 2 OF 2 | B-008

MATERIAL DESCRIPTION AND NOTES	ELEV. 739.3	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
DARK GRAY, SHALE *(continued)*																		
		32 50/2"	-	88	SS-10	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
	730.6 EOB	50/3"	-	33	SS-11	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

BORING LOG

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT: SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS: DR: | DES: | D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

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FY14 B351 WAREHOUSE ADDITION

BORING LOG

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	C-	511

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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0351-COF20244-C- 511_CE_ 01.dwg

C511

PROJECT: NASA B351 W.H. ADDITION	DRILLING FIRM / OPERATOR: B&P / R.WEBB	DRILL RIG: MOBILE B61 TRUCK	STATION / OFFSET:	EXPLORATION ID B-009
TYPE: BUILDING	SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT:	
PID: Client:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/30/11	ELEVATION: 771.9 (MSL) EOB: 36.92 ft.	PAGE 1 OF 2
START: 5/24/13 END: 5/24/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	COORD: 635653.665 N, 2140084.638 E	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
HARD, DARK GRAY AND BROWN, LEAN CLAY WITH SAND, CONTAINS FEW ROOTS, DAMP (FILL)	771.9		4 4 5	13	50	SS-1	4.5+	-	-	-	-	-	-	-	-	-	12	CL (V)	
STIFF TO HARD, GRAY AND BROWN, SANDY LEAN CLAY, LITTLE GRAVEL, MOIST (FILL)	769.4		2 3 2	7	61	SS-2	1.75 - 2.25	-	-	-	-	-	-	-	-	-	16	CL (V)	
			1 2 3	7	67	SS-3	0.7 - 0.9	13	4	10	18	30	25	32	15	17	20	CL	
@13.5'; CHANGES TO GRAY MOTTLED WITH BROWN	755.9		2 2 4	9	67	SS-4	0.75 - 1.0	-	-	-	-	-	-	-	-	-	21	CL (V)	
APPROXIMATE BASE OF FILL	753.9		6 7 9	24	72	SS-5	4.3	-	-	-	-	-	-	-	-	-	15	CL (V)	
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, CLAYEY SAND, LITTLE GRAVEL, MOIST	748.9		5 7 9	24	72	SS-6	2.1 - 3.5	11	13	21	20	14	21	39	14	25	16	SC	
			9 10 12	33	72	SS-7	4.5+	-	-	-	-	-	-	-	-	-	20	SC (V)	
HARD, GRAY, LEAN CLAY WITH SAND, LITTLE GRAVEL, DAMP			7 10 12	33	72	SS-8	4.5+	-	-	-	-	-	-	-	-	-	12	CL (V)	
			10 14 25	58	78	SS-9	4.5+	-	-	-	-	-	-	-	-	-	12	CL (V)	

PID:	BR ID:	PROJECT: NASA B351 W.H. ADDITION	STATION / OFFSET:	START: 5/24/13	END: 5/24/13	PG 2 OF 2	B-009

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
HARD, GRAY, LEAN CLAY WITH SAND, LITTLE GRAVEL, DAMP *(continued)*	741.9																		
DARK GRAY, SHALE	739.9		50/4"	-	100	SS-10	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	
	735.0	EOB	50/5"	-	100	SS-11	-	-	-	-	-	-	-	-	-	-	-	Rock (V)	

PROJECT: NASA B351 W.H. ADDITION	DRILLING FIRM / OPERATOR: B&P / R.WEBB	DRILL RIG: MOBILE B61 TRUCK	STATION / OFFSET:	EXPLORATION ID B-013
TYPE: BUILDING	SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT:	
PID: Client:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/30/11	ELEVATION: 769.9 (MSL) EOB: 25.0 ft.	PAGE 1 OF 1
START: 5/23/13 END: 5/23/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	COORD: 635743.815 N, 2140019.700 E	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
STIFF TO HARD, GRAY-BROWN WITH BLACK, LEAN CLAY WITH SAND, LITTLE TO TRACE GRAVEL, CONTAINS DECAYED LEAVES AND CINDERS, DAMP TO MOIST (FILL) SOIL STOCK PILE	769.9		3 4 2	9	72	SS-1	1.5 - 4.5+	-	-	-	-	-	-	-	-	-	19	CL (V)	
			1 3 3	9	28	SS-2	4.5+	-	-	-	-	-	-	-	-	-	21	CL (V)	
@8.5'; SS-3 CHANGES TO DARK BROWN			2 3 3	9	83	SS-3	2.0 - 4.0	-	-	-	-	-	-	-	-	-	18	CL (V)	
@13.5'; SS-4 CHANGES TO BROWN AND GRAY, SANDY LEAN CLAY, TRACE GRAVEL	754.9		2 6 11	25	72	SS-4	2.0 - 4.5	1	5	11	20	33	30	37	21	16	20	CL	
APPROXIMATE BASE OF FILL	754.4																		
MEDIUM DENSE, GRAY, POORLY GRADED SAND WITH GRAVEL, MOIST	751.9		5 5 8	19	6	SS-5	-	-	-	-	-	-	-	-	-	-	16	SP (V)	
VERY STIFF TO HARD, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, MOIST TO DAMP			4 5 9	21	78	SS-6	2.7 - 4.5+	1	1	2	15	55	26	23	15	8	20	CL	
			9 13 18	46	83	SS-7	4.5+	2	5	8	13	36	36	31	17	14	14	CL	
	744.9	EOB	7 12 15	40	94	SS-8	4.5+	-	-	-	-	-	-	-	-	-	15	CL (V)	

NOTES: GROUNDWATER NOT ENCOUNTERED DURING DRILLING, CAVE DEPTH 1.5'.
ABANDONMENT METHODS, MATERIALS, QUANTITIES: SOIL MIXED WITH .25 BAG BENTONITE CHIPS

PROJECT: NASA B351 W.H. ADDITION	DRILLING FIRM / OPERATOR: B&P / R.WEBB	DRILL RIG: MOBILE B61 TRUCK	STATION / OFFSET:	EXPLORATION ID B-010
TYPE: BUILDING	SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT:	
PID: Client:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/30/11	ELEVATION: 752.6 (MSL) EOB: 10.0 ft.	PAGE 1 OF 1
START: 5/22/13 END: 5/22/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	COORD: 635596.322 N, 2140177.524 E	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
HARD, BROWN MOTTLED WITH GRAY, SANDY LEAN, TRACE GRAVEL, DAMP	752.6		5 7 9	24	72	SS-1	4.5+	1	4	8	14	37	36	31	16	15	13	CL	
			5 8 13	31	67	SS-2	4.5+	2	4	9	13	36	36	30	16	14	13	CL	
@3.5'; SS-3 CONTAINS IRON STAINING	747.1		5 7 10	25	78	SS-3	4.5+	-	-	-	-	-	-	-	-	-	15	CL (V)	
HARD, GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP			5 10 11	31	78	SS-4	4.5+	-	-	-	-	-	-	-	-	-	12	CL (V)	
	742.6	EOB	5 11 13	36	78	SS-5	4.5+	-	-	-	-	-	-	-	-	-	12	CL (V)	

PROJECT: NASA B351 W.H. ADDITION	DRILLING FIRM / OPERATOR: B&P / R.WEBB	DRILL RIG: MOBILE B61 TRUCK	STATION / OFFSET:	EXPLORATION ID B-011
TYPE: BUILDING	SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT:	
PID: Client:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/30/11	ELEVATION: 752.2 (MSL) EOB: 9.83 ft.	PAGE 1 OF 1
START: 5/22/13 END: 5/22/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	COORD: 635566.542 N, 2140099.160 E	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
HARD, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP	752.2		5 6 7	19	83	SS-1	4.5+	0	1	4	9	49	37	29	17	12	16	CL	
			5 6 14	37	67	SS-2	4.5+	2	3	7	12	38	38	32	15	17	14	CL	
@3.5'; SS-3 CONTAINS IRON STAINING			5 7 9	24	33	SS-3	4.5+	-	-	-	-	-	-	-	-	-	13		
			5 9 11	30	83	SS-4	4.5+	-	-	-	-	-	-	-	-	-	13		
	742.4	EOB	9 11 50/4"	-	69	SS-5	4.5+	3	5	7	11	35	39	28	14	14	12	CL	

PROJECT: NASA B351 W.H. ADDITION	DRILLING FIRM / OPERATOR: B&P / R.WEBB	DRILL RIG: MOBILE B61 TRUCK	STATION / OFFSET:	EXPLORATION ID B-012
TYPE: BUILDING	SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT:	
PID: Client:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/30/11	ELEVATION: 771.4 (MSL) EOB: 25.0 ft.	PAGE 1 OF 1
START: 5/24/13 END: 5/24/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	COORD: 635662.071 N, 2140014.772 E	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
STIFF TO HARD, GRAY-BROWN, LEAN CLAY WITH SAND, TRACE GRAVEL, CONTAINS MANY ROOTS, DECREASES WITH DEPTH, DAMP TO MOIST (FILL) SOIL STOCK PILE	771.4		4 3 3	9	72	SS-1	3.0 - 4.5+	-	-	-	-	-	-	-	-	-	17	CL (V)	
			3 3 6	13	56	SS-2	1.75 - 2.0	-	-	-	-	-	-	-	-	-	15	CL (V)	
@8.5'; SS-3 CONTAINS ASPHALT FRAGMENTS			3 3 5	12	50	SS-3	1.5 - 1.75	-	-	-	-	-	-	-	-	-	19	CL (V)	
STIFF TO HARD, GRAY-BROWN, SANDY LEAN CLAY, TRACE GRAVEL, DAMP	759.4		3 3 5	12	61	SS-4	1.0 - 4.5+	-	-	-	-	-	-	-	-	-	20	CL (V)	
APPROXIMATE BASE OF FILL	756.4				104	ST-5	3.5 - 3.75	2	4	13	31	30	20	27	17	10	15	CL	
@17.6'; IN ST-5 CHANGES TO HARD, BROWN, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP							4.5+	1	4	9	19	28	39	36	16	20	16	CL	
			9 14 15	43	72	SS-6	4.5+	2	4	7	13	36	38	32	16	16	15	CL	
			9 11 15	39	78	SS-7	4.5+	-	-	-	-	-	-	-	-	-	14	CL (V)	
	746.4	EOB	9 15 21	53	78	SS-8	4.5+	-	-	-	-	-	-	-	-	-	16	CL (V)	

PROJECT: NASA B351 W.H. ADDITION	DRILLING FIRM / OPERATOR: B&P / R.WEBB	DRILL RIG: MOBILE B61 TRUCK	STATION / OFFSET:	EXPLORATION ID B-014
TYPE: BUILDING	SAMPLING FIRM / LOGGER: B&P / P.MCINTYRE	HAMMER: DIEDRICH AUTOMATIC	ALIGNMENT:	
PID: Client:	DRILLING METHOD: 3.25" HSA	CALIBRATION DATE: 6/30/11	ELEVATION: 756.6 (MSL) EOB: 10.0 ft.	PAGE 1 OF 1
START: 5/21/13 END: 5/21/13	SAMPLING METHOD: SPT	ENERGY RATIO (%): 89	COORD: 635846.588 N, 2140031.241 E	

MATERIAL DESCRIPTION AND NOTES	ELEV.	DEPTHS	SPT/RQD	N_{60}	REC (%)	SAMPLE ID	HP (tsf)	GR	CS	MS	FS	SI	CL	LL	PL	PI	WC	USCS CLASS	HOLE SEALED
MEDIUM DENSE, BROWN, SILTY SAND WITH GRAVEL, TRACE CLAY, DRY (FILL)	755.1		7 8 7	22	67	SS-1	-	20	20	21	16	15	8	NP	NP	NP	3	SM	
HARD, BROWN AND GRAY, SANDY LEAN CLAY, LITTLE GRAVEL, DAMP (FILL)	753.4		7 8 8	24	67	SS-2	4.0 - 4.5+	13	5	11	14	29	28	31	16	15	11	CL	
VERY STIFF TO HARD, DARK GRAY, GRAY AND BROWN, SILTY CLAYEY SAND WITH GRAVEL, MOIST			3 5 6	16	78	SS-3	3.5 - 4.5+	-	-	-	-	-	-	-	-	-	19	SC-SM (V)	
	748.6		4 7 10	25	83	SS-4	4.5+	-	-	-	-	-	-	-	-	-	16	SC-SM (V)	
HARD, BROWN MOTTLED WITH GRAY, LEAN CLAY WITH SAND, TRACE GRAVEL, DAMP	746.6	EOB	4 8 10	27	83	SS-5	4.5+	1	2	9	14	37	37	-	-	-	14	CL (V)	

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

LAST APPROVED EDMS REVISION | TECH LEAD | FAC-SYS MGR. | REV DATE:

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Fax: 330/659-6675

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT: SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES: | D.ENG: | PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC. | CONTRACT #: NNC09CA01C | TASK ORDER | RELEASE APPROVAL: | DATE: | RELEASE APPROVAL: | DATE: | RELEASE APPROVAL: | DATE:

DRAWN: Author | DESIGNED: | CHECKED: Checker | ENGINEER: Approver | APPROVAL DATE:

RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

BORING LOG

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- C-	512

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1

SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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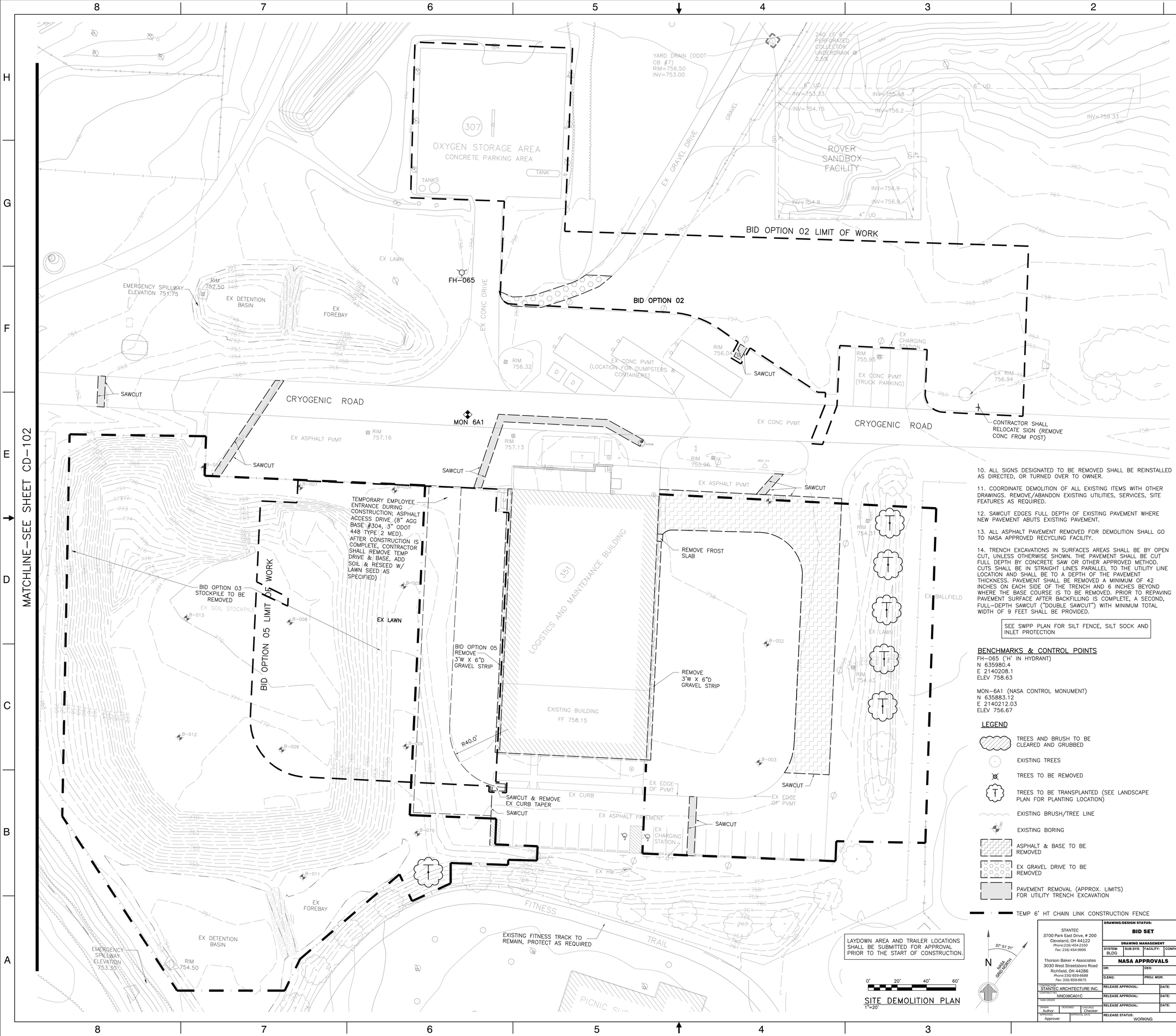

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.

DEMOLITION NOTES

1. WASTE MANAGEMENT AND RECYCLING:
ALL MATERIALS LEAVING GOVERNMENT PROPERTY FOR RECYCLING OR DISPOSAL SHALL BE COORDINATED WITH NASA WASTE MANAGEMENT IN ACCORDANCE WITH SPECIFICATION SECTION 01 35 43.98 ENVIRONMENTAL PROTECTION PROCEDURES.
ANY REMOVED OR DEMOLISHED ITEM THAT MEETS THE DEFINITION OF CONSTRUCTION & DEMOLITION DEBRIS (C&DD) SHALL BE EVALUATED FOR REUSE AND/OR RECYCLING. THE CONTRACTOR SHALL REUSE OR RECYCLE ANY ITEM THAT CAN BE SEGREGATED FROM THE WASTE STREAM AND REUSED OR RECYCLED IN A COST EFFECTIVE MANNER. NASA WASTE MANAGEMENT (WM) MANAGES THE CONSTRUCTION WASTE MANAGEMENT PROGRAM. ALL REUSE, RECYCLING AND DISPOSAL ACTIVITIES SHALL BE COORDINATED WITH NASA WM. THE CONTRACTOR SHALL SUBMIT A MANIFEST FOR ANY C&DD MATERIALS THAT WILL BE REUSED OFF SITE, RECYCLED OR DISPOSED OF TO THE COTR, WHICH WILL THEN BE REVIEWED AND APPROVED BY NASA WM FOR TRANSPORTATION OFF SITE. MATERIALS THAT WILL BE REUSED OR RECYCLED SHALL BE SEGREGATED AND MANIFESTED INDIVIDUALLY. NASA HAS SPECIFICALLY TARGETED THE FOLLOWING MATERIALS FOR REUSE OR RECYCLING:
ASPHALT, CONCRETE, GRAVEL/STONE,
COMMERCIAL/INDUSTRIAL FILL SOIL, TOPSOIL,
TREES/BUSHES, FERROUS AND NON-FERROUS METALS, CONCRETE BLOCK, BRICKS, CARPETING, AND CERAMIC TILES.

2. COMMERCIAL/INDUSTRIAL FILL:
EXCESS EXCAVATED MATERIALS HAVE BEEN DESIGNATED AS COMMERCIAL/INDUSTRIAL FILL SOILS AND SHALL BE REUSED ON SITE OR REMOVED FROM GOVERNMENT PROPERTY AND TRANSPORTED TO A COMMERCIAL OR INDUSTRIAL FILL SITE MEETING THE DEFINITIONS FOUND IN THE OHIO VOLUNTARY ACTION PROGRAM OAC 3745-300. IN NO CASE SHALL EXCESS EXCAVATED SOIL BE ALLOWED TO COME INTO CONTACT WITH A WATERWAY. NO EXCESS EXCAVATED SOIL SHALL BE REMOVED FROM THE SITE WITHOUT THE WRITTEN AUTHORIZATION FROM THE GOVERNMENT IN THE FORM OF COMPLETED AND SIGNED MANIFESTS AND PROPERTY PASSES.

3. REMOVAL OF STRUCTURES AND OBSTRUCTIONS:
BUILDINGS, FOUNDATIONS, STRUCTURES, ASPHALT AND CONCRETE PAVEMENT, AND UTILITIES ABOVE AND BELOW GROUND SHALL BE REMOVED AND DISPOSED OF OFF SITE WITHIN STANDARDS AS OUTLINED WITHIN THE CURRENT OHIO DEPARTMENT OF TRANSPORTATION "CONSTRUCTION AND MATERIAL SPECIFICATIONS" MANUAL UNDER ITEM 202.

4. TREES AND OTHER SITE FEATURES NOTED TO REMAIN SHALL BE PROTECTED THROUGHOUT CONSTRUCTION WITH CONSTRUCTION FENCING. PLACE 4' HT. ORANGE CONSTRUCTION FENCING AT AND AROUND ALL NOTED SITE FEATURES AND/OR THE DRIP LINE OF ALL TREES NOTED TO BE SAVED. DO NOT STORE VEHICLES, EQUIPMENT, OR MATERIALS WITHIN THE PROTECTED AREA. OBTAIN FIELD APPROVAL FROM THE OWNER, ARCHITECT, AND/OR AUTHORIZED OWNER REPRESENTATIVE PRIOR TO ANY TREE REMOVAL. IF NECESSARY, CONTRACTOR WILL RELOCATE TO PROTECT SITE FEATURES. OTHER MEASURES MAY BE REQUIRED BY THE LANDSCAPE ARCHITECT IF ANY DAMAGE TO SUCH ITEMS OR TREES OCCURS. REMOVE FENCING AFTER CONSTRUCTION.

5. ALL EXISTING UTILITY CASTINGS INCLUDING MANHOLES, CATCH BASINS, VALVES, VALVE BOXES, ETC. SHALL REMAIN AND BE ADJUSTED TO PROPOSED GRADES, UNLESS NOTED OTHERWISE. THE GENERAL CONTRACTOR SHALL COORDINATE WORK WITH NASA.

6. ALL EXISTING UTILITY LINES & SERVICES WITHIN THE LIMITS OF CONSTRUCTION SHALL REMAIN AND BE PROTECTED, UNLESS NOTED OTHERWISE. CONTRACTOR SHALL COORDINATE REMOVAL OR RELOCATION WITH NASA FOR PROPER CAPPING/SEALING/DISCONNECTING, ETC.

7. THE CONTRACTOR SHALL COORDINATE WORK WITH NASA TO MAINTAIN TRAFFIC CONTROL.

8. ALL EXISTING UTILITY POLES, LIGHT POLES, ELECTRIC HANDHOLDS, UNDERGROUND WIRING, AND SITE LIGHTING SHALL BE PROTECTED, UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL COORDINATE WORK WITH NASA COMPANY.

9. CONTRACTOR SHALL KEEP ALL EXISTING UTILITIES OPERATING DURING DEMOLITION AND CONSTRUCTION AND UNTIL THE NEW SYSTEMS ARE OPERATING PROPERLY. PROVIDE TEMPORARY CONNECTIONS AS REQUIRED.

10. ALL SIGNS DESIGNATED TO BE REMOVED SHALL BE REINSTALLED AS DIRECTED, OR TURNED OVER TO OWNER.

11. COORDINATE DEMOLITION OF ALL EXISTING ITEMS WITH OTHER DRAWINGS. REMOVE/ABANDON EXISTING UTILITIES, SERVICES, SITE FEATURES AS REQUIRED.

12. SAWCUT EDGES FULL DEPTH OF EXISTING PAVEMENT WHERE NEW PAVEMENT ABUTS EXISTING PAVEMENT.

13. ALL ASPHALT PAVEMENT REMOVED FOR DEMOLITION SHALL GO TO NASA APPROVED RECYCLING FACILITY.

14. TRENCH EXCAVATIONS IN SURFACES AREAS SHALL BE BY OPEN CUT, UNLESS OTHERWISE SHOWN. THE PAVEMENT SHALL BE CUT FULL DEPTH BY CONCRETE SAW OR OTHER APPROVED METHOD. CUTS SHALL BE IN STRAIGHT LINES PARALLEL TO THE UTILITY LINE LOCATION AND SHALL BE TO A DEPTH OF THE PAVEMENT THICKNESS. PAVEMENT SHALL BE REMOVED A MINIMUM OF 42 INCHES ON EACH SIDE OF THE TRENCH AND 6 INCHES BEYOND WHERE THE BASE COURSE IS TO BE REMOVED. PRIOR TO REPAVING PAVEMENT SURFACE AFTER BACKFILLING IS COMPLETE, A SECOND, FULL-DEPTH SAWCUT ("DOUBLE SAWCUT") WITH MINIMUM TOTAL WIDTH OF 9 FEET SHALL BE PROVIDED.

SEE SWPP PLAN FOR SILT FENCE, SILT SOCK AND INLET PROTECTION

BENCHMARKS & CONTROL POINTS

FH-065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON-6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

- TREES AND BRUSH TO BE CLEARED AND GRUBBED
- EXISTING TREES
- TREES TO BE REMOVED
- TREES TO BE TRANSPLANTED (SEE LANDSCAPE PLAN FOR PLANTING LOCATION)
- EXISTING BRUSH/TREE LINE
- EXISTING BORING
- ASPHALT & BASE TO BE REMOVED
- EX GRAVEL DRIVE TO BE REMOVED
- PAVEMENT REMOVAL (APPROX. LIMITS) FOR UTILITY TRENCH EXCAVATION
- TEMP 6' HT CHAIN LINK CONSTRUCTION FENCE

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONSULTANT	STANTEC ARCHITECTURE INC.
CONTRACT NO.	NNC09CA01C
TASK ORDER	
DRAWN: Author	DESIGNED:
CHECKED: Checker	
APPROVED: Approver	APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM: BLDG	SUB-SYS:	FACILITY:	CONFIG:

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE STATUS: WORKING	

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SITE DEMOLITION PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	-CD-	101

AREA:		SHEET 1 OF 1	
UNITS: ENGLISH	SOFTWARE: AUTOCAD 2013	REVISION -	VER 1
SCALE: AS SHOWN	OFFICIAL DATE: 06-24-2014		

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CD101

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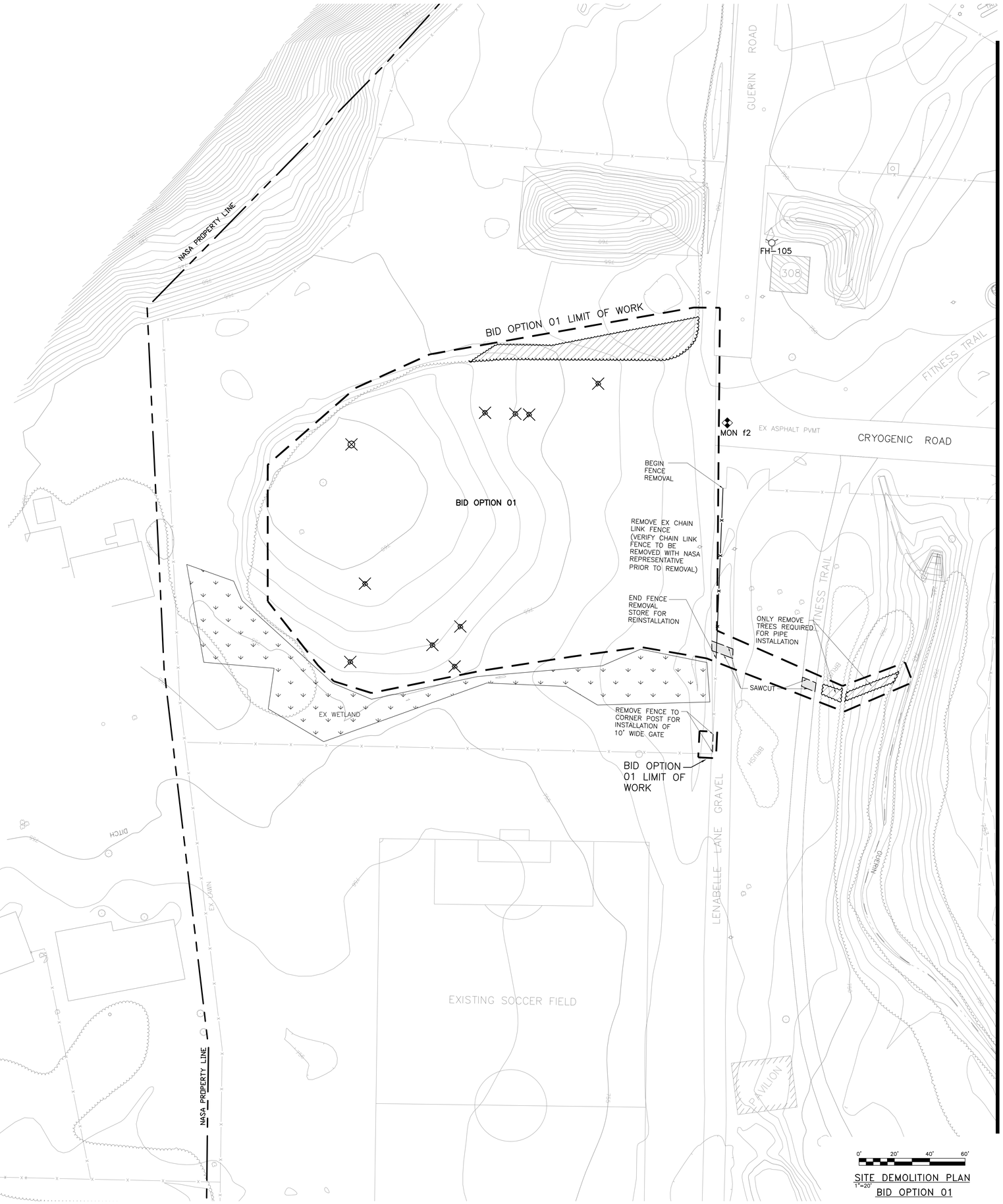
5/22/2013 11:36:45 AM



SITE DEMOLITION PLAN
BID OPTION 01

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.

BENCHMARKS & CONTROL POINTS

FH-105 (0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

LEGEND

- TREES AND BRUSH TO BE CLEARED AND GRUBBED
- EXISTING TREES
- TREES TO BE REMOVED
- EXISTING BRUSH/TREE LINE
- EXISTING BORING
- ASPHALT & BASE TO BE REMOVED
- EX GRAVEL DRIVE TO BE REMOVED
- PAVEMENT REMOVAL (APPRX. LIMITS) FOR UTILITY TRENCH EXCAVATION
- EXISTING WETLAND

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
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Phone:330/659-6688
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DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: DES: D.ENG: PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
TASK ORDER:
DRAWN: Author DESIGNED: CHECKED: Checker
APPROVED: Approver APPROVAL DATE:

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RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SITE DEMOLITION PLAN
BID OPTION 01

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	-CD-	102

AREA: SHEET 1 OF 1
UNITS: ENGLISH SOFTWARE: AUTOCAD 2013 REVISION - VER 1
SCALE: AS SHOWN OFFICIAL DATE: 06-24-2014

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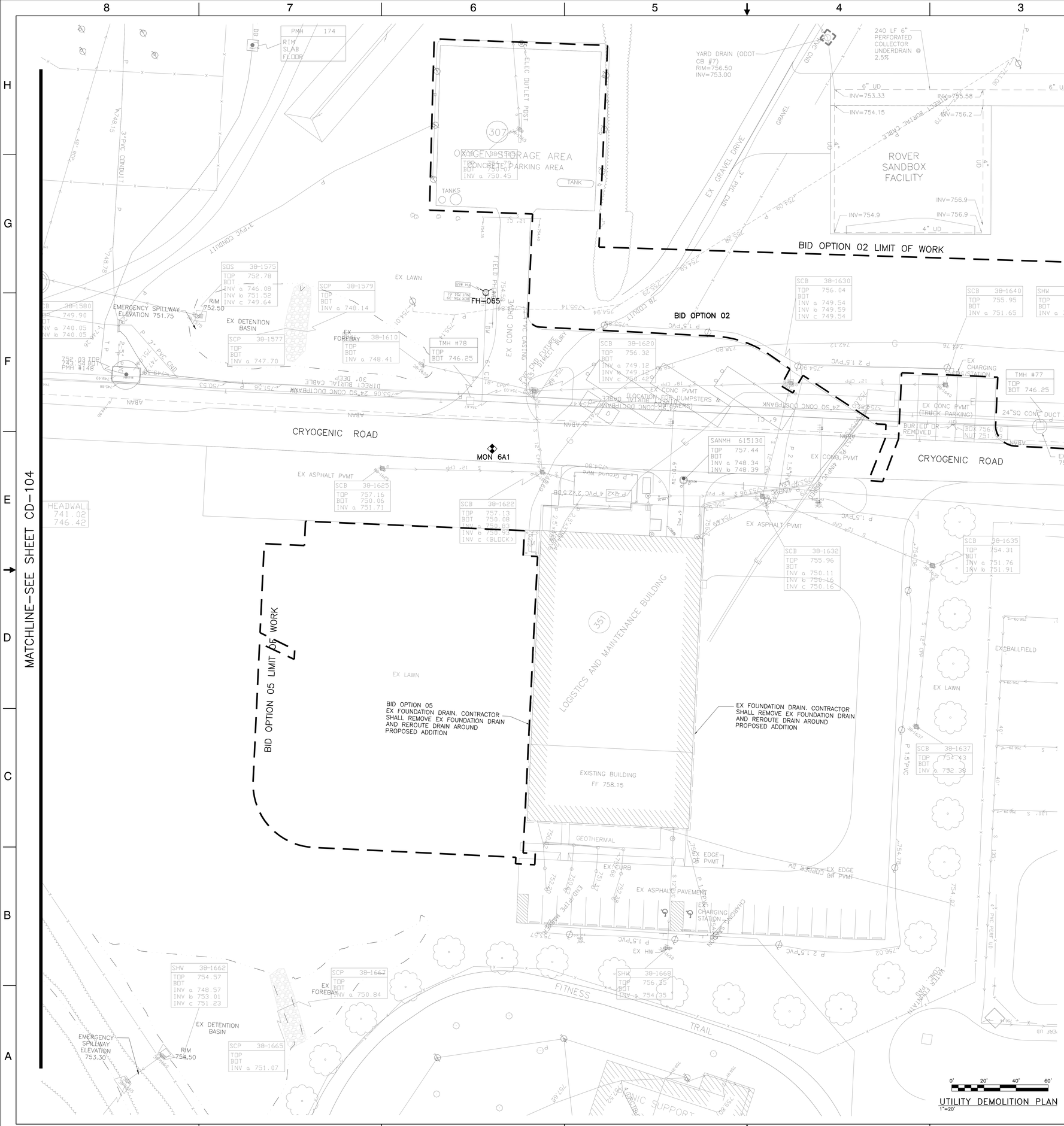

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.
2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.
3. SEE SHEET CD-101 FOR DEMOLITION NOTES

BENCHMARKS & CONTROL POINTS

FH-065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON-6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

CHG	NUM	DESCRIPTION	APP/DATE
		REVISIONS	
LAST APPROVED EDMS REVISION		TECH LEAD	FAC-SYS MGR: REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

UTILITY DEMOLITION PLAN

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3700 Park East Drive, # 200
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Phone:216/454-2150
Fax: 216/454-9995

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3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT #: NNC09CA01C
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DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:

RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	-CD-	103

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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UTILITY DEMOLITION PLAN
1"=20'
BID OPTION 01

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

2. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.

3. SEE SHEET CD-101 FOR DEMOLITION NOTES

BENCHMARKS & CONTROL POINTS

FH-105 ('0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

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Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

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Richfield, OH 44286
Phone:330/659-6688
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SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

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RELEASE APPROVAL:	DATE:
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JOHN H. GLENN RESEARCH CENTER
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FY14 B351 WAREHOUSE ADDITION

UTILITY DEMOLITION PLAN
BID OPTION 01

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	-CD-	104

AREA: SHEET 1 OF 1

UNITS: ENGLISH	SOFTWARE: AUTOCAD 2013	REVISION	VER
SCALE: AS SHOWN	OFFICIAL DATE: 06-24-2014	-	1

CD104

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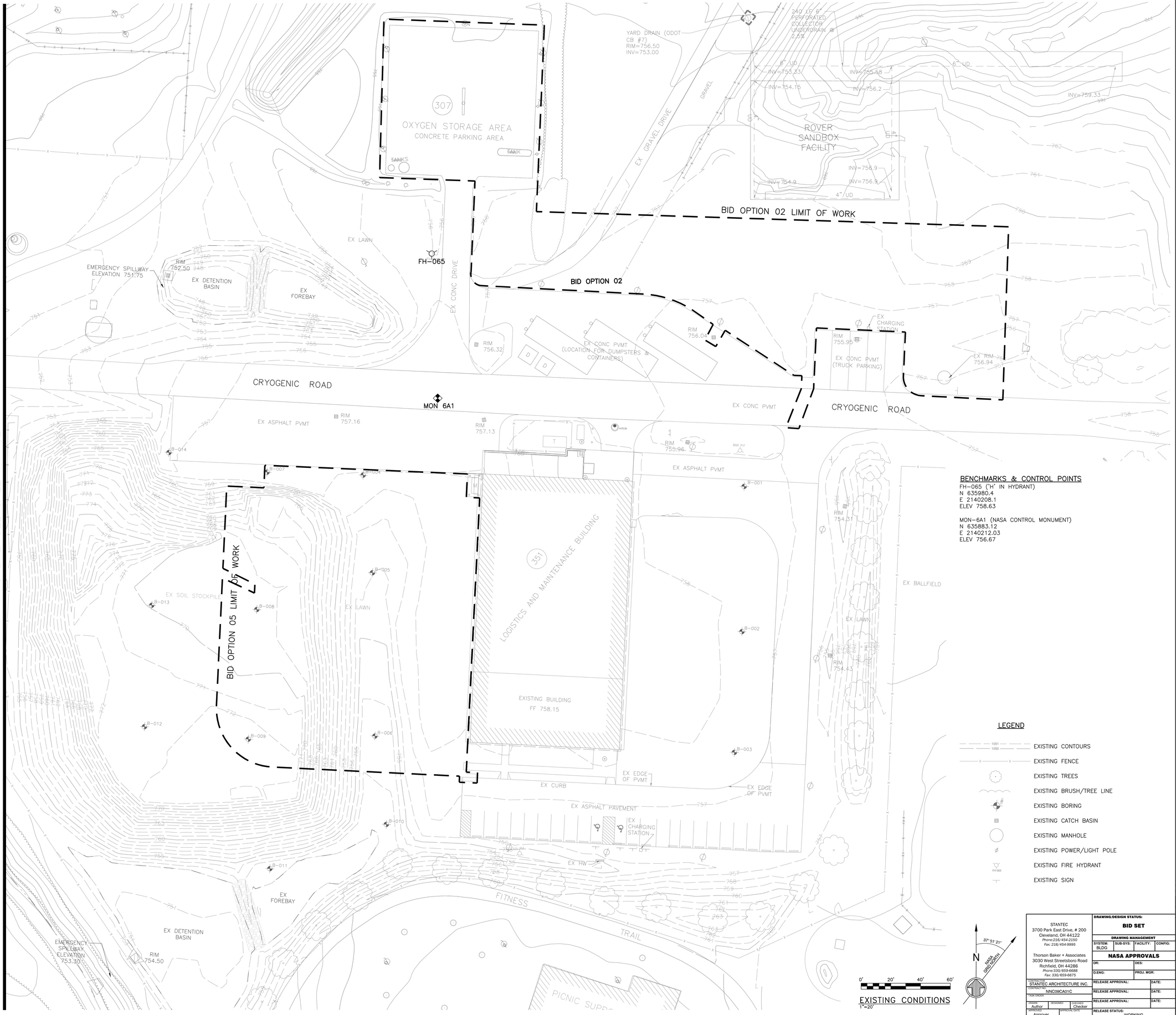

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE–0351–COF20244–G–001.

GENERAL NOTES

1. THE EXISTING CONDITIONS SHOWN ON THESE DRAWINGS HAVE BEEN TAKEN FROM A SURVEY PREPARED BY NASA. THORSON BAKER & ASSOCIATES, INC. DOES NOT WARRANT THAT THE INFORMATION SHOWN HEREON IS EITHER ACCURATE OR COMPLETE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE EXISTING CONDITIONS AT THE PROJECT SITE.
2. THE NASA REQUIREMENTS, TOGETHER WITH THE 2013 EDITION OF THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION (ODOT) CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) SHALL GOVERN ALL CONSTRUCTION ITEMS THAT ARE PART OF THIS PLAN, UNLESS NOTED OTHERWISE. IF THERE ARE DISCREPANCIES, NASA REQUIREMENTS SHALL GOVERN.
3. THE CONTRACTOR AND SUBCONTRACTORS SHALL BE SOLELY RESPONSIBLE FOR COMPLYING WITH ALL FEDERAL, STATE AND LOCAL SAFETY REQUIREMENTS, TOGETHER WITH EXERCISING PRECAUTIONS AT ALL TIMES FOR THE PROTECTION OF PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS ALSO THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND SUBCONTRACTORS TO INITIATE, MAINTAIN AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS, AND PROGRAMS IN CONNECTION WITH THE WORK.
4. NASA AND THORSON BAKER & ASSOCIATES, INC. WILL NOT BE RESPONSIBLE FOR MEANS, METHODS, PROCEDURES, TECHNIQUES, OR SEQUENCE OF CONSTRUCTION. NASA AND THORSON BAKER & ASSOCIATES, INC. WILL NOT BE RESPONSIBLE FOR SAFETY ON THE JOB SITE, OR FAILURE BY THE CONTRACTOR TO PERFORM WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
5. ANY MODIFICATION TO THE SPECIFICATIONS OR CHANGES TO THE WORK AS SHOWN ON THESE DRAWINGS MUST HAVE PRIOR WRITTEN APPROVAL FROM NASA.
6. THE CONTRACTOR SHALL NOTIFY NASA AT LEAST TWO (2) WORKING DAYS PRIOR TO COMMENCING THE WORK.
7. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO CONSTRUCTION.
8. ANY SURVEY MONUMENTS OR PERMANENT MARKERS DISTURBED DURING CONSTRUCTION SHALL BE RESET BY CONTRACTOR'S SURVEYOR AT THE CONTRACTOR'S EXPENSE.
9. ALL SIGNS, LANDSCAPING, STRUCTURES, OR OTHER APPURTENANCES DISTURBED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACES OR REPAIRED TO THE SATISFACTION OF OWNER AT NO ADDITIONAL COST.

BENCHMARKS & CONTROL POINTS

FH–065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON–6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

- EXISTING CONTOURS
- EXISTING FENCE
- EXISTING TREES
- EXISTING BRUSH/TREE LINE
- EXISTING BORING
- EXISTING CATCH BASIN
- EXISTING MANHOLE
- EXISTING POWER/LIGHT POLE
- EXISTING FIRE HYDRANT
- EXISTING SIGN

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3700 Park East Drive, # 200
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Fax: 216/454-9995

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Phone:330/659-6688
Fax: 330/659-6675

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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

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		REVISIONS	

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FY14 B351 WAREHOUSE ADDITION

EXISTING CONDITIONS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- V-	101

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

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V101

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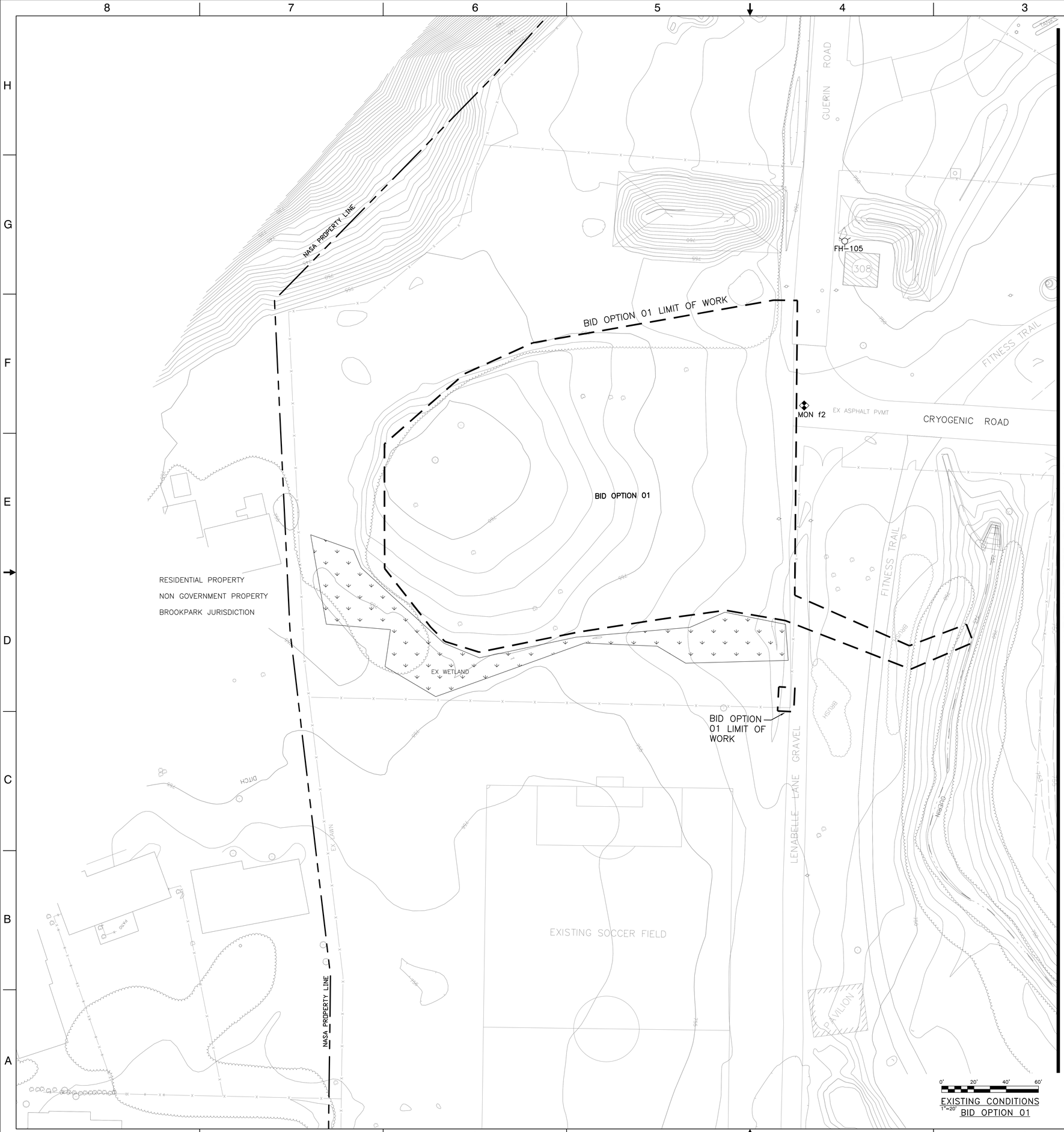

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

BENCHMARKS & CONTROL POINTS

FH-105 ('0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

- EXISTING CONTOURS
- EXISTING FENCE
- EXISTING TREES
- EXISTING BRUSH/TREE LINE
- EXISTING BORING
- EXISTING CATCH BASIN
- EXISTING MANHOLE
- EXISTING POWER/LIGHT POLE
- EXISTING FIRE HYDRANT
- EXISTING SIGN
- EXISTING WETLAND

CHG	NUM	DESCRIPTION	APP/DATE

REVISIONS

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FY14 B351 WAREHOUSE ADDITION

EXISTING CONDITIONS
BID OPTION 01

STANTEC
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Phone:216/454-2150
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3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

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CONTRACT #: NNC09CA01C
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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- V-	102

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
SCALE: AS SHOWN | OFFICIAL DATE: 06-24-2014

V102

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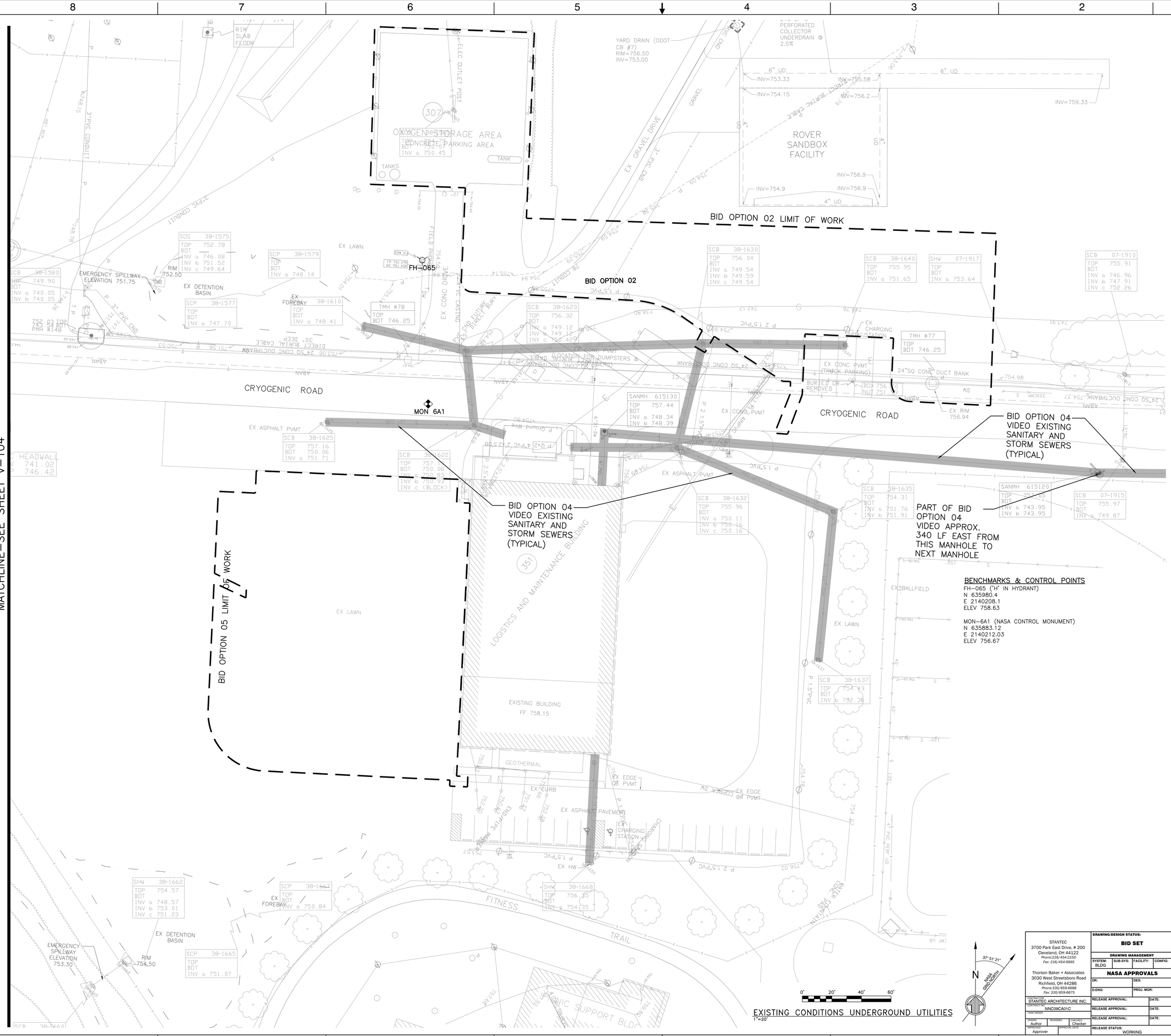

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

BID OPTION 04
VIDEO EXISTING SANITARY AND STORM SEWERS

BENCHMARKS & CONTROL POINTS

FH-065 ("H" IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON-6A1 (NASA CONTROL MONUMENT)
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CHG	NUM	DESCRIPTION	APP/DATE
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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

EXISTING CONDITIONS
UNDERGROUND UTILITIES

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

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CONTRACT NO.: NNC09CA01C
TASK ORDER:
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SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- V-	103

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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V103

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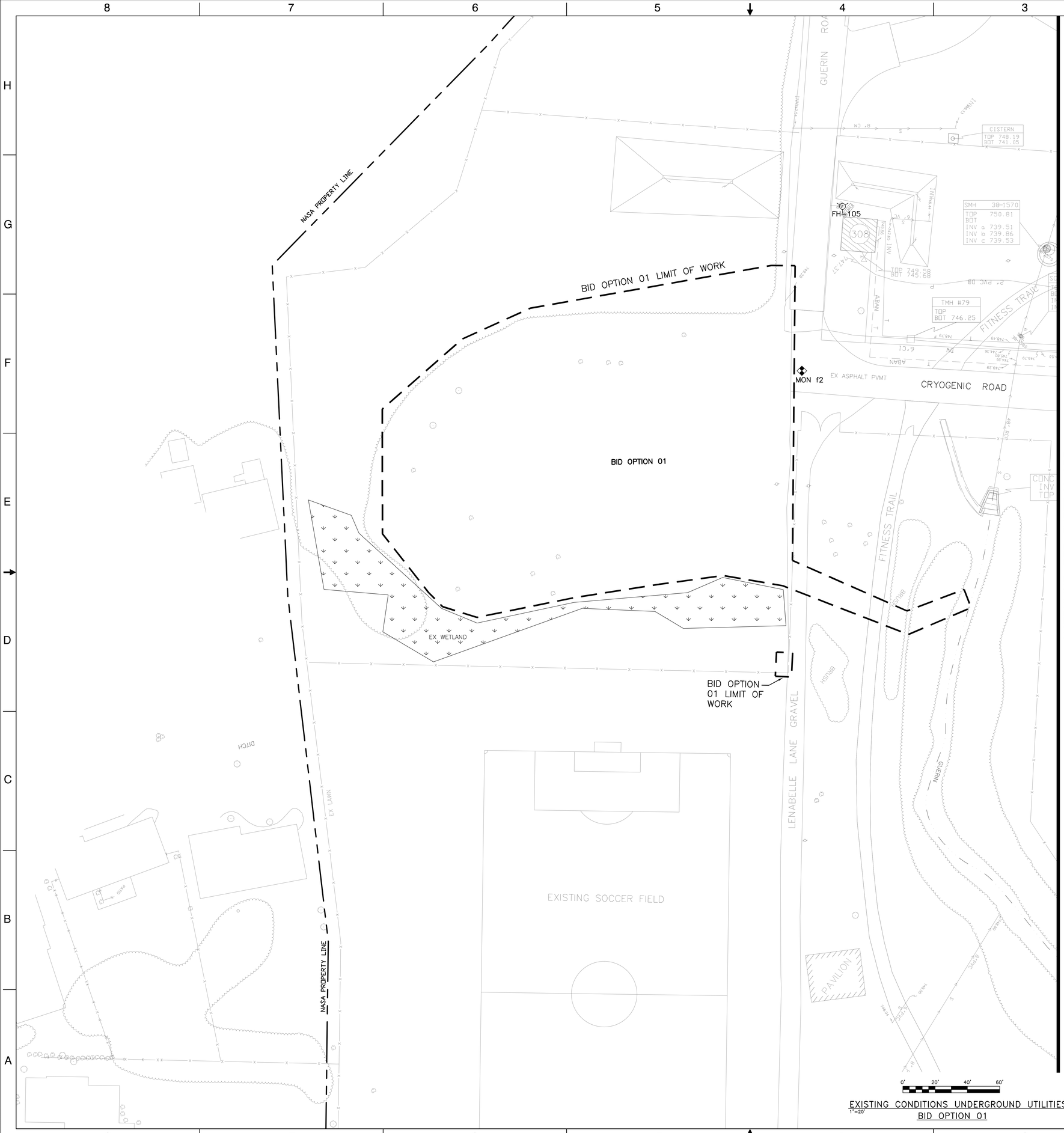

EXISTING CONDITIONS UNDERGROUND UTILITIES
BID OPTION 01

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.

BENCHMARKS & CONTROL POINTS

FH-105 ('0' IN OPEN)
N 636016.6
E 2139800.6
ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
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RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
REVISIONS			

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

EXISTING CONDITIONS UNDERGROUND UTILITIES-BID OPTION 01

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- V-	104

AREA: SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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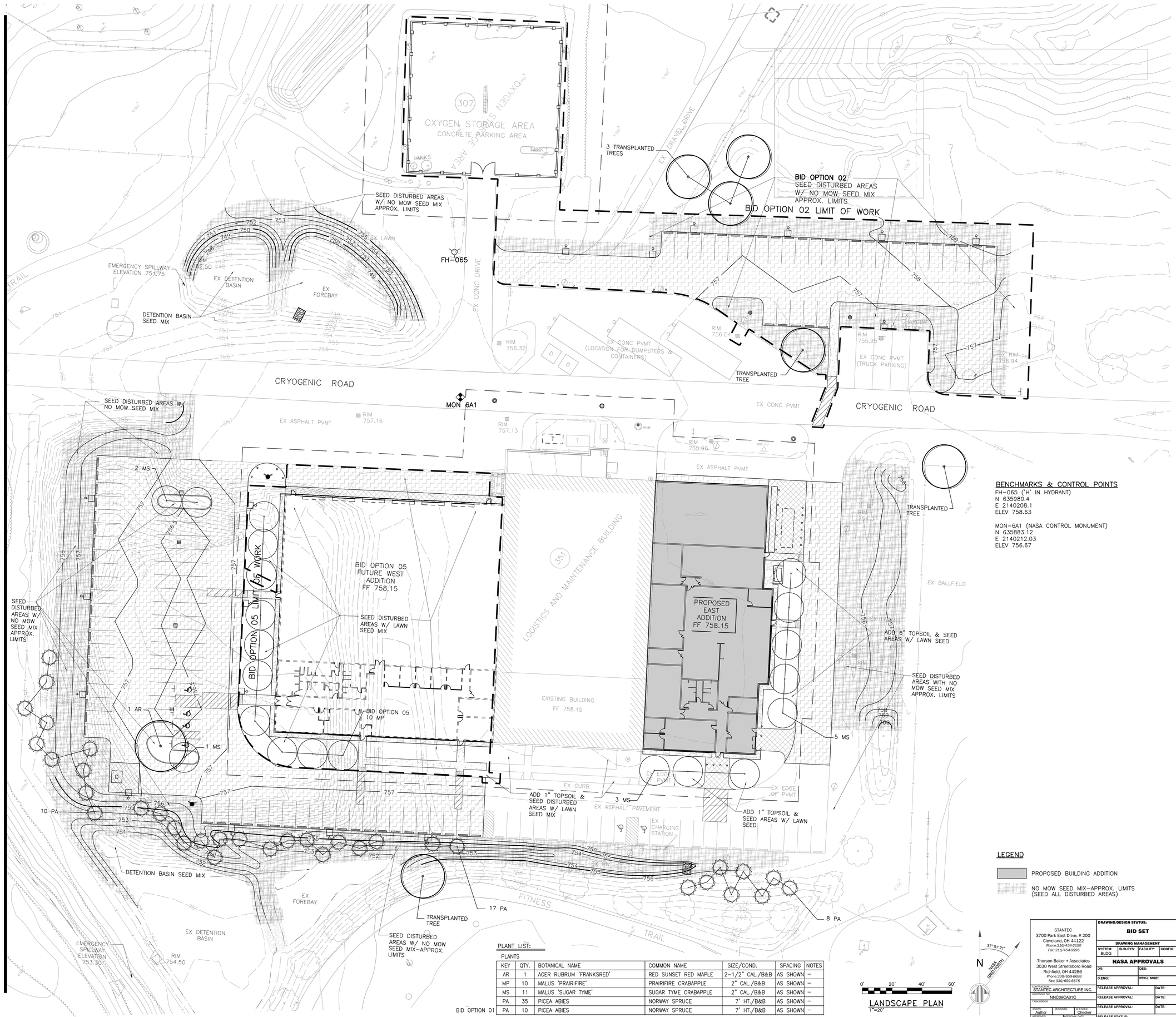

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.
2. SEE SHEET L-501 FOR PLANTING NOTES.
3. SEE SHEET L-501 FOR SEED MIX SPECIFICATIONS.
4. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.
5. NOTE ALL TREES AND SHRUBS TO BE MINIMUM 10' FROM ALL FENCES.

BENCHMARKS & CONTROL POINTS

FH-065 ('H' IN HYDRANT)
N 635980.4
E 2140208.1
ELEV 758.63

MON-6A1 (NASA CONTROL MONUMENT)
N 635883.12
E 2140212.03
ELEV 756.67

LEGEND

PROPOSED BUILDING ADDITION

NO MOW SEED MIX-APPROX. LIMITS (SEED ALL DISTURBED AREAS)

PLANT LIST:

PLANTS

KEY	QTY.	BOTANICAL NAME	COMMON NAME	SIZE/COND.	SPACING	NOTES
AR	1	ACER RUBRUM 'FRANKSRED'	RED SUNSET RED MAPLE	2-1/2" CAL./B&B	AS SHOWN	-
MP	10	MALUS 'PRAIRIFIRE'	PRAIRIFIRE CRABAPPLE	2" CAL./B&B	AS SHOWN	-
MS	11	MALUS 'SUGAR TYME'	SUGAR TYME CRABAPPLE	2" CAL./B&B	AS SHOWN	-
PA	35	PICEA ABIES	NORWAY SPRUCE	7' HT./B&B	AS SHOWN	-
BID OPTION 01 PA	10	PICEA ABIES	NORWAY SPRUCE	7' HT./B&B	AS SHOWN	-

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FY14 B351 WAREHOUSE ADDITION

LANDSCAPE PLAN

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Thorson Baker + Associates
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Fax: 330/659-6675

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CE	0351 -	COF20244	- L-	101

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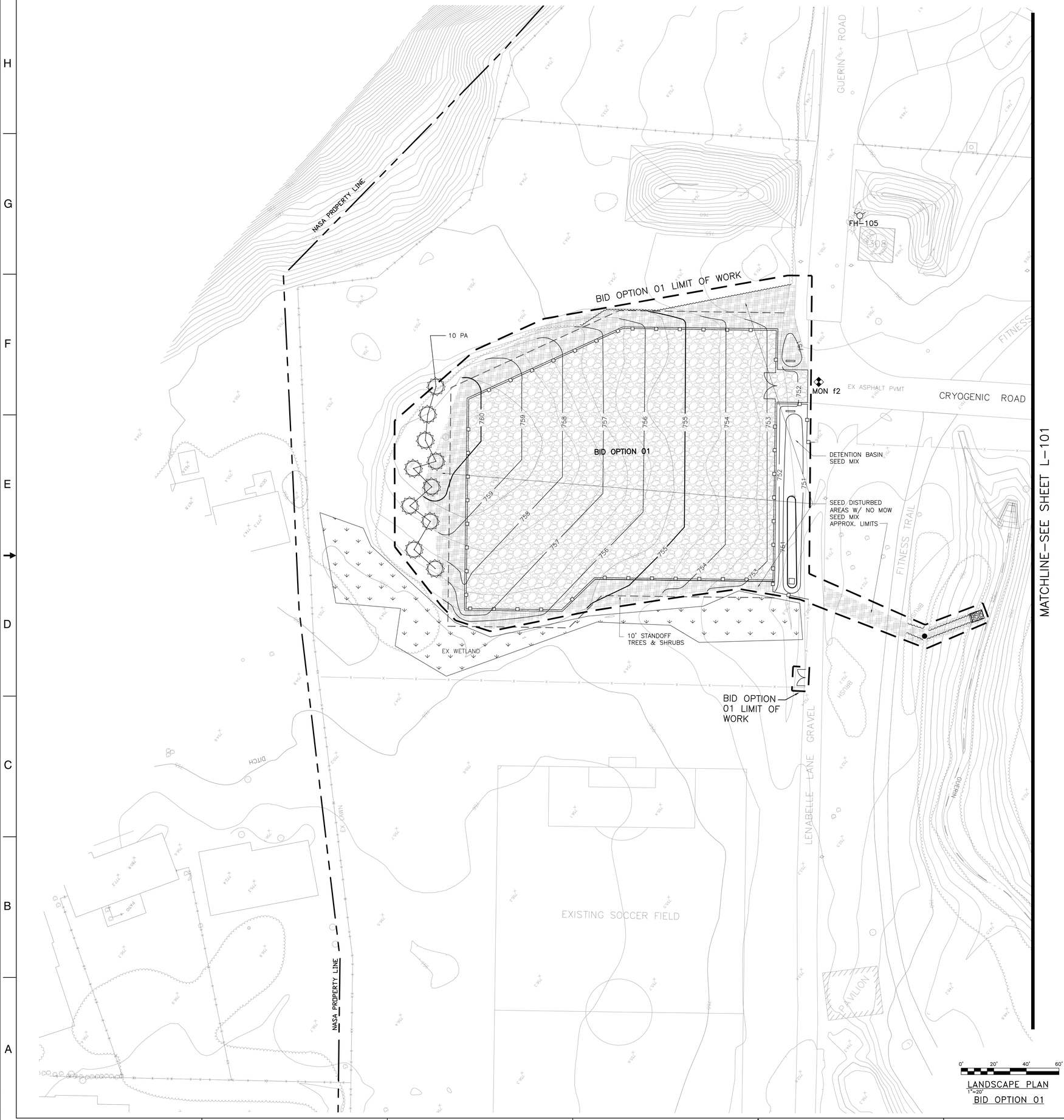

NOTES

1. FOR DRAWING SHEET INDEX AND GENERAL NOTES, REFER TO SHEET CE-0351-COF20244-G-001.
2. SEE SHEET L-101 FOR PLANT MATERIAL LIST.
3. SEE SHEET L-501 FOR SEED MIX SPECIFICATIONS.
4. CONTRACTOR TO CONTACT NASA SURVEYORS TO MARK EXISTING UTILITIES AFTER STAKING TYP. EXCAVATION. GRC PERMIT IS REQUIRED PRIOR TO STARTING ANY EXCAVATION.
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BENCHMARKS & CONTROL POINTS

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ELEV 752.21

MON-f2 (NASA CONTROL MONUMENT)
N 635914.67
E 2139775.41
ELEV 750.46

LEGEND

NO MOW SEED MIX-APPROX. LIMITS (SEED ALL DISTURBED AREAS)

0' 20' 40' 60'

LANDSCAPE PLAN
1"=20'
BID OPTION 01

N
37° 51' 21"
NASA GRID NORTH

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SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	L-	102

AREA: | SHEET 1 OF 1
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L102

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PLANTING NOTES AND SPECIFICATIONS

1. THESE DOCUMENTS ARE MEANT TO SERVE AS A GUIDE FOR CONSTRUCTION. MODIFICATIONS TO THE DESIGNS MAY BE REQUIRED TO ACCOMMODATE VARYING FIELD CONDITIONS OR MODIFIED PLANT ARRANGEMENTS.

2. UNLESS OTHERWISE DIRECTED, CONTRACTOR SHALL PROTECT ALL TREES SCHEDULED TO REMAIN. FENCE THOSE WHICH MAY RISK DAMAGE FROM CONSTRUCTION EQUIPMENT OR WORK.

3. ALL TREES WHICH ARE TO BE REMOVED SHALL BE REMOVED IN A MANNER WHICH WILL NOT INJURE PLANT MATERIAL SCHEDULED TO REMAIN. STUMPS ARE TO BE COMPLETELY REMOVED AND HAULED OFF SITE. NO BURIAL OR BURNING WILL BE PERMITTED. STUMPS WHICH ARE NOT IN THE PATH OF PROPOSED PAVEMENTS, STRUCTURES OR OTHER SIMILAR IMPROVEMENTS MAY BE GROUND IN PLACE.

4. THE GENERAL CONTRACTOR WILL PROVIDE AND PLACE 6" OF TOPSOIL. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR ALL FINE GRADING RELATING TO HIS WORK.

5. TREES & VEGETATION WITHIN LIMITS OF CONSTRUCTION SHALL BE CLEARED AND GRUBBED UNLESS NOTED OTHERWISE.

6. BEFORE PLANTING, DETERMINE LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES AND PERFORM WORK IN A MANNER WHICH WILL AVOID POSSIBLE DAMAGE. HAND EXCAVATE, AS REQUIRED. IF CONDITIONS DETRIMENTAL TO PLANT GROWTH ARE ENCOUNTERED, SUCH AS RUBBLE FILL, ADVERSE DRAINAGE CONDITIONS, OR OBSTRUCTIONS, NOTIFY LANDSCAPE ARCHITECT BEFORE PLANTING.

7. ALL PLANT MATERIAL QUALITY AND SIZES WILL CONFORM TO THE CURRENT ISSUE OF THE AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN. PLANT MATERIAL MUST BE SELECTED FROM NURSERIES THAT HAVE BEEN INSPECTED AND CERTIFIED BY STATE PLANT INSPECTORS. NOMENCLATURE WILL BE IN ACCORDANCE WITH HORTUS 111 BY L.H. BAILEY.

8. SEE SHEET L-101 FOR PLANT MATERIAL LIST. TOTAL QUANTITIES OF MATERIALS SHOWN ON LANDSCAPE DRAWINGS SHALL TAKE PRECEDENCE OVER QUANTITIES SHOWN ON THE PLANT MATERIAL LIST. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL QUANTITIES ON THE PLANTING PLAN.

9. REPORT ANY DISCREPANCIES IN THE PLANS TO THE LANDSCAPE ARCHITECT PRIOR TO START OF CONSTRUCTION. LANDSCAPE ARCHITECT IS TO BE THE AUTHORITY FOR INTERPRETATION OF PLAN(S) AND QUALITY OF WORK.

10. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO INSPECT THE PLANTS EITHER AT THE NURSERY OR AT THE JOB SITE PRIOR TO PLANTING. CONTRACTOR SHALL LABEL AT LEAST ONE PLANT OF EACH VARIETY WITH A SECURELY ATTACHED WATERPROOF TAG BEARING LEGIBLE DESIGNATION OF THE BOTANICAL AND COMMON NAMES.

11. CONTRACTOR SHALL NOT MAKE PLANT SUBSTITUTIONS. IF SPECIFIED LANDSCAPE MATERIAL IS NOT OBTAINABLE, SUBMIT PROOF OF NON-AVAILABILITY TO LANDSCAPE ARCHITECT TOGETHER WITH A PROPOSAL FOR USE OF EQUIVALENT MATERIAL.

12. WHERE FORMAL ARRANGEMENTS OR CONSECUTIVE ORDER OF TREES OR SHRUBS ARE SHOWN, SELECT STOCK FOR UNIFORM HEIGHT AND SPREAD TO ASSURE SYMMETRY IN PLANTING.

13. DO NOT BEND OR BIND-TIE TREES OR SHRUBS IN SUCH A MANNER AS TO DAMAGE BARK, BREAK BRANCHES OR DESTROY NATURAL SHAPE. PROVIDE PROTECTIVE COVERING DURING DELIVERY. DO NOT DROP BALLED AND BURLAPPED STOCK DURING DELIVERY. IF PLANTING IS DELAYED MORE THAN 6 HOURS AFTER DELIVERY, SET TREES AND SHRUBS IN SHADE, PROTECT FROM WEATHER AND MECHANICAL DAMAGE, AND KEEP ROOTS MOIST BY COVERING WITH MULCH, BURLAP OR OTHER ACCEPTABLE MEANS OF RETAINING MOISTURE.

14. WHERE BED GRADES MEET ADJACENT GRADES, THE EDGE OF THE BED SHALL BE SLOPED GRADUALLY DOWN TO MEET THE ADJACENT GRADE 1" BELOW IT. THE FINISHED MULCH GRADE SHALL BE 1" BELOW THE ADJACENT LAWN OR PAVEMENT GRADE TO PREVENT IT FROM WASHING ONTO THE ADJACENT GRADES. PROVIDE POSITIVE DRAINAGE AWAY FROM ALL BUILDINGS AND AROUND OR AWAY FROM PLANTING BEDS TO PREVENT PONDING OF WATER. DO NOT RAISE BED GRADES, FINISHED GRADES, OR MULCH ABOVE FINISHED FLOOR ELEVATIONS.

15. IF THE QUALITY OR QUANTITY OF ON-SITE TOPSOIL STOCKPILED IS INSUFFICIENT TO COMPLETE WORK, PROVIDE IMPORTED TOPSOIL. OBTAIN RIGHTS AND PAY ALL COSTS FOR IMPORTED TOPSOIL MATERIAL.

16. PROPOSED TOPSOIL SHALL BE ACCEPTABLE TO THE LANDSCAPE ARCHITECT AND SOILS TESTING FIRM.

17. AFTER PLANTING, PRUNE BRANCHES OF DECIDUOUS STOCK TO BALANCE LOSS OF ROOTS IN SUCH A MANNER TO PRESERVE NATURAL CHARACTER APPROPRIATE TO PARTICULAR REQUIREMENTS OF THE PLANT. REMOVE BROKEN, DAMAGED AND UNSYMMETRICAL BRANCHES AND SUFFICIENT OTHER GROWTH TO INSURE HEALTHY AND SYMMETRICAL GROWTH OF NEW WOOD. DO NOT TRIM THE CENTRAL LEADER. APPLY ANTI-DESICCANT USING POWER SPRAY TO PROVIDE AN ADEQUATE FILM OVER TRUNKS, BRANCHES, STEMS, TWIGS AND FOLIAGE. IF DECIDUOUS TREES OR SHRUBS ARE MOVED IN FULL-LEAF, SPRAY WITH ANTI-DESICCANT AT NURSERY BEFORE MOVING AND AGAIN IN TWO WEEKS AFTER PLANTING.

18. STAKE ALL TREES.

19. ALL PLANT MATERIALS AND GROUNDCOVERS TO BE INSPECTED AND APPROVED BY THE LANDSCAPE ARCHITECT BEFORE FINAL ACCEPTANCE OF WORK.

20. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR ALL CLEAN-UP ASSOCIATED WITH HIS CONSTRUCTION PROCEDURES.

NO-MOW SEED MIX

SEED MIX SHALL BE "NO-MOW LAWN MIX" AS SUPPLIED BY PRAIRIE NURSERY, WESTFIELD, WISCONSIN (1-800-476-9453). MIX IS SIX LOW GROWING FINE FESCUE TURF GRASSES.

DETENTION BASIN & SWALE SEEDING

1. SEED MIX SHALL BE AS FOLLOWS:

SEEDING RATE: 10 PLS LB/ACRE NATIVE PRAIRIE SEED
15 LB/ACRE ANNUAL RYE NURSE CROP

SPECIES

FORBS
ASCLEPIAS INCARNATA
ASTER NOVAE-ANGLIAE
CACALIA ATRIPLICIFOIA
EUPATORIUM MACULATUM
EUPATORIUM PERFOLIATUM
HELENIUM AUTUMNALE
HELIOPSIS HELIANTHOIDES
IRIS VERSICOLOR
LOBELIA SIPHILITICA
MONARDA FISTULOSA
RATIBIDA PINNATA
RUDBECKIA HIRTA
OENOETHERA BIENNIS
SILPHIUM PERFOLIATUM
VERBENA HASTATA

LEGUMES
DESMODIUM CANADENSE

GRASSES, SEDGES & RUSHES
CAREX HYSTERICINA
CAREX STIPATA
CAREX VULPINOIDEA
ELYMUS CANADENSIS
ELYMUS VIRGINICUS
PANICUM VIRGATUM
SCIRPUS ATROVIRENS
SORGHASTRUM NUTANS
SPARTINA PECTINATA

SEED MIX SHALL BE COMPRISED OF 60% GRASSES AND 40% FORBS AND LEGUMES BY WEIGHT. PROVIDE SEED MIX FORMULA FROM SEED SUPPLIER FOR USE AS DETENTION BASIN AND SWALE SEEDING. PROVIDE SEEDS PER SQUARE FOOT, RATE OF PURE LIVE SEED, AND PERCENTAGE OF WEIGHT OF TOTAL MIX PER SPECIES. NO LESS THAN ELEVEN OF THE FORBS LISTED ABOVE AND NO LESS THAN SEVEN OF THE GRASSES, SEDGES AND RUSHES SHALL BE PROVIDED IN MIX. NO SINGLE SPECIES MAY ACCOUNT FOR MORE THAN 10% OF MIX BY WEIGHT. EACH SPECIES SHALL ACCOUNT FOR 2% MINIMUM OF MIX BY WEIGHT.

GRASS MIX AND SPECIFICATIONS

(FOR NEW LAWNS AND RESTORING DISTURBED UNDEVELOPED AREAS)

COMMERCIAL SITE MIX:

COMMON NAME	BOTANICAL NAME	PROPORTION BY WEIGHT	MINIMUM PURITY	MINIMUM GERMINATION	APPLICATION RATE
MANHATTAN III PERENNIAL RYEGRASS	LOLIUM PERENNE 'MANHATTAN III'	20%	98%	90%	300 LB/AC.
MILLENIUM TALL FESCUE	FESTUCA ARUNDINACEA 'MILLENIUM'	35%	98%	90%	300 LB/AC.
JAGUAR 3 TALL FESCUE	FESTUCA ARUNDINACEA 'JAGUAR 3'	35%	98%	85%	300 LB/AC.
KENTUCKY BLUEGRASS	POA PRATENSIS 'COMMON'	10%	95%	80%	300 LB/AC.

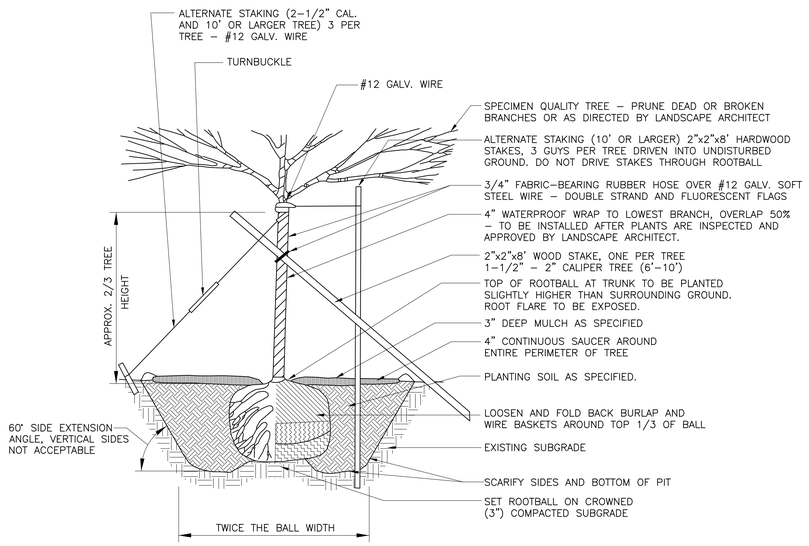
1. SEED MIX SHALL BE BLENDED IN THE FOLLOWING PROPORTIONS BY WEIGHT AND MEETING THE PERCENTAGES OF PURITY AND GERMINATION AS NOTED ABOVE.

2. FINISH GRADE ALL LAWNS AREAS WITH 6" TOPSOIL, REMOVING ANY FOREIGN MATERIAL LARGER THAN 1 1/2" FROM LAWN AREAS. PRIOR TO SEEDING, APPLY GROUND AGRICULTURAL LIMESTONE TO SOIL, IF NECESSARY, AT A RATE DETERMINED BY CONTRACTOR'S SOIL TESTS TO ADJUST pH OF SOIL AT NO LESS THAN 5.5. AFTER TOPSOIL AND, IF NECESSARY, LIMESTONE HAVE BEEN SPREAD, APPLY FERTILIZER AT A RATE OF FIVE POUNDS PER 1500 SQUARE FEET. FERTILIZER SHALL BE A COMMERCIAL FERTILIZER CONTAINING 10% NITROGEN, 6% PHOSPHORIC ACID, AND 4% POTASH.

3. SOW GRASS SEED EVENLY BY MECHANICAL SPREADER AT NOTED APPLICATION RATE. DO ALL SEEDING WHEN SOIL IS DRY AND WIND DOES NOT EXCEED 5 MPH VELOCITY. AFTER SEEDING, RAKE SURFACE OF SOIL TO INCORPORATE SEED INTO TOP 1/8" OF SOIL, AND ROLL LAWN. PLACE CLEAN STRAW MULCH WITHIN 48 HOURS AFTER SEEDING. MULCH AT A RATE OF ONE AND ONE HALF BALES PER 1,000 SQUARE FOOT.

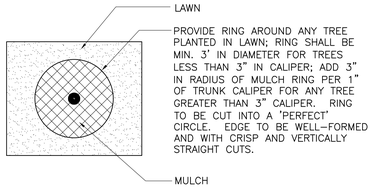
4. CONTRACTOR SHALL REMOVE EXISTING VEGETATION, ADD TOPSOIL AND SEED. RESEED AS NECESSARY UNTIL THE AREA IS 90% ESTABLISHED. CONTRACTOR IS RESPONSIBLE FOR WATERING UNTIL THE AREA IS 90% ESTABLISHED; OWNER TO PROVIDE WATER.

5. CONTRACTOR SHALL ERADICATE CRAB GRASS AND OTHER NOXIOUS WEEDS AFTER LAWN IS INSTALLED.



NOTES
EVERGREEN TREE PLANTING SIMILAR BUT TREE WRAP NOT REQUIRED. GUYING NOT REQUIRED FOR TREES UNDER 1½" CALIPER (6' HEIGHT) REMOVE GUYING, TREE WRAP, ETC. AFTER ONE GROWING SEASON

TREE PLANTING DETAIL



MULCH RING

LANDSCAPE DETAILS

NOTES

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SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244	- L-	501

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: AUTOCAD 2013 | REVISION - | VER 1
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L501

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GENERAL NOTES

Design Criteria

Applicable Building Code: OBC 2011

1. Design live loads

   A. Warehouse
      1.1. First Floor =125 psf

   B. Roof loads
      1.1. Minimum roof snow or live load = 30 psf
           dictated by Building Official
      1.2. Minimum roof live load = 30 psf
      1.3. Photovoltaic Panels (at high roof only) = 10 psf
      1.4. Ground snow load = 30 psf
           1.3.a. Snow exposure factor (ce) = 1.0
           1.3.b. Snow importance factor (Is) = 1.0
           1.3.c. Thermal Factor (Ct) = 1.0
      1.5. Flat roof snow load (Pf) = 25 psf
      1.6. Rain on snow = 0 psf
      1.7. Total design snow load = 25 psf + drifting
      1.8. Roof design is governed by the minimum roof live load or total design snow load + drifting whichever is more stringent.

2. Design wind loads

   A. Basic wind speed (3 second gust) = 90 mph
      2.1. Exposure = B
      2.2. Importance factor (Iw) = 1.0

   B. Main wind-primary frame

	Height	Interior Zone	End Zone
1.	0-30'	10.0 psf	12.8 psf

   C. Components and Cladding Wind Loads (PSF) for Walls

Effective Area (sq.ft.)	10	20	50	100	10	20	50	100
Height	Interior Zone				Exterior Zone			
0-30	15.8	15.1	14.3	13.6	19.5	18.2	16.5	15.1

   D. Components and cladding: use the most stringent wind load obtained from code, underwriter criteria (Factory Mutual, etc.), and the project specifications. Cladding manufacturer shall consider increased pressure coefficients at building perimeter, corners, eaves, and rakes. Loads noted in general notes are obtained from code.

   E. Roof uplift

      Typical bay gross 13.7 psf net 3.7 psf
      Perimeter bay (10.0' wide) gross 18.4 psf net 8.4 psf
      Corner bay (10.0' x 10.0' wide) gross 22.1 psf net 12.1 psf

3. Seismic

   S_S = 0.182

   S_1 = 0.051

   S_{DS} = 0.146

   S_{D1} = 0.058

Seismic importance factor (Ie)	1.00
Occupancy Category	II
Seismic design category	A
Seismic site class	C
Response Modification factor (R)	3.5
Seismic Response Coefficient (Cs)	0.01
Basic seismic force resistance system	Ordinary steel moment frames
Analysis procedures	Equivalent lateral force method
Design base shear (v)	East Addition 10 kips (ultimate)

4. Frost depth = 42"

General

1. The structure is designed to be self-supporting and stable after the building is fully completed. It is solely the contractor's responsibility to determine erection procedure and sequence and insure the safety of the construction personnel, public, building and its component parts, and adjacent buildings and properties. This includes the addition of whatever temporary or permanent shoring, bracing, needling, underpinning, or sheet piling, etc. that may be necessary to brace new construction, adjacent buildings, so that the structure is braced for wind, seismic, gravity, construction loads, etc. and that no horizontal or vertical settlement or any damage occurs to the adjacent existing structures. Temporary supports shall be maintained in place until permanent supports and/or shoring and bracing are installed. Design of these supports shall be by a registered engineer registered in the state where the project is located in the employ of the contractor.

2. Fall protection support from perimeter columns shall be provided in accordance with OSHA requirements as required. Such material shall remain the contractor's property after completion of the project.

3. It is the contractors responsibility to enforce all applicable safety codes and regulations during all phases of construction.

4. The contractor shall perform all construction for the project in a manner and sequence that are based on accepted industry standards that recognize the interaction of the components that comprise the structure, without causing distress, unanticipated movements or irregular load paths as a result of the construction means and methods employed.

5. Construction loads shall not exceed design live loads. The contractor shall be responsible for all design required to support construction equipment used in constructing this project. Shoring and re-shoring is the responsibility of the contractor.

6. Principal openings through the framing are shown on these drawings. The general contractor shall examine the structural and mechanical drawings for the required openings and shall verify size and location of all openings with the mechanical contractor. Providing all openings required by the mechanical, electrical, plumbing, or other trades shall be a part of the general contract, whether or not shown in the structural drawings. Any deviation from the openings shown on the structural drawings shall be brought to the engineer's attention for review.

7. All contractors are required to examine the drawings and specifications carefully, visit the site and fully inform themselves as to all existing conditions and limitations, prior to agreeing to perform the work. Failure to visit the site and familiarize themselves with the existing conditions and limitations will in no way relieve the contractor from furnishing any materials or performing any work in accordance with drawings and specifications without additional cost to the owner.

8. Details labeled "Typical Details" on drawings apply to situations occurring on the project that are the same or similar to those specifically detailed. Such details apply whether or not details are referenced at each location. Notify engineer of clarifications regarding applicability of "Typical Details".

9. Work these drawings with architectural, mechanical, and electrical drawings.

10. Do not scale drawings.

11. Any discrepancies between structural and architectural drawings shall be brought to the attention of the architect and structural engineer.

12. Should any of the general notes conflict with any details or instructions on plans, or in the specifications, the strictest provision shall govern.

13. Shop drawings and submittals:

    A. These drawings shall be checked and coordinated with other materials and contracts by the general contractor and shop drawings and submittals shall bear the contractor's review stamp with the checker's initials before being submitted to the architect for approval.

    B. When the fabricator has been authorized to use the architect and engineer's drawings as erection drawings, the fabricator must remove all title blocks, professional seals and any other references to the architect and engineer from that erection drawing. The fabricator's name and title shall be placed on the erection drawings.

    C. Where dimensions and elevations of existing construction could affect the new construction, it is the contractor's responsibility to make field measurements in time for their incorporation in the shop drawings.

Building Pad Preparation

1. All building pad preparation shall follow the recommendations of the geotechnical report (uno).

2. All trees, brush, roots, topsoil, rubble, organically contaminated or otherwise objectionable materials encountered are to be removed from structural areas of the site per the geotechnical report.

3. Foundation design is based upon the removal of approximately 5-8 feet of unsuitable week soils and the replacement of engineered fill placed directly on glacial till surface. See the geotechnical report for additional information. See note 5 & 6 under foundation section for additional footing bearing information

4. Areas to recieve slab on grade construction should be proof rolled and any weak materials removed and replaced with engineered fill as described in the geotechnical report.

5. Subgrade sectors which will exist in cut and those which are to support fill structures are to be proof rolled. Areas exhibiting instability are to be undercut and back filled on a lift-by-lift basis with each lift carefully compacted. See geotechnical report for additional information.

6. If unstable subgrade sectors cannot be stabilized by excavation and recompaction, then crushed stone or similar coarse aggregate materials shall be rolled into the subgrade until a firm subgrade reaction is achieved.

7. The geotechnical engineer shall determine on site or off site imported material that can be used for engineered fill. All fill material shall be approved by the geotechnical engineer.

8. The proposed engineered fill materials are to be placed in lifts not exceeding eight (8) inches in loose measured thickness. Each lift is to be compacted as follows:

   A. Slab on grade: Minimum of 98% maximum density by ASTM D698.
   B. Footings bearing on fill: A minimum of 98% maximum density by ASTM D698.

9. The earthwork program should be conducted under the supervision of a soils testing laboratory. The in-place densities achieved are to be verified by tests.

10. Contractor shall assume foundations will require undercut to (-6'-0") below finish floor and replaced with engineered fill or CLSM placed and compacted to bottom of footing elevations indicated on structural drawings. cost shall be included in his bid.

11. If undercutting to remove unsuitable materials (fill, etc) to reach glacial till as defined in the geotechnical report is required it shall be paid based on unit cost.

12. Where undercutting to less than (-6'-0") below finish floor is not required, the owner shall recieve a credit based on unit cost.

13. Volume of engineered fill/CLSM shall be determined by the depth of fill placed, multiplied by the footing width. Additional material beyond the width of the footing placed due to the lay back of the excavation or overcut, will not be considered in the volume calculation. Unit costs submitted in the contractor's proposal shall make consideration for the potential volume of overcut.

14. Payment for additional engineered fill or CLSM will be made on unit cost basis on the actual net volume in place and accepted. Adjustments will be made on net variation of total quantities based on estimated design dimensions.

15. Unit Prices: Unit prices for the engineered fill/CLSM per cubic yard, as set forth in contract conditions, will apply in event additions to or deductions from work are required and authorized by a written order from Architect to Contractor.

16. Unit price quoted shall include full compensation for labor, materials, tools, equipment and incidentals required for excavation, trimming, shoring, dewatering, reinforcement, concrete and other items for complete installation.

17. There will be no additional compensation for over excavation and engineered fill/CLSM or other costs due to unathorized overexcavating.

Foundation

1. The contractor shall familiarize himself with the survey and the geotechnical investigation report before starting construction. All foundation work shall be in accordance with the recommendations of the geotechnical report by Barr & Prevost dated 7/8/13 except where noted otherwise on drawings or specifications.

2. A soils testing laboratory shall be retained by the owner to provide construction review to insure conformance with the construction documents during the excavation, back fill, and foundation phases of the project.

3. The soils testing laboratory shall:

   - Discuss with the engineer the design intent of the construction documents and the testing procedures used to ensure conformance with the construction documents before construction begins.
   - Inform the engineer of any variance in these procedures.

4. It shall be the responsibility of the soils testing laboratory to:

   - Determine topsoil and excavation stripping depth;
   - Inspect all subsoil exposed during stripping, site grading, and excavation operations;
   - Approve fill materials, perform density tests of fills to insure placement per specification requirements;
   - Inspect foundation bearing surfaces.

5. Foundation design is based on 3,000 psf bearing pressure on existing undisturbed glacial till or compacted engineered fill placed directly on glacial till surface.

6. Foundations directly adjacent to the existing structure shall bear so that the bottom of new footing matches bottom of existing footing. New footings shall not undermine existing foundations and vice versa.

7. Top of footing elevations, footing steps and thickness of footings are shown on the drawings and are based upon the information from the geotechnical report and the civil drawings available at the time of design. The top and bottom of footing may vary depending on the conditions encountered at the site. Frost depth shall be maintained and coordinated with final grading and location of footing steps. If proper foundation bearing is found to be deeper than that shown on the drawings then foundations shall be thickened maintaining the top of footing elevation to assure proper foundation bearing. The contractor shall submit unit prices for such work and shall qualify the extent of work in the base bid. If top of footing elevations need to vary for final site conditions then the general contractor shall coordinate the effort of other trades.

8. Step footings, where required, at a ratio of one (1) vertical to two (2) horizontal with a maximum vertical step of 2'-0" unless noted otherwise.

9. Inundation and long term exposure of bearing surfaces, which will result in deterioration of bearing formations, shall be prevented. Footings shall be placed immediately following footing excavations and bearing surface inspection.

10. All fill materials shall be free of organic contaminations and other deleterious matter.

11. For back fill against footings place in 8" thick layers, with each lift compacted at near optimum moisture content, until a minimum in place density of 95% of the maximum density as determined by ASTM D698 is achieved.

12. All soil surrounding and under footings shall be protected from frost action and freezing during the course of construction.

13. Notify structural engineer of any unusual soil conditions that are in variance with the geotechnical report.

Controlled Low-Strength Material (CLSM)

1. Self-compacting, flowable concrete material produced from the following:

   A. Portland cement: ASTM C 150, Type I .
   B. Flyash: ASTM C618, class C or F.
   C. Normal-weight aggregate: ASTM C 33, fine aggregate.
   D. Water: potable.

2. Unconfined compressive strength of normal-weight, excavatable CLSM shall be 50 psi to 100 psi.

3. Flowability of CLSM shall be 8 inches minimum in accordance with ASTM D 6103 and shall have no noticeable segregation.

4. Where CLSM is intended to be pumped into place, proportion mix as such to prevent segregation or excessive bleeding.

5. CLSM mix shall be proportioned by the ready mixed concrete supplier on the basis of field experience and/or laboratory trial mixtures to produce a cohesive and non-segregating mixture meeting the specified properties. Proposed mix design shall be submitted for approval, including historic or trial mixture test data.

6. Place CLSM in lifts allowing sufficient time between lifts for previously placed CLSM to set up. Limit lift height to prevent excessive lateral pressure on existing walls, structures, or formwork.

7. CLSM and surrounding soil shall be protected from frost-action and freezing during the course of construction, including excavations to receive CLSM.

8. CLSM and excavations to receive CLSM shall be protected from rain water. Standing water shall be removed from excavations prior to placement. of CLSM. In areas of excessive groundwater. CLSM mix shall be modified accordingly to account for additional water infiltration during curing period.

9. Foundations and other structures shall not be installed on CLSM for a minimum of 24 hours after placement of CLSM. An independent testing agency shall verify bearing capacity of CLSM prior to placement of foundations and other structures by either penetration resistance testing in accordance with ASTM C403 or Ball drop method of testing in accordance with ASTM D6024.

10. An independent testing laboratory shall be retained to prepare and test at least 3 cylinders of CLSM for each day's pour for compressive strength in accordance with ASTM D 4832. Sampling methods shall be in accordance with ASTM D 5971.

Underpinning

1. It is solely the contractor's responsibility to determine underpinning procedures and sequence and insure the safety of the construction personnel, building and its component parts during underpinning. This includes the addition of whatever shoring, temporary bracing, piling or soil improvement techniques which may be employed.

2. Underpinning procedures and sequence shall be developed and employed so as to not compromise the existing structure, nor cause distress, unanticipated movements or irregular load paths.

3. The structural drawings shown here are intended to show the general extent of the underpinning only. The drawings do not show all framing members, incidental framing, walls, quantities, sizes, obstructions, etc., and are not intended to be used by the contractor to define the complete scope of underpinning where footing sizes, etc., are shown. This information is based on the original construction documents and may not represent the existing as-built conditions. Field verify all existing conditions.

4. Conform to all applicable codes and standards for the underpinning of structures, safety of adjacent structures and stability of structures during underpinning procedures.

5. The system selected shall comply with the codes and specifications referenced in related sections of the contract document or within the guidelines of accepted applicable industry standards for materials, procedures, testing and inspection.

6. A soils testing lab shall be retained by the contractor to evaluate the existing geotechnical conditions and to establish design parameters for the underpinning systems, procedures and sequences to be employed.

7. The geotechnical report prepared by the contractor's engineer shall be prepared under the supervision of an engineer registered in the state the project is located in, stamped, signed and submitted to the architect for review.

8. The contractor's engineer will be the engineer of record for the underpinning design, systems, and procedures.

9. Examples of acceptable underpinning systems are concrete fill with or without shoring of the existing structure, micro piling, auger cast piling, helical earth anchors and soil grouting. The system selected shall be used only with the consent of the contractor's geotechnical engineer of record and employed within his recommendations and guidelines.

10. The contractor's proposal shall clearly state the system to be employed, procedures to be used, required submittals and field testing and inspection to be provided.

Concrete

1. All concrete construction shall conform to ACI 301, "Specifications for Structural Concrete" and ACI 302, 305 and 306 unless noted otherwise for the year referenced in the applicable building code.

2. All detailing, fabrication and placing of reinforcing bars, unless otherwise noted, shall conform to ACI 318, "Building Code Requirements for Structural Concrete" ACI 117 as referenced in the applicable building code, and the latest ACI detailing manual.

3. Concrete Types Schedule

Type of Concrete	Minimum Cementitious Content lb./cu.yd.	Maximum Water Cement Ratio	Specified 28-day Compressive Strength psi	Specified Slump Range for Placement (with W.R.) inches	Specified Air Content Range % by volume	Maximum Size Aggregate inches
• Spread Footings	470	0.60	3000	5	0-3 Entrapped	1 1/2
• Interior Concrete	564	0.48	4000	3-5	0-3 Entrapped	1
• Concrete Permanently • Exposed to the Weather or Vulnerable to De-icers or Freeze Thaw Cycles Exterior Slabs	564	0.45	4500	5-6	6 ±1.5%	1

Notes:
A. All cement shall be Type I or Type III Portland Cement per ASTM C150. Types IA and IP are not acceptable. Use one brand of cement throughout the project.
B. Minimum cementitious content shall consist of 100% cement or a combination of cement and flyash per Note C, or a combination of cement and ground granulated blast furnace slag (GGBFS) per Note D. Flyash shall not be used in combination with GGBFS as a substitute for cement.
C. Flyash is permitted and shall conform to ASTM C618 Type C or F, but shall not exceed 20% of cementitious content by weight indicated above on a substitution basis and shall be included in the water-to-cement ratio. If flyash is used, the mix design submittals shall have tests using the same amount of flyash. The contractor's schedule shall account for the use of flyash.
D. Ground granulated blast furnace slag (GGBFS) is permitted and shall conform to ASTM C989, but shall not exceed 15% of cementitious content by weight indicated above on a substitution basis and shall be included in the water-to-cement ratio. If GGBFS is used, the mix design submittals shall have tests using the same amount of GGBFS. The contractor's schedule shall account for the use of GGBFS.
E. Concrete used for floors shall have 1800 psi, 3 day strength. Mixes to be pumped shall be so identified on the mix design submittal. All pumped mixes shall have a mid-range or high-range water reducer.
F. All admixtures other than superplasticizers shall be added at the batch plant. Superplasticizers, designed for addition to the mix at the plant, may be added at the batch plant with verifications from the structural engineer and verifications that the water-to-cement ratio has not been exceeded. Superplasticizers added at the site shall be sent in pre-measured containers from the batch plant.
G. All concrete used for cast-in-place concrete slabs shall contain the specified water reducing or water reducing/retarding admixture. All concrete slabs, placed at air temperature below 50°F shall contain the specified non-corrosive, non-chloride accelerator. All concrete placed at air temperature above 80° shall contain specified water-reducing/retarder admixture. All concrete required to be air-entrained shall contain an approved air-entraining admixture. All pumped concrete shall contain the specified high-range water-reducing admixture. Concrete with a water-cement ratio above 0.40 to 0.60 shall contain the specified water reducer.
H. All concrete requiring a high slump for placement (i.e. pumping, drilled piers, etc.) shall contain mid-range and high-range superplasticizer. Increased slump may not be achieved by exceeding the specified maximum water cement ratio. Maximum slump is 8 inches with use of water reducing admixture (ASTM C494).
I. Calcium chloride shall not be permitted nor shall any admixture containing calcium chloride be permitted.

4. All pipe sleeve openings through concrete slabs shall be formed with standard steel pipe.

5. No electrical conduit shall be placed above the welded wire fabric or top reinforcing of slabs.

6. All aluminum in contact with concrete or dissimilar metals shall be coated with two coats coal tar epoxy, approved by the architect, unless otherwise noted.

7. Concrete shall be discharged at the site within 1 1/2 hours after water has been added to the cement and aggregates. Addition of water to the mix at the project site will not be permitted. All water must be added at the batch plant. Slump may be adjusted only through the use of additional water reducing admixture or high range water reducing admixture.

8. All concrete shall be placed without horizontal construction joints, except where specifically noted. Horizontal reinforcement shall be continuous through vertical construction joints.

9. Construction joint locations other than shown on the drawings are permitted subject to prior approval of the engineer. Expansion joint and control joint locations are mandatory as shown. Contractor shall submit drawings showing intended placing sequences and location of construction joints to the engineer for approval. At poured in place walls, construction joints shall be located so as to provide a 60'-0" maximum horizontal length of concrete placement in any direction.

10. All exposed edges of concrete members shall be chamfered 3/4" unless shown otherwise on architectural drawings.

11. See architectural drawings for concrete finishes, masonry anchors, and for miscellaneous embedded plates, bolts, anchors, angles, etc.

12. The placement of sleeves, outlet boxes, box-outs, anchors, etc., for the mechanical, electrical and plumbing trades is the responsibility of the trade involved; however, any box-outs not covered by typical details in the structural drawings shall be submitted for approval.

13. Reinforcing steel shop drawings shall indicate the sequence in which layers of crossing reinforcing should be placed in order to produce the correct outermost layers as indicated on the drawings.

14. Reinforcing bars shall conform to ASTM A615, grade 60. No tack welding of reinforcing in the field will be permitted.

15. Reinforcing bars for welded applications shall conform with ASTM A706, 60 ksi yield strength.

16. Welded wire fabric reinforcing shall conform to ASTM A185 and be furnished in flat sheets and installed on chairs.

17. Reinforcing bar sizes #3 through #5 may be bent cold the first time, provided reinforcing bar temperature is above 32°. For other bar sizes, preheat reinforcing bars before bending. See procedures as outlined in ACI 301 referenced in applicable building code.

18. Provide dovetail anchors at 2'-0" o.c. for all masonry faced walls and provide at columns where walls abut columns.

19. Wire bar supports shall be furnished for all reinforcing within slabs, inclusive of wire welded fabric. Bottom bars in slabs on grade may be supported by other suitable supports. Reinforcing shall be properly positioned prior to concrete placement and may not be re-positioned once concrete operations have begun. Wire bar and other types of supports shall be in accordance with the concrete reinforcing steel institute manual of standard practice.

20. Reinforcement shall be continuous through all construction joints unless otherwise noted on drawings.

21. All hooks shown on drawings shall be standard hooks unless otherwise noted.

22. Where continuous bars are called for, they shall run continuously around corners and be lapped at necessary splices, or hooked at discontinuous ends. Lap lengths shall be as given in the splice and development table. Lap beam top bars at mid-span and beam bottom bars at supports, unless otherwise noted.

23. Provide additional reinforcing at the sides and corners of all openings in concrete in accordance with the typical details. Minimum additional requirements are as follows:

    (2)-#5 top and bottom in slabs
    (2)-#5 each face in walls
    (2)-#5 x 4'-0" long diagonally each corner of opening

24. Extend bars a minimum of 2'-0" beyond openings, hook where extension is not possible.

25. In reinforced concrete walls and trench footings provide corner dowels of same size and spacing as horizontal reinforcing. Dowels shall have a class "b" lap with horizontal reinforcing in each direction.

Minimum Lap Splice and Anchorage Dimension Table

1. 3000 psi normal weight concrete, Fy=grade 60,non-coated bars

Top Bars			Other Bars		
Bar size	Lap	Anchorage	Bar Size	Lap	Anchorage
#3	28"	22"	#3	22"	17"
#4	37"	29"	#4	29"	22"
#5	47"	36"	#5	36"	28"
#6	56"	43"	#6	43"	33"
#7	81"	63"	#7	63"	48"
#8	93"	72"	#8	72"	55"

2. 4000 psi normal weight concrete, Fy=grade 60, non-coated bars

Top Bars			Other Bars		
Bar Size	Lap	Anchorage	Bar Size	Lap	Anchorage
#4	33"	25"	#4	25"	19"
#5	41"	31"	#5	31"	24"
#6	49"	37"	#6	37"	29"
#7	71"	54"	#7	54"	42"
#8	81"	62"	#8	62"	48"

3. When lapping two different size bars, use the lap dimension of the smaller bar or the anchorage dimension of the larger bar. Use whichever dimension is larger.

Minimum Concrete Cover for Reinforcing

1. Concrete reinforcing shall be placed per the tolerances of ACI 117 and ACI 318 as referenced in the applicable building code regarding minimum cover.

2.

Location		Minimum Cover
Footings and grade beams cast against and permanently exposed to earth		3"
Slabs on grade (W.W.F.)		1/3 slab thickness from top of slab
Exterior slabs and stairs:	#5 and smaller	1 1/2"
	#6 and larger	2"
Walls interior face:		3/4"
Walls exterior face:	#5 and smaller	1 1/2"
	#6 and larger	2"
Columns and piers (vert. reinf.)		2"
Column and pier ties		1 1/2"

3. Maximum deviation from the above requirements shall be ±1/4 inch for sections 10 inches thick or less; and ±1/2 inch for sections over 10 inches thick. See ACI 318, listing in the applicable building code reference standards, section 7.7 for conditions not listed.

Masonry

1. All masonry shall conform to Building Code Requirements for Masonry Structures" (ACI 530/ASCE 5/TMS 402) and "Specifications for Masonry Structures" (ACI 530.1/ASCE 6/TMS 602) as referenced in the applicable building code noted.

2. All brick and concrete masonry and construction shall comply with the recommendations of Brick Institute of America (BIA) and the National Concrete Masonry Association (NCMA) and minimum requirements established by the applicable building code.

3. Grout to fill cores shall be ASTM C476, coarse grout (3/8" maximum aggregate) with a minimum compressive strength of 2500 psi in 28 days.

4. Concrete masonry units (CMU) shall be medium weight units conforming to ASTM C90.

   ASTM C270 Type "S" mortar with a minimum compressive strength of 1800 psi shall be used for all masonry. Masonry shall have a minimum comprressive strength (f'm)=1500 psi unless noted otherwise.

5. When structural reinforcement is incorporated in masonry cement mortar, the maximum air content shall be 18%.

6. Reinforcing bars shall conform to ASTM A615, grade 60.

7. Deformed bar anchors (DBA) shall conform to ASTM A496, 70 ksi yield strength.

8. All masonry units shall have galvanized horizontal joint reinforcement as follows:
   A. 9 Ga. side and cross rods (ladder type) spaced 16" o.c. vertically

9. Lap joint reinforcing as shown in the table below.

Wire Joint Reinforcing	Splice Length
W1.1 (11 ga.)	6"
W1.7 (9 ga.)	7"
W2.1 (8 ga.)	8"
W2.8 (3/16 wire)	9"
W4.9 (1/4 wire)	12"

10. All cores with reinforcement shall be filled solid with grout. All grout shall be consolidated in place by vibration to insure complete filling of cells.

11. Place reinforcing bars before grouting. Place grouts in lifts not exceeding 5 feet. Consolidate each lift by mechanical vibration. The next lift of the pour may be made after the initial water loss and reconsolidation of the prior lift, while it is still plastic.

12. Properly secure reinforcing bars to maintain the positions indicated on the drawings. Bars to be located in center of cells unless otherwise noted.

13. Mortar protrusions, extending into cells or cavities to be reinforced and filled, shall be removed.

14. Lay masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course of footing and in all courses of column and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete grout.

15. All corners to be tied by masonry bond.

16. Grout cores solid a minimum of one course below any change in wall thickness.

17. All masonry walls shall have vertical control joints at a maximum spacing of 25'. Coordinate with locations indicated on architectural drawings. Control joints shall extend through the entire wall thickness, except at continuous bond beams at the roof line the masonry shall be scored only.

18. All CMU shall be temporarily braced during construction for the governing building code for lateral design loads until permanent restraints have been installed. Temporary bracing is the sole responsibility of the contractor. The contractor is responsible for all costs associated with repairs resulting from improper or insufficient bracing.

19. The collar joint in multi-wythe walls below grade shall be fully grouted as the wall is constructed.

20. Miscellaneous Steel Lintel Schedule

    A. For masonry walls 8" or thicker or masonry veneer and steel studs:
       - For openings up to 4'-0" use L3-1/2x3-1/2x5/16.
       - For openings from 4'-0" to 5'-0" use L4x3-1/2x5/16 LLV.
       - For openings from 5'-0" to 6'-0" use L5x3-1/2x5/16 LLV.
       - For openings from 6'-0" to 7'-0" use L6x3-1/2x5/16 LLV.
       - For openings from 7'-0" to 10'-0" use W8x21+5/16" bottom plate.

    B. Use one angle for each 4" wythe of masonry.

    C. All lintels shall have a bearing at each end of 1 inch per foot of opening with a minimum of 6".

    D. All lintels shall bear on 16" solid masonry extending 16" beyond end of lintel.

    E. All lintels on the building exterior shall be galvanized.

21. Quality Assurance

    An independent testing laboratory shall be retained to periodically inspect and perform material testing of masonry materials and construction to conform with the building code and the following:

    Minimum Tests and Submittals

    Certificates for materials used in masonry construction indicating compliance with the contract documents.

    Verification of specified masonry compressive strength (f'm) in accordance with Specification Article 1.4b "Specification for Masonry Structures" (ACI 530 / ASCE 6 / TMS 602) prior to construction, except where specifically exempted by the building code requirements for masonry structures (ACI 530 / ASCE 5 / TMS 402).

    See Special Inspection section for Level 1, required inspections.

Steel Joists

1. Steel joist design, fabrication and erection shall conform to the latest specifications and code of standard practice of the Steel Joist Institute. The requirements of OSHA section 1926.757, or as shown on the drawings. All joist girders to conform to latest edition of AISC and SJI specifications. Joist girder supplier shall supply a copy of all girder calculations and section properties with shop drawings. Joists shown as "special" joists on the drawings shall be designed for the load diagrams shown.

2. All steel joists shall receive one standard shop coat of white or light gray oxide paint unless noted otherwise on drawings. Asphaltic paints are not acceptable.

3. All steel joists shall be designed to resist net uplift forces shown at beginning of general notes.

4. Ends of every joist which rests on steel supports shall be welded per SJI requirements.

5. General contractor shall verify all structural steel joist locations, mechanical unit weights and opening sizes and locations with mechanical contractor and vendor's drawings for actual mechanical units purchased.

6. No light gage framing, mechanical, electrical, or other equipment shall be suspended from or attached to any interior bridging.

7. Field modifications to joists and joist girders is prohibited without the written consent from the joist manufacturer. The contractor shall copy the architect and engineer on all correspondence.

Structural Steel

1. DOMESTIC STEEL USE REQUIREMENTS AS SPECIFIED IN SECTION 153.011 OF THE OHIO REVISED CODE APPLY TO THE PROJECT. COPIES OF SECTION 153.011 OF THE OHIO REVISED CODE CAN BE OBTAINED FROM THE 'OFFICE OF THE OHIO FACILITIES CONSTRUCTION COMMISSION.'

2. Detailing, fabrication, and erection shall conform to the latest AISC specifications as referenced in the applicable building code.

   Structural Steel: (W shapes, Plate Girders) ASTM A992 (Fy=50ksi)
   (M, S, C shapes) ASTM A36 uno
   (Plate, Angles) ASTM A36 uno

   HSS: (tubular shapes) ASTM A500 grade B (Fy=46ksi)
   (round shapes) ASTM A500 grade B (Fy=42ksi)

   Pipe Sections: ASTM A53, type E or S, grade B (Fy=35ksi)

   All anchor rods shall be ASTM F1554 grade 36, uno.

   All structural steel not to receive spray fire-proofing shall be primed white or light gray; asphaltic paints are not acceptable.

   All column base plates shall have a minimum of four anchor rods.

3. Connections shown on these drawings are generally schematic. They are intended to define the spatial relationship of the framed members and show a feasible method of making the connection. Any connection that is not shown or is not completely detailed on the structural drawings shall be designed by a registered professional engineer, retained by the fabricator. Details and connections may be designed to conform to AISC Steel Construction Manual thirteenth edition. Completely detailed means the following information is shown on the shop detail drawings:

   A. All plate dimensions and grade.
   B. All weld sizes, lengths, pitches and returns.
   C. All hole sizes and spacings.
   D. Number and type of bolts: where bolts are shown but no number is given, the connection has not been completely detailed.
   E. Where partial information is given, it shall be the minimum requirement for connection.
   F. Method of design.

4. Details and connections completely detailed in the contract drawings may not be altered without written approval by the engineer. Where approved, altered connections shall be completely detailed by the fabricator's engineer clearly on the shop drawings.

5. Alterations of schematic connection details may impact architectural concept and shall not be made without prior written approval of the engineer.

6. Minimum connection plate thickness shall be 3/8", unless otherwise indicated in the contract drawings.

7. For W, M, S, and C shapes, unless otherwise noted, beam to beam connections and beam to column connections shall be double angle (t=5/16") framed beam connections shop welded per Table 10, AISC manual (thirteenth edition) for using weld A, and using 3/4" diameter ASTM 325-n bolts in standard or horizontally slotted holes for the field connection.

   The minimum length of connection angles shall be equal to one-half the depth of the member to be supported.

8. Unless otherwise noted, all connections at HSS sections shall be designed and detailed in accordance with the AISC "Hollow Structural Sections Connection Manual," first edition.

9. Where the reactions of uniformly loaded beams and girders are not shown on the drawings, the connections shall be designed to support the maximum allowable uniform load as indicated in the load tables of the "AISC Manual of Steel Construction" for the given beam size and span. For beams and girders not uniformly loaded see plan for reaction; if no reaction is shown, contact Engineer of Record for reactions.

10. Slip critical bolts (friction bolts) shall be used at the following locations:

    A. Moment connections
    B. Column splices
    C. Cross bracing connections

11. Slip critical bolts shall be tightened per AISC specifications.

12. All other bolts not designated as slip critical bolts shall be considered bearing bolts. Do not over tighten bearing bolts, especially for beams to support concrete slabs. Tighten bearing bolts to a snug condition only, per AISC specifications.

13. Twist-off type tension control bolts are not permitted to be used as bearing bolts.

14. All moment plate connections shall be designed for the full moment capacity (as tabulated by the Steel Construction Manual, Part 12, thirteenth edition) of the beam, unless noted otherwise. Local stresses at bolt holes do not govern. All connections to tubes and pipes shall use thru plates unless noted otherwise.

15. All welding shall be done using E-70xx electrodes in accordance with the latest AWS specifications.

16. Work these drawings with architectural drawings for nailer holes and architectural clearances.

17. General contractor shall verify all structural beam locations, mechanical unit weights and opening sizes and locations with mechanical contractor and vendor's drawings for actual mechanical unit purchased.

18. Splicing of structural members where not detailed on the drawings is prohibited without prior approval of the structural engineer.

19. Cuts, holes, coping, etc. required for work of other trades shall be shown on the shop drawings and made in the shop. Cuts or burning of holes in structural steel members in the field will not be permitted, unless specifically approved in each case by the structural engineer.

20. All HSS shapes (round, square, rectangular, etc.) are to have a 1/4" cap plate at all exposed ends. Cap plates to be seal welded all around, uno. Provide 3/8"Ø weep holes in the center of the plate.

21. All weld sizes not shown in details herein shall be the minimum required size based on thickness of thicker part as per AISC thirteenth edition, tables J2.3 & J2.4. exception: at member splices welds or bolts shall develop full strength of the member or components being connected.

22. All around welds indicated herein shall be discontinuous at the flange tips of open sections.

23. All structural steel, including base plates and tops of anchor bolts, to be exposed to soil are to be coated with an approved coal tar epoxy, 16 mils minimum thickness.

24. Any alteration made by the detailer on the structural steel shop drawings to schematic or completely detailed connections shown on the contract drawings must be clearly identified by clouding or by direct note on the shop drawing by the detailer prior to submission to the engineer.

25. Any member sizes shown on the plans, and currently listed in the AISC Steel Construction Manual, latest edition, which are not currently available must be brought to the architect and structural engineers attention prior to award of steel contract. No claim for additional cost will be accepted after the award, for member/built up member substitutions for these sizes.

ABBREVIATIONS

A.B. --------	ANCHOR BOLTS
ADD'L --------	ADDITIONAL
AFF --------	ABOVE FINISH FLOOR
ARCH. --------	ARCHITECTURAL
B.PL. --------	BASE PLATE
BLDG. --------	BUILDING
BLK. --------	BLOCK
BM. --------	BEAM
BOT. --------	BOTTOM
BRDG. --------	BRIDGING
BRG. --------	BEARING
BTJ. --------	BOLTED TIE JOIST
CANT'L. --------	CANTILEVER
C.I.P. --------	CAST-IN-PLACE
C.J. --------	CONTROL JOINT
CL. --------	CENTERLINE
CLR. --------	CLEAR
CMU --------	CONCRETE MASONRY UNIT
COL. --------	COLUMN
CONC. --------	CONCRETE
CONSTR.-----	CONSTRUCTION
CONT. --------	CONTINUOUS
C.Y. --------	CUBIC YARD
DET. --------	DETAIL
DIAG. --------	DIAGONAL
Ø / DIA. -------	DIAMETER
DJ --------	DOUBLE JOIST
DK. --------	DECK
D.L. --------	DEAD LOAD
DWG. --------	DRAWING
DWLS. --------	DOWELS
EA. --------	EACH
E.F. --------	EACH FACE
E.J. --------	EXPANSION JOINT
EL. --------	ELEVATION
ELEV. --------	ELEVATOR
E.S. --------	EACH SIDE
EQ. --------	EQUAL
EQUIP. --------	EQUIPMENT
E.W. --------	EACH WAY
EXP. --------	EXPANSION
(E) / EXIST.---	EXISTING
EXT. --------	EXTERIOR
F/BLDG.-------	FACE OF BUILDING
F/CONC--------	FACE OF CONCRETE
F.D. --------	FLOOR DRAIN
FIN. --------	FINISH
FLG. --------	FLANGE
FLR. --------	FLOOR
F.S. --------	FAR SIDE OR FOOTING STEP
FT. --------	FEET
FTG. --------	FOOTING
GA. --------	GAUGE
G.B. --------	GRADE BEAM
G.C. --------	GENERAL CONTRACTOR
GALV. --------	GALVANIZED
HD'D --------	HEADED
HORIZ. --------	HORIZONTAL
I.F. --------	INSIDE FACE
INT. --------	INTERIOR
J/B --------	JOIST BEARING
JST. --------	JOIST
JT. --------	JOINT
k --------	KIP
LG. --------	LONG
L.L. --------	LIVE LOAD
(LLH) --------	LONG LEG HORIZONTAL

Structural Steel (cont)

26. Filler beams shall be spaced equally between established dimensions, unless noted otherwise.

27. All 4x4x5/16 angles required for roof units and roof openings over 12"x12" to be supplied by structural steel fabricator and be coordinated by general contractor with the joist fabricator, mechanical drawings and mechanical equipment supplier.

28. All structural steel beams and columns adjacent to masonry shall have adjustable masonry anchors at 2'-0" o.c.

29. Hot dip galvanize per ASTM AI23 after fabrication the following structural steel members:

    A. Shelf angles supporting masonry
    B. Lintels supporting single or multiple wythe exterior masonry walls.
    C. Items identified on the architectural and structural drawings.

30. The non-composite steel decks are part of the stability system for a completed structure. The contractor shall provide temporary erection bracing to maintain structural steel in proper position until permanently secured. Remove temporary bracing and their connections only after erection of permanent members is complete and non-composite steel decks are properly fastened. A completed structure has its boundary's defined by the building exterior and/or interior expansion joints where they exist between building segments.

Metal Form Deck

1. All metal floor decking shall comply with the provisions of the latest edition of the Steel Deck Institute "Design Manual for Composite Decks, Form Decks, Roof Decks and Cellular Metal Floor Deck with Electrical Distribution."

2. Metal form deck shall be black high strength steel. Deck shall be puddle welded at all steel supports as follows:

    A. Provide puddle welds at all steel supports using 16 ga. welding washers with 3/8"Ø hole for metal form deck 24 ga. and thinner. Provide 5/8"Ø puddle welds for metal form deck 22 ga. and thicker.
        a. All puddle welds shall be spaced @ 10" o.c. max. (30/4 pattern).
        b. Weld at all laps or edges of panels.
        c. Welds to be made following AWS D1.3 specifications by qualified welding operators.
        d. All deck end laps shall be a minimum of 2".
    B. For metal form deck supported by cold form framing attach with #10 TEK screws at 6" O.C.

3. Provide metal pour stop at all edges of concrete construction (including floor openings) except where edge angle is detailed. Pour stop shall be of gage as recommended by manufacturer for specific conditions with a minimum of 20 ga. Attach to deck with #10 TEK screws @ 2'-0" o.c. where not continuously supported.

Metal Roof Decking

1. All metal roof decking shall comply with the provisions of the steel deck institute "Design Manual for Composite Decks, Form Decks, Roof Decks and Cellular Metal Floor Deck with Electrical Distribution" and underwriter requirements (Factory Mutual, etc.).

2. Deck and accessories shall be cleaned and given a phosphate treatment and a shop prime coat of white or light gray rust inhibitive paint.

3. Deck and accessories that are to receive spray fireproofing shall be galvanized.

4. No light gage framing, mechanical, electrical or other equipment shall be suspended from or attached to any metal roof deck.

5. See plans for deck attachment.

Cold-Formed Metal Framing

1. The design, installation and construction of cold-formed carbon or low-alloy steel, structural and nonstructural steel framing, shall be in accordance with "The Standard for Cold-Formed Steel Framing-General Provisions, American Iron and Steel Institute" (AISI-general) and AISI-NASPEC.

2. Design of metal stud framing shown is based on CSJ type (1 5/8" flange) studs with Dietrich Industries section properties and allowable resisting moment capacity. Alternate manufacturer's framing size shall meet the minimum section properties and allowable resisting moment capacity of the members indicated on the design drawings. Additional costs for an increase in stud size or gage is prohibited.

3. All framing members 16 ga. and heavier shall be formed from steel with a minimum yield strength of 50 ksi. All other framing shall be formed from steel with a minimum yield strength of 33 ksi.

4. All framing shall be galvanized.

5. All connections shall be screwed or welded. Powder driven fasteners are not acceptable for any structural applications.

6. Member web openings shall be positioned a minimum of 10" from connections.

7. All welds shall be touched up with zinc-rich paint.

8. Contractor shall submit fabrication and erection shop drawings to the engineer for review for all cold formed metal framing components and connections indicated on the contract drawings. Any deviation from this design shall be approved by the architect/engineer and additional review costs shall be the responsibility of the contractor. For all framing components and connections not specifically detailed on the structural drawings including trusses, headers, jambs, etc. submit shop drawings and calculations stamped by an engineer registered in the state the project is located.

9. At wall locations where multiple studs are required to support vertical loads, a continuous load path shall be provided to support those loads through the structure inclusive of the floor system to the foundations. This may be accomplished through the use of beams, headers, blocking, stiffeners or other appropriate means based on location and detailing considerations.

10. OSB or plywood sheathing shall be attached to light gage framing with #10 TEK screws at 8" o.c. (uno). The screws shall be of sufficient length to penetrate through the cold-formed steel framing member by at least three exposed threads. All screws shall be hot dipped galvanized per ASTM A153 when sheathing is pressure treated or fire retardant treated.

11. All sheathing shall be APA rated sheathing.

Special Inspections

1. Special inspection is to be provided in addition to the inspections conducted by the department of building safety and shall not be construed to relieve the owner or his authorized agent from requesting the periodic and called inspections required by the applicable building code. Special inspection shall be paid by the owner.

Required Special Inspections

1. In addition to the regular inspections, the following items will also require special inspection in accordance with the applicable building code.

    A. Soils compliance prior to foundation inspection (compacting fill, special grading)
    B. Structural concrete over 2,500 psi
    C. Structural steel fabrication
    D. Field welding
    E. High strength bolts

2. Special inspector shall meet the qualifications as stated in the applicable building code and shall perform the duties and responsibilities as outlined in the applicable building code.

3. Special inspection shall meet the requirements of the applicable building code. Special inspector(s) shall be hired by the owner to perform the required special inspections. The names of persons or firms who are to perform the special inspections shall be forwarded to the building official for approval. The special inspector(s) shall complete and submit all forms required by the building department having jurisdiction.

4. The special inspector(s) shall:

    A. Observe the work assigned for conformance to the approved drawing and specifications.
    B. Furnish inspection reports to the engineer of record and building department. Discrepancies shall be brought to the immediate attention of the contractor for correction, then, if not corrected to the engineer and the building department.
    C. Submit to the engineer of record and the building department a signed final report stating that the work was in conformance with the approved drawings and specifications and the applicable workmanship provisions of the IBC.

5. Special Inspection Notes:

    A. Continuous special inspection is always required during the performance of the work unless specifically noted below.
    B. Where fabrication of structural load-bearing members and assemblies is being performed on the premises of a fabricator's shop, continuous special inspection is required during the performance of the work except as allowed in the applicable building code and unless specifically noted below.
    C. It is the responsibility of the contractor to provide the special inspector(s) with advance notice, no less than one working day, of the initiation of any work required to have special inspections. All work performed without required special inspection will be subject to removal.

6. Types of work requiring special inspection are:

    A. Structural steel elements of buildings and structures as required by the applicable building code and Table 1, except as allowed in the applicable building code:
        6.1. Structural steel welding in compliance with AWS D1.1:
            6.1.a. During welding of complete and partial penetration groove welds, multi-pass fillet welds, and single pass fillet welds greater than 5/16".
            6.1.b. Periodic inspection of single pass fillet welds less than or equal to 5/16" and floor and deck welds.
        6.2. Structural steel frame in compliance with details indicated on approved construction documents including but not limited to bracing, stiffening, member locations, and proper application of joint details at each connection in compliance with the applicable building code and Table 1.
        6.3. Installation of high-strength bolting in compliance with AISC specifications, the applicable building code and Table 1:
            6.4.a. During installation of slip critical connections.
            6.4.b. Periodic inspection of bearing type connections and material verification of high-strength bolts, nuts, and washers.
    B. Concrete construction as required by the applicable building code and Table 2, except as allowed in the applicable building code:
        6.1. Periodic inspection of reinforcing steel material and placement during placement of concrete.
        6.2. Periodic inspection for verification of proper use of required mix design, maintenance of specified curing temperature and techniques, and formwork shape, location, and dimensions.
        6.3. During preparation of required strength test specimens and placement of concrete for proper application of techniques.
    C. Masonry construction as required by the applicable building code and Table 3, level 1 special inspection, except as allowed in the applicable building code:
        6.1. As masonry construction begins, periodic inspection of proportions of site prepared mortar, construction of mortar joints, and location and placement of reinforcement and connectors
        6.2. Periodic inspection during the laying of masonry units and placement of reinforcing steel as follows:
            6.2.a. Size and location of structural elements.
            6.2.b. Type, size, location of anchors, and details of anchorage of masonry to structural members, frames, and other construction.
            6.2.c. Specified size, grade, and type of reinforcement.
            6.2.d. Protection of masonry during cold or hot weather.
        6.3. Welding of reinforcing bars.
        6.4. Prior to grouting, periodic inspection to ensure clean grout space, placement of reinforcement and connectors, proportions of site-prepared grout, and construction of mortar joints.
        6.5. During grout placement to ensure compliance with code provisions and construction documents.
        6.6. During preparation of grout specimens, mortar specimens, and/or prisms.
        6.7. Periodic inspection to verify compliance with required inspection provisions of the construction documents and approved submittals.
    D. Special inspection for existing site soil conditions, during site preparation and fill placement, to ensure load-bearing requirements in compliance with the applicable building code and Table 5, except as allowed in the applicable building code:
        6.1. Periodic verification of subgrade materials are required as follows:
            6.1.a. Adequate bearing capacity below footings.
            6.1.b. Proper material and depth of excavations.
            6.1.c. Classification and testing of controlled fill materials.
            6.1.d. Site subgrade has been prepared properly prior to placement of controlled fill.
        6.2. During placement and compaction of controlled fill, verify material, densities, and lift thickness.
    E. Special cases as deemed necessary by the building official in compliance with the applicable building code.

TABLE 1
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

APPLICABLE TO PROJECT		VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD (a)	IBC REFERENCE
	1.	MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS AND WASHERS:				
X	a.	IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVAL CONSTRUCTION DOCUMENTS	--	X	APPLICABLE ASTM MATERIAL SPECIFICATIONS; AISC 360, SECTION A3.3	--
X	b.	MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQ'D.	--	X	--	--
	2.	INSPECTION OF HIGH-STRENGTH BOLTING:				
X	a.	BEARING-TYPE CONNECTIONS.	--	X	--	--
X	b.	SLIP-CRITICAL CONNECTIONS.	X	X	AISC 360, SECTION M2.5	1704.3.3
	3.	MATERIAL VERIFICATION OF STRUCTURAL STEEL:				
X	a.	IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	--	--	ASTM A 6 OR ASTM A 568	1708.4
X	b.	MANUFACTURER'S CERTIFIED MILL TEST REPORTS	--	--	ASTM A 6 OR ASTM A 568	
	4.	MATERIAL VERIFICATION OF WELD FILLER MATERIALS:				
X	a.	IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.	--	--	AISC 360, SECTION A3.5	--
X	b.	MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	--	--	--	--
	5.	INSPECTION OF WELDING:				
X	a.	STRUCTURAL STEEL:				
X		1) COMPLETE AND PARTIAL JOINT PENETRATION GROOVE WELDS.	X	--	AWS D1.1	1704.3.1
X		2) MULTI-PASS FILLET WELDS.	X	--		
X		3) SINGLE-PASS FILLET WELDS > 5/16"	X	--		
X		4) SINGLE-PASS FILLET WELDS ≤ 5/16"	--	X		
X		6) FLOOR AND ROOF DECK WELDS.	--	X	AWS D1.3	--
	6.	INSPECTION OF STEEL FRAME JOINT DETAIL FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS:				
	a.	DETAILS SUCH AS BRACING AND STIFFENING.	--	--	--	1704.3.2
	b.	MEMBER LOCATIONS.	--	--		
X	c.	APPLICATION OF JOINT DETAILS AT EACH CONNECTION.	--	X		

(a) Where applicable, also see Section 1707.1. Special Inspection for Seismic Resistance.

TABLE 2
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

APPLICABLE TO PROJECT		VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD (a)	IBC REFERENCE
X	1.	INSPECTION OF REINFORCING STEEL AND PLACEMENT.	--	X	ACI 318: 3.5, 7.1-7.7	1913.4
X	2.	INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1704.3, ITEM 5B.	--	--	AWS D1.4 ACI 318: 3.5.2	1911.5
X	3.	INSPECT BOLTS TO BE INSTALLED IN CONCRETE PRIOR TO AND DURING PLACEMENT OF CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED	X	--	--	1904.22,1913.2, 1913.3
X	4.	VERIFYING USE OF REQUIRED DESIGN MIX.	--	X	ACI 318: Ch. 4, 5.2-5.4	1904, 1905.2-1905.4, 1914.2, 1914.3
X	5.	AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TEST, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	--	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	1905.6, 1914.10
X	6.	INSPECTION OF CONCRETE PLACEMENT AND SHOTCRETE FOR PROPER APPLICATION TECHNIQUES	X	--	ACI 318: 5.9, 5.10	1905.9, 1905.10, 1914.6, 1914.7, 1914.8
X	7.	INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	--	X	ACI 318: 5.11-5.13	1905.11, 1905.13, 1914.9
X	8.	INSPECT FORMWORK FOR SHAPE, LOCATION, AND DIMENSIONS OF CONCRETE MEMBER BEING FORMED.	--	X	ACI 318: 6.1.1	--

TABLE 3
LEVEL 1 REQUIRED SPECIAL INSPECTION OF MASONRY CONSTRUCTION

APPLICABLE TO PROJECT		VERIFICATION AND INSPECTION	FREQUENCY OF INSPECTION		REFERENCED FOR CRITERIA		
			CONTINUOUS	PERIODIC	IBC SECTION	TMS 402 / ACI 530 / ASCE 5a	TMS 602 / ACI 530.1 / ASCE 6a
	1.	AS MASONRY CONSTRUCTION BEGINS, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:					
X	a.	PROPORTIONS OF SITE-PREPARED MORTAR.	--	X	--	--	ART 2.6A
X	b.	CONSTRUCTION OF MORTAR JOINTS.	--	X	--	--	ART 3.3B
X	c.	LOCATION OF REINFORCEMENT, CONNECTORS.	--	X	--	--	ART 3.4, 3.6A
	2.	THE INSPECTION PROGRAM SHALL VERIFY:					
X	a.	SIZE AND LOCATION OF STRUCTURAL ELEMENTS	--	X	--	--	ART 3.3F
X	b.	TYPE, SIZE AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES OR OTHER CONSTRUCTION.	--	X	--	SEC 1.2.2 (e), 1.16.1	--
X	c.	SPECIFIED SIZE, GRADE AND TYPE OF REINFORCEMENT,	--	X	--	SEC 1.13	ART 2.4, 3.4
X	d.	WELDING OF REINFORCING BARS.	X	--	--	SEC 2.1.10.7.2, 3.3.3.4(b)	--
X	e.	PREPARATION, CONSTRUCTION AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F) OR HOT WEATHER (TEMPERATURE ABOVE 90°F)	--	X	SEC 2104.3, S104.4	--	ART. 1.8C, 1.8D
	3.	PRIOR TO GROUTING, THE FOLLOWING SHALL BE VERIFIED TO ENSURE COMPLIANCE:					
X	a.	GROUT SPACE IS CLEAN.	--	X	--	--	ART 3.2D
X	b.	PLACEMENT OF REINFORCEMENT AND CONNECTORS.	--	X	--	SEC 1.13	ART. 3.4
X	c.	PROPORTIONS OF SITE-PREPARED GROUT.	--	X	--	--	ART. 2.6B
X	d.	CONSTRUCTION OF MORTAR JOINTS.	--	X	--	--	ART. 3.3B
X	4.	GROUT PLACEMENT SHALL BE VERIFIED TO ENSURE COMPLIANCE WITH CODE AND CONSTRUCTION DOCUMENT PROVISIONS.	X	--	--	--	ART. 3.5
X	5.	PREPARATION OF ANY REQUIRED GROUT SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS SHALL BE OBSERVED.	X	-	SEC. 2105.2.2, 2105.3	--	ART. 1.4
X	6.	COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED.	--	X	--	--	ART. 1.5

(a) The specific standards referenced are those listed in chapter 35.

TABLE 5
REQUIRED VERIFICATION AND INSPECTION OF SOILS

APPLICABLE TO PROJECT		VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODICALLY DURING TASK LISTED
X	1.	VERIFY MATERIALS BELOW FOOTINGS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	--	X
X	2.	VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	--	X
X	3.	PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	--	X
X	4.	VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	--
X	5.	PRIOR TO PLACEMENT OF CONTROLLED FILL, OBSERVE SUB-GRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY	--	X

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

GENERAL NOTES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	S-	002

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: | OFFICIAL DATE: 06-24-2014

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S-002
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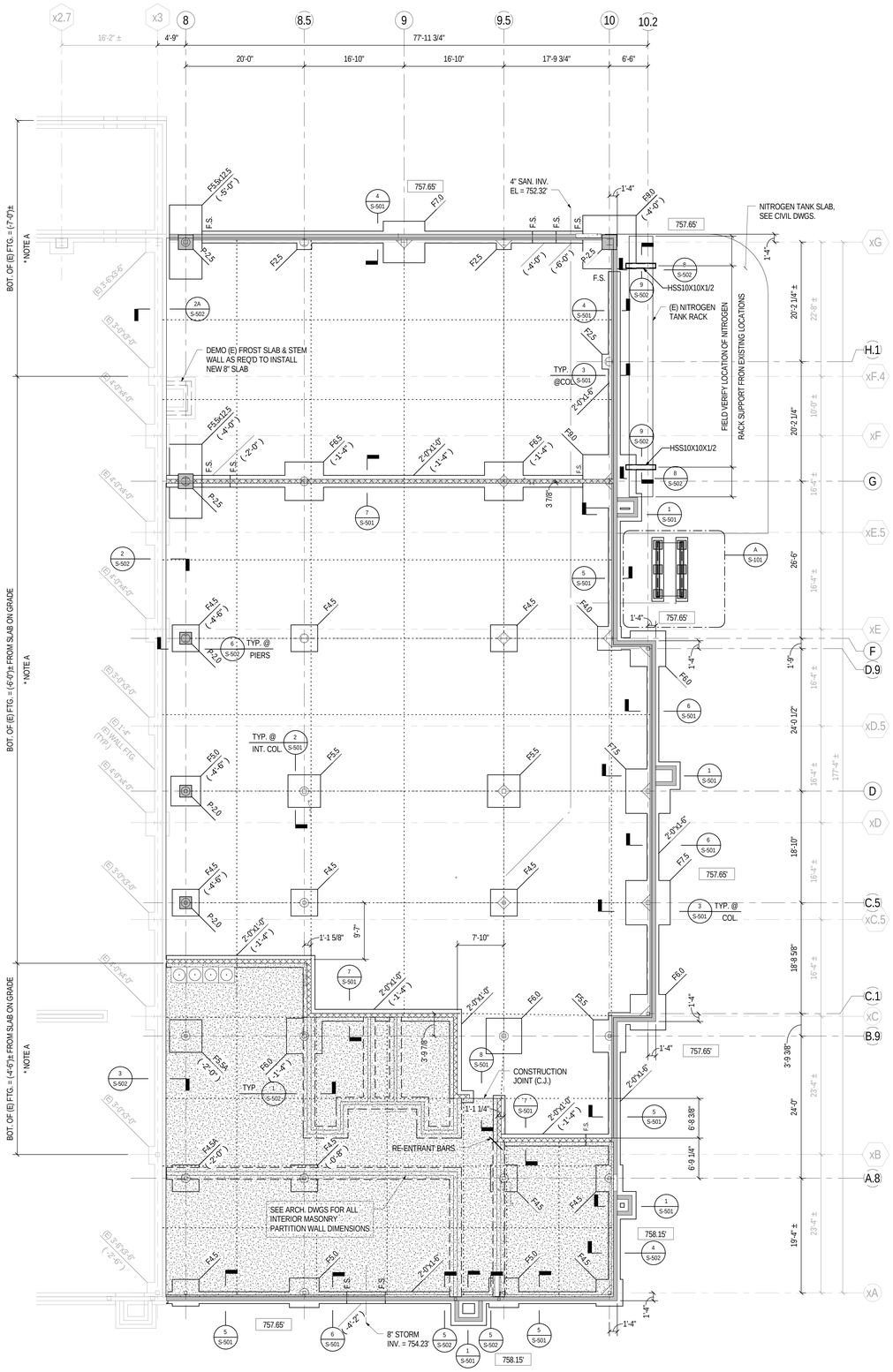
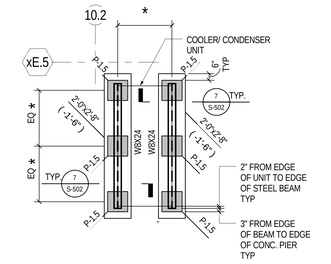


FOUNDATION PLAN - EAST ADDITION

SCALE: 1/8" = 1'-0"



Cooler/Condenser Unit Foundation Plan

A S-101 / S-101 1/4" = 1'-0"

NOTES:

- * : DIMENSIONS TO BE DETERMINED BY CONTRACTOR. COORDINATE WITH ACTUAL UNIT PURCHASED.

GENERAL SHEET NOTES

NOTES:

- FLOOR CONSTRUCTION: 8" CONCRETE SLAB ON GRADE WITH #4 @ 12" O.C. E.W. PROVIDE 6" LAYER OF GRANULAR FILL AND 1" LAYER OF SAND BELOW GRANULAR FILL AND ABOVE 10 MIL VAPOR BARRIER BELOW SLAB.
- FLOOR CONSTRUCTION: 4" CONCRETE SLAB ON GRADE WITH ONE LAYER OF 6x6-W2.1xW2.1 W.W.F. PROVIDE 6" LAYER OF GRANULAR FILL AND 1" LAYER OF SAND BELOW GRANULAR FILL 10 MIL VAPOR BARRIER BELOW SLAB.
- TOP OF SLAB ELEVATION = 0'-0", PROJECT DATUM ELEVATION = 758.15' USGS.
- ELEVATIONS NOTED THUS (+X'-X") ARE TO TOP OF FOOTING REFERENCED FROM SLAB ON GRADE ELEVATION (UNO).
- TOP OF INTERIOR FOOTING ELEVATION = (-1'-0") (UNO).
- TOP OF EXTERIOR FOOTING ELEVATION = (-2'-8") (UNO).
- CONTINUOUS FOOTINGS ARE MARKED THUS: WIDTH x DEPTH (TOP OF FTG. EL.)
- PROVIDE (2) #4x3'-0" LONG AT ALL REENTRANT CORNERS.
- COORDINATE MECHANICAL HOUSEKEEPING PAD LOCATIONS AND SIZES WITH MECHANICAL DRAWINGS. SEE TYPICAL EQUIPEMENT PAD DETAIL ON S-501.
- SEE ARCHITECTURAL DRAWINGS FOR EXTENT AND FINISH OF SLAB ON GRADE AND ANY FLOOR DEPRESSIONS, UNDERFLOOR CONDUITS, DRAINS, ETC.
- SEE SHEET S-001 & S-002 FOR GENERAL NOTES.
- SEE SHEET S-501 FOR TYPICAL DETAILS.
- FX.X DENOTES SPREAD FOOTINGS. SEE FOOTING SCHEDULE THIS SHEET.
- P-X DENOTES CONCRETE PIER. SEE CONCRETE PIER SCHEDULE ON THIS SHEET. T/PIER = (-1'-0").
- FOUNDATIONS ADJACENT TO EXISTING STRUCTURES SHALL BEAR ON UNDISTURBED SOIL AT THE SAME ELEVATION OF THE EXISTING FOOTINGS.
- xxxx DENOTES PRESUMED FINISH GRADE AT LOCATION SHOWN. VERIFY VALUE WITH FINAL SITE PLAN AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
- (E) DENOTES EXISTING CONSTRUCTION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS AND NOTIFY ENGINEER OF ANY DISCREPANCIES.
- NOTE A: NEW FOUDNATIONS ADJACENT TO EXISTING BUILDING MUST BEAR AT SAME BOTTOM OF EXISTING FOOTING ELEVATIONS. NEW BOTTOM OF FOOTING ELEVATIONS MAY NEED TO BE ADJUSTED TO MATCH FIELD CONDITIONS.

COLUMN FOOTING SCHEDULE (EAST ADDITION) 3000 PSF

MARK	FOOTING SIZE WIDTH x DEPTH	LENGTH x	REINFORCING
F2.5	2'-6"x2'-6"x1'-6"		(4) - #4 E.W. TOP & BOT.
F4.0	4'-0"x4'-0"x1'-6"		(4) - #5 E.W. TOP & BOT.
F4.5	4'-6"x4'-6"x1'-6"		(6) - #5 E.W. TOP & BOT.
F4.5A	4'-6"x4'-6"x2'-6"		(6) - #5 E.W. TOP & BOT.
F5.0	5'-0"x5'-0"x1'-6"		(7) - #5 E.W. TOP & BOT.
F5.5	5'-6"x5'-6"x1'-6"		(7) - #5 E.W. TOP & BOT.
F5.5A	5'-6"x5'-6"x2'-6"		(7) - #5 E.W. TOP & BOT.
F5.5x12.5	5'-6"x12'-6"x2'-0"		(6) - #6 L.W. TOP & BOT. (14) - #6 S.W. TOP & BOT.
F6.0	6'-0"x6'-0"x1'-6"		(8) - #5 E.W. TOP & BOT.
F6.5	6'-6"x6'-6"x1'-6"		(7) - #6 E.W. TOP & BOT.
F7.0	7'-0"x7'-0"x1'-6"		(7) - #6 E.W. TOP & BOT.
F7.5	7'-6"x7'-6"x1'-6"		(7) - #6 E.W. TOP & BOT.
F9.0	9'-0"x9'-0"x1'-10"		(9) - #7 E.W. TOP & BOT.

COLUMN PIER SCHEDULE

MARK	PIER SIZE	TYPE	REINFORCING
P-1.5	1'-6"x1'-6"	II	(4) #6 VERT., #3 TIES @ 12" O.C. MAX.
P-2.0	2'-0"x2'-0"	I	(8) #7 VERT., #4 TIES @ 4" O.C. AT ANCHOR RODS & #4 TIES @ 12" O.C. REMAINING
P-2.6	2'-6"x2'-6"	I	(8) #8 VERT., #4 TIES @ 4" O.C. AT ANCHOR RODS & #4 TIES @ 12" O.C. REMAINING

TYPE I

TYPE II

CONCRETE PIER TYPES

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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FY14 B351 WAREHOUSE ADDITION

FOUNDATION PLAN - EAST ADDITION

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	101

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

S-101
0351-COF20244-S-101_CE_1.dwg TEMPLATE DATE: 02/28/2011

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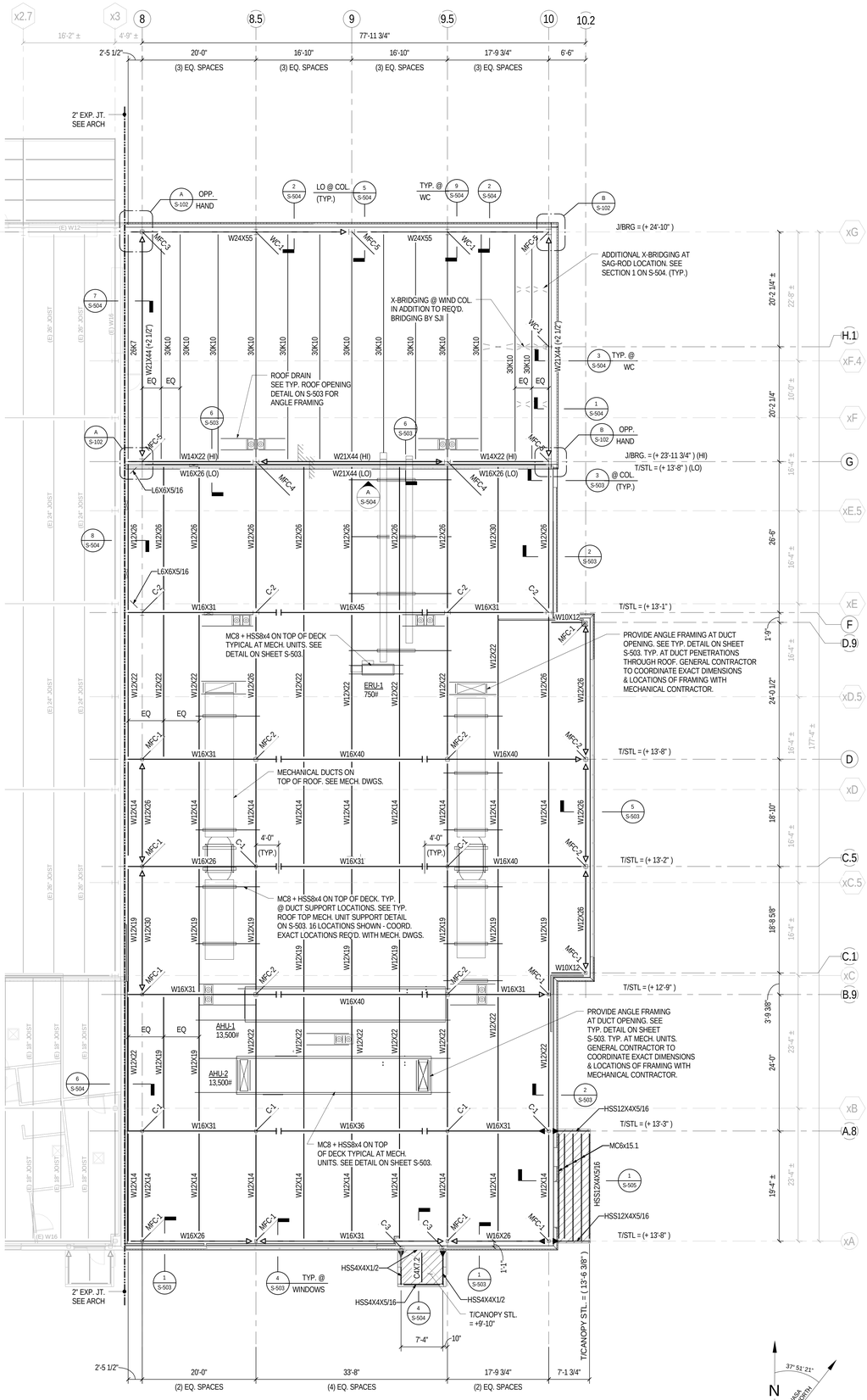
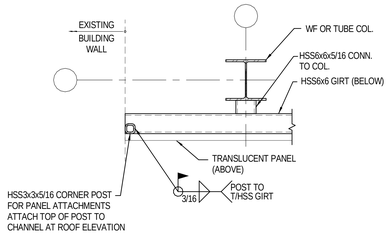


ROOF FRAMING PLAN - EAST ADDITION

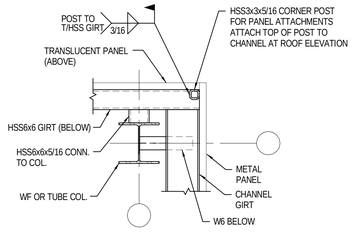
SCALE: 1/8" = 1'-0"



CORNER POST PANEL CONNECTION DETAIL

A S-102 Det A

S-102 | S-102 3/4" = 1'-0"



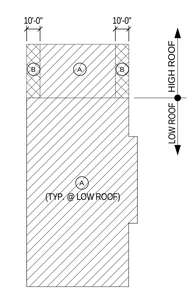
CORNER POST PANEL CONNECTION DETAIL

B S-102 Det B

S-102 | S-102 3/4" = 1'-0"

COLUMN SCHEDULE			
MARK	COLUMN SIZE	BASE PLATE	ANCHOR RODS
C-1	HSS6X6X5/16	PL3/4"x12"x1'-0"	(4) - 3/4"Ø
C-2	W8X31	PL1"x14"x1'-2"	(4) - 3/4"Ø
C-3	HSS5X5X5/16	PL3/4"x8"x9'-8"	(4) - 1/2"Ø HD'D STUDS
MFC-1	HSS6X6X5/16	PL1"x14"x1'-2"	(4) - 1"Ø
MFC-2	HSS8x8x1/2	PL1"x16"x1'-4"	(4) - 1"Ø
MFC-3	HSS12X12X1/2	PL1 1/4"x22"x1'-10"	(4) - 1 1/4"Ø
MFC-4	W8X48	PL1"x16"x1'-4"	(4) - 1"Ø
MFC-5	W12X65	PL1 1/4"x22"x1'-10"	(4) - 1 1/4"Ø
WC-1	W8X31	PL3/4"x14"x1'-2"	(4) - 3/4"Ø

- MFC-X DENOTES MOMENT FRAME COLUMNS
- WC-X DENOTES WIND COLUMN
- SEE SHEET S-503 FOR TYPICAL COLUMN BASE PLATES.
- SEE SHEET S-501 FOR TYPICAL ANCHOR ROD DETAIL.



ROOF DECK CONNECTION SCHEDULE

TYPICAL ROOF DECK CONNECTION SCHEDULE			
MARK	ATTACHMENT		
	PERPENDICULAR TO SUPPORT	PARALLEL TO SUPPORT	SEAMS
A	PUDDLE WELD AT 8" O.C. (24/4 PATTERN)	PUDDLE WELD AT 8" O.C.	(3)-#10 TEK SCREW PER SPAN
B	PUDDLE WELD AT 8" O.C. (24/4 PATTERN)	PUDDLE WELD AT 8" O.C.	(5)-#10 TEK SCREWS PER SPAN

NOTES:

- ALL PUDDLE WELDS TO BE 5/8"Ø FUSION TYPE (UNO.).
- WELDS TO BE MADE FOLLOWING AWS D1.3 SPECIFICATIONS BY QUALIFIED WELDING OPERATORS.
- ALL DECK END LAPS TO BE A MINIMUM OF 2".
- SEE SECTIONS AND DETAILS FOR ADDITIONAL WELDS REQUIRED

GENERAL SHEET NOTES

NOTES:

- ROOF CONSTRUCTION: 3"x20GA. WIDE RIB DECK (TYPE N) WELDED TO SUPPORT STEEL. SEE TYPICAL ROOF DECK CONNECTION SCHEDULE. MINIMUM 3-SPAN CONDITION (UNO).
- ROOF CONSTRUCTION: 1 1/2"x22GA. WIDE RIB DECK (TYPE B) WELDED TO SUPPORT STEEL. SEE TYPICAL ROOF DECK CONNECTION SCHEDULE. MINIMUM 3-SPAN CONDITION (UNO).
- T/S = TOP OF STEEL ELEVATION REFERENCED FROM SLAB ON GRADE ELEVATION OF 0'-0".
- J/B = ROOF JOIST BEARING ELEVATION REFERENCED FROM SLAB ON GRADE ELEVATION OF 0'-0".
- ROOF BEAM ELEVATION NOTED THUS (±) INDICATE TOP OF BEAM ABOVE OR BELOW J/B ELEVATION NOTED.
- PROVIDE JOIST BRIDGING IN ACCORDANCE WITH THE STEEL JOIST INSTITUTE (UNO). SEE TYPICAL DETAIL ON S-503.
- PROVIDE ADDITIONAL ROW OF BRIDGING AT 1st PANEL POINT OF ALL JOISTS SUBJECTED TO NET UPLIFT LOADING--SEE GENERAL NOTES.
- COORDINATE ALL OPENINGS AND EDGE CONDITIONS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS. SEE SHEET S-503 FOR TYPICAL OPENING DETAIL.
- DESIGN JOIST SUBSTITUTES FOR 400 PLF (UNO).
- SEE SHEET S-001 & S-002 FOR GENERAL NOTES.
- SEE SHEET S-503 FOR TYPICAL DETAILS.
- C-X DENOTES COLUMNS. SEE THIS SHEET FOR SCHEDULE.
- MFC-X DENOTES MOMENT FRAME COLUMNS. SEE THIS SHEET FOR SCHEDULE.
- WC-X DENOTES WIND COLUMNS.
- DENOTES FLEXIBLE (TYPE II) MOMENT CONNECTION. SEE SHEET S-504 FOR DETAILS.
- DENOTES RIGID (TYPE I) MOMENT CONNECTION. SEE SHEET S-503 FOR DETAILS.
- BEAMS ARE DESIGNED TO SUPPORT EQUIPMENT INDICATED ON PLAN. IF EQUIPMENT LOCATION VARIES OR WEIGHT EXCEEDS THAT NOTED THEN NOTIFY ENGINEER.
- (E) DENOTES EXISTING CONSTRUCTION.

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NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

ROOF FRAMING PLANS - EAST ADDITION

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	102

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

S-102
0351-COF20244-S-102_CE_1.dwg TEMPLATE DATE: 02/28/2011

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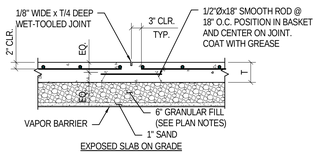
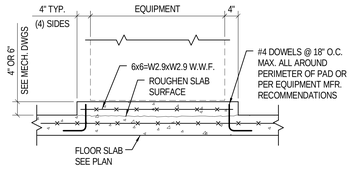


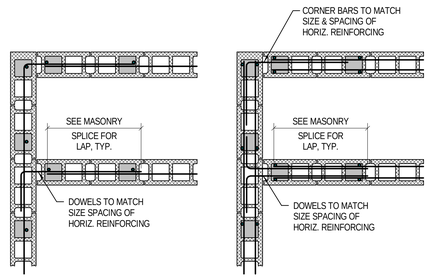
CONTROL JOINT - SLAB W/ REBAR

(SEE PLAN FOR LOCATIONS)

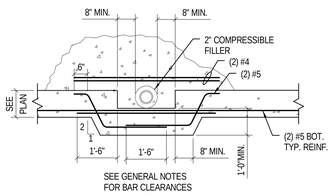


COORDINATE SIZE, QUANTITY, AND LOCATION OF EQUIPMENT BOLTS AND PAD WITH EQUIPMENT SUPPLIER'S CERTIFIED DRAWING. SEE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS FOR LOCATION OF EQUIPMENT PADS.

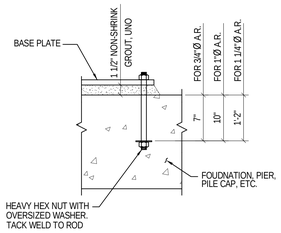
TYPICAL EQUIPMENT PAD DETAIL



TYPICAL MASONRY WALL HORIZONTAL REINF. DETAILS



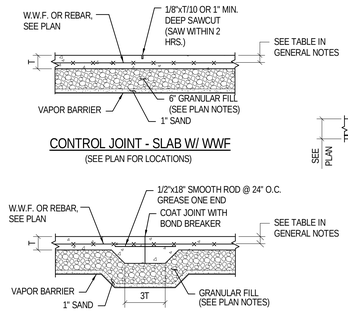
TYPICAL DETAIL AT MECHANICAL LINE PENETRATION



TYPICAL ANCHOR ROD DETAIL

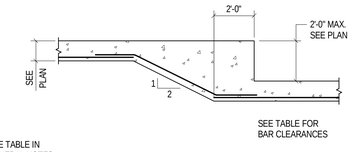
(A36 ANCHOR RODS)

- ANCHOR ROD MATERIAL AND DETAILS MAY VARY AT MOMENT FRAMES. SEE BASE DETAILS FOR FRAMES AND/OR BRACES.
- CONTRACTOR MAY USE LEVELING NUTS OR LEVELING PLATES AT CONTRACTORS OPTION.
- AN INCREASE IN GROUT THICKNESS FOR LARGE BASE PLATES IS PERMISSABLE IF APPROVED BY THE ENGINEER. COORDINATE DUE TO INCREASE IN GROUT THICKNESS FOR OTHER TRADES IS THE RESPONSIBILITY OF THE CONTRACTOR.



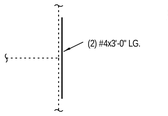
CONTROL JOINT - SLAB W/ WWF

(SEE PLAN FOR LOCATIONS)

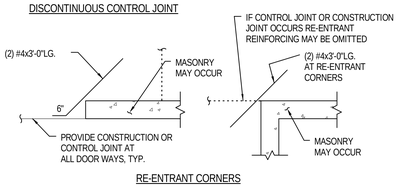


FOOTING STEP DETAIL

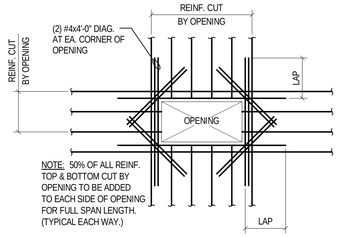
CONSTRUCTION JOINT



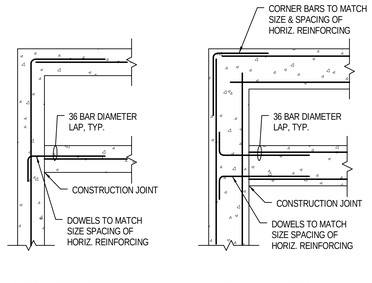
DISCONTINUOUS CONTROL JOINT



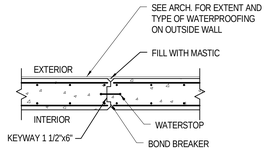
TYPICAL RE-ENTRANT AND DISCONTINUOUS CONTROL JOINT SLAB REINFORCING



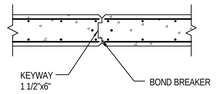
TYPICAL REINFORCING AT WALL OPENING DETAIL



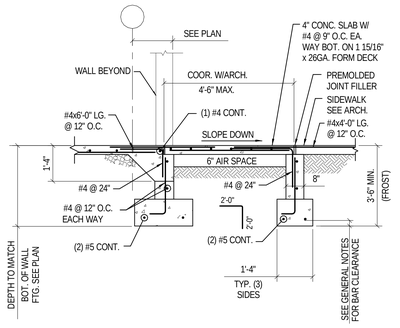
CONCRETE WALL HORIZONTAL REINFORCING DETAILS



TYPICAL BUILDING CONCRETE WALL CONSTRUCTION JOINT DETAIL



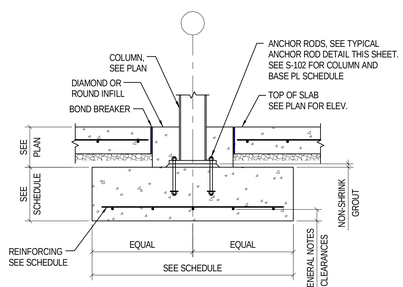
TYPICAL CONCRETE DOCK RETAINING WALL CONSTRUCTION JOINT DETAIL



1 S-501 Sec 1

S-101 S-501 1/2" = 1'-0"

0 1/2 1 2 4

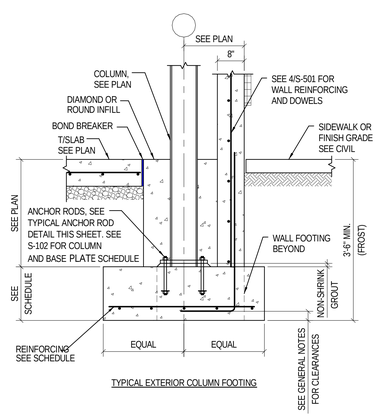


TYPICAL INTERIOR COLUMN FOOTING

2 S-501 Sec 2

S-101 S-501 3/4" = 1'-0"

0 1/2 1 2 4



TYPICAL EXTERIOR COLUMN FOOTING

3 S-501 Sec 3

S-101 S-501 3/4" = 1'-0"

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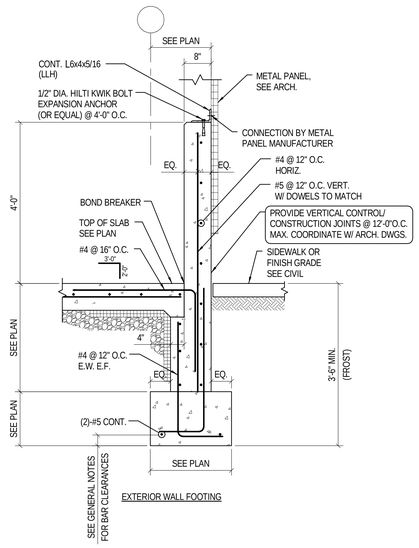
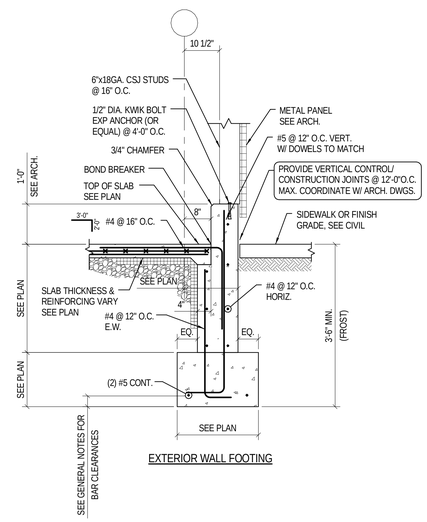


4 S-501 Sec 4

S-101 S-501 3/4" = 1'-0"

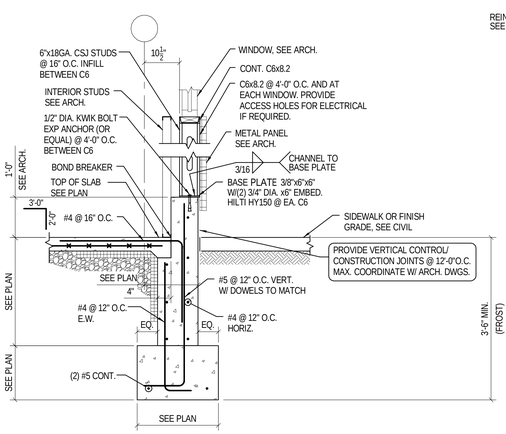
0 1/2 1 2 4



5 S-501 Sec 5

S-101 S-501 3/4" = 1'-0"

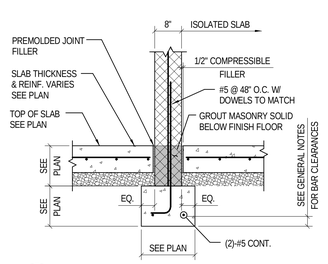
0 1/2 1 2 4



6 S-501 Sec 6

S-101 S-501 3/4" = 1'-0"

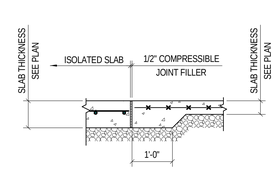
0 1/2 1 2 4



7 S-501 Sec 7

S-101 S-501 3/4" = 1'-0"

0 1/2 1 2 4



8 S-501 Sec 8

S-101 S-501 3/4" = 1'-0"

0 1/2 1 2 4

CHG	NUM	DESCRIPTION	APP/DATE
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Fax: 330/659-6675

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:

CONTRACTOR	RELEASE APPROVAL:	DATE:
STANTEC ARCHITECTURE INC.		
CONTRACT NO. NNC09CA01C	RELEASE APPROVAL:	DATE:
TASK ORDER	RELEASE APPROVAL:	DATE:
DRAWN Author / DESIGNED / CHECKED Checker / APPROVED Approver / APPROVAL DATE	RELEASE STATUS: WORKING	

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

FOUNDATION DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	501

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION – | VER 1

SCALE: As indicated | OFFICIAL DATE: 06-24-2014

S-501

0351-COF20244-S-501_CE_1.dwg TEMPLATE DATE: 02/26/2011

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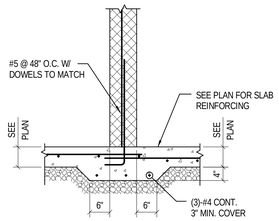

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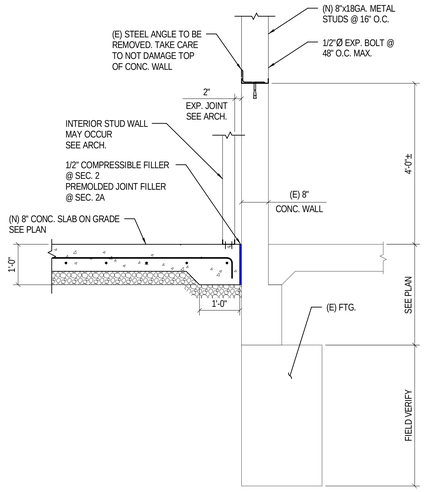
S-101 S-502 3/4" = 1'-0"



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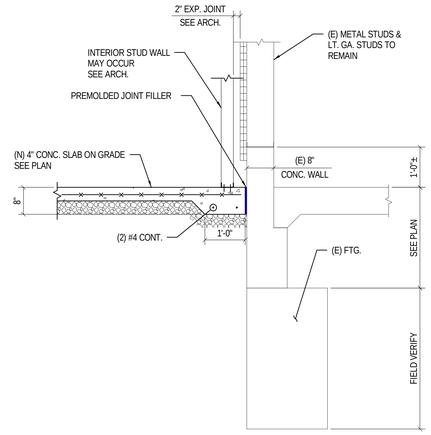
2A
S-101 S-502



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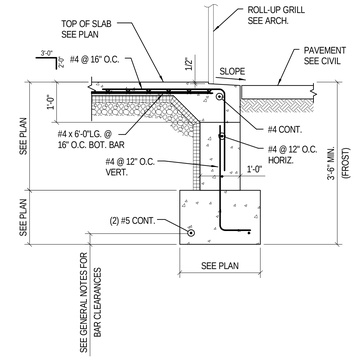

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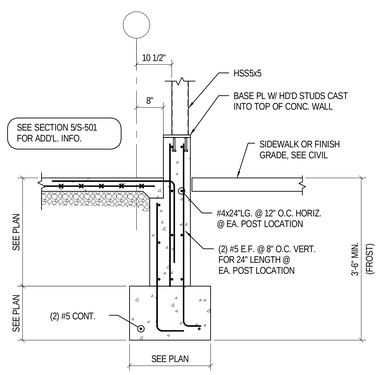

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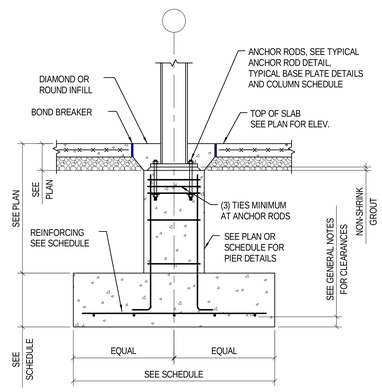

INTERIOR COLUMN FOOTING W/PIER

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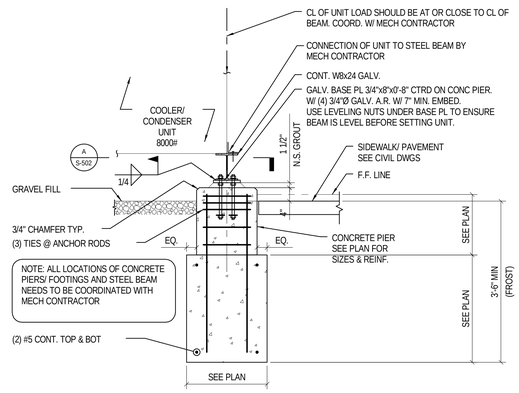

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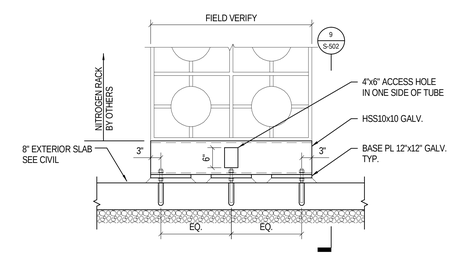

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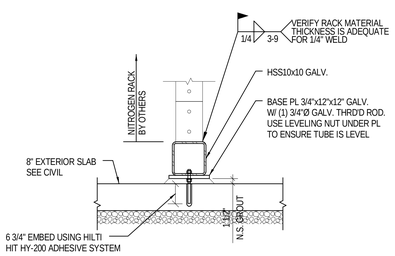

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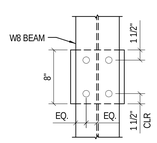

A S-502 Det A
S-502 S-502 1 1/2" = 1'-0"

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
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CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

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SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	502

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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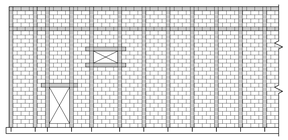


ORDINARY REINFORCED MASONRY WALL ELEVATION

NOTES:

VERTICAL REINFORCING:

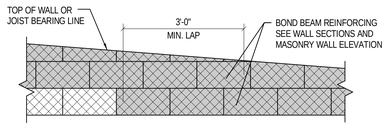
- PROVIDE TYPICAL REINFORCING SHOWN IN TYPICAL WALL SECTION.
- ALL VERTICAL BARS SPECIFIED BELOW ARE #5 BARS UNO.
- PROVIDE (2)-BARS FULL HEIGHT AT EACH SIDE OF WALL OPENING UNLESS SHOWN ON PLAN. REINFORCING TO CLEAR END OF LINTEL.
- PROVIDE (1) BAR AT EACH CORNER.
- PROVIDE (1) BAR AT EACH SIDE OF A CONTROL JOINT.
- PROVIDE (1) BAR WITHIN 8" OF ENDS OF WALLS.
- ALL VERTICAL BARS SHALL HAVE DOWELS TO MATCH.

HORIZONTAL REINFORCING:

- PROVIDE HORIZONTAL JOINT REINFORCING GALVANIZED 9 GAGE SIDE AND CROSS RODS SPACED @ 16" O.C. VERTICALLY, LADDER TYPE.
- PROVIDE (2) #4 AT THE TOP & BOTTOM OF ALL OPENINGS 1'-4" OR LARGER EXTEND 24" OR 40db WHICHEVER IS GREATER PAST THE EDGE OF OPENING.

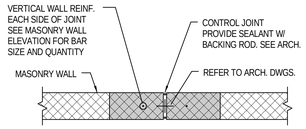
GENERAL:

- LAP LENGTHS SHALL COMPLY W/MASONRY SPLICE TABLE
- REINFORCING SHALL BE COORDINATED W/ARCHITECTURAL ELEVATIONS, PLANS & DETAILS
- FOR CONDITIONS AT LINTELS SEE TYPICAL DETAILS
- PROVIDE BOND BEAMS AS SHOWN IN SECTIONS.



TYPICAL BOND BEAM LAP AT CHANGE IN BOND BEAM ELEVATION

NOTE: PROVIDE MINIMUM 8" DEEP BOND BEAM



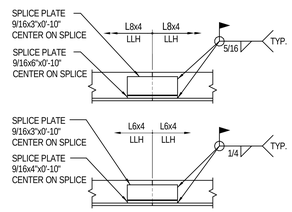
DO NOT CONTINUE CONTROL JOINT THRU BOND BEAM AT ROOF. SCORE MASONRY AT ROOF BOND BEAM. REINFORCEMENT IN ROOF BOND BEAM TO BE CONTINUOUS ACROSS SCORED JOINT.

COORDINATE LOCATIONS WITH ARCHITECTURAL ELEVATIONS

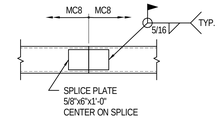
MASONRY CONTROL JOINT

SPACE @ 25'-0" O.C. MAX.

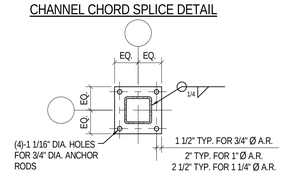
IBC MASONRY SPLICE TABLE	
REINFORCING SIZE	8" MASONRY
#3	27"
#4	36"
#5	45"
#6	54"



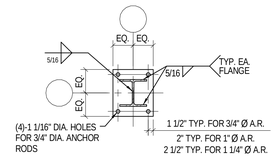
ANGLE CHORD SPLICE DETAIL



CHANNEL CHORD SPLICE DETAIL

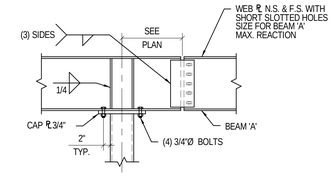


TUBE COLUMN

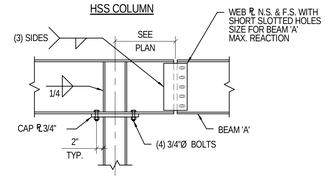


WIDE FLANGE COLUMN

TYPICAL COLUMN BASE PLATE DETAILS

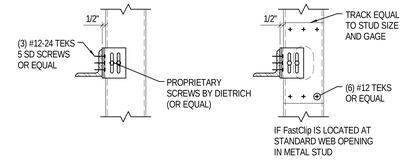


HSS COLUMN



WF COLUMN

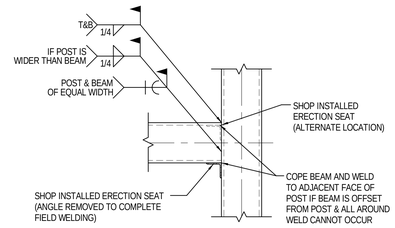
TYPICAL BEAM OVER COLUMN DETAIL



3-1/2" FastClip SLIDE CLIPS

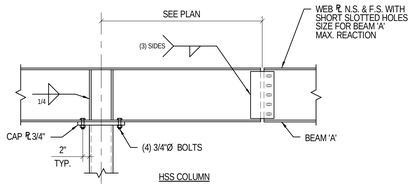
TYPICAL FastClip ATTACHMENT DETAILS

FastClip BY DIETRICH INDUSTRIES, INC. (OR EQUAL)



ALL TUBE TO TUBE CONNECTIONS TO BE WELDED ALL AROUND, UNO

TYPICAL TUBE TO TUBE CONNECTION



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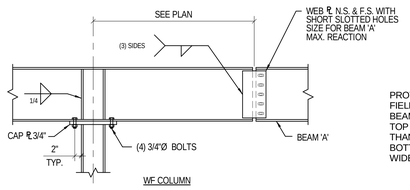
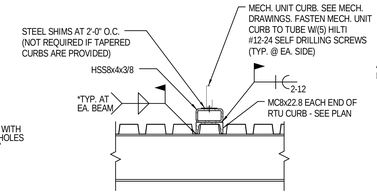
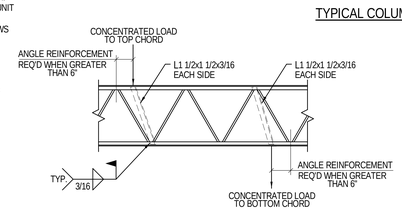


WF COLUMN

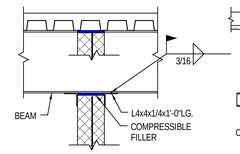
TYPICAL BEAM OVER COLUMN DETAIL



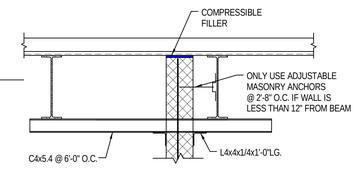
TYPICAL ROOFTOP MECHANICAL UNIT SUPPORTS



TYPICAL JOIST REINFORCING DETAIL

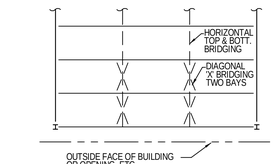


WALL PERPENDICULAR TO BEAM

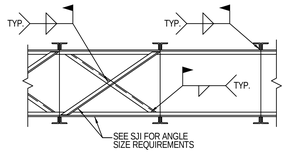


WALL PARALLEL TO BEAM

TYPICAL INTERIOR MASONRY WALL BRACING



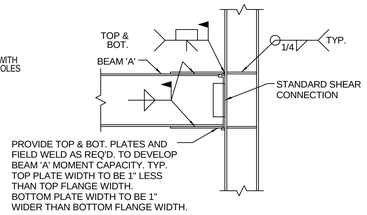
SEE STEEL JOIST INSTITUTE FOR NUMBER OF ROWS OF BRIDGING PER BAY. JOIST SUPPLIER TO PROVIDE ADDITIONAL ROWS OF BRIDGING AS REQ'D. FOR UPLIFT.



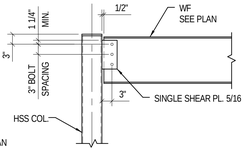
TYPICAL BRIDGING DETAILS

SINGLE-PLATE CONNECTION TO HSS COLUMN SCHEDULE			
BEAM DEPTH	NUMBER OF BOLTS	PLATE LENGTH	ALLOWABLE REACTION, k
W30	8	23.5	84.7
W27, W24	7	20.5	74.2
W21	6	17.5	63.6
W18	5	14.5	53.0
W16	4	11.5	42.4
W14, W12	3	8.5	31.8
W10, W8	2	5.5	20.4

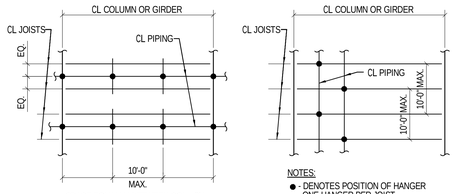
STANDARD SHEAR CONNECTION SCHEDULE	
BEAM SIZE	MINIMUM NO. OF ROWS OF A325 3/4" DIAM BOLTS IN DOUBLE SHEAR
W12	3
W14	3
W16	4
W18	5
W21	6
W24	6
W27	7
W30	7
W33	8



TYPICAL BEAM TO COLUMN FULL CAPACITY MOMENT CONNECTIONS



SINGLE SHEAR PLATE CONNECTION TO HSS COLUMN



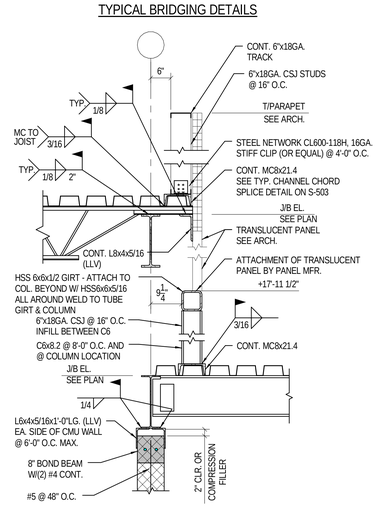
PIPING PARALLEL TO JOIST

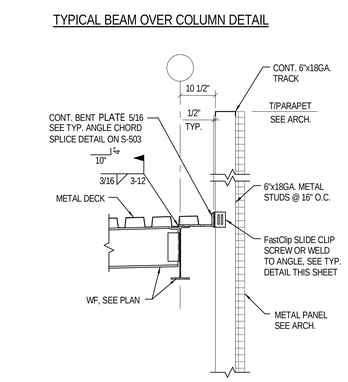
PIPING PERPENDICULAR TO JOIST

PIPE HANGER SPACING DIAGRAMS

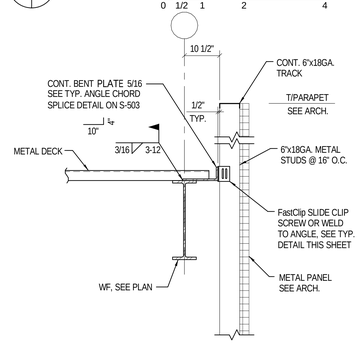
(FOR PIPES HAVING DIAMETER OF 8" OR LARGER)

NOTES:
THIS DETAIL INDICATES HOW LARGE PIPES SHOULD BE SUPPORTED.
THIS DOES NOT PERMIT THE HANGING OF LARGE PIPES FROM JOISTS UNLESS SHOWN ON STRUCTURAL DRAWINGS OR APPROVED BY THE CONTRACTING OFFICER. MECHANICAL TO COORDINATE LOCATION OF PIPES WITH CONTRACTING OFFICER.





1 S-503 Sec 1
S-102 | S-503 3/4" = 1'-0"



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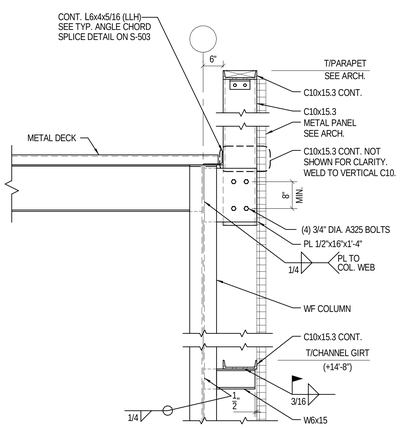

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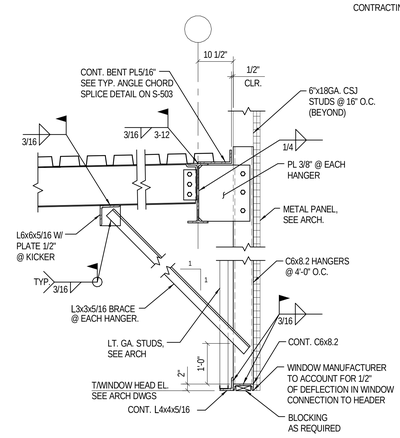

4 S-503 Sec 4
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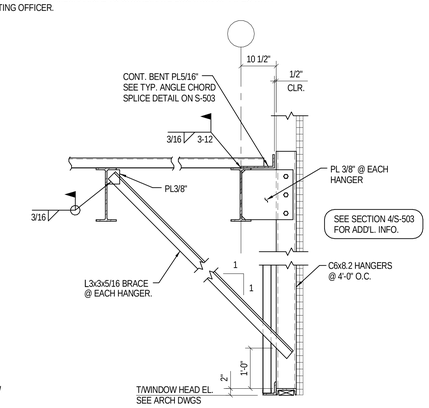

5 S-503 Sec 5
S-102 | S-503 3/4" = 1'-0"

6 S-503 Sec 6
S-102 | S-503 3/4" = 1'-0"

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

FRAMING DETAILS

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Cleveland, OH 44122
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3030 West Streetsboro Road
Richfield, OH 44286
Phone: 330/659-6688
Fax: 330/659-6675

CONTRACT: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
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RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	503

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S-503
0351-COF20244-S-503_CE_1.dwg TEMPLATE DATE: 02/28/2011

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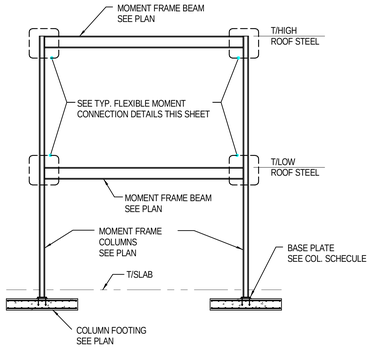


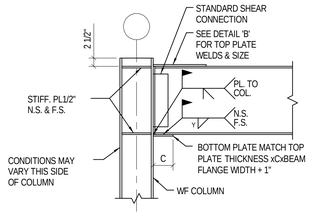
NOTES:

1. CENTER ALL PLATES ALONG COLUMN CENTERLINE.

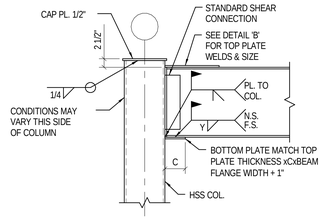
MOMENT FRAME ELEVATION

A S-504 ELEVATION A

S-102 | S-504 3/4" = 1'-0"



TYPICAL FLEXIBLE MOMENT CONNECTION DETAIL
WIDE FLANGE COLUMN

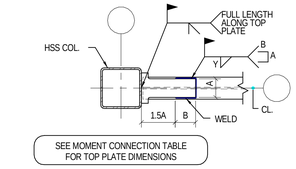


TYPICAL FLEXIBLE MOMENT CONNECTION DETAIL
FOR HSS COLUMN

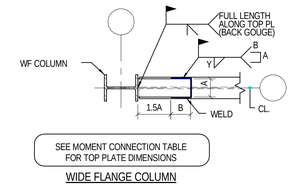
FLEXIBLE MOMENT CONNECTION TABLE							
BEAM SIZE	TOP PLATE DIMENSIONS				BOTTOM PLATE DIMENSIONS		
	PLATE	A	B	WELD 'Y'	PLATE	WIDTH	C
W16x26 W16x31	PL 1/2"	4 1/2"	5 1/2"	5/16"	PL 1/2"	6 1/2"	B+1/2A
W12x26 W12x30 W21x44	PL 1/2"	5 1/2"	5 1/2"	5/16"	PL 1/2"	7 1/2"	B+1/2A
W18x40 W24x55	PL 1/2"	6"	5"	5/16"	PL 1/2"	8"	B+1/2A

NOTES:

1. CENTER ALL PLATES ALONG COLUMN CENTERLINE.



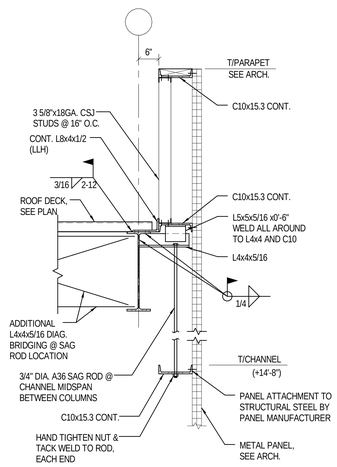
HSS COLUMN



WIDE FLANGE COLUMN

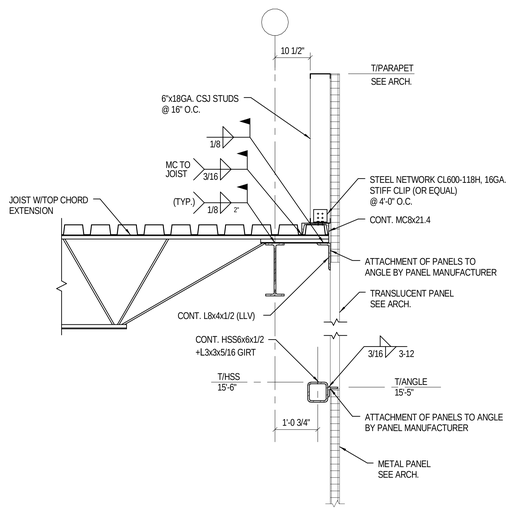
B S-504 Det B

S-504 3/4" = 1'-0"



1 S-504 Sec 1

S-102 | S-504 3/4" = 1'-0"



2 S-504 Sec 2

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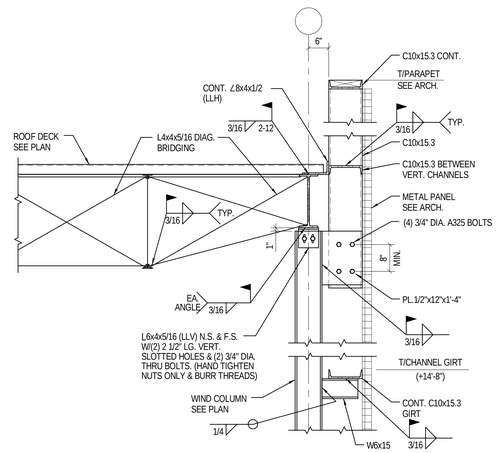

3 S-504 Sec 3

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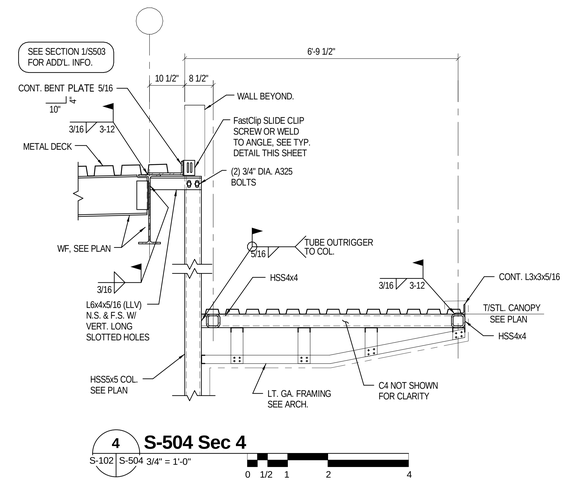

4 S-504 Sec 4

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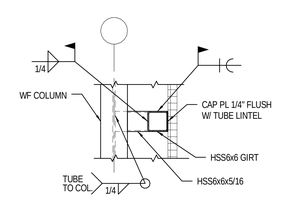

5 S-504 Sec 5

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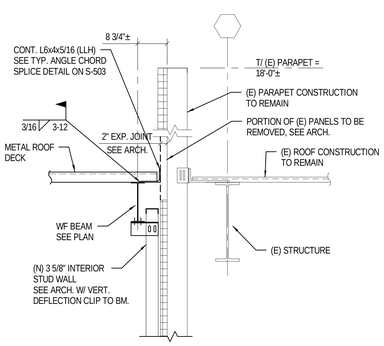

6 S-504 Sec 6

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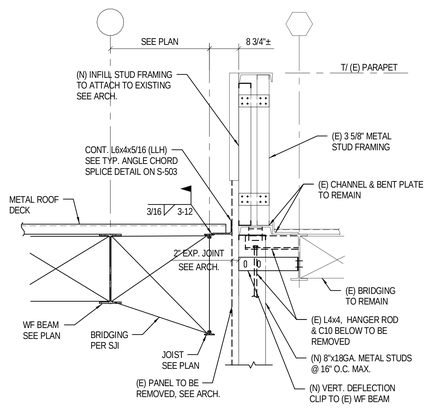

7 S-504 Sec 7

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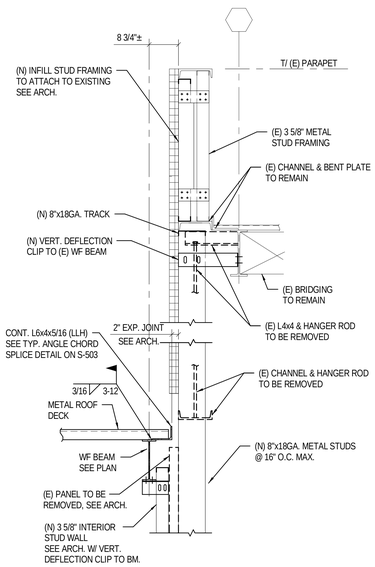

8 S-504 Sec 8

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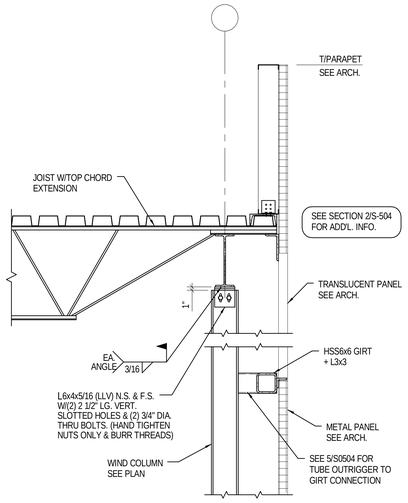

9 S-504 Sec 9

S-102 | S-504 3/4" = 1'-0"

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

FRAMING DETAILS

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
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Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	504

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: 3/4" = 1'-0" | OFFICIAL DATE: 06-24-2014

S-504

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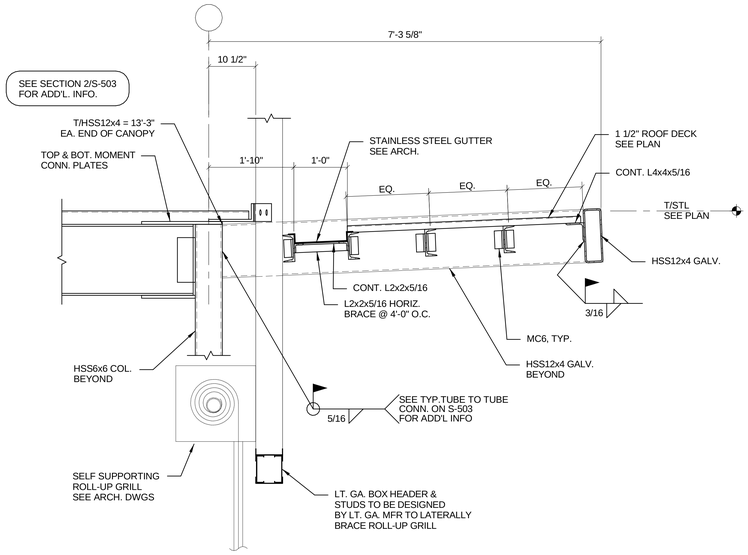

1 S-505 Sec 1
S-102 S-505 1" = 1'-0"
0 1/2 1 2 4

CHG	NUM	DESCRIPTION	APP/DATE

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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FY14 B351 WAREHOUSE ADDITION

FRAMING DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	S-	505

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1

SCALE: 1" = 1'-0" | OFFICIAL DATE: 06-24-2014

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NASA APPROVALS
DR: | DES:
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RELEASE APPROVAL: | DATE:
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RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

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S-505
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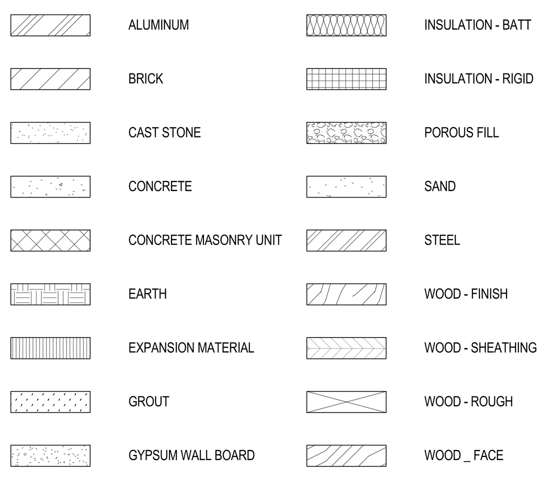
LIST OF ABBREVIATIONS

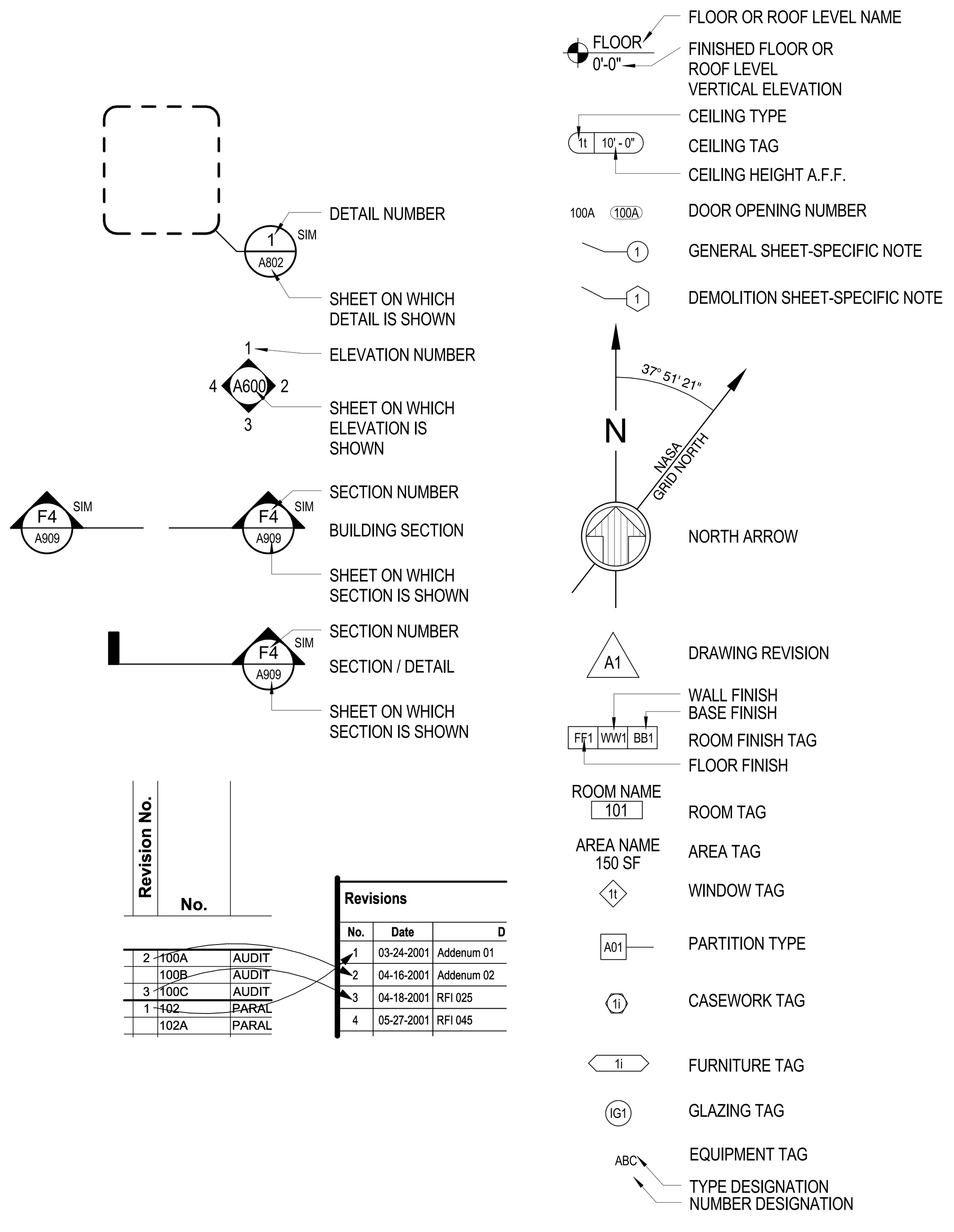
AB.	ANCHOR BOLT
ACM.	ASBESTOS CONTAINING MATERIAL
ACOUST.	ACOUSTICAL
ACT.	ACOUSTIC CEILING TILE
ACW	ACOUSTIC WALL PANEL
A.D. ADJ.	AREA DRAIN ADJACENT
ADJUST.	ADJUSTABLE
ADMIN.	ADMINISTRATION
A.F.F.	ABOVE FINISH FLOOR
AGC.	ACOUSTIC GYPSUM CEILING
ALUM.	ALUMINUM
ANCH.	ANCHOR
APPROX.	APPROXIMATELY
APL	ACOUSTICAL PLASTER
A/V	AUDIO-VISUAL
@	AT
BD.	BOARD
BKT.	BRACKET
BLDG.	BUILDING
BLK.	BLOCK
BLKG.	BLOCKING
BM.	BEAM
BOT.	BOTTOM
B.O.	BOTTOM OF
BRK.	BRICK
BSMT.	BASEMENT
CAB.	CABINET
C.B.	CHALK BOARD
CEM.	CEMENT
CH	CEILING HEIGHT
CHAN.	CHANNEL
C.I.P.	CAST IN PLACE
C.J.	CONTROL JOINT
C L	CENTERLINE
CLG.	CEILING
CLKG.	CAULKING
CLR.	CLEAR
CLOS.	CLOSET
C.M.U.	CONCRETE MASONRY UNIT
C.O.	CLEAR OPENING
COL.	COLUMN
CONF.	CONFERENCE
CONC.	CONCRETE
CONV.	CONVECTOR
C.H.P.	CONC. HOUSEKEEPING PAD
COORD.	COORDINATE
COND.	CONDITION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
CORR.	CORRIDOR
CPT	CARPET
CR	CLASSROOM
C.R.	COLD ROLLED
CRS.	COURSES
CSK.	COUNTERSINK
CSC	CONCEALED SPLINE CEILING
C.T.	CERAMIC TILE
CU.	CUBIC
C.U.H.	CABINET UNIT HEATER
D.A.	DOUBLE ACTING
DET.	DETAIL
DEMO.	DEMOLITION
D.F.	DRINKING FOUNTAIN
D.H.	DOUBLE HUNG OR DOOR HOLDER
DIA.	DIAMETER
DIM.	DIMENSION
DISP.	DISPENSER
DP	DEEP
DN.	DOWN
DO.	DITTO (REPEAT)
D.O.	DOOR OPENING
DS	DOWNSPOUT
D.W.	DRYWALL
DWG.	DRAWING
E.S.	EACH SIDE
EA.	EACH
E.J.	EXPANSION JOINT
EL.	ELEVATION (GRADE)
ELEC.	ELECTRICAL
ELEV.	ELEVATION (FACADE) OR ELEVATOR
EQ., =	EQUALS
EXH.	EXHAUST
EXIST., EXST.	EXISTING
EXP. JT.	EXPANSION JOINT
EXP.	EXPOSED
EXT.	EXTERIOR
F. A.	FIRE ALARM
F. A.	FRESH AIR
F.D.C.	FIRE DEPT. CONNECTION
F.C.	FIRE CODE
F.D.	FLOOR DRAIN
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
F.H.	FLAT HEAD
F.H.C.	FIRE HOSE CABINET
FIN.	FINISH
FL.	FLOOR
FLASH.	FLASHING
FLUOR.	FLUORESCENT
F.O.	FRAMED OPENING
F.P.	FIREPROOFING
F.S.	FULL SIZE
FT.	FEET, FOOT
FND	FOUNDATION
GA.	GAUGE
GALV.	GALVANIZED
GB	GRAB BARS
GBACT	GYPSUM BACKED ACT
G.B.B.	GYPSUM BACKER BOARD
G.C.	GENERAL CONTRACTOR
GL.	GLASS
GR.	GRADE
GRND.	GROUND
G.V.P.	GYPSUM BOARD & VENEER PLASTER
G.W.B.	GYPSUM WALL BOARD
GYP.	GYPSUM
H.	HIGH
H.B.	HOSE BIB
HAZMAT	HAZARDOUS MATERIAL
HDWD.	HARDWOOD
HDWR.	HARDWARE
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
HSEKP'G	HOUSEKEEPING
HT.	HEIGHT
HVAC.	HEATING, VENTILATING & AIR CONDITIONING
I.D.	INSIDE DIAMETER
IN.	INCH, INCHES
INCAN.	INCANDESCENT
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
I.P.S.	INSIDE PIPE SIZE
JAN.	JANITOR
JST.	JOIST
JNT.	JOINT
K.E.C.	KITCHEN EQUIPMENT CONTRACTOR
L.	LENGTH
LAM.	LAMINATED
LB., #	POUND
L.C.	LEAD COATED
L.D.P.	LAMINATED DRYWALL PARTITION
LF	LINEAR FOOT (FEET)
LGM	LIGHT GAUGE METAL
L.P.	LOW POINT
LT	LIGHT
LVR.	LOUVER
L.W.	LIGHT WEIGHT
M.	MEN'S ROOM
MACH.	MACHINE
MAS.	MASONRY
MAT'L	MATERIAL
MAX.	MAXIMUM
M.B.	MARKER BOARD
MBL.	MARBLE
M.D.O.	MEDIUM DENSITY OVERLAY PLYWOOD
MECH.	MECHANICAL
MFR.	MANUFACTURER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MLDG.	MOULDING
M.O.	MASONRY OPENING
M.R.	MOISTURE RESISTANT
M.T.	METAL THRESHOLD
MTL.	METAL
NAP	NAPKIN
N/A	NOT APPLICABLE
N.C.	NON-CORROSIVE
N.I.C.	NOT IN CONTRACT
NO., #	NUMBER
NOM.	NOMINAL
N.T.S.	NOT TO SCALE
O.A.	OVER ALL
O.A.F.	OVERALL FRAME
O.C.	ON CENTER
O.D.	OUTSIDE DIAMETER
O.H.	OPPOSITE HAND
OPER.	OPERATE
OPNG.	OPENING
OVHD.	OVERHEAD
OZ.	OUNCE (S)
PB.	PEGBOARD
P.C.	PLUMBING CONTRACTOR
PERIM.	PERIMETER
PERP.	PERPENDICULAR (TO)
PG.	PAGE
PL.	PLATE
PLAS.	PLASTER
PLUMB.	PLUMBING
PLYWD.	PLYWOOD
PNL.	PANEL
POL.	POLISHED
P.L.	PLASTIC LAMINATE
P.P.T.	PRESERVATIVE PRESSURE TREATED
PR.	PAIR
PREP.	PREPARATION
PREFIN.	PREFINISHED
P.T.	PAPER TOWEL DISPENSER
PTN.	PARTITION
PTD.	PAINTED
Q.T.	QUARRY TILE
QTY.	QUANTITY
r	RADIUS
R.	RISER
RAD. ENCL.	RADIATOR ENCLOSURE
R.D.	ROOF DRAIN
REFIN.	REFINISH
REINF.	REINFORCING
REQD.	REQUIRED
RESIL.	RESILIENT
RET.	RETAINING
REV.	REVISED
RF.	ROOF
RM.	ROOM
R.O.	ROUGH OPENING
R.W.L.	RAIN WATER LEADER
R.B.	RESILIENT BASE
RND	ROUND
R.T.U.	ROOF TOP UNIT
SCHED.	SCHEDULE
S.D.	SOAP DISPENSER
SECT.	SECTION
S.F.	SQUARE FOOT / FEET
SH.	SHELVES
SHT.	SHEET
SIM.	SIMILAR
SGL	SINGLE
SLID.	SLIDING
SP.	STANDPIPE
SPEC.	SPECIFICATIONS
SPED.	SPECIAL EDUCATION ROOM
SQ.	SQUARE
S.S.	STAINLESS STEEL
S.T.	STRUCTURAL STEEL
S.T.C.	SOUND TRANSMISSION CLASS
STD.	STANDARD
STL.	STEEL
STOR.	STORAGE
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED
S.V.	SHEET VINYL
T.	TREADS
T.B.	TACK BOARD
T.C.	TERRA COTTA
TEL.	TELEPHONE
TEMP.	TEMPERED
TERR.	TERRAZZO
T & G	TONGUE & GROOVE
THK.	THICKNESS
THRESH.	THRESHOLD
TLT.	TOILET
T.O.J.	TOP OF JOIST
T.O.S.	TOP OF SLAB
	TOP OF STEEL
T.O.W.	TOP OF WALL
T.P.	TOILET PAPER DISPENSER
TYP.	TYPICAL
TWR.	TOWER TOWER
UC.	UNDERCUT
U.L.	UNDERWRITERS LABORATORY
U.O.N.	UNLESS OTHERWISE NOTED
UPR.	UPPER
U.V.	UNIT VENT
V.	VENT
	VINYL COVE BASE
V.C.T.	VINYL COMPOSITION TILE
VEND.	VENDING, VENDOR
VERT.	VERTICAL
VEST.	VESTIBULE
V.I.F.	VERIFY IN FIELD
VP	VENEER PLASTER
VT	VINYL TILE
W.	WIDE OR WOMEN'S ROOM
W/	WITH
W.C.	WATER CLOSET
WD.	WOOD
W.D.	WINDOW DIMENSION
W.F.	WIDE FLANGE (STRUCTURAL SHAPE)
W.I.	WROUGHT IRON
WIND.	WINDOW
W.P.	WATERPROOFING
WT.	WEIGHT
W.W.M.	WELDED WIRE MESH
X	INDICATES TIMES OR BY
YD.	YARD
Z	ZEE (STRUCTURAL SHAPE)

THE PRECEEDING LIST OF ABBREVIATIONS IS PRESENTED AS A GENERAL GUIDE AND DOES NOT NECESSARILY SHOW ALL ABBREVIATIONS USED. OTHER GENERALLY ACCEPTED ABBREVIATIONS MAY BE FOUND AMONG THE DRAWINGS.

MATERIALS LEGEND



SYMBOLS LEGEND



CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

CHG	NUM	DESCRIPTION	APP/DATE
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3700 Park East Drive, # 200
Cleveland, OH 44122
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Richfield, OH 44286
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Fax: 330/659-6675

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DRAWN: Author | DESIGNED | CHECKED: Checker
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DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

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FY14 B351 WAREHOUSE ADDITION

ARCHITECTURAL SYMBOLS, MATERIALS & ABBREVIATIONS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	A-	001

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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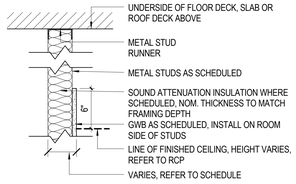
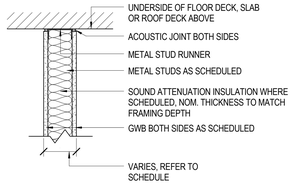


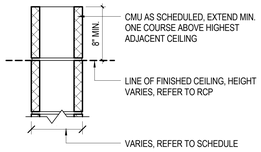
NOTE: REFER TO PARTITION SCHEDULE FOR TOP TERMINATION OF INSULATION. IF NOT NOTED TO STRUCTURE TERMINATE MATERIAL MIN. 6" ABOVE HIGHEST ADJACENT CEILING.

TOP T2



NOTE: REFER TO PARTITION SCHEDULE FOR TOP TERMINATIONS OF GWB AND INSULATION. IF NOT NOTED TO STRUCTURE TERMINATE MATERIAL MIN. 6" ABOVE HIGHEST ADJACENT CEILING.

TOP T3



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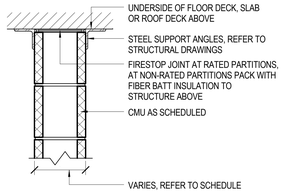
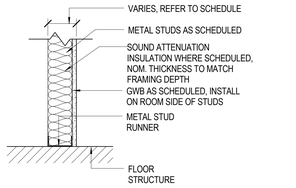
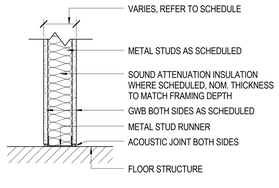


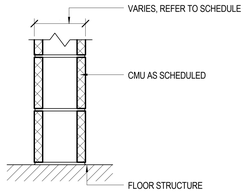
TOP T10



BASE B2

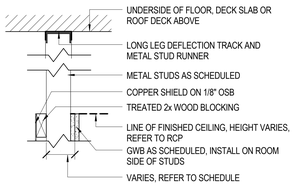


BASE B3

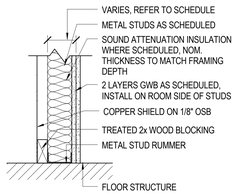


BASE B7

REFER TO BASE B7



TOP T15



BASE B15

PARTITION SCHEDULE - NON-STRUCTURAL METAL FRAMING GROUPS A - L

TYPE	CONSTRUCTION DATA: OVERALL PARTITION DEPTH	GWB THICKNESS	FRAMING SIZE	METAL GA	STUD SPACING	DETAIL AT TOP	DETAIL AT BASE	TOP TERMINATION: STUDS TO STRUCTURE	GWB TO STRUCTURE	INSULATION TO STRUCTURE	FIRE PARTITIONS: FIRE RATING (HRS)	FIRE TEST	ACOUSTICAL PERFORMANCE: SOUND INSULATION	STC RATING	STC TEST	NOTES
Group B - Material, Stud																
B03	3 1/8"	5/8"	2 1/2"			T2	B2	●	-	-	0		-	0		
B05	4 1/4"	5/8"	3 5/8"			T2	B2	●	-	-	0		-	0		
B06	4 1/4"	5/8"	3 5/8"			T2	B2	●	-	●	0		◆	0		
Group C - Material, Stud, Material																
C01	4 7/8"	5/8"	3 5/8"			T3	B3	●	-	-	0		-	0		
C04	4 7/8"	5/8"	3 5/8"			T3	B3	●	●	●	0		◆	49	SA-870717	
C11	7 1/4"	5/8"	6"			T3	B3	●	●	●	0		◆	47		
Group E - Material (2 Layers), Stud, Material																
E10	6 1/2"	5/8"	3 5/8"			T15	B15	●	-	-	0		-	0		SEE SHIELDING DETAILS DRAWING X-101 AND X-102 FOR ADDITIONAL INFORMATION

PARTITION SCHEDULE - CMU FRAMING GROUPS M - S

TYPE	CONSTRUCTION DATA: OVERALL PARTITION DEPTH	GWB THICKNESS	MASONRY / FRAMING SIZE	METAL GA	STUD SPACING	DETAIL AT TOP	DETAIL AT BASE	TOP TERMINATION: STUDS TO STRUCTURE	GWB TO STRUCTURE	INSULATION TO STRUCTURE	MASONRY TO STRUCTURE	FIRE PARTITIONS: FIRE RATING (HRS)	FIRE TEST	ACOUSTICAL PERFORMANCE: SOUND INSULATION	STC RATING	STC TEST	NOTES
Group M - CMU																	
M04	5 5/8"	0"	6" NOM.			T9	B7	-	-	-	-	0		-	0		
M05	5 5/8"	0"	6" NOM.			T10	B7	-	-	-	●	0		-	44	KAL-359-4-66	
M09	7 5/8"	0"	8" NOM.			T10	B7	-	-	-	●	0		-	45	KAL-359-3-66	

General Partition Notes:

1. Not all partition groups or types within groups have been utilized - resulting type numbers may not be sequential. Refer to partition schedules for types utilized in this project.

2. For all partition systems that are indicated to extend from floor slab to underside of structure or floor slab above, including all Fire Rated partitions and all partitions indicated to have a Sound Transmission Class (STC), provide assembly at head of partition that will accommodate a minimum deflection of the structure above the partition as indicated on the structural drawings, but not less than L/360 (where L= the span of the structure) without transferring loads resultant from that deflection to the partition assembly.

3. Provide assembly that will transfer lateral loads applied normal to the face of the partition system into the structure or floor slab above. Where Fire-Rated partitions occur , provide a UL-listed and approved head assembly for that partition that has been tested and determined to provide a Fire Rating equivalent to that of the Fire Rated Partition. Where partitions indicated to have a Sound Transmission Class occurs, provide a head assembly for that partition that has been tested and determined to provide a Sound Transmission Class equivalent to that of the Sound Rated Partition. All head assemblies shall be install in strict conformance to manufactures recommendations.

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT No.: NNC09CA01C
TASK ORDER:
ORIGIN: DESIGNED: CHECKED:
APPROVED: APPROVAL DATE:

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: DES:
D.ENG: PROJ. MGR:
RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

PARTITION TYPES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	002

AREA: SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: ■ | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-002
0351-COF20244-A-002_CE_1.dwg TEMPLATE DATE: 02/28/2011

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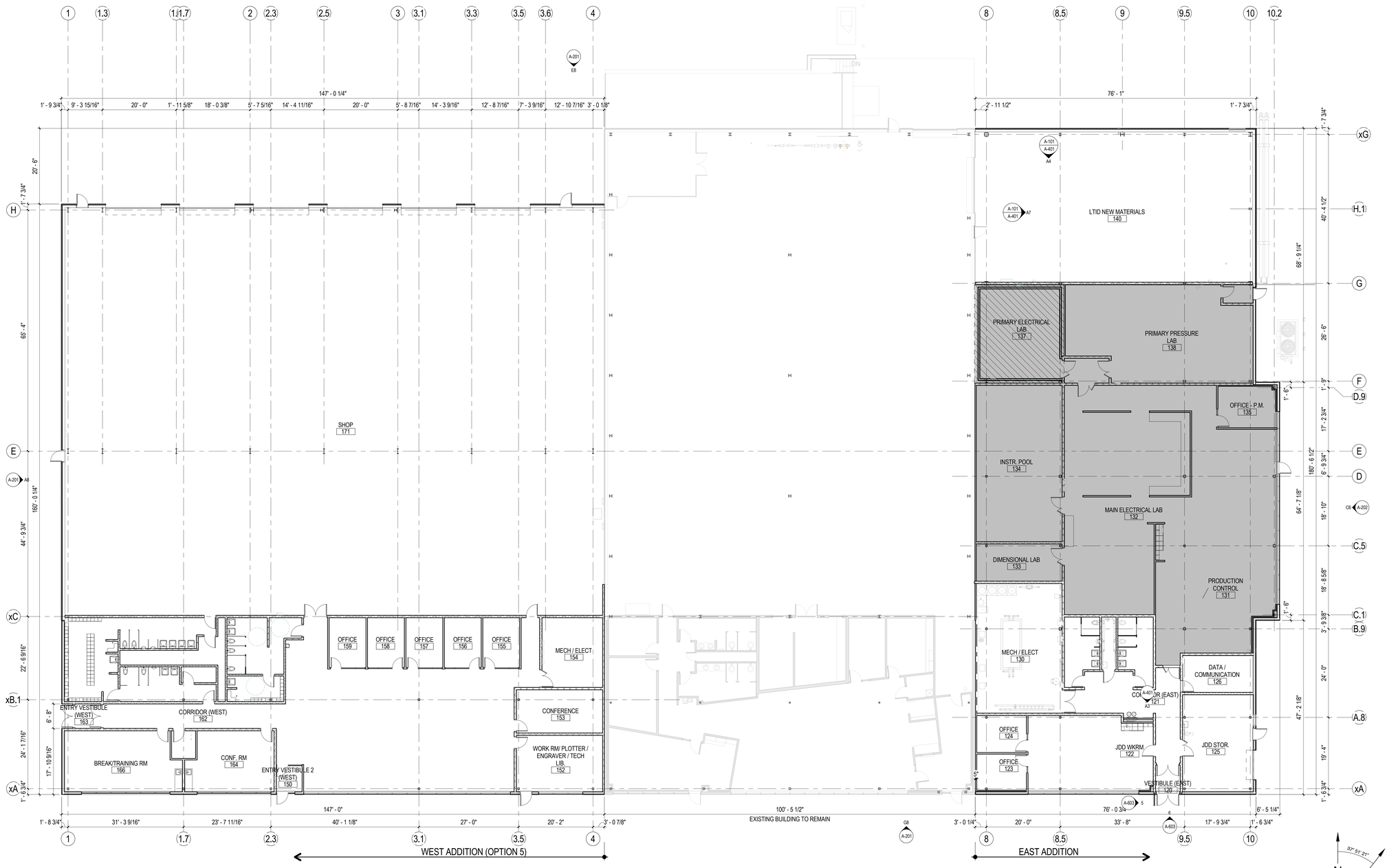

C2 FIRST FLOOR CONTROL PLAN

A-101 1" = 10'-0" 0 5 10 20'

ISOLATED SLAB

EM SHIELDED AREA (ALL SIDES)

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST
2. REFER TO LIFE SAFETY PLAN ON SHEET G-002 FOR FIRE RATED PARTITION TYPES AND LOCATIONS
3. REFER TO FRAME TYPES DRAWING A-601 FOR INTERIOR WINDOW OPENINGS
4. ALL DOOR OPENINGS TO BE LOCATED 4" FROM NEAREST PERPENDICULAR WALL UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
5. DIMENSIONS PROVIDED ARE TO FINISHED FACE OF PARTITION UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
6. CONTRACTOR TO VERIFY ALL BUILT-IN COUNTER, CABINETRY AND SURFACE MOUNTED EQUIPMENT LOCATIONS AND PROVIDE BLOCKING WITHIN PARTITION CONSTRUCTION AS REQUIRED FOR THEIR INSTALLATION
7. REFER TO INTERIOR ELEVATIONS SHEET I-601 FOR ADDITIONAL WALL MOUNTED ITEMS
8. PERIMETER WALL CONSTRUCTION U VALUES:

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DESIGN: Author
DESIGNED | CHECKED | APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT: SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

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RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR CONTROL PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	101

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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A-101

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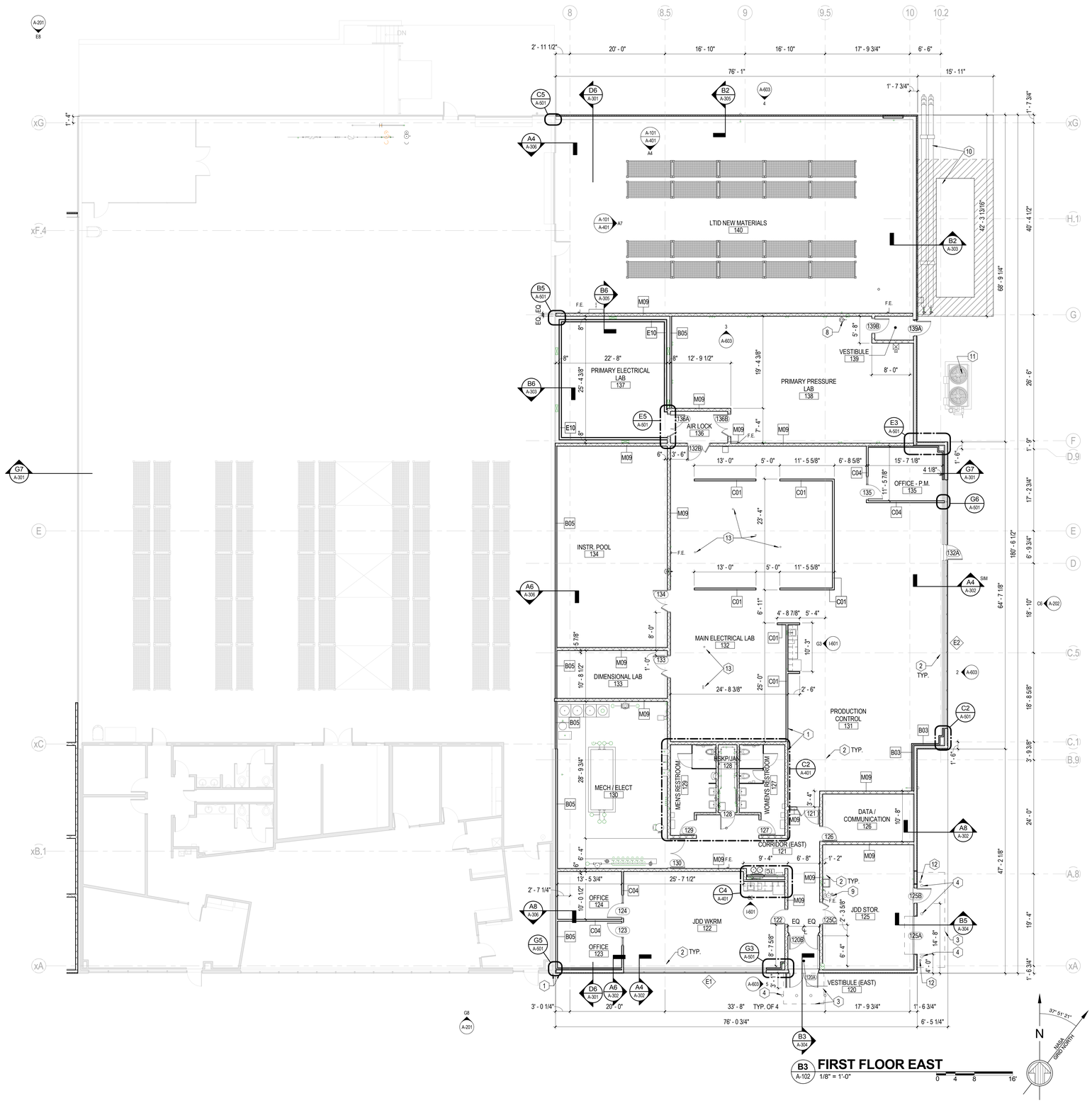

B3 A-102 **FIRST FLOOR EAST**
1/8" = 1'-0"
0 4 8 16'

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST
2. REFER TO LIFE SAFETY PLAN ON SHEET G-002 FOR FIRE RATED PARTITION TYPES AND LOCATIONS
3. REFER TO FRAME TYPES DRAWING A-601 FOR INTERIOR WINDOW OPENINGS
4. ALL DOOR OPENINGS TO BE LOCATED 4" FROM NEAREST PERPENDICULAR WALL UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
5. DIMENSIONS PROVIDED ARE TO FINISHED FACE OF PARTITION UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
6. CONTRACTOR TO VERIFY ALL BUILT-IN COUNTER, CABINETRY AND SURFACE MOUNTED EQUIPMENT LOCATIONS AND PROVIDE BLOCKING WITHIN PARTITION CONSTRUCTION AS REQUIRED FOR THEIR INSTALLATION
7. REFER TO INTERIOR ELEVATIONS SHEET I-601 FOR ADDITIONAL WALL MOUNTED ITEMS
8. PERIMETER WALL CONSTRUCTION U VALUES:

CONSTRUCTION SHEET KEYED NOTES

1. ALIGN
2. PAINTED STEEL COLUMN - SEE STRUCTURAL DRAWINGS
3. DASHED LINE INDICATES LINE OF CANOPY ABOVE
4. PAINTED STEEL BOLLARD - SEE CIVIL DRAWINGS
5. NOT USED
6. SURFACE MOUNTED AED CABINET
7. TIME CLOCK
8. EMERGENCY EYEWASH STATION - SEE PLUMBING DRAWINGS
9. EMERGENCY EYEWASH/SHOWER - SEE PLUMBING DRAWINGS
10. NITROGEN TRAILER AND TANKS - SEE PLUMBING DRAWINGS
11. COOLING TOWER - SEE MECHANICAL DRAWINGS
12. PAINTED METAL DOWNSPOUT TO BE TIED INTO STORM - SEE CIVIL DRAWINGS
13. POWER POLE - LOCATION TO BE COORDINATED WITH CEILING ITEMS AND WITH FURNITURE LAYOUT PRIOR TO INSTALLATION

CHG	NUM	DESCRIPTION	APP/DATE
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Cleveland, OH 44122
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Fax: 216/454-9995

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Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

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DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

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FY14 B351 WAREHOUSE ADDITION

FLOOR PLAN EAST

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	102

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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A-102
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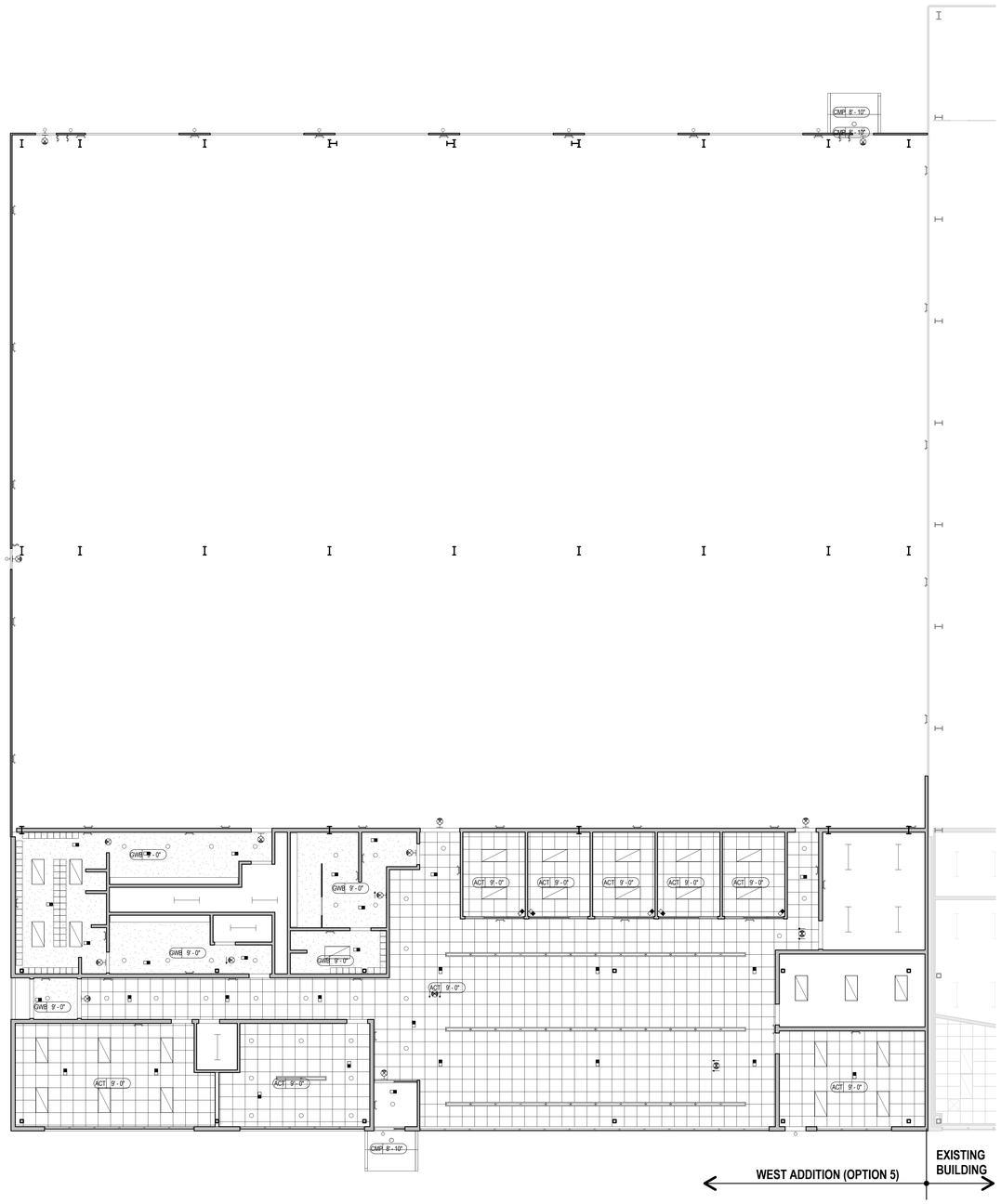
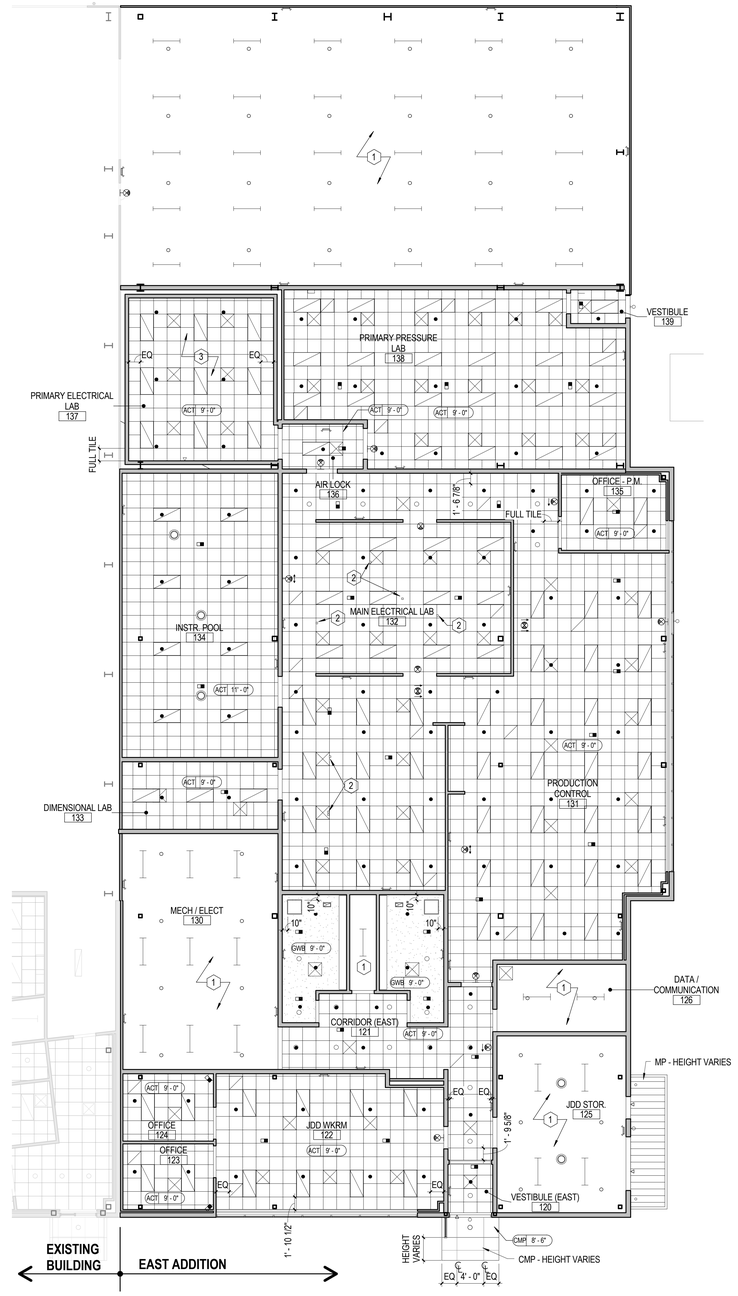


FIRST FLOOR REFLECTED CEILING PLAN - WEST (OPTION 5)

C5 / A-104 — 1/8" = 1'-0"



FIRST FLOOR REFLECTED CEILING PLAN - EAST

C3 / A-104 — 1/8" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST
2. MECHANICAL, ELECTRICAL AND TECHNOLOGY ITEMS ARE SHOWN ON THE REFLECTED CEILING PLANS FOR GENERAL LOCATION PURPOSES - COORDINATE WITH ENGINEERING DRAWINGS. SEE OTHER DISCIPLINE DRAWINGS FOR DETAILED DESCRIPTION OF ITEMS.
3. ALL ITEMS NOT DIMENSIONED ARE TO BE PLACED IN THE CENTER OF THE NEAREST ADJACENT CEILING TILE.
4. CENTER CEILING GRIDS IN ROOMS UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS.
5. SEE MECHANICAL, ELECTRICAL AND TECHNOLOGY DRAWINGS FOR LOCATIONS OF LIGHTS, DIFFUSERS, SPEAKERS, ETC. LOCATED IN ROOMS WITHOUT CEILINGS.

CONSTRUCTION SHEET KEYED NOTES

1. OPEN TO STRUCTURE ABOVE
2. APPROXIMATE LOCATION OF POWER POLE - COORDINATE LOCATION WITH CEILING ITEMS AND WITH FURNITURE LAYOUT PRIOR TO INSTALLATION
3. SHIELDING TO BE INSTALLED ABOVE CEILING THIS AREA - SEE SHIELDING DRAWING X-101 FOR SHIELDING NOTES AND DETAILS

REFLECTED CEILING LEGEND

- ACT
- GWB - GYPSUM BOARD
- CMP - COMPOSITE METAL PANEL SYSTEM
- MP - METAL PANEL SYSTEM
- 2x4 FLUORESCENT LIGHT FIXTURE
- SUSPENDED LINEAR LIGHT FIXTURE
- RECESSED DOWN LIGHT
- SUPPLY AIR DIFFUSER
- SUPPLY AIR DIFFUSER (EXPOSED CEILING)
- RETURN AIR DIFFUSER
- EXHAUST GRILLE
- OCCUPANCY SENSOR
- EMERGENCY LIGHT (WALL PACK)
- EXIT SIGN
- CEILING HEIGHT (tt 10'-0")
- CEILING TYPE DESIGNATION
- CEILING ACCESS PANEL
- SPRINKLER HEAD (SEMI-RECESSED PENDANT)
- SPRINKLER HEAD (UPRIGHT)

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REFLECTED CEILING PLANS

DRAWING/DESIGN STATUS: BID SET

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NASA APPROVALS — DR: ; DES: ; D.ENG: ; PROJ. MGR:

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RELEASE STATUS: WORKING

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author; DESIGNED:; CHECKED: Checker
APPROVED: Approver; APPROVAL DATE:

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	104

AREA: ; SHEET 1 OF 1
UNITS: ENGLISH; SOFTWARE: REVIT 2014; REVISION: -; VER: 1
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A-104

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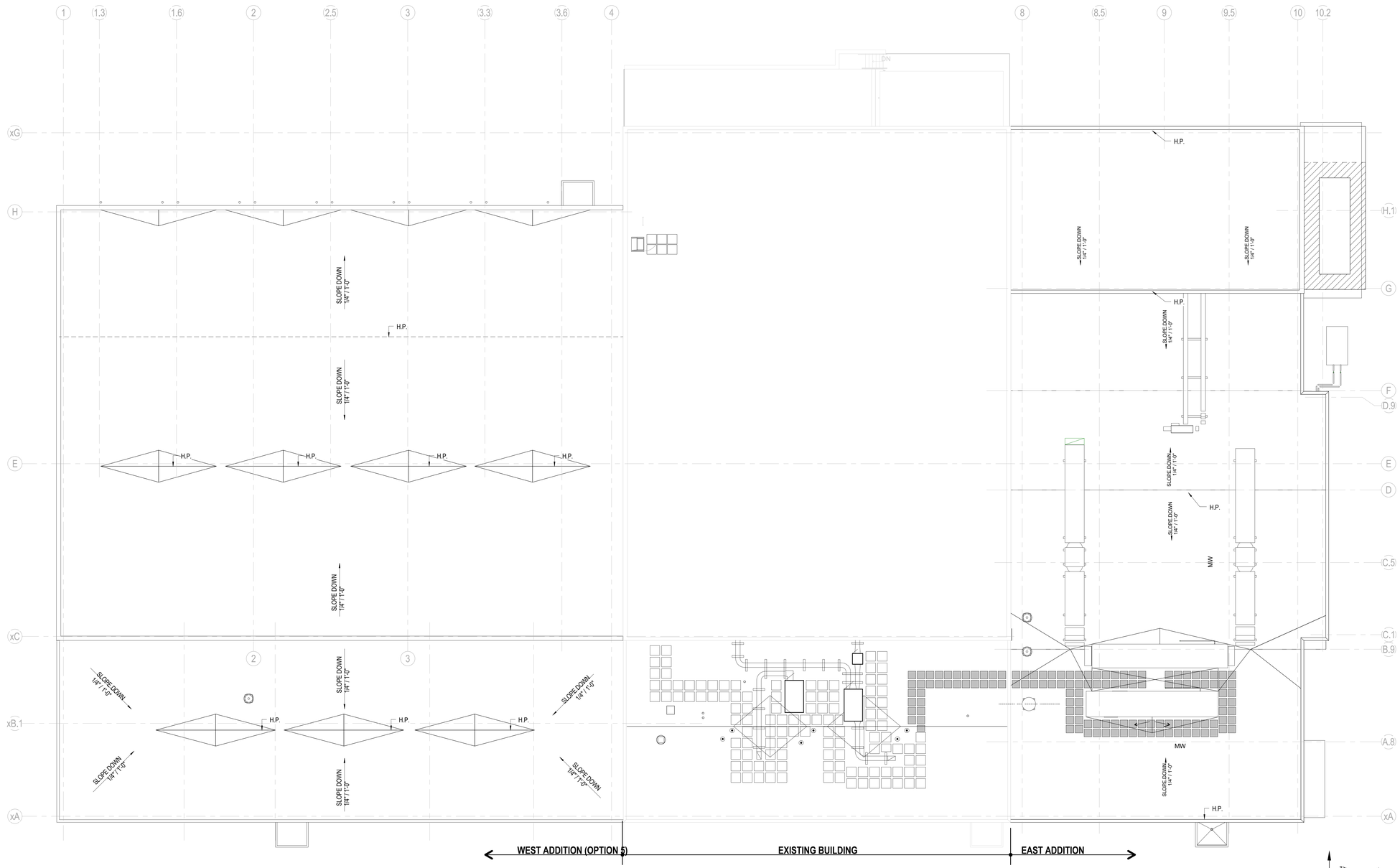

1 ROOF PLAN - CONTROL
A-105 1" = 10'-0"

0 5 10 20'

37° 51' 21"
N
NASA GRID NORTH

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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FY14 B351 WAREHOUSE ADDITION

ROOF CONTROL PLAN

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Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

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CONTRACT NO.: NNC09CA01C
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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

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D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	105

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
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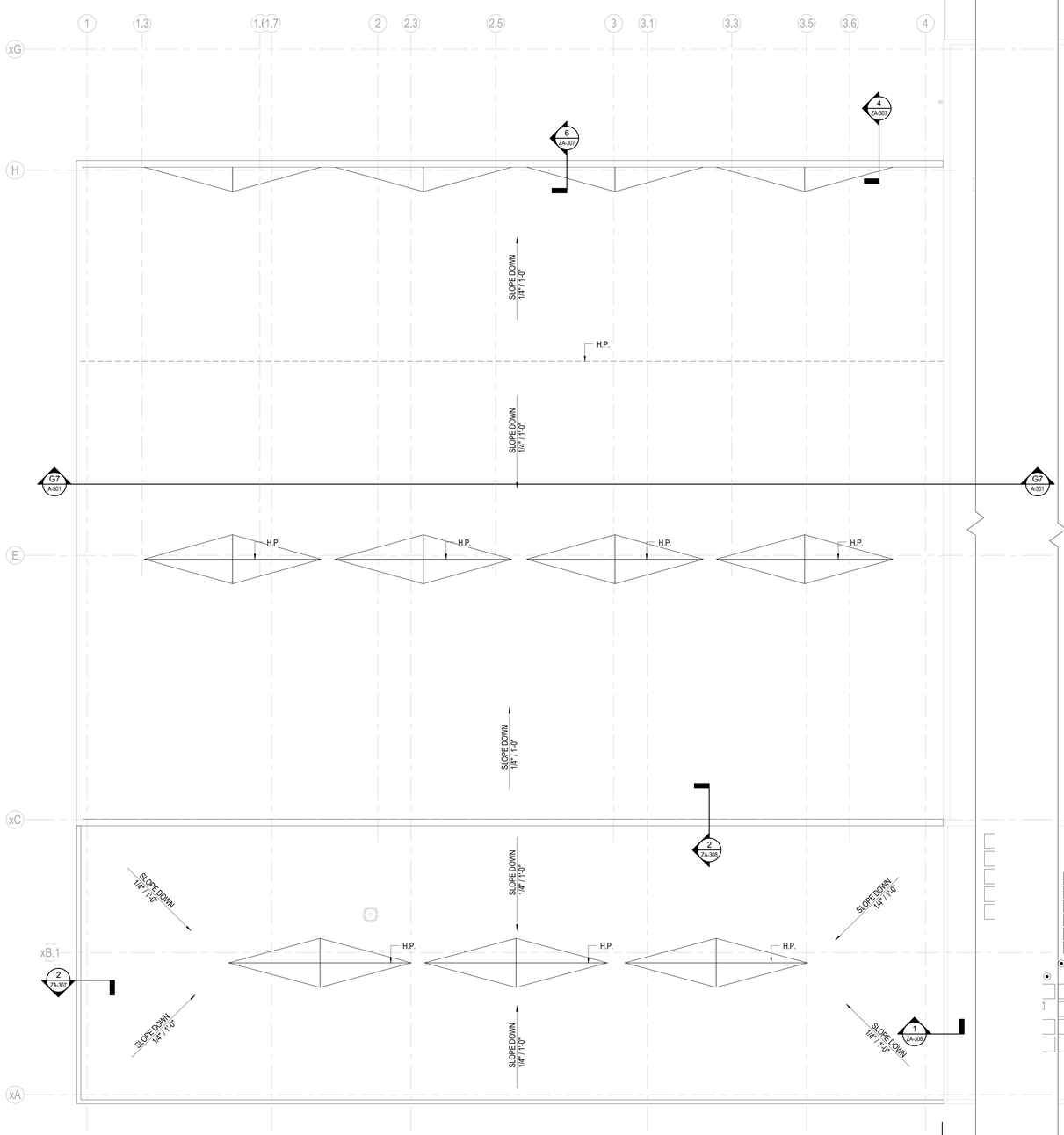
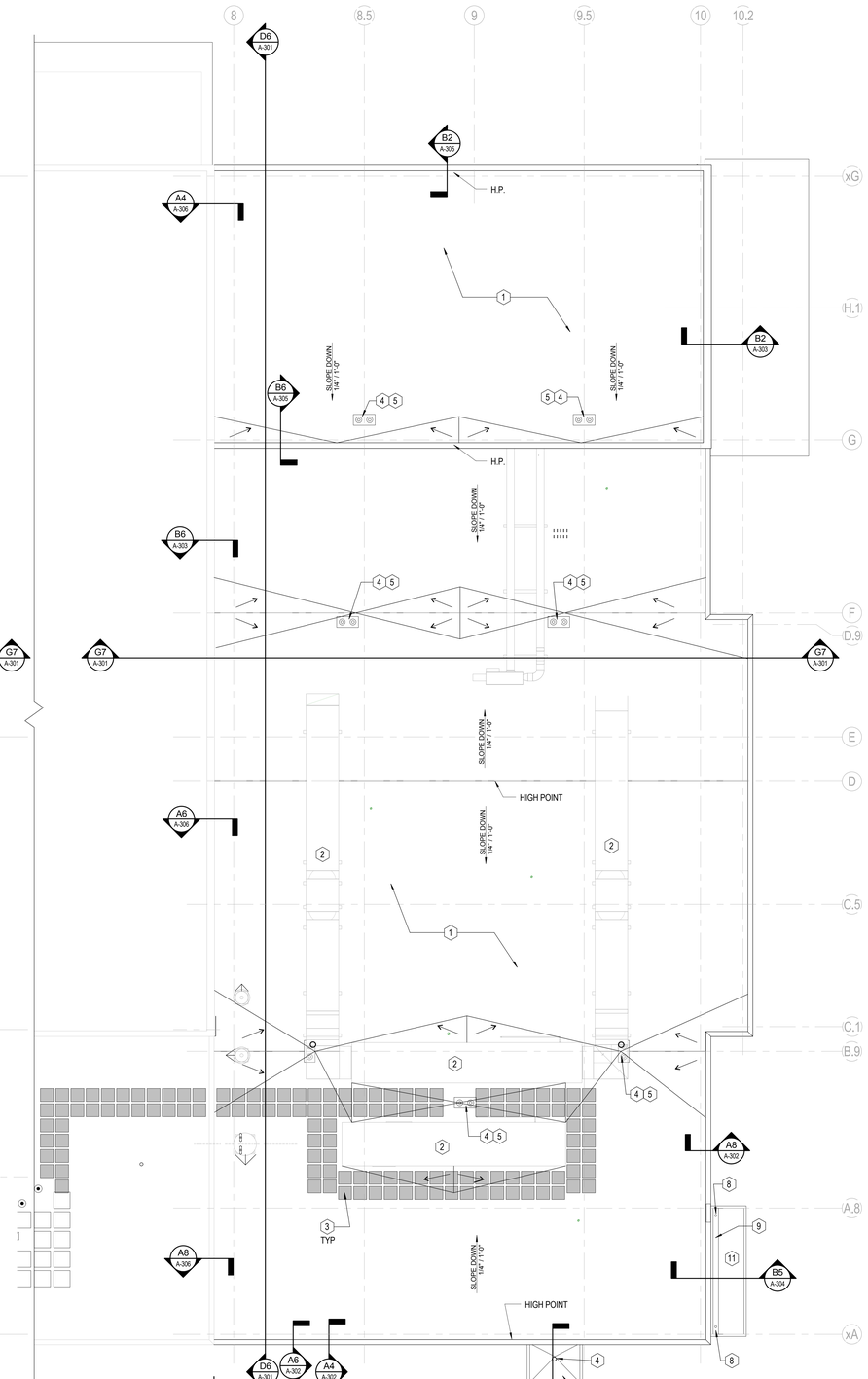


B5 A-106 **ROOF PLAN WEST - OPTION 5**
1/8" = 1'-0"
0 4 8 16'



B2 A-106 **ROOF PLAN EAST**
1/8" = 1'-0"
0 4 8 16'

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST.
2. COORDINATE ROOFING ACCESSORIES REQUIRED FOR LIGHTNING PROTECTION SYSTEM WITH ELECTRICAL CONTRACTOR.
3. REFER TO ELECTRICAL AND MECHANICAL ROOF PLANS FOR ADDITIONAL ROOF PENETRATIONS AND IDENTIFICATION OF PENETRATIONS INDICATED.
4. ALL MECHANICAL EQUIPMENT ROOF CURBS/EQUIMENT SUPPORTS TO BE FURNISHED BY DIVISION 23 CONTRACTOR AND INSTALLED BY DIVISION 7 CONTRACTOR.
5. SEE DRAWING A-503 FOR TYPICAL ROOF SUPPORT FLASHING DETAILS.
6. SLOPES ARE CREATED BY BOTH SLOPING STEEL AND TAPERED INSULATION - SEE LEGEND BELOW.
7. COORDINATE WITH PLUMBING DRAWINGS AND CONTRACTOR FOR ALL PIPING PENETRATIONS THRU ROOF.
8. COORDINATE AND PROVIDE MANUFACTURER STANDARD TPO ROOF DETAILS FOR ALL ROOF MEMBRANE PENETRATIONS - INCLUDING FASTENER PENETRATIONS.

CONSTRUCTION SHEET KEYED NOTES

1. FULLY ADHERED WHITE TPO ROOF MEMBRANE ON 1/2" PROTECTION BOARD ON 6" RIGID INSULATION ON METAL DECK
2. MECHANICAL EQUIPMENT - SEE MECHANICAL DRAWINGS
3. MEMBRANE ROOF WALKWAY PADS
4. ROOF DRAIN - REFER TO PLUMBING DRAWINGS
5. OVERFLOW DRAIN - REFER TO PLUMBING DRAWINGS
6. TAPERED RIGID INSULATION CRICKET - SLOPE TO BE 1/2" PER 1'-0"
7. FULLY ADHERED WHITE TPO MEMBRANE ROOF SYSTEM ON 1" MINIMUM TAPERED RIGID INSULATION ON METAL DECK - SLOPE AT 1/4" PER 12" MINIMUM
8. 3" DIAMETER LOW PROFILE GUTTER DRAIN
9. FORMED STAINLESS STEEL GUTTER BOX WITH LAPPED AND SOLDERED SEAMS SLOPED TO DRAIN - SEE WALL SECTIONS AND DETAILS
10. FULLY ADHERED WHITE TPO ROOF MEMBRANE ON 1" MINIMUM TAPERED RIGID INSULATION ON METAL DECK
11. FULLY ADHERED WHITE TPO ROOF MEMBRANE ON 1/2" FACED EXTERIOR GLASS MAT GYPSUM SHEATHING ON METAL DECK

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED:
APPROVED: | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED			
EDMS REVISION			

TECH LEAD: | FAC-SYS MGR: | REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ROOF PLANS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	106

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-106
0351-COF20244-A-106_CE_1.dwg TEMPLATE DATE: 02/28/2011

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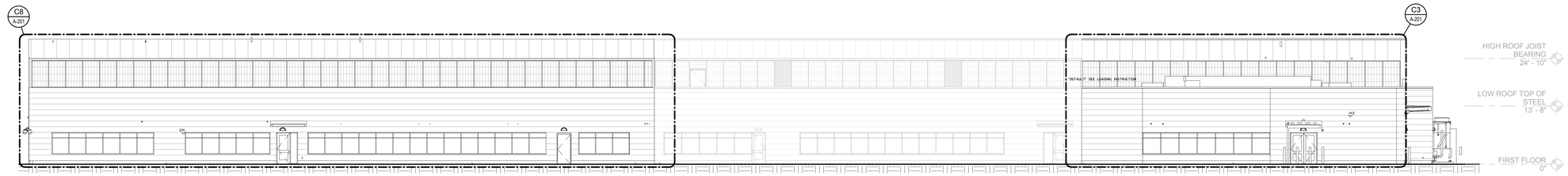
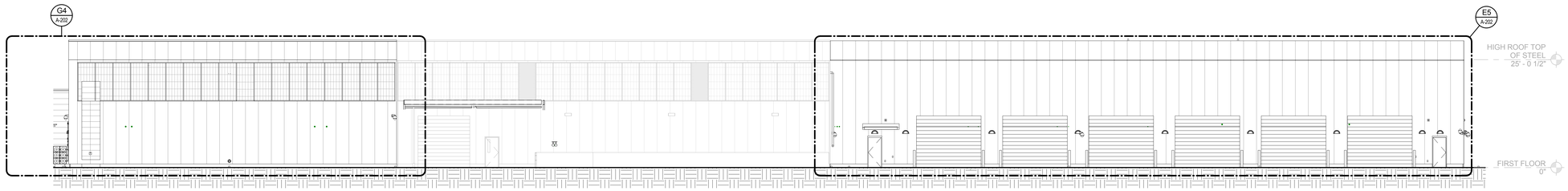
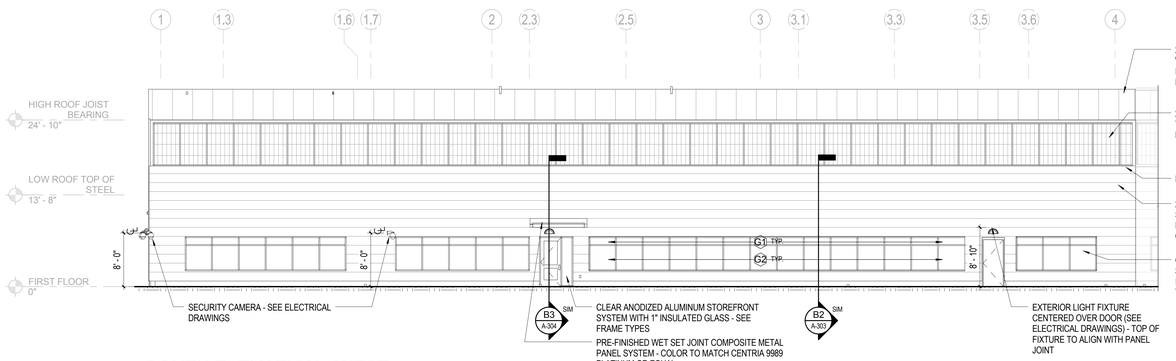


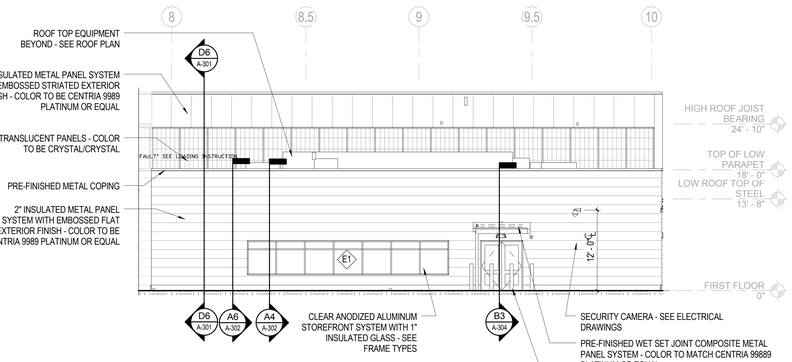
G8 / A-201 CONTROL SOUTH ELEVATION
1" = 10'-0" 0 5 10 20'



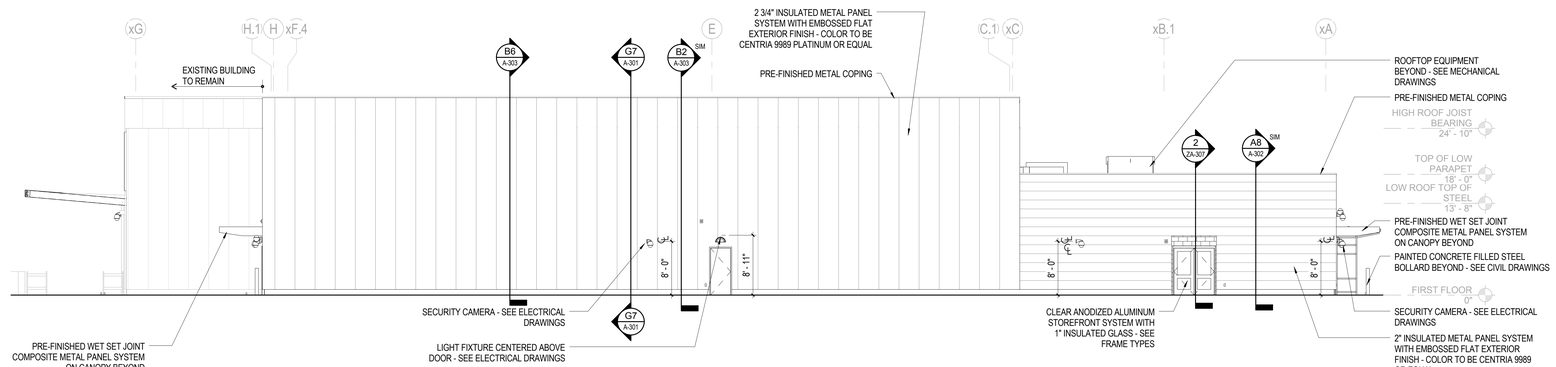
E8 / A-201 CONTROL NORTH ELEVATION
1" = 10'-0" 0 8 16 32'



C8 / A-201 SOUTH ELEVATION - WEST ADDITION (BID OPTION 05)
1/8" = 1'-0" 0 4 8 16'



C3 / A-201 SOUTH ELEVATION -EAST ADDITION
1/8" = 1'-0" 0 4 8 16'



A8 / A-201 WEST ELEVATION - WEST ADDITION (BID OPTION 05)
1/8" = 1'-0" 0 4 8 16'

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-002 FOR SUBMITTAL DRAWING LIST.
2. SEE FRAME TYPE DRAWINGS FOR EXTERIOR CURTAIN WALL AND LOUVER INFORMATION.

CHG	NUM	DESCRIPTION		APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD:	FAC-SYS MGR:	REV DATE:

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LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

EXTERIOR ELEVATIONS

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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:

RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	201

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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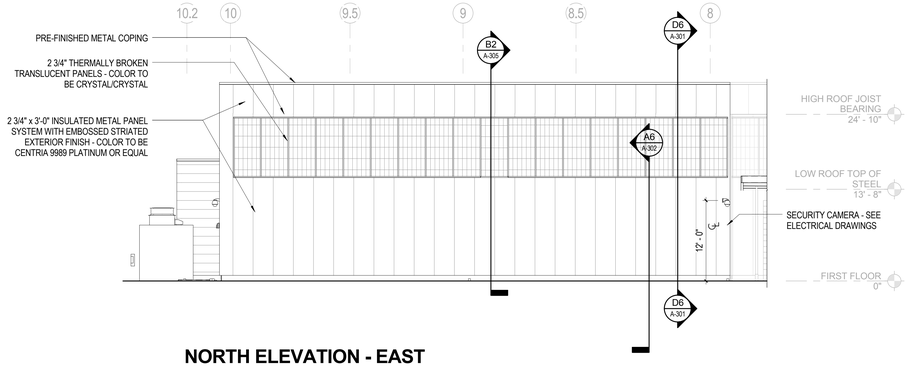
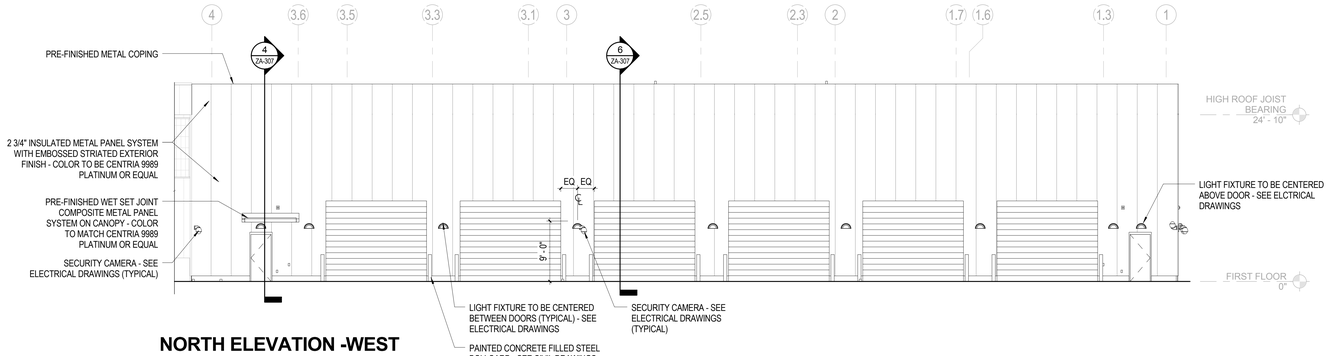


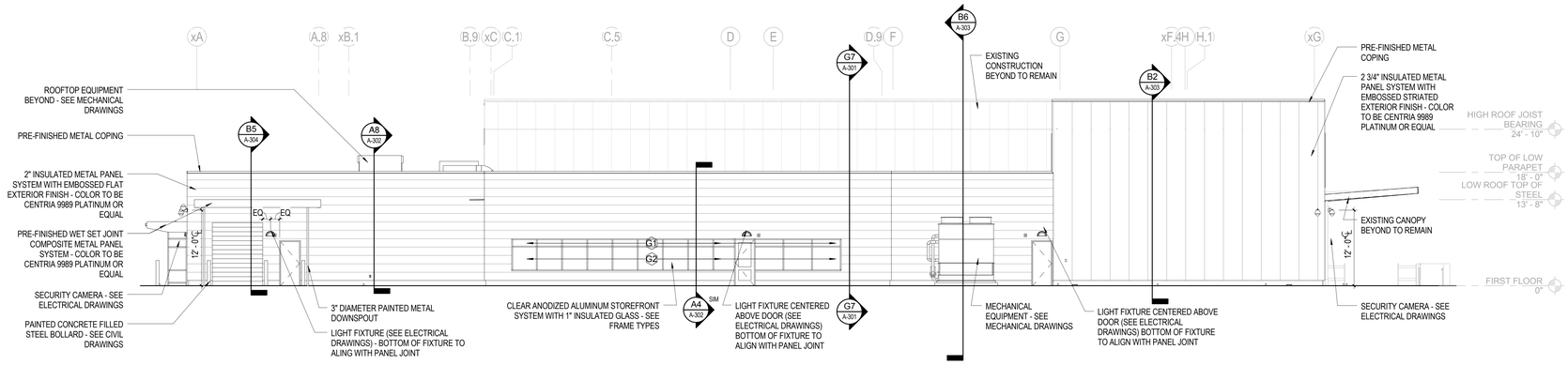
NORTH ELEVATION - EAST ADDITION

G4 / A-202 1/8" = 1'-0"



NORTH ELEVATION -WEST ADDITION (BID OPTION 05)

E5 / A-202 1/8" = 1'-0"



EAST ELEVATION - EAST ADDITION

C6 / A-202 1/8" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-002 FOR SUBMITTAL DRAWING LIST.
2. SEE FRAME TYPE DRAWINGS FOR EXTERIOR CURTAIN WALL AND LOUVER INFORMATION.

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NASA APPROVALS

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D.ENG: | PROJ. MGR:
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FY14 B351 WAREHOUSE ADDITION

EXTERIOR ELEVATIONS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	202

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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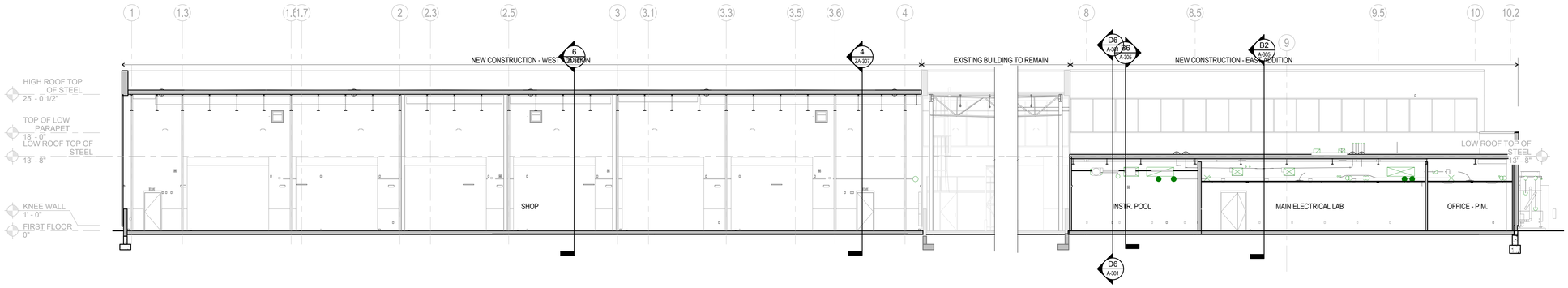
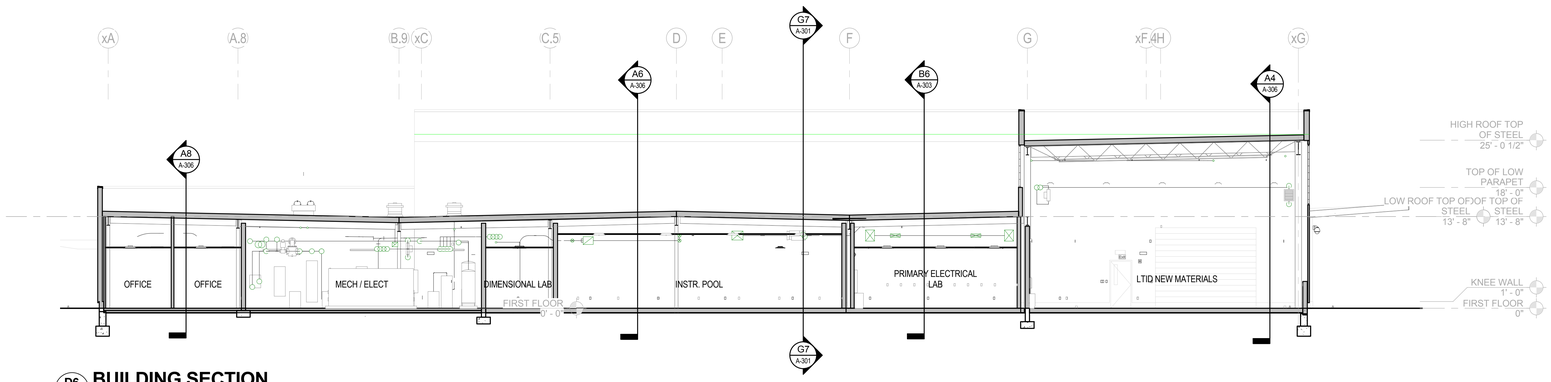


G7 A-301 **BUILDING SECTION**
1/8" = 1'-0"



D6 A-301 **BUILDING SECTION**
1/8" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST.
2. LARGER SCALE DETAIL VIEWS TAKE PRECEDENCE OVER SMALLER SCALE VIEWS.
3. ALL PAINTED EXPOSED STRUCTURAL STEEL TO RECEIVE FACTORY PRIMER AND FINISH COAT.
4. CONTRACTOR TO PROVIDE TEMPORARY WALL ENCLOSURE IN AREAS WHERE EXISTING INSULATED METAL PANELS ARE INDICATED TO BE REMOVED AND SHALL SUBMIT DRAWINGS TO OWNER FOR REVIEW PRIOR TO INSTALLATION OF TEMPORARY ENCLSURES.
5. EXISTING INSULATED METAL PANELS INDICATED TO BE REMOVED/RE-INSTALLED ARE TO BE REMOVED AND STORED IN A LOCATION TO BE DETERMINED BY THE OWNER UNTIL RE-INSTALLATION. METAL PANEL INSTALLER SHALL RE-USE BASE EXTRUSIONS AT THEIR DISCRETION.

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DR: | DES:
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FY14 B351 WAREHOUSE ADDITION

BUILDING SECTIONS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	301

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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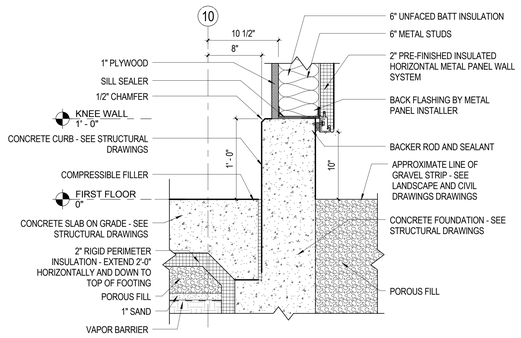
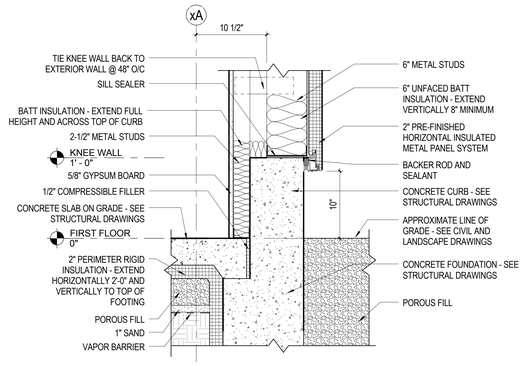


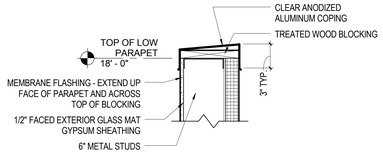
F8 / A-302 DETAIL AT LOW CURB

1 1/2" = 1'-0"



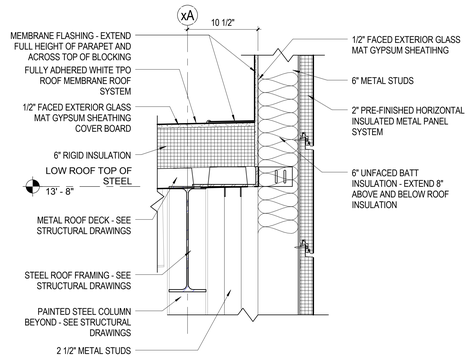
F6 / A-302 DETAIL AT LOW CURB

1 1/2" = 1'-0"



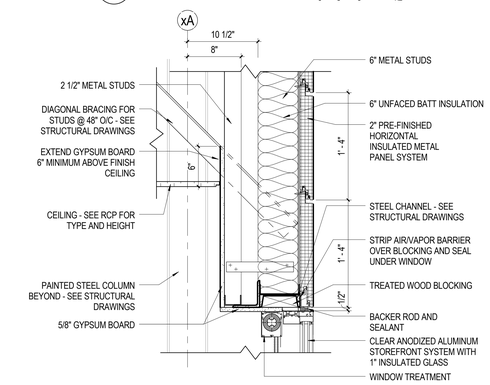
H4 / A-302 TYPICAL COPING DETAIL AT LOW BAY

1 1/2" = 1'-0"



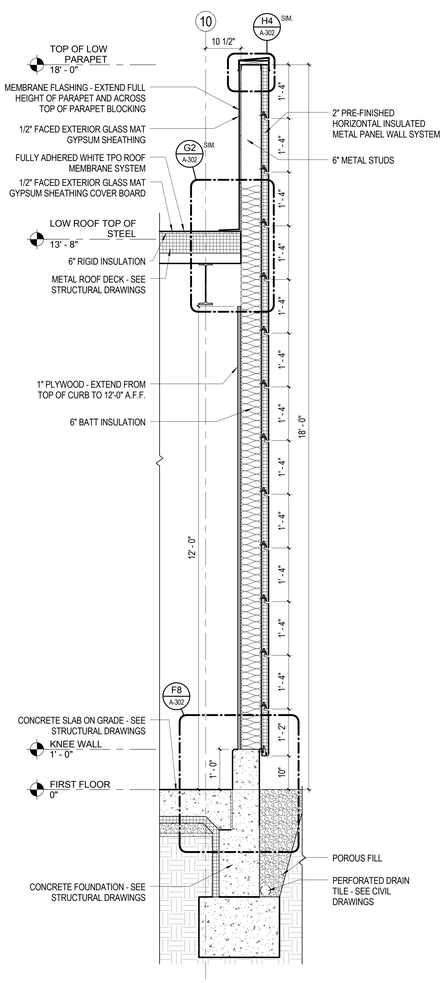
G2 / A-302 ROOF/PARAPET CONNECTION DETAIL AT LOW BAY

1 1/2" = 1'-0"



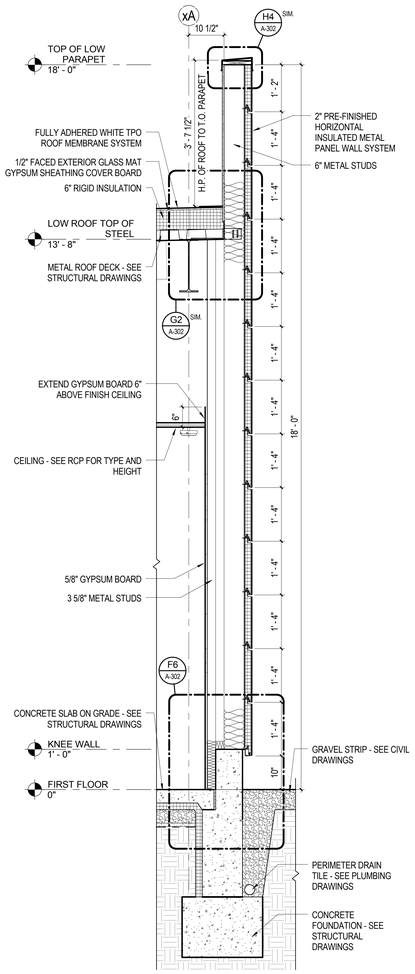
E2 / A-302 WINDOW HEAD DETAIL

1 1/2" = 1'-0"



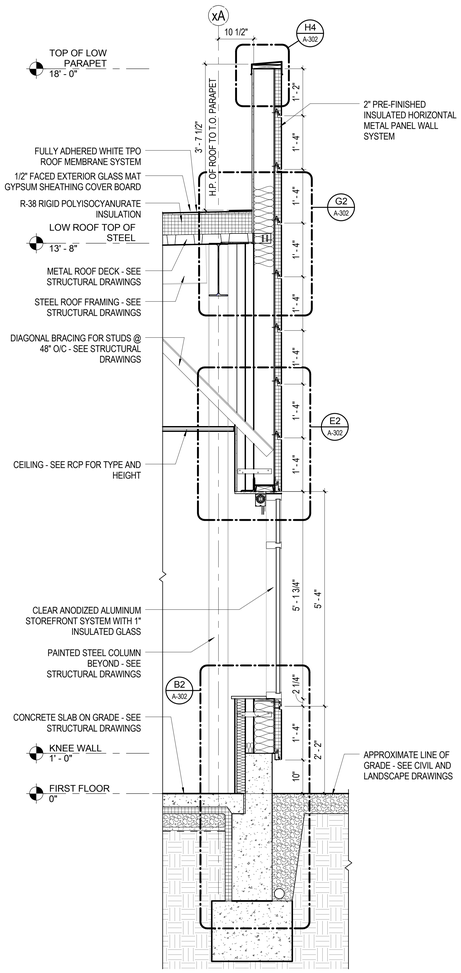
A8 / A-302 WALL SECTION

3/4" = 1'-0"



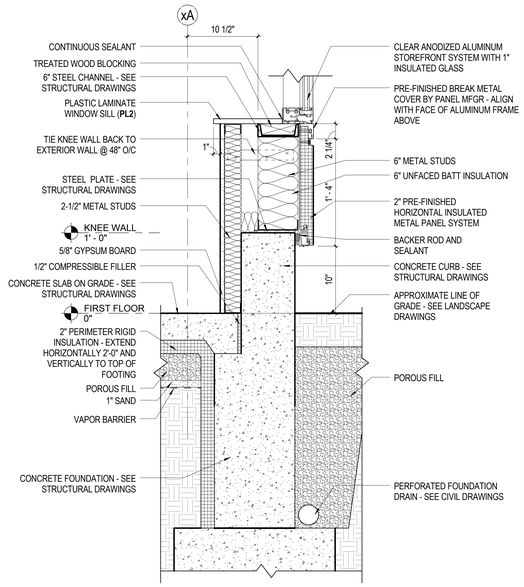
A6 / A-302 WALL SECTION

3/4" = 1'-0"



A4 / A-302 WALL SECTION

3/4" = 1'-0"



B2 / A-302 SILL DETAIL

1 1/2" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST.
2. LARGER SCALE DETAIL VIEWS TAKE PRECEDENCE OVER SMALLER SCALE VIEWS.
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BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

EAST ADDITION - WALL SECTIONS AND DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	302

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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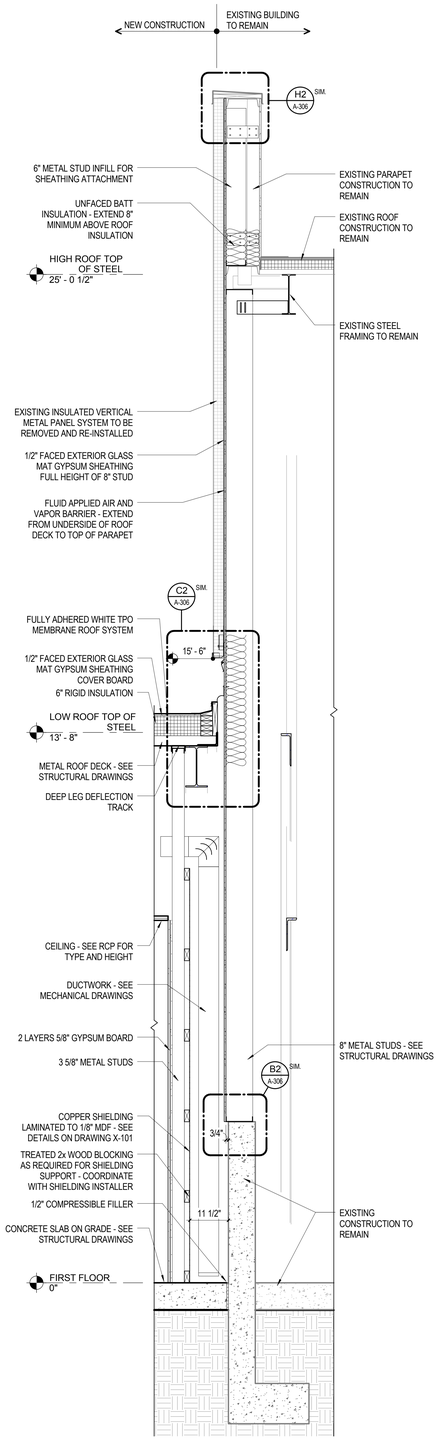
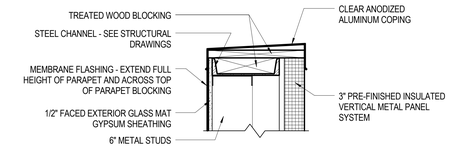


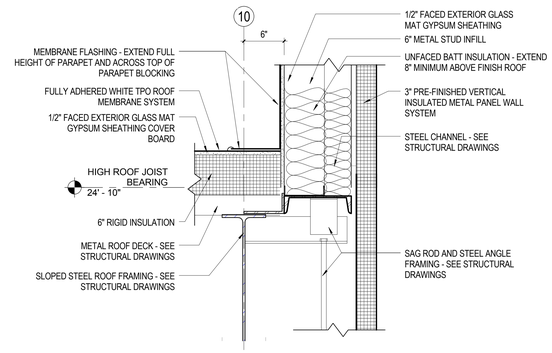
WALL SECTION AT TRANSITION

B6 / A-303 — 3/4" = 1'-0"



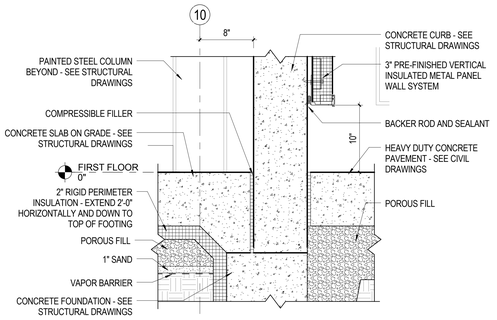
TYPICAL COPING DETAIL AT HIGH BAY

H4 / A-303 — 1 1/2" = 1'-0"



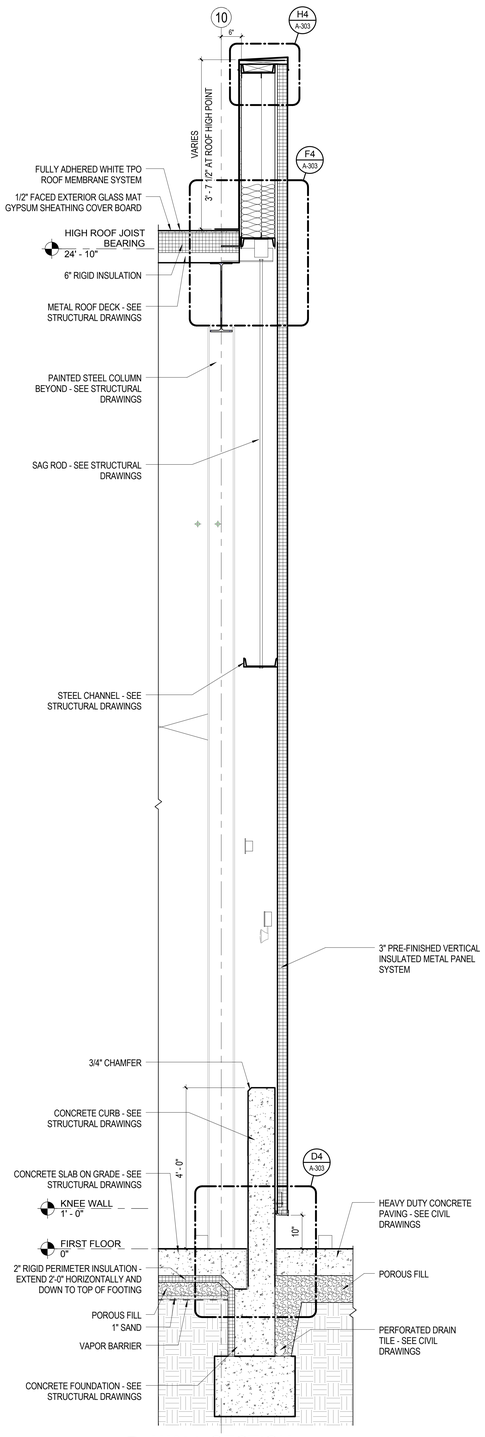
ROOF/PARAPET CONNECTION AT HIGH BAY

F4 / A-303 — 1 1/2" = 1'-0"



CURB DETAIL

D4 / A-303 — 1 1/2" = 1'-0"



WALL SECTION

B2 / A-303 — 3/4" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST.
2. LARGER SCALE DETAIL VIEWS TAKE PRECEDENCE OVER SMALLER SCALE VIEWS.
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FY14 B351 WAREHOUSE ADDITION

EAST ADDITION - WALL SECTIONS AND DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	303

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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A-303

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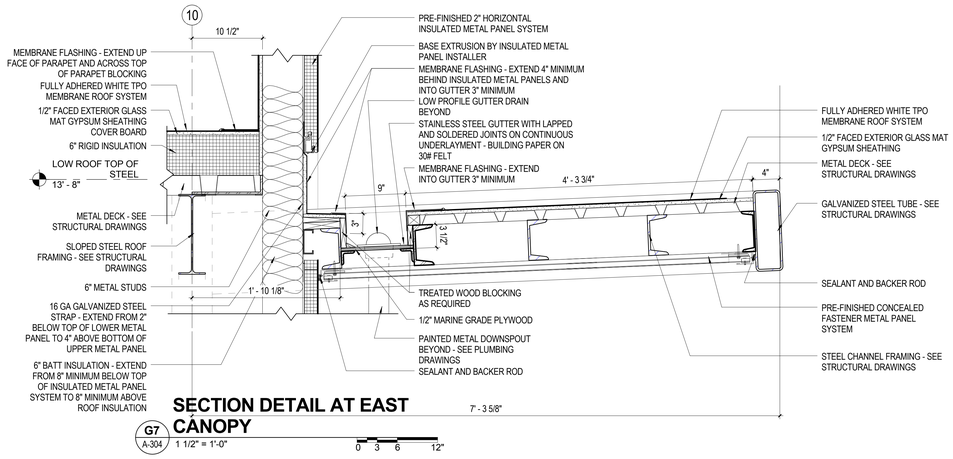
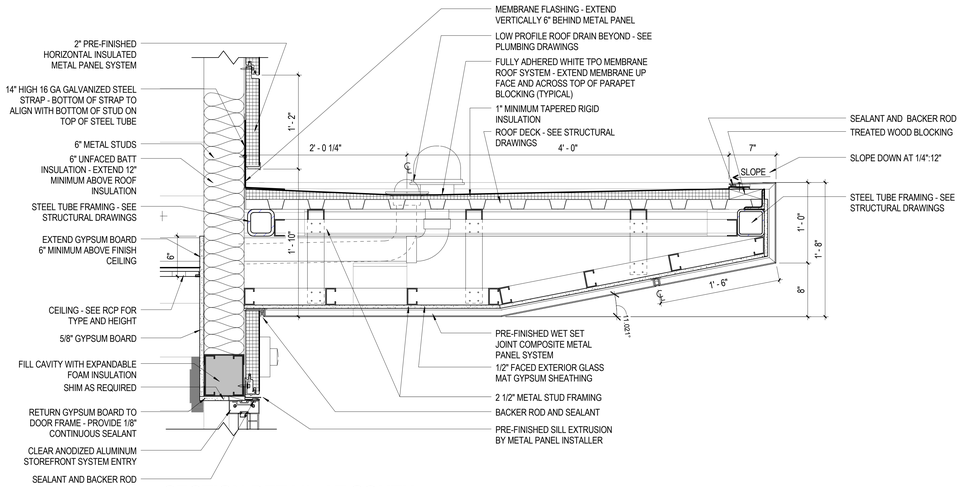


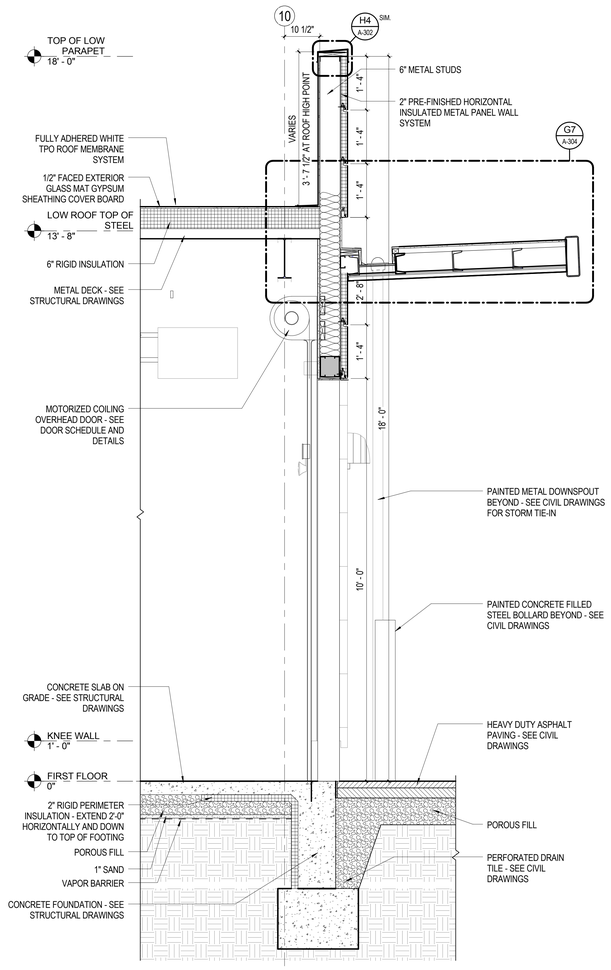
SECTION DETAIL AT EAST CANOPY

G7 / A-304 — 1 1/2" = 1'-0"



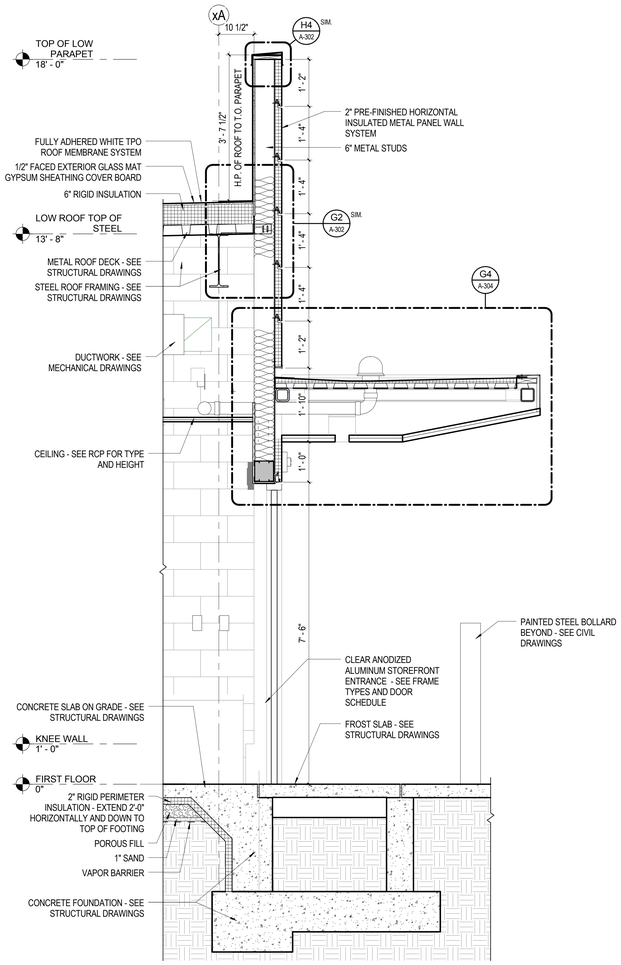
SECTION DETAIL AT SOUTH CANOPY

G4 / A-304 — 1 1/2" = 1'-0"



WALL SECTION

B5 / A-304 — 3/4" = 1'-0"



WALL SECTION

B3 / A-304 — 3/4" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST.
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3. ALL PAINTED EXPOSED STRUCTURAL STEEL TO RECEIVE FACTORY PRIMER AND FINISH COAT.
4. CONTRACTOR TO PROVIDE TEMPORARY WALL ENCLOSURE IN AREAS WHERE EXISTING INSULATED METAL PANELS ARE INDICATED TO BE REMOVED AND SHALL SUBMIT DRAWINGS TO OWNER FOR REVIEW PRIOR TO INSTALLATION OF TEMPORARY ENCLSURES.
5. EXISTING INSULATED METAL PANELS INDICATED TO BE REMOVED/RE-INSTALLED ARE TO BE REMOVED AND STORED IN A LOCATION TO BE DETERMINED BY THE OWNER UNTIL RE-INSTALLATION. METAL PANEL INSTALLER SHALL RE-USE BASE EXTRUSIONS AT THEIR DISCRETION.

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D.ENG: | PROJ. MGR:
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RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

EAST ADDITION - WALL SECTIONS AND DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	304

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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A-304
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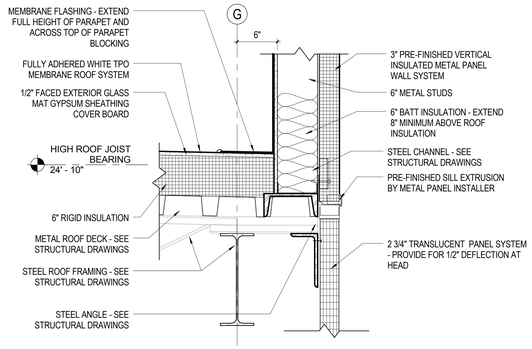
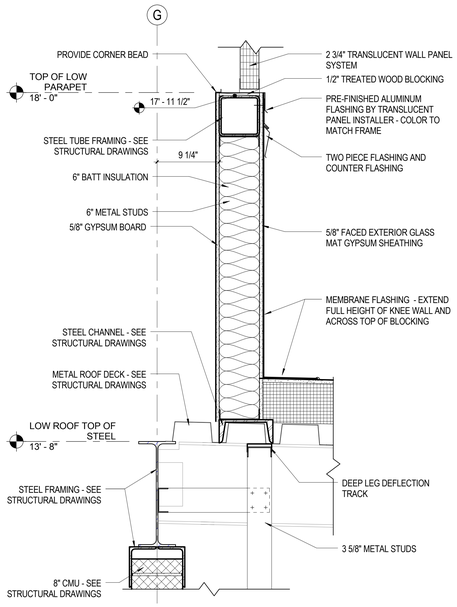


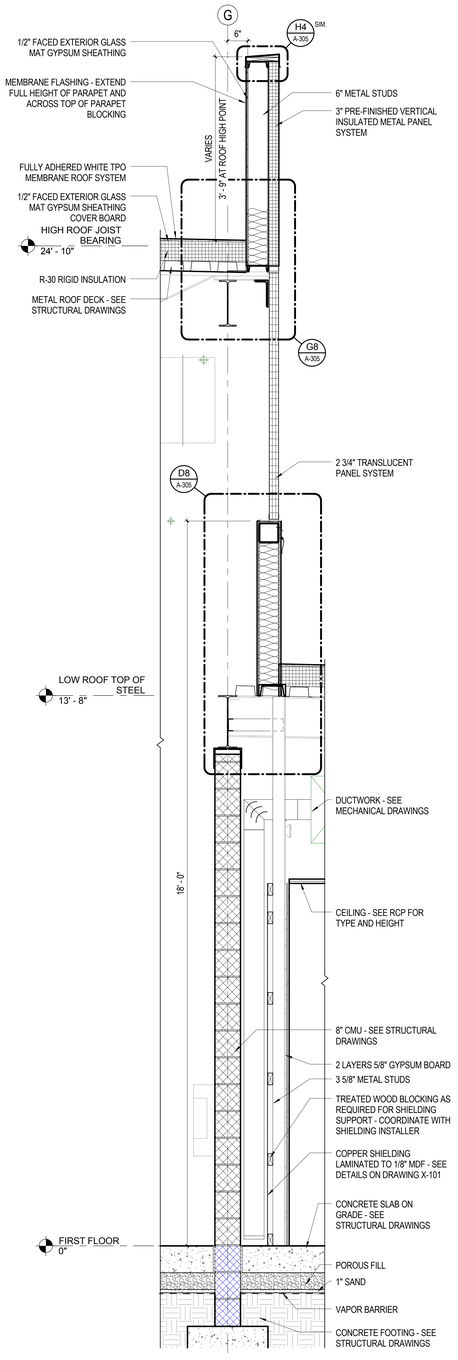
ROOF/PARAPET CONNECTION AT HIGH ROOF

G8 / A-305 — 1 1/2" = 1'-0"



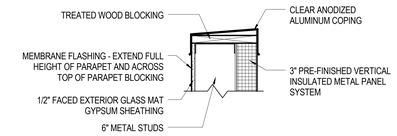
DETAIL AT LOW/HIGH CONNECTION

D8 / A-305 — 1 1/2" = 1'-0"



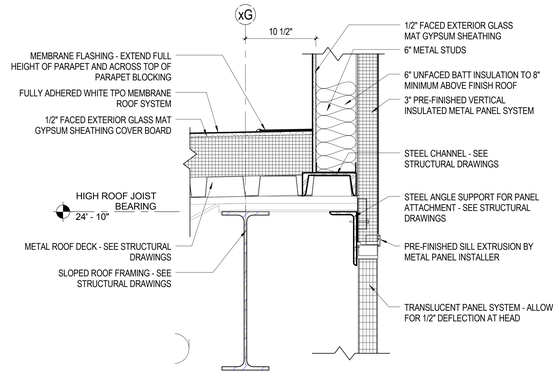
WALL SECTION

B6 / A-305 — 3/4" = 1'-0"



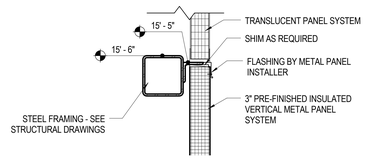
COPING DETAIL AT HIGH BAY

H4 / A-305 — 1 1/2" = 1'-0"



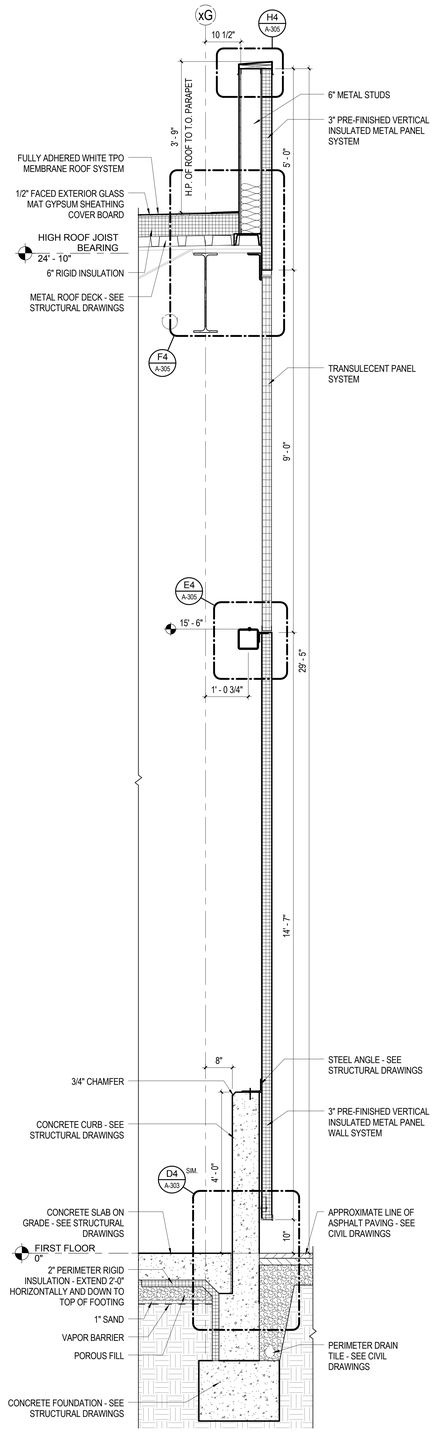
ROOF/PARAPET CONNECTION AT HIGH ROOF

F4 / A-305 — 1 1/2" = 1'-0"



SECTION DETAIL

E4 / A-305 — 1 1/2" = 1'-0"



WALL SECTION

B2 / A-305 — 3/4" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

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FY14 B351 WAREHOUSE ADDITION

EAST ADDITION - WALL SECTIONS AND DETAILS

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RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	A-	305

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-305

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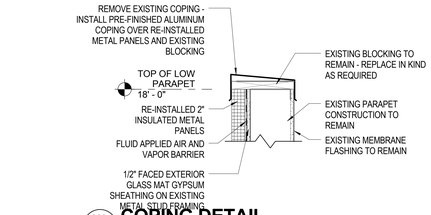
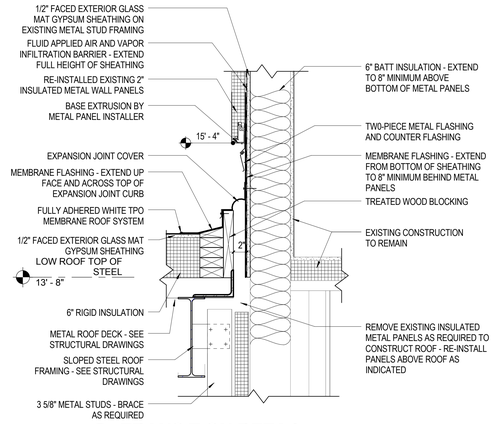
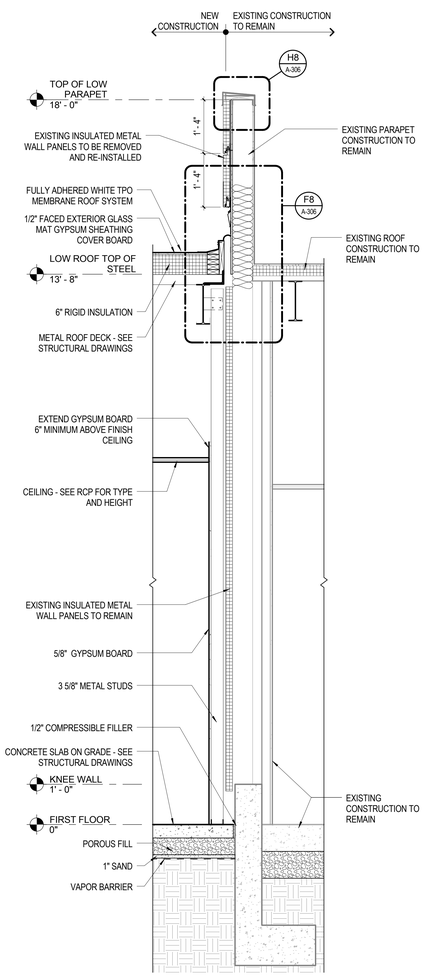


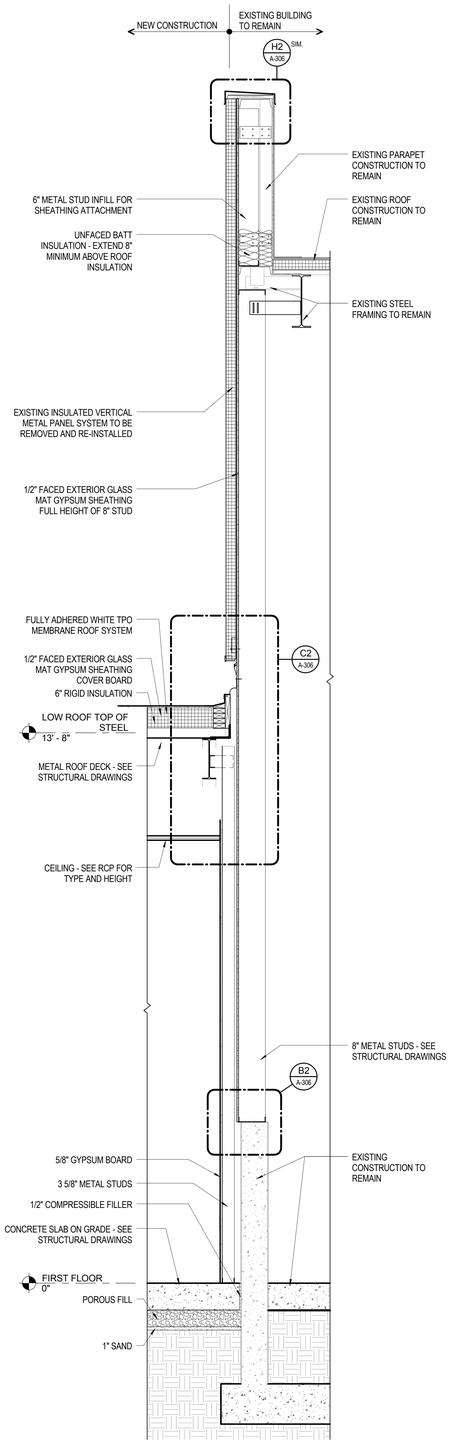
H8 A-306 **COPING DETAIL**
1 1/2" = 1'-0"



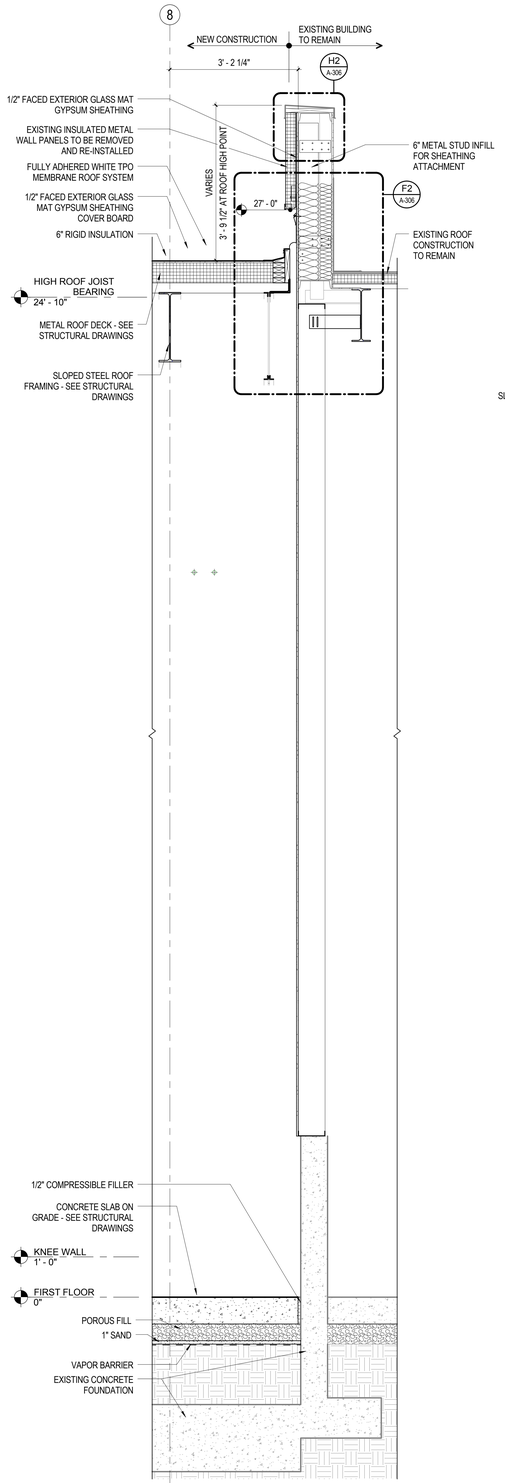
F8 A-306 **TRANSITION DETAIL**
1 1/2" = 1'-0"



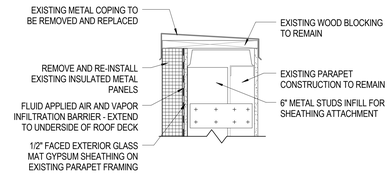
A8 A-306 **WALL SECTION**
3/4" = 1'-0"



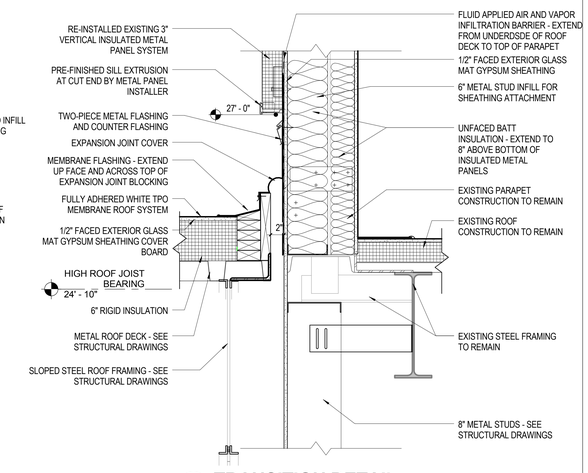
A6 A-306 **WALL SECTION**
3/4" = 1'-0"



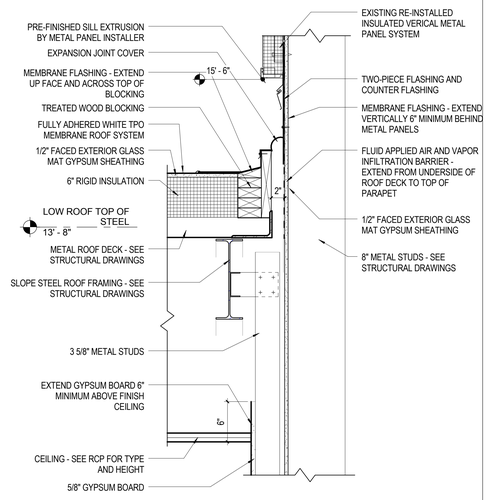
A4 A-306 **WALL SECTION**
3/4" = 1'-0"



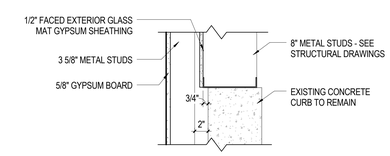
H2 A-306 **COPING DETAIL**
1 1/2" = 1'-0"



F2 A-306 **TRANSITION DETAIL**
1 1/2" = 1'-0"



C2 A-306 **TRANSITION DETAIL**
1 1/2" = 1'-0"



B2 A-306 **SECTION DETAIL**
1 1/2" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

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FY14 B351 WAREHOUSE ADDITION

EAST ADDITION - WALL SECTIONS AND DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	306

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
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A-306

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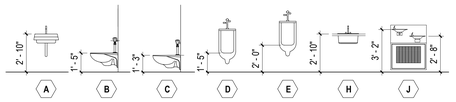
TOILET FIXTURE LEGEND



FIXTURE MOUNTING HEIGHTS

- (A) ACCESSIBLE WALL MOUNTED SINK
- (B) ACCESSIBLE WATER CLOSET
- (C) WATER CLOSET
- (D) ACCESSIBLE URINAL
- (E) URINAL
- (H) COUNTER MOUNTED SINK
- (J) DRINKING FOUNTAIN

GENERAL NOTES

1. PROVIDE FIRE RETARDANT TREATED WOOD BLOCKING BEHIND ALL WALL MOUNTED ACCESSORIES AS REQUIRED. MOUNT WITH CONCEALED FASTENERS.

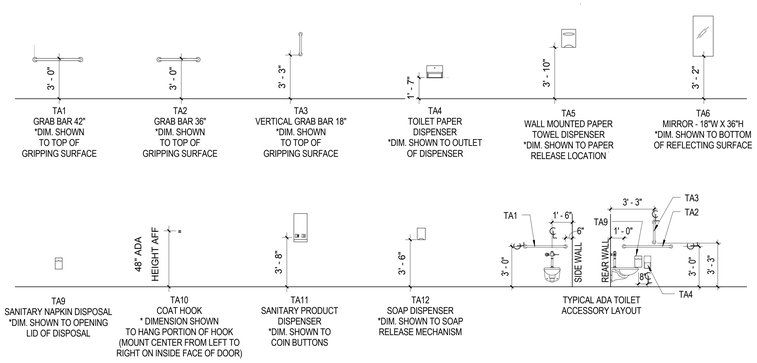
PLUMBING FIXTURE SCHEDULE - EAST

Count	Type Mark	Description
121		
CORRIDOR (EAST)		
1	J	WALL MOUNTED DRINKING FOUNTAIN
122		
JDD WKRM		
1	H	COUNTER MOUNTED SINK
127		
WOMEN'S RESTROOM		
2	A	ACCESSIBLE WALL MOUNTED SINK
1	B	WALL MOUNTED ACCESSIBLE WATER CLOSET
1	C	WALL MOUNTED WATER CLOSET
129		
MEN'S RESTROOM		
2	A	ACCESSIBLE WALL MOUNTED SINK
1	B	WALL MOUNTED ACCESSIBLE WATER CLOSET
1	D	WALL MOUNTED ACCESSIBLE URINAL
131		
PRODUCTION CONTROL		
1	H	COUNTER MOUNTED SINK

CONSTRUCTION GENERAL SHEET NOTES

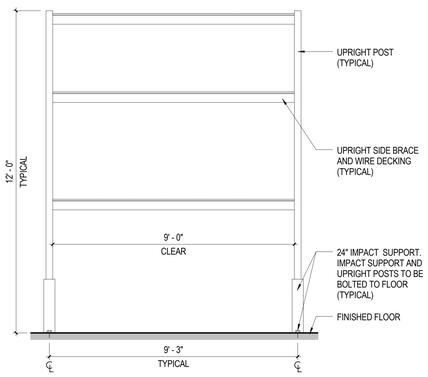
1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST
2. REFER TO LIFE SAFETY PLAN ON SHEET G-002 FOR FIRE RATED PARTITION TYPES AND LOCATIONS
3. REFER TO FRAME TYPES DRAWING A-601 FOR INTERIOR WINDOW OPENINGS
4. ALL DOOR OPENINGS TO BE LOCATED 4" FROM NEAREST PERPENDICULAR WALL UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
5. DIMENSIONS PROVIDED ARE TO FINISHED FACE OF PARTITION UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
6. CONTRACTOR TO VERIFY ALL BUILT-IN COUNTER, CABINETRY AND SURFACE MOUNTED EQUIPMENT LOCATIONS AND PROVIDE BLOCKING WITHIN PARTITION CONSTRUCTION AS REQUIRED FOR THEIR INSTALLATION
7. REFER TO INTERIOR ELEVATIONS SHEET I-601 FOR ADDITIONAL WALL MOUNTED ITEMS
8. PERIMETER WALL CONSTRUCTION U VALUES:

TYPICAL TOILET ACCESSORY MOUNTING HEIGHT LEGEND



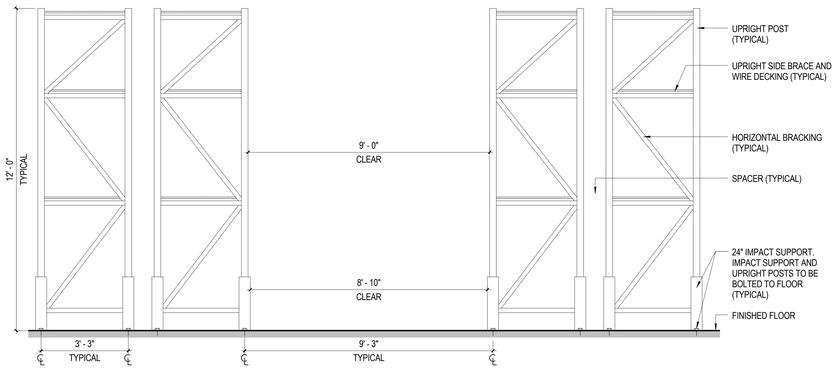
TOILET ACCESSORY SCHEDULE - EAST

Count	Type Mark	Description	Manufacturer	Model
127				
WOMEN'S RESTROOM				
1	TA1	Barrier-Free Grab Bars	Bobrick	812 36
1	TA2	Barrier-Free Grab Bars	Bobrick	812 42
1	TA3	Barrier-Free Grab Bar 18"	Bobrick	B-6806x18"
4	TA4	Surface-Mounted Multi-Roll Toilet Tissue Dispenser	Bobrick	B-2888 (barrier free)
1	TA5	Wall Mtd Paper Towel Dispenser	Kimberly-Clark	09991
2	TA6	Channel-Frame Mirrors	Bobrick	B-165 1836
1	TA7	Slim Jim w/ Venting Channels	Rubbermaid	3540-60
2	TA9	Sanitary Napkin Disposal	Bobrick	B-254
2	TA10	Coat Hook	Bobrick	B-670
1	TA11	Sanitary Napkin/Tampon dispenser	Bobrick	B-282 25 (barrier free)
1	TA12	Soap Dispenser	Bobrick	B-2111
129				
MEN'S RESTROOM				
1	TA1	Barrier-Free Grab Bars	Bobrick	812 36
1	TA2	Barrier-Free Grab Bars	Bobrick	812 42
1	TA3	Barrier-Free Grab Bar 18"	Bobrick	B-6806x18"
1	TA4	Surface-Mounted Multi-Roll Toilet Tissue Dispenser	Bobrick	B-2888 (barrier free)
1	TA5	Wall Mtd Paper Towel Dispenser	Kimberly-Clark	09991
2	TA6	Channel-Frame Mirrors	Bobrick	B-165 1836
1	TA7	Slim Jim w/ Venting Channels	Rubbermaid	3540-60
1	TA10	Coat Hook	Bobrick	B-670
1	TA12	Soap Dispenser	Bobrick	B-2111



NOTE:
1. ROW SPACERS, IMPACT SUPPORT COMPONENTS, WIRE DECKING AND BRACING TO BE PROVIDED AS REQUIRED PER MANUFACTURER'S WRITTEN RECOMMENDATIONS. RACKS TO BE LEVEL, PLUMB AND PROPERLY ANCHORED PER MANUFACTURER'S WRITTEN RECOMMENDATIONS.
2. MAXIMUM STORAGE CAPACITY LABEL TO BE ADHERED TO RACKS.
3. VERIFY RACK SHELF SPACING AND QUANTITY WITH OWNER. PROVIDE 3 SHELVES PER RACK.
4. WAREHOUSE SHELVING SYSTEMS TO BE COMPLIANT WITH ALL ANSI MH 16.1-2008 REQUIREMENTS AND GUIDELINES, TYPICAL.
5. RACKS TO BE LYON, HEAVY DUTY, MODEL LU-323-42H144 OR EQUAL.

A4 / A-401 ELEVATION - TYPICAL WAREHOUSE SHELVING
1/2" = 1'-0"



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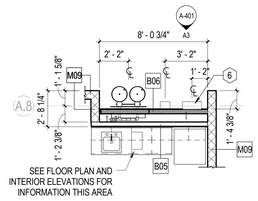
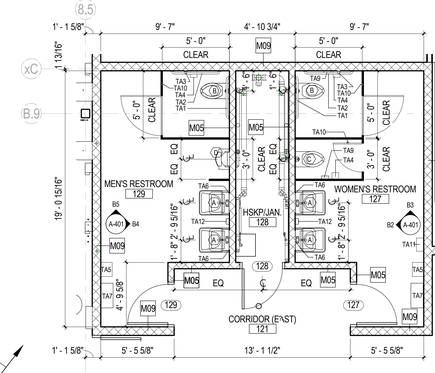
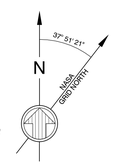
A7 / A-401 ELEVATION - TYPICAL WARE HOUSE SHELVING
1/2" = 1'-0"

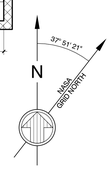


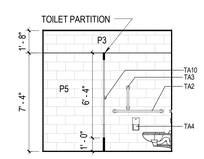
C4 / A-401 ENLARGED PLAN - EAST WATER COOLER ALCOVE
1/4" = 1'-0"



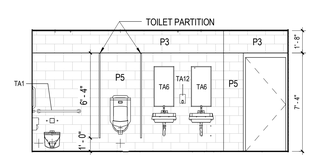
C2 / A-401 ENLARGED PLAN - EAST RESTROOMS
1/4" = 1'-0"



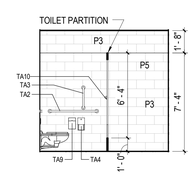




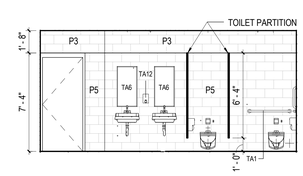
B5 / A-401 MEN'S (EAST)
1/4" = 1'-0"



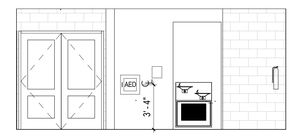
B4 / A-401 MEN'S (EAST)
1/4" = 1'-0"



B3 / A-401 WOMEN'S (EAST)
1/4" = 1'-0"



B2 / A-401 WOMEN'S (EAST)
1/4" = 1'-0"



A3 / A-401 WATER COOLER ALCOVE
1/4" = 1'-0"

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN: Author | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ENLARGED EAST ADDITION TOILET ROOM PLANS, ELEVATIONS, LEGENDS & SCHEDULES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	401

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-401
0351-COF20244-A-401_CE_1.dwg TEMPLATE DATE: 02/28/2011

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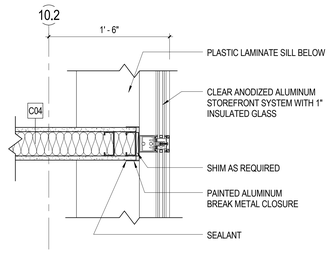
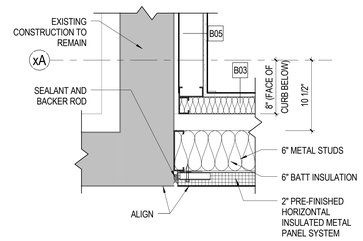


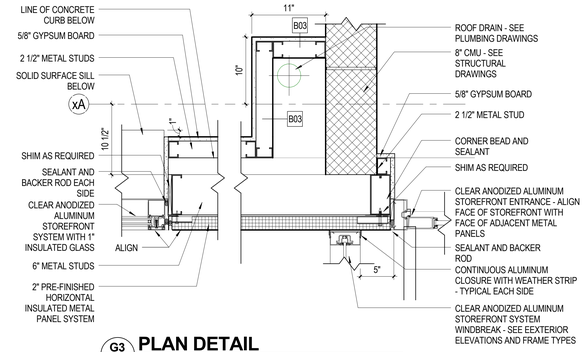
TYPICAL DETAIL AT WALL/MULLION CONNECTION

G6 / A-501 — 1 1/2" = 1'-0"



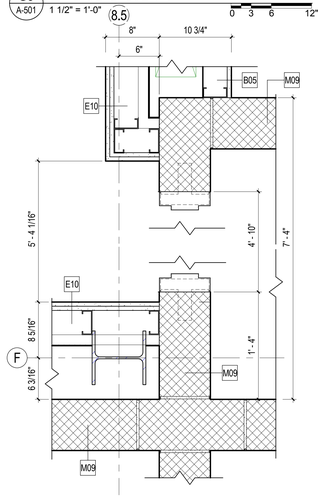
PLAN DETAIL

G5 / A-501 — 1 1/2" = 1'-0"



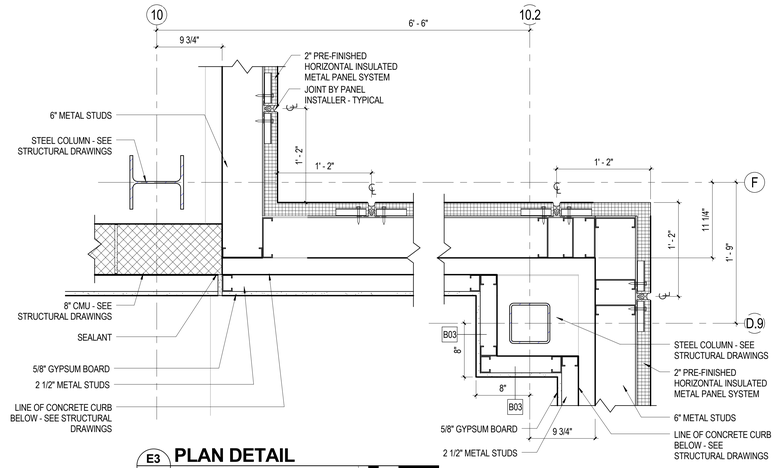
PLAN DETAIL

G3 / A-501 — 1 1/2" = 1'-0"



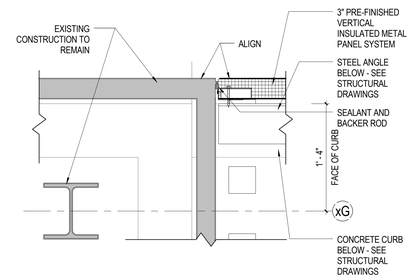
PLAN DETAIL

E5 / A-501 — 1 1/2" = 1'-0"



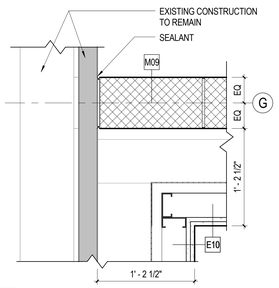
PLAN DETAIL

E3 / A-501 — 1 1/2" = 1'-0"



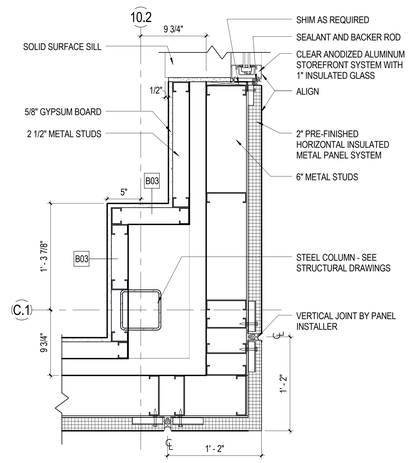
PLAN DETAIL

C5 / A-501 — 1 1/2" = 1'-0"



PLAN DETAIL

B5 / A-501 — 1 1/2" = 1'-0"



PLAN DETAIL

C2 / A-501 — 1 1/2" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST
2. REFER TO LIFE SAFETY PLAN ON SHEET G-002 FOR FIRE RATED PARTITION TYPES AND LOCATIONS
3. REFER TO FRAME TYPES DRAWING A-601 FOR INTERIOR WINDOW OPENINGS
4. ALL DOOR OPENINGS TO BE LOCATED 4" FROM NEAREST PERPENDICULAR WALL UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
5. DIMENSIONS PROVIDED ARE TO FINISHED FACE OF PARTITION UNLESS OTHERWISE NOTED OR DIMENSIONED ON DRAWINGS
6. CONTRACTOR TO VERIFY ALL BUILT-IN COUNTER, CABINETRY AND SURFACE MOUNTED EQUIPMENT LOCATIONS AND PROVIDE BLOCKING WITHIN PARTITION CONSTRUCTION AS REQUIRED FOR THEIR INSTALLATION
7. REFER TO INTERIOR ELEVATIONS SHEET I-601 FOR ADDITIONAL WALL MOUNTED ITEMS
8. PERIMETER WALL CONSTRUCTION U VALUES:

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

EAST ADDITION - PLAN DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	501

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-501

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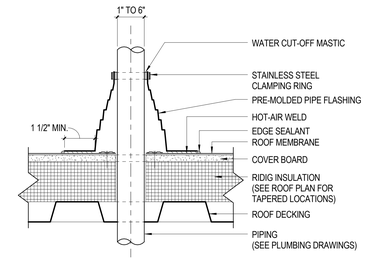
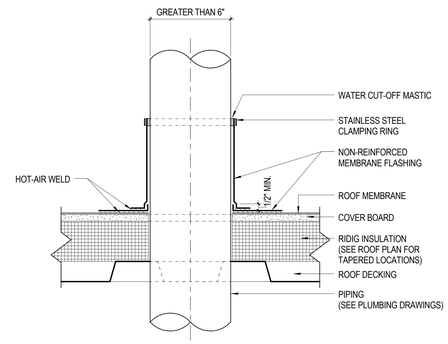
CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST



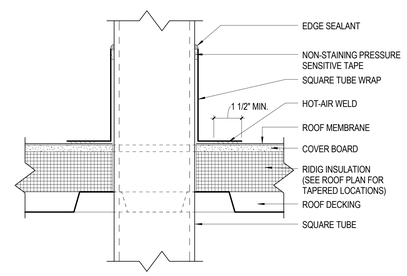
TYPICAL ROOF PIPE FLASHING DETAIL

G3 / A-502 — 3" = 1'-0" (0 1½ 3 6")



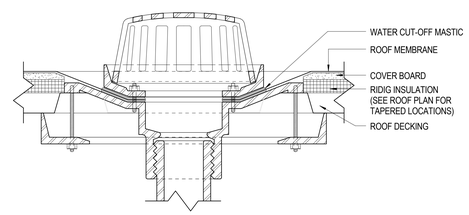
TYPICAL ROOF LARGE PIPE FLASHING DETAIL

E3 / A-502 — 3" = 1'-0" (0 1½ 3 6")



TYPICAL ROOF SQUARE TUBE FLASHING DETAIL

C3 / A-502 — 3" = 1'-0" (0 1½ 3 6")



TYPICAL ROOF DRAIN DETAIL

B3 / A-502 — 3" = 1'-0" (0 1½ 3 6")

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Cleveland, OH 44122
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Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONSULTANTS: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

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D.ENG: | PROJ. MGR:

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RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

TYPICAL ROOF DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	502

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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A-502
0351-COF20244-A-502_CE_1.dwg TEMPLATE DATE: 02/28/2011

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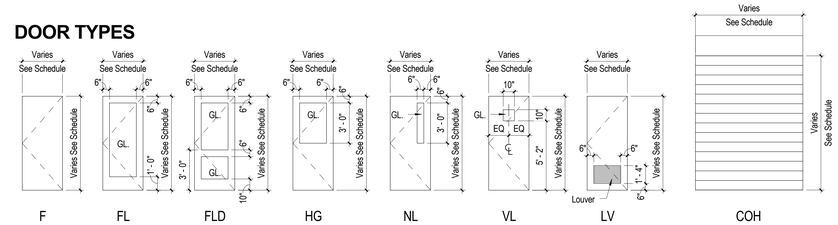
DOOR SCHEDULE KEY

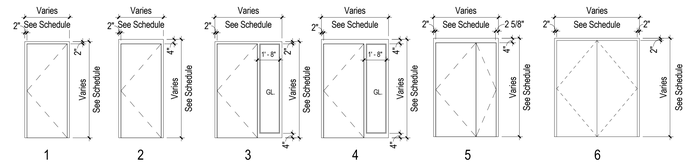
ALUM	ALUMINUM
COH	COILING OVERHEAD DOOR
HM	HOLLOW METAL
STL	STEEL
SCW	SOLID CORE WOOD
HCW	HOLLOW CORE WOOD
TEMP	TEMPERED GLAZING
WIRE	WIRED GLAZING
INS	INSULATED GLAZING
LAM	LAMINATED GLAZING
F	FLUSH DOOR
FG	FULL GLASS DOOR
HG	HALF GLASS DOOR
MS	MEDIUM STILE DOOR
NL	NARROW LITE DOOR
NLFR	NARROW LITE FIRE RATED DOOR
VL	VISION LITE DOOR
WM	WIRE MESH PARTITION DOOR
EXIST	EXISTING TO REMAIN
-	NOT APPLICABLE

DOOR TYPES



*Where glazing is noted (GL.) see door schedule for glazing type

INTERIOR FRAME TYPES



*WHERE GLAZING IS NOTED (GL) SEE DOOR SCHEDULE FOR GLAZING TYPE

Door Schedule - East Addition

Rev. No.	No.	Room Name	Rm. No.	Door Width	Door Height	Door Thick	Door Type	Door Mat'l	Frame Type (Inst)	Frame Mat'l	Frame Details Head	Frame Details Jamb	Frame Details Sill	Opening Fire Label	Opening Glaz	Opening Comments
FIRST FLOOR																
East																
	120A	VESTIBULE (EAST)	120	6'-0"	7'-3 5/8"	1 3/4"	FLD	ALUM/GLASS	E6	ALUM	H6	J6	S2	-	1" INSUL	DOOR TO BE PREPPED FOR ACCESS CONTROL
	120B	CORRIDOR (EAST)	121	6'-0"	7'-2"	1 3/4"	FLD	ALUM/GLASS	6	ALUM	H3	J3		-	1/4" TEMP	DOOR TO BE PREPPED FOR ACCESS CONTROL
	121	PRODUCTION CONTROL	131	4'-6"	7'-0"	1 3/4"	F	HM	5	HM	H2	J2		-		
	122	CORRIDOR (EAST)	121	3'-0"	7'-0"	1 3/4"	F	HM	4	HM	H2	J2		-		
	123	JDD WKRM	122	3'-0"	7'-0"	1 3/4"	F	WD	3	HM	H1/H4	J1/J4/J5		-	1/4" TEMP	WD DOOR TO RECEIVE WOOD VENEER (WV1) AND SIDE LITE GLAZING TO RECEIVE INTERIOR GLAZING FILM (GL1). SEE FINISH LEGEND.
	124	JDD WKRM	122	3'-0"	7'-0"	1 3/4"	F	WD	3	HM	H1/H4	J1/J4/J5		-	1/4" TEMP	WD DOOR TO RECEIVE WOOD VENEER (WV1) AND SIDE LITE GLAZING TO RECEIVE INTERIOR GLAZING FILM (GL1). SEE FINISH LEGEND.
	125A	JDD STOR.	125	8'-0"	10'-0"		COH		-	STEEL	H8	J8				MOTORIZED OVERHEAD COILING DOOR
	125B	JDD STOR.	125	3'-0"	7'-0"	1 3/4"	F	HM	1	HM	H7	J7	S3	-		
	125C	CORRIDOR (EAST)	121	4'-6"	7'-0"	1 3/4"	F	HM	7	HM	H2	J2		-		
	126	CORRIDOR (EAST)	121	3'-0"	7'-0"	1 3/4"	F	HM	2	HM	H2	J2		-		
	127	WOMEN'S RESTROOM	127	3'-0"	7'-0"	1 3/4"	F	HM	2	HM	H2	J2		-		
	128	CORRIDOR (EAST)	121	3'-0"	7'-0"	1 3/4"	F	HM	2	HM	H2	J2		-		
	129	CORRIDOR (EAST)	121	3'-0"	7'-0"	1 3/4"	F	HM	2	HM	H2	J2		-		
	130	MECH / ELECT	130	6'-0"	7'-0"	1 3/4"	F	HM	6	HM	H2	J2		-		
	132A	MAIN ELECTRICAL LAB	132	3'-0"	7'-4"	1 3/4"	FLD	ALUM/GLASS	1	ALUM	H6	J6	S2	-	1" INSUL	DOOR TO BE PREPPED FOR ACCESS CONTROL
	132B	AIR LOCK	136	4'-6"	7'-0"	1 3/4"	F	HM	5	HM	H2	J2		-		
	133	MAIN ELECTRICAL LAB	132	4'-6"	7'-0"	1 3/4"	F	HM	5	HM	H2	J2		-		
	134	MAIN ELECTRICAL LAB	132	4'-6"	7'-0"	1 3/4"	F	HM	5	HM	H2	J2		-		
	135	MAIN ELECTRICAL LAB	132	3'-0"	7'-0"	1 3/4"	F	WD	3	HM	H1/H4	J1/J4/J5		-	1/4" TEMP	WD DOOR TO RECEIVE WOOD VENEER (WV1) AND SIDE LITE GLAZING TO RECEIVE INTERIOR GLAZING FILM (GL1). SEE FINISH LEGEND.
	136A	PRIMARY ELECTRICAL LAB	137	4'-6"	7'-0"	1 3/4"	F	HM	5	HM	H2	J2		-		
	136B	PRIMARY PRESSURE LAB	138	4'-6"	7'-0"	1 3/4"	F	HM	5	HM	H2	J2		-		
	139A	VESTIBULE	139	3'-0"	7'-0"	1 3/4"	F	HM	1	HM	H7	J7	S3	-		
	139B	PRIMARY PRESSURE LAB	138	3'-0"	7'-0"	1 3/4"	F	HM	2	HM	H2	J2		-		

Grand total: 23

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

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FY14 B351 WAREHOUSE ADDITION

DOOR SCHEDULE

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	601

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-601
0351-COF20244-A-601_CE_1.dwg TEMPLATE DATE: 02/28/2011

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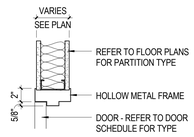
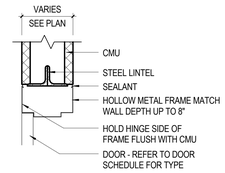


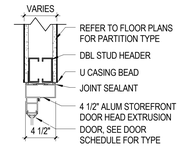
DOOR HEAD DETAIL - GWB PARTITION

H1 / A-602 — 1 1/2" = 1'-0"



DOOR HEAD DETAIL - MASONRY PARTITION

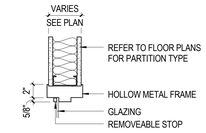
H2 / A-602 — 1 1/2" = 1'-0"



ALL INTERIOR ALUMINUM STOREFRONT / ENTRANCE SYSTEMS TO BE 1/4" FLOAT GLASS UNLESS OTHERWISE NOTED OR REQUIRED BY APPLICABLE BUILDING CODES. REFER TO FRAME TYPES FOR ADDITIONAL GLAZING DESIGNATIONS.

DOOR HEAD DETAIL - ALUMINUM STOREFRONT

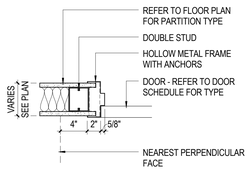
H3 / A-602 — 1 1/2" = 1'-0"



ALL INTERIOR HOLLOW METAL GLAZING TO BE 1/4" TEMPERED GLASS UNLESS OTHERWISE NOTED OR REQUIRED BY APPLICABLE BUILDING CODES. REFER TO FRAME TYPES FOR ADDITIONAL GLAZING DESIGNATIONS.

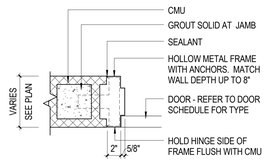
BORROWED/SIDE LITE HEAD DETAIL - GWB PARTITION

H4 / A-602 — 1 1/2" = 1'-0"



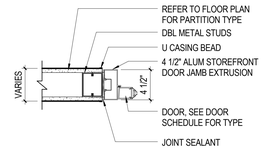
DOOR JAMB DETAIL - GWB PARTITION

J1 / A-602 — 1 1/2" = 1'-0"



DOOR JAMB DETAIL - MASONRY PARTITION

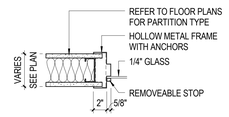
J2 / A-602 — 1 1/2" = 1'-0"



ALL INTERIOR ALUMINUM STOREFRONT / ENTRANCE SYSTEMS TO BE 1/4" FLOAT GLASS UNLESS OTHERWISE NOTED OR REQUIRED BY APPLICABLE BUILDING CODES. REFER TO FRAME TYPES FOR ADDITIONAL GLAZING DESIGNATIONS.

DOOR JAMB DETAIL - ALUMINUM STOREFRONT

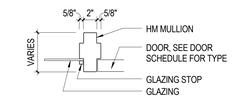
J3 / A-602 — 1 1/2" = 1'-0"



ALL INTERIOR HOLLOW METAL GLAZING TO BE 1/4" TEMPERED GLASS UNLESS OTHERWISE NOTED OR REQUIRED BY APPLICABLE BUILDING CODES. REFER TO FRAME TYPES FOR ADDITIONAL GLAZING DESIGNATIONS.

BORROWED/SIDE LITE JAMB DETAIL - GWB PARTITION

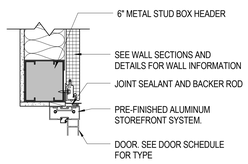
J4 / A-602 — 1 1/2" = 1'-0"



ALL INTERIOR HOLLOW METAL GLAZING TO BE 1/4" TEMPERED GLASS UNLESS OTHERWISE NOTED OR REQUIRED BY APPLICABLE BUILDING CODES. REFER TO FRAME TYPES FOR ADDITIONAL GLAZING DESIGNATIONS.

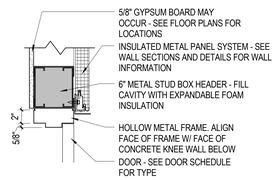
DOOR TO SIDE LIGHT JAMB DETAIL - HOLLOW METAL

J5 / A-602 — 1 1/2" = 1'-0"



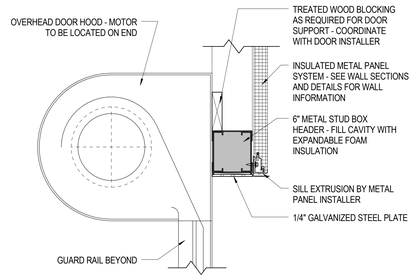
EXTERIOR ALUMINUM STOREFRONT HEAD DETAIL

H6 / A-602 — 1 1/2" = 1'-0"



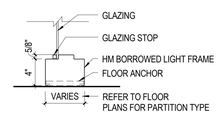
EXTERIOR HOLLOW METAL DOOR HEAD DETAIL

H7 / A-602 — 1 1/2" = 1'-0"



EXTERIOR OVERHEAD COILING DOOR HEAD DETAIL

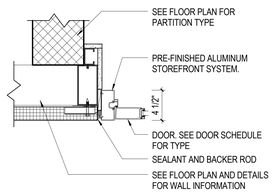
H8 / A-602 — 1 1/2" = 1'-0"



ALL INTERIOR HOLLOW METAL GLAZING TO BE 1/4" TEMPERED GLASS UNLESS OTHERWISE NOTED OR REQUIRED BY APPLICABLE BUILDING CODES. REFER TO FRAME TYPES FOR ADDITIONAL GLAZING DESIGNATIONS.

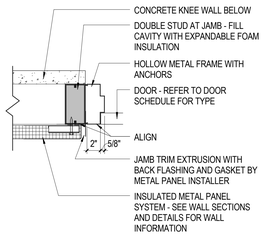
BORROWED/SIDELIGHT SILL DETAIL AT FLOOR LINE - HOLLOW METAL/GWB

S1 / A-602 — 1 1/2" = 1'-0"



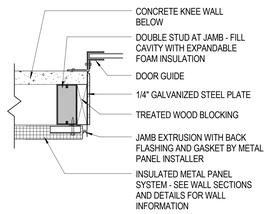
EXTERIOR ALUMINUM STOREFRONT JAMB DETAIL

J6 / A-602 — 1 1/2" = 1'-0"



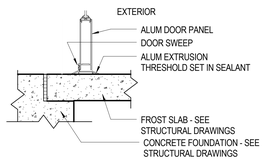
EXTERIOR HOLLOW METAL DOOR JAMB DETAIL

J7 / A-602 — 1 1/2" = 1'-0"



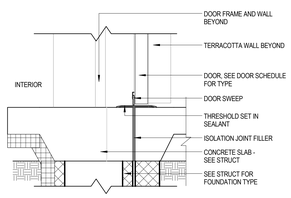
EXTERIOR OVERHEAD COILING DOOR JAMB DETAIL

J8 / A-602 — 1 1/2" = 1'-0"



EXTERIOR ALUMINUM STOREFRONT SILL DETAIL

S2 / A-602 — 1 1/2" = 1'-0"



EXTERIOR DOOR SILL DETAIL

S3 / A-602 — 1 1/2" = 1'-0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

CHG NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION	TECH LEAD: / FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

OPENING DETAILS

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT — SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS — DR: | DES: | D.ENG: | PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC. — RELEASE APPROVAL: — DATE:
CONTRACT NO.: NNC09CA01C — RELEASE APPROVAL: — DATE:
TASK ORDER — RELEASE APPROVAL: — DATE:
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	602

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

A-602
0351-COF20244-A-602_CE_1.dwg TEMPLATE DATE: 02/28/2011

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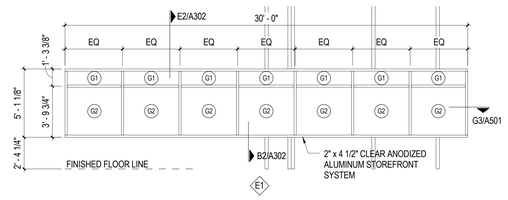

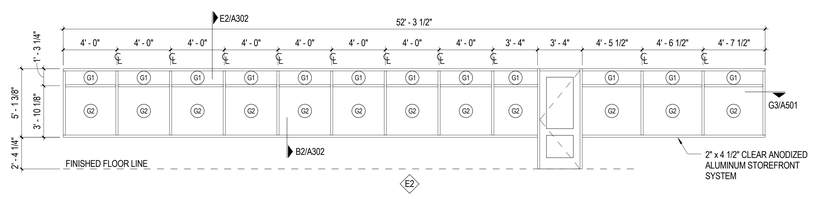

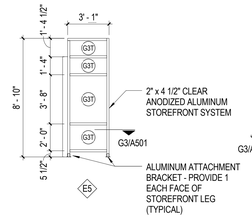

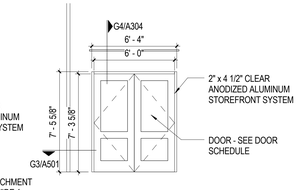

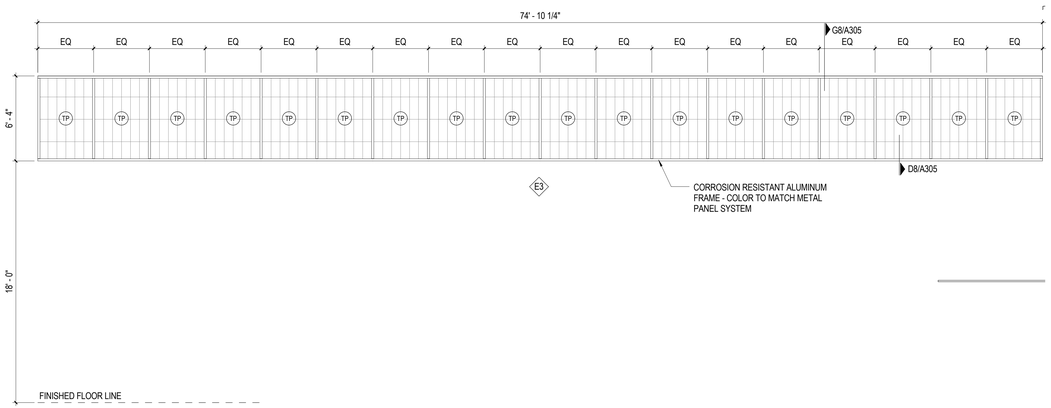

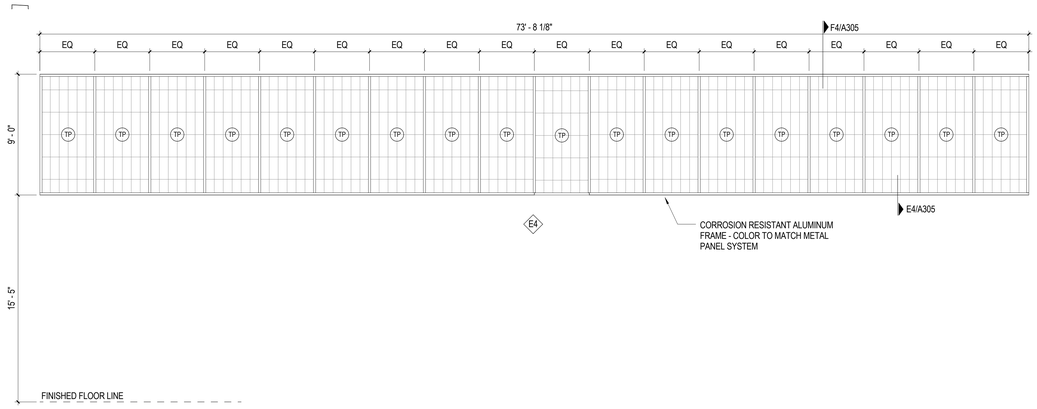

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-002 FOR SUBMITTAL DRAWING LIST.
2. SEE SPECIFICATIONS FOR GLAZING TYPES.
3. PROVIDE TEMPERED GLASS PER OBC.
4. PROVIDED TEMPERED GLASS FOR ALL INTERIOR GLAZED AREAS RECEIVING 1/4" OR 1/2" NON-INSULATED GLASS
5. GLAZING CONTRACTOR IS RESPONSIBLE FOR FOLLOWING ALL APPLICABLE SAFETY CODES AND FOR FIELD VERIFYING ALL DIMENSIONS PRIOR TO INSTALLATION. CONTRACTOR TO NOTIFY GOVERNMENT OF DISCREPANCIES.

GLAZING TYPE SCHEDULE	
G1	1" INSULATED GLASS VRE1-59
G2	1" INSULATED CLEAR GLASS VRE1-30
TP	2 3/4" INSULATED TRANSLUCENT PANEL - CRYSTAL/CRYSTAL

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT No.: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

EXTERIOR FRAME TYPE ELEVATIONS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	A-	603

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
SCALE: 1/4" = 1'-0" | OFFICIAL DATE: 06-24-2014

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A-603
0351-COF20244-A-603_CE_1.dwg TEMPLATE DATE: 02/28/2011
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AIR COMPRESSOR SYSTEM:

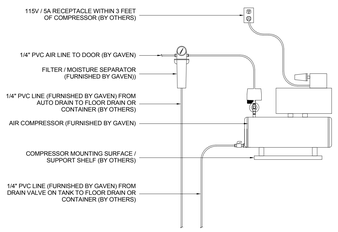
GAVEN PROVIDES ONE (1) TANK MOUNTED OIL-LESS AIR COMPRESSOR WHICH IS CAPABLE OF SERVING UP TO FOUR (4) OF OUR PNEUMATIC RF DOORS. THIS UNIT WILL PROVIDE 90 PSI AIR PRESSURE TO THE DOOR'S CONTROL BOX WHERE IT IS REGULATED DOWN TO 30 PSI. THE COMPRESSOR IS TYPICALLY MOUNTED IN THE EQUIPMENT ROOM FOR THE MAGNET AND IN A LOCATION WHICH IS EASILY ACCESSED TO ALLOW THE UNIT TO BE MAINTAINED. **AS WITH ANY COMPRESSOR, CONDENSATE WILL COLLECT IN THE HOLDING TANK AND MUST BE DRAINED TO PREVENT MOISTURE FROM BUILDING UP IN SYSTEM AND AFFECTING THE OPERATION OF BOTH THE COMPRESSOR AND THE DOOR. WE RECOMMENDED THE UNIT BE DRAINED ON A WEEKLY BASIS TO ENSURE PROPER OPERATION OF THE SYSTEM AND TO PROLONG THE LIFE OF THE COMPRESSOR. THE COMPRESSOR CARRIES THE MANUFACTURERS ONE (1) YEAR WARRANTY AND IS NOT COVERED UNDER GAVEN'S LIFE TIME WARRANTY ON THE SHIELD.**

THE 1/2 HP COMPRESSOR REQUIRES A 115V RECEPTACLE CAPABLE OF PROVIDING 4.3 AMP'S WITHIN 3 FEET OF WHERE THE COMPRESSOR IS TO BE MOUNTED BY OTHERS.

THE COMPRESSOR IS EQUIPPED WITH A DRAIN VALVE LOCATED IN A LINE RUN FROM THE BOTTOM OF THE TANK. WE RECOMMEND THIS LINE BE RUN TO A DRAIN IN THE ROOM IF AVAILABLE FOR CONVENIENCE. IF NO DRAIN IS AVAILABLE, A CONTAINER NEEDS TO BE PROVIDED (BY OTHERS) TO ACCOMMODATE THE WATER THAT IS DRAINED FROM THE UNIT.

GAVEN'S INSTALLERS WILL RUN A 1/4" PVC LINE FROM EACH DOOR (IF MORE THAN ONE) TO THE ROOM WHERE THE COMPRESSOR IS TO BE LOCATED. THE LINES WILL BE COMBINED TO ONE LINE (IF MORE THAN ONE DOOR) WHICH WILL BE CONNECTED TO A WALL MOUNTED FILTER / MOISTURE COLLECTOR WITH AUTOMATIC DRAIN. THIS UNIT IS TO BE LOCATED WITHIN A FEW FEET OF THE COMPRESSOR AND SHOULD BE EASY TO ACCESS SHOULD SERVICE BE REQUIRED. A 1/4" PVC LINE (PROVIDED BY GAVEN) IS REQUIRED TO BE RUN FROM THE AUTOMATIC DRAIN. **TO A DRAIN OR CONTAINER (BY OTHERS) TO COLLECT ANY MOISTURE THAT IS RELEASED. SINCE THIS DRAIN IS OPERATED BY A FLOAT DEVICE AND WILL WORK AUTOMATICALLY, IT IS CRITICAL THAT IT IS RUN TO A DRAIN OR A CONTAINER (BY OTHERS) AT ALL TIMES TO AVOID ACCIDENTAL DISCHARGE OF THE COLLECTED MOISTURE.**

GAVEN'S INSTALLERS WILL MOUNT THE UNIT AND RUN ALL OF THE ABOVE LINES PROVIDED THAT A MOUNTING SURFACE OR SHELF FOR THE COMPRESSOR IS INSTALLED AND READY WHILE WE ARE ON SITE. IF A MOUNTING SURFACE IS NOT READY FOR THE UNIT WHILE WE ARE ON SITE, THE AIR LINE WILL BE RUN TO THE DOOR AND THE UNIT HOOKED UP TEMPORARILY TO TEST THE DOOR'S OPERATION AND TO RUN THE RF TEST ON THE ROOM. ALL MATERIALS WILL BE LEFT ON SITE AND IT WILL BE UP TO THE GENERAL CONTRACTOR TO PERFORM THE FINAL INSTALLATION OF THE UNIT. **GAVEN WILL NOT ACCEPT ANY CHARGES FOR THIS WORK BEING PERFORMED BY OTHERS**



TECHNICAL SPECIFICATIONS

TYPE	TANK MOUNTED OIL-LESS
FREE AIR CFM @90 PSI	0.40
VOLTAGE @ 60 Hz	115
AMPS	4.3
TANK (GAL.)	2
(F) NPT OUTLET (IN.)	1/4
ON PRESSURE SWITCH SETTING	70
OFF PRESSURE SWITCH SETTING	90
FINISH	GRAY
LENGTH (IN.)	18
WIDTH (IN.)	8
HEIGHT (IN.)	17
INCLUDES	PRESSURE SWITCH, MANUAL DRAIN, PRESSURE SAFETY VALVE, PRESSURE GAGE, & GLOBE VALVE

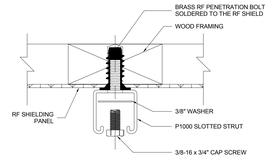
1 - ATTACHMENT DETAILS:

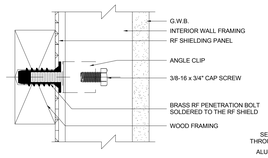
THE DETAILS BELOW SHOW HOW THE FRAMING AND UNI-STRUT ARE ATTACHED TO THE SHIELDING. THE BRASS RF PENETRATION BOLTS ARE ALL SUPPLIED AND INSTALLED BY GAVEN INDUSTRIES.

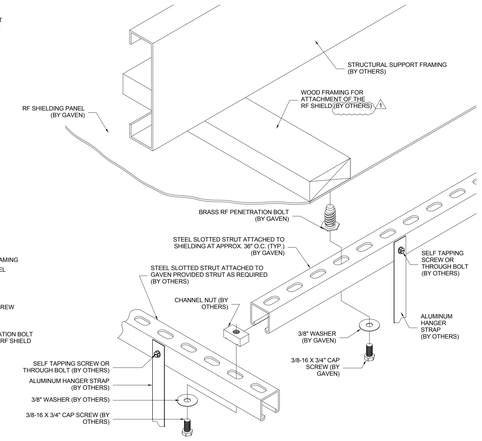
THE UNI-STRUT WILL BE RUN AT 4' 0" ON CENTER IN ROWS ACROSS THE CEILING PERPENDICULAR TO THE WOOD FRAMING MEMBERS. ALL HANGERS FOR ANYTHING IN THE ROOM MUST ATTACH TO THE UNI-STRUT. ADDITIONAL CROSS PIECES RUN PERPENDICULAR TO OUR STRUT MAY BE ADDED BY OTHERS BUT MUST ATTACH TO THE UNI-STRUT ONLY.

THE RF PENETRATION BOLTS FOR THE FINISHED WALL FRAMING ARE TYPICALLY INSTALLED TOP AND BOTTOM OF THE WALL FRAMING AT 4' 0" INTERVALS. ANGLE CLIPS (PROVIDED BY OTHERS) MAY BE FASTENED TO THE PENETRATION BOLT WITH A 3/8-16 X 3/4" CAP SCREW. THE WALL FRAMING CAN THEN BE STOOD IN PLACE AND SCREWS RUN THROUGH THE ANGLE CLIPS INTO THE STUDS TO ANCHOR THE WALL.

DO NOT USE ANY OTHER MEANS OF ATTACHMENT TO THE SHIELD AND UNDER NO CIRCUMSTANCES SHOULD ANY FASTENER BE RUN THROUGH THE SHIELDING BY ANYONE OTHER THAN GAVEN INDUSTRIES PERSONNEL.







RF SHIELDED PNEUMATIC DOOR W/ INTEGRAL AIR SEAL CONTROLS:

TO ENSURE THERE IS SUFFICIENT CLEARANCE FOR THE DOOR, THE FRAME MUST BE CLEAR 6" FROM ANY CORNER.

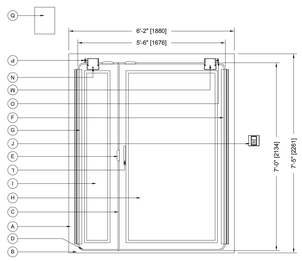
THE DOOR FRAME WILL HAVE A NOMINAL CLEAR OPENING OF 5' 6" W x 7' 0" H (1676 mm W x 2134 mm H).

THE DOOR IS SUPPLIED WITH A SMALL AIR COMPRESSOR WHICH IS TYPICALLY MOUNTED IN AN ACCESSIBLE LOCATION FOR MAINTENANCE WITHIN 25' OF THE DOORS - AN EQUIPMENT CLOSET OR THE EQUIPMENT ROOM FOR THE MAGNET ARE THE MOST COMMON LOCATIONS.

THE PNEUMATIC SEAL IS OPERATED BY THE USE OF TWO (2) PUSH PLATES MOUNTED ON THE WALL BOTH INSIDE AND OUTSIDE OF THE ENCLOSURE. SIMPLY DEPRESS THE AIR RELEASE PLATE AND PULL THE DOOR OPEN. THERE IS A SMALL BOX MOUNTED ABOVE THE CEILING OUTSIDE THE ROOM ABOVE THE DOOR WITH A PRESSURE REGULATOR FOR THE DOOR AIR SUPPLY.

OUR DOORS ARE PROVIDED WITH EITHER A PLASTIC LAMINATE FINISH OR UNFINISHED WOOD VENEERS AS SPECIFIED BY THE CUSTOMER. THE DOORS FRAME AND PERIMETER OF THE DOOR LEAF ARE CONSTRUCTED OF STAINLESS STEEL AND ARE READY FOR PAINT. ALL AREAS THAT CAN BE PAINTED ARE FACTORY PRIMED AND READY FOR PAINT. DUE TO THE AMOUNT OF FABRICATION WORK, A FINISHED STAINLESS STEEL SURFACE CANNOT BE OFFERED.

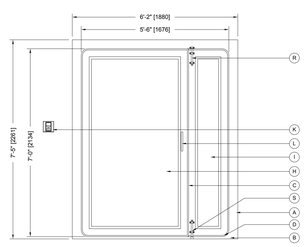
CAUTION: DO NOT PAINT THE RF GASKET ON THE DOOR OR ANY PART OF THE DOOR LEAF OR FRAME THAT IS NOT FACTORY PRIMED. THIS WILL RESULT IN FAILURE OF THE DOOR TO CREATE AN RF SEAL AND WILL REQUIRE REPLACEMENT OF THE PNEUMATIC SEAL.



1 - PNEUMATIC RF SHIELDED DOOR ELEVATION

(LH OUT VIEWED FROM OUTSIDE THE SHIELDED ROOM)

ITEM	DESCRIPTION	ITEM	DESCRIPTION
A	STN. STL. FRAME	L	STN. STL. PULL HANDLE
B	STN. STL. THRESHOLD	M	ACTIVE LEAF - LEAF AIR MANIFOLD
C	ACTIVE DOOR LEAF AIR SEAL	N	INACTIVE LEAF - LEAF AIR MANIFOLD
D	INACTIVE DOOR LEAF AIR SEAL	O	ACTIVE LEAF - FRAME AIR MANIFOLD
E	ACTIVE LEAF STN. STL. DOOR STOP	P	INACTIVE LEAF - FRAME AIR MANIFOLD
F	ACTIVE LEAF HEAVY DUTY ROTON HINGE	Q	CONTROL BOX
G	INACTIVE LEAF HEAVY DUTY ROTON HINGE		
H	ACTIVE RF DOOR LEAF		
I	INACTIVE RF DOOR LEAF		
J	ELECTRIC AIR SEAL RELEASE PUSH PLATE		



2 - PNEUMATIC RF SHIELDED DOOR ELEVATION

(LH OUT VIEWED FROM INSIDE THE SHIELDED ROOM)

ITEM	DESCRIPTION	ITEM	DESCRIPTION
A	STN. STL. FRAME	L	STN. STL. PULL HANDLE
B	STN. STL. THRESHOLD	R	TOP DROP PIN
C	ACTIVE DOOR LEAF AIR SEAL	S	BOTTOM DROP PIN
D	INACTIVE DOOR LEAF AIR SEAL		
H	ACTIVE RF DOOR LEAF		
I	INACTIVE RF DOOR LEAF		
K	FIBER OPTIC AIR SEAL RELEASE PUSH PLATE		

1 - ELECTRICAL FILTER & GROUND STUD TYP. DETAILS:

EACH ELECTRICAL FILTER WILL CREATE A GROUND POINT IN THE SHIELD ONCE POWER IS CONNECTED TO THE FILTER. DUE TO THIS FACT THE FILTERS, ALONG WITH THE GROUND STUD MUST BE INSTALLED WITH IN THE AREA OF THE MAGNET'S INTERFACE PANEL IN ORDER TO PREVENT GROUND LOOPS IN THE SHIELDING. THE MAGNET MANUFACTURER TYPICALLY WILL SPECIFY A DISTANCE FROM THE INTERFACE PANEL IN WHICH ALL OF THE FILTERS AND THE GROUND STUD MUST BE LOCATED. IF NO SPECIFIC DISTANCE IS GIVEN,THESE ITEMS WILL BE INSTALLED WITHIN 39" (1000MM) OF THE INTERFACE PANEL. WE RECOMMEND THAT THE FILTERS BE MOUNTED IN AN ACCESSIBLE AREA ON EITHER THE WALL OR THE CEILING.

CARE SHOULD BE TAKEN TO ENSURE THAT THE CONNECTION BETWEEN THE BRASS RF FILTER NUT AND THE SHIELD IS NOT TO BE DISTURBED. THIS CONNECTION IS CRITICAL TO PREVENT AN RF LEAK. NEVER REMOVE THIS NUT FOR ANY REASON.

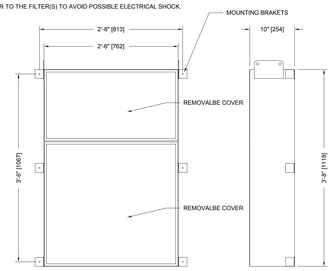
JUNCTION BOXES CAN BE MOUNTED DIRECTLY ON THE FILTER NIPPLE WITH STANDARD ELECTRICAL LOCK NUTS. THE NIPPLE IS A STANDARD 1" RUNNING THREAD. LOCK NUTS AND JUNCTION BOXES ARE BY OTHERS.

ALL CONDUIT RUN TO THE FILTERS ON THE OUTSIDE OF THE ROOM SHOULD BE CONNECTED WITH A PLASTIC OR DIELECTRIC CONNECTOR TO ENSURE THE FILTER DOES NOT GROUND TO THE CONDUIT.

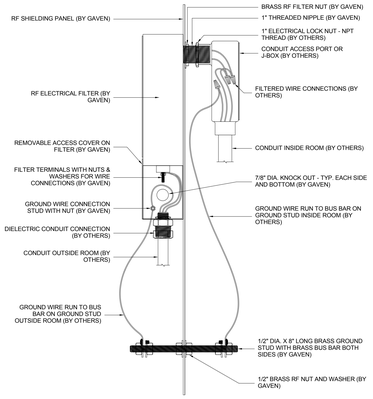
ALL GROUND WIRES OUTSIDE THE SHIELDING SHOULD BE RUN TO THE GROUND TERMINAL IN THE FILTER AND THEN TO THE GROUND STUD. ALL GROUND WIRES INSIDE THE SHIELDING SHOULD BE RUN DIRECTLY TO THE GROUND BAR.

FOLLOW THE MRI EQUIPMENT MANUFACTURER'S GUIDELINES FOR GROUNDING THE SYSTEM.

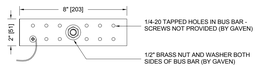
FOR SAFETY REASONS, BE SURE THE GROUND STUD IS INSTALLED AND PROPERLY GROUNDED BEFORE APPLYING POWER TO THE FILTER(S) TO AVOID POSSIBLE ELECTRICAL SHOCK.



1 - CORCOM CDEUX400100A6 ELECTRICAL FILTER



2 - ELECTRICAL FILTER AND GROUND STUD DETAILS



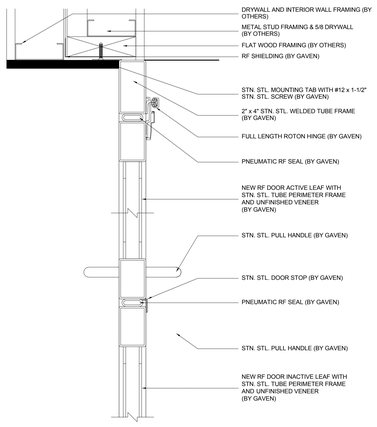
3 - BUS BAR DETAIL

3/16" THICK BRASS BAR

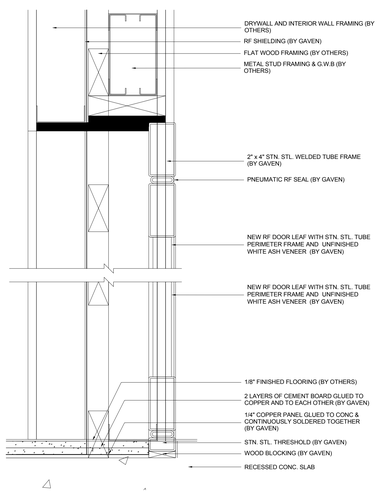
OUT SWING RF SHIELDED PNEUMATIC DOOR SECTIONS:

TO ENSURE THERE IS SUFFICIENT CLEARANCE FOR THE DOOR, THE FRAME MUST BE CLEAR 6" FROM ANY CORNER.

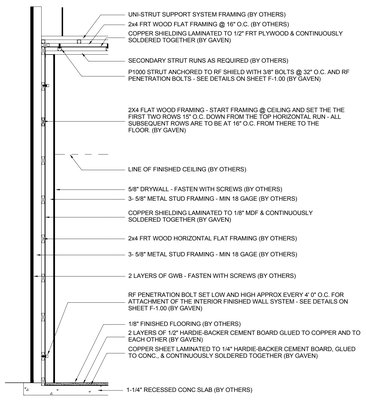
CAUTION: DO NOT PAINT THE RF GASKET ON THE DOOR OR ANY PART OF THE DOOR LEAF OR FRAME THAT IS NOT FACTORY PRIMERED. THIS WILL RESULT IN FAILURE OF THE DOOR TO CREATE AN RF SEAL AND WILL REQUIRE REPLACEMENT OF THE PNEUMATIC SEAL.



1 - PNEUMATIC RF SHIELDED DOOR SECTIONS AT STRIKE AND HINGE

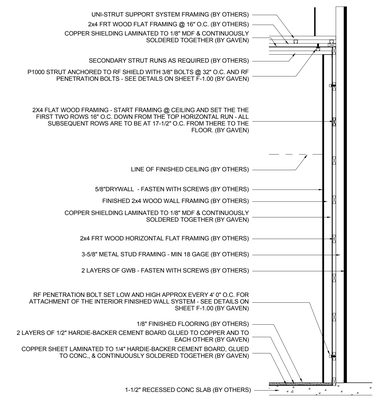


2 - PNEUMATIC RF SHIELDED DOOR SECTIONS AT HEAD AND SILL



1 - TYP. NORTH WALL SECTION

SCALE: $\frac{3}{4}$" = 1' 0"



2 - TYP. SOUTH WALL SECTION

SCALE: $\frac{3}{4}$" = 1' 0"

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD:	FAC-SYS MGR: / REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

STANTEC
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Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
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Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SHIELDING DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244 - X-		101

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

X-101
0351-COF20244-X-101_CE_1.dwg **TEMPLATE DATE: 02/28/2011**

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6/23/2014 3:58:08 PM

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

ROTON HINGE :

PRODUCT SPECIFICATIONS:

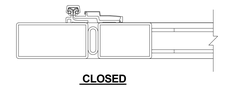
ROTON MODEL 780-210 IS AN ALUMINUM CONTINUOUS GEARED FULL SURFACE HINGE THAT PROVIDES A 1/32" DOOR INSET. IT CAN BE USED WITH ANY STANDARD FRAME WITHOUT HINGE PREPS, AND EITHER WITH OR WITHOUT REINFORCEMENTS DEPENDING ON DOOR WEIGHT. THE FRAME FACE MUST HAVE A FLAT SURFACE AT LEAST 1-5/8" WIDE. CLEARANCE BETWEEN THE HINGE EDGE OF THE DOOR AND THE FRAME RABBET IS 1/32" (1MM). "HD" MODELS HAVE ADDITIONAL BEARINGS AND FRAME FASTENERS FOR HEAVY-DUTY APPLICATION.

FASTENERS:- MACHINE SCREWS INSTALLED IN FACTORY DRILLED AND TAPPED HOLES IN FRAME AND DOOR LEAF

LENGTH OPTIONS:- STANDARD AND CUSTOM

WARRANTY:- ALL ROTON PRODUCTS HAVE A LIFETIME WARRANTY

MATERIAL:- ALUMINUM 6063-T6



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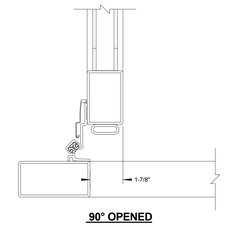
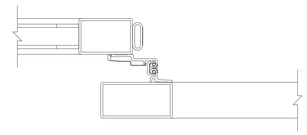


90° OPENED



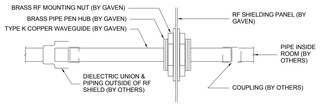
180° OPENED

1 - PLUMBING / PIPE PENETRATION TYP. DETAILS:

ALL PIPE RUNS ARE TO BE ATTACHED DIRECTLY TO THE PIPE PENETRATIONS ON THE INSIDE OF THE ROOM. A PIPE MAY NOT PASS THROUGH ONE OF THE RF PIPE PENS.

ALL PLUMBING PENETRATIONS SHOULD BE DIELECTRICALLY ISOLATED FROM THE PIPING ON THE OUTSIDE OF THE SHIELDED ROOM. IF DIELECTRIC UNIONS ARE NOT PERMITTED BY CODE TO BE INSTALLED IN A SPECIFIC LINE TYPE, THE OUTSIDE CONNECTION SHOULD ONLY BE MADE AFTER ALL WORK INSIDE THE ENCLOSURE IS COMPLETED AND THE ISOLATION FROM GROUND HAS BEEN TESTED,RECORDED, AND VERIFIED BY ALL PARTIES INVOLVED.

CAUTION - (IF ANY SOLDERING OR BRAZING IS REQUIRED TO MAKE ANY ATTACHMENT TO A PIPE PENETRATION) - EXCESSIVE HEAT APPLIED TO THE PIPE PENETRATION CAN DAMAGE THE SOLDERED CONNECTION BETWEEN THE COPPER PIPE AND THE BRASS RF HUB. WRAP A WET CLOTH AROUND THE BRASS HUB PRIOR TO PERFORMING THIS WORK TO HELP PREVENT DAMAGE.



2 - HVAC DUCT PENETRATION TYP. DETAILS:

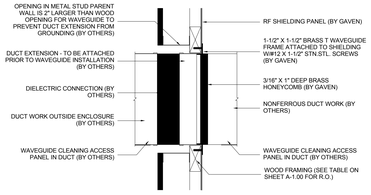
THE HVAC CONTRACTOR MUST USE A NON-CONDUCTIVE MATERIAL TO ATTACH TO THE OUTSIDE OF THE WAVEGUIDE TO ENSURE THE ISOLATION FROM GROUND IS MAINTAINED. THIS IS TYPICALLY A FABRIC CONNECTION WHICH CAN BE ATTACHED TO THE WAVEGUIDE PRIOR TO INSTALLATION. THE DUCT MAY ALSO BE ATTACHED DIRECTLY TO THE WOOD FRAMING THAT THE WAVEGUIDE IS MOUNTED TO AS LONG AS CARE IS TAKEN NOT TO HIT THE WAVEGUIDE MOUNTING SCREWS.

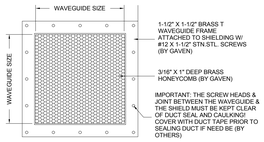
DO NOT ALLOW FOIL FACED OR CONDUCTIVE INSULATION COME INTO CONTACT WITH THE WAVEGUIDE OR THE DUCT EXTENSION BETWEEN THE WAVEGUIDE AND THE DIELECTRIC BREAK. THIS WILL GROUND THE ROOM.

THE DUCT WORK INSIDE THE ENCLOSURE MAY BE ATTACHED DIRECTLY TO THE WAVEGUIDE WITH 1/4" LONG TEK SCREWS. BE SURE NOT TO USE SCREWS LONGER THAN 1/4" TO PREVENT DAMAGE TO THE HONEYCOMB.

DO NOT COVER THE WAVEGUIDE MOUNTING SCREWS WITH DUCT SEAL OR CAULKING AND DO NOT CONTAMINATE THE JOINT BETWEEN THE RF SHIELDING AND THE WAVEGUIDE WITH CAULKING OR DUCT SEAL.

PLEASE NOTE THAT HONEYCOMB WAVEGUIDES CANNOT BE FABRICATED TO MATCH ROUND DUCTS. THE WAVEGUIDES MUST BE SQUARE OR RECTANGULAR. A TRANSITION FROM ROUND TO SQUARE IS REQUIRED TO CONNECT A ROUND DUCT TO A WAVEGUIDE.





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CONTRACT NO:	NNC09CA01C
TASK ORDER:	
DRAWN: Author	DESIGNED: / CHECKED: Checker
APPROVED: Approver	APPROVAL DATE:

DRAWING/DESIGN STATUS:

BID SET

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

CHG NUM	DESCRIPTION	APP/DATE
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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

SHIELDING DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	X-	102

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1

SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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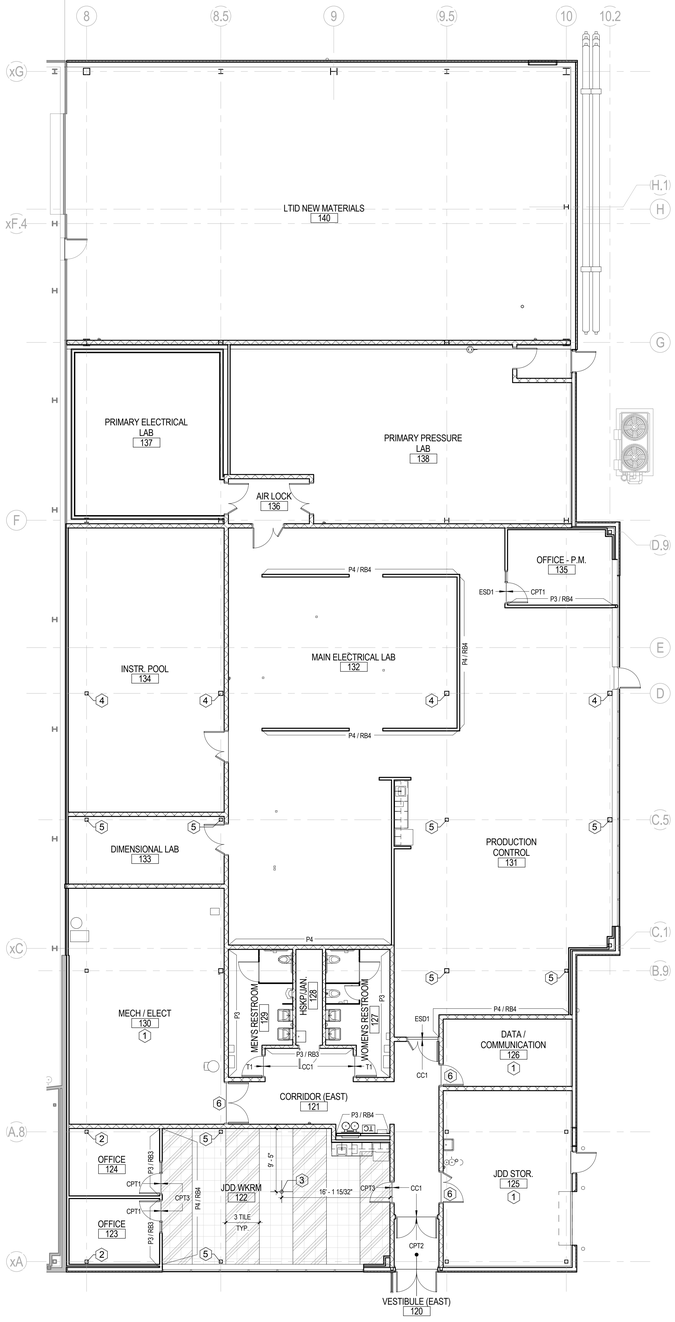
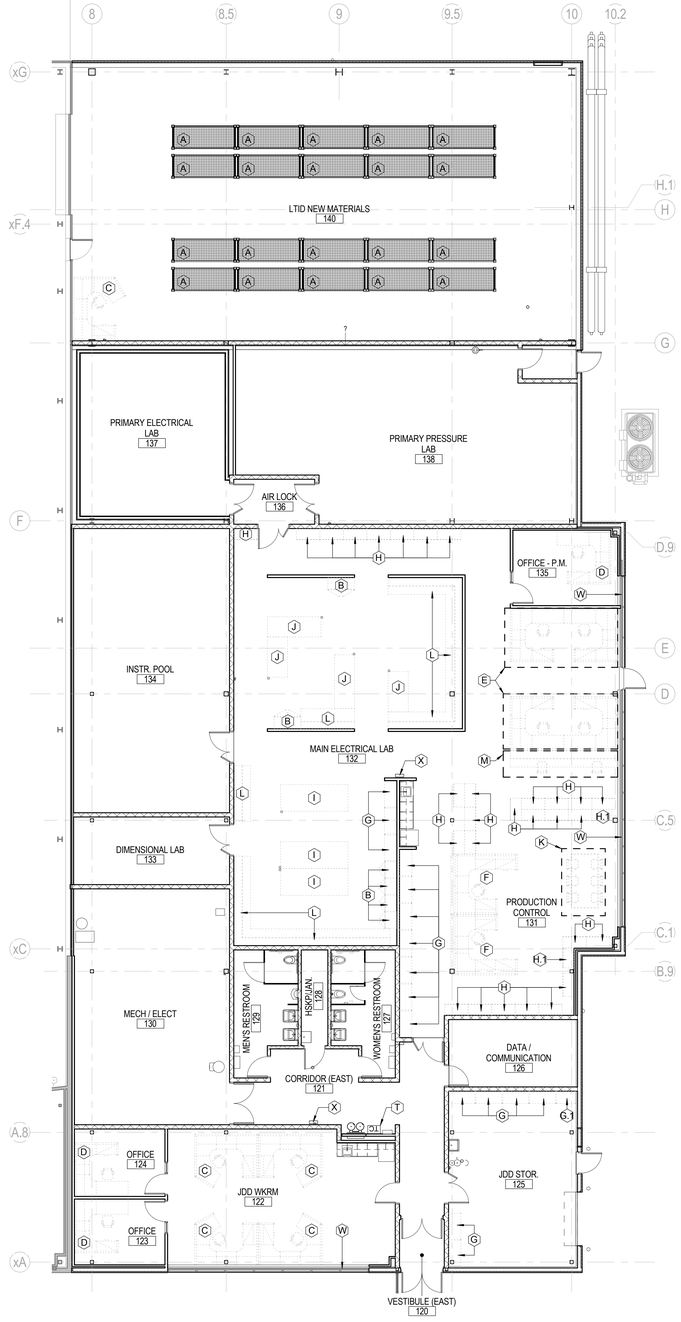
ROOM FINISH SCHEDULE					
No.	Room Name	Floor	Base	Wall	Comments
120	VESTIBULE (EAST)	CPT3	RB1	P1	
121	CORRIDOR (EAST)	CC1	RB1 / RB3	P1 / P3	
122	JDD WKRM	CPT2 / CPT3	RB1 / RB3	P1 / P3	
123	OFFICE	CPT1	RB1 / RB3	P1 / P3	
124	OFFICE	CPT1	RB1 / RB3	P1 / P3	
125	JDD STOR.	CC2	n/a	P1	
126	DATA / COMMUNICATION	CC2	n/a	P1	
127	WOMEN'S RESTROOM	T1	TB1	P3 / P5	SEE FINISH PLAN AND INTERIOR ELEVATIONS FOR PAINT COLOR LOCATIONS. TLT. RM. WALLS SHALL BE AN EPOXY FINISH.
128	HSKP/JAN.	CC2	n/a	P1	P1 SHALL RECEIVE AN EPOXY FINISH.
129	MEN'S RESTROOM	T1	TB1	P3 / P5	SEE FINISH PLAN AND INTERIOR ELEVATIONS FOR PAINT COLOR LOCATIONS. TLT. RM. WALLS SHALL BE AN EPOXY FINISH.
130	MECH / ELECT	CC2	n/a	P1	
131	PRODUCTION CONTROL	ESD1	RB1 / RB4	P1 / P4	
132	MAIN ELECTRICAL LAB	ESD1	RB1 / RB4	P1 / P4	
133	DIMENSIONAL LAB	ESD1	RB1	P1	
134	INSTR. POOL	ESD1	RB1	P1	
135	OFFICE - P.M.	CPT1	RB1 / RB3	P1 / P3	
136	AIR LOCK	ESD1	RB1	P1	
137	PRIMARY ELECTRICAL LAB	ESD1	RB1	P1*	P1* RF SHEILDING FINISH.
138	PRIMARY PRESSURE LAB	ESD1	RB1	P1	
140	LTID NEW MATERIALS	CC2	n/a	P1	FINISHES TO MATCH OPEN STORAGE 114 FROM PHASE 1.



A8 I-101 **FINISH PLAN**
1/8" = 1'-0"



A5 I-101 **FURNITURE PLAN - FOR COORDINATION ONLY**
1/8" = 1'-0"

FINISH LEGEND

WHEN MULTIPLY FINISHES OCCUR REFER TO THE FINISH PLAN OR INTERIOR ELEVATIONS FOR LOCATIONS.

FLOORS

CARPET TILE

CPT1
MANUF: INTERFACE FLOOR
STYLE: 1248202504 CAP AND BLAZER
COLOR: 100883 SOMERSET
SIZE: 19" x 19"
INSTALLATION: QUARTER TURNED

CPT2
MANUF: INTERFACE FLOOR
STYLE: 129010250 0 ENTRY LEVEL
COLOR: 7189 BLUE
SIZE: 19" x 19"
INSTALLATION: QUARTER TURNED

CPT3
MANUF: INTERFACE FLOOR
STYLE: 129010250 0 ENTRY LEVEL
COLOR: 7187 BLACK
SIZE: 19" x 19"
INSTALLATION: QUARTER TURNED

FLOOR TILE

T1
MANUF: AMERICAN OLEAN
PRODUCT: AVENUE ONE
COLOR: AV09-NIGHTLIFE
SIZE: 12" x 12"
GROUT: MAPEI, 27 SILVER

POLISHED CONCRETE FINISH

CC1
MANUF: N/A
PRODUCT: CONCRETE HARDENER

CC2
MANUF: N/A
PRODUCT: SEALED CONCRETE

RESILIENT TILE

ESD1
MANUF: ARMSTRONG
PRODUCT: STATIC DISSIPATIVE VCT
COLOR: 51956 FOSSIL GRAY
SIZE: 12" x 12"

BASE

TILE BASE

TB1
MANUF: AMERICAN OLEAN
PRODUCT: AVENUE ONE
COLOR: AV09-NIGHTLIFE
SIZE: 6" x 12" COVE BASE
GROUT: MAPEI, 27 SILVER

RUBBER BASE

RB1
MANUF: JOHNSONITE
STYLE: DCT-XX
COLOR: 182 SPA BLUE
SIZE: 6"H

RB2 - *NOT USED*

RB3
MANUF: JOHNSONITE
STYLE: DCT-XX
COLOR: TO MATCH WALL P3
SIZE: 6"H

RB4
MANUF: JOHNSONITE
STYLE: DCT-XX
COLOR: TO MATCH WALL P4
SIZE: 6"H

CASEWORK

PLASTIC LAMINATE

PL1 (CASEWORK)
MANUF: FORMICA
COLOR: F0G, 961-MC
FINISH: MICRODOT

PL2 (WINDOW SILL)
MANUF: NEVAMAR
COLOR: S6020T GUNMETAL

SOLID SURFACE

SS1 (COUNTERTOPS)
MANUF: WILSONART GIBRALTAR
STYLE: 9194TM STEEL GREY TEMPEST

WALLS

PAINT

P1
MANUF: BENJAMIN MOORE
COLOR: 2129-60 MT.RANIER GRAY

P2 - *NOT USED*

P3
MANUF: BENJAMIN MOORE
COLOR: HC-156 VAN DEUSEN BLUE

P4
MANUF: BENJAMIN MOORE
COLOR: 2151-50 BRONZED BEIGE

P5
MANUF: SHERWIN WILLIAMS
COLOR: SW7007
CLG. BRIGHT WHITE

MISC

WOOD VENEER

WV1
MFG: TREEFROG
GRAIN: 60204 WHITE OAK
STRAIGHT GRAIN

INTERIOR GLAZING FILM

GL1
MFG: SOLYX
STYLE: SX-3140 DUSTED CRYSTAL

TOILET PARTITIONS

TP1
MANUF: SCRANTON PRODUCTS
STYLE: HDPE
COLOR: WHITE

FINISH PLAN KEYNOTES

1. ALL EXPOSED STRUCTURAL STEEL, SHALL RECEIVE P5 FROM FLOOR TO UNDERSIDE OF JOISTS.
2. ALL EXPOSED STRUCTURAL STEEL COLUMNS SHALL RECEIVE P1 FLOOR TO 12" ABOVE CEILING LINE.
3. BEGIN CARPET TILE GRID AT THIS LOCATION.
4. ALL EXPOSED STRUCTURAL STEEL COLUMNS SHALL RECEIVE P4 FLOOR TO 12" ABOVE CEILING LINE.
5. ALL EXPOSED STRUCTURAL STEEL COLUMNS SHALL RECEIVE P3 FROM FLOOR TO 12" ABOVE CEILING LINE .
6. PROVIDE SAW CUT LINE BETWEEN CC1 AND CC2.

FURNITURE PLAN KEYNOTES

FOR COORDINATION ONLY, UNLESS OTHERWISE NOTED.

- A WAREHOUSE SHELVING
- B STORAGE CABINET
- C WORK STATION W/ TASK CHAIR, STORAGE.
- D PRIVATE OFFICE FURNITURE W/ TASK CHAIR, GUEST CHAIRS, STORAGE.
- E DOUBLE WORK STATION W/ TASK CHAIRS, STORAGE.
- F COUNTERTOP WORK STATION W/ TASK CHAIRS, STORAGE.
- G TALL STORAGE SHELVES
- G.1 TALL STORAGE SHELVES, 36" WIDE
- H TALL LATERAL FILE
- H.1 TALL LATERAL FILE, 30" WIDE
- I STANDING TABLE 36x96
- J STANDING TABLE
- K GROUPING TABLE W/ 6 TASK CHAIRS.
- L BENCH WORK STATION W/ TASK CHAIR, OVERHEAD STORAGE.
- M STANDING DOUBLE BENCH WORK STATION W/ BASE STORAGE, OVERHEAD STORAGE, W/ TALL TASK CHAIRS.
- T TIME CARD MACHINE
- W ROLL DOWN WINDOW SHADES
- X AED

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

FINISH PLAN GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20044-G-001 FOR LIST OF PROJECT DRAWINGS.
2. PROVIDE TRANSITION STRIPS AT TRANSITION BETWEEN FLOORING TYPES. SEE TYP. FINISHED FLOORING TRANSITION DETAILS.
3. INDICATES CHANGE IN FLOORING MATERIAL. ALL FLOORING TRANSITIONS ARE TO OCCUR EXACTLY WHERE SHOWN. CONTRACTOR MAY ASSUME DOORWAY TRANSITIONS TO BE CENTERED WITHIN DOOR FRAME, UNLESS OTHERWISE NOTED.
4. PROVIDE A TAPERED (FEATHERED) TRANSITION TO ACHIEVE A FLUSH CONDITION BETWEEN ALL FLOORING.
5. ALL CARPET TILES SHALL BE QUARTER TURNED.
6. ALL AREAS WITH CARPET SHALL RECEIVE STRAIGHT BASE; ALL AREAS WITH RESILIENT FLOORING SHALL RECEIVE COVE BASE.
7. ALL GYPSUM BOARD CEILINGS AND BULKHEADS SHALL RECEIVE P5, UNLESS OTHERWISE NOTED.
8. ALL SOFFITS SHALL RECIEVE THE SAME PAINT COLOR AS THE ADJACENT WALLS, UNLESS OTHERWISE NOTED.
9. REFER TO ELEVATIONS AND CASEWORK DETAILS FOR PLASTIC LAMINATE DESIGNATIONS.
10. IN AREAS WITH ACT CEILINGS, WALLS SHALL BE PAINTED TO 12" ABOVE FINISHED CEILING.
11. IN AREAS WITHOUT FINISHED CEILINGS, WALLS SHALL BE PAINTED TO DECK.
12. ALL GYPSUM BOARD WALLS SHALL RECEIVE AN EGGSHELL FINISH, UNLESS OTHERWISE NOTED.
13. ALL GYPSUM BOARD CEILINGS SHALL RECEIVE A FLAT FINISH, UNLESS OTHERWISE NOTED.
14. ALL PAINTED METAL SURFACES SHALL RECEIVE A SATIN FINISH, UNLESS OTHERWISE NOTED.
15. ALL METAL DOORS SHALL RECEIVE P1.
16. ALL METAL DOOR FRAMES SHALL RECEIVE P1.
17. ALL SURFACES TO BE PAINTED, SHALL BE PAINTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. ALL PAINTED FINISHES SHALL RECEIVE AT LEAST TWO COATS. MATCH MANUFACTURE'S PAINT CHIP.
18. WINDOW SILLS SHALL RECEIVE A PLASTIC LAMINATE (**PL2**) UNLESS OTHERWISE NOTED. SEE SHEET A-302 FOR SILL DETAIL.

FURNITURE PLAN GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20044-G-001 FOR LIST OF PROJECT DRAWINGS.
2. TIMECARD (FURNITURE KEYNOTE **T**) MANUFACTURER TO BE DETERMINE BY OWNER. MOUNTING HEIGHT SHALL BE 48" A.F.F. TO ACCESS POINT OF CARD READER.
3. ALL EXTERIOR WINDOWS SHALL RECEIVE ROLL DOWN WINDOW SHADES (FURNITURE KEYNOTE **W**). REFER TO SPECIFICATIONS MANUAL. SEE SHEET A-302 FOR WINDOW HEAD DETAIL.
4. AED - AUTOMATED EXTERNAL DEFIBRILLATOR (FURNITURE KEYNOTE **X**), MANUFACTURER, QUANTITY, AND EXACT LOCATIONS, TO BE DETERMINED BY OWNER. MOUNTING HEIGHT SHALL BE 48" A.F.F. TO BOTTOM OF CASE OR MACHINE.
5. WAREHOUSE SHELVING (FURNITURE KEYNOTE **A**) TO BE PROVIDED & INSTALLED BY CONTRACTOR. EXACT LOCATION TO BE DETERMINED BY END USER. SEE SHEET A-401 FOR ELEVATIONS, AND DETAILS.
6. PROVIDE BLOCKING FOR OVERHEAD BINS / SHELVES FOR LAB BENCHING (FURNITURE KEYNOTE **L**). COORDINATE LOCATION OF BLOCKING W/ FURNITURE MANUFACTURER AND OWNER.
7. IN AREAS OTHER THAN THE TOILET ROOMS, WASTE RECEPTACLES' AND PAPER DISPENSERS' MANUFACTURERS, QUANTITIES, AND EXACT LOCATIONS SHALL BE DETERMINED BY OWNER.

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT — SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES: | D.ENG: | PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC. — RELEASE APPROVAL: — DATE:
CONTRACT NO.: NNC09CA01C — RELEASE APPROVAL: — DATE:
TASK ORDER — RELEASE APPROVAL: — DATE:
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE
RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR FINISH AND FURNITURE PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	I-	101

AREA: — SHEET 1 OF 1
UNITS: ENGLISH — SOFTWARE: REVIT 2014 — REVISION: - — VER: 1
SCALE: As indicated — OFFICIAL DATE: 06-24-2014

I-101

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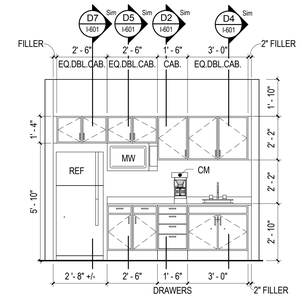
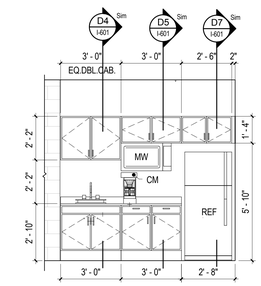
6/23/2014 3:44:23 PM



G3 I-601 PRODUCTION CONTROL 131

3/8" = 1'-0" 0 1 2 4'



G2 I-601 JDD WORKROOM 122

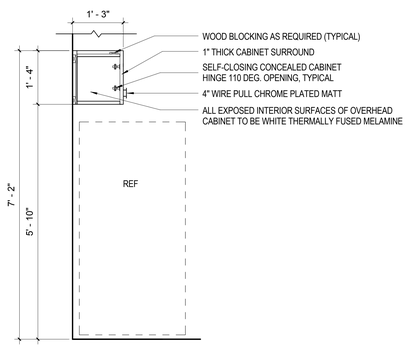
3/8" = 1'-0" 0 1 2 4'

CONSTRUCTION GENERAL SHEET NOTES

1. SEE SHEET G-001 FOR SUBMITTAL DRAWING LIST

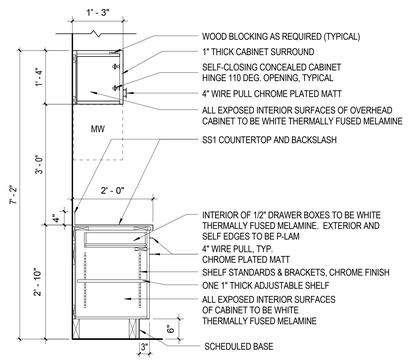
INTERIOR ELEVATION & DETAIL GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20044-G-001 FOR LIST OF PROJECT DRAWINGS.
2. SEE FINISH LEGEND FOR CASEWORK FINISH DESIGNATIONS ON SHEET
3. CE-0351-COF20044-I-101.
4. ALL EXPOSED SURFACES OF BASE AND OVERHEAD CASEWORK SHALL BE PLASTIC LAMINATE, (**PL1**).
5. ALL WORKSURFACES AND BACKSPLASHES SHALL BE SOLID SURFACE, (**SS1**).
6. ALIGN BASE CABINETS W/ OVERHEAD CABINETS.
7. KITCHENETTE EQUIPMENT: COFFEE MAKER (**CM**), MICROWAVE (**MV**), AND REFRIGERATOR (**REF**), N.I.C.
8. COORDINATE REFRIGERATOR (**REF**) W/ ICEMAKER N.I.C., W/ PLUMBING AS REQUIRED.
9. ANY PANEL TO RECEIVE SCREW FASTENERS IS TO BE VENEER CORE SUBSTRATE.



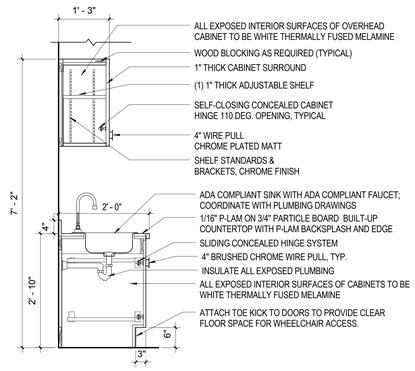
D7 I-601 CASEWORK SECTION - UPPER CAB. SHORT

3/4" = 1'-0" 0 1 2'



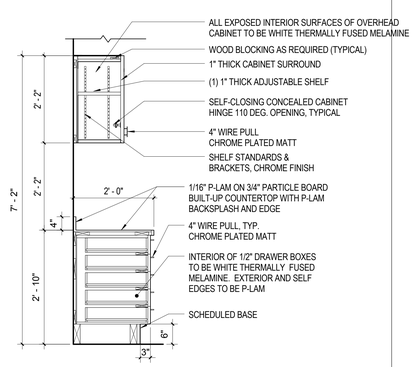
D5 I-601 CASEWORK SECTION

3/4" = 1'-0" 0 1 2'



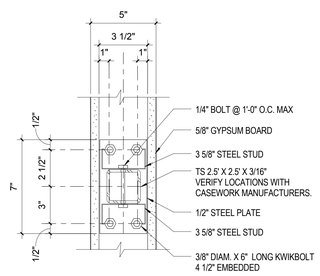
D4 I-601 CASEWORK SECTION - SINK BASE

3/4" = 1'-0" 0 1 2'



D2 I-601 CASEWORK SECTION - DRAWERS

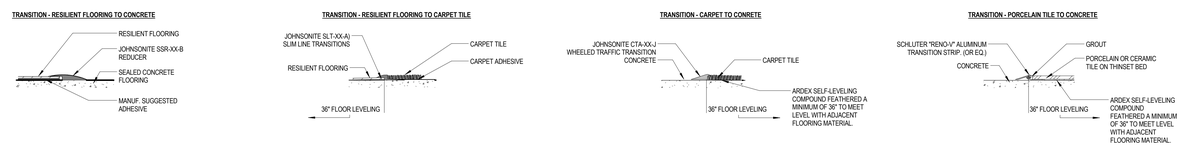
3/4" = 1'-0" 0 1 2'



B7 I-601 CASEWORK ANCHOR POINT DETAIL

3" = 1'-0" 0 1½ 3 6"

TYPICAL FINISHED FLOORING TRANSITION STRIP DETAILS



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NASA APPROVALS

DR: | DES:
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FY14 B351 WAREHOUSE ADDITION

INTERIOR ELEVATIONS AND DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	I-	601

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

I-601
0351-COF20244-I-601_CE_1.dwg TEMPLATE DATE: 02/28/2011

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EQUIPMENT TAG LEGEND

EQUIPMENT LEGEND

TAG	EQUIPMENT	SCHEDULE SHEET
AHU	AIR HANDLING UNIT	SEE SCHEDULE ON DRAWING M-604
AS	AIR SEPARATOR	SEE SCHEDULE ON DRAWING M-602
CCP	COOLING COIL CONDENSATE PUMP	SEE SCHEDULE ON DRAWING M-605
CWP	CHILLED WATER PUMP	SEE SCHEDULE ON DRAWING M-605
DF	DUCT FURNACE	SEE SCHEDULE ON DRAWING M-602
ERU	ENERGY RECOVERY UNIT	SEE SCHEDULE ON DRAWING M-602
EF	EXHAUST FAN	SEE SCHEDULE ON DRAWING M-602
ET	EXPANSION TANK	SEE SCHEDULE ON DRAWING M-602
ECH	ELECTRIC CEILING HEATER	SEE SCHEDULE ON DRAWING M-602
EDH	ELECTRIC DUCT HEATER	SEE SCHEDULE ON DRAWING M-602
EUH	ELECTRIC UNIT HEATER	SEE SCHEDULE ON DRAWING M-602
GF	GLYCOL MAKE-UP PACKAGE	SEE SCHEDULE ON DRAWING M-602
HP	HEAT PUMP	SEE SCHEDULE ON DRAWING M-602
IRH	INFRARED RADIANT HEATER	SEE SCHEDULE ON DRAWING M-602
P	BUILDING LOOP PUMP	SEE SCHEDULE ON DRAWING M-602
RV	ROOF VENTILATOR	SEE SCHEDULE ON DRAWING M-602
SA	SOUND ATTENUATOR	SEE SCHEDULE ON DRAWING M-604
SF	SUPPLY FAN	SEE SCHEDULE ON DRAWING M-602

MECHANICAL SYMBOLS

SOME SYMBOLS MAY NOT BE USED ON THIS PROJECT

- EQUIPMENT MARK (type FC, number 1)
- SECTION INDICATOR (section B2 on dwg. H1.7)
- DETAIL INDICATOR (section B2 on dwg. H1.7)
- KEY NOTE INDICATOR (refers to notes on same sheet)
- REVISION INDICATOR
- PIPE RISER (riser HWS-1 on dwg. H1.3)
- DUCT RISER (riser E-1 on dwg. H1.5)
- DIFFUSER/REGISTER/GRILLE MARK (type 1, 150 CFM)
- DENOTES CONNECT TO EXISTING
- DENOTES LIMIT OF DEMOLITION
- DESIGNATED ACCESS REQUIREMENTS
- INSIDE DUCT DIMENSION (in inches, first dim. is as viewed)
- SUPPLY (S) DUCT TURNED UP
- SUPPLY (S) DUCT TURNED DOWN
- RETURN (R)/EXHAUST (E) DUCT TURNED UP
- RETURN (R)/EXHAUST (E) DUCT TURNED DOWN
- SQUARE ELBOW
- ROUND ELBOW
- SPIN-IN WITH VOLUME DAMPER
- AIR EXTRACTOR
- FLEXIBLE DUCTWORK
- EXISTING DUCTWORK TO REMAIN
- EXISTING DUCTWORK TO BE REMOVED
- SUPPLY AIR DIFFUSER (black triangle indicates blank-off)
- RETURN/EXHAUST REGISTER OR GRILLE
- BACKDRAFT DAMPER
- FUSABLE LINK FIRE DAMPER
- MOTORIZED FIRE DAMPER
- COMBINATION FIRE/SMOKE DAMPER
- SMOKE DAMPER
- VOLUME DAMPER (manual)
- BUBBLE TIGHT SHUTOFF DAMPER (manual)
- MOTORIZED DAMPER
- MOTORIZED BUBBLE TIGHT SHUTOFF DAMPER
- AIRFLOW MECHANICAL STATION
- END SWITCH
- HIGH LIMIT HUMIDITY STATION
- THERMOSTAT
- FAN SPEED CONTROLLER
- PRESSURE SENSOR
- HUMIDISTAT
- HYDROGEN DETECTOR
- DUCT SMOKE DETECTOR
- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- LOCK SHIELD GATE VALVE
- GLOBE VALVE
- GAS COCK VALVE
- ANGLE GLOBE VALVE
- OS & Y GATE VALVE
- 2-WAY CONTROL VALVE
- 3-WAY CONTROL VALVE
- PRESSURE RELIEF VALVE
- TEMPERATURE & PRESSURE RELIEF VALVE
- CALIBRATED BALANCE VALVE
- AUTOMATIC FLOW CONTROL VALVE
- DOUBLE DETECTOR CHECK VALVE ASSEMBLY
- SWING CHECK VALVE
- SPRING LOADED CHECK VALVE
- ALARM CHECK VALVE
- COMBINATION CHECK/BALANCE/SHUTOFF VALVE
- PRESSURE REDUCING VALVE
- DIAPHRAGM VALVE
- SOLENOID VALVE
- FLOW SWITCH
- PRESSURE SWITCH
- WATER METER
- COMBINATION BALL VALVE/STRAINER
- STRAINER
- BLOW-OFF STRAINER
- PRESSURE/TEMPERATURE TEST PLUG
- GAUGECOCK
- PRESSURE GAUGE
- THERMOMETER
- FLEXIBLE PIPE CONNECTION
- MANUAL AIR VENT
- FLOW METER
- PIPE ANCHOR
- PIPE GUIDE
- UNION
- FLOAT AND THERMOSTATIC STEAM TRAP
- VACUUM BREAKER
- CAP
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER STRAIGHT INVERT
- ECCENTRIC REDUCER STRAIGHT CROWN
- CHAIN OPERATOR
- MOTOR OPERATOR
- PUMP
- CLEAN OUT
- FLOOR DRAIN
- FUNNEL DRAIN
- TRAP
- BACKFLOW PREVENTER
- FRESH AIR INLET ON HOUSE TRAP
- HOSE BIBB
- FROSTPROOF HOSE BIBB
- WATER HAMMER ARRESTOR
- GAS COCK
- PITCH PIPE DOWN IN DIRECTION OF ARROW
- TEE TURNED UP
- TEE TURNED DOWN
- PIPE TURNED UP
- PIPE TURNED DOWN
- DOMESTIC COLD WATER PIPE
- DOMESTIC HOT WATER PIPE
- DOMESTIC HOT WATER RETURN PIPE
- SANITARY SEWER
- SANITARY SEWER BELOW GRADE OR SLAB
- STORM SEWER
- STORM SEWER BELOW GRADE OR SLAB
- PLUMBING VENT
- DRAIN PIPE
- GAS PIPE
- FIRE PROTECTION PIPE
- CONDENSER WATER SUPPLY PIPE
- CONDENSER WATER RETURN PIPE
- COOLING COIL CONDENSATE DRAIN
- GROUND SOURCE WATER SUPPLY
- GROUND SOURCE WATER RETURN
- DIFFERENTIAL PRESSURE SWITCH

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

MECHANICAL ABBREVIATIONS

ABOVE FINISHED FLOOR ..... AFF
ACCESS DOOR ..... A.D.
AIR CONDITIONING ..... A/C
AIR HANDLING UNIT ..... AHU
ALTERNATE ..... ALT.
ANALOG INPUT ..... AI
ANALOG OUTPUT ..... AO
ARCHITECTURAL ..... ARCH.
AUTOMATIC ..... AUTO.
AVERAGE ..... AVG.
BLOCK ..... BL.
BOTTOM ..... BTM.
BRITISH THERMAL UNITS/HOUR ..... BTUH
BUILDING ..... BLDG.
CAPACITY ..... CAP.
CAST IRON ..... C.I.
CEILING ..... CLG.
CHANNEL ..... [
CLEAN OUT ..... C.O.
COLUMN ..... COL.
COMBINATION ..... COMB.
CONCRETE ..... CONC.
CONNECTION ..... CONN.
CONSTRUCTION ..... CONST.
CONTINUOUS ..... CONT.
CONTRACTOR ..... CONTR.
CONVECTOR ..... CONV.
COOLER ..... CLR.
CUBIC FEET/MINUTE ..... CFM
DAMPER ..... DPR.
DETAIL ..... DTL.
DIAMETER ..... DIA.
DIGITAL INPUT ..... DI
DIGITAL OUTPUT ..... DO
DIMENSION ..... DIM.
DISCHARGE ..... DISCH.
DIVISION ..... DIV.
DOWN ..... DN.
DRAWING ..... DWG.
DUCT FURNACE ..... DF.
ELECTRIC WATER COOLER ..... EWC.
ELECTRICAL ..... ELEC.
ELECTRICAL CONTRACTOR ..... E.C.
ELEVATOR ..... ELEV.
EMERGENCY GENERATOR ..... EM.GEN.
ENCLOSURE ..... ENCL.
EQUIPMENT ..... EQPMT.
EXHAUST ..... EXH.
EXHAUST FAN ..... E.F.
EXISTING ..... EXIST.
EXPANSION ..... EXP.
EXTERNAL STATIC PRESSURE ..... E.S.P.
FABRICATE ..... FAB.
FAN COIL UNIT ..... FCU.
FINISH ..... FIN.
FIRE HYDRANT ..... FH.
FIRE PROTECTION ..... FP
FIXTURE ..... FIXT.
FLASHING ..... FLASH.
FLEXIBLE ..... FLEX.
FLEXIBLE CONNECTION ..... F.C.
FLOOR ..... FLR.
FLOOR DRAIN ..... FD.
FOOTING ..... FTG.
FOUNDATION ..... FND.
FRESH AIR ..... F.A.
FRESH AIR INLET ..... FAI.
GAUGE ..... GA.
GENERAL CONTRACTOR ..... G.C.
GENERAL EXHAUST ..... G.C.
HEAT EXCHANGER ..... H.X.
HEATING ..... HTG.
HEATING UNIT ..... H.U.
HVAC CONTRACTOR ..... H.C.
HEIGHT ..... HGT.
HIGH POINT ..... H.P.
HORIZONTAL ..... HORIZ.
HORSEPOWER ..... HP
HOT WATER TANK ..... H.W.T.
HYDRAULIC ..... HYD.
INCLUDE ..... INCL.
INFRARED HEATER ..... IRH.
INSULATION ..... INSUL.
JANITOR CLOSET ..... J.C.
JOINT ..... JT.
KITCHEN SINK ..... KS
LAUNDRY TRAY ..... LT
LAVATORY ..... LAV
LIGHTING ..... LTG.
LOUVER ..... LVR.
LOW VOLTAGE ..... L.V.
MANHOLE ..... M.H.
MANUFACTURER ..... MFR.
MECHANICAL ..... MECH.
MECHANICAL EQUIPMENT ROOM ..... M.E.R.
MILLIONS OF BTU'S/HOUR ..... MMBH
MOP BASIN ..... MB
MOP RECEPTOR ..... MR
MOUNTING ..... MTG.
NOMINAL ..... NOM.
NORMALLY OPEN ..... N.O.
NORMALLY CLOSED ..... N.C.
NOT IN CONTRACT ..... N.I.C.
NOT TO SCALE ..... N.T.S.
ON CENTER ..... O.C.
OPENING ..... OPNG.
OUTSIDE AIR ..... O.A.
OUTSIDE AIR TEMPERATURE ..... O.A.T.
OUTSIDE SCREW & YOKE ..... OS & Y
OVERHEAD ..... O.H.
PENTHOUSE ..... P.H.
PLUMBING ..... PLMB.
PLUMBING CONTRACTOR ..... P.C.
PRESSURE ..... PRESS.
PRESSURE RELIEF VALVE ..... P.R.V.
PRESSURE DROP ..... P.D.
ROOF VENT ..... R.V.
RETURN AIR ..... R.A.
RETURN AIR TEMPERATURE ..... R.A.T.
REQUIRED ..... REQD.
ROOM ..... RM.
REVISION ..... REV.
SCHEDULE ..... SCHED.
SECTION ..... SECT.
SERVICE SINK ..... SS
SHEET ..... SHT.
SHEET METAL ..... S.M.
SHOWER ..... SH
SIMILAR ..... SIM.
SPECIFICATION ..... SPEC.
SQUARE FOOT ..... SQ.FT.
STAINLESS STEEL ..... S.STL.
STANDARD ..... STD.
STATIC PRESSURE ..... S.P.
STEEL ..... STL.
STORAGE ..... STOR.
STRAINER ..... STR.
STRUCTURAL ..... STRUCT.
SUPPLY AIR ..... S.A.
SUPPLY AIR TEMPERATURE ..... S.A.T.
SUSPENDED ..... SUSP.
SWITCH ..... SW.
TANK ..... TK.
TEMPERATURE ..... TEMP.
THERMOSTAT ..... T-STAT
THICK ..... THK.
THOUSANDS OF BTU'S/HOUR ..... MBH
TOTAL STATIC PRESSURE ..... T.S.P.
TRANSFORMER ..... XFMR
TYPICAL ..... TYP.
UNIT HEATER ..... U.H.
UNIT VENTILATOR ..... U.V.
URINAL ..... UR
VALVE ..... VA.
VARIABLE AIR VOLUME ..... VAV
VERTICAL ..... VERT.
VIBRATION ..... VIB.
VIBRATION ISOLATOR ..... VIB.ISO.
VOLUME ..... VOL.
WALL HYDRANT ..... WH
WATER CLOSET ..... WC
WATER HEATER ..... WH
WEIGHT ..... WT.
WIDE FLANGE ..... W.F.

MECHANICAL DRAWING LIST

M-001 HVAC SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES
M-002 HVAC TESTING AND IDENTIFICATION TABLES
M-101 FIRST FLOOR MECHANICAL DUCT PLAN EAST
M-102 ROOF MECHANICAL DUCT PLAN EAST
M-103 FIRST FLOOR MECHANICAL PIPING PLAN EAST
M-401 MECHANICAL ENLARGED PLANS AND SECTIONS
M-402 GEOTHERMAL BOREHOLE PLAN
M-501 HVAC DETAILS
M-502 HVAC DETAILS
M-503 HVAC AIR HANDLING UNIT DETAILS
M-601 HVAC DIAGRAMS
M-602 MECHANICAL SCHEDULES
M-603 MECHANICAL SCHEDULES
M-701 HVAC CONTROLS
M-702 HVAC CONTROLS
M-703 HVAC CONTROLS
M-704 HVAC CONTROLS
M-705 HVAC CONTROLS
M-706 HVAC CONTROLS
M-707 HVAC CONTROLS
M-708 HVAC CONTROLS

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APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

HVAC SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	001

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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PIPING MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	FITTINGS	JOINTS
GROUND SOURCE WATER (GSWS & GSWR) BOREHOLE U-TUBE PIPING	ALL SIZES	HDPE SDR-7.3 ASTM D2513	MOLDED HDPE SDR-7.3 ASTM D3261	HEAT FUSION
GROUND SOURCE WATER (GSWS & GSWR) HORIZONTAL TRENCH PIPING	ALL SIZES	HDPE SDR-11 ASTM D2513	MOLDED HDPE SDR-11 ASTM D3261	HEAT FUSION
CONDENSER WATER (CWS&CWR) AND AIR CONDITIONING CONDENSATE AND CHILLED WATER AND HOT WATER	3" AND SMALLER	TYPE L HARD COPPER ASTM B88	WROUGHT COPPER ANSI/ASME B16.22	"BRIDGIT" LEAD FREE SOLDER
			VIEGA PRO-PRESS FITTINGS (SEE NOTE #3)	VIEGA PRO-PRESS FITTINGS (SEE NOTE #3)
	4" AND LARGER	SCH. 40 BLACK CARBON STEEL,TYPE E OR S, GRADE B, ASTM A53	SCH. 40 WROUGHT STEEL BUTT WELDING FITTINGS, ASTM A234	BUTT WELDED FITTINGS (SEE NOTE #2)
NON-POTABLE DOMESTIC COLD WATER	ALL SIZES	TYPE L HARD COPPER ASTM B88	WROUGHT COPPER ANSI/ASME B16.22	"BRIDGIT" LEAD FREE SOLDER
			VIEGA PRO-PRESS FITTINGS (SEE NOTE #3)	VIEGA PRO-PRESS FITTINGS (SEE NOTE #3)
VACUUM PUMP EXHAUST	6"	SCH 40 PVC	PVC DWV	SOCKET SOLVENT WELD
FURNACE CONDENSATE	ALL SIZES	SCH 40 PVC (SEE NOTE 3)	PVC DWV (SEE NOTE 3)	SOCKET SOLVENT WELD (SEE NOTE 3)

NOTES:

1. PVC PIPING SHALL NOT BE USED IN AREAS THAT UTILIZE A RETURN AIR PLENUM.
2. THIS TABLE ONLY APPLIES TO THE WORK DELINEATED UNDER THE M-XXX SERIES DRAWINGS.
3. COPPER TUBING SHALL BE USED AS SPECIFIED HEREIN FOR A/C CONDENSATE WHERE RECOMMENDED BY THE HEATING SYSTEM DEVICE / APPLIANCE MANUFACTURER.
4. WHEN INSTALLING PRO-PRESS FITTINGS ONTO COPPER TUBE OR PIPE, THE CONTRACTOR SHALL SLIDE THE FITTING ONTO THE TUBE AND MAKE CONTACT WITH THE EMBOSSED FITTING STOP AND/OR IN ACCORDANCE WITH THE "PRO-PRESS INSERTION DEPTH CHART" INCLUDED HEREIN. WITH A PERMANENT MARKER, MARK INSERTION DEPTH ON THE TUBE BEFORE LOCKING FITTINGS IN PLACE. THIS IS A REQUIREMENT OF GOVERNMENT QUALITY ASSURANCE PERSONNEL FOR INSPECTION OF PROPER DEPTH INSTALLATION OF THE FITTINGS.

PRO-PRESS INSERTION DEPTH CHART

TUBE SIZE	½"	¾"	1"	1¼"	1½"	2"	2½"	3"	4"
INSERTION DEPTH	¾"	7/8"	7/8"	1"	1 7/16"	1 9/16"	2⅛"	2⅛"	2½"

PIPING SYSTEM TEST CRITERIA LIST

EACH PIPING SYSTEM SHALL BE TESTED ACCORDING TO THE FOLLOWING SCHEDULES

SYSTEM	SYSTEM WORKING PRESSURE PSIG	MAXIMUM ALLOWABLE WORKING PRESSURE PSIG	(1) TEST PRESSURE PSIG	WORKING TEMP. °F	DESIGN STANDARD	(2) INSPECTION REQ'D FOR WELDED OR BRAZED PIPE OR TUBING
SEWER						
A.C. UNIT COIL COND./COND WATER GRAVITY RETURN	0	3	5(A)	80		
WATER						
CONDENSER / CW	80	100	160	40-90	B31.3	VISUAL
GROUND SOURCE /GSW	80	100	160	40-90	B31.9	VISUAL
COLD NON-POTABLE /CNPW	80	80	120	80	B31.9	VISUAL
CHILLED/CHW	70	90	135	40	B31.3	VISUAL
HEATING HOT/HW	80	80	120	250	B31.9	VISUAL

(1) TESTING SHALL BE HYDROSTATIC, AND IN ACCORDANCE WITH SPECIFICATION SECTION 23 05 93.98.
(A) TESTING SHALL BE PNEUMATIC.

(2) REFER TO SPECIFICATION SECTION 01 45 33 01 98 FOR PIPE WELDING REQUIREMENTS

DUCT AND PIPE IDENTIFICATION

SYSTEM REQUIRING IDENTIFICATION	IDENTIFICATION W/ BLACK LETTERS ON A WHITE BACKGROUND:ENGLISH	COLOR BANDS *
AIR DUCTS		
AIR CONDITIONING SUPPLY	A/C SPLY	WHITE
AIR CONDITIONING RETURN	A/C RTN	WHITE
EXHAUST AIR	EXH AIR	GRAY
OUTSIDE AIR SUPPLY	OA SUPPLY	WHITE
WATER	IDENTIFICATION w/WHITE LETTERS ON A GREEN BACKGROUND	
CONDENSER RETURN	C WTR RTN - "X" PIPE SIZE	GREEN
CONDENSER SUPPLY	C WTR SPLY - "X" PIPE SIZE	GREEN
NON-POTABLE COLD	NONPOT DOM WTR - "X" PIPE SIZE	LIGHT BLUE
GROUND SOURCE SUPPLY	GS WTR SPLY - "X" PIPE SIZE	ORANGE
GROUND SOURCE RETURN	GS WTR RTN - "X" PIPE SIZE	ORANGE
CHILLED SUPPLY	CH WTR SPLY - "X" PIPE SIZE	BLUE
CHILLED RETURN	CH WTR RTN - "X" PIPE SIZE	BLUE
HEATING HOT SUPPLY	HTR RTN - "X" PIPE SIZE	YELLOW
HEATING HOT RETURN	HTG SPLY - "X" PIPE SIZE	YELLOW

* COLOR BAND SHALL BE POSITIONED OVER EACH END OF THE LABEL TO SECURE IT IN PLACE AND SHALL NOT OBSCURE THE LABEL LETTERING.

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

KEYNOTES

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
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DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

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D.ENG: | PROJ. MGR: KJS
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FY14 B351 WAREHOUSE ADDITION

HVAC
TESTING AND IDENTIFICATION TABLES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	002

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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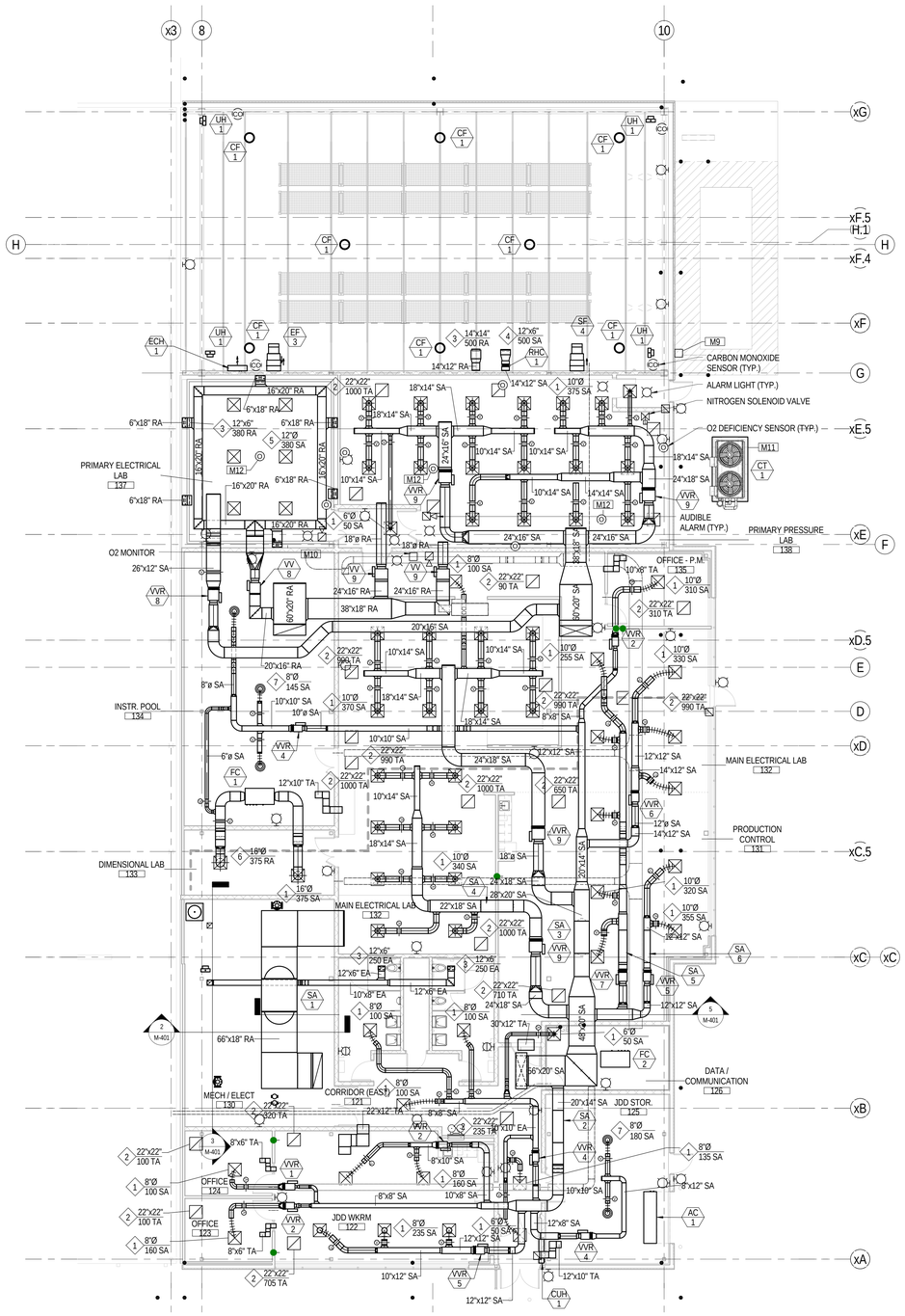

FIRST FLOOR - MECHANICAL DUCT PLAN

1/8" = 1'-0"

GENERAL NOTES

GENERAL NOTES APPLY TO ALL SHEETS IN THE SERIES THAT THEY ARE ON. EACH SERIES OF SHEETS WILL START OVER AT NOTE 1.

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

SHEET NOTES

SHEET NOTES APPLY ONLY TO THE SHEET THAT THEY ARE ON. EACH SHEET WILL START OVER AT NOTE 1.

1. ALL SUPPLY DUCTWORK TO BE INSULATED PER SPECIFICATIONS.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM M1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO M002 FOR THE ENTIRE LIST OF ALL KEY NOTES. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

M9	RELOCATE EXISTING AIR TEMPERATURE SENSOR FROM WEST WALL OF WAREHOUSE TO LOCATION INDICATED.
M10	PRIMARY ELECTRICAL LAB IS A SHIELDED ROOM. ALL DUCTWORK, PIPING, POWER CIRCUITS AND CONTROL CIRCUITS PENETRATING SHIELD SHALL BE PROVIDED WITH WAVE GUIDES. REFER TO DRAWING X-101 AND X-102 FOR WAVE GUIDE SHIELDING REQUIREMENTS.
M11	CONCRETE SUPPORT SLAB.
M12	OXYGEN SENSOR LOCATED ABOVE CEILING.

ROOM AIR FLOW SCHEDULE

ROOM NUMBER	SUPPLY CFM	RETURN CFM	EXHAUST CFM
120B	50	---	---
121	235	235	---
122	1025	1025	---
124	100	100	---
125	160	160	---
126	50	---	---
127	100	---	250
128	---	---	---
129	100	---	250
130	---	---	500
131 & 132	5825	5825	---
133	425	375	---
134	435	435	---
135	310	310	---
136	50	---	---
137	2125	2125	---
138	3050	3050	---
139	50	---	---
140	500	500	---

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CONTRACTOR OF RECORD: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT: SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR.: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR MECHANICAL DUCT PLAN EAST

SIZE: CE | BLDG/SYS: 0351 | PROJECT ID: COF20244 | DISCP: M- | TYP SEQ: 101
AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

M-101

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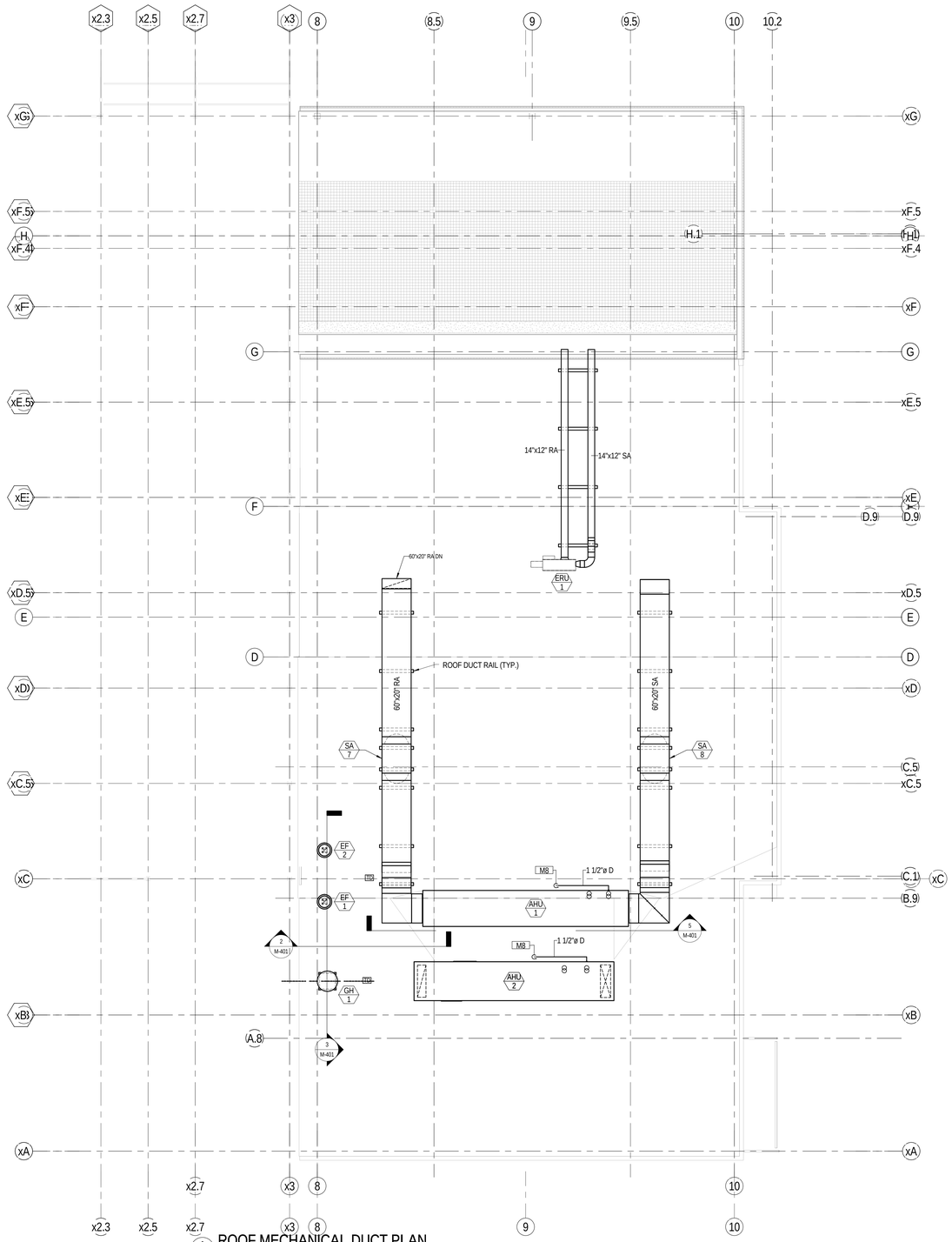

1 M-102 ROOF MECHANICAL DUCT PLAN
1/8" = 1'-0"

GENERAL NOTES

GENERAL NOTES APPLY TO ALL SHEETS IN THE SERIES THAT THEY ARE ON. EACH SERIES OF SHEETS WILL START OVER AT NOTE 1.

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

SHEET NOTES

SHEET NOTES APPLY ONLY TO THE SHEET THAT THEY ARE ON. EACH SHEET WILL START OVER AT NOTE 1.

1. ALL ROOF MOUNTED DUCTWORK TO BE INSULATED PER SPECIFICATIONS.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM M1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO M002 FOR THE ENTIRE LIST OF ALL KEY NOTES. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

M8	ROUTE CONDENSATE DOWN TO ROOF DRAIN.

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3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

NASA GRID NORTH
37° 54' 27"
N

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CONTRACT No:	NNC09CA01C
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APPROVED: Approver	APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

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HVAC			

NASA APPROVALS

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D.ENG:	PROJ. MGR: KJS
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RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
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FY14 B351 WAREHOUSE ADDITION

ROOF MECHANICAL DUCT PLAN EAST

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	102

AREA:
SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
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M-102

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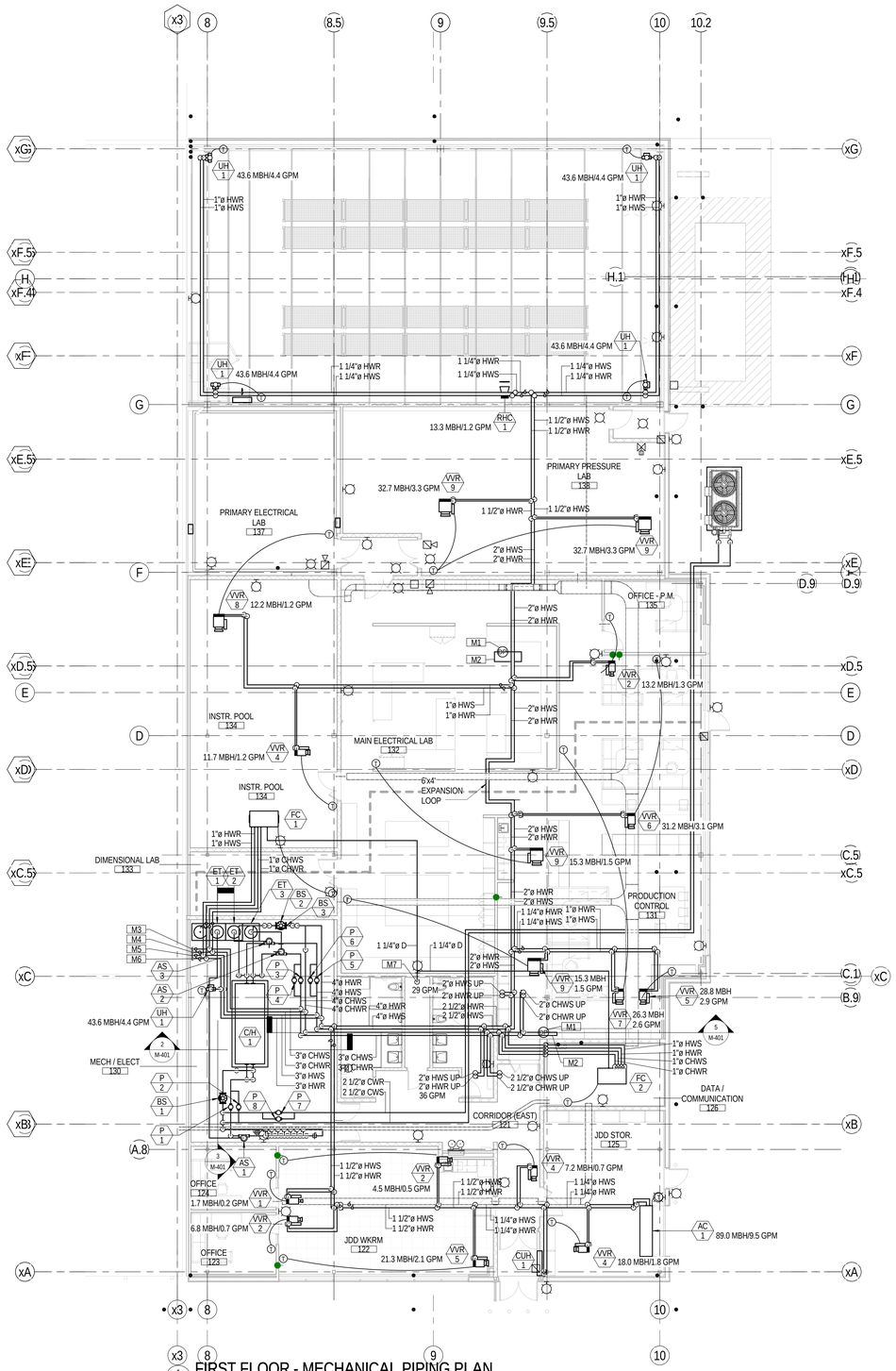
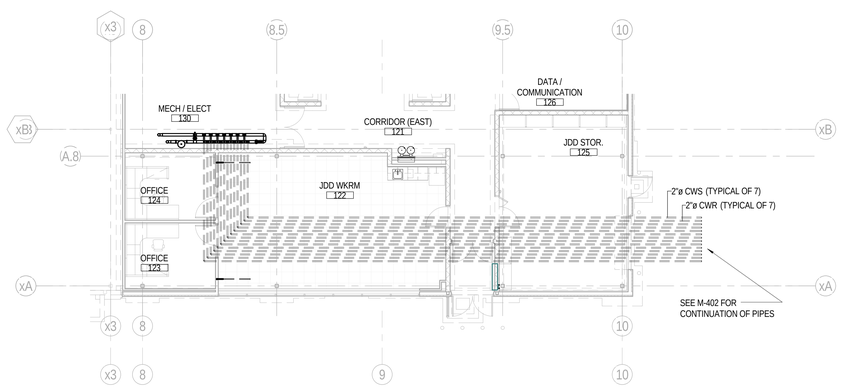


1 M-103 FIRST FLOOR - MECHANICAL PIPING PLAN
1/8" = 1'-0"



2 M-103 FIRST FLOOR - WELL FIELD PIPING PLAN
1/8" = 1'-0"

GENERAL NOTES

GENERAL NOTES APPLY TO ALL SHEETS IN THE SERIES THAT THEY ARE ON. EACH SERIES OF SHEETS WILL START OVER AT NOTE 1.

1. REFER TO SHEET CE-0351-COF20244-G-001 FOR LIST OF PROJECT DRAWINGS.

SHEET NOTES

SHEET NOTES APPLY ONLY TO THE SHEET THAT THEY ARE ON. EACH SHEET WILL START OVER AT NOTE 1.

1. ALL PIPING TO BE INSULATED PER SPECIFICATIONS.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM M1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

M1	DIFFERENTIAL PRESSURE SENSOR.
M2	DIFFERENTIAL BY PASS.
M3	2 1/2" CHWS CAPPED FOR FUTURE WEST ADDITION.
M4	2 1/2" CHWR CAPPED FOR FUTURE WEST ADDITION.
M5	3" HWS CAPPED FOR FUTURE WEST ADDITION.
M6	3" HWR CAPPED FOR FUTURE WEST ADDITION.
M7	1 1/4" D DOWN TOO FLOOR DRAIN.

NASA GRID NORTH
39° 51' 21"
N

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FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR MECHANICAL PIPING PLAN EAST

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	M-	103

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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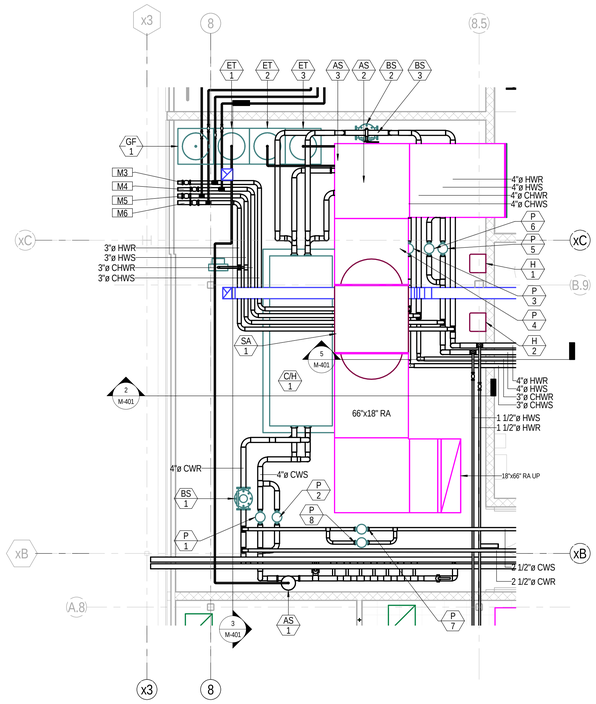
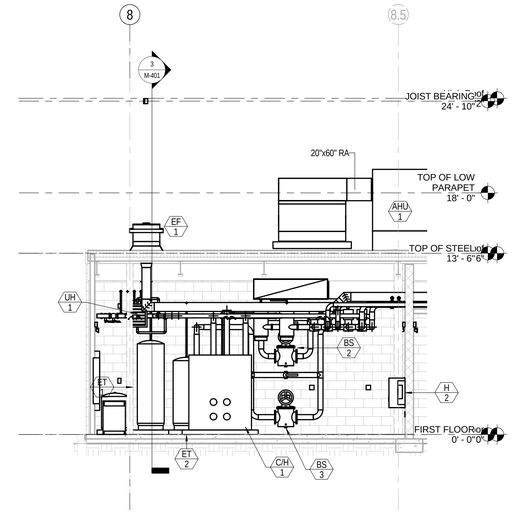
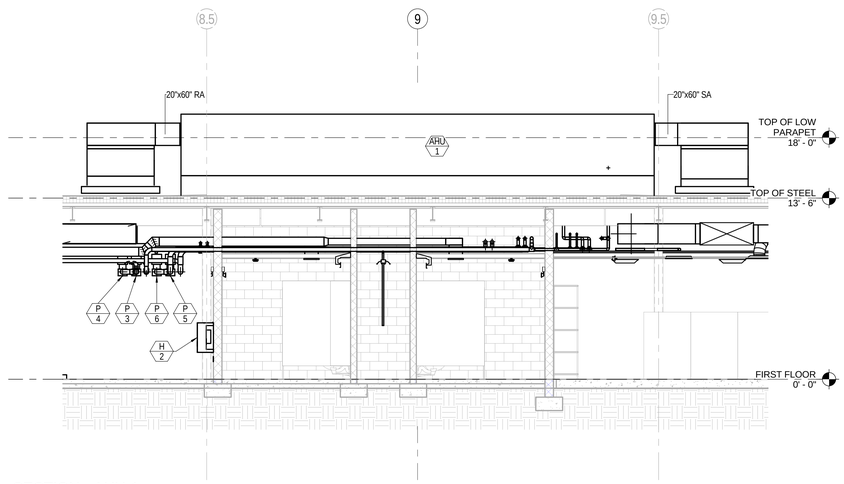


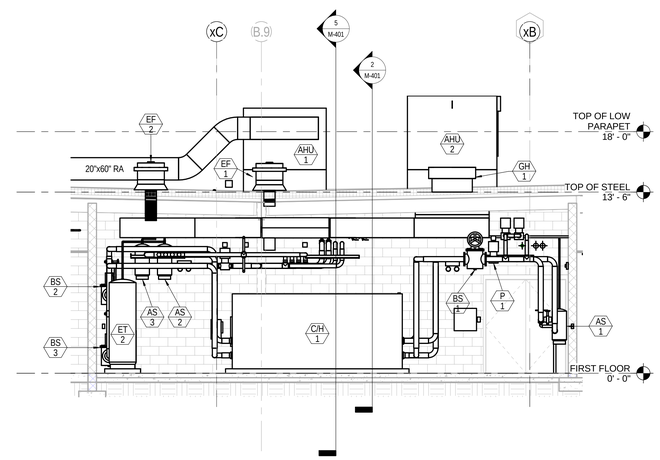
1 M-401 ENLARGED MECHANICAL ROOM PLAN
1/4" = 1'-0"



2 M-401 SECTION 1 - MECHANICAL ROOM
1/4" = 1'-0"



5 M-401 SECTION - AHU-1
1/4" = 1'-0"



3 M-401 SECTION 3 - MECHANICAL ROOM
1/4" = 1'-0"

GENERAL NOTES

GENERAL NOTES APPLY TO ALL SHEETS IN THE SERIES THAT THEY ARE ON. EACH SERIES OF SHEETS WILL START OVER AT NOTE 1

1. REFER TO SHEET CE-0351-COF20244-G-001 FOR LIST OF PROJECT DRAWINGS.

SHEET NOTES

SHEET NOTES APPLY ONLY TO THE SHEET THAT THEY ARE ON. EACH SHEET WILL START OVER AT NOTE 1.

1. SHEET NOTE 1.
2. SHEET NOTE 2.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM M1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

M3	2 1/2" CHWS CAPPED FOR FUTURE WEST ADDITION.
M4	2 1/2" CHWR CAPPED FOR FUTURE WEST ADDITION.
M5	3" HWS CAPPED FOR FUTURE WEST ADDITION.
M6	3" HWR CAPPED FOR FUTURE WEST ADDITION.

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FY14 B351 WAREHOUSE ADDITION

MECHANICAL ENLARGED PLANS AND SECTIONS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	M-	401

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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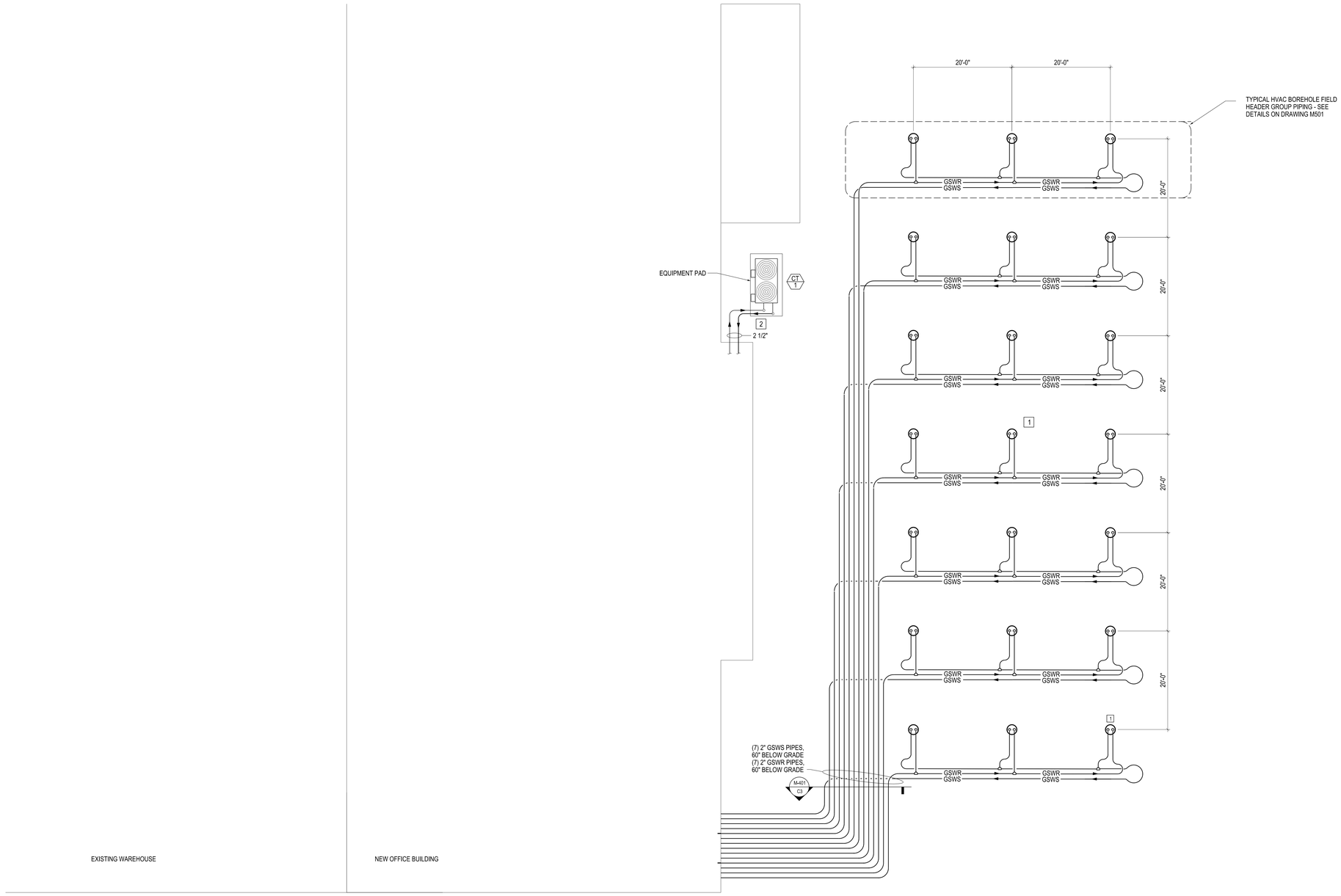
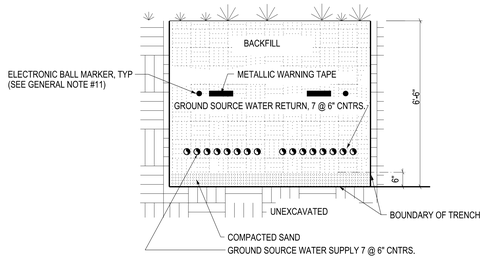


HVAC BOREHOLE FIELD LAYOUT PLAN

1/8"=1'-0"

0 4' 8' 16'



SECTION 1-M-401

1/8"=1'-0"

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. FIELD VERIFY EXACT LOCATION OF ALL UNDERGROUND UTILITIES. COORDINATE WITH PROJECT SITE CONTRACTOR.
3. SUBMIT GROUND SOURCE HEAT PUMP LOOP HEAT EXCHANGER PIPING LAYOUT SHOP DRAWINGS INCLUDING BUT NOT LIMITED TO PIPE SIZES, BORE HOLE DEPTHS, ETC. TO ARCHITECT/ENGINEER FOR REVIEW BEFORE DRILLING AND EXCAVATION BEGINS.
4. GROUND SOURCE HEAT PUMP LOOP HEAT EXCHANGER PIPING SHALL BE INSTALLED AS INDICATED IN A REVERSE RETURN ARRANGEMENT TO ACHIEVE A SELF-BALANCING SYSTEM.
5. PROVIDE 21 NEW BOREHOLES, EACH A MINIMUM OF 505 FEET DEEP FOR GROUND SOURCE HEAT EXCHANGER. PROVIDE A TOTAL OF 7 CIRCUITS FROM THE BUILDING TO THE BOREHOLES - ARRANGED INTO SEPARATE CIRCUITS OF 3 BOREHOLES AS INDICATED ON THE PLAN ON THIS SHEET.
6. BOREHOLES SHALL BE SEPARATED BY A MINIMUM OF 20 FEET ON CENTER. BOREHOLES, UNLESS NOTED OTHERWISE, SHALL BE LOCATED A MINIMUM OF 20 FEET AWAY FROM THE BUILDING.
7. WORK UNDER THIS CONTRACT INCLUDES BACKFILL COMPACTION APPROPRIATE FOR THE EACH LOCATION.
8. VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO EXCAVATION.
9. PROVIDE EACH BOREHOLE WITH 20 FT MINIMUM STEEL CASING. CASING STEEL SHALL BE 0.188 INCH MINIMUM WALL THICKNESS.
10. REFER TO SPECIFICATION SECTION 23 81 47 "WATER-LOOP AND GROUND-LOOP HEAT PUMP SYSTEM" FOR ADDITIONAL INFORMATION, INCLUDING A TEST BORE LOG.
11. PROVIDE AN ELECTRONIC BALL MARKER SYSTEM FOR FUTURE DETECTION OF UNDERGROUND GROUND-SOURCE WATER LINES AND BORE HOLE LOCATIONS; THE SYSTEM SHALL CONSISTS OF A SERIES 4-INCH DIAMETER WATER-RESISTANT HIGH-DENSITY POLYETHYLENE BALL MARKER SHELLS, EACH CONTAINING A PASSIVE-TUNED ANTENNA MOLDED INSIDE A PLASTIC DISK WHICH IS FREE-FLOATING IN A MIXTURE OF WATER AND PROPYLENE GLYCOL. MARKER SYSTEM SHALL BE "3M SCOTCHMARK PART NUMBER 1403-XR (BLUE)" OR APPROVED EQUIVALENT. MARKERS TO BE INSTALLED AND BURIED AS FOLLOWS; MINIMUM 4-INCHES ABOVE EVERY BOREHOLE AND BURIED WATER LINES, BUT NOT TO EXCEED 5 FEET BELOW FINAL GRADE SURFACE. FREQUENCY OF BALL MARKERS USED FOR THE PIPELINES AND BACKFILL REQUIREMENTS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. BEFORE PLACING A BALL MARKER OVER A KEY POINT, DECIDE IF A TIE-DOWN PROCEDURE IS NECESSARY TO KEEP IT IN PLACE - IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTRACTOR SHALL PROVIDE A "3M EMS II MARKER LOCATOR" WHICH CONSISTS OF A COMPACT ELECTRONICS PACKAGE AND A HAND-HELD PROBE.

KEYNOTES

1 BOREHOLE (TYPICAL)

2 SUPPORT PIPING FROM WALL AND EQUIPMENT PAD.

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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
HVAC			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION	TECH LEAD:	FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

GEOTHERMAL BOREHOLE PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	402

AREA: SHEET 1 OF

UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1

SCALE: 1/8" = 1'-0" | OFFICIAL DATE: 06-24-2014

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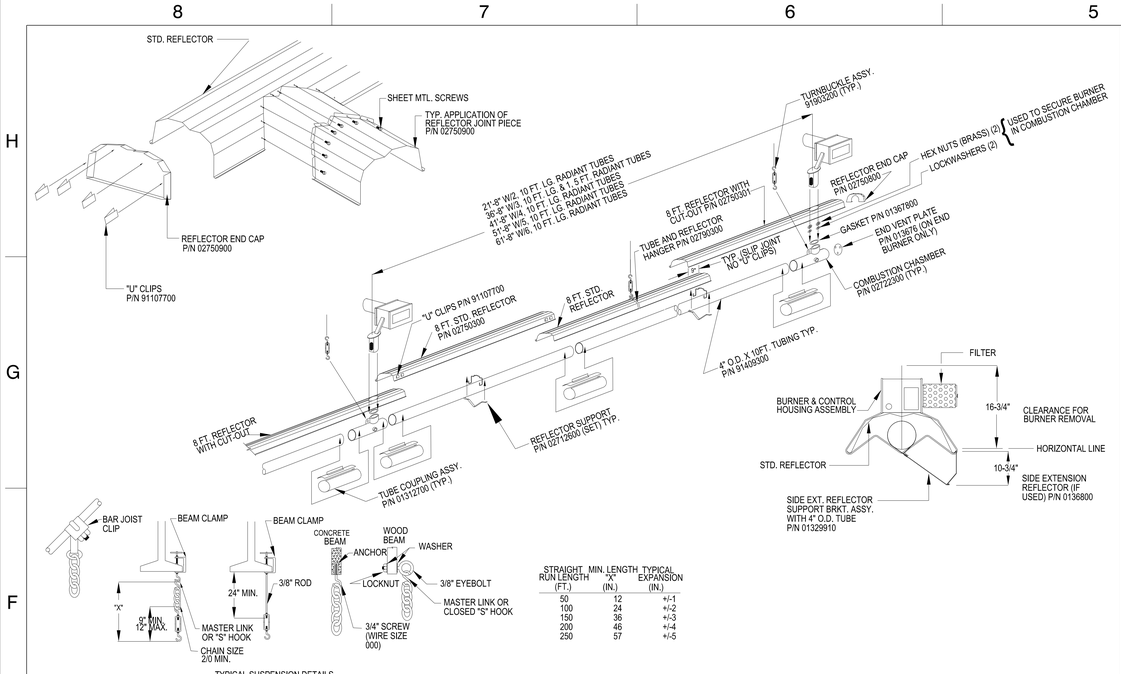


STRAIGHT RUN LENGTH (FT.)	MIN. LENGTH "X" (IN.)	TYPICAL EXPANSION (IN.)
50	12	+/-1
100	24	+/-2
150	36	+/-3
200	46	+/-4
250	57	+/-5

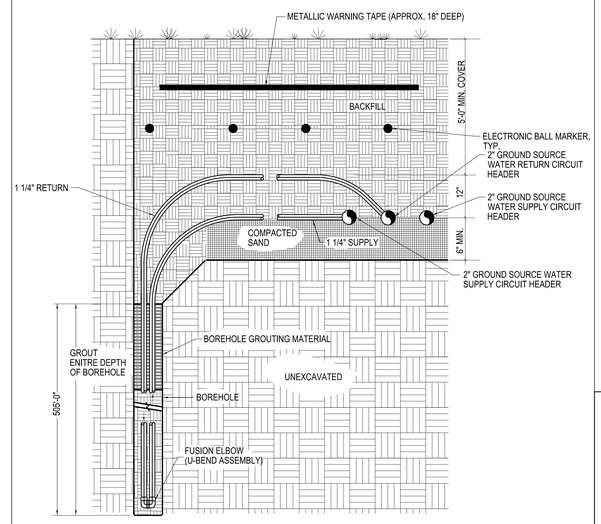
TYPICAL SUSPENSION DETAILS

(NOTE: USE ONLY THE TURNBUCKLES FURNISHED BY ROBERTS-GORDON INC.)

TYPICAL RADIANT HEATER SUSPENSION DETAIL (BID OPTION 5)

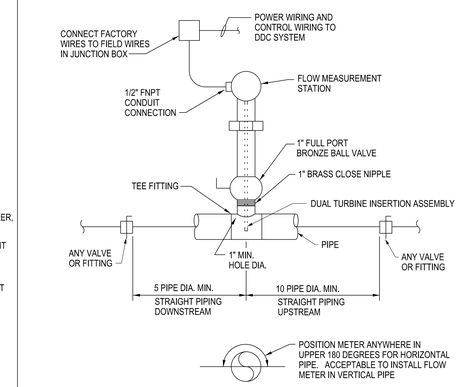
NTS

(NOTE: BASIS OF DESIGN IN DETAIL IS ROBERTS GORDON CORAYVAC SYSTEM)



TYPICAL BOREHOLE DETAIL

NTS



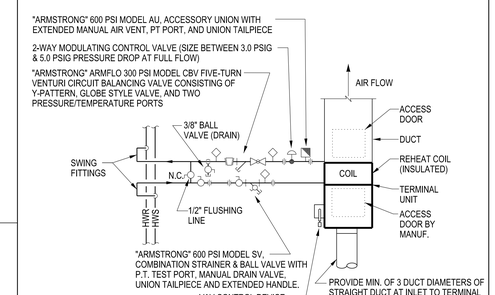
NOTE: PROVIDE MINIMUM UPSTREAM AND DOWNSTREAM LENGTHS OF STRAIGHT PIPING RUNS AS REQUIRED BY THE FLOW MEASUREMENT STATION MANUFACTURER.

WATER LINE FLOW MEASUREMENT STATION DETAIL

NTS

GENERAL NOTES

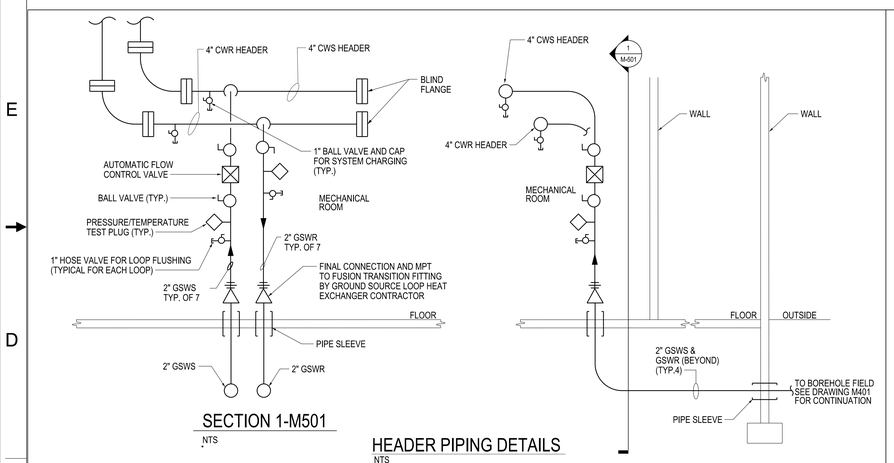
1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET CE-0351-COF20244-M-001 FOR LIST OF PIPING SYMBOLS.



NOTE:
1. PROVIDE HALF THE TRU'S WITH 2-WAY VALVES AND HALF WITH 3-WAY VALVES. DISTRIBUTE THROUGHOUT THE BUILDING EVENLY.
2. ALL ACTUATED VALVES SIZED AND PROVIDED BY "SIEMENS"

TERMINAL REHEAT UNIT WITH HOT WATER COIL DETAIL

NTS

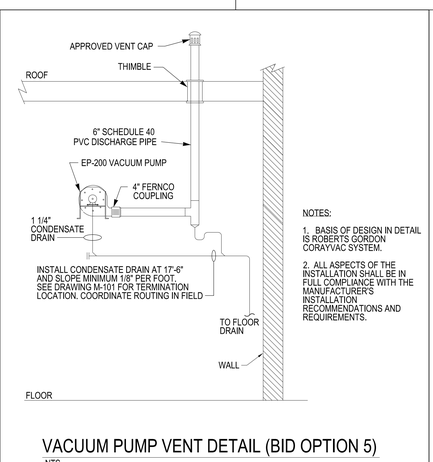


SECTION 1-M501

NTS

HEADER PIPING DETAILS

NTS

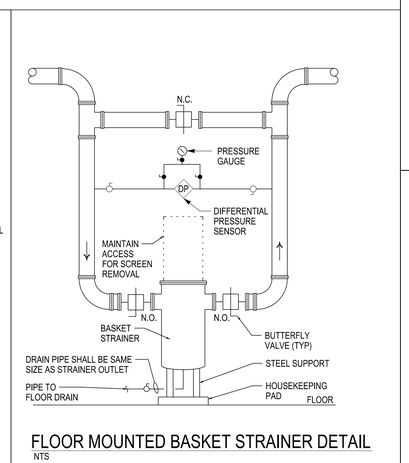


NOTES:

1. BASIS OF DESIGN IN DETAIL IS ROBERTS GORDON CORAYVAC SYSTEM.
2. ALL ASPECTS OF THE INSTALLATION SHALL BE IN FULL COMPLIANCE WITH THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS AND REQUIREMENTS.

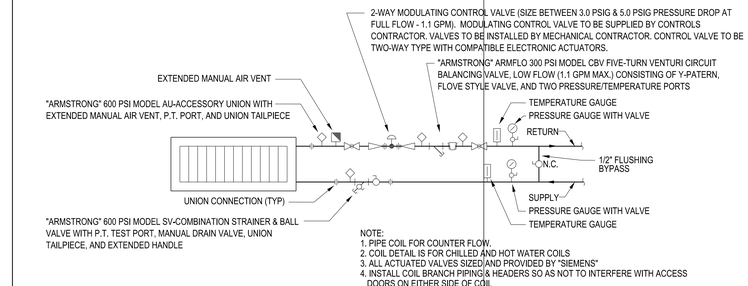
VACUUM PUMP VENT DETAIL (BID OPTION 5)

NTS



FLOOR MOUNTED BASKET STRAINER DETAIL

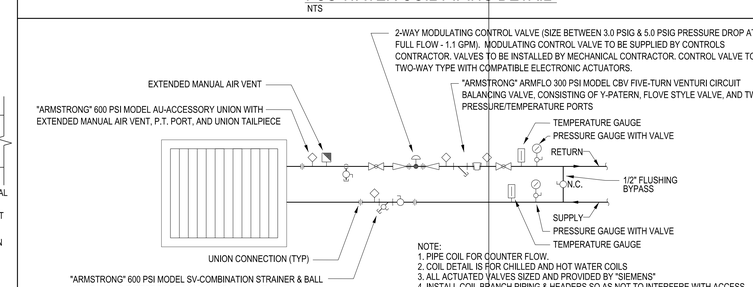
NTS



NOTE:
1. PIPE COIL FOR COUNTER FLOW.
2. COIL DETAIL IS FOR CHILLED AND HOT WATER COILS
3. ALL ACTUATED VALVES SIZED AND PROVIDED BY "SIEMENS"
4. INSTALL COIL BRANCH PIPING & HEADERS SO AS NOT TO INTERFERE WITH ACCESS DOORS ON EITHER SIDE OF COIL

FCU WATER COIL PIPING DETAIL

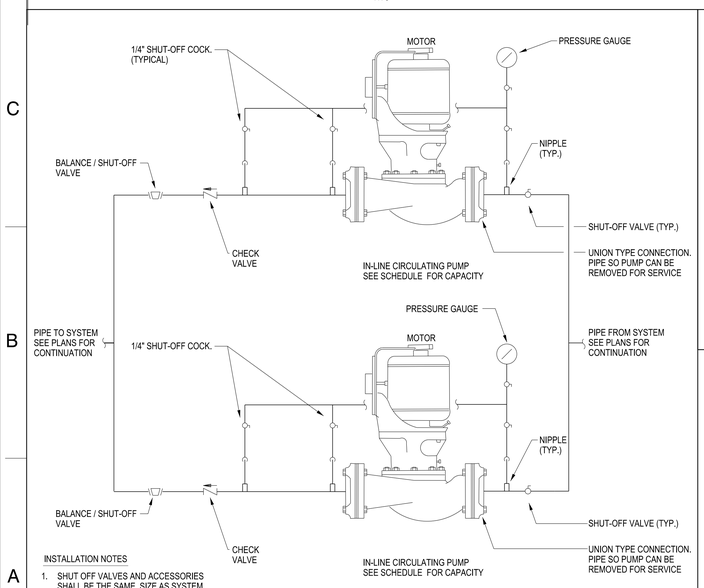
NTS



NOTE:
1. PIPE COIL FOR COUNTER FLOW.
2. COIL DETAIL IS FOR CHILLED AND HOT WATER COILS
3. ALL ACTUATED VALVES SIZED AND PROVIDED BY "SIEMENS"
4. INSTALL COIL BRANCH PIPING & HEADERS SO AS NOT TO INTERFERE WITH ACCESS DOORS ON EITHER SIDE OF COIL

AHU WATER COIL PIPING DETAIL

NTS



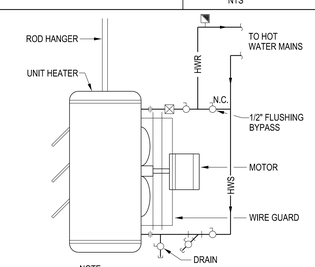
INSTALLATION NOTES

1. SHUT OFF VALVES AND ACCESSORIES SHALL BE THE SAME SIZE AS SYSTEM PIPING.
2. THE BALANCE VALVE SHALL BE SIZED AT A PRESSURE DROP OF 3 PSI MAX AT FULL FLOW.

PROVIDE OPTIONAL SPACER COUPLING FOR FLUID TEMPERATURES OVER 100 DEG. F.

DUAL INLINE PUMP DETAIL

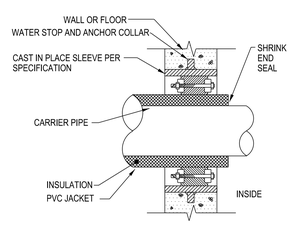
NTS



NOTE:
PIPING ILLUSTATED FOR HORIZONAL TYPE.
PROVIDE EQUIVALENT FOR VERTICAL TYPE.

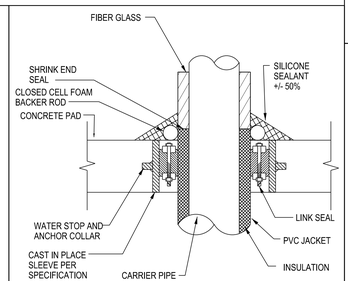
HOT WATER UNIT HEATER PIPING DETAIL

NTS



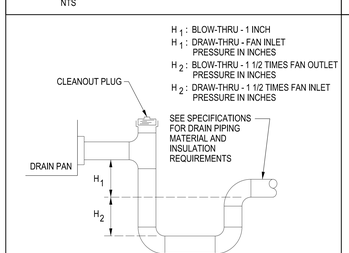
LINK-SEAL® SLEEVE AND SEAL THRU WALL DETAIL

NTS



LINK-SEAL® SLEEVE AND SEAL THRU SLAB DETAIL

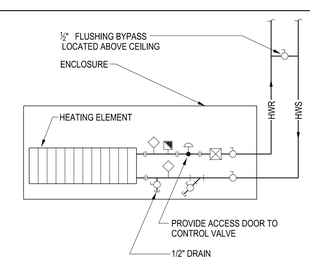
NTS



NOTE:
INCREASE UNIT PAD / STRUCTURE / CURB HEIGHT TO ACHIEVE SPACE REQUIRED TO INSTALL INDICATED TRAP DEPTH.

DEEP SEAL CONDENSATE TRAP DETAIL

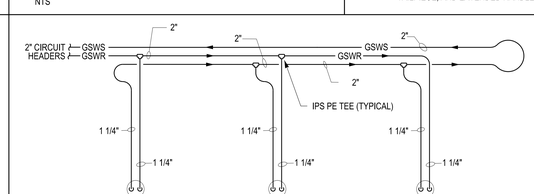
NTS



NOTE:
1. ALL ACTUATED VALVES SIZED AND PROVIDED BY "SIEMENS"

CABINET UNIT HEATER PIPING DETAIL

NTS



NOTES:

1. THIS LAYOUT IS SCHEMATIC AND IS REPRESENTATIVE OF A TYPICAL CIRCUIT. SEPARATE SUPPLY AND RETURN CIRCUIT HEADERS AS SPECIFIED. THE NUMBER AND ARRANGEMENT OF EACH CIRCUIT VARIES AS INDICATED ON THE PLAN. ALL MAIN CIRCUIT HEADER PIPES SHALL BE 2". ALL INDIVIDUAL BRANCH RUNOUTS TO BOREHOLES SHALL BE 1-1/4". EACH BOREHOLE SHALL HAVE IT'S OWN BRANCH CONNECTION TO THE 2" CIRCUIT HEADERS, AND THE CIRCUITS SHALL BE PIPED IN A REVERSE RETURN ARRANGEMENT.

GROUND SOURCE BOREHOLE FIELD HEADER GROUP PIPING DETAIL

NTS

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

DRAWING/DESIGN STATUS:	BID SET
DRAWING MANAGEMENT	SYSTEM: HVAC / SUB-SYS: / FACILITY: / CONFIG:
NASA APPROVALS	DR: / DES:
	D.ENG: / PROJ. MGR: KJS
CONTRACTOR: STANTEC ARCHITECTURE INC.	RELEASE APPROVAL: / DATE:
CONTRACT NO.: NNC09CA01C	RELEASE APPROVAL: / DATE:
TASK ORDER:	RELEASE APPROVAL: / DATE:
DRAWN / DESIGNED / CHECKED / APPROVED / APPROVAL DATE	RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION	TECH LEAD:	FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	M	501

AREA: / SHEET 1 OF

UNITS: ENGLISH / SOFTWARE: / REVISION - / VER 1

SCALE: 12" = 1'-0" / OFFICIAL DATE: 06-24-2014

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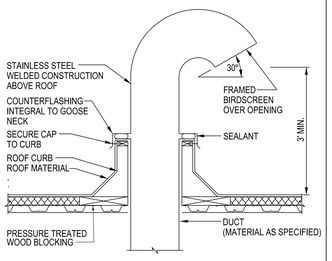
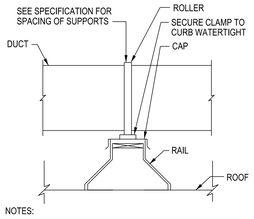
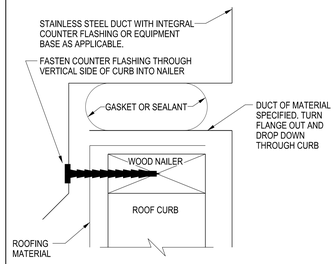


GOOSENECK ON ROOF CURB DETAIL
NTS

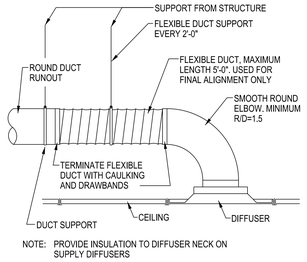


NOTES:
1. COORDINATE MECHANICAL EQUIPMENT REQUIRING CURBS OR OTHER ROOF WORK WITH G.C.
2. FOR INSTALLATIONS IN EXISTING ROOFING ALL CUTTING, SUPPLEMENTAL FRAMING, AND PATCHING, ETC. IS BY HVAC CONTRACTOR. PERFORM WORK IN SUCH A MANNER AS TO MAINTAIN ROOFING WARRANTY.

ROOF DUCT RAIL DETAIL
NTS

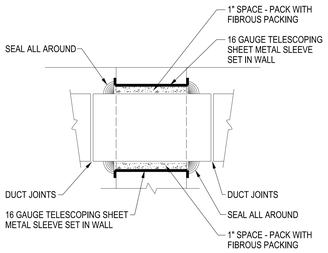


DUCT WORK AND EQUIPMENT CONNECTION TO ROOF CURB DETAIL
NTS

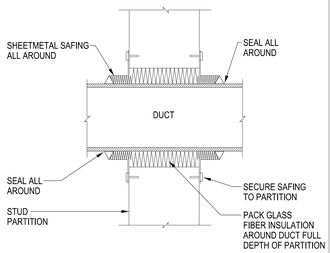


NOTE: PROVIDE INSULATION TO DIFFUSER NECK ON SUPPLY DIFFUSERS

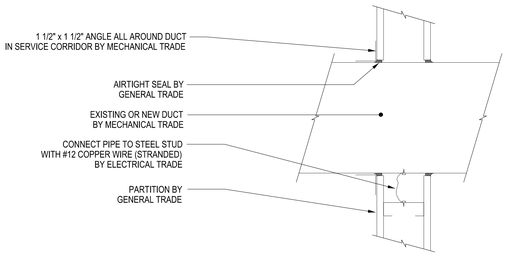
CEILING DIFFUSER DUCT CONNECTION
NTS



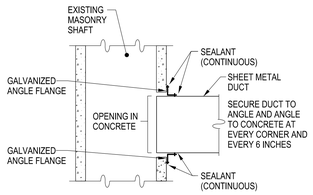
DUCT PASSING THRU MASONRY WALL DETAIL
NTS



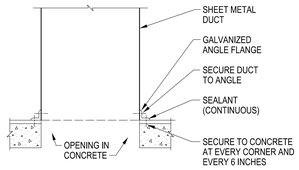
DUCT PASSING THRU STUD WALL PARTITION DETAIL
NTS



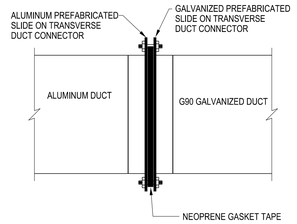
DUCT PENETRATION DETAIL THROUGH LABORATORY PARTITIONS
NTS



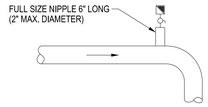
DUCT TO MASONRY SHAFT CONNECTION DETAIL
NTS



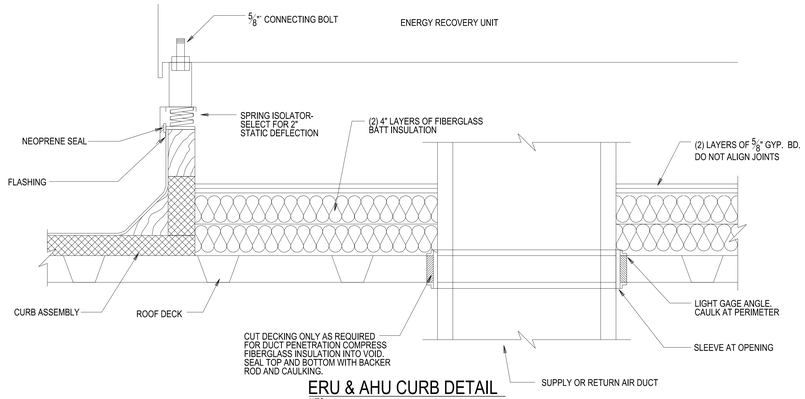
DUCT TO CONCRETE CONNECTION DETAIL
NTS



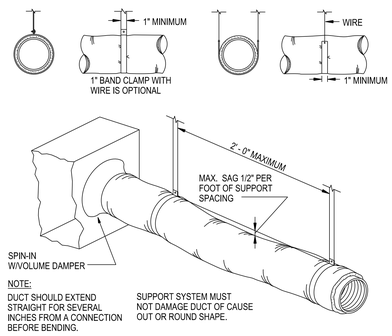
DIELECTRIC CONNECTION DETAIL
NTS



MANUAL AIR VENT CONNECTION DETAIL
NTS

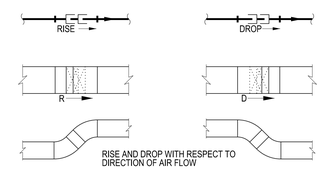


ERU & AHU CURB DETAIL
NTS

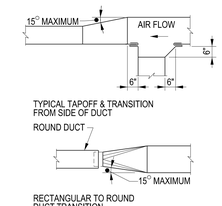


NOTE:
DUCT SHOULD EXTEND STRAIGHT FOR SEVERAL INCHES FROM A CONNECTION BEFORE BENDING.

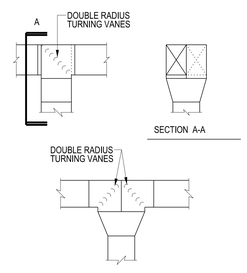
SUPPORT SYSTEM MUST NOT DAMAGE DUCT OF CAUSE OUT OR ROUND SHAPE.



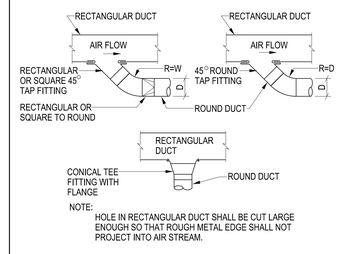
RECTANGULAR OFFSETS USING RADIUS ELBOWS
NTS



DUCT TRANSITIONS
NTS



TYPICAL DUCT SPLITS
NTS

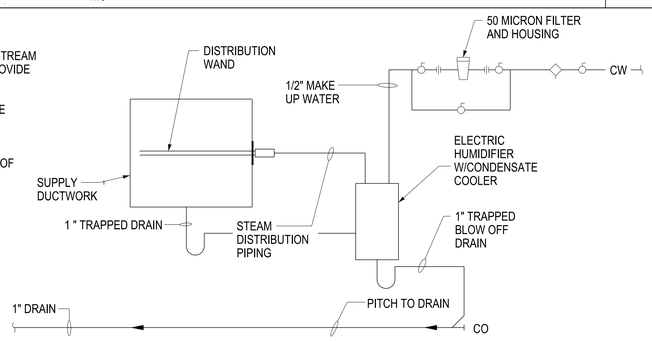


NOTE:
HOLE IN RECTANGULAR DUCT SHALL BE CUT LARGE ENOUGH SO THAT ROUGH METAL EDGE SHALL NOT PROJECT INTO AIR STREAM.

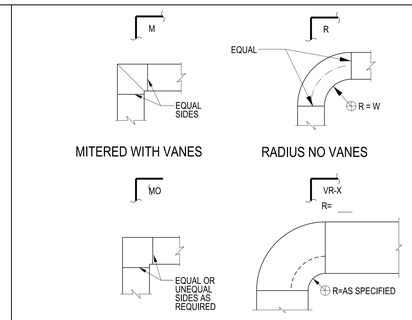
TYPICAL TAKE-OFF FROM RECTANGULAR DUCT TO ROUND DUCT
NTS

NOTES:

1. PROVIDE STAINLESS STEEL DUCT 2' UPSTREAM AND 8' DOWNSTREAM OF HUMIDIFIER. PROVIDE WATERTIGHT DRAIN CONNECTION.
2. SUPPORT HUMIDIFIER FROM STRUCTURE ABOVE WITH HANGER RODS AND STEEL CHANNEL.
3. PROVIDE ACCESS DOOR DOWNSTREAM OF EACH HUMIDIFIER.



ELECTRIC HUMIDIFIER DETAIL
NTS



REFER TO SMACNA MANUAL FOR VANE SPACING

ELBOW DETAILS
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET CE-0351-COF20244-M-001 FOR LIST OF PIPING SYMBOLS.

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT: SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	M	502

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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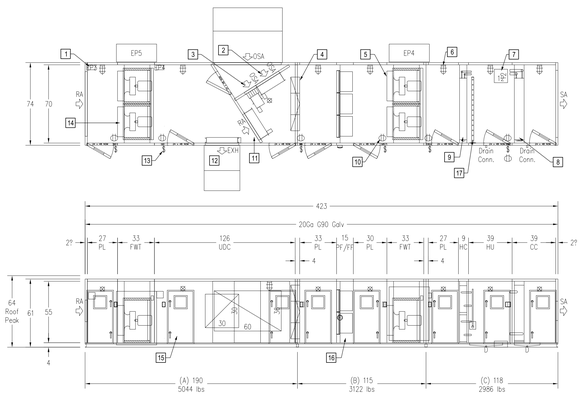
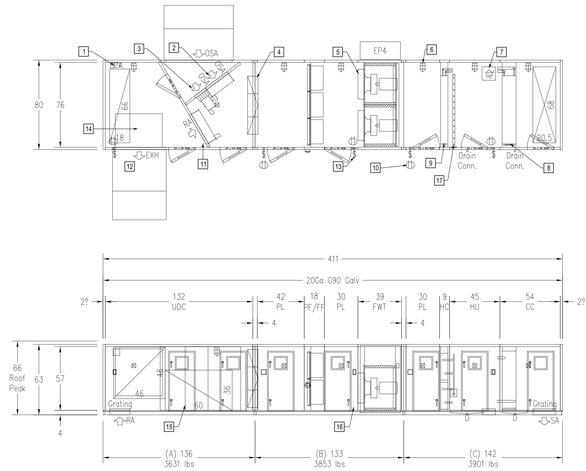
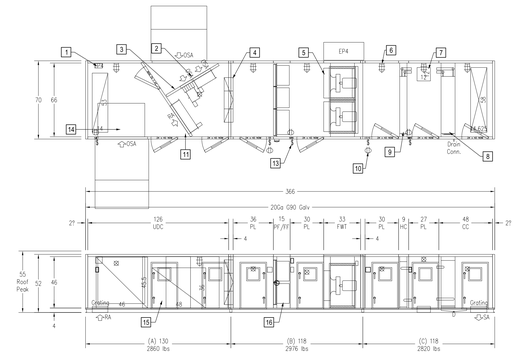


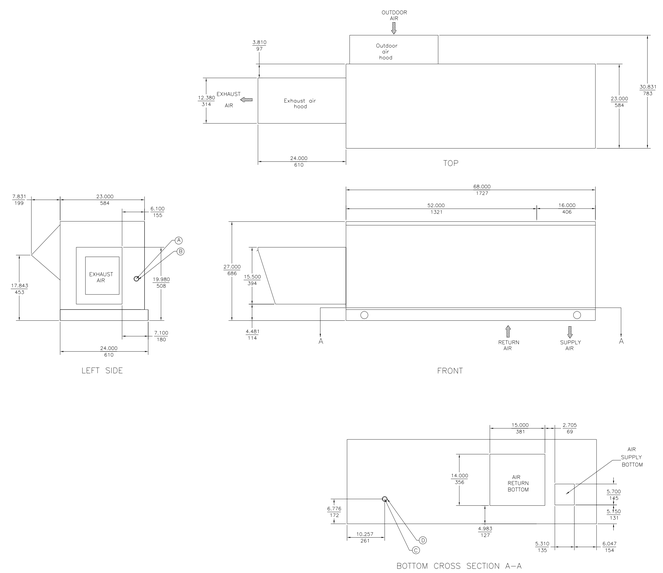
1 HVAC AIR HANDLING UNIT DETAIL - AHU-1
1/4"=1'-0"



2 HVAC AIR HANDLING UNIT DETAIL - AHU-2
1/4"=1'-0"



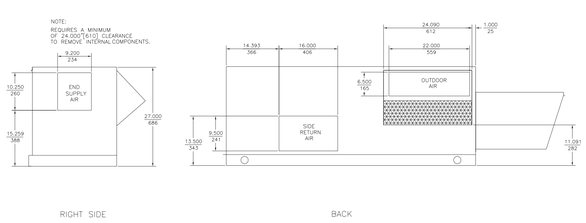
3 HVAC AIR HANDLING UNIT DETAIL - AHU-3
1/4"=1'-0"

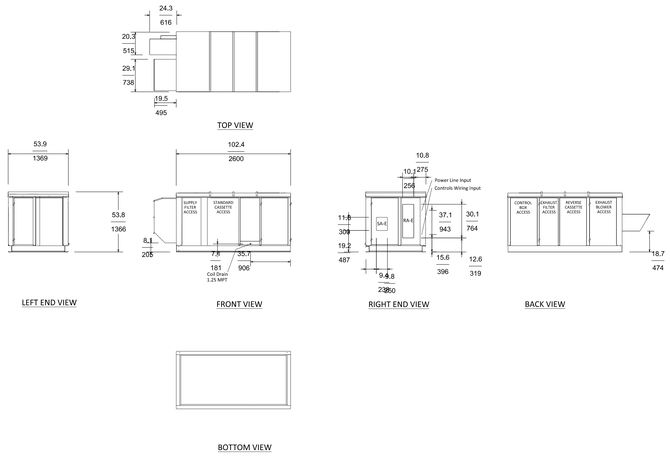


4 HVAC AIR HANDLING UNIT DETAIL - ERU-1
1/4"=1'-0"

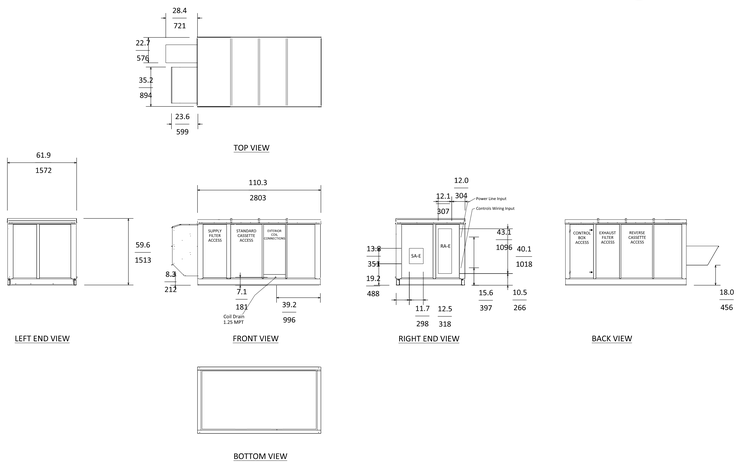
NOTES:
1. Dimensions in [ ] are in millimeters
2. Direction of Airflow.

CONNECTION TABLE		CONNECTION SIZES
A	Field power supply knockout	7/8"
B	Field power supply knockout	1 1/8"
C	Low voltage knockout	7/8"
D	Low voltage knockout	1 1/8"





5 HVAC AIR HANDLING UNIT DETAIL - ERU-2
1/4"=1'-0"



6 HVAC AIR HANDLING UNIT DETAIL - ERU-3
1/4"=1'-0"

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET CE-0351-COF20244-M-001 FOR LIST OF PIPING SYMBOLS.

KEYNOTES

1. 120V JUNCTION BOX FOR SEPARATE 120V POWER FEED
2. ECONOMIZER DAMPER
3. MIN OA DAMPER
4. AIR BLENDER
5. FAN ARRAY
6. LIGHT, TYPICAL
7. PIPE CHASE
8. COOLING COIL
9. HEATING COIL
10. 120V GFI RECEPTACLE, TYPICAL
11. RA DAMPER
12. EA FAN
13. LIGHT SWITCH, TYPICAL
14. AXIAL EXHAUST FAN WITH VFD
15. 24" WIDE ACCESS DOOR WITH 10x10 THERMAL PANE TEMPERED GLASS, TYPICAL
16. PRE AND FINAL FILTERS WITH MAGNAHELIC
17. HUMIDIFIER MANIFOLD

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC AIR HANDLING UNIT DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	M	503

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION -
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014 | VER 1

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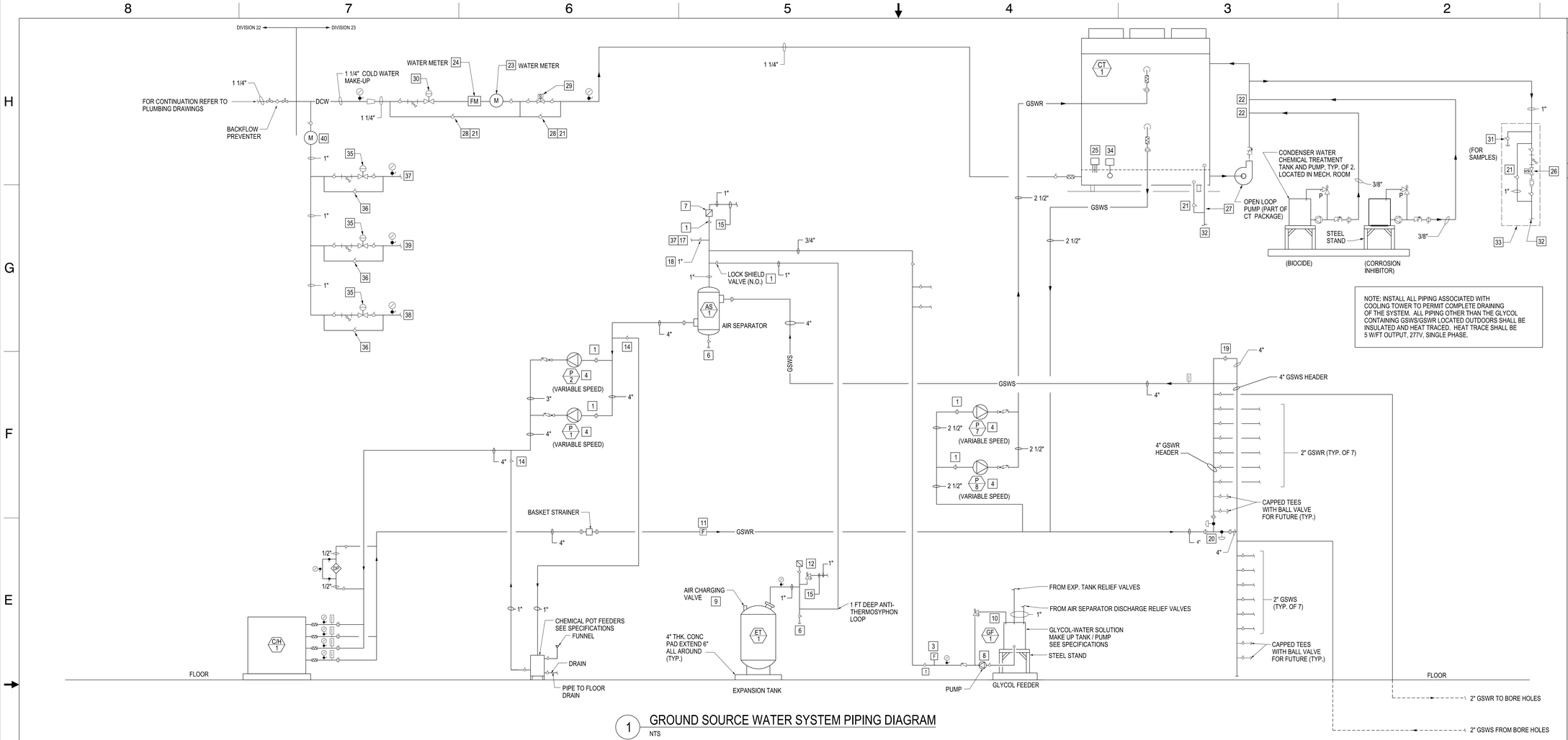
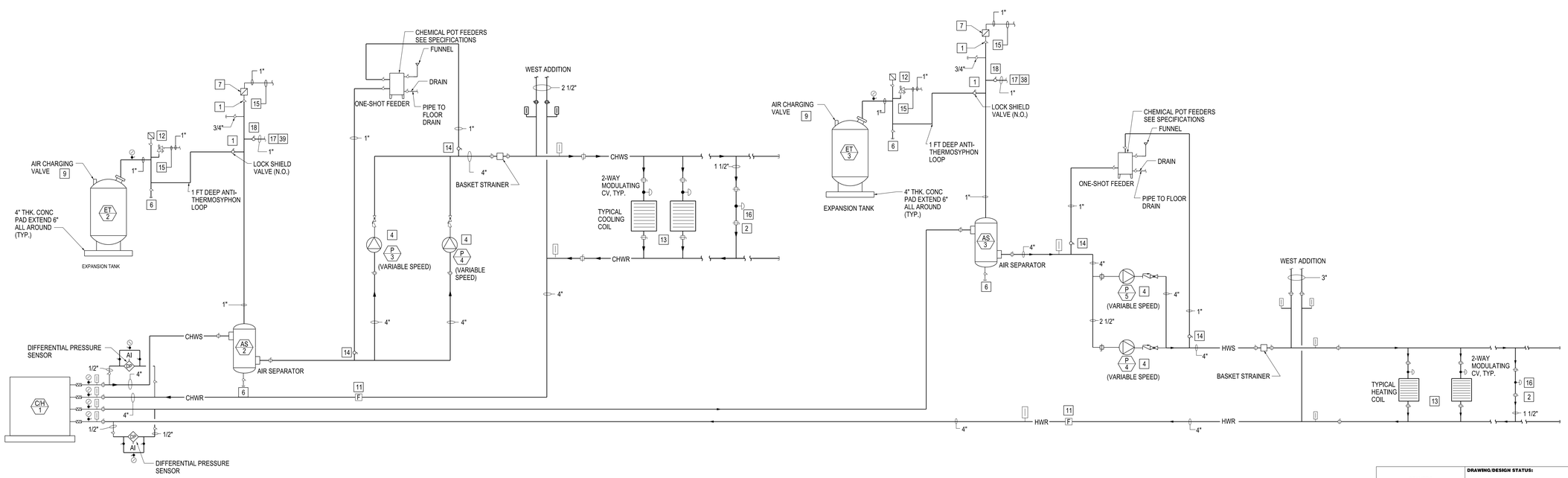


NOTE: INSTALL ALL PIPING ASSOCIATED WITH COOLING TOWER TO PERMIT COMPLETE DRAINING OF THE SYSTEM. ALL PIPING OTHER THAN THE GLYCOL CONTAINING GSWS/GSSWR LOCATED OUTDOORS SHALL BE INSULATED AND HEAT TRACED. HEAT TRACE SHALL BE 5 W/FT OUTPUT, 277V, SINGLE PHASE.

1 GROUND SOURCE WATER SYSTEM PIPING DIAGRAM
NTS



2 CHILLED WATER SYSTEM & HOT WATER SYSTEM PIPING DIAGRAM
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET CE-0351-COF20244-M-702 FOR THE CONTROL SEQUENCE OF OPERATION FOR THIS SYSTEM.

KEYNOTES

1. MANUAL VALVE REMAINS OPEN UNDER NORMAL SYSTEM OPERATION.
2. REFER TO PLANS FOR LOCATION
3. FLOW SWITCH ALARM TO THE DDC SYSTEM.
4. REFER TO EQUIPMENT INSTALLATION AND PIPING DETAILS ON M501 SERIES SHEETS FOR ADDITIONAL REQUIREMENTS
5. NOT USED
6. 3/4" BALL VALVE DRAIN WITH THREADED HOSE END NIPPLE AND CAP.
7. 3/4" INLET SIZED HIGH CAPACITY AUTOMATIC AIR VENT. PIPE DISCHARGE TO GLYCOL TANK. DRAIN SIZE SHALL MATCH VENT OUTLET SIZE.
8. SET GLYCOL MAKE UP PRESSURE TO 12 PSIG.
9. CHARGE AIR IN EXPANSION TANK TO A PRESSURE EQUAL TO THE MAKE UP FILL TANK PUMP PRESSURE SETTING (12 PSI).
10. PRESSURE RELIEF. SIZED EQUAL TO VALVE DISCHARGE SIZE, PIPED BACK TO TANK.
11. FLOW METER CONNECTED TO DDC SYSTEM
12. REFER TO EXPANSION TANK SCHEDULE FOR RELIEF PRESSURE.
13. REFER TO PLANS FOR QUANTITY AND LOCATIONS.
14. 1" TO CHEMICAL FEEDER
15. EXTEND TO GLYCOL MIX AND FILL TANK, FULL SIZE OF VALVE OUTLET
16. DIFFERENTIAL BYPASS CONTROL VALVE
17. 1" MAKE-UP WATER
18. NORMALLY CLOSED MAKEUP WATER VALVE
19. FLUSHING BYPASS VALVE (NORMALLY CLOSED)
20. DIVERTING VALVES
21. MANUAL VALVE REMAINS CLOSED UNDER NORMAL SYSTEM OPERATION.
22. INJECTION QUILL ASSEMBLY WITH CORPORATION STOP
23. CONTACT HEAD WATER METER CONTROLLING CONDENSER WATER CHEMICAL FEED SYSTEMS.
24. COMPOUND WATER METER CONNECTED TO THE DDC SYSTEM.
25. ELECTRONIC LEVEL SENSOR IN STILLING CHAMBER IN COOLING TOWER SUMP TO CONTROL SOLENOID MAKE UP VALVE.
26. BLOW DOWN SOLENOID VALVE.
27. 3" OVERFLOW, AND 2" NORMAL DRAIN
28. 1 1/2" BYPASS WITH VALVE.
29. CONDENSER WATER MAKE UP CONTROL VALVE CONTROLLED BY THE DDC SYSTEM.
30. PRESSURE REDUCING VALVE, SET FOR 50 PSIG.
31. 3/4" BALL VALVE DRAIN WITH THREADED HOSE END NIPPLE AND CAP.
32. ROUTE FULL SIZE TO NEAREST DRAIN.
33. COMPONENTS SHALL BE LOCATED WITHIN 5 FEET OF THE FINISHED GRADE.
34. TOROIDAL TYPE CONDUCTIVITY SENSOR.
35. PRESSURE REDUCING VALVE, SET FOR 15 PSIG.
36. 1" BYPASS WITH VALVE. (NORMALLY CLOSED)
37. 1" MAKE-UP WATER TO GSW LOOP.
38. 1" MAKE-UP WATER TO HEATING HOT WATER LOOP.
39. 1" MAKE-UP WATER TO CHILLED WATER LOOP.
40. MAKE UP WATER METER WITH SCROLLING NUMBER TYPE REGISTER (METER IS NOT CONNECTED TO THE DDC SYSTEM)

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Phone:330/659-6688
Fax: 330/659-6675

DRAWING/DESIGN STATUS:	BID SET
DRAWING MANAGEMENT	SYSTEM: HVAC / SUB-SYS: / FACILITY: / CONFIG:
	NASA APPROVALS
DR:	DES:
D.ENG:	PROJ. MGR: KJS
CONTRACTOR: STANTEC ARCHITECTURE INC.	RELEASE APPROVAL: / DATE:
CONTRACT NO.: NNC09CA01C	RELEASE APPROVAL: / DATE:
TASK ORDER	RELEASE APPROVAL: / DATE:
DRAWN / DESIGNED / CHECKED	RELEASE APPROVAL: / DATE:
APPROVED / APPROVAL DATE	RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

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FY14 B351 WAREHOUSE ADDITION

HVAC DIAGRAMS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	601

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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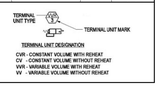
VARIABLE VOLUME REHEAT TERMINAL UNIT SCHEDULE

MARK		CFM RANGE MIN.	CFM RANGE MAX.	BOX MIN. CFM	BOX INLET SIZE (IN.)	DUCT INLET SIZE (IN.)	DUCT OUTLET SIZE	COIL CAPACITY (MBH) MIN. CFM	COIL CAPACITY (MBH) MAX. CFM	NOMINAL HEATING GPM	OPEN MAX. P.D. IN. W.G. - UNIT PLUS COIL	MAX. HW COIL P.D. FT.	HWS & HWR RUNOUT SIZES	MANUFACTURER	MODEL	REMARKS
VVR	1	0	150	45 CFM	4"	6"	12"x8"	0.0	5.8	0.6	0.30	0.15	3/4"	TITUS	DESV	1, 2, 3
VVR	2	151	320	80 CFM	6"	8"	12"x8"	5.8	12.3	1.3	0.40	0.40	3/4"	TITUS	DESV	1, 2, 3
VVR	4	400	600	145 CFM	8"	10"	12"x10"	16.4	23.1	2.4	0.40	1.80	3/4"	TITUS	DESV	1, 2, 3
VVR	5	601	850	175 CFM	9"	12"	14"x12"	23.1	32.7	3.3	0.40	0.50	1"	TITUS	DESV	1, 2, 3
VVR	6	851	1000	230 CFM	10"	12"	14"x12"	32.7	38.5	3.9	0.60	1.00	1"	TITUS	DESV	1, 2, 3
VVR	7	1001	1600	325 CFM	12"	14"	16"x15"	38.5	61.6	6.2	0.45	1.50	1"	TITUS	DESV	1, 2, 3
VVR	8	1601	2400	450 CFM	14"	16"	20"x17"	61.6	92.4	9.2	0.50	2.90	1"	TITUS	DESV	1, 2, 3
VVR	9	2401	3200	580 CFM	16"	18"	24"x18"	92.4	123.2	12.3	0.55	3.00	1"	TITUS	DESV	1, 2, 3

1. MANUFACTURER AND MODEL ARE BASIS OF DESIGN.
2. SEE PLANS FOR ACTUAL GPM.
3. COILS SELECTED WITH 40% PROPYLENE GLYCOL.



UNIT HEATER (WATER) SCHEDULE

MARK		LOCATION	NOMINAL CFM	MBH	GPM	E.W.T.F Temperature	MAX P.D. FT WG.	E.A.T.F	TYPE	FAN MOTOR #	FAN MOTOR HP	FAN MOTOR RPM	FAN MOTOR VOLTS	MANUFACTURER	MODEL	REMARKS
UH	1	LTID NEW MATERIALS 16	900	43.6	4.4	160 °F	0.17 ftH2O	60 °F	Horizontal	1	0.05 hp	1000	120	STERLING	HS-60	

1. COIL SELECTED WITH 40% PROPYLENE GLYCOL

EXPANSION TANK SCHEDULE

MARK		SERVICE	TYPE	ACCEPTANCE GALLONS	TANK VOLUME GALLONS	PRESSURES PSIG FILL	PRESSURES PSIG RELIEF	PRECHARGE	DIMENSIONS - IN. HEIGHT	DIMENSIONS - IN. DIAMETER	DIMENSIONS - IN. INLET	MANUFACTURER	MODEL	REMARKS
ET	1	HOT WATER	BLADDER	264.0	264.0	0.00	0.00	0.00	80"	24"	1 1/2"	BELL & GOSSETT	B-500	1
ET	2	GROUND LOOP	BLADDER	264.0	264.0	0.00	0.00	0.00	65"	24"	1 1/2"	BELL & GOSSETT	B-400	1
ET	3	CHILLED WATER	BLADDER	264.0	264.0	0.00	0.00	0.00	37"	24"	1 1/2"	BELL & GOSSETT	B-200	1

1. 40% PROPYLENE GLYCOL

AIR SEPARATOR SCHEDULE

MARK		GPM	CONNECTION DIAMETER	SYSTEM SERVED	MANUFACTURER	MODEL	REMARKS
AS	1	210	4"	GROUND LOOP	BELL & GOSSETT	ROLAIRTROL - 4F	1
AS	2	250	4"	CHILLED WATER	BELL & GOSSETT	ROLAIRTROL - 4F	1
AS	3	170	4"	HOT WATER	BELL & GOSSETT	ROLAIRTROL - 4F	1

1. 40% PROPYLENE GLYCOL

DUCT HEATING COIL SCHEDULE

MARK		CFM	DUCT WIDTH (IN.)	DUCT HEIGHT (IN.)	E.W.T (°F)	L.W.T (°F)	COIL CAPACITY (MBH)	AIR TEMPERATURE E.D.B. (°F)	AIR TEMPERATURE L.D.B. (°F)	GPM	MAX. COIL WATER P.D. (FT.)	AIR P.D. (IN.)	REMARKS
RHC	1	500	14"	12"	160	140	13.3	40 °F	68 °F	1.5	2.00	0.17	1

1. 40% PROPYLENE GLYCOL

PUMP SCHEDULE

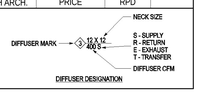
MARK		LOCATION	SERVICE	TYPE	GPM	TDH (FT.)	MIN. EFF. (%)	CASING PRESSURE (PSIG)	RPM	BHP	MOTOR HP	MOTOR VOLTS	MOTOR PHASE	MANUFACTURER	MODEL	REMARKS
P	1	MECH/ELEC 18	GROUND LOOP	INLINE	210.0	105.00	70.5	125.00	1750	8	10.0	460	3	BELL & GOSSETT	SERIES 80 3x3x11	1,2,3
P	2	MECH/ELEC 18	GROUND LOOP	INLINE	210.0	105.00	70.5	125.00	1750	8	10.0	460	3	BELL & GOSSETT	SERIES 80 3x3x11	1,2,3
P	3	MECH/ELEC 18	CHILLED WATER	INLINE	250.0	75.00	72.5	125.00	1750	6.5	7.5	460	3	BELL & GOSSETT	SERIES 80 3x3x9 1/2B	1,2,3
P	4	MECH/ELEC 18	CHILLED WATER	INLINE	250.0	75.00	72.5	125.00	1750	6.5	7.5	460	3	BELL & GOSSETT	SERIES 80 3x3x9 1/2B	1,2,3
P	5	MECH/ELEC 18	HOT WATER	INLINE	170.0	75.00	66.5	125.00	1750	6	7.5	460	3	BELL & GOSSETT	SERIES 80 3x3x9 1/2B	1,2,3
P	6	MECH/ELEC 18	HOT WATER	INLINE	170.0	75.00	66.5	125.00	1750	6	7.5	460	3	BELL & GOSSETT	SERIES 80 3x3x9 1/2B	1,2,3
P	7	MECH/ELEC 18	GROUND LOOP	INLINE	50.0	40.00	57	125.00	1750	1	1 1/2	460	3	BELL & GOSSETT	SERIES 80 1 1/2x1 1/2x1 1/2	1,2,3
P	8	MECH/ELEC 18	GROUND LOOP	INLINE	50.0	40.00	57	125.00	1750	1	1 1/2	460	3	BELL & GOSSETT	SERIES 80 1 1/2x1 1/2x1 1/2	1,2,3

1. 40% PROPYLENE GLYCOL.
2. PROVIDE DISCONNECT SWITCH
3. MOTOR SUITABLE FOR USE WITH VARIABLE FREQUENCY DRIVE

DIFFUSER, REGISTER, AND GRILLE SCHEDULE

MARK	SQUARE/RECT-ROUND-LINEAR	SIZE FACE	SIZE NECK	MOUNT.	PATTERN	MATERIAL	FINISH	MANUFACTURER	MODEL	REMARKS
1	SQUARE	24"x24"	VARIES	LAY-IN	360° (3 CONE)	STEEL	COORD. WITH ARCH.	PRICE	SPD	
2	SQUARE	24"x24"	22"x22"	VARIES	VARIES	STEEL	COORD. WITH ARCH.	PRICE	535	
3	RECTANGULAR	VARIES	VARIES	VARIES	VARIES	STEEL	COORD. WITH ARCH.	PRICE	535	
4	RECTANGULAR	VARIES	VARIES	VARIES	VARIES	STEEL	COORD. WITH ARCH.	PRICE	32	
5	SQUARE	24"x24"	10"Ø	LAY-IN	2-WAY	STEEL	COORD. WITH ARCH.	PRICE	HCF	
6	SQUARE	24"x24"	16"Ø	VARIES	VARIES	STEEL	COORD. WITH ARCH.	PRICE	535	
7	ROUND	VARIES	VARIES	DUCT	360°	STEEL	COORD. WITH ARCH.	PRICE	RPD	

1. Manufacturer and model are basis of design.
2. Provide (2) slot linear to fit in 6" linear slot with length to match section shown on reflecting ceiling plan. Remove pattern controller to use as a return.
3. Provide (2) slot linear to fit in 6" linear slot with X" length
4. Provide mfr standard insulated plenum for supply applications
5. Refer to detail on M503 for grille detail & connection of duct size to 22x22 inlet/plenum



FAN COIL UNIT SCHEDULE

MARK		SERVICE	LOCATION	ARRANGEMENT	CFM	E.S.P. IN. W.G.	COOLING COIL TOTAL (BTU/H)	COOLING COIL SENSIBLE (BTU/H)	COOLING COIL GPM	COOLING COIL P.D. FT. W.G.	HEATING COIL CAPACITY (BTU/H)	HEATING COIL GPM	HEATING COIL P.D. FT. W.G.	HUMIDIFIER #/HR	ELECTRICAL FLA	ELECTRICAL OPD	ELECTRICAL VOLTS	ELECTRICAL PHASE	MANUFACTURER	MODEL	REMARKS
FCU	1	D104. LAB 15	INSTR. POOL 24	DUCTED	1000	0.30	26,000	22,800	5.0	10.00	51,200	4.0	10.00	4.3	5.5	15	460	3	LIEBERT	MINI-MATE 2,MMD 40C3	1,2,4,5,6
FCU	2	DATA/COMM 19	DATA/COMM 19	SPOT COOLER	1000	0.30	26,000	22,800	5.0	10.00	51,200	4.0	10.00	4.3	4.8	15	460	3	LIEBERT	MINI-MATE 2,MMD 40C3	1,3,4,5,6

1. COOLING BASE AT 75°F DB/ 61°F WB
2. DUCTED UNIT WITH FILTER BOX
3. AIR DISTRIBUTION PLENUM
4. DISCONNECT SWITCH
5. COOLING AND HEATING COILS SIZED WITH 40% PROPYLENE GLYCOL
6. LOW FAN SPEED

AIR CURTAIN SCHEDULE

MARK		UNIT WIDTH	MAX FPM	CFM	MOTOR # / UNIT	MOTOR HP	MOTOR VOLTAGE	MOTOR PHASE	MOTOR HERTZ	WATER E.W.T	WATER L.W.T	MBH	WATER P.D. FT. W.G.	GPM	MANUFACTURER	MODEL	REMARKS
AC	1	96"	1904 FPM	2170 CFM	2	0.5	120 V	1	60 Hz	160 °F	140 °F	89.0 Btu/h	8.70 ftH2O	9.5 GPM	POWERED AIRE, INC	CHS 2 -96	1,2

1. COIL SIZE WITH 40% PROPYLENE GLYCOL
2. PROVIDE DISCONNECT SWITCH

AIR HANDLING UNIT SCHEDULE

MARK		LOCATION	SERVICE	SYSTEM TYPE	CAPACITY (CFM) SA	CAPACITY (CFM) DESIGN OA	ESP (IN. W.G.) SUPPLY	ESP (IN. W.G.) RETURN/EXHAUST	SUPPLY FAN	RETURN/EXHAUST FAN	COOLING COIL	HEATING COIL	MANUFACTURER	REMARKS
AHU	1	ROOF	PRIMARY LABS	VAV	8300	850	2.5	2.5	SF-1	RF-1	CC-1	HC-1	TEMTROL	1
AHU	2	ROOF	EAST ADDITION	VAV	10900	1450	2.5	1.5	SF-2	EF-4	CC-2	HC-2	TEMTROL	1

1. PROVIDE WITH VIBRATION ISOLATION CURB.

AHU COOLING COIL SCHEDULE

MARK		LOCATION	CFM	MBH SENSIBLE	MBH TOTAL	AIR TEMPERATURE (°F) E.D.B.	AIR TEMPERATURE (°F) E.W.B.	AIR TEMPERATURE (°F) L.D.B.	AIR TEMPERATURE (°F) L.W.B.	MAX. FACE VELOCITY	WATER (°F) E.W.T.	WATER (°F) L.W.T.	GPM	WATER P.D. FT. W.G.	MAX. AIR P.D. IN. W.G.	MAX. ROWS	REMARKS
CC	1	AHU-1	8200	240.0	243.1	82.3	61.6	55.0	51.1	475	45	57	45.0	10.00	0.52	10	1
CC	2	AHU-2	10900	334.4	339.1	83.5	62.7	55.1	51.9	475	45	57	63.0	10.00	0.68	10	1

1. 40% PROPYLENE GLYCOL

HUMIDIFIER SCHEDULE

MARK		LOCATION	TYPE	OUTPUT #/HR	AHU	ELECTRICAL FLA	ELECTRICAL Voltage	ELECTRICAL Phase	MANUFACTURER	MODEL	REMARKS
H	1	MECH/ELEC	ELECTRICAL	100	1	45	460 V	3	Nortec	NH-EL-1/100	1, 2
H	2	MECH/ELEC	ELECTRICAL	150	2	67.5	460 V	3	Nortec	NH-EL-1/150	1, 2

1. Manufacturer and model are basis of design.
2. Control valve provided by the humidifier manufacturer

AHU HEATING COIL SCHEDULE

MARK		LOCATION	CFM	COIL CAPACITY MBH	AIR TEMPERATURE (°F) E.D.B.	AIR TEMPERATURE (°F) L.D.B.	MAX. FACE VELOCITY	GPM	WATER TEMPERATURE (°F) E.W.T.	WATER TEMPERATURE (°F) L.W.T.	AIR P.D. IN. W.G.	WATER P.D. FT. W.G.	MAX. ROWS	REMARKS
HC	1	AHU-1	8200	256.7	38.3	67.3	500	29.0	160	140	0.15	8.30	3	1
HC	2	AHU-2	10900	321.3	38.3	65.6	500	36.0	160	140	0.21	0.21	3	1
HC	3	ERU-2	3100	95.5	40.0	68.0	500	9.5	160	140	0.21	0.21	3	1, 2
HC	4	ERU-3	2000	61.6	40.0	68.0	500	9.5	160	140	0.21	0.21	3	1, 2

1. 40% PROPYLENE GLYCOL
2. OPTION #5

CABINET UNIT HEATER SCHEDULE

MARK		LOCATION	NOMINAL CFM	MBH	GPM	E.W.T. (°F)	NO. OF ROWS	MAX. P.D. FT. W.G.	E.A.T. (°F)	FAN MOTOR #	FAN MOTOR HP	FAN MOTOR VOLTS	MANUFACTURER	MODEL	REMARKS
CUH	1	VESTIBULE	280	24.8	1.7	160	4	6.20	65	1	0.08 hp	277	TRANE	TRANE FFMB030	1, 2

1. 40% PROPYLENE GLYCOL
2. INVERTED VERITCAL CABINET

SOUND ATTENUATOR SCHEDULE

MARK		SERVICE	CFM	VELOCITY (FPM)	MIN. DYNAMIC INSERTION LOSS 63	125	250	500	1000	2000	4000	8000	MAX. P.D. IN. W.G.	HEIGHT	WIDTH	LENGTH	MANUFACTURER	MODEL	REMARKS
SA	1	AHU-2	10,900	-1500	4	8	14	17	19	15	13	10	0.12	18"	68"	60"	VIBRO-ACOUSTICS	RD-HV-F1	
SA	2	AHU-2	1,820	1200	6	11	19	22	26	20	16	13	0.26	14"	20"	60"	VIBRO-ACOUSTICS	RD-MV-F1	
SA	3	AHU-2	4,360	1300	4	8	14	17	19	15	13	10	0.12	20"	28"	60"	VIBRO-ACOUSTICS	RD-HV-F1	
SA	4	AHU-2	2,720	1100	6	11	19	22	26	20	16	13	0.22	18"	22"	60"	VIBRO-ACOUSTICS	RD-MV-F1	
SA	5	AHU-2	1,405	1000	6	11	19	22	26	20	16	13	0.22	14"	16"	60"	VIBRO-ACOUSTICS	RD-MV-F1	
SA	6	AHU-2	710	800	6	11	19	22	26	20	16	13	0.12	12"	12"	60"	VIBRO-ACOUSTICS	RD-MV-F1	
SA	7	AHU-1	8,200	1500	4	8	14	17	19	15	13	10	0.12	20"	60"	60"	VIBRO-ACOUSTICS	RD-HV-F1	
SA	8	AHU-1	8,200	-1500	4	8	14	17	19	15	13	10	0.12	20"	60"	60"	VIBRO-ACOUSTICS	RD-HV-F1	

1. Manufacturer and model are basis of design.
2. Reactive sound attenuator
3. Dissipative sound attenuator
4. Custom fume hood sound attenuator
5. Match duct

FAN SCHEDULE

MARK		SERVICE	LOCATION	ARRANGEMENT	CFM	S.P. IN. W.G.	FAN RPM	BHP	MOTOR HP	MOTOR VOLTS	MOTOR PHASE	WHEEL TYPE	WHEEL DIA.	MANUFACTURER	MODEL	REMARKS
CF	1	LT1D CIRCULATION	LT1D 16	DOWNBLAST	550	0.10	1650	-	35 WATTS	115	1	AXIAL	12"	AIRIUS	AIR PEAR MODEL 25	1
EF	1	TOILET ROOMS	ROOF	DOWNBLAST	500	0.50	1490	0.12	0.166	115	1	BI	---	GREENHECK	G-098-A	1
EF	2	MECH. RM. EXHAUST	ROOF	DOWNBLAST	500	0.50	1490	0.12	0.166	115	1	BI	---	GREENHECK	G-098-A	1
EF	3	LT1D EXHAUST	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCE3-24	1
EF	4	EAST ADDITION	AHU-2	PROPELLER	10400	0.50	1160	2.42	3	460	3	PROP	36"	GREENHECK	SCE3-36	1
EF	5	WEST ADDITION - BID OPTION #5	AHU-3	PROPELLER	5500	0.50	1750	1.17	1.5	460	3	PROP	24"	GREENHECK	SCE3-24	1
EF	6	WEST ADDITION - BID OPTION #5	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCE3-24	1
EF	7	WEST ADDITION - BID OPTION #5	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCE3-24	1
EF	8	WEST ADDITION - BID OPTION #5	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCE3-24	1
EF	9	WEST ADDITION - BID OPTION #5	ROOF	DOWNBLAST	1700	0.50	1440	0.34	0.5	460	3	BI	---	GREENHECK	GB-131	1
RF	1	PRIMARY LABS	AHU-1	2 FAN ARRAY	8200	4.80	3480	2 @ 4.5	2 @ 5.5	460	3	PLENUM	16"	TEMTROL	16-75-184T-40X32X25-A2	1
SF	1	PRIMARY LABS	AHU-1	2 FAN ARRAY	8200	6.80	3460	2 @ 6.2	2 @ 6.5	460	3	PLENUM	16"	TEMTROL	16-75-184T-40X32X25-A2	1
SF	2	EAST ADDITION	AHU-2	2 FAN ARRAY	10900	9.50	3500	2 @ 11.5	2 @ 12	460	3	PLENUM	18"	TEMTROL	18-70-215T-40X34X29-A2	1
SF	3	WEST ADDITION - BID OPTION #5	AHU-3	2 FAN ARRAY	6000	9.50	3907	2 @ 6.2	2 @ 6.5	460	3	PLENUM	16"	TEMTROL	16-50-184T-40X30X23.5-A2	1
SF	4	LT1D SUPPLY	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCS3-24	1
SF	5	WEST ADDITION - BID OPTION #5	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCS3-24	1
SF	6	WEST ADDITION - BID OPTION #5	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCS3-24	1
SF	7	WEST ADDITION - BID OPTION #5	WALL	WALL PROPELLER	7000	0.50	1750	1.81	2	460	3	PROP	24"	GREENHECK	SCS3-24	1

1. Manufacturer and model are basis of design.

GENERAL NOTES

GENERAL NOTES APPLY TO ALL SHEETS IN THE SERIES THAT THEY ARE ON. EACH SERIES OF SHEETS WILL START OVER AT NOTE 1.

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

SHEET NOTES

SHEET NOTES APPLY ONLY TO THE SHEET THAT THEY ARE ON. EACH SHEET WILL START OVER AT NOTE 1.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM M1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO M002 FOR THE ENTIRE LIST OF ALL KEY NOTES. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

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CONTRACT NO. STANTEC ARCHITECTURE INC.
CONTRACT NO. NNC09CA01C
TASK ORDER
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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FY14 B351 WAREHOUSE ADDITION

MECHANICAL SCHEDULES

SIZE: CE | BLDG/SYS: 0351 | PROJECT ID: COF20244 | DISCP: M- | TYP SEQ: 602
AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

M-602
0351-COF20244-M-602_CE_1.dwg TEMPLATE DATE: 02/28/2011

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GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

KEYNOTES

WATER TO WATER HEAT PUMP SCHEDULE

MARK	LOCATION	SERVICE	COOLING CAPACITY (TONS)	CHILLED WATER DESIGN EWT (°F)	CHILLED WATER DESIGN LWT (°F)	CHILLED WATER DESIGN FLOW (GPM)	CHILLED WATER DESIGN P.D. (FT W.G.)	EER	SOURCE/SINK WATER DESIGN EWT (°F)	SOURCE/SINK WATER DESIGN LWT (°F)	SOURCE/SINK WATER DESIGN FLOW (GPM)	SOURCE/SINK WATER DESIGN P.D. (FT W.G.)	HEATING CAPACITY (MBTUH)	HEATING WATER DESIGN EWT (°F)	HEATING WATER DESIGN LWT (°F)	HEATING WATER DESIGN FLOW (GPM)	HEATING WATER DESIGN P.D. (FT W.G.)	COP	SOURCE/SINK WATER DESIGN EWT (°F)	SOURCE/SINK WATER DESIGN LWT (°F)	SOURCE/SINK WATER DESIGN FLOW (GPM)	SOURCE/SINK WATER DESIGN P.D. (FT W.G.)	ELECTRICAL VOLTS	PH	MCA	MOCP	MANUFACTURER AND MODEL	NOTES
CH 1	50	50	93.6	54.0	44.0	246	9.7	15.9	80	94	207	6.0	1052.4	140.0	160.0	113	6	1.3	40	32	161	6	460	3	292	350	MULTISTACK MODEL - (3)MS050AN2H2H0AAC-134A	1 2 3 4 5 6 7 8 9 10 11 12 13

NOTES: COMPLETE AND FULLY FUNCTIONAL MULTI-STACK MODULES SHALL HAVE ALL BUT NOT LIMITED TO THE FOLLOWING COMPONENTS:

1. STAINLESS STEEL EVAPORATOR AND CONDENSER
2. ELECTRONIC CHILLED WATER CONTROLLER
3. STAINLESS STEEL INLET/OUTLET HEADERS AND FILTER
4. 5 YEARS COMPRESSOR WARRANTY
5. ACOUSTICAL INSULATION
6. PROVIDE FILTERS IN CONDENSER AND EVAPORATOR SUPPLY HEADERS
7. PROVIDE 4X4 RAILS AND WAFFLE PADS
8. CHILLER MUST BE PIPED IN ACCORDANCE WITH INSTALLATION MANUAL INSTRUCTION BY AUTHORIZED MULTISTACK APPROVED CONTRACTOR
9. CHILLER STARTUP SHALL BE SUPERVISED BY AUTHORIZED MULTISTACK APPROVED CONTRACTOR
10. FULLY INTEGRAL BACNET COMPATABLE.
11. UNIT SHALL BE CAPABLE OF COOLING, HEATING AND SIMULTANEOUS HEATING AND COOLING
12. COORDINATE LUG CONFIGURATIONS WITH CONDUCTOR SIZES AND QUANTITIES INDICATED ON THE ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT
13. 40% PROPYLENE GLYCOL

ROOFTOP ENERGY RECOVERY UNIT SCHEDULE

MARK	AREA SERVED	SUPPLY FAN CFM	SUPPLY FAN TSP	SUPPLY FAN ESP	SUPPLY FAN HP	SUPPLY FAN RPM	EXHAUST FAN CFM	EXHAUST FAN TSP	EXHAUST FAN ESP	EXHAUST FAN HP	EXHAUST FAN RPM	WHEEL EFFECTIVENESS SUMMER SEN/TOT	WHEEL EFFECTIVENESS WINTER SEN/TOT	SUMMER - TOTAL EXCH WHEEL SUPPLY EAT	SUMMER SUPPLY LAT	SUMMER EXHAUST EAT	SUMMER EXHAUST LAT	WINTER - TOTAL EXCH WHEEL SUPPLY EAT	WINTER SUPPLY LAT	WINTER EXHAUST EAT	WINTER EXHAUST LAT	UNIT WIRING VI/Ø/HZ	FLA	MCA	MOCP	HEATING COIL	BASIS OF DESIGN	NOTES
ERU 1	VENTILATION / HEAT RECOVERY UNIT	500	---	0.5	1/4	---	500	---	0.5	1/4	---	0.70/0.69	0.71/0.71	89.0 db 73.0 wb	79.9 db 66.4 wb	76.0 db 63.0 wb	86.1 db 70.4 wb	0.0 db -1.0 wb	48.5 db 34.3 wb	68.0 db 45.0 wb	15.7 db 14.6 wb	120/1/60	9.8	11.1	15	RHC-2	VENMAR MODEL ERV500E	1 2 3 4 6 7 8
ERU 2	VENTILATION / HEAT RECOVERY UNIT	3100	2.74	1.0	3.0	1353	3100	3.51	1.0	5.0	1790	0.65/0.59	0.67/0.67	89.0 db 73.0 wb	80.5 db 67.3 wb	76.0 db 63.0 wb	86.2 db 70.5 wb	0.0 db -1.0 wb	45.6 db 32.4 wb	68.0 db 45.0 wb	15.2 db 14.2 wb	480/3/60	11.8	13.5	20	HC-3	VENMAR MODEL VHC-42	1 2 3 4 5 6 7 8
ERU 3	VENTILATION / HEAT RECOVERY UNIT	2000	1.75	1.0	2.0	1437	1700	2.06	1.0	2.0	1708	0.77/0.71	0.79/0.78	89.0 db 73.0 wb	80.5 db 67.2 wb	76.0 db 63.0 wb	86.2 db 70.5 wb	0.0 db -1.0 wb	45.4 db 32.3 wb	68.0 db 45.0 wb	15.2 db 14.2 wb	480/3/60	6.9	7.6	10	HC-4	VENMAR MODEL VHC-36	1 2 3 4 5 6 7 8

1. PROVIDE WITH VIBRATION ISOLATION ROOF CURB, 100% OA INLET HOOD.
2. PROVIDE UNIT WITH ELECTRONIC DDC UNIT MOUNTED CONTROLS
3. PROVIDE SPECIFIED POWER CONNECTION POINTS WITH UNIT MOUNTED DISCONNECT. DISCONNECT SHALL BE WEATHERPROOF NEMA 3R
4. UNIT SHALL BE PROVIDED WITH 2" MERV 8 PLEATED PRE-FILTER (INITIAL PD=0.16", FINAL PD=0.75"), ON SUPPLY SIDE. EXHAUST SIDE SHALL HAVE 2" MERV 8 PLEATED FILTER (INITIAL PD=0.16", FINAL PD=0.75").
5. VFD FROST PREVENTION SYSTEM
6. WHEEL PD = 0.34" (SUPPLY SIDE AND EXHAUST SIDE)
7. COORDINATE LUG CONFIGURATIONS WITH CONDUCTOR SIZES AND QUANTITIES INDICATED ON THE ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT.
8. BID OPTION #5

GAS-FIRED INFRARED RADIANT HEATING SCHEDULE

MARK	BURNERS MBH INPUT	BURNERS AIR TEMP.	BURNERS MINIMUM DISTANCE BETWEEN BURNERS	BURNERS MAXIMUM DISTANCE BETWEEN BURNERS	BURNERS VOLTS/Ø	VACUUM PUMP CFM	VACUUM PUMP MIN. VACUUM IN. W.C.	VACUUM PUMP RPM	VACUUM PUMP HP	VACUUM PUMP VOLTS/Ø	VACUUM PUMP FLA	BASIS OF DESIGN	NOTES
IRH 1	100	72	30'	60'	120/1	240	0.75"	3450	1	460/3	3.0	ROBERTS GORDON CORAYVAC CRV-B-10	1 2 3 4 5 6 7 8 9 10 11 12 13

NOTES:

1. PROVIDE ULTRAVAC CONTROL PANEL. PANEL ELECTRICAL REQUIREMENTS: 120/1/60; 20 A BREAKER
2. PROVIDE (1) E201 VACUUM PUMP WITH VFD FOR RADIANT HEAT SYSTEM. ELECTRICAL REQUIREMENT TO VFD: 120/1/60, 6.6 AMPS
3. PROVIDE ZONE MODULATING CONTROL PER DRAWINGS
4. BURNER CONTROLLED FROM ULTRAVAC CONTROL PANEL. CONTROL WIRING FROM ULTRAVAC CONTROL PANEL TO BURNER SHALL BE 120/V1. CONTROL WIRING SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.
8. PROVIDE ONE WALL MOUNTED THERMOSTAT/SENSOR PER ZONE.
9. PROVIDE BACNET INTERFACE PANEL.
10. PROVIDE VACUUM PRESSURE SWITCH MOUNTED ON MOTOR
11. COORDINATE LUG CONFIGURATIONS WITH CONDUCTOR SIZES AND QUANTITIES INDICATED ON THE ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT.
12. PROVIDE DUCTED OUTSIDE AIR SUPPLY WITH PRESSURE SWITCH. INSTALL PER MANUFATURER'S RECOMMENDED GUIDELINES.
13. BID OPTION #5

VARIABLE FREQUENCY MOTOR SPEED CONTROLLER SCHEDULE

MARK	LOCATION	SERVES	TYPE OF CONTROL	ELECTRICAL DATA HP	ELECTRICAL DATA VOLTS	ELECTRICAL DATA PHASE	ELECTRICAL DATA HERTZ	MOUNTING	REMARKS
VSD 1	AHU-1	SF 1	STATIC PRESSURE	13	460	3	60	OUTDOOR UNIT MOUNTED	
VSD 2	AHU-1	RF 1	STATIC PRESSURE	11	460	3	60	OUTDOOR UNIT MOUNTED	
VSD 3	AHU-2	SF 2	STATIC PRESSURE	24	460	3	60	OUTDOOR UNIT MOUNTED	
VSD 4	AHU-2	EF 4	STATIC PRESSURE	3	460	3	60	OUTDOOR UNIT MOUNTED	
VSD 5	AHU-3	SF 3	STATIC PRESSURE	13	460	3	60	OUTDOOR UNIT MOUNTED	1
VSD 6	AHU-3	EF 5	STATIC PRESSURE	1.5	460	3	60	OUTDOOR UNIT MOUNTED	1
VSD 7	ERU-2	ENERGY WHEEL	STATIC PRESSURE	--	460	3	60	OUTDOOR UNIT MOUNTED	1
VSD 8	ERU-3	ENERGY WHEEL	STATIC PRESSURE	--	460	3	60	OUTDOOR UNIT MOUNTED	1
VSD 9	MECHANICAL ROOM	P 1	DIFFERENTIAL PRESSURE	10	460	3	60	FREE STANDING	
VSD 10	MECHANICAL ROOM	P 2	DIFFERENTIAL PRESSURE	10	460	3	60	FREE STANDING	
VSD 11	MECHANICAL ROOM	P 3	DIFFERENTIAL PRESSURE	7 1/2	460	3	60	FREE STANDING	
VSD 12	MECHANICAL ROOM	P 4	DIFFERENTIAL PRESSURE	7 1/2	460	3	60	FREE STANDING	
VSD 13	MECHANICAL ROOM	P 5	DIFFERENTIAL PRESSURE	7 1/2	460	3	60	FREE STANDING	
VSD 14	MECHANICAL ROOM	P 6	DIFFERENTIAL PRESSURE	7 1/2	460	3	60	FREE STANDING	
VSD 15	MECHANICAL ROOM	P 7	WATER TEMPERATURE	1 1/2	460	3	60	FREE STANDING	
VSD 16	MECHANICAL ROOM	P 8	WATER TEMPERATURE	1 1/2	460	3	60	FREE STANDING	
VSD 17	CT-1	COOLING TOWER FAN	WATER TEMPERATURE	3	460	3	60	OUTDOOR FREE STANDING	
VSD 18	CT-1	COOLING TOWER FAN	WATER TEMPERATURE	3	460	3	60	OUTDOOR FREE STANDING	
VSD 19	LTD-1	SF 4	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	
VSD 20	LTD-1	EF 3	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	
VSD 23	SHOP	SF 6	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	1
VSD 24	SHOP	SF 7	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	1
VSD 25	SHOP	SF 8	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	1
VSD 26	SHOP	EF 5	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	1
VSD 27	SHOP	EF 6	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	1
VSD 28	SHOP	EF 7	ROOM TEMPERATURE	2	460	3	60	FREE STANDING	1

NOTES:

1. BID OPTION #5

CLOSED CIRCUIT COOLING TOWER SCHEDULE

MARK	GPM	FLUID P.D. (PSI)	E.A.T. F WB	L.W.T. °F	E.W.T. ° F	FANS QTY.	FANS TOTAL CFM	FAN MOTORS QTY.	FAN MOTORS HP	FAN MOTORS VOLTS	FAN MOTORS Ø	SPRAY PUMP GPM	SPRAY PUMP HP	SPRAY PUMP VOLTS	SPRAY PUMP Ø	MAX. UNIT DIMENSIONS	OPERATING WEIGHT	BASIS OF DESIGN	NOTES
CT 1	50	2.0	78	84	94	2	19,320	2	3	480	3	200	1	480	3	9'-0"x4'-0"x11'-0" TALL	8,000 LBS	EVAPCO - MODEL ATWB-4-5F9-ZR	1 2 3 4 5 6 7 8

1. PROVIDE COMBINATION MAGNETIC STARTER / DISCONNECT FOR SPRAY PUMP MOTOR. FAN MOTORS SHALL BE CONTROLLED THROUGH A VARIABLE FREQUENCY CONTROLLER INCORPORATING PHASE FAILURE PROTECTION WITH AN ADJUSTABLE TIME DELAY.
2. SELECT WITH FLUID AS 40% PROPYLENE GLYCOL.
3. 4 KW (480V /3 PH.) BASIN HEATER TO MAINTAIN 40 DEG F. BASIN WATER DOWN TO 0 DEG F. AMBIENT. PROVIDE BASIN HEATER CONTROL PANEL WITH CONTACTOR, DISCONNECT SWITCH, CONNECTION FOR THERMOSTAT, AND LOW WATER CUT OUT.
4. ELECTRONIC BASIN LEVEL SENSOR PACKAGE AND FAN VIBRATION CUT OUT SWITCH.
5. THE TOWER SHALL BE SET ON VERTICALLY RESTRAINED SPRING VIBRATION ISOLATORS WITH A MINIMUM OF 2" OF STATIC DEFLECTION.
6. LOW SOUND FAN OPTION.
7. COORDINATE LUG CONFIGURATIONS WITH CONDUCTOR SIZES AND QUANTITIES INDICATED ON THE ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT.
8. ALL OUTDOOR MOUNTED DISCONNECTS, PANELS, VFD'S, ETC. SHALL BE ENCLOSED IN STAINLESS STEEL WEATHER TIGHT BOXES.

RELIEF HOOD SCHEDULE

MARK	TYPE	THROAT SIZE (INCHES)	CURB CAP WIDTHXLENGTH(INCHES)	DAMPER SIZE (INCHES)	STATIC PRESSURE (IN WG)	MANUFACTURER & MODEL	NOTES
GH 1	INTAKE HOOD	12x12	26x27	12x12	0.1	GREEN HECK MODEL FGI	1 2 3

NOTES:

1. PROVIDE PREFABRICATED ROOF CURB.
2. PROVIDE MOTORIZED BACKDRAFT DAMPER. SET TO 0.1 INCHES STATIC PRESSURE.
3. PROVIDE BIRD SCREEN

ELECTRIC UNIT HEATER SCHEDULE

MARK	CFM	BTUH	AMP	TOTAL KW	VOLTS/PH	REMARKS	BASIS OF DESIGN
ECH 1	65	6826	7.3	2	277/1	1 2 3 4	Q-MARK MODEL CWH1207DS

1. PROVIDE UNIT MOUNTED CONTROLS
2. PROVIDE DISCONNECT SWITCH
3. SURFACE MOUNTING FRAME
4. COORDINATE LUG CONFIGURATIONS WITH CONDUCTOR SIZES AND QUANTITIES INDICATED ON THE ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT.

GLYCOL MAKE UP PACKAGE SCHEDULE

MARK	TANK VOL. (GAL.)	PUMP GPM	PUMP PSI	PUMP MOTOR HP	PUMP MOTOR VOLTS / ø	DIMENSIONS DIAMETER	DIMENSIONS HEIGHT	BASIS OF DESIGN
GF 1	50	1.80	50	1/3	120 / 1	28	42	WESSELS 'GMP'

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CONTRACT NO.: NNC09CA01C
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APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
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FY14 B351 WAREHOUSE ADDITION

HVAC SCHEDULES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	603

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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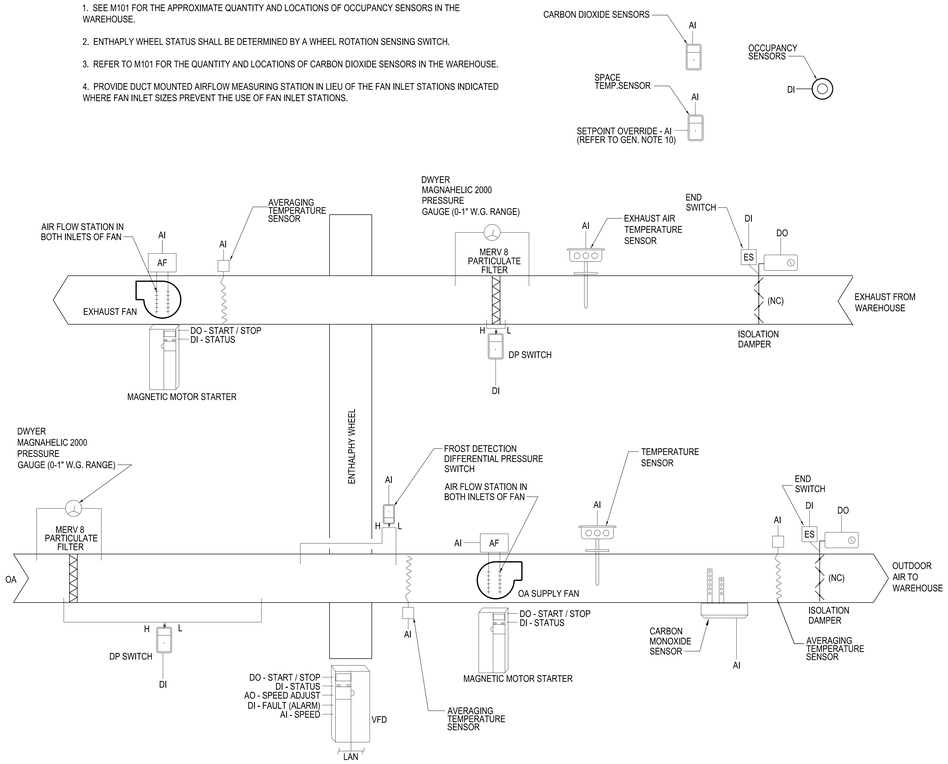
NOTES:

1. SEE M101 FOR THE APPROXIMATE QUANTITY AND LOCATIONS OF OCCUPANCY SENSORS IN THE WAREHOUSE.

2. ENTHAPLY WHEEL STATUS SHALL BE DETERMINED BY A WHEEL ROTATION SENSING SWITCH.

3. REFER TO M101 FOR THE QUANTITY AND LOCATIONS OF CARBON DIOXIDE SENSORS IN THE WAREHOUSE.

4. PROVIDE DUCT MOUNTED AIRFLOW MEASURING STATION IN LIEU OF THE FAN INLET STATIONS INDICATED WHERE FAN INLET SIZES PREVENT THE USE OF FAN INLET STATIONS.

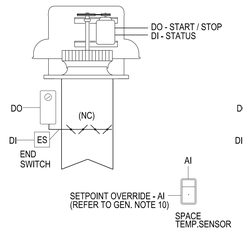


ERU-1 / WAREHOUSE VENTILATION CONTROL DIAGRAM

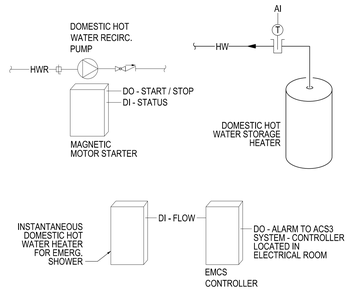
NTS

ERU-1 / WAREHOUSE VENTILATION CONTROL EMCS INPUT / OUTPUT SUMMARY

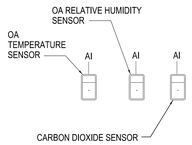
| | CONNECTED POINTS | | |



EF-2 CONTROL DIAGRAM
NTS



PLUMBING SYSTEMS CONTROL
NTS



NOTES:

1. TEMPERATURE SENSOR SHALL BE PROVIDED WITH A SUN SHIELD AND IT SHALL BE LOCATED ON A NORTH BUILDING EXPOSURE. DO NOT LOCATE SENSOR ABOVE THE ROOF.

2. ALL SENSORS: LOCATE A MINIMUM OF 25 FEET AWAY FROM BUILDING EXHAUST DISCHARGES.

OUTDOOR AIR CONDITIONS MONITORING
NTS

MISCELLANOUS CONTROLS EMCS INPUT / OUTPUT SUMMARY

POINT DESCRIPTION	CONNECTED POINTS – INPUTS – DIGITAL: STATUS	CURRENT DETECTION STATUS	FLOW STATUS	OCCUPANCY	HIGH LIMIT	PULSE OUTPUT	INPUTS – ANALOG: TEMPERATURE	PRESSURE	DIFFERENTIAL PRESSURE	CURRENT SENSING	FLOW RATE	MOTOR SPEED	RELATIVE HUMIDITY	CARBON DIOXIDE	OUTPUTS – DIGITAL: ON / OFF / AUTO	ALARM SIGNAL TO ACS3 SYSTEM	OPEN / CLOSE	ENABLE / DISABLE	OUTPUTS – ANALOG: POSITIONING	SPEED CONTROL	CAPACITY CONTROL	SETPOINT ADJUSTMENT	ALARMS – DIGITAL: PROOF FAILURE	HIGH LIMIT	LOW LIMIT	SYSTEM / CONTROLLER FAULT	USAGE EVENT ALARM	ALARMS – ANALOG: HIGH LIMIT	LOW LIMIT	ALARMS – TYPE: CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	SOFTWARE – APPLICATION: RUN TIME	TREND	POWER CALC	CONSUMPTION TOTALIZATION	ENERGY MANAGEMENT: TIME SCHEDULING EVENT PROGRAM	OPTIMUM START / STOP PROGRAM	NIGHT SETBACK PROGRAM	ECONOMIZER PROGRAM	RESET PROGRAM	PEAK DEMAND LIMITING PROGRAM	EMERGENCY POWER PROGRAM	OCCUPANCY OVERRIDE PROGRAM
MECHANICAL ROOM							●																			●						●																	
EF-2		●													●								●									●		●	●													
DAMPERS																		●					●									●																	
OUTDOOR AIR							●						●	●																				●															
DOMESTIC WATER RECIRCULATION PUMP		●													●								●									●		●				●										●
DOMESTIC HOT WATER (FROM STOR. HTR.)							●																							●		●																
DOMESTIC HOT WATER (FROM INST. HTR.)			●														●										●				●																	

(1) APPLIES TO EACH POINT OF ELECTRICAL POWER DISTRIBUTION METERING INDICATED ON DRAWING E-601.

SPACE CARBON DIOXIDE MONITORING:

1. THE EMCS SYSTEM SHALL MONITOR THE CARBON DIOXIDE CONCENTRATION OF THE OUTDOOR AIR. THE EMCS SYSTEM SHALL ALSO MONITOR THE CARBON DIOXIDE CONCENTRATION OF THE INDOOR AIR AT ALL LOCATIONS INDICATED ON THE DRAWINGS.

ELECTRIC HEATERS (ECH-1):

1. ELECTRIC SPACE HEATERS SHALL BE CONTROLLED VIA UNIT MOUNTED CONTROLS. NO EMCS SYSTEM INTERFACE OR EMCS SYSTEM CONTROLS ARE REQUIRED.

MECHANICAL ROOM VENTILATION CONTROL (EF-2):

1. EMCS SHALL MONITOR THE STATUS OF THE FAN AND SHALL ISSUE AN ALARM WHENEVER THE FAN FAILS TO OPERATE. EMCS SHALL MONITOR THE MECHANICAL ROOM SPACE TEMPERATURE. THE FAN SHALL BE CALLED TO RUN ON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT (85 DEG. F.) WHENEVER THE FAN IS CALLED TO RUN, THE FAN INLET DAMPER AND THE MAKE UP AIR DAMPER SHALL BE OPENED. AND WHEN CONFIRMED OPEN VIA END SWITCHES, THE FAN MOTOR SHALL BE ENERGIZED. ON A FALL IN SPACE TEMPERATURE, THE FAN SHALL BE DE-ENERGIZED, THE REVERSE SHALL OCCUR.

DOMESTIC WATER CONTROL AND MONITORING:

1. HOT WATER RECIRCULATION PUMP: THE EMCS SYSTEM SHALL HAVE START / STOP CONTROL OVER THIS PUMP AND SHALL MONITOR THE PUMP STATUS. THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER THIS PUMP FAILS TO RUN. THE EMCS SYSTEM SHALL OPERATE THIS PUMP BASED ON A TIME OF DAY SCHEDULE.

2. DOMESTIC HOT WATER SUPPLY TEMPERATURE MONITORING OF STORAGE HEATER: THE EMCS SYSTEM SHALL MONITOR THE TEMPERATURE OF THE DOMESTIC HOT WATER IN THE MAIN SUPPLY PIPING. WHENEVER THE DOMESTIC WATER CIRCULATION PUMP IS ENERGIZED, IF THE TEMPERATURE FALLS BELOW 115 DEG F., AN ALARM SHALL BE ISSUED AT THE OPERATOR'S WORKSTATION.

3. DOMESTIC HOT WATER USAGE AT INSTANTANEOUS HEATER SERVING THE SAFETY SHOWER AND EYEWASH: THE EMCS SYSTEM SHALL MONITOR THE DOMESTIC HOT WATER FLOW CONDITION THROUGH A SET OF CONTACTS PART OF THE HOT WATER HEATER CONTROL PACKAGE THAT INDICATE THE PRESENCE OF FLOW THROUGH THE HEATER, AND WHENEVER FLOW IS CONTINUALLY DETECTED FOR MORE THAN 2 MINUTES (INDICATING USAGE OTHER THAN PERIODIC TESTING), AN ALARM SHALL BE GENERATED AT THE EMCS SYSTEM WORKSTATION. AN ALARM SHALL BE ISSUED TO THE ACS3 SYSTEM CONTROLLER LOCATED IN THE ELECTRICAL ROOM WHENEVER FLOW IS DETECTED.

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. ALL CONTROL COMPONENTS AND PROGRAMMING SHALL BE PROVIDED BY SIEMENS UNLESS OTHERWISE INDICATED.

GENERAL CONTROL REQUIREMENTS

1. ALL SETPOINTS, THRESHOLDS, DIFFERENTIALS, TIME DELAYS, RESET SCHEDULES, ETC. INDICATED IN THE FOLLOWING SEQUENCES OF OPERATION ARE INITIAL RECOMMENDATIONS AND SHALL BE ADJUSTABLE BY THE BUILDING OPERATOR AT THE EMCS WORKSTATION OR WEB BROWSER VIA SYSTEM GRAPHICS WITHOUT RE-PROGRAMMING (I.E. NO ALTERATION OF SYSTEM PROGRAM CODE SHALL BE REQUIRED). ALL TEMPERATURES INDICATED IN THE SEQUENCES ARE IN DEGREES FAHRENHEIT.

2. THE EMCS SYSTEM SHALL HAVE THE ABILITY TO OVERRIDE THE OPERATIONAL STATUS OF ALL FANS, DAMPERS, PUMPS, AND CONTROL VALVES VIA OVERRIDE COMMAND AT THE OPERATOR'S WORKSTATION.

3. ALL INPUTS, OUTPUTS, AND CALCULATED POINTS OF THE EMCS SYSTEM SHALL BE CAPABLE OF BEING TRENDED. THE EMCS SYSTEM PROVIDER SHALL ESTABLISH TRENDS FOR ANY POINTS THE OWNER DEEMS NECESSARY. TRENDS SHALL BE INITIALLY SET FOR A SAMPLING RATE OF ONCE EVERY 5 MINUTES FOR EACH POINT OR AS REQUIRED BY THE OWNER. TRENDS SHALL BE MAINTAINED FOR A MINIMUM OF SEVEN DAYS FOR ALL TERMINAL EQUIPMENT UNLESS REQUIRED OTHERWISE BY THE OWNER. VIEWING OF TREND GRAPHS SHALL BE AVAILABLE AT THE EMCS WORKSTATION OR VIA THE WEB BROWSER. EMCS CONTROLLERS, PANELS AND WORKSTATIONS SHALL BE SELECTED WITH ADEQUATE MEMORY AND STORAGE CAPACITY. THE WORKSTATION SHALL ISSUE AN ALARM AND PROVIDE THE USER OPPORTUNITY TO SAVE TREND DATA TO FILES PRIOR TO ERASURE OF THAT DATA. AUTO-SAVE FEATURES SHALL BE INCORPORATED INTO THE SYSTEM TO RETAIN USER-SELECTED TREND DATA WITHOUT REQUIRING CONTINUAL USER INPUT.

4. ALL DAMPER AND VALVE ACTUATORS SHALL BE ELECTRIC AND SHALL HAVE SPRING RETURN MECHANISMS.

5. THE EMCS SYSTEM SHALL UTILIZE A SINGLE SET OF GLOBAL OUTDOOR AIR TEMPERATURE AND RELATIVE HUMIDITY SENSORS FOR THE PROJECT. THE EMCS SYSTEM SHALL CALCULATE THE OUTDOOR AIR ENTHALPY, DEW POINT, AND WET BULB.

6. ALL CONTROL FUNCTIONS DESCRIBED IN THE SEQUENCES OF OPERATION SHALL BE PERFORMED BY THE EMCS SYSTEM UNLESS EXPLICITLY INDICATED OTHERWISE. ALL WORK DESCRIBED SHALL BE PROVIDED BY THE ATC SYSTEM SUPPLIER/SUB-CONTRACTOR UNDER THE AUTOMATIC TEMPERATURE CONTROLS SPECIFICATION SECTION UNLESS EXPLICITLY INDICATED OTHERWISE.

7. IF SPACE TEMPERATURES THAT ARE MONITORED THROUGH THE EMCS SYSTEM FALL MORE THAN 10 DEG. ABOVE OR BELOW SETPOINT, THE EMCS SYSTEM SHALL ISSUE AN ALARM.

8. ALL PUMP AND FAN STATUS MONITORING SHALL BE ACHIEVED THROUGH CURRENT SWITCHES THAT HAVE AN ADJUSTABLE TRIP POINT. ADDITIONALLY, FANS AND PUMPS WITH FLOW MEASURING STATIONS SHALL HAVE A PROOF OF FLOW POINT VIA THE FLOW STATION. IF CURRENT AND AIR/WATER FLOW IS NOT DETECTED WITH 20 SECONDS OF THE SIGNAL FOR THE FAN TO START, AN ALRM SHALL BE ISSUED AT THE OPERATOR'S WORKSTATION AND THE FAN/PUMP SHALL BE DE-ENERGIZED.

9. ALL EMCS SYSTEM SPACE TEMPERATURE SENSORS FOR SHALL BE PROVIDED WITH A LOCAL TEMPERATURE SENSOR OVERRIDE FEATURE THAT HAS A PERMIT'S THE USER TO ADJUST THE SPACE TEMPERATURE SETPOINT +/- 2 DEG. F. (ADJUSTABLE) AWAY FROM THE SPACE TEMPERATURE SETPOINT SET BY THE EMCS SYSTEM VIA PROGRAMMING. WHERE INDICATED, SENSORS SHALL ALSO INCORPORATE AN OCCUPANCY OVERRIDE PUSHBUTTON THAT PROVIDES A BINARY INPUT TO THE EMCS SYSTEM TO INDICATE SPACE OCCUPANCY.

10. THE EMCS SYSTEM SHALL PROVIDE A RUN-TIME TOTALIZATION FEATURE FOR ALL FANS, PUMPS, ERUS, COMPRESSORS, AND ALL OTHER HVAC EQUIPMENT CONTROLLED BY THE EMCS SYSTEM. RUN-TIME TOTALIZATION IS NOT REQUIRED FOR ECHS, AND UHS.

11. DUCT SMOKE DETECTORS ARE FURNISHED BY SIEMENS, INSTALLED BY DIVISION 23, AND WIRED BY DIVISION 26. THE DETECTORS SHALL INITIATE A HARD-WIRED SHUTDOWN OF THE ASSOCIATED FANS. IN ADDITION, A SET OF AUXILLARY CONTACTS ON THE DETECTORS SHALL BE USED TO INITIATE AN ALARM AT THE EMCS SYSTEM WORKSTATION.

12. IN ADDITION TO MEETING THE REQUIREMENTS OF THE SPECIFICATIONS, THE CONTRACTOR IS REQUIRED TO PROVIDE ALL CONTROL POINTS INDICATED IN ANY ONE OF THE FOUR POSSIBLE CONTROL WORK REPRESENTATIONS THAT ARE PART OF THESE CONTRACT DRAWINGS. THESE FOUR REPRESENTATIONS ARE THE ENTIRETY OF THE HVAC DRAWINGS, THE CONTROL SEQUENCES OF OPERATION, THE POINTS LISTS, AND THE CONTROL DIAGRAMS ON THE M700 SERIES SHEETS (WHEN A DIAGRAM HAVE BEEN PREPARED FOR A GIVEN SYSTEM OR PIECE OF EQUIPMENT). THE OMISSION OF A PARTICULAR CONTROL POINT FROM EITHER ONE, TWO, OR THREE OF THESE FOUR REPRESENTATIONS SHALL NOT BE CONSTRUED TO MEAN THIS PARTICULAR CONTROL POINT IS NOT REQUIRED. INCLUSION OF THE POINT IN ANY ONE OF THE FOUR REPRESENTATIONS OBLIGATES THE CONTRACTOR TO PROVIDE THE POINT AS PART OF THE COMPLETE AND FUNCTIONAL CONTROL SYSTEM.

WAREHOUSE VENTILATION CONTROL (SF-4, EF-3):

1. FAN START/STOP: THE EMCS SYSTEM SHALL PROVIDE START/STOP CONTROL OVER EF-3, AND SF-4 AND SHALL MONITOR THEIR OPERATING STATUS. THE FANS SHALL BE CONTROLLED BY THE EMCS SYSTEM THROUGH VARIABLE FREQUENCY CONTROLLERS. WHENEVER A FAN IS CALLED TO RUN, THE ASSOCIATED MOTORIZED ISOLATION DAMPER SHALL BE OPENED. ONCE THE DAMPER IS CONFIRMED OPEN VIA END SWITCH, THE FAN MOTOR SHALL BE ENERGIZED. WHENEVER A FAN IS DE-ENERGIZED, THE ASSOCIATED MOTORIZED DAMPER SHALL BE INDEXED TO ITS NORMAL POSITION (CLOSED).

2. TEMPERATURE CONTROL: WHENEVER THE SPACE TEMPERATURE IS 75 DEG F. OR LESS, BOTH FANS SHALL BE DE-ENERGIZED. ON A RISE IN SPACE TEMPERATURE ABOVE 75 DEG F., BOTH FANS SHALL BE ENERGIZED AND SHALL INITIALLY OPERATE AT THEIR MINIMUM SPEED. THE EMCS SYSTEM SHALL MODULATE THE SPEED OF BOTH FANS IN UNISON TO MAINTAIN THE INDOOR SPACE TEMPERATURE EIGHT (8) DEGREES HIGHER THAN THE EXTERIOR AIR TEMPERATURE. WHEN THE INDOOR AIR TEMPERATURE IS EQUAL TO 95 DEG F. OR HIGHER, THE FANS SHALL OPERATE AT THEIR MAXIMUM SPEED. ON A FALL IN SPACE TEMPERATURE THE REVERSE SHALL OCCUR. THE EMCS SYSTEM SHALL MONITOR THE VFD OPERATING STATUS, THE DRIVE'S FAULT STATUS, THE FAN SPEED FEEDBACK SIGNAL, AND THE VFD CURRENT FOR EACH FAN. THE EMCS SYSTEM SHALL HAVE CONTROL OVER THE BYPASS STARTERS AND SHALL OPERATE THE FANS THROUGH THE BYPASS STARTERS UPON MANUAL COMMAND AT THE OPERATOR'S WORKSTATION.

3. FAN LOCKOUT CONTROL: WHENEVER THE OUTDOOR AIR TEMPERATURE IS HIGHER THAN THE INDOOR AIR TEMPERATURE, THE FANS SHALL BE DE-ENERGIZED.

4. MISCELLANEOUS ALARMS: THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER A DAMPER FAILS TO OPEN OR A FAN FAILS TO RUN. WHENEVER THE VIBRATION SWITCH DETECTS EXCESSIVE VIBRATION, THE ASSOCIATED FAN SHALL BE DE-ENERGIZED AND AN ALARM ISSUED AT THE OPERATOR'S WORKSTATION.

5. CARBON MONOXIDE MONITORING: THE EMCS SYSTEM SHALL MONITOR THE SPACE FOR THE PRESENCE OF EXCESSIVE CARBON MONOXIDE AT MULTIPLE POINTS INDICATED ON THE PLANS. WHENEVER THE LOWER ALARM LEVEL CONCENTRATION (50 PPM) IS REACHED AT ANY ONE SENSOR, THE EMCS SYSTEM SHALL ISSUE AN ABNORMAL CONDITION NOTIFICATION AT THE EMCS SYSTEM, AND SHALL OPERATE EF-3 AND SF-4 AT THE SPEED REQUIRED TO MAINTAIN A MAXIMUM LEVEL OF 50 PPM. ONCE THE CONCENTRATION FALLS BELOW 30 PPM, THE FANS SHALL BE DE-ENERGIZED. WHENEVER THE HIGHER ALARM LEVEL (80 PPM) CONCENTRATION IS REACHED AT ANY ONE SENSOR, THE FANS SHALL CONTINUE TO RUN. A CRITICAL ALARM SHALL BE ISSUED AT THE EMCS SYSTEM WORKSTATION, AND AN AUDIBLE AND VISUAL ALARM (HORN AND STROBE) IN THE SPACE SHALL BE ENERGIZED.

WAREHOUSE CONTROLS EMCS INPUT / OUTPUT SUMMARY

POINT DESCRIPTION	CONNECTED POINTS – INPUTS – DIGITAL: STATUS	CURRENT DETECTION STATUS	SMOKE DETECTOR	OCCUPANCY	HIGH LIMIT	INPUTS – ANALOG: TEMPERATURE	PRESSURE	DIFFERENTIAL PRESSURE	CURRENT SENSING	FLOW RATE	MOTOR SPEED	RELATIVE HUMIDITY	CARBON MONOXIDE CONCENTRATION	OUTPUTS – DIGITAL: ON / OFF / AUTO	BYPASS STARTER	OPEN / CLOSE	ENABLE / DISABLE	FORWARD / REVERSE	OUTPUTS – ANALOG: POSITIONING	SPEED CONTROL	CAPACITY CONTROL	SETPOINT ADJUSTMENT	ALARMS – DIGITAL: PROOF FAILURE	HIGH LIMIT	LOW LIMIT	SYSTEM / CONTROLLER FAULT	ALARMS – ANALOG: HIGH LIMIT	LOW LIMIT	ALARMS – TYPE: CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	SOFTWARE – APPLICATION: RUN TIME	TREND	POWER CALC	ENERGY CALC	ENERGY MANAGEMENT: TIME SCHEDULING EVENT PROGRAM	OPTIMUM START / STOP PROGRAM	NIGHT SETBACK PROGRAM	ECONOMIZER PROGRAM	RESET PROGRAM	OCCUPANCY OVERRIDE PROGRAM	EMERGENCY POWER PROGRAM	DUTY / STANDBY PROGRAM
EXHAUST FAN EF - 3																																	●	●	●	●	●											
EF - 3 VARIABLE FREQUENCY DRIVE	●							●		●				●	●			●		●			●		●						●																	
OUTDOOR AIR DAMPER	●															●							●								●																	
EXHAUST AIR DAMPER	●															●							●								●																	
SUPPLY FAN SF - 4																																	●	●	●	●	●											
SF - 4 VARIABLE FREQUENCY DRIVE	●							●		●				●	●			●		●			●		●						●																	
OUTDOOR AIR DAMPER	●															●							●								●																	
EXHAUST AIR DAMPER	●															●							●								●																	
WAREHOUSE																																																
TEMPERATURE						●																●						●		●												●	●					
OCCUPANCY SENSORS				●																																												
HEATING SYSTEM CONTROLLER																	●																					●										
SPACE CARBON MONOXIDE													●															●			●	●		●														
SPACE CARBON MONOXIDE ALARM HORN/STROBE																	●																															

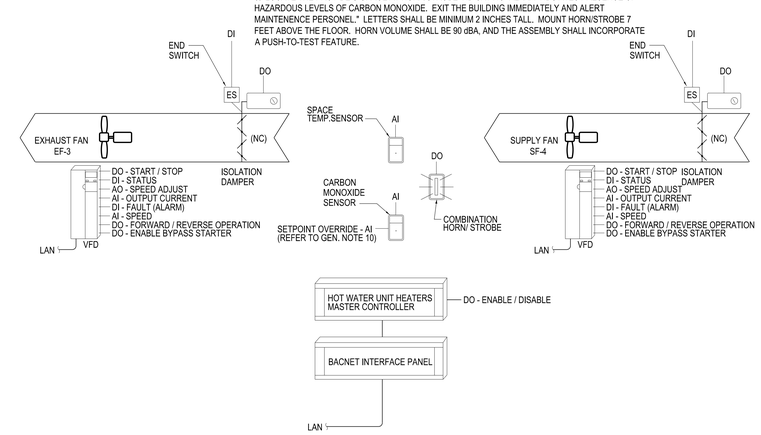
NOTES:

NOTE:

1. LOCATE TEMPERATURE SENSOR AT 54" ABOVE THE THE FINISHED FLOOR.

2. REFER TO PLAN FOR QUANTITY AND LOCATIONS OF CARBON MONOXIDE SENSORS.

3. LOCATE THE PROVIDE SIGNAGE AT HORN/STROBE INDICATING "ALARM INDCIATES PRESENCE OF HAZARDOUS LEVELS OF CARBON MONOXIDE. EXIT THE BUILDING IMMEDIATELY AND ALERT MAINTENENCE PERSONEL." LETTERS SHALL BE MINIMUM 2 INCHES TALL. MOUNT HORN/STROBE 7 FEET ABOVE THE FLOOR. HORN VOLUME SHALL BE 90 dBA, AND THE ASSEMBLY SHALL INCORPORATE A PUSH-TO-TEST FEATURE.



WAREHOUSE CONTROL DIAGRAM
NTS

LAST APPROVED EDMS REVISION	TECH LEAD:	FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC CONTROLS

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
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Thorson Baker + Associates
3030 West Streetsboro Road
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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	702

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION | VER
SCALE: NONE | OFFICIAL DATE: 06-24-2014 | - | 1

0351-COF12482-M-702_CE_01.dwg

TEMPLATE DATE: 02/28/2011

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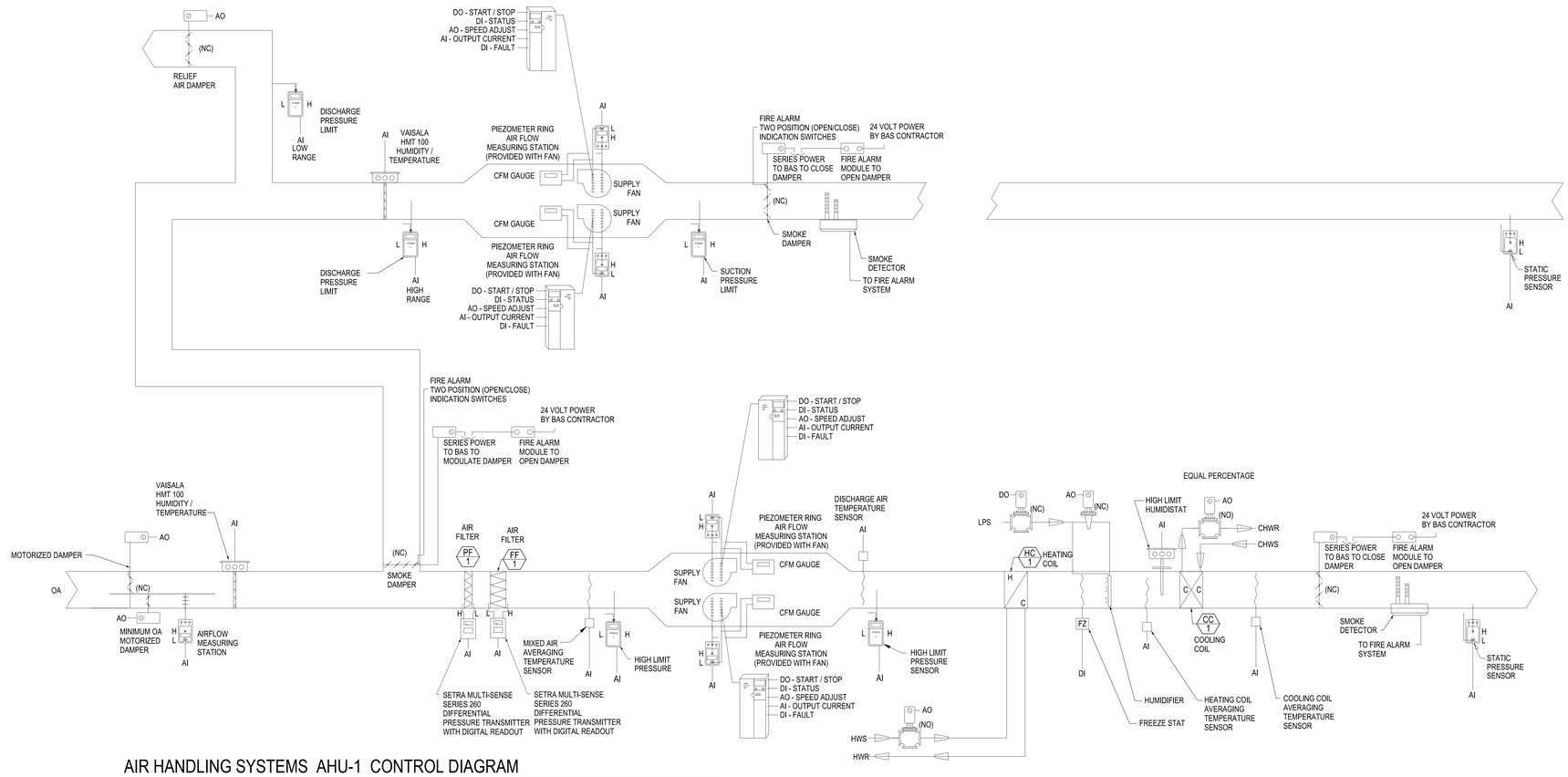
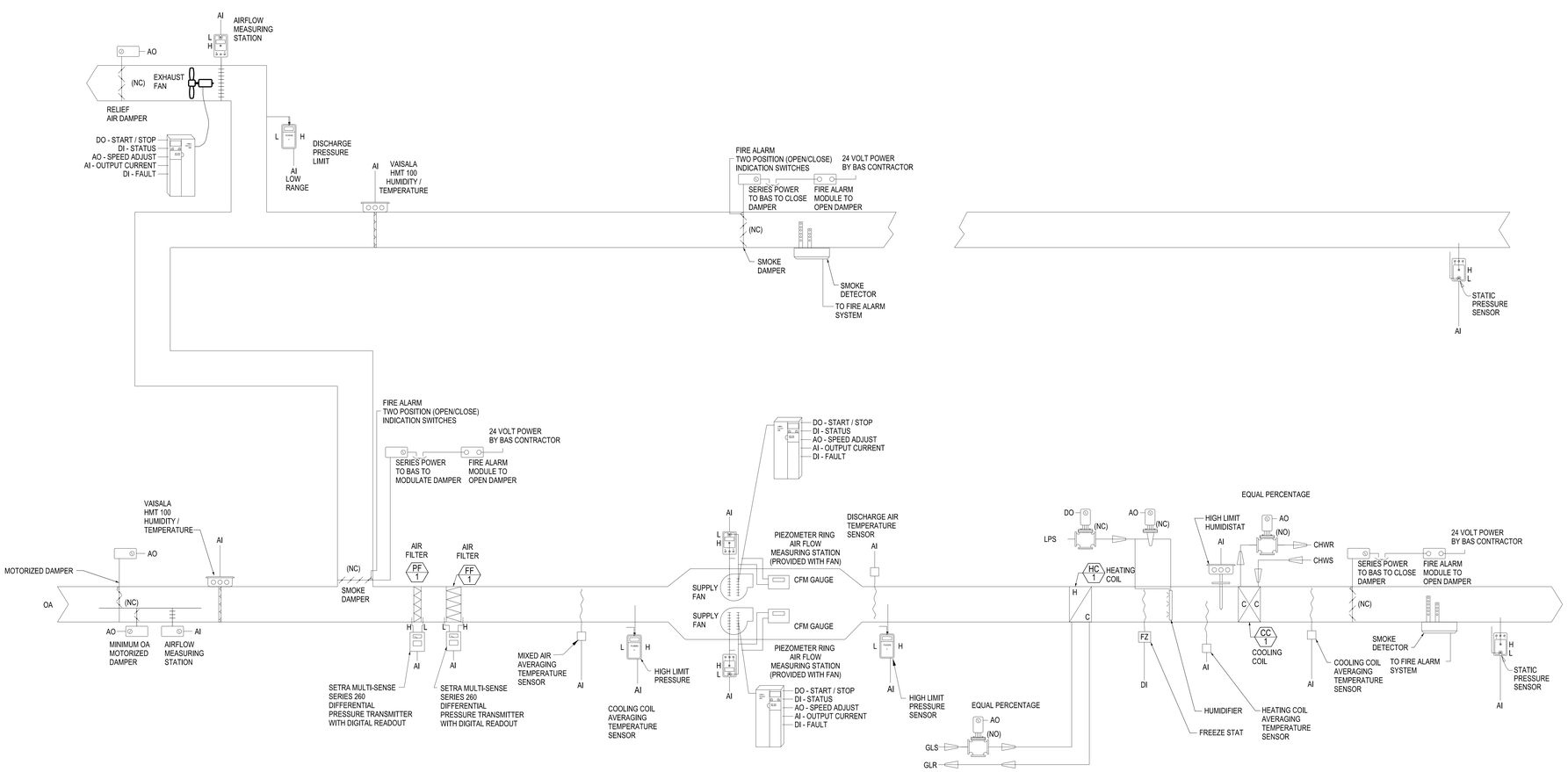


AIR HANDLING SYSTEMS AHU-1 CONTROL DIAGRAM

SCALE: NTS



AIR HANDLING SYSTEMS AHU-2 CONTROL DIAGRAM

SCALE: NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. ALL CONTROL COMPONENTS AND PROGRAMMING SHALL BE PROVIDED BY SIEMENS UNLESS OTHERWISE INDICATED.

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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM: HVAC	SUB-SYS:	FAC/LIT:	CONFIG:

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS

CONTRACTOR: STANTEC ARCHITECTURE INC.	RELEASE APPROVAL:	DATE:
CONTRACT NO.: NNC09CA01C	RELEASE APPROVAL:	DATE:
TASK ORDER:	RELEASE APPROVAL:	DATE:
DRAWN / DESIGNED / CHECKED		
APPROVED / APPROVAL DATE	RELEASE STATUS: WORKING	

LAST APPROVED EDMS REVISION	TECH LEAD:	FAC-SYS MGR:	REV DATE:

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC CONTROLS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	703

AREA: | SHEET 1 OF

UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1

SCALE: NONE | OFFICIAL DATE: 06-24-2014

0351-COF12482-M-703_CE_01.dwg

TEMPLATE DATE: 02/28/2011

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GENERAL HVAC APPLICATION PROGRAMS

I. TIME SCHEDULING/EVENT PROGRAM: THE TIME SCHEDULING PORTION OF THE PROGRAM SHALL START AND STOP EACH EQUIPMENT DEVICE OR SYSTEM BASED ON THE TIME OF THE DAY AND DAY OF THE WEEK, INCLUDING HOLIDAYS. TO ELIMINATE POWER SURGES, AN OPERATOR'S ADJUSTABLE TIME DELAY SHALL BE PROVIDED BETWEEN CONSECUTIVE START COMMANDS. THIS PROGRAM SHALL INDICATE TO THE OPERATOR THAT THE UNIT IS "ON" OR "OFF" IN THE "OCCUPIED" OR "UNOCCUPIED" MODE WHEN A STATUS INQUIRY IS MADE; THIS WILL BE THE PRIMARY MEANS OF CONTROL. THE PROGRAM MUST EXECUTE ENTIRELY WITHIN THE LOCAL PANEL CONTROLLER.

i. SCHEDULING PROGRAM INPUTS:
A. DAY OF WEEK/HOLIDAY.
B. TIME OF DAY.
C. SUMMER AND WINTER HIGH-LOW LIMITS.
D. DAY/WEEKEND/HOLIDAY START-STOP SCHEDULES.
E. SUMMER OR WINTER OPERATION.

ii. SCHEDULING PROGRAM OUTPUTS:
A. START SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
B. STOP SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
C. CONTROL STATUS AVAILABLE AT THE OPERATOR'S CONSOLE.

iii. IN ADDITION, BASED ON USER COMMANDS AT THE OPERATOR'S CONSOLE, THE SOFTWARE SHALL BE CAPABLE OF OVERRIDING NORMAL UNOCCUPIED MODES OF OPERATION FOR EVENTS. EVENTS SHALL BE PREPROGRAMMED BY THE OPERATOR UP TO 12 MONTHS IN ADVANCE. EACH EVENT SHALL AUTOMATICALLY BE ERASED AFTER USE.

iv. EVENT PROGRAM INPUTS:
A. AREA, EQUIPMENT DEVICE, OR SYSTEM INVOLVED.
B. TIME OF DAY.
C. EVENT START AND STOP SCHEDULE.

v. EVENT PROGRAM OUTPUTS:
A. START SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
B. STOP SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
C. CONTROL STATUS AVAILABLE AT THE OPERATOR'S CONSOLE.

vi. ALL TIME SCHEDULES AND EVENTS SHALL BE PROGRAMMABLE IN GRAPHIC FORMAT.

II. OPTIMUM START-STOP PROGRAM: THIS SOFTWARE SHALL START AND STOP EACH EQUIPMENT DEVICE OR SYSTEM ON A SLIDING SCHEDULE BASED ON INDOOR AND OUTDOOR AIR CONDITIONS. THE PROGRAM SHALL TAKE INTO ACCOUNT THE THERMAL CHARACTERISTICS OF THE STRUCTURE, INDOOR CONDITIONS AND OUTDOOR AIR CONDITIONS USING PREDICTION SOFTWARE TO DETERMINE THE MINIMUM TIME THE HVAC SYSTEM OPERATION REQUIRES TO SATISFY ENVIRONMENTAL REQUIREMENTS AT THE START OF THE OCCUPIED CYCLE AND TO DETERMINE THE EARLIEST TIME FOR STOPPING EQUIPMENT AT THE DAY'S END. THIS PROGRAM SHALL INDICATE TO THE OPERATOR THAT THE UNIT IS "ON" OR "OFF" IN "OPTIMUM START-STOP" OVERRIDE WHEN A STATUS INQUIRY IS MADE. THE PROGRAM MUST EXECUTE ENTIRELY WITHIN THE LOCAL PANEL CONTROLLER.

i. PROGRAM INPUTS:
A. TIME SCHEDULING/EVENT PROGRAM INPUTS.
B. SPACE TEMPERATURE(S).
C. BUILDING HEATING CONSTANT (OPERATOR ADJUSTABLE).
D. BUILDING COOLING CONSTANT (OPERATOR ADJUSTABLE).
E. OUTDOOR AIR TEMPERATURE.
F. REQUIRED SPACE TEMPERATURE AT OCCUPANCY (HEATING).
G. REQUIRED SPACE TEMPERATURE AT OCCUPANCY (COOLING).
H. WIND VELOCITY (WHEN APPLICABLE).

ii. PROGRAM OUTPUTS:
A. START SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
B. STOP SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
C. CONTROL STATUS AVAILABLE AT THE OPERATOR'S CONSOLE.

III. NIGHT SETBACK PROGRAM: THE SOFTWARE SHALL LIMIT THE RISE OR DROP OF SPACE TEMPERATURE DURING UNOCCUPIED HOURS. WHENEVER THE SPACE TEMPERATURE IS ABOVE (OR BELOW FOR HEATING) THE OPERATOR ASSIGNED TEMPERATURE LIMIT, THE SYSTEM SHALL BE TURNED "ON" UNTIL THE TEMPERATURE IS WITHIN THE ASSIGNED TEMPERATURE LIMIT. THIS PROGRAM SHALL ALSO COOL THE BUILDING WITH COOL "NIGHT" AIR IN THE SUMMER AND WARM "DAY" AIR IN THE WINTER DURING UNOCCUPIED PERIODS. THIS PROGRAM SHALL INDICATE TO THE OPERATOR THAT THE UNIT IS "ON" IN "NIGHT SETBACK" OVERRIDE WHEN A STATUS INQUIRY IS MADE. THE PROGRAM MUST EXECUTE ENTIRELY WITHIN THE LOCAL PANEL CONTROLLER. THE NIGHT SETBACK PROGRAM SHALL INCLUDE A MORNING WARM - UP OR COOL - DOWN SEQUENCE PRIOR TO OCCUPANCY OF THE BUILDING TO RETURN THE BUILDING TO NORMAL OCCUPIED SET POINTS.

i. PROGRAM INPUTS:
A. TIME SCHEDULING/EVENT PROGRAM INPUTS.
B. SPACE TEMPERATURE(S).
C. MAXIMUM ALLOWABLE TEMPERATURE DURING UNOCCUPIED PERIODS.
D. MINIMUM ALLOWANCE TEMPERATURE DURING UNOCCUPIED PERIODS.

ii. PROGRAM OUTPUTS:
A. START SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
B. STOP SIGNAL (MOMENTARY OR MAINTAINED AS SPECIFIED).
C. DAY/NIGHT (OPEN/CLOSE) CONTROL SIGNAL TO TERMINAL EQUIPMENT.
D. CONTROL STATUS AVAILABLE AT THE OPERATOR'S CONSOLE.

IV. ECONOMIZER PROGRAM: THE SOFTWARE SHALL REDUCE THE HVAC SYSTEM COOLING REQUIREMENTS WHEN THE OUTDOOR AIR (O.A.) CONDITIONS OF DRY BULB TEMPERATURE AND HUMIDITY ARE LESS THAN THE AIR SYSTEM'S RETURN AIR (R.A.) CONDITIONS OF DRY BULB TEMPERATURE AND HUMIDITY. THE PROGRAM SHALL BE IN CONTROL WHENEVER THE PARTICULAR AIR HANDLING UNIT IS OPERATING. THE PROGRAM SHALL ALSO ACCOUNT FOR THE AVAILABILITY OF COOLING. THE OUTPUT FROM THE PROGRAM SHALL PROVIDE POSITIONING OF THE O.A., R.A. AND RELIEF AIR DAMPERS BETWEEN MINIMUM O.A., MAXIMUM O.A., AND POSITIONS IN BETWEEN.

THE PROGRAM SHALL USE SYSTEM - WIDE VARIABLES OF O.A. TEMPERATURE AND ENTHALPY AS ONE CONTROLLING INPUT. THE PROGRAM SHALL ALSO USE MEASURED VALUES OF R.A. TEMPERATURE AND ENTHALPY AS A SECOND CONTROLLING INPUT.

i. WHEN R.A. TEMPERATURE IS NOT AVAILABLE AS A MEASURED POINT, A REPRESENTATIVE SPACE TEMPERATURE SHALL BE SUBSTITUTED FOR THE R.A. TEMPERATURE.

ii. WHEN R.A. OR SPACE TEMPERATURES ARE NOT AVAILABLE AS MEASURED TEMPERATURES, AN ADJUSTABLE CHANGEOVER SETPOINT TEMPERATURE SHALL BE MANUALLY INPUT AT THE OPERATOR'S CONSOLE.

iii. WHEN R.A. HUMIDITY IS NOT MEASURED, THE AIR HANDLING UNITS SUPPLY AIR (S.A.) TEMPERATURE SHALL BE SUBSTITUTED FOR THE R.A.'S DEWPOINT IN THE ENTHALPY CALCULATION.

iv. WHEN S.A. TEMPERATURE IS NOT AVAILABLE AS A MEASURED TEMPERATURE, AN ADJUSTABLE CHANGEOVER SETPOINT TEMPERATURE SHALL BE MANUALLY INPUT AT THE OPERATOR'S CONSOLE.

CONTROL MODE 1: WITH COOLING AVAILABLE, THE PROGRAM SHALL COMPARE VALUES OF ENTHALPY. IF O.A. TEMPERATURE IS HIGHER THAN THE AIR HANDLING UNIT S.A. TEMPERATURE AND IF O.A. ENTHALPY IS HIGHER THAN R.A. ENTHALPY, THEN THE DAMPERS SHALL BE DRIVEN TO THE MINIMUM O.A. POSITION.

CONTROL MODE 2: WITH COOLING AVAILABLE, IF O.A. TEMPERATURE IS HIGHER THAN THE AIR HANDLING UNIT S.A. TEMPERATURE AND IF O.A. ENTHALPY IS LOWER THAN R.A. ENTHALPY, THEN THE DAMPERS SHALL BE DRIVEN TO THE MAXIMUM O.A. POSITION.

CONTROL MODE 3: IF O.A. TEMPERATURE IS HIGHER THAN THE REQUIRED AIR HANDLING UNIT S.A. TEMPERATURE AND RA TEMPERATURE AND IF COOLING IS NOT AVAILABLE, THEN THE DAMPERS SHALL BE DRIVEN TO THE MAXIMUM O.A. POSITION.

CONTROL MODE 4: IF O.A. TEMPERATURE IS LOWER THAN THE AIR HANDLING UNIT S.A. TEMPERATURE. THE DAMPERS SHALL BE POSITIONED TO MIX O.A. WITH R.A. AND TO MAINTAIN THE REQUIRED MIXED AIR / S.A. TEMPERATURE.

THIS PROGRAM SHALL OPERATE ENTIRELY ON THE DCP'S.

i. PROGRAM INPUTS:
A. AVAILABILITY OF COOLING.
B. O.A. DRY BULB TEMPERATURE.
C. O.A. ENTHALPY.
D. R.A. TEMPERATURE, SPACE TEMPERATURE, OR CHANGEOVER SETPOINT TEMPERATURE.
E. R.A. ENTHALPY, S.A. TEMPERATURE, OR CHANGEOVER SETPOINT TEMPERATURE.
F. REQUIRED MIXED AIR OR S.A. TEMPERATURE SETPOINT.

ii. PROGRAM OUTPUTS:
A. AUTOMATIC (MODULATING) O.A., R.A. AND RELIEF AIR DAMPER CONTROL SIGNALS.
B. CONTROL MODE AVAILABLE FOR DISPLAY AT OPERATOR'S CONSOLE.

V. COIL RESET PROGRAM: THE SOFTWARE SHALL SELECT THE ZONE WITH THE GREATEST DEMAND FOR HEATING OR THE ZONE WITH THE GREATEST DEMAND FOR COOLING. THE PROGRAM SHALL RESET THE AHU DISCHARGE TEMPERATURE DOWNWARD UNTIL IT SATISFIES THE ZONE WITH THE GREATEST COOLING DEMAND, OR UNTIL THE ZONE HUMIDITY CONTROL REQUIREMENTS CANNOT BE MET. THE PROGRAM SHALL ALSO RESET THE AHU DISCHARGE TEMPERATURE UPWARD UNTIL IT SATISFIES THE ZONE WITH THE GREATEST HEATING DEMAND. THE PROGRAM MUST EXECUTE ENTIRELY ON THE AHU DCPs. ZONE INFORMATION SHALL BE SERIALLY TRANSMITTED TO THE AHU EMCS SYSTEM BY THE LABORATORY, OFFICE AND / OR GENERAL SPACE DDC SYSTEM.

i. PROGRAM INPUTS:
A. ZONE TEMPERATURES (WHERE SHOWN).
B. ZONE RELATIVE HUMIDITY (WHERE SHOWN).
C. SUPPLY AIR TEMPERATURE.
D. REHEAT COIL VALVE POSITIONS OR PROPORTIONAL SIGNALS FROM PRIMARY ELEMENTS.
E. MINIMUM ALLOWABLE TEMPERATURE DURING OCCUPIED PERIODS.
F. MAXIMUM ALLOWABLE TEMPERATURE DURING OCCUPIED PERIODS.
G. MAXIMUM ALLOWABLE SPACE RELATIVE HUMIDITY.
H. FAN VANE POSITION (CAPACITY).

II. PROGRAM OUTPUTS:
A. COOLING COIL SUPPLY AIR TEMPERATURE SETPOINT.
B. HEATING COIL SUPPLY AIR TEMPERATURE SETPOINT.
C. INDICATION TO OPERATOR AS TO WHICH ZONE IS CALLING FOR MOST HEATING OR FOR MOST COOLING.

CONTROL SEQUENCE FOR AHU-1

GENERAL

1. ALL CONTROL SETPOINTS, TIME DELAYS, ETC., SHALL BE ADJUSTABLE.
2. EACH AIR HANDLING UNIT COMPONENT SHALL RECEIVE A SEPARATE CONTROL SIGNAL FOR OPERATION.
3. AUTO RESET DI FREEZESTAT SHALL DE - ENERGIZE AHU THROUGH CONTROL PANEL. MANUAL RESET THROUGH CONTROL PANEL SHALL BE REQUIRED TO RESET UNIT. ALL OTHER SAFETIES SHALL BE HARD WIRED TO FAN STARTERS.
4. UPON ACTIVATION OF ANY SAFETY, THE FAN(S) ASSOCIATED WITH THAT UNIT SHALL BE DE - ENERGIZED, OUTDOOR INTAKE, RETURN AND DISCHARGE DAMPERS SHALL CLOSE COMPLETELY, COOLING VALVE SHALL BE OPEN COMPLETELY, HUMIDIFIER SEASONAL VALVE SHALL CLOSE AND HEATING COIL VALVE SHALL MAINTAIN SETPOINT. IF THREE OR MORE AIR HANDLING UNITS ARE IN FAILURE, DE - ENERGIZE ALL LAB EXHAUST FANS EXCEPT ONE TO PREVENT EXCESSIVE NEGATIVE PRESSURE IN BUILDING.
5. ALL FANS AND DAMPERS SHALL HAVE ON / OFF (OPEN / CLOSE) SWITCHING AND MONITORING PROVISIONS THROUGH THE EMCS SYSTEM.
6. ALL SUPPLY AND RETURN FANS ALL HAVE PROOF OF OPERATION THROUGH CURRENT DETECTION AT THE VARIABLE FREQUENCY DRIVE AND AIRFLOW DETECTION AT THE AIRFLOW MEASURING STATION. IF CURRENT AND / OR AIR FLOW IS NOT DETECTED WITHIN 20 SECONDS OF THE SIGNAL FOR THE FAN TO START, AN ALARM SHALL BE REGISTERED AT THE OPERATOR'S CONSOLE AND THE SYSTEM SHALL BE DE - ENERGIZED.
7. ALL VARIABLE FREQUENCY DRIVES SHALL HAVE HARD WIRE START/STOP, STATUS SPEED ADJUST, OUTPUT CURRENT AND FAULT INTERFACE WITH THE EMCS.
8. ALL COOLING COILS AND HEATING COILS SHALL HAVE TWO - WAY MODULATING CONTROL VALVES. PRESSURE DROP FOR VALVES SERVING COILS AND SHALL NOT EXCEED 5 PSID IN FULL OPEN POSITION.
9. PROVIDE SOFTWARE TO TREND ALL ANALOG CONTROL POINTS EVERY 10 MINUTES. ARCHIVE DATA FOR ONE YEAR.
10. ALL ACTUATION SHALL BE ELECTRIC.
11. ELECTRICAL CONTRACTOR SHALL PROVIDE POWER TO THE DAMPERS WHICH THE FIRE ALARM SYSTEM CONTROLS.
12. PROVIDE A SERIAL INTERFACE TO THE FIRE ALARM SYSTEM TO MONITOR CLOSURE OF SMOKE DAMPERS, ACTIVATION OF SMOKE DETECTORS, OR SO FIRE ALARM CAN DE-ENERGIZE FANS THROUGH THE EMCS SYSTEM.
13. EXTEND A LAN CABLE TO EACH VFD FOR FUTURE CONNECTION WHEN AN FLN INTERFACE IS AVAILABLE FROM THE VFD MANUFACTURER.

DAMPER CONTROL

1. THE MINIMUM OUTDOOR AIR DAMPER SHALL OPEN TO MINIMUM POSITION WHEN RESPECTIVE UNIT IS OPERATING AND CLOSE WHEN UNIT IS OFF. DAMPER SHALL BE MODULATED TO MAINTAIN MINIMUM CARBON DIOXIDE LEVELS (DEMAND CONTROL VENTILATION). MINIMUM OA DAMPER SHALL BE FULL OPEN DURING ECONOMIZER OPERATION.
2. UPON SIGNAL TO START FAN, THE SUPPLY AND RETURN FANS SHALL RAMP TO 20 HZ. THEN THE RETURN AND DISCHARGE SMOKE DAMPERS SHALL OPEN. THE END SWITCH AT THE DISCHARGE SMOKE DAMPER SHALL MAKE TO COMPLETE AND SIGNAL THE FAN TO CONTINUE RAMPING. PROVIDE CONTINUOUS FEEDBACK FOR RETURN DAMPER POSITION ON A SIGNAL TO STOP THE FANS, THE REVERSE SHALL OCCUR.
3. A COMPARATIVE ENTHALPY EMCS CONTROLLER SHALL CONTROL THE OPERATION OF THE FREE COOLING ECONOMIZER CYCLE. SENSORS SHALL MEASURE THE TEMPERATURE AND HUMIDITY OF BOTH RETURN AIR AND OUTSIDE AIR TO DETERMINE WHICH SOURCE HAS THE LOWER HUMIDITY TO OPERATE THE 100% OUTDOOR, RETURN AND EXHAUST AIR DAMPERS FOR THE MOST ENERGY EFFICIENT MODE OF OPERATION.

FAN CONTROL

1. UPON SIGNAL TO START THE SUPPLY FANS AND RETURN FANS, THE FANS SHALL RAMP TO 20 HZ. THEN THE RETURN AND DISCHARGE SMOKE DAMPERS SHALL OPEN. THE END SWITCH AT THE DISCHARGE SMOKE DAMPER SHALL MAKE TO COMPLETE AND SIGNAL THE FANS TO CONTINUE RAMPING. ON A SIGNAL TO STOP THE FANS, THE REVERSE SHALL OCCUR. THE FANS SHALL OPERATE IN RESPONSE TO THE REMOTE STATIC PRESSURE SENSOR.
2. VARIABLE FREQUENCY DRIVE SHALL MODULATE TO MAINTAIN STATIC PRESSURE SETPOINT AT REMOTE DUCT PRESSURE SENSOR. THE LOCAL STATIC PRESSURE SENSOR SHALL LIMIT MAXIMUM DISCHARGE STATIC PRESSURE.

START / STOP SEQUENCE:
OCCUPIED: SUPPLY FANS AND RETURN FANS SHALL START AND OPERATE CONTINUOUSLY.

HEATING COIL CONTROL

1. THE TWO WAY CONTROL VALVE AT THE COIL SHALL MODULATE IN RESPONSE TO THE DISCHARGE TEMPERATURE SENSOR. THE HEATING COIL DISCHARGE TEMPERATURE SETPOINT SHALL BE AT LEAST 1º F COOLER THAN THE COOLING COIL DISCHARGE SETPOINT.

COOLING COIL CONTROL

1. THE TWO WAY CONTROL VALVE AT THE COIL SHALL MODULATE IN RESPONSE TO THE DISCHARGE SENSOR. THE COOLING COIL DISCHARGE TEMPERATURE SETPOINT SHALL BE AT LEAST 1º F WARMER THAN THE HEATING COIL DISCHARGE SETPOINT.

HUMIDIFIER CONTROL

1. HUMIDIFIER SEASONAL ON/OFF VALVE SHALL BE CLOSED WHEN AHU FAN IS NOT IN OPERATION.
2. WHEN THE AHU IS IN OPERATION, THE SEASONAL TWO - WAY SHUTOFF VALVE SHALL BE OPEN WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 50º F AND CLOSED WHEN THE OUTDOOR AIR TEMPERATURE IS 50º F AND ABOVE.
3. THE MODULATING TWO - WAY HUMIDIFIER CONTROL VALVE SHALL BE CONTROLLED FROM A DISCHARGE HUMIDITY SENSOR / HIGH LIMIT, WHICH SHALL, IN TURN, BE CONTROLLED FROM DUCT MOUNTED HUMIDITY SENSORS; 1 IN THE PRIMARY ELECTRICAL LAB RETURN DUCT AND 1 IN THE PRIMARY PRESSURE LAB RETURN DUCT THE RETURN HUMIDITY SENSOR HAVING THE GREATEST DEMAND SHALL HAVE CONTROL.

AIR HANDLING UNITS AHU-1 EMCS INPUT / OUTPUT SUMMARY

POINT DESCRIPTION	CONNECTED POINTS																								SOFTWARE								
	INPUTS									OUTPUTS						ALARMS						TYPE			APPLICATION			ENERGY MANAGEMENT						
	DIGITAL		ANALOG							DIGITAL			ANALOG			DIGITAL			ANALOG														
	SMOKE DETECTOR	STATUS - ON / OFF	TEMPERATURE	RELATIVE HUMIDITY	PRESSURE	DIFFERENTIAL PRESSURE	CURRENT SENSING	FLOW RATE	MOTOR SPEED	POSITION	ON / OFF / AUTO / MANUAL	BYPASS STARTER	OPEN / CLOSE	POSITIONING	SPEED CONTROL	PROOF FAILURE	HIGH LIMIT	LOW LIMIT	HIGH LIMIT	LOW LIMIT	CRITICAL ALARM	ABN/SNAL ALARM	MAINTENANCE ALARM	RUN TIME	TREND	BTU	TIME SCHEDULING EVENT PROGRAM	OPTIMUM START / STOP PROGRAM	NIGHT SETBACK PROGRAM	ECONOMIZER PROGRAM	COIL RESET PROGRAM	PEAK DEMAND LIMITING PROGRAM	EMERGENCY POWER PROGRAM	COLOR GRAPHICS
AIR HANDLING UNIT AHU-1																								●	●		●	●	●	●	●	●	●	●
SUPPLY FAN		●					●				●				●	●						●												
PRESSURE					●												●					●			●									
LOCAL STATIC PRESSURE					●														●	●			●											
AIR FLOW STATION								●								●									●	●								
COOLING COIL CC - 1 VALVE									●					●																				
CC - 1 DISCHARGE TEMPERATURE (TYP.)			●																●	●			●		●									
FREEZESTAT																		●				●												
HEATING COIL HC - 1 VALVE									●					●																				
HC - 1 DISCHARGE TEMPERATURE (TYP.)			●																●	●			●		●									
AIR FILTER PF - 1						●													●				●		●									
AIR FILTER FF - 1						●													●				●		●									
SUPPLY AIR SMOKE DETECTOR	●																●					●												
SUPPLY AIR SMOKE DAMPER												●				●						●												
MIXED AIR TEMPERATURE			●																●	●			●											
RETURN AIR SMOKE DETECTOR	●																●					●												
RETURN AIR SMOKE DAMPER									●					●		●						●												
MINIMUM OUTDOOR AIR DAMPER									●					●		●						●			●									
OUTDOOR AIR DAMPER									●					●		●						●			●									
AIR FLOW STATION (MINIMUM OA)							●									●									●	●								
RETURN FAN																											●		●		●	●	●	
RETURN FAN		●				●		●			●				●	●						●												
LOCAL STATIC PRESSURE					●														●	●			●											
AIR FLOW STATION							●									●																		
INLET SMOKE DAMPER												●				●						●												
HUMIDIFIER MODULATING CONTROL VALVE														●																				
HUMIDIFIER SEASONAL ON / OFF VALVE												●																						
SUPPLY AIR DISCHARGE / HIGH LIMIT HUMIDISTAT				●															●			●			●									
RETURN AIR HUMIDISTAT (TYP OF 2)				●																														
SUPPLY AIR (COMMON) REMOTE STATIC PRESSURE					●														●	●		●			●									
RETURN AIR (COMMON)			●	●																														
RETURN AIR (COMMON) REMOTE STATIC PRESSURE					●														●	●		●												
OUTDOOR AIR (COMMON)			●	●																					●	●								
RETURN AIR (REMOTE) FIRE / SMOKE DAMPERS												●										●												
RETURN AIR (REMOTE) SMOKE DAMPERS												●										●												

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. ALL CONTROL COMPONENTS AND PROGRAMMING SHALL BE PROVIDED BY SIEMENS UNLESS OTHERWISE INDICATED.

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC CONTROLS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	704

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1
SCALE: NONE | OFFICIAL DATE: 06-24-2014

0351-COF12482-M-704_CE_01.dwg
TEMPLATE DATE: 02/28/2011

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CONTROL SEQUENCE FOR AHU-2

GENERAL

1. ALL CONTROL SETPOINTS, TIME DELAYS, ETC., SHALL BE ADJUSTABLE.
2. EACH AIR HANDLING UNIT COMPONENT SHALL RECEIVE A SEPARATE CONTROL SIGNAL FOR OPERATION.
3. AUTO RESET DI FREEZESTAT SHALL DE - ENERGIZE AHU THROUGH CONTROL PANEL. MANUAL RESET THROUGH CONTROL PANEL SHALL BE REQUIRED TO RESET UNIT. ALL OTHER SAFETIES SHALL BE HARD WIRED TO FAN STARTERS.
4. UPON ACTIVATION OF ANY SAFETY, THE FAN(S) ASSOCIATED WITH THAT UNIT SHALL BE DE - ENERGIZED. OUTDOOR INTAKE, RETURN AND DISCHARGE DAMPERS SHALL CLOSE COMPLETELY. COOLING VALVE SHALL BE OPEN COMPLETELY, HUMIDIFIER SEASONAL VALVE SHALL CLOSE AND HEATING COIL VALVE SHALL MAINTAIN SETPOINT. IF THREE OR MORE AIR HANDLING UNITS ARE IN FAILURE, DE - ENERGIZE ALL LAB EXHAUST FANS EXCEPT ONE TO PREVENT EXCESSIVE NEGATIVE PRESSURE IN BUILDING.
5. ALL FANS AND DAMPERS SHALL HAVE ON / OFF (OPEN / CLOSE) SWITCHING AND MONITORING PROVISIONS THROUGH THE EMCS SYSTEM.
6. ALL SUPPLY AND RETURN FANS ALL HAVE PROOF OF OPERATION THROUGH CURRENT DETECTION AT THE VARIABLE FREQUENCY DRIVE AND AIRFLOW DETECTION AT THE AIRFLOW MEASURING STATION. IF CURRENT AND / OR AIR FLOW IS NOT DETECTED WITHIN 20 SECONDS OF THE SIGNAL FOR THE FAN TO START, AN ALARM SHALL BE REGISTERED AT THE OPERATOR'S CONSOLE AND THE SYSTEM SHALL BE DE - ENERGIZED.
7. ALL VARIABLE FREQUENCY DRIVES SHALL HAVE HARD WIRE START/STOP, STATUS SPEED ADJUST, OUTPUT CURRENT AND FAULT INTERFACE WITH THE EMCS.
8. ALL COOLING COILS AND HEATING COILS SHALL HAVE TWO - WAY MODULATING CONTROL VALVES. PRESSURE DROP FOR VALVES SERVING COILS SHALL NOT EXCEED 5 PSID IN FULL OPEN POSITION.
9. PROVIDE SOFTWARE TO TREND ALL ANALOG CONTROL POINTS EVERY 10 MINUTES. ARCHIVE DATA FOR ONE YEAR.
10. ALL ACTUATION SHALL BE ELECTRIC.
11. ELECTRICAL CONTRACTOR SHALL PROVIDE POWER TO THE DAMPERS WHICH THE FIRE ALARM SYSTEM CONTROLS.
12. PROVIDE A SERIAL INTERFACE TO THE FIRE ALARM SYSTEM TO MONITOR CLOSURE OF SMOKE DAMPERS, ACTIVATION OF SMOKE DETECTORS, OR SO FIRE ALARM CAN DE-ENERGIZE FANS THROUGH THE BAS SYSTEM.
13. EXTEND A LAN CABLE TO EACH VFD FOR FUTURE CONNECTION WHEN AN FLN INTERFACE IS AVAILABLE FROM THE VFD MANUFACTURER.

DAMPER CONTROL

1. THE MINIMUM OUTDOOR AIR DAMPER SHALL OPEN TO MINIMUM POSITION WHEN RESPECTIVE UNIT IS OPERATING AND CLOSE WHEN UNIT IS OFF. DAMPER SHALL BE MODULATED TO MAINTAIN MINIMUM CARBON DIOXIDE LEVELS (DEMAND CONTROL VENTILATION). MINIMUM OA DAMPER SHALL BE FULL OPEN DURING ECONOMIZER OPERATION.
2. UPON SIGNAL TO START FAN, THE SUPPLY FANS SHALL RAMP TO 20 HZ. THEN THE RETURN AND DISCHARGE SMOKE DAMPERS SHALL OPEN. THE END SWITCH AT THE DISCHARGE SMOKE DAMPER SHALL MAKE TO COMPLETE AND SIGNAL THE FANS TO CONTINUE RAMPING. PROVIDE CONTINUOUS FEEDBACK FOR RETURN DAMPER POSITION.ON A SIGNAL TO STOP THE FANS, THE REVERSE SHALL OCCUR.
3. A COMPARATIVE ENTHALPY EMCS CONTROLLER SHALL CONTROL THE OPERATION OF THE FREE COOLING ECONOMIZER CYCLE. SENSORS SHALL MEASURE THE TEMPERATURE AND HUMIDITY OF BOTH RETURN AIR AND OUTSIDE AIR TO DETERMINE WHICH SOURCE HAS THE LOWER HUMIDITY TO OPERATE THE 100% OUTDOOR, RETURN AND EXHAUST AIR DAMPERS FOR THE MOST ENERGY EFFICIENT MODE OF OPERATION.

SUPPLY AIR FAN CONTROL

1. UPON SIGNAL TO START THE SUPPLY FAN, THE FAN SHALL RAMP TO 20 HZ, THEN THE RETURN AND DISCHARGE SMOKE DAMPERS SHALL OPEN. THE END SWITCH AT THE DISCHARGE SMOKE DAMPER SHALL MAKE TO COMPLETE AND SIGNAL THE FAN TO CONTINUE RAMPING TO MATCH THE AIR VOLUME OF THE OTHER PARALLEL FANS, ON A SIGNAL TO STOP THE FANS, THE REVERSE SHALL OCCUR. THE FANS REMAINING OPERATIONAL SHALL IN RESPONSE TO THE REMOTE STATIC PRESSURE SENSOR AND SHALL EQUALIZE AIRFLOW BETWEEN ALL OPERATIONAL UNITS.
2. VARIABLE FREQUENCY DRIVE SHALL MODULATE TO MAINTAIN STATIC PRESSURE SETPOINT AT REMOTE DUCT PRESSURE SENSOR. THE LOCAL STATIC PRESSURE SENSOR SHALL LIMIT MAXIMUM DISCHARGE STATIC PRESSURE. FOR MULTIPLE OPERATING UNITS CONNECTED IN PARALLEL, VARY FAN SPEED SO THAT ALL UNITS ARE SUPPLYING THE SAME AIR VOLUME.
3. OCCUPIED: SUPPLY FANS SHALL START AND OPERATE CONTINUOUSLY.

EXHAUST FAN CONTROL

1. EMCS CONTROLLER SHALL CONTROL OPERATION OF EXHAUST FAN. EXHAUST FAN SHALL BE ENERGIZED DURING FREE COOLING ECONOMIZER CYCLE AND EXHAUST FAN SHALL BE DE-ENERGIZED DURING MINIMUM O.A.CONDITIONS.
2. EXHAUST FAN SPEED SHALL MODULATE TO MAINTAIN EXHAUST AIR FLOW WITH FIXED OFFSET FROM SUPPLY AIR FLOW.

HEATING COIL CONTROL

1. THE TWO WAY CONTROL VALVE AT THE COIL SHALL MODULATE IN RESPONSE TO THE DISCHARGE TEMPERATURE SENSOR. THE HEATING COIL DISCHARGE TEMPERATURE SETPOINT SHALL BE AT LEAST 11° F COOLER THAN THE COOLIING COIL DISCHARGE SETPOINT.

COOLING COIL CONTROL

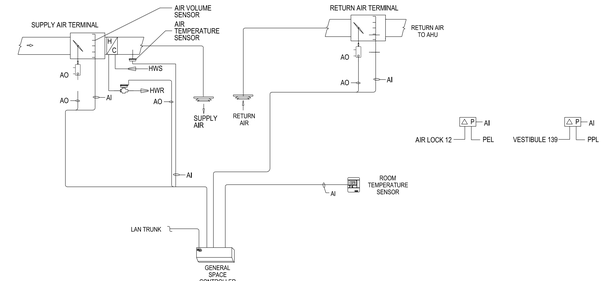
1. THE TWO WAY CONTROL VALVE AT THE COIL SHALL MODULATE IN RESPONSE TO THE DISCHARGE SENSOR. THE COOLING COIL DISCHARGE TEMPERATURE SETPOINT SHALL BE AT LEAST 1°F WARMER THAN THE HEATING COIL DISCHARGE SETPOINT.

HUMIDIFIER CONTROL

1. HUMIDIFIER SEASONAL ON/OFF VALVE SHALL BE CLOSED WHEN AHU FAN IS NOT IN OPERATION.
2. WHEN THE AHU IS IN OPERATION, THE SEASONAL TWO - WAY SHUTOFF VALVE SHALL BE OPEN WHEN THE OUTDOOR AIR TEMPERATURE IS BELOW 50° F AND CLOSED WHEN THE OUTDOOR AIR TEMPERATURE IS 50° F AND ABOVE.
3. THE MODULATING TWO - WAY HUMIDIFIER CONTROL VALVE SHALL BE CONTROLLED FROM A DISCHARGE HUMIDITY SENSOR / HIGH LIMIT, WHICH SHALL, IN TURN, BE CONTROLLED FROM 4 RETURN DUCT MOUNTED HUMIDITY SENSORS. THE EXHAUST HUMIDITY SENSOR HAVING THE GREATEST DEMAND SHALL HAVE CONTROL.

AIR HANDLING UNITS AHU-2 EMCS INPUT / OUTPUT SUMMARY

POINT DESCRIPTION	CONNECTED POINTS – INPUTS – DIGITAL: SMOKE DETECTOR	STATUS - ON / OFF	INPUTS – ANALOG: TEMPERATURE	RELATIVE HUMIDITY	PRESSURE	DIFFERENTIAL PRESSURE	CURRENT SENSING	FLOW RATE	MOTOR SPEED	POSITION	OUTPUTS – DIGITAL: ON / OFF / AUTO / MANUAL	BYPASS STARTER	OPEN / CLOSE	OUTPUTS – ANALOG: POSITIONING	SPEED CONTROL	ALARMS – DIGITAL: PROOF FAILURE	HIGH LIMIT	LOW LIMIT	ALARMS – ANALOG: HIGH LIMIT	LOW LIMIT	ALARMS – TYPE: CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	SOFTWARE – APPLICATION: RUN TIME	TREND	BTU	ENERGY MANAGEMENT: TIME SCHEDULING EVENT PROGRAM	OPTIMUM START / STOP PROGRAM	NIGHT SETBACK PROGRAM	ECONOMIZER PROGRAM	COIL RESET PROGRAM	PEAK DEMAND LIMITING PROGRAM	EMERGENCY POWER PROGRAM	COLOR GRAPHICS
AIR HANDLING UNIT AHU-2																								●	●		●	●	●	●	●	●	●
SUPPLY FAN		●						●			●				●	●					●												
PRESSURE						●											●				●				●								
LOCAL STATIC PRESSURE						●													●	●		●											
AIR FLOW STATION									●							●									●	●							
COOLING COIL CC - 1 VALVE										●				●																			
CC - 1 DISCHARGE TEMPERATURE (TYP.)				●															●	●		●			●								
FREEZESTAT																		●			●												
HEATING COIL HC - 1 VALVE										●				●																			
HC - 1 DISCHARGE TEMPERATURE (TYP.)				●															●	●		●			●								
AIR FILTER PF - 1							●												●				●		●								
AIR FILTER FF - 1							●												●				●		●								
SUPPLY AIR SMOKE DETECTOR	●																●				●												
SUPPLY AIR SMOKE DAMPER													●			●					●												
MIXED AIR TEMPERATURE				●															●	●		●											
RETURN AIR SMOKE DETECTOR	●																●				●												
RETURN AIR SMOKE DAMPER										●				●		●					●												
MINIMUM OUTDOOR AIR DAMPER										●				●		●					●				●								
OUTDOOR AIR DAMPER										●				●		●					●				●								
AIRFLOW STATION									●							●									●	●							
HUMIDIFIER MODULATING CONTROL VALVE														●																			
HUMIDIFIER SEASONAL ON / OFF VALVE													●																				
SUPPLY AIR DISCHARGE / HIGH LIMIT HUMIDISTAT					●														●	●		●			●								
RETURN AIR HUMIDISTAT (TYP OF 4)					●																												
SUPPLY AIR (COMMON) REMOTE STATIC PRESSURE						●													●	●		●			●								
RETURN AIR (COMMON)				●	●																												
EXHAUST FAN																																	
EXHAUST FAN		●						●		●			●			●					●												
ARIFLOW STATION									●							●																	
OUTDOOR AIR (COMMON)				●	●																				●	●							
RETURN AIR (REMOTE) FIRE / SMOKE DAMPERS												●										●											
RETURN AIR (REMOTE) SMOKE DAMPERS												●										●											



NOTES:
1. REFER TO MECHANICAL DRAWINGS FOR NUMBER OF REQUIRED AIR TERMINALS.
2. ROOM TEMPERATURE SENSOR SHALL BE A WALL MOUNTED NETWORK ACCESSIBLE THERMOSTAT.
3. TERMINAL UNIT DAMPERS AND REHEAT COIL VALVES SHALL FAIL IN THE LAST POSITION.

VAV CONTROL DIAGRAM W/ VAV RETURN

NTS

VAV CONTROL W/ VAV RETURN EMCS INPUT / OUTPUT SUMMARY

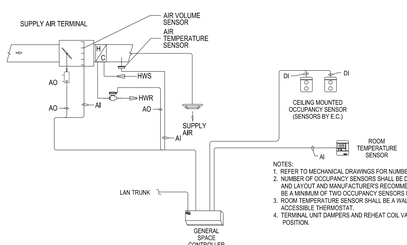
POINT DESCRIPTION	CONNECTED POINTS – INPUTS – DIGITAL: STATUS - OCCUPIED / UNOCCUPIED	INPUTS – ANALOG: TEMPERATURE	DIFFERENTIAL PRESSURE	FLOW RATE	POSITION	OUT - PUTS – ANALOG: POSITIONING	ALARMS – DIGITAL: HIGH LIMIT	LOW LIMIT	ALARMS – TYPE: CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	APPLICATION SOFTWARE: ROOM OCCUPIED / UNOCCUPIED	
VAV SUPPLY AIR TERMINAL				●	●	●						●	
REHEAT COIL VALVE						●							
SPACE OCCUPANCY SENSOR (TYP. FOR ALL)	●									●			
SPACE TEMPERATURE TRANSMITTER		●											
SUPPLY AIR TEMPERATURE TRANSMITTER		●											
DIFFERENTIAL PRESSURE SETPOINT			●				●	●	●				
DIFFERENTIAL RESSURE			●				●	●	●				
VAV RETURN AIR TERMINAL				●	●	●						●	

VAV CONTROL SEQUENCE W/ VAV RETURN

1. VAV SUPPLY TERMINAL SHALL MODULATE BETWEEN MAXIMUM AND MINIMUM AIR VOLUMES TO MAINTAIN SPACE TEMPERATURE. AT MINIMUM AIR VOLUME, IF SPACE TEMPERATURE FALLS BELOW SETPOINT, THE REHEAT COIL VALVE SHALL MODULATE OPEN AS REQUIRED TO RAISE SPACE TEMPERATURE TO SETPOINT. THE VAV RETURN / EXHAUST TERMINAL SHALL TRACK THE SUPPLY TO MAINTAIN THE DESIGN AIR VOLUME OFFSET. THE VAV TERMINAL AND REHEAT COIL VALVE SHALL BE CONTROLLED FROM THE AIR TEMPERATURE SENSOR DOWNSTREAM FROM THE REHEAT COIL, WHICH SHALL HAVE ITS SETPOINT RESET FROM THE ROOM TEMPERATURE SENSOR.
2. THE TEMPERATURE OF THE SUPPLY AIR, ALONG WITH THE RESPECTIVE AIR VOLUME, SHALL BE MEASURED AND INPUT INTO THE CONTROLLER. THE CONTROLLER SHALL ADJUST THE HEATING VALVE ON THE SUPPLY AIR REHEAT COIL, BASED ON THOSE INPUTS AS WELL AS AN INPUT FROM THE SPACE TEMPERATURE SENSOR. IF THE DISCHARGE AIR TEMPERATURE REQUIRED TO SATISFY THE SPACE TEMPERATURE EXCEEDS THE MAXIMUM DESIGN DISCHARGE TEMPERATURE, RESET THE HEATING CFM (OR MIN SUPPLY CFM) UP TO A LARGER CFM UNTIL THE DISCHARGE TEMPERATURE IS EQUAL TO THE MAXIMUM DESIGN DISCHARGE TEMPERATURE SETPOINT. MAXIMUM DESIGN DISCHARGE AIR TEMPERATURE SHALL BE 90°F.
3. UNOCCUPIED MODE: THE UNOCCUPIED MODE OF OPERATION IS DETERMINED BY A MINIMUM OF TWO CEILING MOUNTED OCCUPANCY SENSORS IN EACH SPACE. DURING THIS MODE OF OPERATION THE SPACE TEMPERATURE COOLING AND HEATING SETPOINTS SHALL BE RESET BY AN ADJUSTABLE VALUE THAT CHANGES FOR SCHEDULED OCCUPIED PERIODS AND SCHEDULED UNOCCUPIED PERIODS. THE DESIGN SHOULD START WITH A +/- 3 DEGREE F OFFSET DURING SCHEDULED OCCUPIED PERIODS AND +/-6 DEGREE F OFFSET DURING SCHEDULED UNOCCUPIED PERIODS. SCHEDULED OCCUPIED PERIODS SHALL BE FROM 6AM TO 6PM DAILY. AS THE SPACE REQUIRES MORE AIR FLOW TO MAINTAIN THE COOLING TEMPERATURE SETPOINT, THE SUPPLY AND RETURN TERMINALS SHALL BOTH MODULATE, ENSURING THAT THE DESIGN OFFSET IS MAINTAINED. AT ALL TIMES THE COOLING MAXIMUM CFM VALUE SHALL BE POSSIBLE, SHOULD SPACE SENSIBLE COOLING LOAD REQUIRE THIS VALUE. UPON A RETURN TO OCCUPANCY, A TEMPERATURE CONTROL ALGORITHM SHALL CONTROL THE TERMINALS AND REHEAT TO MINIMIZE CHANGES IN SPACE TEMPERATURE TO LESS THAN +/- 2 DEGREES F.
4. TERMINAL UNITS SERVING LABORATORY SPACES BE PROGRAMMED WITHOUT UNOCCUPIED MODE.
5. PEL ROOM DIFFERENTIAL PRESSURE SHALL BE MONITORED BY THE ROOM DIFFERENTIAL PRESSURE SENSOR WITH RESPECT TO AIRLOCK 12. DIFFERENTIAL PRESSURE SHALL BE MAINTAINED AT A POSITIVE 0.05" WC. RETURN AIR TERMINAL UNIT SHALL BE MODULATED TO MAINTAIN PRESSURE SETPOINT. RETURN AIR TERMINAL SHALL BE OPEN 100% WHEN DIFFERENTIAL PRESSURE EXCEEDS 0.10" WC.
6. PPL ROOM DIFFERENTIAL PRESSURE SHALL BE MONITORED BY THE ROOM DIFFERENTIAL PRESSURE SENSOR WITH RESPECT TO VESTIBULE 139. DIFFERENTIAL PRESSURE SHALL BE MAINTAINED AT A POSITIVE 0.05" WC. RETURN AIR TERMINAL UNIT SHALL BE MODULATED TO MAINTAIN PRESSURE SETPOINT. RETURN AIR TERMINAL SHALL BE OPEN 100% WHEN DIFFERENTIAL PRESSURE EXCEEDS 0.10" WC.
7. PEL SHALL BE CONTROLLED TO 73.4°F ± 1.8°F AND 45% RH ± 10%. TEMPERATURE CHANGE SHALL NOT EXCEED 1.1°F PER HOUR.
8. PPL SHALL BE CONTROLLED TO 73.4°F ± 3.0°F AND 45% RH ± 10%. TEMPERATURE CHANGE SHALL NOT EXCEED 2.0°F PER HOOUR.

VAV CONTROL EMCS INPUT / OUTPUT SUMMARY

POINT DESCRIPTION	CONNECTED POINTS – INPUTS – DIGITAL: STATUS - OCCUPIED / UNOCCUPIED	INPUTS – ANALOG: TEMPERATURE	FLOW RATE	POSITION	OUT - PUTS – ANALOG: POSITIONING	ALARMS – DIGITAL: HIGH LIMIT	LOW LIMIT	ALARMS – TYPE: CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	APPLICATION SOFTWARE: ROOM OCCUPIED / UNOCCUPIED	
VAV SUPPLY AIR TERMINAL			●	●	●						●	
REHEAT COIL VALVE					●							
SPACE OCCUPANCY SENSOR (TYP. FOR ALL)	●								●			
SPACE TEMPERATURE TRANSMITTER		●										
SUPPLY AIR TEMPERATURE TRANSMITTER		●										



NOTES:
1. REFER TO MECHANICAL DRAWINGS FOR NUMBER OF REQUIRED AIR TERMINALS.
2. NUMBER OF OCCUPANCY SENSORS SHALL BE DETERMINED BY ROOM SIZE AND LAYOUT AND MANUFACTURER'S RECOMMENDED SPACING. THERE SHALL BE A MINIMUM OF TWO OCCUPANCY SENSORS FOR EACH ROOM.
3. ROOM TEMPERATURE SENSOR SHALL BE A WALL MOUNTED NETWORK ACCESSIBLE THERMOSTAT.
4. TERMINAL UNIT DAMPERS AND REHEAT COIL VALVES SHALL FAIL IN THE LAST POSITION.

VAV CONTROL DIAGRAM

NTS

VAV CONTROL SEQUENCE

1. VAV SUPPLY TERMINAL SHALL MODULATE BETWEEN MAXIMUM AND MINIMUM AIR VOLUMES TO MAINTAIN SPACE TEMPERATURE. AT MINIMUM AIR VOLUME, IF SPACE TEMPERATURE FALLS BELOW SETPOINT, THE REHEAT COIL VALVE SHALL MODULATE OPEN AS REQUIRED TO RAISE SPACE TEMPERATURE TO SETPOINT. THE VAV TERMINAL AND REHEAT COIL VALVE SHALL BE CONTROLLED FROM THE AIR TEMPERATURE SENSOR DOWNSTREAM FROM THE REHEAT COIL, WHICH SHALL HAVE ITS SETPOINT RESET FROM THE ROOM TEMPERATURE SENSOR.
2. THE TEMPERATURE OF THE SUPPLY AIR, ALONG WITH THE RESPECTIVE AIR VOLUME, SHALL BE MEASURED AND INPUT INTO THE CONTROLLER. THE CONTROLLER SHALL ADJUST THE HEATING VALVE ON THE SUPPLY AIR REHEAT COIL, BASED ON THOSE INPUTS AS WELL AS AN INPUT FROM A SPACE TEMPERATURE SENSOR. IF THE DISCHARGE AIR TEMPERATURE REQUIRED TO SATISFY THE SPACE TEMPERATURE EXCEEDS THE MAXIMUM DESIGN DISCHARGE TEMPERATURE, RESET THE HEATING CFM (OR MIN SUPPLY CFM) UP TO A LARGER CFM UNTIL THE DISCHARGE TEMPERATURE IS EQUAL TO THE MAXIMUM DESIGN DISCHARGE TEMPERATURE SETPOINT. MAXIMUM DESIGN DISCHARGE AIR TEMPERATURE SHALL BE 90°F.
3. NON - LABORATORY UNOCCUPIED MODE: THE UNOCCUPIED MODE OF OPERATION IS DETERMINED BY A MINIMUM OF TWO CEILING MOUNTED OCCUPANCY SENSORS IN EACH SPACE. DURING THIS MODE OF OPERATION THE SPACE TEMPERATURE COOLING AND HEATING SETPOINTS SHALL BE RESET BY AN ADJUSTABLE VALUE THAT CHANGES FOR SCHEDULED OCCUPIED PERIODS AND SCHEDULED UNOCCUPIED PERIODS. THE DESIGN SHOULD START WITH A +/- 3 DEGREE F OFFSET DURING SCHEDULED OCCUPIED PERIODS AND +/-6 DEGREE F OFFSET DURING SCHEDULED UNOCCUPIED PERIODS. SCHEDULED OCCUPIED PERIODS SHALL BE FROM 6AM TO 6PM DAILY. AS THE SPACE REQUIRES MORE AIR FLOW TO MAINTAIN THE COOLING TEMPERATURE SETPOINT, THE SUPPLY AIR TERMINALS SHALL MODULATE. AT ALL TIMES THE COOLING MAXIMUM CFM VALUE SHALL BE POSSIBLE, SHOULD SPACE SENSIBLE COOLING LOAD REQUIRE THIS VALUE. UPON A RETURN TO OCCUPANCY, A TEMPERATURE CONTROL ALGORITHM SHALL CONTROL THE TERMINALS AND REHEAT TO MINIMIZE CHANGES IN SPACE TEMPERATURE TO LESS THAN +/- 2 DEGREES F.
4. TERMINAL UNITS SERVING LABORATORY SPACES BE PROGRAMMED WITHOUT UNOCCUPIED MODE.
5. MAIN ELECTRICAL LAB SHALL BE CONTROLLED TO 73.4°F ± 3.0°F WITH A MINIMUM RH OF 20% AND A MAXIMUM RH OF 70%. TEMPERATURE CHANGE SHALL NOT EXCEED 3.8°F PER HOUR.

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. ALL CONTROL COMPONENTS AND PROGRAMMING SHALL BE PROVIDED BY SIEMENS UNLESS OTHERWISE INDICATED.

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3030 West Streetsboro Road
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DRAWING/DESIGN STATUS:	BID SET
DRAWING MANAGEMENT	SYSTEM: HVAC; SUB-SYS:; FACILITY:; CONFIG:
	NASA APPROVALS
DR:	DES:
D.ENG:	PROJ. MGR: KJS
CONTRACTOR: STANTEC ARCHITECTURE INC.	RELEASE APPROVAL: DATE:
CONTRACT NO.: NNC09CA01C	RELEASE APPROVAL: DATE:
TASK ORDER	
DRAWN / DESIGNED / CHECKED	RELEASE APPROVAL: DATE:
APPROVED / APPROVAL DATE	RELEASE STATUS: WORKING

LAST APPROVED EDMS REVISION | TECH LEAD: | FAC-SYS MGR: | REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC CONTROLS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	M	705

AREA: | SHEET 1 OF

UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1

SCALE: NONE | OFFICIAL DATE: 06-24-2014

0351-COF12482-M-703_CE_01.dwg

TEMPLATE DATE: 02/28/2011

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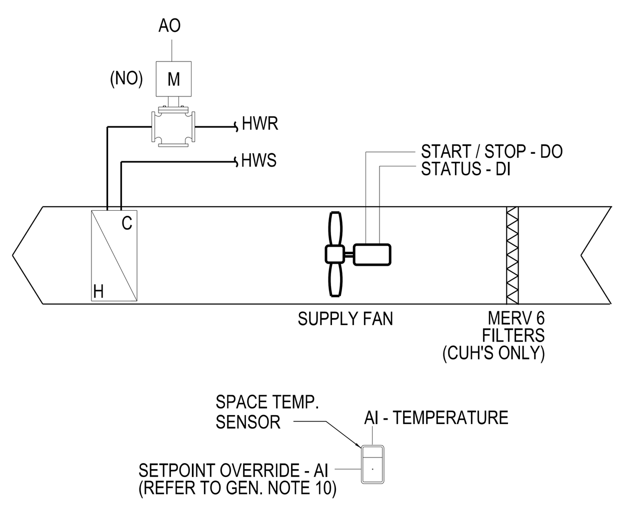


CABINET UNIT HEATERS AND UNIT HEATERS:

1. UNIT TEMPERATURE CONTROL: THE EMCS SYSTEM SHALL LOCKOUT THE OPERATION OF THE CABINET UNIT HEATER or UNIT HEATER UNTIL THE OUTDOOR AIR TEMPERATURE FALLS BELOW 60 DEG F. THE HOT WATER CONTROL VALVE SHALL FAIL TO THE LAST POSITION. ONLY HEATERS SERVING MAIN ENTRY VESTIBULES SHALL HAVE OCCUPIED MODES. ALL OTHER CABINET AND UNIT HEATERS SHALL CONTINUOUSLY OPERATE IN THE UNOCCUPIED MODE.

2. OCCUPIED MODE: WHENEVER THE SPACE IS IN THE OCCUPIED MODE (VIA TIME OF DAY SCHEDULING), THE UNIT FAN SHALL OPERATE CONTINOUSLY. ON A FALL IN SPACE TEMPERATURE, THE CABINET UNIT HEATER HOT WATER VALVE SHALL BE MODULATED OPEN TO MAINTAIN THE DESIRED SPACE TEMPERATURE.

3. UNOCCUPIED MODE: ON A FALL IN SPACE TEMPERATURE BELOW THE UNOCCUPIED SETPOINT, THE CABINET UNIT HEATER FAN MOTOR SHALL BE ENERGIZED AND THE HOT WATER VALVE SHALL BE FULLY OPENED. ON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT, THE FAN SHALL BE DE-ENERGIZED AND THE HOT WATER CONTROL VALVE SHALL BE FULLY CLOSED.

CUH- 1 AND UNIT HEATER CONTROLS

NTS

FCU, UH, AND CUH EMCS INPUT / OUTPUT POINT SUMMARY

CONNECTED POINTS – INPUTS

	DIGITAL						ANALOG							
POINT DESCRIPTION	STATUS	CURRENT DETECTION STATUS	SMOKE DETECTOR	OCCUPANCY OVERRIDE	HIGH LIMIT	PULSE OUTPUT	TEMPERATURE	RELATIVE HUMIDITY	DIFFERENTIAL PRESSURE	CURRENT SENSING	VOLTAGE	MOTOR SPEED	RELATIVE HUMIDITY	CARBON DIOXIDE
FAN COIL UNITS														
SUPPLY FAN		●												
SPACE TEMPERATURE							●							
SPACE HUMIDITY								●						
CHILLED WATER VALVE														
SUPPLY TEMPERATURE							●							
CONDENSATE SWITCH					●									
HOT WATER VALVE														
CUH-1, AND UH'S														
SPACE TEMPERATURE							●							
SUPPLY FAN		●												
HOT WATER VALVE														

CONNECTED POINTS – OUTPUTS

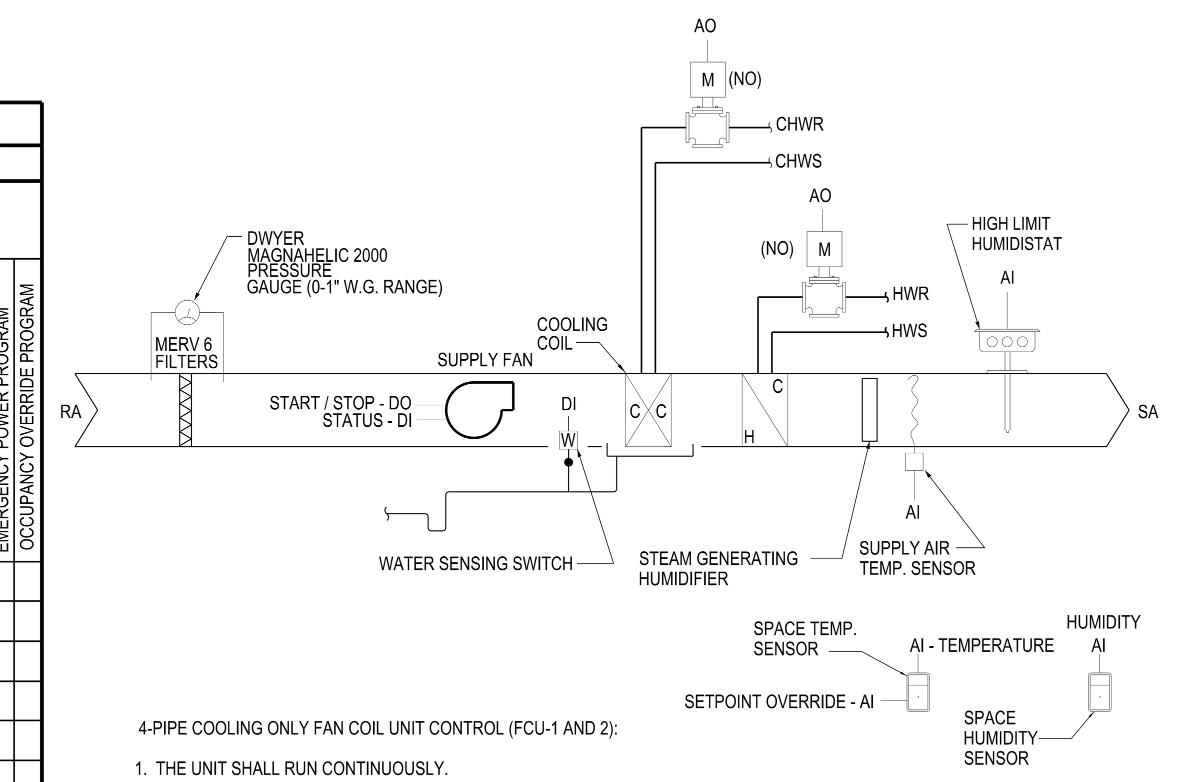
	DIGITAL				ANALOG				
POINT DESCRIPTION	ON / OFF / AUTO	BYPASS STARTER	OPEN / CLOSE	ENABLE / DISABLE	POSITIONING	SPEED CONTROL	CAPACITY CONTROL	SETPOINT ADJUSTMENT	
FAN COIL UNITS									
SUPPLY FAN	●								
SPACE TEMPERATURE									
SPACE HUMIDITY									
CHILLED WATER VALVE					●				
SUPPLY TEMPERATURE									
CONDENSATE SWITCH									
HOT WATER VALVE					●				
CUH-1, AND UH'S				●					
SPACE TEMPERATURE									
SUPPLY FAN	●								
HOT WATER VALVE					●				

CONNECTED POINTS – ALARMS

	DIGITAL					ANALOG			TYPE		
POINT DESCRIPTION	PROOF FAILURE	HIGH LIMIT	LOW LIMIT	SYSTEM / CONTROLLER FAULT		HIGH LIMIT	LOW LIMIT		CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM
FAN COIL UNITS											
SUPPLY FAN	●									●	
SPACE TEMPERATURE		●	●							●	
SPACE HUMIDITY						●	●			●	
CHILLED WATER VALVE											
SUPPLY TEMPERATURE											
CONDENSATE SWITCH		●								●	
HOT WATER VALVE											
CUH-1, AND UH'S											
SPACE TEMPERATURE			●						●		
SUPPLY FAN	●									●	
HOT WATER VALVE											

SOFTWARE

	APPLICATION					ENERGY MANAGEMENT							
POINT DESCRIPTION	RUN TIME	TREND	POWER CALC	ENERGY CALC	CONSUMPTION TOTALIZATION	TIME SCHEDULING EVENT PROGRAM	OPTIMUM START / STOP PROGRAM	NIGHT SETBACK PROGRAM	ECONOMIZER PROGRAM	RESET PROGRAM	PEAK DEMAND LIMITING PROGRAM	EMERGENCY POWER PROGRAM	OCCUPANCY OVERRIDE PROGRAM
FAN COIL UNITS													
SUPPLY FAN	●												
SPACE TEMPERATURE		●											
SPACE HUMIDITY		●											
CHILLED WATER VALVE													
SUPPLY TEMPERATURE		●											
CONDENSATE SWITCH													
HOT WATER VALVE													
CUH-1, AND UH'S													
SPACE TEMPERATURE		●											
SUPPLY FAN	●												
HOT WATER VALVE													



4-PIPE COOLING ONLY FAN COIL UNIT CONTROL (FCU-1 AND 2):

1. THE UNIT SHALL RUN CONTINUOUSLY.

2. THE EMCS SYSTEM SHALL MONITOR THE SPACE TEMPERATURE, HUMIDITY, AND CONTROL UNIT OPERATION.

3. ON CALL FOR COOLING, THE 2-WAY CHILLED WATER VALVE SHALL BE MODULATED TO MAINTAIN ROOM TEMPERATURE SETPOINT.

4. ON CALL FOR HEATING, THE 2-WAY HOT WATER VALVE SHALL BE MODULATED TO MAINTAIN ROOM TEMPERATURE SETPOINT.

5. MODULATING TWO-WAY HUMIDIFIER CONTROL VALVE SHALL BE CONTROLLED FROM ROOM HUMIDITY SENSOR.

6. ALARMS AND MONITORING: THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER THE SPACE TEMPERATURE RISES OR FALLS MORE THAN 5 DEG. F. FROM THE SPACE TEMPERATURE SETPOINT. THE EMCS SYSTEM SHALL MONITOR THE FAN STATUS AND SHALL ISSUE AN ALARM WHENEVER THE FAN FAILS TO RUN. UPON A RISE IN WATER LEVEL IN THE A/C CONDENSATE DRAIN PAN ABOVE THE HIGH LIMIT LEVEL, THE UNIT SHALL BE PREVENTED FROM OPERATING IN COOLING OR DEHUMIDIFICATION MODE AND AN ALARM SHALL BE ISSUED AT THE OPERATOR'S WORKSTATION. THE HIGH LEVEL WATER SENSOR SHALL MEET THE REQUIREMENTS OF UL508 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE PROVISIONS OF THE OHIO BUILDING CODE.

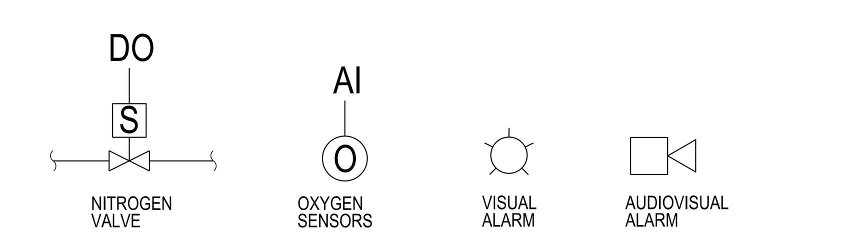
7. DIMENSION LAB SHALL BE MAINTAINED AT 68ºF ± 2.0ºF DURING CRITICAL PERIODS AND 73.4ºF ±5ºF DURING NON CRITICAL PERIODS. MINIMUM RELATIVE HUMIDITY SHALL BE 30% AND MAXIMUM HUMIDITY SHALL BE 70%.

FAN COIL UNIT CONTROLS

NTS

VAV CONTROL W/ VAV RETURN EMCS INPUT / OUTPUT SUMMARY

	CONNECTED POINTS														APPLICATION SOFTWARE		
	INPUTS						OUT - PUTS		ALARMS								
	DIGITAL		ANALOG				ANALOG		DIGITAL			TYPE					
POINT DESCRIPTION	STATUS - OPEN/CLOSED		LEVEL	SETPOINT		POSITION	POSITIONING		HIGH LIMIT	LOW LIMIT		CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	ROOM OCCUPIED / UNOCCUPIED	TREND	
NITROGEN VALVE							●					●				●	
OXYGEN SENSOR (TYP)			●							●		●				●	
WARNING HAZARD SETPOINT			●														



CALIBRATION LAB NITROGEN AND SAFETY CONTROLS

1. REFER TO SHEET M-101 FOR DEVICE LOCATIONS AND QUANTITY.

2. DURING PERIODS NOT REQUIREING N2, TWO POSITION SWITCH IN "CLOSED VALVE" POSITION. NITROGEN VALVE IS CLOSED.

3. DURING PERIODS REQUIRING N2, TWO POSITION SWITCH MOVED TO "OPEN VALVE" POSITION. NITROGEN VALVE OPENS IF OXYGEN LEVEL IS SUFFICIENT.

4. IF OXYGEN LEVEL DROPS BELOW WARNING HAZARD SETPOINT OF O2 MONITOR, NITROGEN VALVE CLOSES, VISUAL ALARM ACTIVATES (FLASHING RED LIGHTS), AUDIBLE ALARMS ACTIVATES, AHU-1 IS PLACED INTO 100% ECONOMIZER MODE AND AN ALARM SIGNAL IS SENT TO FIRE ALARM SYSTEM. PRESSING THE HORN ACKNOWLEDGE BUTTON ON FACE OF O2 MONITOR WILL SILENCE HORNS BUT FLASHING LIGHTS REMAIN ILLUMINATED UNITIL OXYGEN LEVELS RETURN TO ABOVE THE WARNING HAZARD SETPOINT.

5. IF A PROBLEM OCCURS WITH THE O2 MONITOR, SUCH AS LOSS OF POWER OR FAULTY SENSOR, A TROUBLE SIGNAL WILL BE SENT TO FIRE ALARM SYSTEM.

6. AT ANY TIME DURING N2 OPERATIONS, THE TWO POSITION SWITCH CAN BE MOVED TO THE ""CLOSED VALVE" POSITION AND NITROGEN VALVE SHALL CLOSE.

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

GENERAL CONTROL REQUIREMENTS

1. ALL SETPOINTS, THRESHOLDS, DIFFERENTIALS, TIME DELAYS, RESET SCHEDULES, ETC. INDICATED IN THE FOLLOWING SEQUENCES OF OPERATION ARE INITIAL RECOMMENDATIONS AND SHALL BE ADJUSTABLE BY THE BUILDING OPERATOR AT THE EMCS WORKSTATION OR WEB BROWSER VIA SYSTEM GRAPHICS WITHOUT RE-PROGRAMMING (I.E. NO ALTERATION OF SYSTEM PROGRAM CODE SHALL BE REQUIRED). ALL TEMPERATURES INDICATED IN THE SEQUENCES ARE IN DEGREES FAHRENHEIT.

2. THE EMCS SYSTEM SHALL HAVE THE ABILITY TO OVERRIDE THE OPERATIONAL STATUS OF ALL FANS, DAMPERS, PUMPS, AND CONTROL VALVES VIA OVERRIDE COMMAND AT THE OPERATOR'S WORKSTATION.

3. ALL INPUTS, OUTPUTS, AND CALCULATED POINTS OF THE EMCS SYSTEM SHALL BE CAPABLE OF BEING TRENDED. THE EMCS SYSTEM PROVIDER SHALL ESTABLISH TRENDS FOR ANY POINTS THE OWNER DEEMS NECESSARY. TRENDS SHALL BE INITIALLY SET FOR A SAMPLING RATE OF ONCE EVERY 5 MINUTES FOR EACH POINT OR AS REQUIRED BY THE OWNER. TRENDS SHALL BE MAINTAINED FOR A MINIMUM OF SEVEN DAYS FOR ALL TERMINAL EQUIPMENT UNLESS REQUIRED OTHERWISE BY THE OWNER. VIEWING OF TREND GRAPHS SHALL BE AVAILABLE AT THE EMCS WORKSTATION OR VIA THE WEB BROWSER. EMCS CONTROLLERS, PANELS AND WORKSTATIONS SHALL BE SELECTED WITH ADEQUATE MEMORY AND STORAGE CAPACITY. THE WORKSTATION SHALL ISSUE AN ALARM AND PROVIDE THE USER OPPORTUNITY TO SAVE TREND DATA TO FILES PRIOR TO ERASURE OF THAT DATA. AUTO-SAVE FEATURES SHALL BE INCORPORATED INTO THE SYSTEM TO RETAIN USER-SELECTED TREND DATA WITHOUT REQUIRING CONTINUAL USER INPUT.

4. ALL DAMPER AND VALVE ACTUATORS SHALL BE ELECTRIC AND SHALL HAVE SPRING RETURN MECHANISMS.

5. THE EMCS SYSTEM MAY UTILIZE A SINGLE SET OF GLOBAL OUTDOOR AIR TEMPERATURE AND RELATIVE HUMIDITY SENSORS FOR THE PROJECT. THE EMCS SYSTEM SHALL CALCULATE THE OUTDOOR AIR ENTHALPY, DEW POINT, AND WET BULB.

6. ALL CONTROL FUNCTIONS DESCRIBED IN THE SEQUENCES OF OPERATION SHALL BE PERFORMED BY THE EMCS SYSTEM UNLESS EXPLICITLY INDICATED OTHERWISE. ALL WORK DESCRIBED SHALL BE PROVIDED BY THE ATC SYSTEM SUPPLIER/SUB-CONTRACTOR UNDER THE AUTOMATIC TEMPERATURE CONTROLS SPECIFICATION SECTION UNLESS EXPLICITLY INDICATED OTHERWISE.

7. IF SPACE TEMPERATURES THAT ARE MONITORED THROUGH THE EMCS SYSTEM FALL MORE THAN THE ADJUSTABLE ALARM LEVELS, THE EMCS SYSTEM SHALL ISSUE AN ALARM.

8. ALL PUMP AND FAN STATUS MONITORING SHALL BE ACHIEVED THROUGH CURRENT SWITCHES THAT HAVE AN ADJUSTABLE TRIP POINT. ADDITIONALLY, FANS AND PUMPS WITH FLOW MEASURING STATIONS SHALL HAVE A PROOF OF FLOW POINT VIA THE FLOW STATION. IF CURRENT AND AIR / WATER FLOW IS NOT DETECTED WITHIN 20 SECONDS OF THE SIGNAL FOR THE FAN TO START, AN ALARM SHALL BE ISSUED AT THE OPERATOR'S WORKSTATION AND THE FAN / PUMP SHALL BE DE-ENERGIZED.

9. ALL EMCS SYSTEM SPACE TEMPERATURE SENSORS FOR SHALL BE PROVIDED WITH A LOCAL TEMPERATURE SENSOR OVERRIDE FEATURE THAT HAS A PERMIT'S THE USER TO ADJUST THE SPACE TEMPERATURE SETPOINT +/- 2 DEG. F. (ADJUSTABLE) AWAY FROM THE SPACE TEMPERATURE SETPOINT SET BY THE EMCS SYSTEM VIA PROGRAMMING. WHERE INDICATED, SENSORS SHALL ALSO INCORPORATE AN OCCUPANCY OVERRIDE PUSHBUTTON THAT PROVIDES A BINARY INPUT TO THE EMCS SYSTEM TO INDICATE SPACE OCCUPANCY.

10. THE EMCS SYSTEM SHALL PROVIDE A RUN-TIME TOTALIZATION FEATURE FOR ALL FANS, PUMPS, ERUS, BOILERS, AHUS, SPLIT SYSTEM FANS, SPLIT SYSTEM COMPRESSORS, FAN COILS, MISC. EXHAUST AND TRANSFER AIR FANS, AND CHILLED BEAM FANS, AND ALL OTHER HVAC EQUIPMENT CONTROLLED BY THE EMCS SYSTEM EXCEPT AS NOTED OTHERWISE. RUN-TIME TOTALIZATION IS NOT REQUIRED FOR CABINET UNIT HEATERS OR UNIT HEATERS.

11. VARIABLE FREQUENCY DRIVES SHALL PROVIDE AN ANALOG FEEDBACK SIGNAL TO THE EMCS SYSTEM FOR THE MOTOR SPEED AND AMPACITY. DRIVES SHALL ALSO HAVE DRY CONTACTS FOR OPERATING STATUS AND DRIVE FAULT STATUS. ALL POINTS LISTED IN THE DIAGRAMS AND IN THE POINTS LIST ARE MINIMUMS.

12. THE EMCS SYSTEM SHALL MONITOR THE STATUS OF SMOKE DAMPERS.

13. PROVIDE ENGRAVED PLASTIC LAMINATE SIGNAGE, IN LETTERS MINIMUM 3/16 INCH HIGH, AT ALL SPACE FAN START/STOP MOMENTARY CONTACT BUTTONS, TIMING SWITCHES, ETC. THE SIGNAGE SHALL INDICATE THE SWITCH/SYSTEM FUNCTION.

14. DUCT SMOKE DETECTORS ARE FURNISHED BY SIEMENS, INSTALLED BY SIEMENS, AND WIRED BY DIVISION 26. THE DETECTORS SHALL INITIATE A HARD-WIRED SHUTDOWN OF THE ASSOCIATED FANS. IN ADDITION, A SET OF AUXILLARY CONTACTS ON THE DETECTORS SHALL BE USED TO INITIATE AN ALARM AT THE EMCS SYSTEM WORKSTATION.

15. IN ADDITION TO MEETING THE REQUIREMENTS OF THE SPECIFICATIONS, THE CONTRACTOR IS REQUIRED TO PROVIDE ALL CONTROL POINTS INDICATED IN ANY ONE OF THE FOUR POSSIBLE CONTROL WORK REPRESENTATIONS THAT ARE PART OF THESE CONTRACT DRAWINGS. THESE FOUR REPRESENTATIONS ARE THE ENTIRETY OF THE HVAC DRAWINGS, THE CONTROL SEQUENCES OF OPERATION, THE POINTS LISTS, AND THE CONTROL DIAGRAMS ON THE M700 SERIES SHEETS (WHEN A DIAGRAM HAVE BEEN PREPARED FOR A GIVEN SYSTEM OR PIECE OF EQUIPMENT). THE OMMISSION OF A PARTICULAR CONTROL POINT FROM EITHER ONE, TWO, OR THREE OF THESE FOUR REPRESENTATIONS SHALL NOT BE CONSTRUED TO MEAN THIS PARTICULAR CONTROL POINT IS NOT REQUIRED. INCLUSION OF THE POINT IN ANY ONE OF THE FOUR REPRESENTATIONS OBLIGATES THE CONTRACTOR TO PROVIDE THE POINT AS PART OF THE COMPLETE AND FUNCTIONAL CONTROL SYSTEM.

16. THE CONTRACTOR MAY, AT HIS OPTION AND FOR NO ADDITIONAL COST, PROVIDE AN 'OPTINET' CENTRAL ENVIRONMENAL MONITORING SYSTEM AS MANUFACTURED BY AIRCUITY INC. TO MONITOR SPACE CARBON DIOXIDE CONCENTRATIONS AND DEWPOINTS IN LIEU OF THE SEPERATE SPACE CARBON DIOXIDE SENSORS AND SPACE DEWPOINT SENSORS SHOWN ON THE DRAWINGS. THE OPTINET SYSTEM SHALL SAMPLE AIR FROM EACH LOCATION WHERE A SPACE CO2 AND/OR DEWPOINT WALL SENSOR IS SHOWN ON THE DRAWINGS, AND THE VALUES SENSED BY THE CENTRALIZED SENSOR SUITE SHALL BE COMMUNICATED TO THE BUILDING EMCS SYSTEM. THE SENSOR SUITE, AIR DATA ROUTERS, AND HIGH FLOW VACCUM PUMP SHALL BE LOCATED IN EITHER OF THE TWO PENTHOUSE MECHANICAL ROOMS. IT IS THE CONTRACTOR'S RESPONSIBLITY TO COORDINATE WITH THE WORK OF OTHER TRADES AND PROVIDE ALL NECESSARY POWER WIRING, RECEPTACLES, OPTINET STRUCTURED CABLE, SERVERS, AND GATEWAYS FOR A COMPLETE AND FUNCTIONAL SYSTEM THAT DUPLICATES THE CONTROL POINTS REPRESENTED BY THE CONTRACT DRAWINGS. THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A FACTORY AUTHORIZED REPRESENTATIVE FOR ALL SETUP, COMMISSIONING, AND OWNER TRAINING WORK ACTIVITIES RELATED TO THIS SYSTEM.

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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO. NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
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LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

HVAC CONTROLS

SIZE: CE | BLDG/SYS: 0351 - | PROJECT ID: COF20244 - | DISCP: M- | TYP SEQ: 706
AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION: - | VER: 1
SCALE: NONE | OFFICIAL DATE: 06-24-2014
0351-COF12482-M-703_CE_01.dwg
TEMPLATE DATE: 02/28/2011

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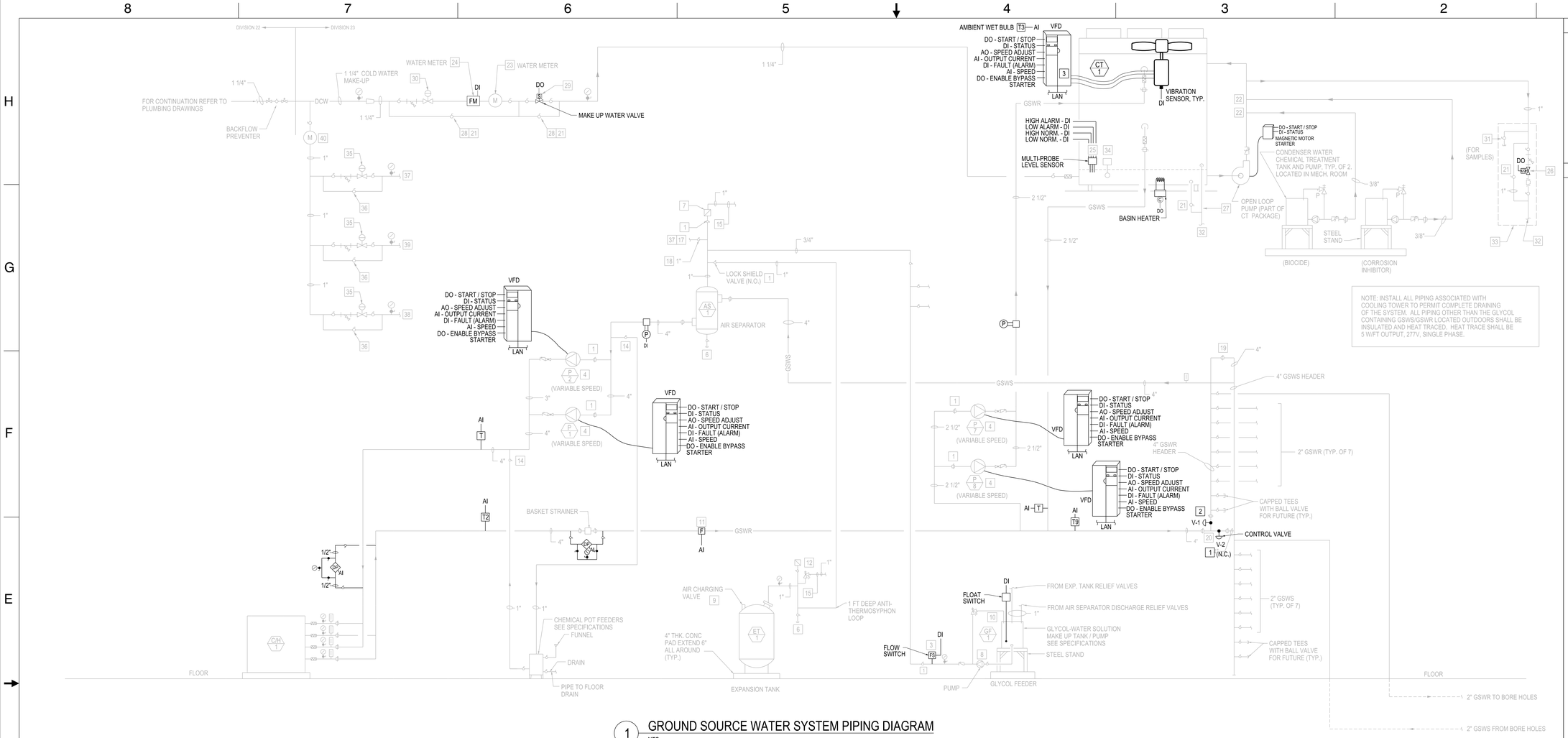
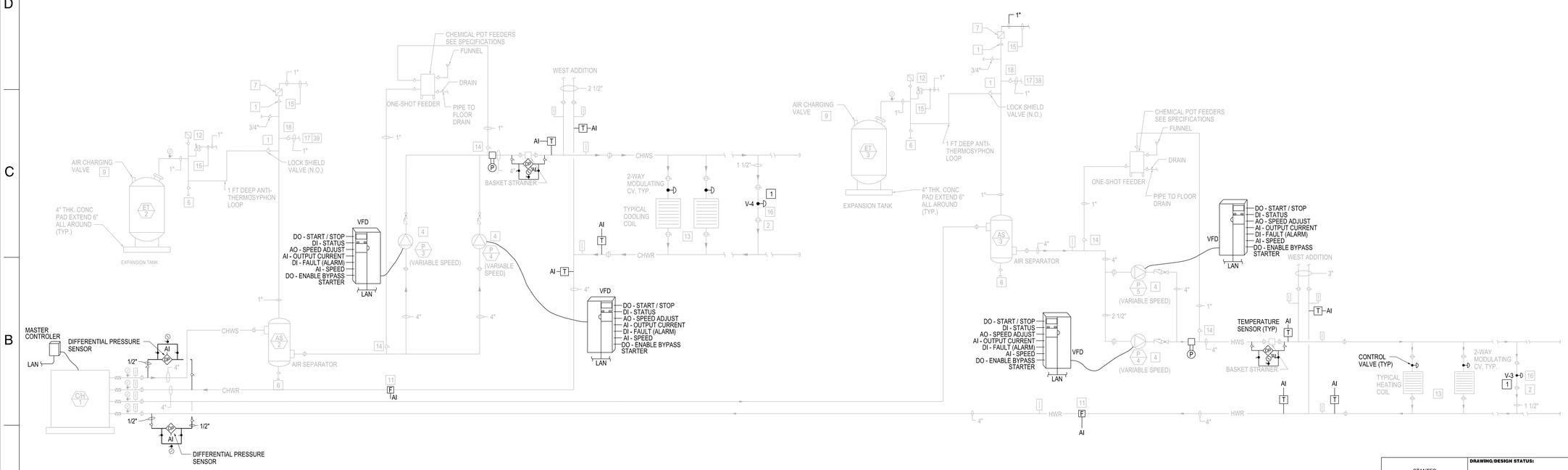


1 GROUND SOURCE WATER SYSTEM PIPING DIAGRAM
NTS



2 CHILLED WATER SYSTEM & HOT WATER SYSTEM PIPING DIAGRAM
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO DRAWING M-708 FOR THE CONTROL SEQUENCE OF OPERATION FOR THIS SYSTEM.
3. ALL CONTROL COMPONENTS AND ACTUATED VALVES BY SIEMENS UNLESS OTHERWISE NOTED.

KEYNOTES

1. FAST ACTING DIFFERENTIAL BYPASS VALVE WITH FULL STROKE TIME OF 30 SECONDS OR LESS
2. FAST ACTING DIVERTER VALVE WITH FULL STROKE TIME OF 30 SECONDS OR LESS.
3. TYPICAL 2.

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DRAWING MANAGEMENT

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HVAC			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
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FY14 B351 WAREHOUSE ADDITION

HVAC CONTROLS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	M-	707

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: | REVISION - | VER 1
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HYDRONIC SYSTEMS EMCS INPUT / OUTPUT SUMMARY

POINT DESCRIPTION	CONNECTED POINTS – INPUTS – DIGITAL: STATUS	CURRENT DETECTION STATUS	PULSE OUTPUT	OCCUPANCY	HIGH LIMIT	LOW LIMIT	INPUTS – ANALOG: TEMPERATURE	PRESSURE	DIFFERENTIAL PRESSURE	CURRENT SENSING	FLOW RATE	MOTOR SPEED	RELATIVE HUMIDITY	OUTPUTS – DIGITAL: ON / OFF / AUTO	BYPASS STARTER	OPEN / CLOSE	ENABLE / DISABLE	OUTPUTS – ANALOG: POSITIONING	SPEED CONTROL	CAPACITY CONTROL	SETPOINT ADJUSTMENT	ALARMS – DIGITAL: PROOF FAILURE	HIGH LIMIT	LOW LIMIT	SYSTEM / CONTROLLER FAULT	ALARMS – ANALOG: HIGH LIMIT	LOW LIMIT	ALARMS – TYPE: CRITICAL ALARM	ABNORMAL ALARM	MAINTENANCE ALARM	SOFTWARE – APPLICATION: RUN TIME	TREND	POWER CALC	ENERGY CALC	ENERGY MANAGEMENT: TIME SCHEDULING EVENT PROGRAM	OPTIMUM START / STOP PROGRAM	NIGHT SETBACK PROGRAM	ECONOMIZER PROGRAM	RESET PROGRAM	PEAK DEMAND LIMITING PROGRAM	EMERGENCY POWER PROGRAM	DUTY / STANDBY PROGRAM
HOT WATER SYSTEMS																																												
PUMP, P - 5 (1)																																●	●											●
P- 5 VARIABLE FREQUENCY DRIVE	●									●		●		●	●			●				●			●				●		●	●	●	●									
HWS TO BUILDING							●																●	●					●			●												
HWR FROM BUILDING							●																									●												
HWS/R DIFFERENTIAL PRESSURE (7)									●											●							●			●			●											
FLOW METER											●																					●												
DIFFERENTIAL BYPASS VALVE	●																	●														●												
GROUND SOURCE PUMPING SYSTEM																																												
PUMP, P - 1 (2)																																●	●											●
P- 1 VARIABLE FREQUENCY DRIVE	●									●		●		●	●			●				●			●				●		●	●	●	●									
GSWS TO BUILDING							●																●	●					●			●												
GSWS FROM GEOTHERMAL HX							●																									●												
GSWR FROM BUILDING							●																									●												
GEOTHERMAL BYPASS VALVE																		●														●												
MIX / FILL TANK MAKE UP FLOW	●																						●						●															
MIX / FILL TANK FLUID LEVEL																								●					●															
BASKET STRAINER DIFFERENTIAL PRESSURE (8)									●											●						●	●			●			●											
FLOW METER (6)											●																					●												
DIFFERENTIAL BYPASS VALVE	●																	●														●												
CHILLED WATER SYSTEM																																												
PUMP, P - 3 (3)																																●	●											●
P- 3 VARIABLE FREQUENCY DRIVE	●									●		●		●	●			●				●			●				●		●	●	●	●									
CHWS TO BUILDING							●																●	●					●			●												
CHWR FROM BUILDING							●																									●												
DIFFERENTIAL BYPASS VALVE	●																	●														●												
CLOSED CIRCUIT EVAPORATIVE COOLER																																												
PUMP, P - 7 (4)																																●	●											●
P- 7 VARIABLE FREQUENCY DRIVE	●									●		●			●					●		●			●							●	●	●	●									
GSWR TO COOLER							●																●	●					●				●												
GSWR FROM COOLER							●																●	●					●				●												
GSWR MIXED FLOW							●																●	●					●				●												
CT FAN VARIABLE FREQUENCY DRIVE (5)	●									●		●			●					●		●			●							●	●	●	●									
CT SPRAY PUMP	●														●							●			●																			
BASIN HEATER	●														●							●			●																			
MAKE UP WATER METER			●													●																												
MAKE UP WATER VALVE																●																												
BASIN LEVEL					●	●																							●															
AMBIENT WETBULB TEMPERATURE							●																									●												
WATER TO WATER HEAT PUMP SYSTEM																																												
MASTER CONTROLLER	●													●			●								●					●	●		●					●						
CHILLED WATER FLOW SWITCH	●																																											
HOT WATER FLOW SWITCH	●																																											
GROUND SOURCE WATER FLOW SWITCH	●																																											

NOTES:

1. P-6 SHALL BE SIMILAR.
2. P-2 SHALL BE SIMILAR.
3. P-4 SHALL BE SIMILAR.
4. P-8 SHALL BE SIMILAR.
5. APPLIES TO ALL COOLING TOWER FANS.
6. APPLIES TO ALL FLOW METERS.
7. APPLIES TO ALL DP SENSORS.
8. APPLIES TO ALL DP SENSORS AT BASKET STRAINERS.

HOT WATER SYSTEMS CONTROL:

1. PUMPING SYSTEM START/STOP: THE EMCS SYSTEM SHALL MONITOR THE STATUS OF AND SHALL HAVE START/STOP CONTROL OVER BOTH OF THE PUMPS (P-5 AND P-6). THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER A PUMP FAILS TO RUN. EACH PUMP SET SHALL OPERATE IN A DUTY-STANDBY FASHION. IF THE DUTY PUMP FAILS, THE STANDBY PUMP SHALL BE ENERGIZED. THE EMCS SYSTEM SHALL LOG THE RUN TIME OF EACH PUMP SEPARATELY, AND EVERY 14 DAYS THE EMCS SYSTEM SHALL SELECT THE DUTY PUMP AS THE PUMP WITH THE LEAST AMOUNT OF RUN TIME. THE DUTY PUMP SHALL RUN CONTINUOUSLY UNTIL THE NEXT CHANGE-OVER. DURING CHANGE-OVER EVENTS, THE NEW LEAD PUMP SHALL RAMP UP SIMULTANEOUSLY AS THE OLD LEAD PUMP SLOWS DOWN SO AS TO MINIMIZE NUISANCE TRIPS DUE TO LOW FLOW CONDITIONS. BUT TO SIMULTANEOUSLY LIMIT THE DISCHARGE PRESSURE RISE TO BELOW PUMP DISCHARGE PIPING RELIEF VALVE LIMIT.

2. PUMP SPEED CONTROL: THE EMCS SYSTEM SHALL CONTROL THE PUMPS THROUGH VARIABLE FREQUENCY CONTROLLERS. THE EMCS SYSTEM SHALL MONITOR THE PIPING SYSTEM DIFFERENTIAL PRESSURE (DP) AT THE LOCATION INDICATED ON THE PLANS, AND ON A FALL IN DIFFERENTIAL PRESSURE BELOW THE DP SETPOINT, THE PUMP SPEED SHALL BE INCREASED TO MAINTAIN THE DESIRED PIPING DP. THE DP SETPOINT SHALL INITIALLY BE 11 PSIG. THE EMCS SYSTEM SHALL MONITOR THE VFD OPERATING STATUS, THE DRIVE'S FAULT STATUS, THE PUMP SPEED FEEDBACK SIGNAL, AND THE VFD CURRENT FOR EACH PUMP. THE EMCS SYSTEM SHALL HAVE CONTROL OVER THE BYPASS STARTERS AND SHALL OPERATE THE PUMPS THROUGH THE BYPASS STARTERS UPON MANUAL COMMAND AT THE OPERATOR'S WORKSTATION.

3. HOT WATER SYSTEM BYPASS VALVE (V-3) WILL BE MODULATED TO MAINTAIN THE REQUIRED DIFFERENTIAL PRESSURE ACROSS CHILLER HEATER.

4. MISCELLANEOUS MONITORING: THE EMCS SYSTEM SHALL MONITOR THE FLOW RATE OF THE BUILDING LOOP PUMPS (P-5 AND 6). THE EMCS SYSTEM SHALL MONITOR THE PRESSURE DROP ACROSS THE BASKET STRAINER AND SHALL ISSUE AN ALARM WHENEVER THE PRESSURE DROP EXCEEDS THE HIGH LIMIT (5 PSI DP).

SOURCE WATER PUMPS CONTROL:

1. PUMPING SYSTEM START/STOP: THE EMCS SYSTEM SHALL MONITOR THE STATUS OF AND SHALL HAVE START/STOP CONTROL OVER BOTH OF THE GEOTHERMAL LOOP PUMPS (P-1 AND P-2). THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER A PUMP FAILS TO RUN. EACH PUMP SET SHALL OPERATE IN A DUTY-STANDBY FASHION. IF THE DUTY PUMP FAILS, THE STANDBY PUMP SHALL BE ENERGIZED. THE EMCS SYSTEM SHALL LOG THE RUN TIME OF EACH PUMP SEPARATELY, AND EVERY 14 DAYS THE EMCS SYSTEM SHALL SELECT THE DUTY PUMP AS THE PUMP WITH THE LEAST AMOUNT OF RUN TIME. THE DUTY PUMP SHALL RUN CONTINUOUSLY UNTIL THE NEXT CHANGE-OVER. DURING CHANGE-OVER EVENTS, THE NEW LEAD PUMP SHALL RAMP UP SIMULTANEOUSLY AS THE OLD LEAD PUMP SLOWS DOWN SO AS TO MINIMIZE HEAT PUMP NUISANCE TRIPS DUE TO LOW FLOW CONDITIONS, BUT TO SIMULTANEOUSLY LIMIT THE DISCHARGE PRESSURE RISE TO BELOW PUMP DISCHARGE PIPING RELIEF VALVE LIMIT.

2. PUMP SPEED CONTROL: THE EMCS SYSTEM SHALL CONTROL THE PUMPS THROUGH VARIABLE FREQUENCY CONTROLLERS. THE EMCS SYSTEM SHALL MONITOR THE PIPING SYSTEM DIFFERENTIAL PRESSURE (DP) AT THE LOCATION INDICATED ON THE PLANS, AND ON A FALL IN DIFFERENTIAL PRESSURE BELOW THE DP SETPOINT, THE PUMP SPEED SHALL BE INCREASED TO MAINTAIN THE DESIRED PIPING DP. THE DP SETPOINT SHALL INITIALLY BE 11 PSIG. THE EMCS SYSTEM SHALL MONITOR THE VFD OPERATING STATUS, THE DRIVE'S FAULT STATUS, THE PUMP SPEED FEEDBACK SIGNAL, AND THE VFD CURRENT FOR EACH PUMP. THE EMCS SYSTEM SHALL HAVE CONTROL OVER THE BYPASS STARTERS AND SHALL OPERATE THE PUMPS THROUGH THE BYPASS STARTERS UPON MANUAL COMMAND AT THE OPERATOR'S WORKSTATION.

3. BYPASS VALVE CONTROL: THE EMCS SYSTEM SHALL MONITOR THE BUILDING LOOP SOURCE WATER SUPPLY TEMPERATURE (T9), AND WHENEVER THE BUILDING LOOP SUPPLY TEMPERATURE FALLS BELOW 59 DEG F (FROM A HIGHER TEMPERATURE) OR RISES ABOVE 94 DEG F (FROM A LOWER TEMPERATURE), THE BOREHOLE FIELD BYPASS VALVE SHALL BE FULLY OPENED. WHENEVER THE TEMPERATURE RISES ABOVE 63 DEG F (FROM A LOWER TEMPERATURE) OR FALLS BELOW 90 DEG F (FROM A HIGHER TEMPERATURE) THE BOREHOLE FIELD BYPASS VALVE SHALL BE FULLY CLOSED. ONCE THE VALVE CLOSES, A MINIMUM OF 20 MINUTES SHALL PASS BEFORE THE VALVE IS PERMITTED TO OPEN.

4. MISCELLANEOUS MONITORING: THE EMCS SYSTEM SHALL MONITOR THE FLOW RATE OF THE BUILDING LOOP PUMPS (P-1 AND 2). THE EMCS SYSTEM SHALL MONITOR THE PRESSURE DROP ACROSS THE BASKET STRAINER AND SHALL ISSUE AN ALARM WHENEVER THE PRESSURE DROP EXCEEDS THE HIGH LIMIT (5 PSI DP). THE EMCS SYSTEM SHALL MONITOR THE STATUS OF THE GLYCOL MIX/FILL TANK PUMP AND SHALL ISSUE AN ALARM IF THE PUMP OPERATES LONGER THAN 45 SECONDS OR IF THE PUMP IS ENERGIZED MORE THAN ONCE IN A 10-DAY PERIOD. AN ALARM SHALL BE ISSUED IF THE PRE-MIXED GLYCOL SOLUTION IN THE MAK E UP TANK FALLS BELOW THE LOW LIMIT LEVEL.

WATER TO WATER HEAT PUMP SYSTEMS CONTROL

1. THE EMCS SYSTEM SHALL MONITOR AND CONTROL UNIT THROUGH MASTER CONTROLLER INTERFACE.

2. WHEN ENABLED, THE MASTER CONTROLLER STAGES UNIT CAPACITY FROM MAXIMUM HEATING TO MAXIMUM COOLING AS REQUIRED BY BUILDING LOAD UNIT TO PROVIDE HEATING, COOLING AND SIMULTANEOUS HEATING AND COOLING.

3. MASTER CONTROLLER SHALL RESPOND TO ENTERING WATER TEMPERATURES TO PROVIDE FOR EFFICIENT PERFORMANCE DURING ALL MODES OF OPERATION.

4. MASTER CONTROLLER SHALL SHUTDOWN UNIT DURING PERIODS WHEN LOAD LEVEL DECREASES BELOW NORMAL OPERATING REQUIREMENTS.

CHILLED WATER SYSTEMS CONTROL:

1. PUMPING SYSTEM START/STOP: THE EMCS SYSTEM SHALL MONITOR THE STATUS OF AND SHALL HAVE START/STOP CONTROL OVER BOTH OF THE PUMPS (P-3 AND P-4). THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER A PUMP FAILS TO RUN. EACH PUMP SET SHALL OPERATE IN A DUTY-STANDBY FASHION. IF THE DUTY PUMP FAILS, THE STANDBY PUMP SHALL BE ENERGIZED. THE EMCS SYSTEM SHALL LOG THE RUN TIME OF EACH PUMP SEPARATELY, AND EVERY 14 DAYS THE EMCS SYSTEM SHALL SELECT THE DUTY PUMP AS THE PUMP WITH THE LEAST AMOUNT OF RUN TIME. THE DUTY PUMP SHALL RUN CONTINUOUSLY UNTIL THE NEXT CHANGE-OVER. DURING CHANGE-OVER EVENTS, THE NEW LEAD PUMP SHALL RAMP UP SIMULTANEOUSLY AS THE OLD LEAD PUMP SLOWS DOWN SO AS TO MINIMIZE NUISANCE TRIPS DUE TO LOW FLOW CONDITIONS. BUT TO SIMULTANEOUSLY LIMIT THE DISCHARGE PRESSURE RISE TO BELOW PUMP DISCHARGE PIPING RELIEF VALVE LIMIT.

2. PUMP SPEED CONTROL: THE EMCS SYSTEM SHALL CONTROL THE PUMPS THROUGH VARIABLE FREQUENCY CONTROLLERS. THE EMCS SYSTEM SHALL MONITOR THE PIPING SYSTEM DIFFERENTIAL PRESSURE (DP) AT THE LOCATION INDICATED ON THE PLANS, AND ON A FALL IN DIFFERENTIAL PRESSURE BELOW THE DP SETPOINT, THE PUMP SPEED SHALL BE INCREASED TO MAINTAIN THE DESIRED PIPING DP. THE DP SETPOINT SHALL INITIALLY BE 11 PSIG. THE EMCS SYSTEM SHALL MONITOR THE VFD OPERATING STATUS, THE DRIVE'S FAULT STATUS, THE PUMP SPEED FEEDBACK SIGNAL, AND THE VFD CURRENT FOR EACH PUMP. THE EMCS SYSTEM SHALL HAVE CONTROL OVER THE BYPASS STARTERS AND SHALL OPERATE THE PUMPS THROUGH THE BYPASS STARTERS UPON MANUAL COMMAND AT THE OPERATOR'S WORKSTATION.

3. COLD WATER SYSTEM BYPASS VALVE (V-4) WILL BE MODULATED TO MAINTAIN THE REQUIRED DIFFERENTIAL PRESSURE ACROSS CHILLER HEATER.

4. MISCELLANEOUS MONITORING: THE EMCS SYSTEM SHALL MONITOR THE FLOW RATE OF THE BUILDING LOOP PUMPS (P-3 AND 4). THE EMCS SYSTEM SHALL MONITOR THE PRESSURE DROP ACROSS THE BASKET STRAINER AND SHALL ISSUE AN ALARM WHENEVER THE PRESSURE DROP EXCEEDS THE HIGH LIMIT (5 PSI DP).

FLUID COOLER WATER SYSTEMS CONTROL:

1. PUMPING SYSTEM START/STOP: THE EMCS SYSTEM SHALL MONITOR THE STATUS OF AND SHALL HAVE START/STOP CONTROL OVER BOTH OF THE PUMPS (P-7 AND P-8). THE EMCS SYSTEM SHALL ISSUE AN ALARM WHENEVER A PUMP FAILS TO RUN. EACH PUMP SET SHALL OPERATE IN A DUTY-STANDBY FASHION. IF THE DUTY PUMP FAILS, THE STANDBY PUMP SHALL BE ENERGIZED. THE EMCS SYSTEM SHALL LOG THE RUN TIME OF EACH PUMP SEPARATELY, AND EVERY 14 DAYS THE EMCS SYSTEM SHALL SELECT THE DUTY PUMP AS THE PUMP WITH THE LEAST AMOUNT OF RUN TIME. THE DUTY PUMP SHALL RUN CONTINUOUSLY UNTIL THE NEXT CHANGE-OVER. DURING CHANGE-OVER EVENTS, THE NEW LEAD PUMP SHALL RAMP UP SIMULTANEOUSLY AS THE OLD LEAD PUMP SLOWS DOWN SO AS TO MINIMIZE NUISANCE TRIPS DUE TO LOW FLOW CONDITIONS. BUT TO SIMULTANEOUSLY LIMIT THE DISCHARGE PRESSURE RISE TO BELOW PUMP DISCHARGE PIPING RELIEF VALVE LIMIT.

2. PUMP SPEED CONTROL: THE EMCS SYSTEM SHALL CONTROL THE PUMPS THROUGH VARIABLE FREQUENCY CONTROLLERS. THE EMCS SYSTEM SHALLSTART PUMP AT LOW SPEED ON CALL FOR COOLING WATER. PUMP SPEED SHALL BE CONTROLLED TO MAINTAIN LOOP TEMPERATURE AT TEMPERATURE SENSOR T1.

3. PUMP SHALL BE OFF ON CALL FOR HEATING WATER.

FLUID COOLER CONTROL:

1. FLUID COOLER FAN SPEED CONTROL: THE EMCS SHALL CONTROL FLUID COOLER FANS THROUGH VARIABLE SPEED CONTROLLERS. FLUID COOLER FANS ARE TURNED ON IF THE FLUID TEMPERATURE AT TEMPERATURE SENSOR T2 IS ABOVE AMBIENT TEMPERATURE AT T3 PLUS A SET POINT TEMPERATURE DIFFERENCE. FLUID COOLER FANS SPEED SHALL BE CONTROLLED TO MAINTAIN LOOP TEMPERATURE AT TEMPERATURE SENSOR T1.

2. THE EMCS SHALL CONTROL THE BIOCIDE AND CORROSION INHIBITOR CHEMICAL FEED RATE BASED ON MAKE UP WATER SUPPLY VOLUME VIA A SEPARATE CONTACT HEAD WATER METER. THE SYSTEM SHALL MONITOR THE CONDUCTIVITY OF THE COOLING TOWER SUMP WATER AND SHALL OPEN THE BLEED VALVE TO MAINTAIN THE MAXIMUM LEVEL OF CONDUCTIVITY BELOW SETPOINT.

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO DRAWING M-707 FOR THE CONTROL DIAGRAMS ASSOCIATED WITH THESE SEQUENCES.
3. ALL CONTROL COMPONENTS AND PROGRAMMING SHALL BE PROVIDED BY SIEMENS UNLESS OTHERWISE NOTED.

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0351-COF12482-M-702_CE_01.dwg

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PLUMBING ABBREVIATIONS

THIS LIST OF ABBREVIATIONS IS PROVIDED FOR CONVENIENCE ONLY. ITEMS LISTED HERE MAY OR MAY NOT BE USED ON THIS PROJECT.

1/C	SINGLE CONDUCTOR
A/C	AIR CONDITIONING UNIT
A	AMPS
AC	ALTERNATING CURRENT
ACT	ABOVE CEILING TILE
A.D.	ACCESS DOOR
AD	AREA DRAIN
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
ADJ	ADJUSTABLE
ALT	ALTERNATE
ARCH	ARCHITECTURAL
AUTO	AUTOMATIC
AVG	AVERAGE
BKR	BREAKER
BLDG	BUILDING
BLK	BLOCK
BTM	BOTTOM
BTU	BRITISH THERMAL UNITS
BTUH	BRITISH THERMAL UNITS/HOUR
C	CONDUIT
CAP	CAPACITY
CFH	CUBIC FEET/HOUR
CFM	CUBIC FEET/MINUTE
C.I.	CAST IRON
CIRC	CIRCULATING
CKT	CIRCUIT
CL	CENTERLINE
CLG	CEILING
CLR	COOLER
CO	COMPANY
C.O.	CLEAN OUT
COL	COLUMN
COMB	COMBINATION
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CONV	CONVECTOR
CPU	CENTRAL PROCESS UNIT
CRT	CATHODE RAY TUBE
CT	CURRENT TRANSFORMERS
CU	COPPER
DF	DRINKING FOUNTAIN
DFU	DRAINAGE FIXTURE UNIT
DED	DEDICATED
DET	DETAIL
DHW	DOMESTIC WATER HEATER
DIAM	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DPR	DAMPER
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY ONLY
EM GEN	EMERGENCY GENERATOR
ENCL	ENCLOSURE
EP	ELECTRIC-PNEUMATIC
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
ETD	EXTEND TO DRAIN
EXIST	EXISTING
EXP	EXPANSION
EXTER	EXTERIOR
F & I	FURNISHED AND INSTALLED
FA	FRESH AIR
FAB	FABRICATE
FAI	FRESH AIR INLET
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FH	FIRE HYDRANT
FIN	FINISH
FIXT	FIXTURE
FLASH	FLASHING
FLEX	FLEXIBLE
FLR	FLOOR
FLUOR	FLUORESCENT
FND	FOUNDATION
FTG	FOOTING
FP	FIRE PROTECTION
FPC	FIRE PROTECTION CONTRACTOR
FTN	FOUNTAIN
FU	FIXTURE UNIT
GC	GENERAL CONTRACTOR
GFI	GROUND FAULT INTERRUPTER
GA	GAUGE
GAL	GALLONS
GRD	GROUND
GW	GREY WATER
HC	HVAC CONTRACTOR
HGT	HEIGHT
HORIZ	HORIZONTAL
HP	HORSEPOWER
HTG	HEATING
HU	HEATING UNIT
HV	HIGH VOLTAGE
HW	HOT WATER
HWT	HOT WATER TANK
HX	HEAT EXCHANGER
HYD	HYDRAULIC
HZ	HERTZ
INCL	INCLUDE
INST	INSTANTANEOUS
INSUL	INSULATION
JAN	JANITOR
JB	JUNCTION BOX
JC	JANITOR CLOSET
JT	JOINT
KS	KITCHEN SINK
LAV	LAVATORY
LA	LABORATORY AIR
LTG	LIGHTING
LTS	LIGHTS
LV	LAB VACUUM
LVR	LOUVER
MAX	MAXIMUM
MB	MOP BASIN
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUG ONLY
MBTUH	THOUSAND OF BTU/HOUR
MMBTUH	MILLIONS OF BTU/HOUR
MR	MOP RECEPTOR
MTD	MOUNTED
MTG	MOUNTING
NC	NORMALLY CLOSED
NE	NORMAL/EMERGENCY
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OC	ON CENTER
OH	OVERHEAD
OPNG	OPENING
OS&Y	OUTSIDE SCREW AND YOKE
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PE	PNEUMATIC-ELECTRIC
PEND	PENDANT
PH	PENTHOUSE
PLMB	PLUMBING
PNL	PANEL
PRESS	PRESSURE
PRESS SW	PRESSURE SWITCH
PRV	PRESSURE REDUCING VALVE
PS	PULL SWITCH
PSI	POUND PER SQUARE INCH
PW	PROCESS WATER WASTE
PV	PROCESS WATER VENT
PWS	PROCESS WATER WASTE STACK
PVS	PROCESS VENT STACK
RA	RETURN AIR
RC	RAIN CONDUCTOR
REC	RECESSED
RECEPT	RECEPTACLE
REQD	REQUIRED
REV	REVISION
RM	ROOM
RV	ROOF VENT
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SCHED	SCHEDULE
SECT	SECTION
SFU	SUPPLY FIXTURE UNIT
SH	SHOWER
SHT	SHEET
SIM	SIMILAR
SM	SHEET METAL
SP	SOIL PIPE
SPEC	SPECIFICATION
SQ FT	SQUARE FOOT
SS	SERVICE SINK
SS	SOIL STACK
STAT	THERMOSTAT
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRAINER
STRUCT	STRUCTURAL
SURF	SURFACE
SUSP	SUSPENDED
SUSP CLG	SUSPENDED CEILING
SW	SWITCH
SV	STACK VENT
T-STAT	THERMOSTAT
TELE	TELEPHONE
TEMP	TEMPERATURE
TERM	TERMINAL
THK	THICK
TK	TANK
TSP	TOTAL STATIC PRESSURE
TV	TELEVISION
TYP	TYPICAL
U	URINAL
UG	UNDERGROUND
UH	UNIT HEATER
UV	UNIT VENTILATOR
VA	VALVE
VAV	VARIABLE AIR VOLUME
VIB	VIBRATION
VIB ISO	VIBRATION ISOLATION
VT	VAPOR TIGHT
VP	VENT PIPE
VERT	VERTICAL
VS	VENT STACK (SANITARY)
WC	WATER CLOSET
WC	WATER COLUMN
WS	WASTE STACK
WH	WALL HYDRANT
WH	WATER HEATER
WP	WASTE PIPE
WT	WEIGHT
XFMR	TRANSFORMER

PLUMBING SYMBOLS SCHEDULE

THIS LIST OF SYMBOLS IS PROVIDED FOR CONVENIENCE ONLY. ITEMS LISTED HERE MAY OR MAY NOT BE USED ON THIS PROJECT.

VB	VACUUM BREAKER
T	VALVE MONITORING SWITCH
	PIPE ANCHOR
	PIPE GUIDE
	PIPE PITCH
	PRESSURE/TEMPERATURE TEST PLUG
	PRESSURE GAUGE WITH GAUGE COCK
	STRAINER
A	AQUASTAT
P	PRESSURE SWITCH
	THERMOMETER
	EMERGENCY GAS SHUTDOWN SWITCH
TP	TEMPERATURE AND PRESSURE RELIEF VALVE
P	PRESSURE RELIEF VALVE
	WATER HAMMER ARRESTOR
	BACKFLOW PREVENTOR
	REDUCER
	FLEXIBLE PIPE CONNECTION
F	FLOW METER
	GAS COCK VALVE
	UNION
	PRESSURE REGULATOR
	PUMP
	SIGHT GLASS
M	UTILITY METER
	ALARM CHECK VALVE
	AUTO FLOW CONTROL
	CALIBRATED BALANCE VALVE
	BALL VALVE
	BUTTERFLY VALVE
	CHECK VALVE
	DELUGE VALVE
	DIAPHRAGM VALVE
	OS&Y GATE VALVE
	GATE VALVE
	GLOBE VALVE
	LOCKING GATE VALVE
	NEEDLE VALVE
	PRESSURE REDUCING VALVE
S	SOLENOID VALVE
S	SPRING CHECK VALVE
	STOP VALVE
T	THERMOSTATIC 3-WAY VALVE
	WALL POST INDICATING VALVE
	PIPE TURNED DOWN
	PIPE TURNED UP
	TRAP
	TEE DOWN
	TEE UP
	TEE TURNED DOWN
	TEE TURNED UP
	PIPE BREAK
	PIPE CAP
	DIRECTION OF FLOW ARROW
C.O.	CLEANOUT FERRULE
F.C.O.	FLOOR CLEANOUT
W.C.O.	WALL CLEANOUT
A	KEYNOTE INDICATOR (refer to notes on same sheet)
WC 1	EQUIPMENT MARK (TYPE WC, NUMBER 1)
SAN 1	RISER IDENTIFICATION MARK (TYPE SAN, NUMBER 1)
1	REVISION INDICATOR
1 P401	DETAIL CALLOUT MARK (DETAIL 1 ON DRAWING P401)
1 P401	SECTION INDICATOR (SECTION 1 ON DRAWING P401)
	NORTH ARROW
	REVISION BUBBLE
1A	PIPE GROUP DESIGNATION
	DENOTES CONNECT TO EXISTING
	DENOTES DEMOLITION TO POINT INDICATED
N2	NITROGEN PIPE
CA	COMPRESSED AIR PIPE
DW	DOMESTIC WATER (POTABLE) PIPE
EX DW	PREFIX "EX" INDICATED EXISTING PIPE (e.g., EXISTING DOMESTIC WATER PIPE)
RX DW	PREFIX "RX" INDICATED EXISTING PIPE TO BE REMOVED (e.g., REMOVED DOMESTIC WATER PIPE)
DHW	DOMESTIC HOT WATER (POTABLE) PIPE
DHWR	DOMESTIC HOT WATER RETURN (POTABLE) PIPE
SAN	SANITARY PIPE
SAN	SANITARY PIPE BELOW GRADE OR SLAB
V	SANITARY VENT PIPE
ST	STORM PIPE
EST	EMERGENCY (SECONDARY) STORM PIPE
NPW	NON POTABLE COLD WATER PIPE
NG	NATURAL GAS PIPE
NG - 50#	NATURAL GAS - 50 PSI PIPE
TW	TEMPERED WATER PIPE
C.O.	RISER WITH WALL CLEAN OUT
	FLOOR DRAIN
	ROOF DRAIN
	EXPOSED HOSE BIBB

PLUMBING GENERAL NOTES

1. PLUMBING INSTALLATIONS IN THIS PROJECT SHALL COMPLY WITH THE REQUIREMENTS OF OPC 2006 PLUMBING CODE, AND THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
2. PROVIDE COMPLETE AND FUNCTIONAL SYSTEMS FOR THE PROJECT. THE SYSTEMS SHALL CONFORM TO THE SPECIFICATIONS AND AS SHOWN ON THE DRAWINGS. ITEMS OR WORK NOT SHOWN OR SPECIFIED, BUT REQUIRED FOR COMPLETE SYSTEMS, SHALL BE PROVIDED AND CONFORM WITH ACCEPTED TRADE PRACTICES. THE DRAWINGS AND SPECIFICATIONS ARE PRESENTED TO DEFINE SPECIFIC SYSTEM REQUIREMENTS AND SERVE TO EXPAND ON THE PRIMARY CONTRACT REQUIREMENTS OF PROVIDING COMPLETE SYSTEMS. THE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT AND ROUTING OF THE SYSTEMS INCLUDED IN THIS CONTRACTORS WORK.
3. DO NOT SCALE THE DRAWINGS. BECAUSE OF THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE OFFSETS, FITTINGS, VALVES, OR SIMILAR ITEMS WHICH MAY BE REQUIRED TO PROVIDE COMPLETE OPERATING SYSTEMS. CAREFULLY INVESTIGATE CONDITIONS AFFECTING THE WORK ASSOCIATED WITH THIS PROJECT. INSTALL SYSTEMS IN SUCH A MANNER THAT INTERFERENCES BETWEEN PIPES, CONDUIT, DUCTS, EQUIPMENT, ARCHITECTURAL AND STRUCTURAL FEATURES ARE AVOIDED. PROVIDE ITEMS REQUIRED TO MEET THE PROJECT CONDITIONS WITHOUT ADDITIONAL COST TO THE OWNER.
4. PROTECT BUILDING FROM DAMAGE DURING CONSTRUCTION. PROVIDE PLYWOOD OR SIMILAR BUILDING MATERIAL UNDER EQUIPMENT OR MATERIALS STORED ON FLOORS AND IN AREAS WHERE CONSTRUCTION MAY DAMAGE THE FLOOR SURFACES. BUILDING SURFACES AND/OR FINISHES DAMAGED DURING THE CONSTRUCTION SHALL BE REPLACED AT THE COST OF THE CONTRACTOR AT FAULT.
5. PROVIDE SANITARY PIPING WITH MINIMUM GRADE TO MAINTAIN 2 FPS VELOCITY UNLESS OTHERWISE NOTED. HORIZONTAL WASTE VENT PIPING SHALL BE GRADED TO DRIP BACK TO THE WASTE PIPING BY GRAVITY.
6. PIPING SHALL NOT BE LOCATED IN ANY ELECTRICAL ROOMS, CLOSETS, OR TELECOMMUNICATION ROOMS UNLESS THOSE PIPES SERVE ONLY THAT SPACE.
7. INDICATE THE LOCATIONS OF ACCESS DOORS FOR EACH CONCEALED VALVE, PIECE OF EQUIPMENT, COMPONENTS, OR OTHER DEVICE CONCEALED BEHIND FINISHED CONSTRUCTION AND REQUIRING SERVICE ON THE COORDINATION DRAWINGS.
8. COORDINATE THE EXACT LOCATION AND REQUIREMENTS OF PLUMBING FIXTURES, EQUIPMENT, AND ASSOCIATED APPURTENANCES WITH ARCHITECTURAL DRAWINGS PRIOR TO ROUGH - IN AND INSTALLATION.

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

PLUMBING PIPING MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	FITTINGS	JOINTS	REMARKS
DOMESTIC COLD WATER (UNDERGROUND)	4" AND LARGER	DUCTILE IRON CLASS 52, AWWA C151 WITH CEMENT-MORTAR LINING AWWA C104, AND POLYETHYLENE ENCASEMENT AWWA C105	DUCTILE IRON MECHANICAL JOINT AWWA C110 WITH CEMENT-MORTAR LINING	MECHANICAL JOINT WITH RUBBER GASKETS AND 18-8 TYPE 304 S.S. BOLTS, NUTS AND WASHERS ASTM F593	2
DOMESTIC COLD WATER	ALL SIZES	TYPE L HARD COPPER ASTM B88	WROUGHT COPPER ANSI/ASME B16.22	"PRESS-FIT" OR EQUAL	1, 2
DOMESTIC HOT WATER	ALL SIZES	TYPE L HARD COPPER ASTM B88	WROUGHT COPPER ANSI/ASME B16.22	"PRESS-FIT" OR EQUAL	1, 2
DOMESTIC HOT WATER RETURN	ALL SIZES	TYPE L HARD COPPER ASTM B88	WROUGHT COPPER ANSI/ASME B16.22	"PRESS-FIT" OR EQUAL	1, 2
TRAP PRIMER WATER	ALL SIZES	TYPE L SOFT COPPER ASTM B88	CONTINUOUS RUN BELOW FLOOR	SOLDER FITTINGS W/ NYLON BUSHINGS FOR DIELCTRIC CONNECTIONS	2
NATURAL GAS (UNDERGROUND)	ALL SIZES	POLYETHYLENE (PE) SDR 11, ASTM D3350	POLYETHYLENE (PE) SDR 11, ASTM D3261	BUTT-FUSION	2
NATURAL GAS (ABOVE GROUND)	2" AND SMALLER	SCH. 40 BLACK STEEL ERW, ASTM A53 GR B	300# BLACK MALLEABLE IRON, ASTM A197	THREADED	2
NATURAL GAS (ABOVE GROUND)	2-1/2" AND LARGER	SCH. 40 BLACK STEEL ERW, ASTM A53 GR B TYPE S	300# BLACK MALLEABLE IRON, ASTM A197	BUTT WELDED	2
STORM (UNDERGROUND)	ALL SIZES	CAST IRON SOIL PIPE HUB & SPIGOT ASTM A74	CAST IRON FITTINGS HUB & SPIGOT ASTM A 74	COMPRESSION GASKETS	2
STORM (ABOVE GROUND)	ALL SIZES	CAST IRON SOIL PIPE HUBLESS CISPI 301 & ASTM A 888	CAST IRON FITTINGS HUBLESS CISPI 301 & ASTM A888	HUSKY 4000 HEAVY DUTY NO-HUB CLAMPS OR EQUAL	2
EMERGENCY STORM (ABOVE GROUND)	ALL SIZES	CAST IRON SOIL PIPE HUBLESS CISPI 301 & ASTM A 888	CAST IRON FITTINGS HUBLESS CISPI 301 & ASTM A888	HUSKY 4000 HEAVY DUTY NO-HUB CLAMPS OR EQUAL	2
SANITARY (UNDERGROUND)	2" AND SMALLER	COPPER DRAINAGE TUBING TYPE DWV ASTM B 306	WROUGHT COPPER DRAINAGE FITTINGS ASME B16.29	"BRIDGIT" LEAD FREE SOLDER	2
SANITARY (UNDERGROUND)	3" AND LARGER	CAST IRON SOIL PIPE HUB & SPIGOT ASTM A74	CAST IRON FITTINGS HUB & SPIGOT ASTM A 74	COMPRESSION GASKETS	2
SANITARY (ABOVE GROUND)	2" AND SMALLER	COPPER DRAINAGE TUBING TYPE DWV ASTM B 306	WROUGHT COPPER DRAINAGE FITTINGS ASME B16.29	"BRIDGIT" LEAD FREE SOLDER	2
SANITARY (ABOVE GROUND)	3" AND LARGER	CAST IRON SOIL PIPE HUBLESS CISPI 301 & ASTM A 888	CAST IRON FITTINGS HUBLESS CISPI 301 & ASTM A888	HUSKY 4000 HEAVY DUTY NO-HUB CLAMPS OR EQUAL	2
SANITARY VENT (UNDERGROUND)	2" AND SMALLER	COPPER DRAINAGE TUBING TYPE DWV ASTM B 306	WROUGHT COPPER DRAINAGE FITTINGS ASME B16.29	"BRIDGIT" LEAD FREE SOLDER	2
SANITARY VENT (UNDERGROUND)	3" AND LARGER	CAST IRON SOIL PIPE HUB & SPIGOT ASTM A 74	CAST IRON FITTINGS HUB & SPIGOT ASTM A 74	COMPRESSION GASKETS	2
SANITARY VENT (ABOVE GROUND)	2" AND SMALLER	COPPER DRAINAGE TUBING TYPE DWV ASTM B 306	WROUGHT COPPER DRAINAGE FITTINGS ASME B16.29	"BRIDGIT" LEAD FREE SOLDER	2
SANITARY VENT (ABOVE GROUND)	3" AND LARGER	CAST IRON SOIL PIPE HUBLESS CISPI 301 & ASTM A 888	CAST IRON FITTINGS HUBLESS CISPI 301 & ASTM A 888	HUSKY 4000 HEAVY DUTY NO-HUB CLAMPS OR EQUAL	2
SERVICE (COMPRESSED) AIR - 125 PSIG & UNDER	1/2" - 2"	SCH. 40 BLACK CARBON STEEL, TYPE "F", GRADE "B", ASTM A53	150# BLACK MALLEABLE IRON, ANSI/ASME B16.3, ASTM A197	THREADED	2

PRO-PRESS INSERTION DEPTH CHART

TUBE SIZE	1/2"	3/4"	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
INSERTION DEPTH	3/4"	7/8"	7/8"	1"	1-7/16"	1-9/16"	2-1/8"	2-1/8"	2-1/2"

REMARKS:

1. WHEN INSTALLING PRO-PRESS FITTINGS ONTO COPPER TUBE OR PIPE, SLIDE THE FITTING ONTO THE TUBE AND MAKE CONTACT WITH THE EMBOSSED FITTING STOP AND/OR IN ACCORDANCE WITH THE "PRO-PRESS INSERTION DEPTH CHART". WITH A PERMANENT MARKER, MARK INSERTION DEPTH ON THE TUBE BEFORE LOCKING FITTINGS IN PLACE. THIS IS A REQUIREMENT OF GOVERNMENT QUALITY ASSURANCE PERSONNEL FOR INSPECTION OF PROPER DEPTH INSTALLATION OF THE FITTINGS.
2. REFER TO SPECIFICATION SECTION 22 07 19 FOR PROPER INSTALLATION OF PLUMBING PIPING INSULATION.

PLUMBING SYSTEMS PIPE IDENTIFICATION

SYSTEM REQUIRING IDENTIFICATION	IDENTIFICATION W/ BLACK LETTERS ON A YELLOW BACKGROUND: ENGLISH	COLOR BANDS*
NATURAL GAS	NAT GAS 10-PSIG & UNDER - "X" PIPE SIZE	GRAY
NATURAL GAS	NAT GAS 50-PSIG - "X" PIPE SIZE	GRAY
	IDENTIFICATION W/ WHITE LETTERS ON A GREEN BACKGROUND: ENGLISH	
DOMESTIC COLD WATER (POTABLE)	DOM WTR - "X" PIPE SIZE	LIGHT BLUE
DOMESTIC HOT WATER (POTABLE)	DOM HOT WTR SUP - "X" PIPE SIZE	LIGHT BLUE
DOMESTIC HOT WATER RETURN (POTABLE)	DOM HOT WTR RET - "X" PIPE SIZE	LIGHT BLUE
	IDENTIFICATION W/ BLACK LETTERS ON A WHITE BACKGROUND: ENGLISH	
STORM	STORM - "X" PIPE SIZE	BROWN
EMERGENCY STORM	EMER STORM - "X" PIPE SIZE	BROWN
SANITARY (ABOVE GROUND)	SAN - "X" PIPE SIZE	BROWN
SANITARY VENT	SAN VENT - "X" PIPE SIZE	BROWN
	IDENTIFICATION W/ BLACK LETTERS ON A BLUE BACKGROUND: ENGLISH	
SHOP/SERVICE AIR	SHOP AIR 125 PSI -"X" PIPE SIZE	PURPLE

* COLOR BAND SHALL BE POSITIONED OVER EACH END OF THE LABEL TO SECURE IT IN PLACE AND SHALL NOT OBSCURE THE LABEL LETTERING.

PLUMBING SYSTEM TEST CRITERIA

EACH PIPING SYSTEM SHALL BE TESTED ACCORDING TO THE FOLLOWING SCHEDULES

SYSTEM	SYSTEM WORKING PRESSURE (PSIG)	MAX. ALLOWABLE WORKING PRESSURE (PSIG)	TEST PRESSURE ① (PSIG)	WORKING TEMP. (° F.)	DESIGN STANDARD	INSPECTION REQ'D FOR WELDED PIPE ③
NATURAL GAS/NG (10 PSI & UNDER)	10 & UNDER	10	20	80	B31.8 & NFPA 54	5% RADIOGRAPHY
NATURAL GAS/NG (50 PSI)	50	60	100(A)	80	B31.8 & NFPA 54	5% RADIOGRAPHY
SANITARY/SAN ②	0	3	5(A)	80		
STORM/ST & EMERGENCY STORM/EST ②	0	3	5(A)	80		
DOMESTIC COLD WATER/DW	80	80	120	80	B31.9	VISUAL
DOMESTIC HOT WATER/DHW	80	80	120	200	B31.9	VISUAL
DOMESTIC HOT WATER RETURN/DHWR	80	80	120	200	B31.9	VISUAL
SHOP OR SERVICE AIR	LESS THAN 150	LESS THAN 150	SEE ASME B31.9, SECTION 937 FOR LEAK TEST REQUIREMENTS	120	B31.9	VISUAL

① TESTING SHALL BE HYDROSTATIC, AND IN ACCORDANCE WITH SPECIFICATION SECTION 23 05 93.98. (A) TESTING SHALL BE PNEUMATIC.

② PRESSURE 'FORCED MAIN' SANITARY, STORM OR INDUSTRIAL WASTE SHALL BE RATED FOR AND TESTED TO 1.5 TIMES THE MAXIMUM PRESSURE THE PUMP CAN DELIVER.

③ REFER TO SPECIFICATION SECTION 01 45 33 01 98 FOR PIPE WELDING REQUIREMENTS.

NATURAL GAS PIPING PAINT

THE FOLLOWING INFORMATION MAY BE USED:

PRIMER (INDUSTRIAL AND MARINE) - 1 COAT OF "SHERWIN-WILLIAMS" PRO-CRYL UNIVERSAL PRIMER B66-310 SERIES @ 2.0 - 4.0 MILS DFT.

FINISH PAINT (INDUSTRIAL AND MARINE) - 2 COATS OF "SHERWIN-WILLIAMS" SHER-CRYL HPA HIGH PERFORMANCE ACRYLIC B66-350 SERIES @ 2.5 - 4.0 MILS DFT/CT; COLOR: SAFETY YELLOW (SW 4084).

PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH "SHERWIN-WILLIAMS" PUBLISHED INSTRUCTIONS.

SERVICE AIR PIPING PAINT

THE FOLLOWING INFORMATION MAY BE USED:

PRIMER (INDUSTRIAL AND MARINE) - 1 COAT OF "SHERWIN-WILLIAMS" PRO-CRYL UNIVERSAL PRIMER B66-310 SERIES @ 2.0 - 4.0 MILS DFT.

FINISH PAINT (INDUSTRIAL AND MARINE) - 2 COATS OF "SHERWIN-WILLIAMS" SHER-CRYL HPA HIGH PERFORMANCE ACRYLIC B66-350 SERIES @ 2.5 - 4.0 MILS DFT/CT, COLOR: SAFETY BLUE (SW 4086).

PREPARATION AND APPLICATION SHALL BE IN ACCORDANCE WITH "SHERWIN-WILLIAMS" PUBLISHED INSTRUCTIONS.

WATER FLOW TEST INFORMATION

TEST HYDRANT #65 (NEAR WAREHOUSE SITE)
STATIC READING: 66 PSI
RESIDUAL: 56 PSI
FLOW HYDRANT #105 (NEAR WAREHOUSE SITE)
PITOT READING: 44 PSI @ 1175 GPM

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.	
CONTRACT NO.: NNC09CA01C	
TASK ORDER:	
DRAWN: Author / DESIGNED: / CHECKED: Checker	
APPROVED: Approver / APPROVAL DATE:	

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT — SYSTEM: PLMB / SUB-SYS: / FACILITY: / CONFIG:

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE STATUS: WORKING	

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

PLUMBING SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	001

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

P-001
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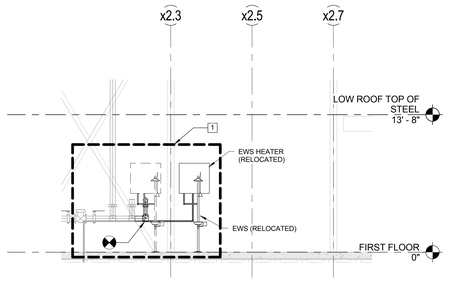
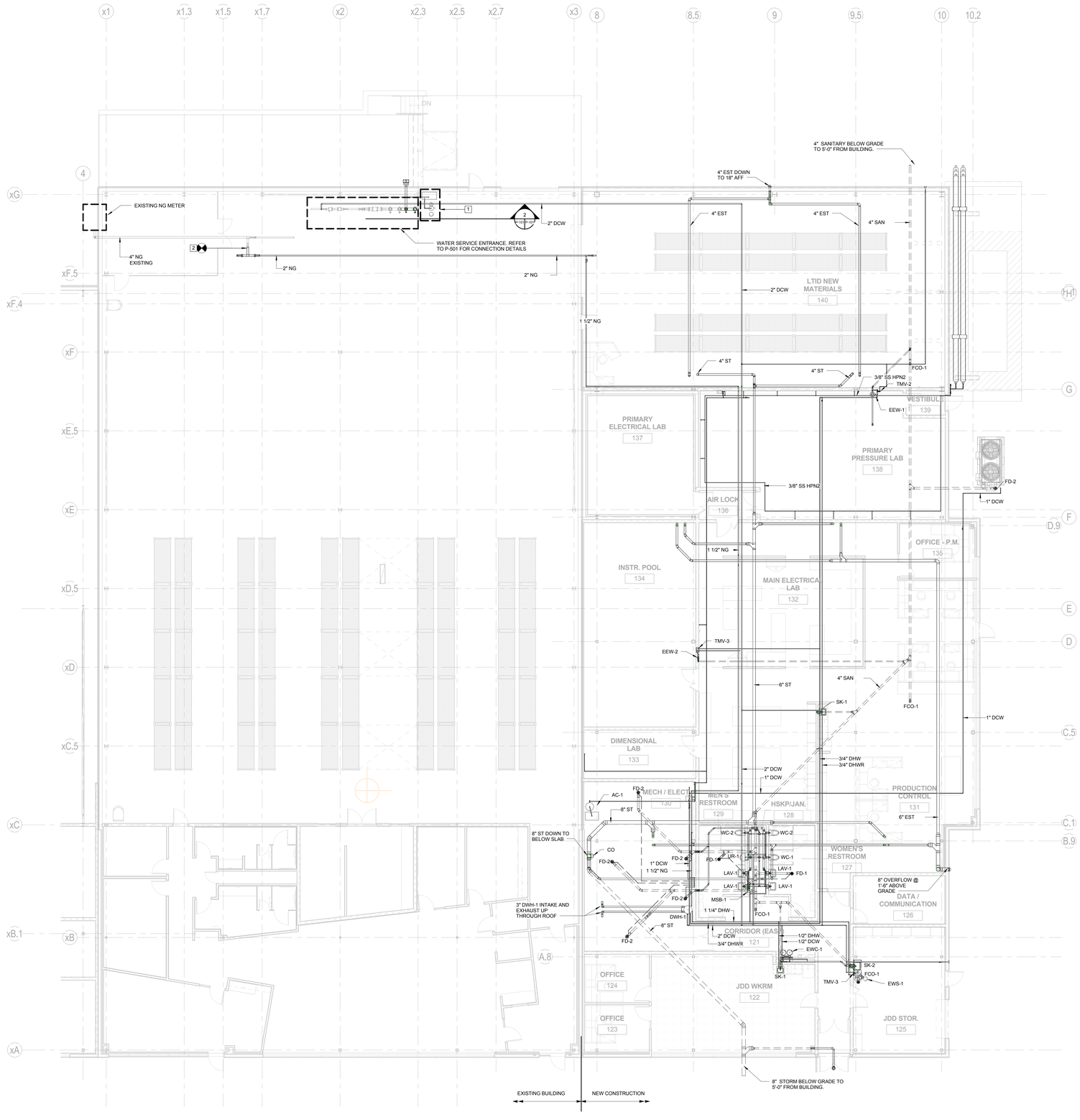


EMERGENCY SHOWER RELOCATION

2 / P-101 — 3/16" = 1'-0"

0 4 8 16'



P-101 PLUMBING FIRST FLOOR PLAN

1 / P-101 — 1/8" = 1'-0"

0 4 8 16'

N — 37° 51' 21" — NASA GRID NORTH

GENERAL NOTES

1. REFER TO P-102 FOR DETAILED ROOF INSTALLATION.
2. REFER TO P-103 FOR DETAILED SUB-SLAB INSTALLATION.
3. REFER TO P-104 FOR DETAILED EAST ADDITION PIPING INSTALLATION.
4. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

KEYED NOTES

1. REMOVE AND RELOCATE EXISTING EMERGENCY SHOWER/EYEWASH STATION AND ASSOCIATED HOT WATER HEATER TO LOCATION INDICATED ON PLAN. COORDINATE FINAL LOCATION WITH SPRINKLER RISER LOCATION. ROUTE DRAIN TO EXISTING FLOOR DRAIN IN AREA. COORDINATE HEATER RELOCATION WITH ELECTRICAL.
2. REMOVE EXISTING CAP AND CONNECT NEW NG PIPE.

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
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APPROVED: JFG | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT — SYSTEM: PLMB | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

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D.ENG: | PROJ. MGR: KJS
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CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

PLUMBING PLAN - COMPLETE

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	101

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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P-101

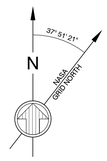
0351-COF20244-P-101_CE_1.dwg TEMPLATE DATE: 02/28/2011

6/23/2014 1:32:27 PM

1 P-102 **P-102 PLUMBING ROOF**

1/8" = 1'-0"

0 4 8 16'



GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

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Phone:330/659-6688
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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
ORIGIN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
PLMB			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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FY14 B351 WAREHOUSE ADDITION

PLUMBING PLAN - ROOF

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	102

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION ■ | VER 1

SCALE: 1/8" = 1'-0" | OFFICIAL DATE: 06-24-2014

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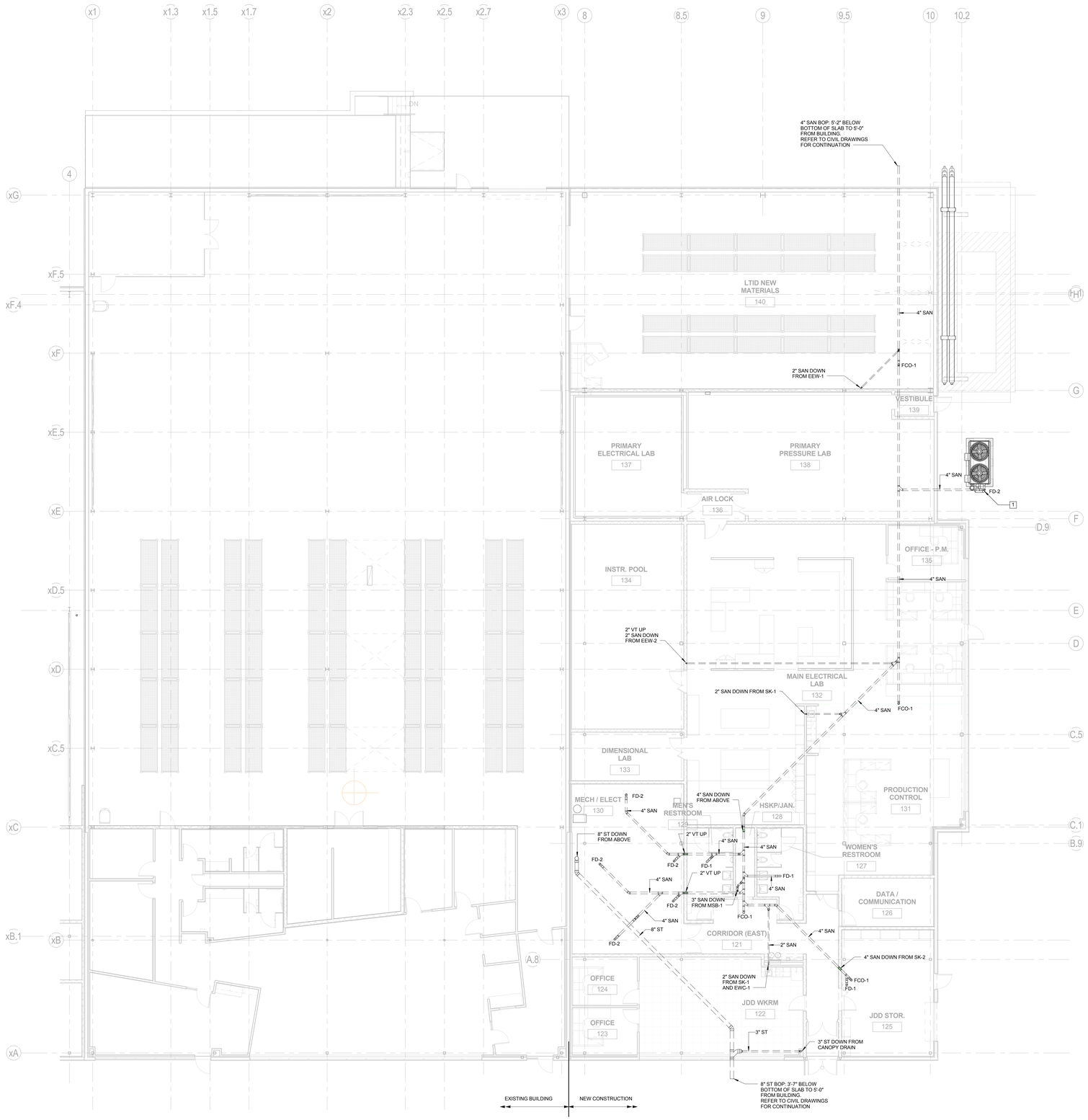
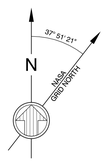
P-102

0351-COF20244-P-102_CE_1.dwg **TEMPLATE DATE: 02/28/2011**

6/23/2014 1:32:08 PM



1 P-103 **P-103 SUB SLAB**
1/8" = 1'-0"
0 4 8 16'



GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

KEYED NOTES

1 PROVIDE FD-2 FOR COOLING TOWER DRAIN. INSTALL 12" ABOVE GRADE. INSTALL TRAP AT 4'-9" BELOW GRADE AND PROVIDE TRAP SEAL COORDINATE INSTALLATION LOCATION WITH MECHANICAL AND SITE.

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FY14 B351 WAREHOUSE ADDITION

PLUMBING PLAN - SUB SLAB

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	103

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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P-103
0351-COF20244-P-103_CE_1.dwg TEMPLATE DATE: 02/28/2011
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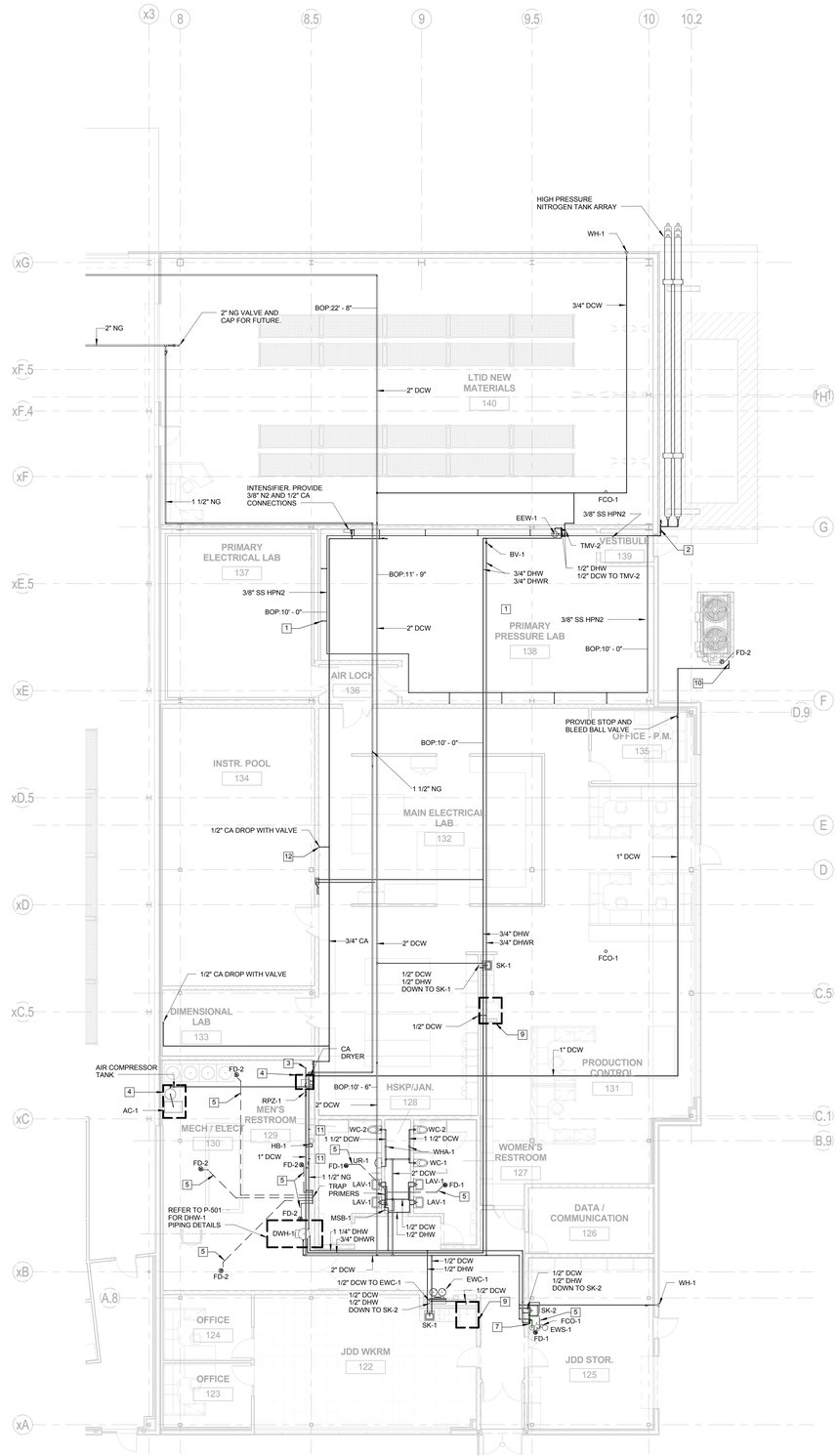
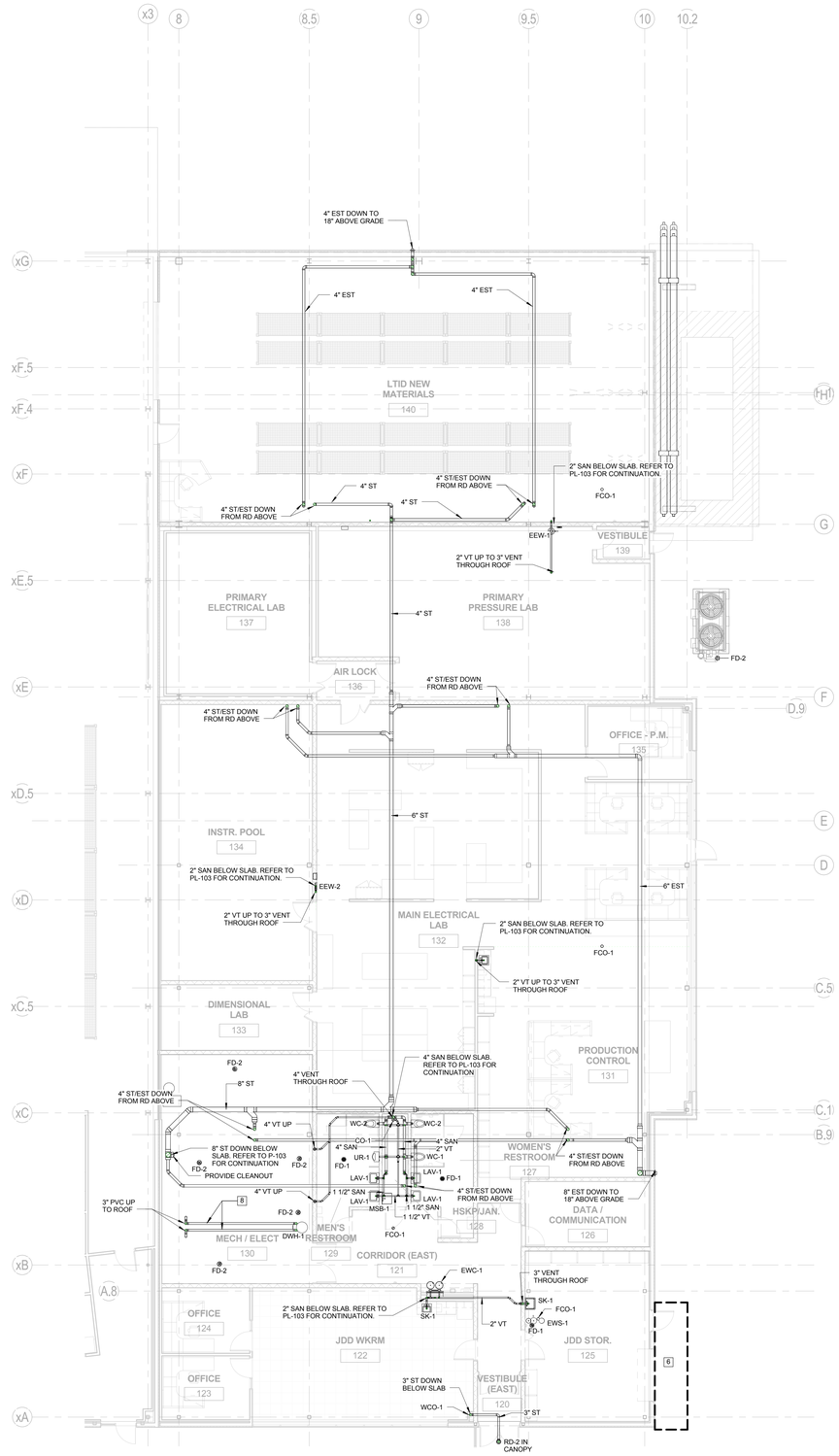


1 P-104 EAST ADDITION - PIPING

P-104 1/8" = 1'-0"

0 4 8 16'



2 P-104 EAST ADDITION - SANITARY/STORM

P-104 1/8" = 1'-0"

0 4 8 16'

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

KEYED NOTES

1. PROVIDE 3/8" NITROGEN DROP IN APPROXIMATE LOCATION INDICATED. DROP SHALL TERMINATE WITH BALL VALVE AND FEMALE PIPE THREAD. FINAL DROP LOCATIONS SHALL BE DETERMINED IN FIELD BY NASA.
2. PROVIDE CONNECTION TO N2 TANK ARRAY. REFER TO DRAWING P-502 FOR FITUP DETAIL.
3. 1" MAKE-UP WATER CONNECTION. COORDINATE FINAL CONNECTION WITH MECHANICAL.
4. PROVIDE HOUSEKEEPING PAD UNDER AIR COMPRESSOR, TANK, AND REFRIGERATED DRYER. REFER TO S-501 FOR DETAILS. PAD SHALL BE 6" LARGER THAN EQUIPMENT AROUND PERIMETER OF EQUIPMENT.
5. 3/8" DCW BELOW SLAB TO TRAP FROM TRAP PRIMER.
6. CANOPY SLOPES TO GUTTER FOR CONNECTION TO STORM SYSTEM. REFER TO ARCHITECTURAL AND CIVIL DRAWINGS FOR ADDITIONAL INFORMATION.
7. PROVIDE 1-1/4" DCW AND 1-1/4" DHW TO TMV-4. REFER TO DETAILS FOR EWS-1 PIPING.
8. 3" PVC INTAKE AND EXHAUST PIPE TO DWH-1. INSTALL IN ACCORDANCE WITH DWH-1 MANUFACTURER'S RECOMMENDATIONS.
9. PROVIDE 1/2" DCW TO RECESSED VALVE BOX WITH STOP. PROVIDE FLEXIBLE WATER CONNECTION TO REFRIGERATOR PER MANUFACTURERS RECOMMENDATIONS.
10. PROVIDE 1" DCW CONNECTION TO COOLING TOWER. COORDINATE INSTALLATION WITH MECHANICAL.
11. PROVIDE 1/2" DCW CONNECTION AND ISOLATION VALVE TO EACH HUMIDIFIER. COORDINATE INSTALLATION WITH MECHANICAL.
12. PROVIDE 1/2" CA DROP TO MAIN ELECTRICAL LAB 132. FINAL DROP LOCATION SHALL BE DETERMINED IN FIELD BY NASA.

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FY14 B351 WAREHOUSE ADDITION

PLUMBING PLAN - EAST ADDITION

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	104

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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P-104
0351-COF20244-P-104_CE_1.dwg TEMPLATE DATE: 02/28/2011
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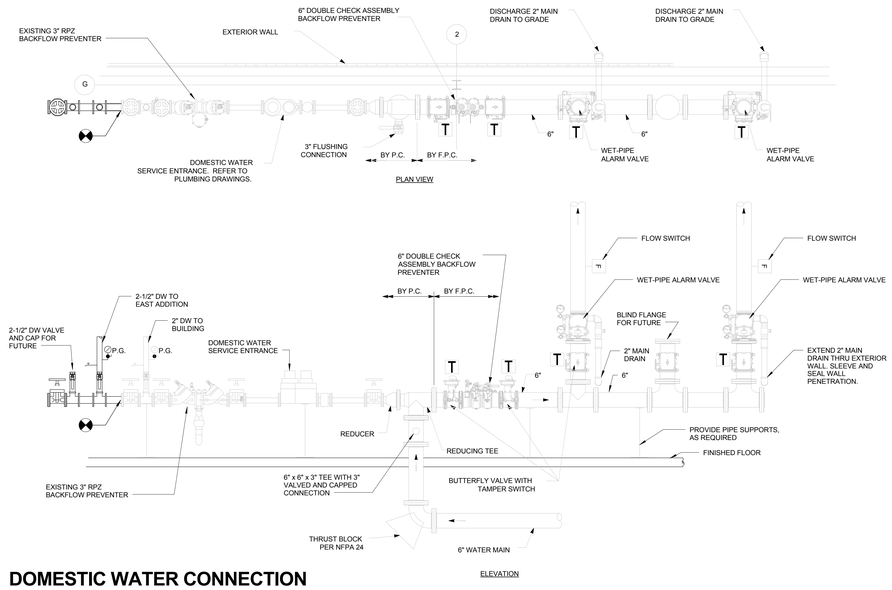
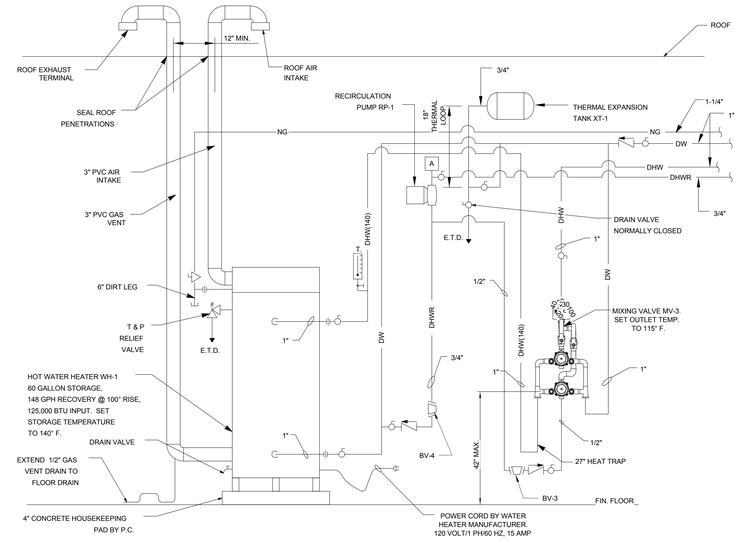


DOMESTIC WATER CONNECTION DETAIL

1 P-501 Not to Scale

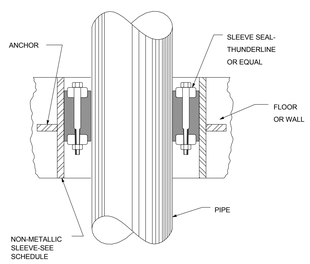


WATER HEATER DETAILS

2 P-501 Not to Scale

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.



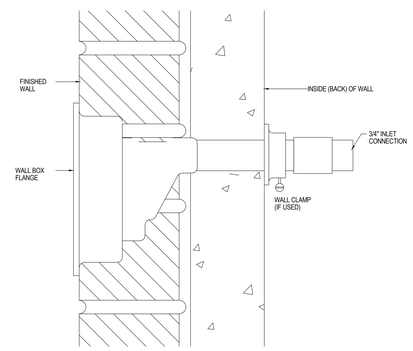
PIPE SIZE	COPPER PIPE		STEEL PIPE		CAST IRON PIPE		DUCTILE IRON PIPE	
	SLEEVE I.D.	MIN. LENGTH	SLEEVE I.D.	MIN. LENGTH	SLEEVE I.D.	MIN. LENGTH	SLEEVE I.D.	MIN. LENGTH
1/2"	2" [200]	2-1/4 "	2" [200]	2-1/4 "				
3/4"	3" [315]	2-1/4 "	3" [315]	2-1/4 "				
1"	3" [300]	2-1/4 "	3" [300]	2-1/4 "				
1-1/4 "	3" [275]	2-1/4 "	3" [275]	3"				
1-1/2 "	3-1/2" [300]	3"	3-1/2" [300]	3"				
2"	4" [300]	4"	4" [300]	3"	4" [300]	3"		
2-1/2"	4" [200]	3"	4" [200]	3"				
3"	5" [300]	4"	5" [300]	3"	5" [300]	3"		
4"	6" [300]	4"	6" [300]	3"	6" [300]	3"	6" [300]	3"
6"	10" [475]	4"	10" [475]	3"	10" [475]	3"	10" [475]	3
8"			12" [475]	5"	12" [475]	5"	12" [475]	5"
10"			14" [410]	5"	14" [410]	5"	14" [410]	5"

NOTE:

1. NUMBERS SHOWN [ ] ARE THUNDERLINE, INC. LINK SEAL TYPE LS NUMBERS.
2. SLEEVES SHALL BE SCHEDULE 40 STEEL FULL THICKNESS OF WALL OR FLOOR, BUT NOT LESS THAN LENGTH NOTED.
3. PIPE SLEEVES TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND REQUIREMENTS
4. SLEEVE LENGTH SHALL BE DETERMINED BY WALL THICKNESS, WITH THE MINIMUM LENGTH AS INDICATED.

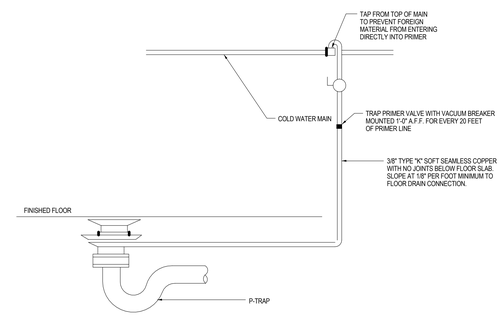
PIPE SLEEVE DETAIL

3 P-501 Not to Scale



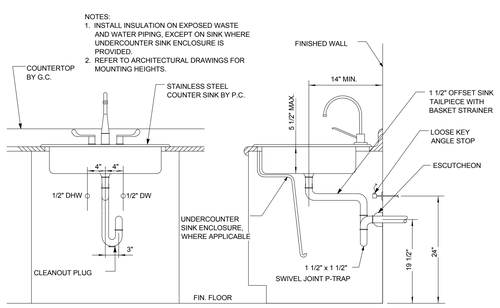
WALL HYDRANT DETAIL

4 P-501 Not to Scale



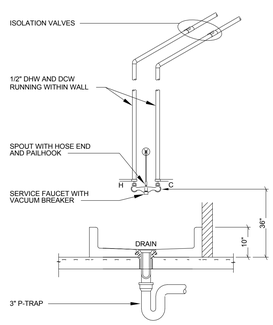
TRAP PRIMER DETAIL

5 P-501 Not to Scale



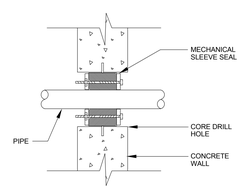
SINK INSTALLATION DETAILS

6 P-501 Not to Scale



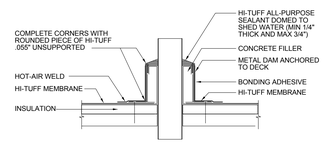
MOP SERVICE BASIN DETAIL

7 P-501 Not to Scale



PIPE PENETRATION THROUGH BELOW GRADE EXTERIOR WALL DETAIL

8 P-501 Not to Scale



ONLY APPLICABLE WHEN THE PROTRUSION HAS A GEOMETRY THAT EFFECTIVELY PREVENTS A NORMAL PIPE OR CURB FLASHING TYPE DETAIL OR THE PROXIMITY OF OTHER PROTRUSIONS PREVENTS PROPER SEAMING.

THE MEMBER BEING FLASHED WITH PITCH POCKET DETAIL MUST BE FIXED AT THE DECK.

FLASHING MINIMUM 6" HIGH WHENEVER POSSIBLE AND MUST BE ABOVE ROOF FLOOD LEVEL.

EXISTING SUPPORT OR SEALING MATERIALS MUST BE REMOVED RATHER THAN BURIED IF,
- STRUCTURALLY INADEQUATE BY DESIGN.
- STRUCTURALLY INADEQUATE BY DETERIORATION.
- LEAVING MATERIAL IN PLACE WOULD TRAP MOISTURE OR OTHER CONTAMINANTS.

PITCH POCKET ROOF PENETRATION DETAIL

9 P-501 Not to Scale

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DRAWING MANAGEMENT

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FY14 B351 WAREHOUSE ADDITION

PLUMBING DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	501

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
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P-501

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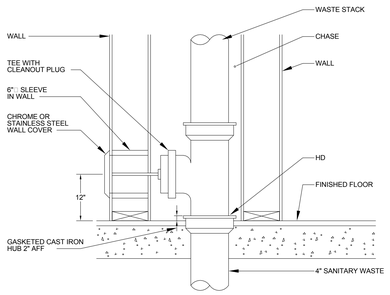
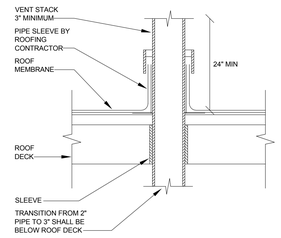


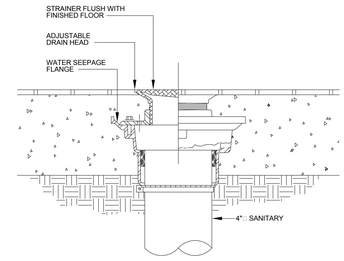
SANITARY STACK CLEANOUT DETAIL

1 / P-502 Not to Scale



VENT STACK THROUGH ROOF DETAIL

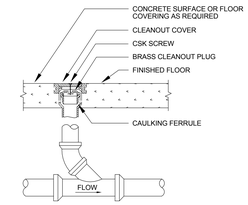
2 / P-502 Not to Scale



NOTES:
1. PROVIDE FLOOR DRAIN WITH TRAP PRIMER TAPPING AND TRAP PRIMER AS SPECIFIED.

FLOOR DRAIN DETAIL

3 / P-502 Not to Scale

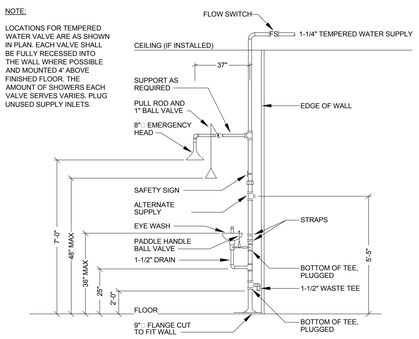


FLOOR CLEANOUT DETAIL

4 / P-502 Not to Scale

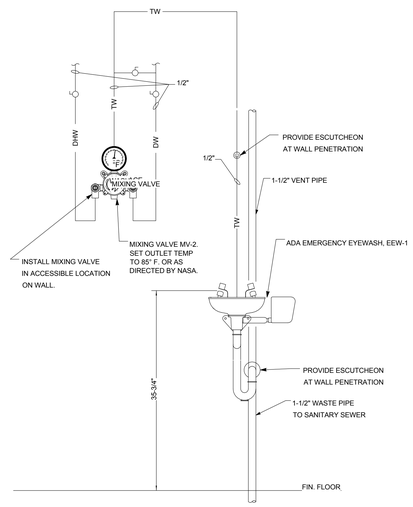
NOTE:

LOCATIONS FOR TEMPERED WATER VALVE ARE AS SHOWN IN PLAN. EACH VALVE SHALL BE FULLY RECESSED INTO THE WALL WHERE POSSIBLE AND MOUNTED 4' ABOVE FINISHED FLOOR. THE AMOUNT OF SHOWERS EACH VALVE SERVES VARIES. PLUG UNUSED SUPPLY INLETS.



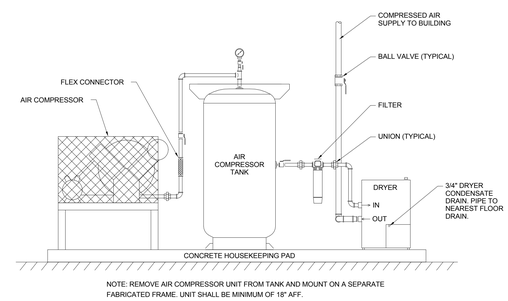
EMERGENCY SHOWER AND EYEWASH DETAIL

5 / P-502 Not to Scale



EMERGENCY EYEWASH DETAILS

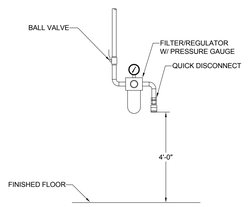
6 / P-502 Not to Scale



NOTE: REMOVE AIR COMPRESSOR UNIT FROM TANK AND MOUNT ON A SEPARATE FABRICATED FRAME. UNIT SHALL BE MINIMUM OF 18" AFF.

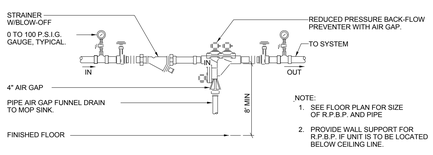
AIR COMPRESSOR DETAIL

7 / P-502 Not to Scale



COMPRESSED AIR DROP DETAIL

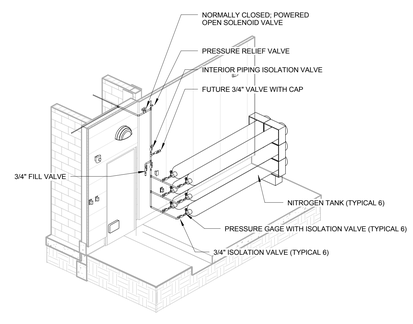
8 / P-502 Not to Scale



NOTE:
1. SEE FLOOR PLAN FOR SIZE OF R.P.B.P. AND PIPE
2. PROVIDE WALL SUPPORT FOR R.P.B.P. IF UNIT IS TO BE LOCATED BELOW CEILING LINE.

RPZ BACKFLOW PREVENTER DETAIL

9 / P-502 Not to Scale



NITROGEN TANK ISOMETRIC

10 / P-502 Not to Scale

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

PLUMBING DETAILS

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3700 Park East Drive, # 200
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Fax: 216/454-9995

Thorson Baker + Associates
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CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN: Author | DESIGNED: | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
PLMB			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE STATUS: WORKING	

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	502

AREA: SHEET 1 OF 1
UNITS: ENGLISH SOFTWARE: REVIT 2014 REVISION = VER 1
SCALE: As indicated OFFICIAL DATE: 06-24-2014

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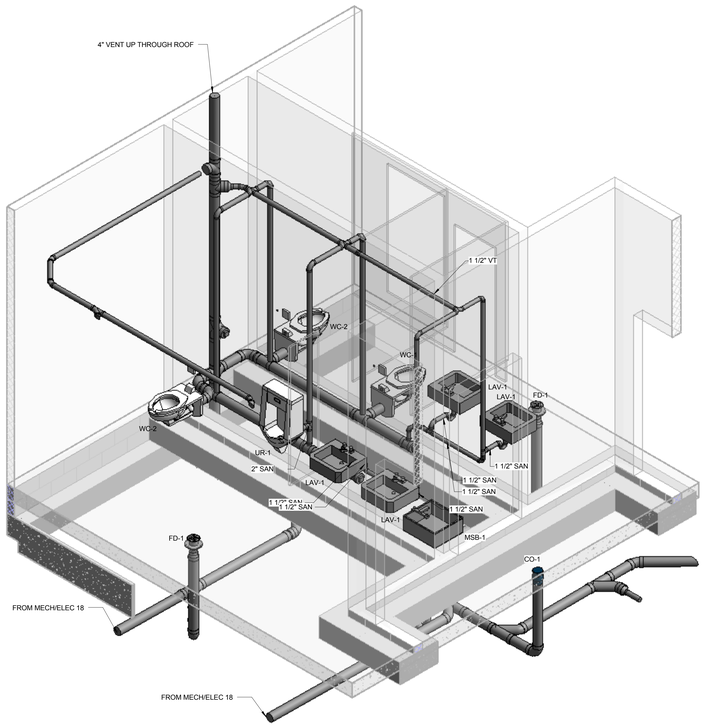
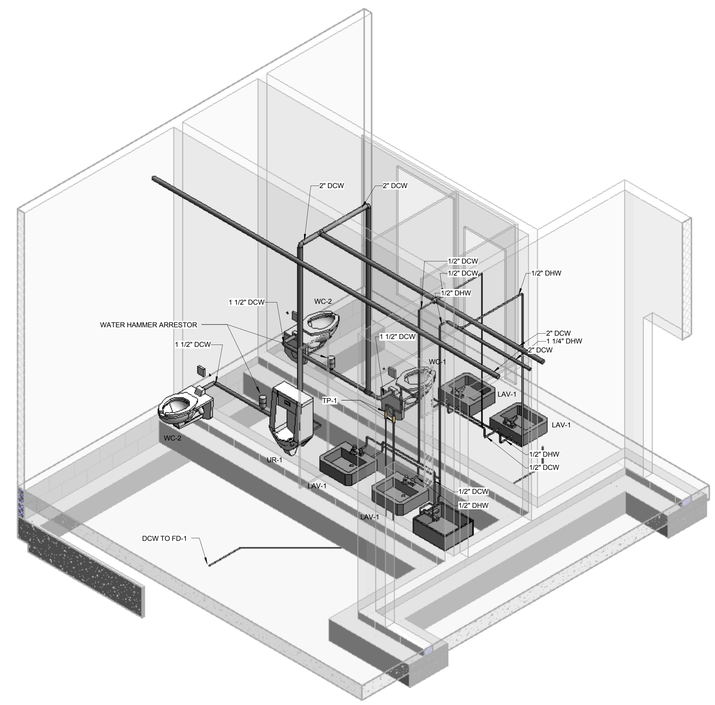
P-502



2 P-601 **EAST END SANITARY RISER**

0 4 8 16'



1 P-601 **EAST END DOMESTIC WATER RISER**

0 4 8 16'

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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CONTRACT: NNC09CA01C
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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: PLMB | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

PLUMBING RISER DIAGRAMS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	601

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: | OFFICIAL DATE: 06-24-2014

P-601
0351-COF20244-P-601_CE_1.dwg TEMPLATE DATE: 02/28/2011

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DRAIN SCHEDULE

TAG	DESCRIPTION / LOCATION	STRAINER SIZE	STRAINER MATERIAL	BODY MATERIAL	OPEN DRAIN AREA (SQ. IN.)	MANUFACTURER & MODEL NUMBER	ACCESSORIES	REMARKS
FD-1	TOILET ROOMS	6" DIAMETER	NICKEL BRONZE	CAST IRON	9	WATTS FD-100-A	TRAP PRIMER CONNECTION	1
FD-2	MECHANICAL ROOMS/ COOLING TOWER	8" DIAMETER	NICKEL BRONZE	CAST IRON	18	WATTS FD-100-A	TRAP PRIMER CONNECTION	1, 2, 4
FCO-1	FLOOR CLEAN OUT	NA	5" NICKEL BRONZE TOP	EPOXY COATED CAST IRON	NA	WATTS CO-200-R	NA	-
RD-1	ROOF DRAIN W/ OVERFLOW	NA	PLAIN BRONZE DOME	D.C.C.I. BODY	DOME AREA: 103	ZURN Z163	DECK EXTENSION	-
RD-2	ROOF DRAIN	NA	PLAIN BRONZE DOME	D.C.C.I. BODY	DOME AREA: 12	ZURN Z185	NA	-
WCO-1	WALL CLEAN OUT	NA	SS ACCESS COVER	CAST IRON	NA	WATTS CO-380-RD	NA	-
DSP-1	DOWNSPOUT NOZZLE	NA	NA	NICKEL BRONZE	NA	ZURN Z199	REMOVABLE STAINLESS STEEL SCREEN	3

1. PROVIDE WATTS TRAP PRIMER CONNECTION ADAPTER WHERE REQUIRED, IN LIEU OF TRAP PRIMER FLOOR DRAIN OPTION.
2. PROVIDE FUNNELS FOR MECHANICAL ROOM FLOOR DRAINS.
3. REFER TO DRAWINGS FOR SIZE.
4. PLUG TRAP PRIMER FITTING FOR COOLING TOWER DRAIN.

WATER FILTER SCHEDULE

TAG	SERVICE	CARTRIDGE SIZE	CONNECTIONS		MAX. FLOW RATE (GPM)	PRESSURE REQUIREMENTS (PSI)	TEMPERATURE REQUIREMENTS (° F)	FILTRATION PERFORMACE	REMARKS
			INLET	OUTLET					
WF-1	HUMIDIFIERS	2-3/4" x 9-3/4"	3/4"	3/4"	5	125	125	5 MICRON	1

1. PROVIDE ONE (1) REPLACEMENT FILTER CARTRIDGE PER UNIT INSTALLED.

WATER HEATER SCHEDULE

TAG	LOCATION	ENERGY SOURCE	INPUT	STORAGE CAPACITY (GAL)	RECOVERY CAPACITY (GPH)	ELECTRICAL REQUIREMENTS (V/PH/HZ)	AMPERAGE	MANUFACTURER & MODEL NUMBER	REMARKS
DWH-1	MECHANICAL ROOM 130	NATURAL GAS	40,000 BTUH	40	41 GPH	120/1/60	15	AO SMITH GPD-40	1, 2, MAINTAIN 140° F. STORAGE TEMPERATURE

1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. 100° F. TEMPERATURE RISE

PUMP SCHEDULE

TAG	SERVICE	TYPE	CAPACITY (GPM)	HEAD / FT	HORSEPOWER	ELECTRICAL REQUIREMENTS (V/ PH/ HZ)	MANUFACTURER & MODEL NUMBER
RP-1	DOMESTIC 120° HOT WATER RECIRCULATING PUMP	IN-LINE CIRCULATOR	2.4	6	10 WATTS	120/1/60	BELL & GOSSETT E3-6V/BTXYZ

RPZ BACKFLOW PREVENTER SCHEDULE

TAG	TYPE	LOCATION	SYSTEM	SIZE	MANUFACTURER & MODEL NUMBER	REMARKS
BFP-1	REDUCED PRESSURE ZONE	MECHANICAL ROOM 130	HVAC MAKE-UP	1"	WILKINS 375XL	1, 2, 3

1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. PROVIDE FIXED AIRGAP FITTING. EXTEND DISCHARGE TO FLOOR DRAIN.
3. BACKFLOW PREVENTER TO BE TESTED AND THE COMPLETION OF THE PROJECT TO CERTIFY PROPER OPERATION.

EXPANSION TANK SCHEDULE

TAG	LOCATION	TANK VOLUME (GAL.)	ACCEPTANCE VOLUME (GAL.)	PHYSICAL SIZE		SYSTEM CONNECTION (IN.)	MAX. OPERATING PRESSURE (PSIG)	MANUFACTURER & MODEL NUMBER	REMARKS
				DIAM. (IN.)	HEIGHT (IN.)				
XT-1	MECHANICAL ROOM 130	5	3.1	12	14	3/4"	150	WESSELS TTA-12	

PLUMBING FIXTURE SCHEDULE

TAG	DESCRIPTION	DHW	DW	TW	SAN	V	TPW	MANUFACTURER AND MODEL NUMBER	REMARKS
WC-1	WATER CLOSET (WALL MOUNTED)	—	1"	—	4"	2"	—	ZURN Z5615-BWL	1, 2, MANUAL DUAL FLUSH 1.1/1.6 GPF
WC-2	HANDICAPPED WATER CLOSET (WALL MOUNTED)	—	1"	—	4"	2"	—	ZURN Z5615-BWL	1, 2, 3, MANUAL DUAL FLUSH 1.1/1.6 GPF
UR-1	URINAL	—	3/4"	—	2"	1-1/2"	—	ZURN Z5708.234.00	1, 2, ELECTRONIC INFRARED 0.125 (PINT) GPF
UR-2	HANDICAPPED URINAL	—	3/4"	—	2"	1-1/2"	—	ZURN Z5708.234.00	1, 2, 3, ELECTRONIC INFRARED 0.125 (PINT) GPF
LAV-1	HANDICAPPED LAVATORY (COUNTER MOUNTED)	1/2"	1/2"	—	2"	1 1/2"	—	ZURN Z5350	1, 2, 3, ZURN Z81104 WRIST BLADE FAUCET 0.5 GPM
SK-1	COUNTERTOP SINK	1/2"	1/2"	—	2"	1 1/2"	—	ELKAY LF19192	1, 2, ELKAY 4" WRIST BLADE FAUCET 0.5 GPM
SK-2	UTILITY SINK	1/2"	1/2"	—	3"	2"	—	KOHLER K-6650	1, 2, ZURN Z841N4 4" WRIST BLADE FAUCET, VACUUM BREAKER
EEW-1	EMERGENCY EYEWASH	—	—	1/2"	2"	1 1/2"	—	SPEAKMAN SE-490-ADA	1, 2
EEW-2	RECESSED EMERGENCY EYEWASH	—	—	1/2"	2"	1 1/2"	—	SPEAKMAN SE-575-DP	1, 2
EWS-1	EMERGENCY EYEWASH SHOWER COMBINATION UNIT	—	—	1-1/4"	—	—	—	SPEAKMAN SE-690-ADA	1, 2
EWC-1	ELECTRIC WATER COOLER (BI-LEVEL)	—	1/2"	—	1-1/4"	1 1/4"	—	ELKAY ERPB2	1, 2
HB-1	HOSE BIBB (INTERIOR)	—	1/2"	—	—	—	—	WATTS SC8-1	1, 2, PROVIDE VACUUM BREAKER
WH-1	WALL HYDRANT (EXTERIOR)	—	3/4"	—	—	—	—	WATTS HY42	1, 2, NON-FREEZE W/ BFP AND MOUNTING BOX
WHA-1	WATER HAMMER ARRESTOR	—	3/4"	—	—	—	—	WATTS LF15M2	1, 2, THREADED CONNECTION
TP-1	TRAP PRIMER VALVE	—	1/2"	—	—	—	3/8"	WATTS LFTP300	1, 2, SURFACE MOUNTED
MSB-1	MOP SERVICE BASIN	1/2"	1/2"	—	3"	2"	—	FIAT TSB3010	1, 2, STAINLESS STEEL CAPS ON ALL CURBS, TNS BRASS B-0663-BSTP FAUCET

1. REFER TO SPECIFICATION SECTION 22 00 00 FOR ADDITIONAL INFORMATION.
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
3. INSTALLATION OF HANDICAPPED PLUMBING FIXTURES SHALL MEET THE REQUIREMENTS OF THE AMERICAN WITH DISABILITES ACT. REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING HEIGHTS.

BALANCING VALVE SCHEDULE

TAG	LOCATION	CALIBRATED FLOW RATE (GPM)	SIZE	REMARKS
BV-1	PRIMARY PRESSURE LAB	2.4	3/4"	B&G CIRCUIT SETTER PLUS

MIXING VALVE SCHEDULE

TAG	SERVICE	ASSE STANDARD	CONNECTIONS		MIN. FLOW (GPM)	MAX. FLOW (GPM)	MANUFACTURER & MODEL NUMBER	REMARKS
			INLETS	OUTLET				
TMV-1	DOMESTIC HOT WATER	1017	1"	1-1/4"	1.0	48	LEONARD TM-820	1
TMV-2	EEW-1	1071	1/2"	1/2"	1.5	5	LEONARD SE-370	1
TMV-3	EEW-2	1071	1/2"	1/2"	1.5	5	LEONARD SE-370	1, 2
TMV-4	EWS-1	1071	3/4"	1"	3.0	12.5	LEONARD SE-362	1

1. MAXIMUM FLOW @ 15 PSI PRESSURE DROP
2. PROVIDE RECESSED MOUNTING CABINET.

AIR COMPRESSOR SCHEDULE

TAG	SERVICE	TYPE	TANK CAPACITY (GALLONS)	FLOW (SCFM)	MAX PRESSURE (PSI)	HORSEPOWER	ELECTRICAL REQUIREMENTS (V/ PH/ HZ)	MANUFACTURER & MODEL NUMBER	REMARKS
AC-1	LAB COMPRESSED AIR	2-STAGE RECIPROCATING	60	14.7 @ 175 PSI	175	5	460/3/60	INGERSOLL RAND 2340L5	

1. PROVIDE INGERSOLL RAND REFRIGERATED DRYER D25IN.
2. PROVIDE 1 MICRON FILTER AND HOUSING. REFER TO DETAIL FOR LOCATION.

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

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SYSTEM: PLMB | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
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RELEASE APPROVAL: | DATE:
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RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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FY14 B351 WAREHOUSE ADDITION

PLUMBING SCHEDULES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	P-	602

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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ELECTRICAL SYMBOLS SCHEDULE

ELECTRICAL ABBREVIATIONS

THIS LIST OF ABBREVIATIONS IS PROVIDED FOR CONVENIENCE ONLY. ITEMS LISTED HERE MAY OR MAY NOT BE USED ON THIS PROJECT.

1/C	SINGLE CONDUCTOR
A	AMPS
A/C	AIR CONDITIONING UNIT
AC	ALTERNATING CURRENT
ACT	ABOVE CEILING TILE
ADJ	ADJUSTABLE
AFC	ABOVE FINISHED CEILING
AFCI	ARC FAULT CIRCUIT INTERRUPTER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ALT	ALTERNATE
ARCH	ARCHITECTURAL
ATS	AUTOMATIC TRANSFER SWITCH
AVG	AVERAGE
BKR	BREAKER
BLDG	BUILDING
BTM	BOTTOM
C	CONDUIT
CAP	CAPACITY
CFM	CUBIC FEET/MINUTE
CIRC	CIRCULATING
CKT	CIRCUIT
CL	CENTERLINE
CLG	CEILING
CO	COMPANY
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CPU	CENTRAL PROCESS UNIT
CT	CURRENT TRANSFORMERS
CU	COPPER
DED	DEDICATED
DET	DETAIL
DIAM	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DIV	DIVISION
DN	DOWN
DPR	DAMPER
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY ONLY
EM GEN	EMERGENCY GENERATOR
ENCL	ENCLOSURE
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EXH	EXHAUST
EXTER	EXTERIOR
FAB	FABRICATE
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FP	FIRE PROTECTION
FPC	FIRE PROTECTION CONTRACTOR
FIN	FINISH
FIXT	FIXTURE
FLASH	FLASHING
FLR	FLOOR
FLUOR	FLUORESCENT
GC	GENERAL CONTRACTOR
GFCI	GOVERNMENT FURNISHED CONTRACTOR INSTALLED
GFI	GROUND FAULT INTERRUPTER
GRD	GROUND
HGT	HEIGHT
HP	HORSEPOWER
HTG	HEATING
HV	HIGH VOLTAGE
HZ	HERTZ
INCL	INCLUDE
INST	INSTANTANEOUS
INSUL	INSULATION
JAN	JANITOR
JB	JUNCTION BOX
JT	JOINT
LTG	LIGHTING
LTS	LIGHTS
LV	LOW VOLTAGE
LVR	LOUVER
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUG ONLY
MTD	MOUNTED
MTG	MOUNTING
NE	NORMAL/EMERGENCY
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD
OPNG	OPENING
PC	PLUMBING CONTRACTOR
PEND	PENDANT
PLBG	PLUMBING
PNL	PANEL
PS	PULL SWITCH
PTs	POTENTIAL TRANSFORMERS
REC	RECESSED
RECEPT	RECEPTACLE
REQD	REQUIRED
RM	ROOM
SECT	SECTION
SIM	SIMILAR
SQ FT	SQUARE FOOT
STAT	THERMOSTAT
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL
SURF	SURFACE
SUSP	SUSPENDED
SUSP CLG	SUSPENDED CEILING
SW	SWITCH
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
VDT	VISUAL DISPLAY TERMINAL
VERT	VERTICAL
WP	WEATHERPROOF
WT	WEIGHT
XFMR	TRANSFORMER

THIS IS A COMPLETE LIST OF ELECTRICAL SYMBOLS FOR REFERENCE ONLY. SYMBOLS SHOWN HERE MAY OR MAY NOT BE USED ON THIS PROJECT.

GENERAL SYMBOLS

- 6 — KEY NOTE INDICATOR
- 5 — ELECTRICAL EQUIPMENT INDICATOR
- 2 — SCHEDULED ITEM INDICATOR
- 2 — DRAWING REVISION INDICATOR
- AC 1 — MECHANICAL EQUIPMENT INDICATOR
- ?? ???? — DETAIL INDICATOR
- ?? ???? — ELEVATION/SECTION INDICATOR

CONDUIT AND WIRING

- BRANCH CIRCUIT RUN CONCEALED
- BRANCH CIRCUIT RUN UNDER FLOOR
- UP — BRANCH CIRCUIT UP OR DOWN
- 2A-1,3,5 — HOME RUN TO PANEL 2A CKTS 1, 3, & 5
- NE — NORMAL & EMERGENCY BRANCH CIRCUIT
- EM — EMERGENCY ONLY BRANCH CIRCUIT
- SMR — SURFACE METAL RACEWAY SIZED FOR NO. OF CONDUCTORS TO BE INSTALLED
- CT-XX — CABLE TRAY, "XX" DEFINE TRAY WIDTH IN INCHES

POWER DISTRIBUTION

- SURFACE MTD PANELBOARD
- FLUSH MTD PANELBOARD
- M — MANUAL MOTOR STARTER
- M — MOTOR CONNECTION
- DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- MAGNETIC STARTER
- COMBINATION STARTER/DISCONNECT
- M — POWER COMPANY METER
- CT — C. T. CABINET
- J — JUNCTION BOX OR PULL BOX
- GRA — GENERATOR REMOTE ANNUNCIATOR
- VFD — VARIABLE FREQUENCY DRIVE
- TRANSFORMER
- ATS — AUTOMATIC TRANSFER SWITCH

ELECTRICAL SINGLE LINE

- DRAW OUT MEDIUM VOLTAGE (15KV OR 5KV) CIRCUIT BREAKER
- DRAW OUT LOW VOLTAGE (480V OR 208) CIRCUIT BREAKER
- MEDIUM VOLTAGE SWITCH
- MEDIUM VOLTAGE SWITCH AND FUSE
- LOW VOLTAGE MOLDED CASE CIRCUIT BREAKER
- ST — SHUNT TRIP CIRCUIT BREAKER
- 2 — COMBINATION MOTOR STARTER- NUMBER INDICATES STARTER SIZE
- MEDIUM VOLTAGE LIQUID FILLED TRANSFORMER
- LOW VOLTAGE DRY TYPE TRANSFORMER
- AUTOMATIC TRANSFER SWITCH
- G — EMERGENCY GENERATOR
- DM — DIGITAL METER
- CURRENT TRANSFORMER
- 4 / 600 — FEEDER SIZE INDICATOR

ELECTRICAL DEVICES

- $ $_2$ $_3$ $_4$ — SINGLE-POLE DOUBLE-POLE 3-WAY & 4-WAY SWITCHES
- $_K — KEY-LOCK SWITCH
- $_P — PILOT-LIGHT SWITCH
- $_L — LIGHTED-HANDLE SWITCH
- $_CO — CENTER-OFF DOUBLE-THROW SWITCH
- $_EXP — EXPLOSION-PROOF SWITCH
- $_D — LOCAL WALL DIMMER SWITCH
- $_DA — AUTOTRANSFORMER LOCAL WALL DIMMER SWITCH
- $_LV — LOW-VOLTAGE WALL SWITCH (MOMENTARY OR MAINTAINED CONTACT)
- $_MC — MOMENTARY-CONTACT SWITCH
- $_F — FAN SWITCH
- $_PB — PUSH-BUTTON SWITCH
- $_RB — RESET BUTTON SWITCH
- $_T — TIMER SWITCH
- $_M — 1-2 POLE MOTOR-RATED SWITCH WITH OVERLOAD
- $_EPO — EMERGENCY POWER OFF SWITCH
- T — TIMECLOCK
- PC — PHOTOCELL
- L C — LIGHTING CONTROL RELAY PANEL
- CC — CONTACT CLOSURE INTERFACE
- VI — VARIABLE INTENSITY SWITCH (SURGERY)
- R — RELAY W/ NUMBER AND TYPE OF POLES AS INDICATED
- RI — REMOTE INDICATOR
- DB — DOORBELL
- CH — CHIME
- PP — POWER POLE
- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE
- DOUBLE DUPLEX RECEPTACLE
- GFI — GFI DOUBLE DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE ON NORMAL/EMERGENCY
- GFI DUPLEX RECEPTACLE
- DUPLEX SPLIT WIRED WITH BOTTOM OUTLET ON WALL SWITCH
- SAFETY TYPE DUPLEX RECEPTACLE
- DUPLEX RECEPTACLE FLOOR BOX
- DOUBLE DUPLEX RECEPTACLE FLOOR BOX
- IG — ISOLATED GROUND TYPE DUPLEX RECEPTACLE WITH SURGE SUPRESSION
- EWC — GFI DUPLEX FOR ELECTRIC WATER COOLER COORDINATE LOCATION WITH SUPPLIER
- WP — GFI RECEPTACLE WITH WEATHERPROOF IN-USE COVER
- EXP — EXPLOSION-PROOF RECEPTACLE
- FF — FLUSH-FLOOR MOUNTED RECEPTACLE
- FP — PEDESTAL-FLOOR MOUNTED RECEPTACLE
- CP — PEDESTAL-COUNTER MOUNTED RECEPTACLE
- C — CLOCK RECEPTACLE
- CLG — RECEPTACLE MOUNTED ON CEILING
- PS — SURFACE MOUNTED MULTI-OUTLET ASSEMBLY DUPLEX OUTLETS MOUNTED ON 1'-0" CENTERS UNLESS OTHERWISE NOTED
- SPECIAL PURPOSE RECEPTACLE - SIZE & TYPE AS INDICATED ON SCHEDULED
- D — DROP CORD
- J — PF — POWER FEED AT MOVEABLE PARTITION
- PE — PNEUMATIC TO ELECTRIC DEVICE
- EP — ELECTRIC TO PNEUMATIC DEVICE
- DUPLEX RECEPTACLE ON DESIGNATED CIRCUIT (GRAY RECEPTACLE)
- DOUBLE DUPLEX RECEPTACLE WITH ONE DUPLEX ON NORMAL CIRCUIT & ONE DUPLEX (GRAY) ON DESIGNATED CIRCUIT
- INDICATES OUTLET TO BE MOUNTED 8" ABOVE COUNTER HEIGHT. TYPICAL UNLESS NOTED OTHERWISE
- DOGHOUSE STYLE PEDESTAL RECEPTACLE
- M — MOTORIZED DAMPER
- EMERGENCY PUSH BUTTON

DEMOLITION/EXISTING

(NOTATIONS TYPICAL)

- J ETR — DENOTES EXISTING TO REMAIN
- J RX — DENOTES REMOVE
- J RR — DENOTES REMOVE AND RELOCATE
- J ER — DENOTES EXISTING RELOCATED

LIGHTING

- A / 2A-2a — FIXTURE DESIGNATIONS: 'A' FIXTURE TYPE 'a' SWITCH NO. '2A-2' PANEL 2A CKT #2
- 2X4 FIXTURE
- 2X2 FIXTURE
- 1X1 FIXTURE
- 1X4 FIXTURE
- FLUORESCENT STRIPLIGHT
- PENDANT TUBE FIXTURE
- CEILING MTD FLUORESCENT OR HID FIXTURE
- CLG MTD FLUORESCENT OR HID WALL WASHER
- WALL MTD FLUORESCENT OR HID FIXTURE
- POLE MTD HID FIXTURE
- CEILING MTD EXIT SIGN W/ ARROWS AS INDICATED
- WALL MTD EXIT SIGN W/ ARROWS AS INDICATED
- LIGHTING TRACK - LENGTH OF TRACK AND NO. OF FIXTURES AS INDICATED ON PLAN.
- 2X4 FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- 2X2 FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- 1X1 FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- 1X4 FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- FLUORESCENT STRIPLIGHT ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- PENDANT TUBE FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- CEILING MOUNTED FLUORESCENT OR HID FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- CEILING MOUNTED FLUORESCENT OR HID WALL WASHER ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)
- WALL MOUNTED FLUORESCENT OR HID FIXTURE ("●" - DESIGNATES FIXTURE ON NORMAL/EMERGENCY POWER)

EMERGENCY BATTERY PACK

- a — BATTERY PACK W/ NO. OF HEADS AS SHOWN. 'a' - INDICATES REMOTE FIXTURES POWERED
- a — REMOTE EMERGENCY HEAD - 'a' INDICATES BATTERY PACK.

OCCUPANCY SENSORS

- U a — CEILING MOUNTED ULTRASONIC OCCUPANCY SENSOR, WHERE 'a' INDICATES LIGHTING ZONE CONTROLLED
- D a — CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR, WHERE 'a' INDICATES LIGHTING ZONE CONTROLLED

COMMUNICATIONS

- TELECOMMUNICATIONS OUTLET. PROVIDE 4-11/16"x4-11/16"x2-1/8" DEEP BACKBOX WITH SINGLE GANG TRIM RING AND 1-1/4" CONDUIT WITH PULLSTRING UP TO ACCESSIBLE CEILING SPACE. TERMINATE 4" ABOVE TO ACCESSIBLE CEILING SPACE WITH BUSHING AND 90 DEGREE TURN. CABLING BY NASA SUPPORT CONTRACTOR.
- W — WALL MOUNTED TELECOMMUNICATIONS OUTLET. PROVIDE 4-11/16"x4-11/16"x2-1/8" DEEP BACKBOX WITH SINGLE GANG TRIM RING AND 1-1/4" CONDUIT WITH PULLSTRING UP TO ACCESSIBLE CEILING SPACE. TERMINATE 4" ABOVE CEILING WITH BUSHING AND 90 DEGREE TURN. CABLING BY NASA SUPPORT CONTRACTOR.
- FF A — FLOOR BOX TYPE A - POWER FLOOR BOX
- FF B — FLOOR BOX TYPE B - NETWORK FLOOR BOX
- FF C — FLOOR BOX TYPE C - POWER / NETWORK / AV FLOOR BOX.
- CT-"XX"-"YY" — 4" DEEP CABLE TRAY WITH FIRST SECTION "XX" WIDE AND SECOND SECTION "YY" WIDE
- SMR WITH TELECOM OUTLET
- TGB — TELECOM GROUNDING BUSSBAR
- TMGB — TELECOM MAIN GROUNDING BUSSBAR
- W"X" — AUDIOVISUAL BACKBOX TYPE "X" REFER TO AUDIOVISUAL BACK BOX SCHEDULE

GROUNDING AND LIGHTNING PROTECTION

- G — GROUNDING BUS BAR
- G — GROUND CONDUCTOR RUN CONCEALED
- G — GROUND CONDUCTOR RUN UNDER FLOOR
- G — CONNECTION TO AIR TERMINAL FOR LIGHTNING PROTECTION
- GROUND CONNECTION
- TW — GROUND ROD TEST WELL

FIRE ALARM SYSTEM

- MANUAL PULL STATION
- HORN (ONLY)
- HORN AND STROBE LIGHT
- CHIME AND STROBE LIGHT
- FIRE ALARM BELL
- TB — REMOTE TROUBLE BELL
- STROBE LIGHT
- FS — FIRE ALARM SPEAKER - CEILING MTD
- FS — FIRE ALARM SPEAKER
- FS — FIRE ALARM SPEAKER WITH TRUMPET
- FS — COMBINATION SPEAKER/STROBE LIGHT - CEILING MOUNTED
- FS — COMBINATION SPEAKER/STROBE LIGHT 15 CD UNLESS OTHERWISE NOTED
- ID — IONIZATION TYPE SMOKE DETECTOR
- PD — PHOTOELECTRIC TYPE SMOKE DETECTOR
- TD — THERMAL TYPE DETECTOR
- PD E — PHOTOELECTRIC TYPE DETECTOR FOR ELEVATOR RECAPTURE
- TD E — THERMAL TYPE DETECTOR FOR ELEVATOR SHUNT TRIP
- ID D — IONIZATION TYPE DETECTOR MOUNTED TO DUCT
- PD D — PHOTOELECTRIC TYPE DETECTOR MOUNTED TO DUCT
- TD D — THERMAL TYPE DETECTOR MOUNTED TO DUCT
- RA — REMOTE ANNUNCIATOR FOR DETECTOR
- RI — REMOTE TEST SWITCH FOR DETECTOR
- PD R — PHOTOELECTRIC TYPE SMOKE DETECTOR WITH RELAY
- PD DH — SMOKE DETECTOR FOR DOOR HOLDS
- CO — CARBON MONOXIDE TYPE DETECTOR
- CO D — CARBON MONOXIDE TYPE DETECTOR MOUNTED TO DUCT
- FS — FLOW SWITCH
- TS — TAMPER SWITCH
- PS — PRESSURE SWITCH FOR DRY TYPE SYSTEM
- SH — ELECTROMAGNETIC SHUTTER HOLDER
- DH — ELECTROMAGNETIC DOOR HOLDER
- DC — FIRE ALARM SYSTEM ACTIVATED DOOR CLOSER
- FT — FIREMANS TELEPHONE JACK
- CM — CONTROL MODULE
- MM — MONITOR MODULE
- BD R — BEAM DETECTOR - RECEIVER
- BD T — BEAM DETECTOR - TRANSMITTER
- FACP — FIRE ALARM CONTROL PANEL
- FAEP — FIRE ALARM EXTENDER PANEL
- FACC — FIRE ALARM COMMAND CENTER
- FAA — FIRE ALARM ANNUNCIATOR
- FTR — FIRE ALARM PUNCH TAPE RECORDER
- FDGP — FIRE ALARM DATA GATHERING PANEL
- FSCP — FIRE SUPPRESSION CONTROL PANEL
- FAGP — FIRE ALARM GRAPHIC PANEL
- FIRE, SMOKE OR FIRE/SMOKE DAMPER

AUTOMATIC DOOR

- MD H — MOTION DETECTOR "H" - HEAD MOUNTED; "C" - CEILING MOUNTED
- PA — PUSH PLATE ACTUATOR
- KS — KEY SWITCH
- PR — POWER RESET
- PS — PRESENCE SENSOR
- SI — DOOR MOUNTED SAFETY INTERLOCK
- KR — KEY OPERATED REMOTE CONTROL UNIT
- ES — ELECTRIC STRIKE
- OHJ — OPERATOR HEAD JUNCTION POWER CONNECTION

SOUND SYSTEM

- S — SPEAKER - CEILING MOUNTED FLUSH
- S S — PAGING HORN SPEAKER - CEILING MOUNTED SURFACE
- S I — SPEAKER - CEILING MOUNTED FLUSH, CONNECT TO LOCAL INTERCOM SYSTEM
- S — TRUMPET TYPE SPEAKER - WALL MOUNTED
- V — VOLUME CONTROL
- M — PAGING MICROPHONE OUTLET
- IM D — MASTER INTERCOM STATION - "D" DENOTES DESK MOUNTED
- IC — INTERCOM STATION
- IS — 2-ROOM INTERCOM STATION - WALL MOUNTED
- IS — 2-ROOM INTERCOM STATION - CEILING MOUNTED
- IS F — FOOT SWITCH INTERCOM STATION
- SSC — SOUND SYSTEM CONSOLE
- SSE — SOUND SYSTEM EQUIPMENT
- AMP — AMPLIFIER
- RAA — REMOTE AUDIO VISUAL PA ANNUNCIATOR

ACCESS CONTROL

- X — ACCESS CONTROL DOOR CALLOUT, TYPE "X"
  - C1 - CARD READER, SINGLE DOOR
  - C2 - CARD READER, DOUBLE DOOR
  - C1D - CARD READER, SINGLE DOOR, DELAYED EGRESS
  - C2D - CARD READER, DOUBLE DOOR, DELAYED EGRESS
  - C1I - CARD READER, SINGLE DOOR, INTERCOM SUBSTATION
  - C2I - CARD READER, DOUBLE DOOR, INTERCOM SUBSTATION
  - C1F - PREP FOR FUTURE CARD READER SINGLE DOOR
  - C2F - PREP FOR FUTURE CARD READER DOUBLE DOOR
  - CO - CARD READER, OVERHEAD DOOR
  - CP - CARD READER, PARKING GATES
  - DE1 - DELAYED EGRESS, SINGLE DOOR
  - DE2 - DELAYED EGRESS, DOUBLE DOOR
  - EE - ELECTRIFIED EGRESS
  - M1D - MONITORED, SINGLE DOOR, DELAYED EGRESS
  - M1R - MONITORED, SINGLE DOOR, REQUEST TO EXIT
  - M2R - MONITORED, DOUBLE DOOR, REQUEST TO EXIT
  - M2RI - MONITORED, DOUBLE DOOR, REQUEST TO EXIT, TELECOM
  - V1 - VESTIBULE, ONE SET OF DOUBLE DOORS
  - V2 - VESTIBULE, TWO SETS OF DOUBLE DOORS
  - V3 - VESTIBULE, THREE SETS OF DOUBLE DOORS
- BR — BIOMETRIC READER
- CR — CARD READER
- PR — PARKING GATE CARD READER
- EC — ELEVATOR CARD READER
- RS — PASSIVE INFRARED REQUEST TO EXIT
- LA — LOCAL ALARM
- RB — REQUEST TO EXIT PUSH BUTTON
- RX — REQUEST TO EXIT SWITCH IN DOOR HARDWARE
- EL — ELECTRIC LATCH RETRACTION
- DE — DELAYED EGRESS
- ES — ELECTRIC STRIKE
- ET — ELECTRIC TRIM
- EM — ELECTRIC MORTISE
- EH — ELECTRIC POWER TRANSFER OR HINGE
- ML — ELECTROMAGNETIC LOCK
- DC — DOOR CONTACT SWITCH
- WC — WINDOW CONTACT SWITCH
- KS — KEYSWITCH
- OC — OVERHEAD DOOR CONTACT SWITCH
- AO — AUTOMATIC OPENER
- KB — FIREMAN'S KEY BOX
- PA — PUSH PLATE ACTUATOR
- PB — DURESS PANIC BUTON
- LD — VEHICLE LOOP DETECTOR
- RR — REMOTE RELEASE
- MD — MOTION DETECTOR
- GB — GLASS BREAK DETECTOR
- EP — EMERGENCY TELEPHONE
- BL — EMERGENCY TELEPHONE BLUE BEACON
- IM — INTERCOM MASTERSTATION
- IS — INTERCOM SUBSTATION
- VS — VIDEO SUBSTATION
- SM — SECURITY MONITOR DISPLAY
- SP — SECURITY PANEL LOCATION
- DVR — DIGITAL VIDEO RECORDER
- NVR — NETWORK VIDEO RECORDER
- SVPS — SECURITY SYSTEM UPS
- ACP — ACCESS CONTROL PANEL
- SPS — SECURITY ACCESS CONTROL INTRUSION DETECTION POWER SUPPLY
- CPS — CAMERA POWER SUPPLY
- DHPS — DOOR HARDWARE POWER SUPPLY
- IDP — INTRUSION DETECTION PANEL
- S — FIXED SECURITY CAMERA. PROVIDE 1" CONDUIT TO DATA/COMM ROOM 110.
- S — WALL MOUNTED SECURITY CAMERA. PROVIDE 1" CONDUIT TO DATA/COMM ROOM 110.
- S PTZ — FIXED PAN, TILT, ZOOM SECURITY CAMERA. PROVIDE 1" CONDUIT TO DATA/COMM ROOM 110.
- S PTZ — WALL MOUNTED PAN, TILT, ZOOM SECURITY CAMERA. PROVIDE 1" CONDUIT TO DATA/COMM ROOM 110.

GENERAL NOTES

1. REFER TO SHEET G-000 FOR LIST OF PROJECT DRAWINGS.
2. WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE N.E.C. AND ALL RULES AND REGULATIONS OF THE GLENN RESEARCH CENTER.
3. WORK SHALL MEET THE APPROVAL OF THE OWNERS REPRESENTATIVE.
4. WIRES SMALLER THAN #12 AWG SHALL NOT BE USED FOR LIGHTING OR POWER CIRCUITS.
5. MINIMUM CONDUIT SIZE SHALL BE 3/4"
6. EQUIPMENT SHALL BEAR U.L. LABELS AND BE GROUNDED AND BONDED IN ACCORDANCE WITH THE N.E.C.
7. DUPLEX RECEPTACLES SHALL BE SURFACE MOUNTED ON MASONRY WALLS WITH SURFACE MOUNTED OUTLETS BOX AND SURFACE METAL RACEWAY. WHERE DUPLEX RECEPTACLES ARE SHOWN AND CAN BE INSTALLED IN GYPSUM BOARD CONSTRUCTION, THEY SHALL BE RECESS MOUNTED.
8. LOCATE JUNCTION BOXES AS REQUIRED TO ALLOW ACCESS AFTER MECHANICAL EQUIPMENT AND DUCTWORK IS INSTALLED. COORDINATE EXACT LOCATIONS WITH THE MECHANICAL TRADE.
9. THE USE OF APPROVED TYPE EXPANSION FITTINGS SHALL BE REQUIRED ON ALL RACEWAYS WHICH CROSS ANY BUILDING EXPANSION JOINTS.
10. EACH DESIGNATED CIRCUIT HOMERUN SERVING RECEPTACLES SHALL HAVE ITS OWN INDIVIDUAL FULL SIZE NEUTRAL BACK TO PANEL.
11. COORDINATE ELEVATION AND LOCATION OF ELECTRICAL DEVICES WITH ARCHITECTURAL DRAWINGS PRIOR TO INSTALLATION.
12. VERIFY SMR LOCATIONS IN REFERENCE TO CASEWORK LOCATIONS. PROVIDE RISER DUCTS AS REQUIRED WHEN SMR ELEVATION CHANGES AS WELL AS FACTORY ELBOWS AND MISCELLANEOUS END PLATES.
13. PROVIDE MINIMUM 2 POINT SUPPORT FROM STRUCTURE TO LIGHTING FIXTURES. 2x4 LIGHTING FIXTURES SHALL HAVE 4-POINT SUPPORT ON STRUCTURE.
14. SMR SHALL BE ATTACHED TO WALL WITH PLUGS AND SCREWS. TAP CONS ARE NOT ACCEPTABLE.
15. PROVIDE PLASTER FLANGES FOR RECESSED LIGHTING FIXTURES IN DRYWALL OR PLASTER CEILINGS. COORDINATE CEILING TYPES WITH ARCHITECTURAL REFLECTED CEILING PLANS.
16. SEE ARCHITECTURAL FLOOR PLANS FOR WALL CONSTRUCTION TYPES.
17. CEILING MOUNTED ELECTRICAL DEVICES SHALL BE MOUNTED IN THE CENTER OF THE CEILING TILES, UNLESS OTHERWISE NOTED.
18. MAINTAIN ACCESS TO ALL COMMUNICATIONS RACEWAYS ABOVE LAY-IN CEILINGS.
19. COORDINATE WITH HVAC, PLUMBING AND FIRE PROTECTION CONTRACTORS FOR LOCATION AND POWER REQUIREMENTS OF EQUIPMENT. MAINTAIN ACCESSIBLIITY TO CONTROLS.
20. WHERE NO SHORT CIRCUIT INTERRUPT/WITHSTAND RATING IS INDICATED, DEVICES OR EQUIPMENT SHALL BE RATED THE SAME AS THE NEAREST UPSTREAM DEVICE. IF THERE IS A CONFLICT BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, PROVIDE THE HIGHEST RATING SPECIFIED OR SHOWN.
21. WHERE DEVICES ARE SHOWN ON OPPOSITE SIDES OF COMMON WALLS, STAGGER DEVICES 8" HORIZONTALLY TO MINIMIZE SOUND TRANSMISSION BETWEEN ROOMS. DO NOT INSTALL BOXES BACK TO BACK. DO NOT INSTALL THROUGH WALL BOXES.
22. INTUMESCENT FIRE STOP SHEETS SHALL BE WRAPPED BEHIND ALL ELECTRICAL BOXES IN FIRE RATED WALLS.
23. EQUIPMENT LISTED ON THESE DRAWINGS BY MANUFACTURER'S BRAND NAME IS TO DENOTE THE QUALITY AND SALIENT FEATURES FOR EQUAL PRODUCTS ONLY.
24. MC CABLE IS APPROVED FOR 20A AND 30A BRANCH CIRCUITS CONCEALED IN WALLS OR ABOVE CEILINGS. EMT AND WIRE SHALL BE USED FOR LARGER CIRCUITS AND BRANCH CIRCUITS THAT ARE NOT CONCEALED.
25. SURFACE METAL RACEWAY (SMR) TO BE LARGE/HIGH-CAPACITY, DUAL CHANNEL, ALUMINUM - WIREMOLD ALDS4000 SERIES OR APPROVED EQUAL.

ELECTRICAL DEVICE MOUNTING SCHEDULE

WALL SWITCH OUTLETS	48" AFF
WALL MOUNTED OCCUPANCY SENSOR	TIGHT TO THE CEILING, UNLESS OTHERWISE NOTED
RECEPTACLES	18" AFF
WALL TELEPHONE OUTLETS	46" AFF
TELECOMMUNICATION OUTLETS	18" AFF UON
FIRE ALARM PULL STATION	48" AFF
FIRE ALARM STROBES	6" BELOW FINISHED CEILING OR 90" AFF WHICHEVER IS LOWER
FIRE ALARM SPEAKER/STROBES	6" BELOW FINISHED CEIILING OR 90" AFF WHICHEVER IS LOWER

NOTES:

1. DEVICE MOUNTING HEIGHTS ARE TO THE CENTER OF BOX AND SHALL BE AS INDICATED ABOVE, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
2. DEVICE HEIGHTS ARE ABOVE FINISHED FLOOR, NOT STRUCTURAL SLAB. COORDINATE WITH FLOOR FINISHED SCHEDULES PRIOR TO ROUGH IN.
3. ELECTRICAL DEVICES AND FIRE ALARM DEVICES SHALL BE INSTALLED PER ADA.

ELECTRICAL DRAWING LIST

CHG	NUM	DESCRIPTION	APP/DATE
	LAST APPROVED EDMS REVISION	TECH LEAD: / FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

STANTEC
3700 Park East Drive, # 200
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Thorson Baker + Associates
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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT — SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES: | D.ENG: | PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC. — RELEASE APPROVAL: — DATE:

CONTRACT NO.: NNC09CA01C — RELEASE APPROVAL: — DATE:

TASK ORDER — RELEASE APPROVAL: — DATE:

DRAWN: JRH | DESIGNED | CHECKED

APPROVED: Approver | APPROVAL DATE

RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL COVER SHEET

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	001

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1

SCALE: 1" = 1'-0" | OFFICIAL DATE: 06-24-2014

E-001

0351-COF20244-E-001_CE_1.dwg TEMPLATE DATE: 02/28/2011

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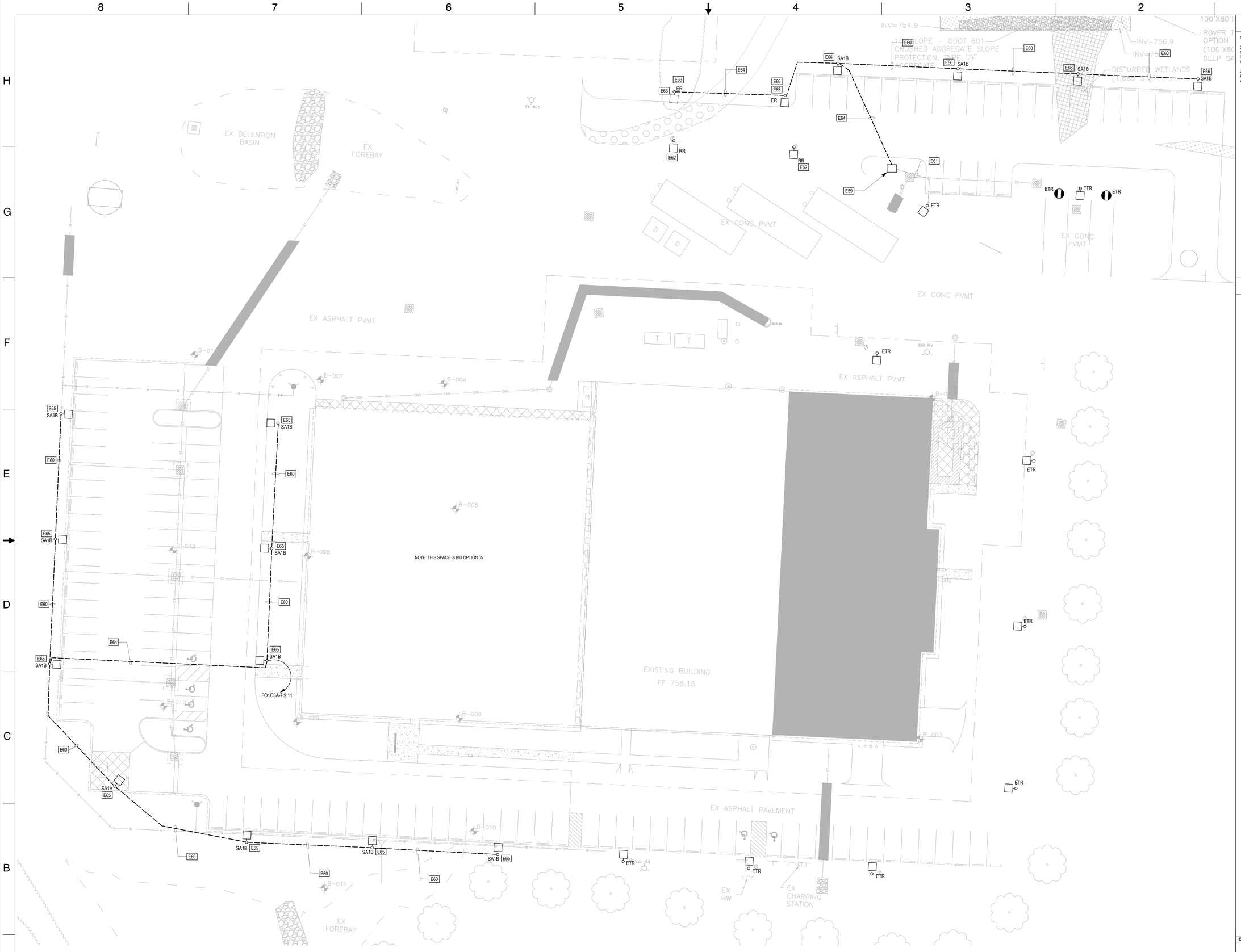

1 ELECTRICAL SITE PLAN
1/16" = 1'-0"

GENERAL NOTES

1. REFER TO SHEET E-001 FOR ELECTRICAL SYMBOLS LEGEND AND NOTES.
2. REFER TO LANDSCAPE / CIVIL DRAWINGS FOR FENCING LOCATIONS (WORK LISTED AS OPTIONS). PROVIDE GROUNDING AT FENCING / GATE LOCATIONS AS REQUIRED. REFER TO DETAIL E3, DRAWING E-501. COORDINATE LOCATIONS,REQUIREMENTS AND INSTALLATION WITH CIVIL / LANDSCAPE TRADE.
3. COORDINATE WORK AT WEST PARKING LOT WITH CIVIL / LANDSCAPE SITE SCOPE AND PHASING. COORDINATE REQUIREMENTS AND INSTALLATION WITH CIVIL / LANDSCAPE TRADES AND OWNER.

KEY NOTES

E59	PROVIDE 12"X12" HANDHOLE TO INTERCEPT EXISTING SITE LIGHTING CONDUIT AND WIRING IN THIS AREA.
E60	PROVIDE (3) #10 + (1) #12 GROUND IN 1" CONDUIT.
E61	EXISTING CONDUIT AND WIRING TO REMAIN. INTERCEPT CONDUIT AND WIRING IN NEW HANDHOLE. SPLICE EXISTING CIRCUIT TO EXTEND CIRCUITING TO LIGHTS AS INDICATED.
E62	REMOVE EXISTING LIGHT POLE AND SALVAGE FOR REINSTALLATION. REFER TO THIS DRAWING FOR RELOCATION. REMOVE EXISTING POLE BASE AND ASSOCIATED CONDUIT AND WIRING BACK TO LOCATION OF NEW HANDHOLE. MAINTAIN CIRCUIT INTEGRITY FOR SPLICING TO FIXTURES UNDER THIS WORK.
E63	REINSTALL LIGHT FIXTURE SALVAGED FROM DEMOLITION.
E64	CONCRETE ENCASE CONDUIT UNDER DRIVE LANE. EXTEND CONCRETE 2' BEYOND EDGE OF DRIVE LANE. REFER TO CIVIL DRAWINGS FOR BURIAL DEPTH OF CONDUIT. PROVIDE (3) #10 + (1) # 12 GROUND IN 1" CONDUIT.
E65	REFER TO DETAIL D6/E502 FOR LIGHTING FIXTURE POLE BASE DETAIL..
E66	REFER TO DETAIL D8/E502 FOR LIGHTING FIXTURE POLE BASE DETAIL..

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

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FY14 B351 WAREHOUSE ADDITION

ELECTRICAL SITE PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	100

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: 1/16" = 1'-0" | OFFICIAL DATE: 06-24-2014

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TEMPLATE DATE: 02/28/2011

1 E-102 **FIRST FLOOR - LIGHTING - PART A**

1/8" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E600 FOR LIGHTING FIXTURE TYPE, DESCRIPTION, LAMPING, ETC.
4. EMERGENCY BATTERY UNITS SHALL BE WIRED AHEAD OF SWITCHING AND OCCUPANCY SENSORS TO ALLOW FOR CONSTANT BATTERY CHARGE.
5. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
6. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
7. ALL EXPOSED CONDUIT ON THE WALLS OF THE SHOP OR STORAGE AREA SHALL BE RIGID GALVANIZED STEEL, UNLESS NOTED OTHERWISE.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM E1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO E001 FOR THE ENTIRE LIST OF ALL KEY NOTES ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

- E1 REFER TO DETAIL F4/E-502 FOR OCCUPANCY SENSOR WIRING DIAGRAM.
- E2 REFER TO DETAIL F6/E-502 FOR OCCUPANCY SENSOR WIRING DIAGRAM.
- E4 REFER TO ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHT AND LOCATION OF LIGHTING FIXTURE.
- E23 REFER TO DETAIL B4/ES02 FOR OCCUPANCY SENSOR WIRING DIAGRAM.
- E97 REFER TO DETAIL E5/E-501 FOR SMART LED DOWNLIGHT WIRING DIAGRAM. PROVIDE POWER SUPPLIES, FILTERS, CONDUIT, CONDUCTORS, WALL DIMMER, AND APPURTENANCES REQUIRED FOR A COMPLETE INSTALLATION. PERFORM INSTALLATION EXACTLY AS PRESCRIBED BY LIGHTING MANUFACTURER.

CHG	NUM	DESCRIPTION	APP/DATE
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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR - LIGHTING - PART A

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN: JRH | DESIGNED: | CHECKED:
APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

N — 37° 51' 21" — NASA GRID NORTH

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	102

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-102

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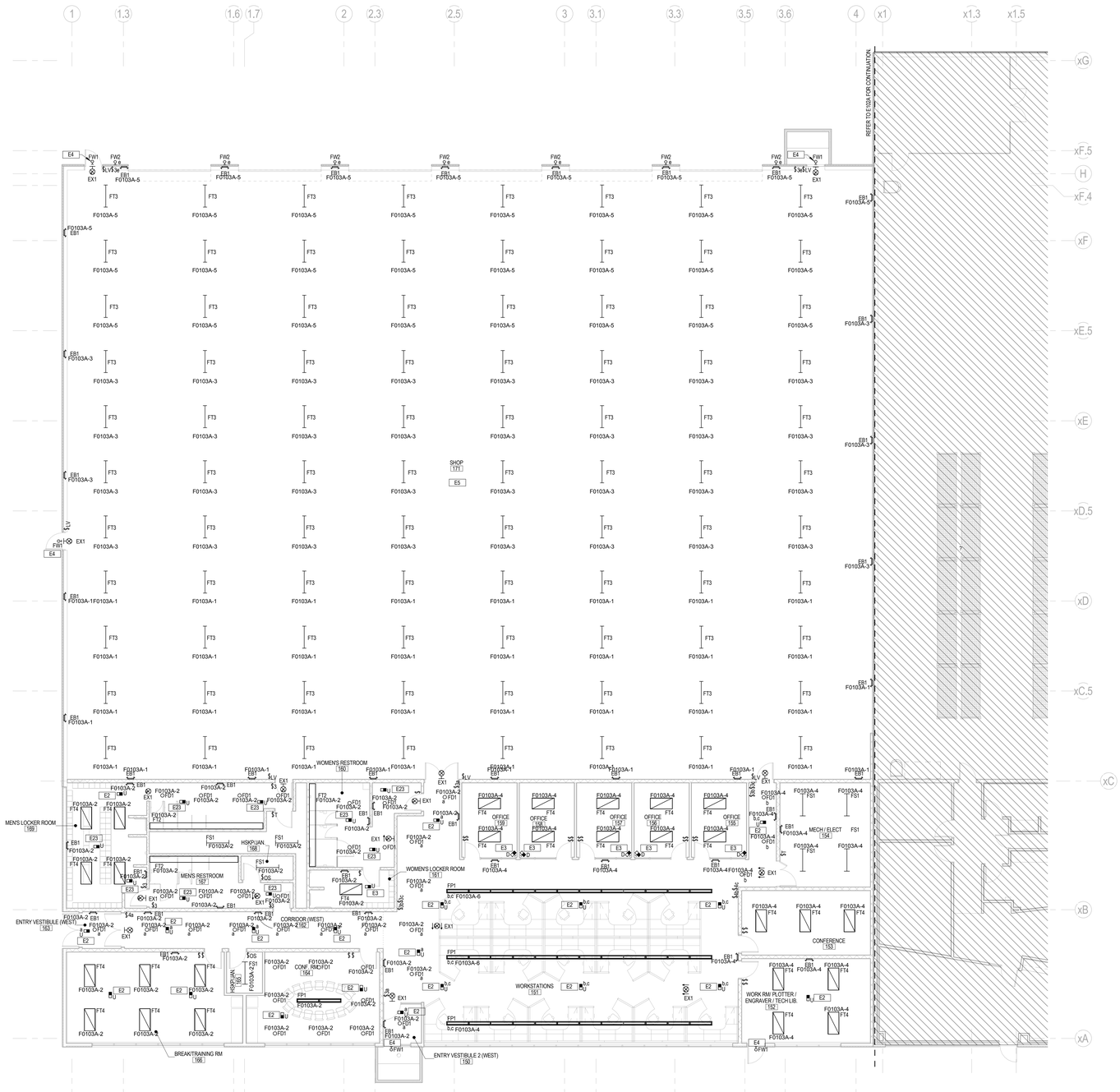

1 FIRST FLOOR - LIGHTING - PART B

E-103 1/8" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E600 FOR LIGHTING FIXTURE TYPE, DESCRIPTION, LAMPING, ETC.
4. EMERGENCY BATTERY UNITS SHALL BE WIRED AHEAD OF SWITCHING AND OCCUPANCY SENSORS TO ALLOW FOR CONSTANT BATTERY CHARGE.
5. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
6. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
7. ALL EXPOSED CONDUIT ON THE WALLS OF THE SHOP OR STORAGE AREA SHALL BE RIGID GALVANIZED STEEL, UNLESS NOTED OTHERWISE.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM E1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO E001 FOR THE ENTIRE LIST OF ALL KEY NOTES. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

E2	REFER TO DETAIL F6/E-502 FOR OCCUPANCY SENSOR WIRING DIAGRAM.
E3	REFER TO DETAIL F8/E-502 FOR OCCUPANCY SENSOR WIRING DIAGRAM.
E4	REFER TO ARCHITECTURAL ELEVATIONS FOR MOUNTING HEIGHT AND LOCATION OF LIGHTING FIXTURE.
E5	LIGHTING CONTROL TO BE TIED INTO TIME CLOCK CONTROL. SELECTED LIGHTS SHALL BE BLINKED AT 20 MINUTES, 10 MINUTES, 5 MINUTES, 2 MINUTES AND 1 MINUTE PRIOR TO "OFF" (FIXTURE "FT3-6"). OVERRIDE OF TIME CONTROL FOR 1 HOUR SHALL BE PROVIDED VIA LOCALIZED SWITCHES. REFER TO DETAIL A8/E502.
E23	REFER TO DETAIL B4/E502 FOR OCCUPANCY SENSOR WIRING DIAGRAM.

N
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NASA GRID NORTH

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BLDG			

NASA APPROVALS

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D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE STATUS: WORKING	

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED		TECH LEAD:	FAC-SYS MGR: / REV DATE:
EDMS REVISION			

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR - LIGHTING - PART B

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	103

AREA: SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1

SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-103

0351-COF20244-E-103_CE_1.dwg TEMPLATE DATE: 02/28/2011

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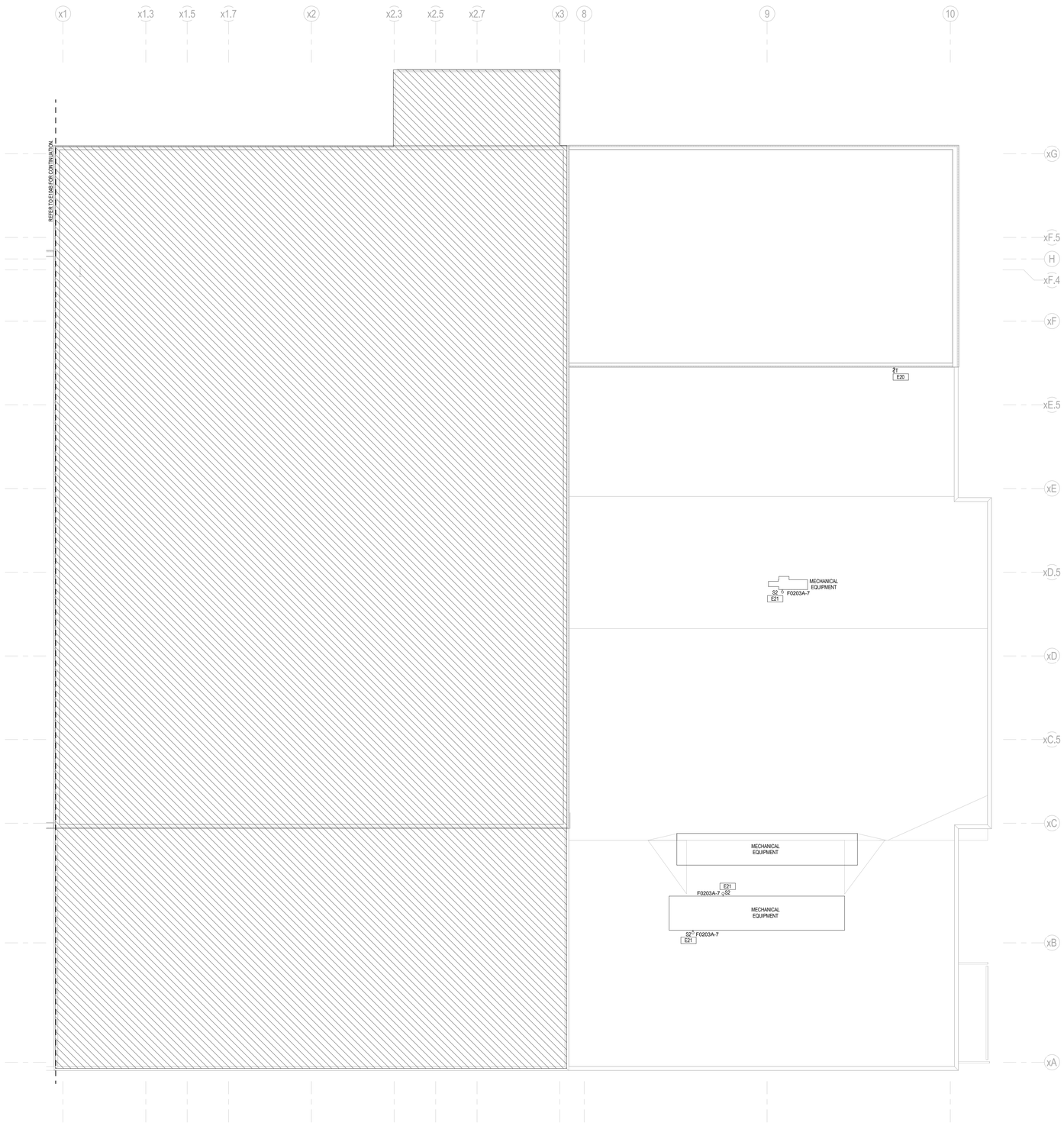

1 E-104 **ROOF - LIGHTING - PART A**
1/8" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E600 FOR LIGHTING FIXTURE TYPE, DESCRIPTION, LAMPING, ETC.
4. EMERGENCY BATTERY UNITS SHALL BE WIRED AHEAD OF SWITCHING AND OCCUPANCY SENSORS TO ALLOW FOR CONSTANT BATTERY CHARGE.
5. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
6. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
7. ALL EXPOSED CONDUIT ON THE WALLS OF THE SHOP OR STORAGE AREA SHALL BE RIGID GALVANIZED STEEL, UNLESS NOTED OTHERWISE.

KEY NOTES

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E20	PROVIDE TIMER SWITCH ADJACENT TO ROOF LADDER/HATCH FOR CONTROL OF EXTERIOR LIGHTING FIXTURES. TYPE S2. PROVIDE WEATHERPROOF ENCLOSURE FOR SWITCH.
E21	REFER TO DETAIL B6/E502 FOR MOUNTING OF LIGHT FIXTURE.

N
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NASA GRID NORTH

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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

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BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:

RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
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EDMS REVISION			

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FY14 B351 WAREHOUSE ADDITION

ROOF - LIGHTING - PART A

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	E-	104

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-104

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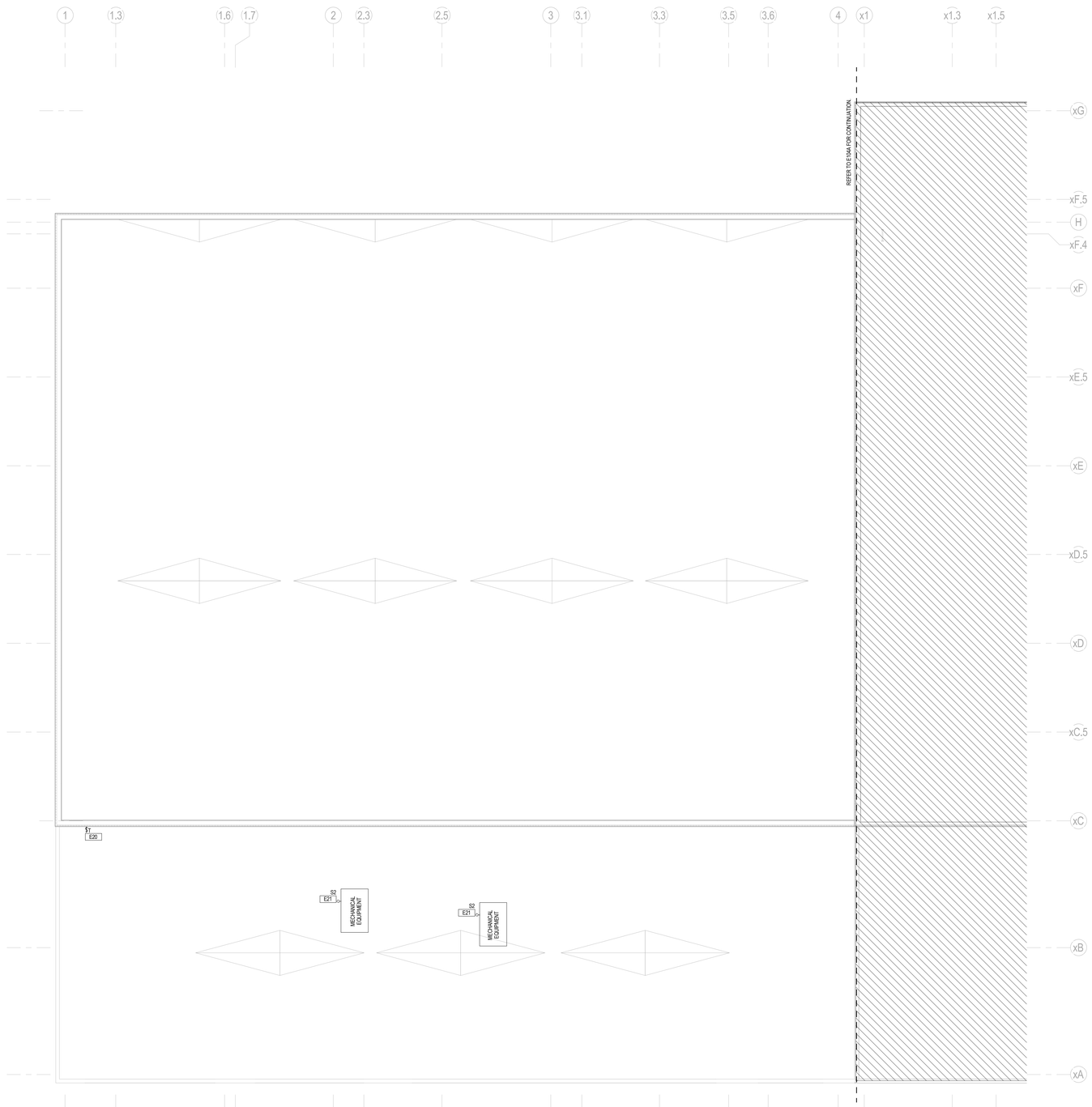

1 E-105 **ROOF - LIGHTING - PART B**
1/8" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E600 FOR LIGHTING FIXTURE TYPE, DESCRIPTION, LAMPING, ETC.
4. EMERGENCY BATTERY UNITS SHALL BE WIRED AHEAD OF SWITCHING AND OCCUPANCY SENSORS TO ALLOW FOR CONSTANT BATTERY CHARGE.
5. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
6. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
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E20	PROVIDE TIMER SWITCH ADJACENT TO ROOF LADDER/HATCH FOR CONTROL OF EXTERIOR LIGHTING FIXTURES. TYPE S2. PROVIDE WEATHERPROOF ENCLOSURE FOR SWITCH.
E21	REFER TO DETAIL B6/E502 FOR MOUNTING OF LIGHT FIXTURE.

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APPROVED: Approver | APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR:
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RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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JOHN H. GLENN RESEARCH CENTER
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FY14 B351 WAREHOUSE ADDITION

ROOF - LIGHTING - PART B

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	105

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-105
0351-COF20244-E-105_CE_1.dwg TEMPLATE DATE: 02/28/2011

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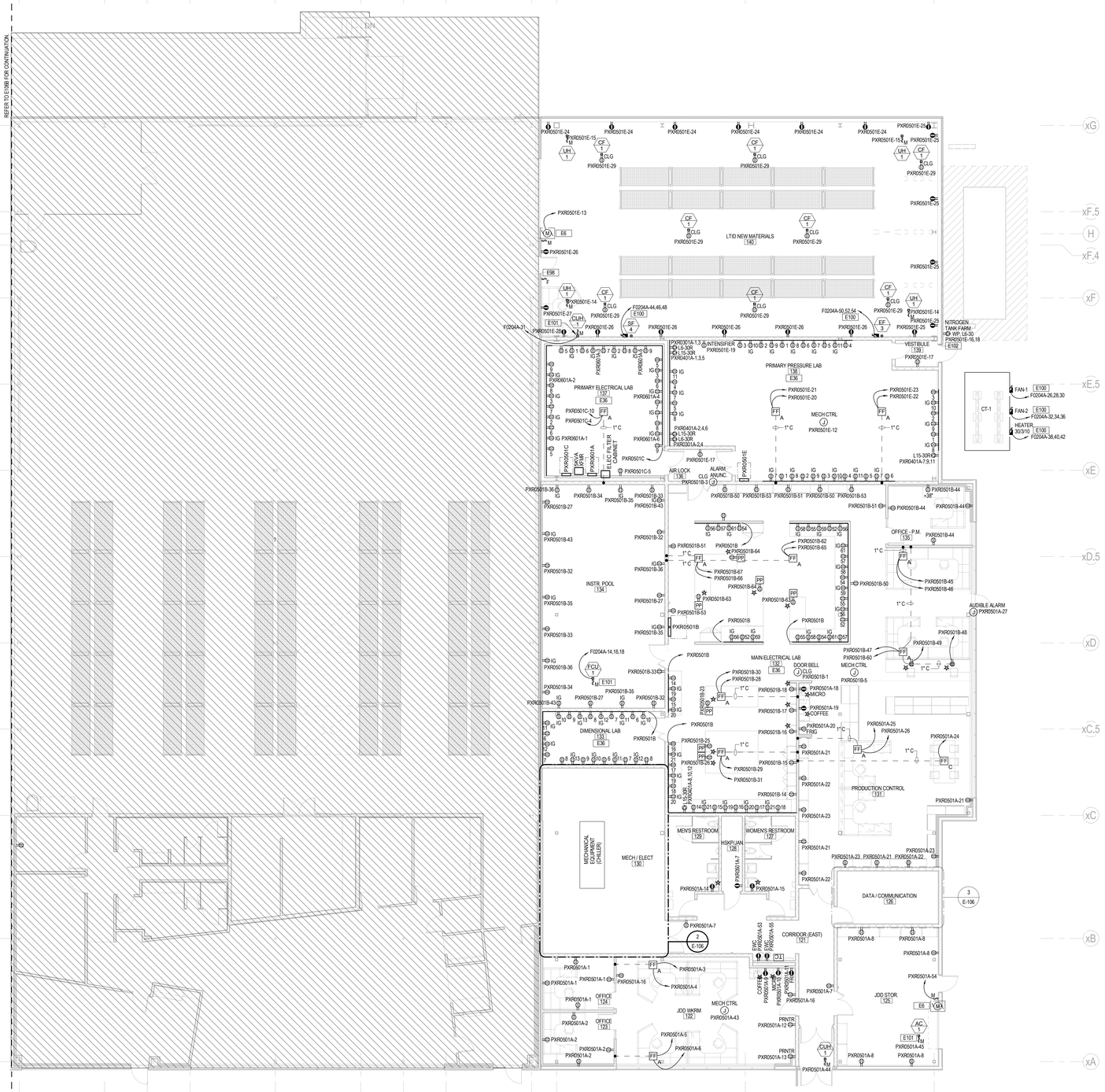
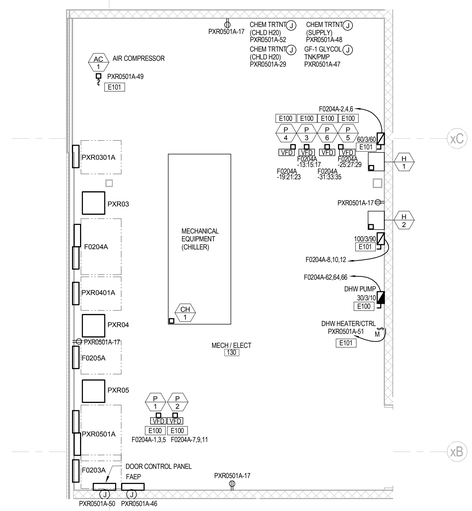
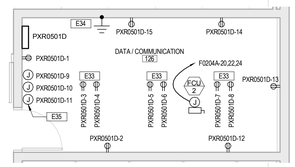


1 E-106 **FIRST FLOOR - POWER - PART A**
1/8" = 1'-0"



2 E-106 **ENLARGED PLAN - POWER - MECH / ELEC 18**
1/4" = 1'-0"



3 E-106 **ENLARGED PLAN - POWER - DATA/COMMUNICATION 19**
1/4" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO DETAIL G9/E503 FOR TYPICAL WALL OUTLET ORIENTATION.
4. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
5. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
6. ALL EXPOSED CONDUIT ON THE WALLS OF THE SHOP OR STORAGE AREA SHALL BE RIGID GALVANIZED STEEL, UNLESS NOTED OTHERWISE.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM E1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO E001 FOR THE ENTIRE LIST OF ALL KEY NOTES. ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

E6	PROVIDE CONNECTION TO MOTORIZED OVERHEAD DOOR. REFER TO DETAIL C9/E505. PROVIDE CONDUIT, WIRE, BOXES, AND TERMINATIONS AS APPLICABLE.
E33	PROVIDE RECEPTACLE FOR TELECOMMUNICATIONS RACK. COORDINATE LOCATION AND MOUNTING HEIGHT WITH OWNER PRIOR TO ROUGH-IN.
E34	REFER TO DETAIL G9/E501. COORDINATE WITH SYSTEMS PLAN.
E35	PROVIDE ELECTRICAL CONNECTIONS TO SECURITY, PAGING, CAMERA, AND OTHER SYSTEMS PROVIDED BY DIVISION 27 AND 28.
E36	LAB TO BE PROVIDED WITH DUAL CHANNEL SURFACE RACEWAY WITH RECEPTACLES 2' ON CENTER TO COINCIDE WITH BENCH LAYOUTS. LABS SHALL POSSESS FLOOR BOXES TO COINCIDE WITH MOVEABLE TABLES/EQUIPMENT.
E98	CF-1 FAN UNIT, 35W, 120V, 1-PH: PROVIDE RECEPTACLE AT FAN LOCATIONS FOR POWER. FANS (8-TOTAL) SERVED BY (1) 120V CIRCUIT, CONTROLLED BY FAN SWITCH, MOUNTED AT DOOR.
E100	INSTALL ASSOCIATED ELECTRICAL EQUIPMENT - VARIABLE FREQUENCY DRIVE/MOTOR STARTER/DISCONNECT SWITCH - FURNISHED BY MECHANICAL TRADE. PROVIDE EQUIPMENT AND MOTOR CONNECTIONS AS APPLICABLE. PROVIDE UNI-STRUT SUPPORT AND HARDWARE AS REQUIRED. COORDINATE REQUIREMENTS AND INSTALLATION WITH MECHANICAL TRADE.
E101	PROVIDE LOCAL DISCONNECT SWITCH / MOTOR-RATED SWITCH AS INDICATED. PROVIDE EQUIPMENT AND MOTOR CONNECTIONS AS APPLICABLE. PROVIDE UNI-STRUT SUPPORT AND HARDWARE AS REQUIRED. COORDINATE REQUIREMENTS AND INSTALLATION WITH MECHANICAL TRADE.
E102	PROVIDE RECEPTACLE FOR NITROGEN TANK FARM FILL PUMP. COORDINATE RECEPTACLE TYPE WITH OWNER TO MATCH EXISTING EQUIPMENT. COORDINATE REQUIREMENTS, LOCATION, AND INSTALLLATION WITH PLUMBING TRADE AND ARCHITECT.

CHG	NUM	DESCRIPTION	APP/DATE
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N — NASA GRID NORTH — 37° 51' 21"

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	E-	106

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
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E-106
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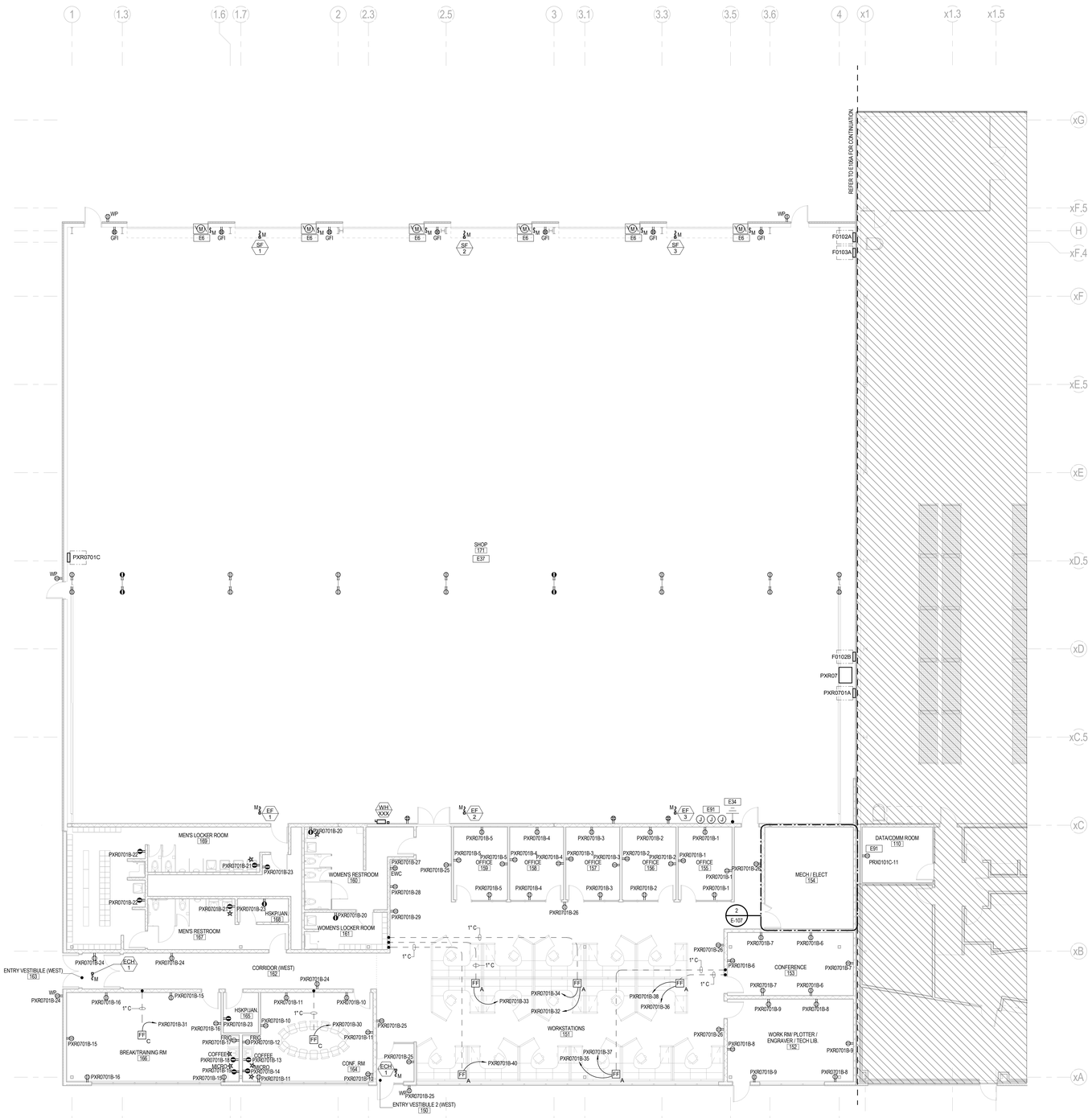
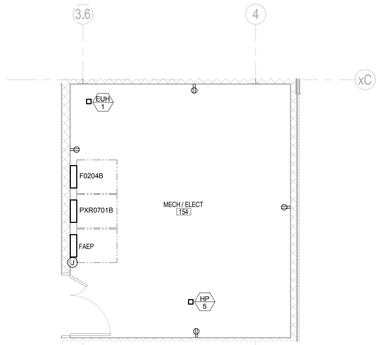


1 E-107 **FIRST FLOOR - POWER - PART B**
1/8" = 1'-0"



2 E-107 **ENLARGED PLAN - POWER - MECH/ELEC 104**
1/4" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO DETAIL G8/E503 FOR TYPICAL WALL OUTLET ORIENTATION.
4. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
5. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
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E6	PROVIDE CONNECTION TO MOTORIZED OVERHEAD DOOR. REFER TO DETAIL C8/E505. PROVIDE CONDUIT, WIRE, BOXES, AND TERMINATIONS AS APPLICABLE.
E34	REFER TO DETAIL G6/E501. COORDINATE WITH SYSTEMS PLAN.
E37	PROVIDE ELECTRICAL CONNECTIONS TO SHOP EQUIPMENT IN THIS AREA. EXACT LAYOUT IS UNKNOWN AT THIS PHASE OF DESIGN.
E91	PROVIDE CONNECTION TO NETWORK EQUIPMENT.

N
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BLDG			

NASA APPROVALS

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FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR - POWER - PART B

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	107

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-107
0351-COF20244-E-107_CE_1.dwg
TEMPLATE DATE: 02/28/2011

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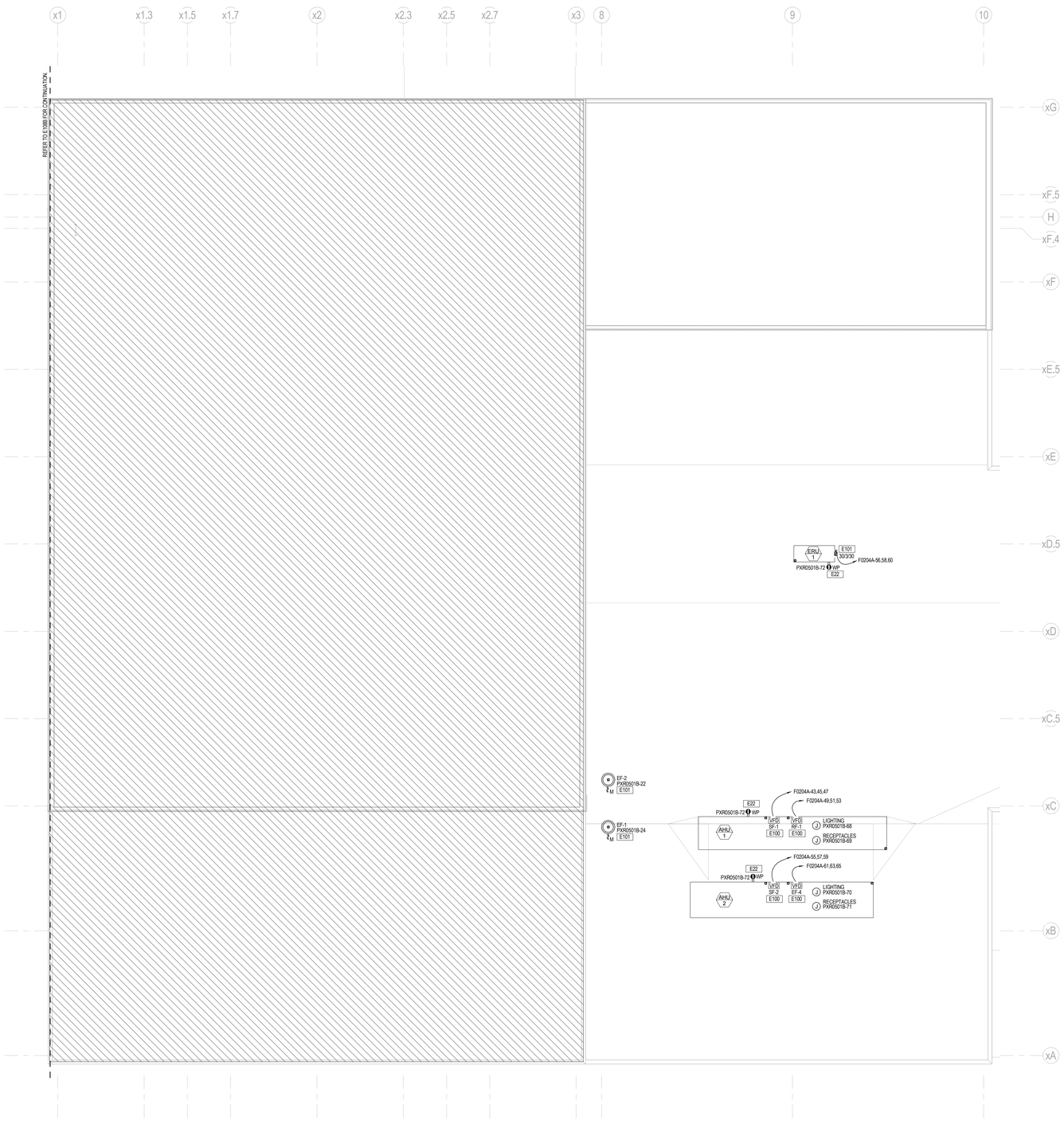

1 E-108 **ROOF - POWER -PART A**

1/8" = 1'-0"

GENERAL NOTES

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3. REFER TO DETAIL G8/E503 FOR TYPICAL WALL OUTLET ORIENTATION.
4. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
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E22	REFER TO DETAIL B6/E502 FOR MOUNTING OF RECEPTACLE.
E100	INSTALL ASSOCIATED ELECTRICAL EQUIPMENT - VARIABLE FREQUENCY DRIVE/MOTOR STARTER/DISCONNECT SWITCH - FURNISHED BY MECHANICAL TRADE. PROVIDE EQUIPMENT AND MOTOR CONNECTIONS AS APPLICABLE. PROVIDE UNI-STRUT SUPPORT AND HARDWARE AS REQUIRED. COORDINATE REQUIREMENTS AND INSTALLATION WITH MECHANICAL TRADE.
E101	PROVIDE LOCAL DISCONNECT SWITCH / MOTOR-RATED SWITCH AS INDICATED. PROVIDE EQUIPMENT AND MOTOR CONNECTIONS AS APPLICABLE. PROVIDE UNI-STRUT SUPPORT AND HARDWARE AS REQUIRED. COORDINATE REQUIREMENTS AND INSTALLATION WITH MECHANICAL TRADE.

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT: SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT No: NNC09CA01C
TASK ORDER:
DRAWN: JRH | DESIGNED: | CHECKED:
APPROVED: Approver | APPROVAL DATE:

RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

N — 37° 51' 21" — NASA GRID NORTH

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ROOF - POWER - PART A

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	108

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-108
0351-COF20244-E-108_CE_1.dwg TEMPLATE DATE: 02/20/2011

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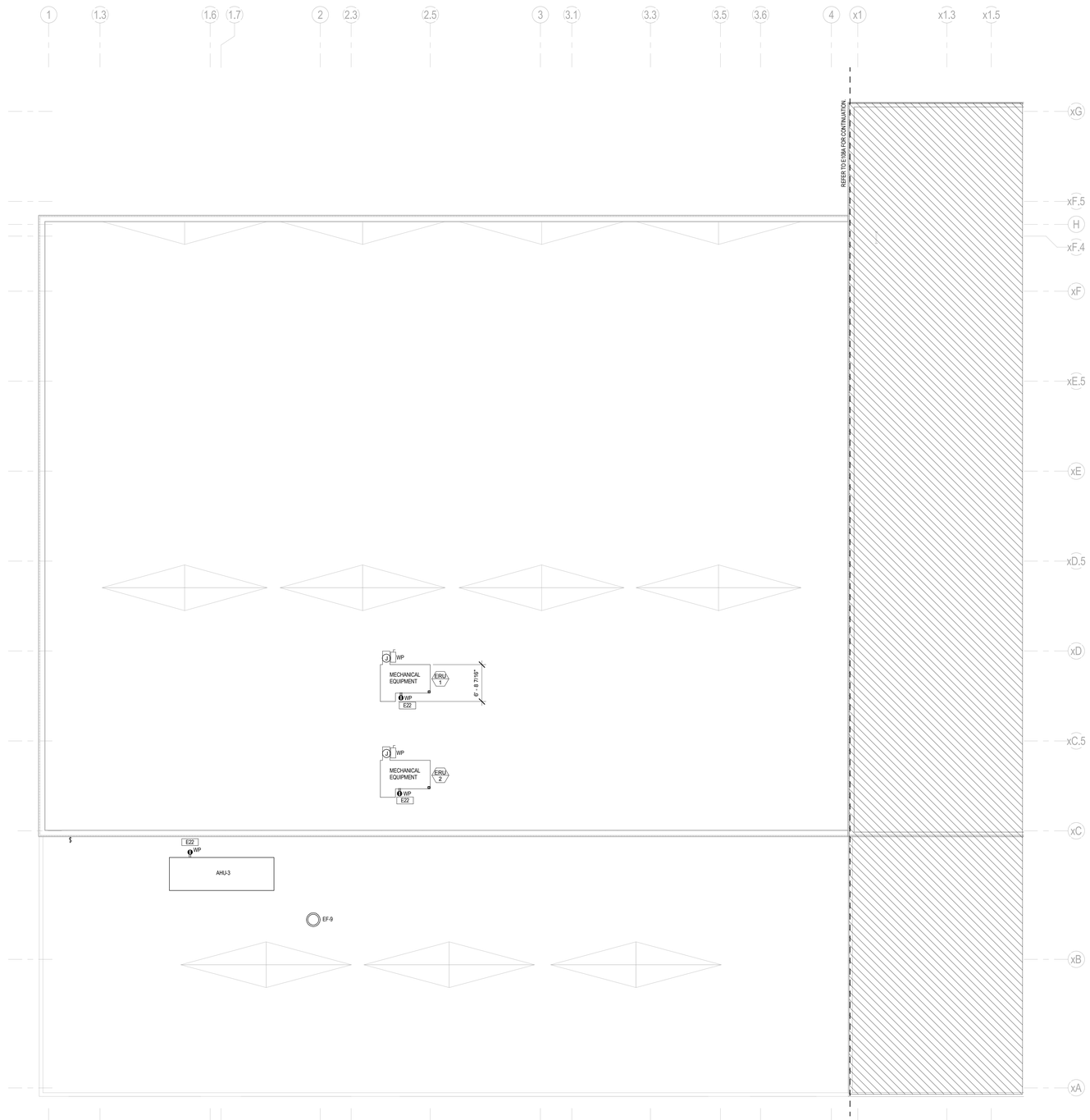

1 ROOF - POWER - PART B
E-109
1/8" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO DETAIL G8/E503 FOR TYPICAL WALL OUTLET ORIENTATION.
4. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
5. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
6. ALL EXPOSED CONDUIT ON THE WALLS OF THE SHOP OR STORAGE AREA SHALL BE RIGID GALVANIZED STEEL, UNLESS NOTED OTHERWISE.

KEY NOTES

KEY NOTES ARE NUMBERED SEQUENTIALLY FROM E1 TO THE LAST KEY NOTE. THEY ARE PROJECT SPECIFIC. REFER TO E001 FOR THE ENTIRE LIST OF ALL KEY NOTES ONLY THE KEY NOTES USED ON A SPECIFIC SHEET WILL BE LISTED ON THAT SHEET.

E22 REFER TO DETAIL B6/E502 FOR MOUNTING OF RECEPTACLE.

N
37° 51' 21"
NASA GRID NORTH

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CONTRACT NO.: NNC09CA01C
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DRAWN: JRH | DESIGNED: | CHECKED:
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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR: | DES:
D.ENG: | PROJ. MGR:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
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CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED		TECH LEAD:	FAC-SYS MGR:
EDMS REVISION			REV DATE:

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FY14 B351 WAREHOUSE ADDITION

ROOF - POWER - PART B

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	109

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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E-109
0351-COF20244-E-109_CE_1.dwg TEMPLATE DATE: 02/28/2011

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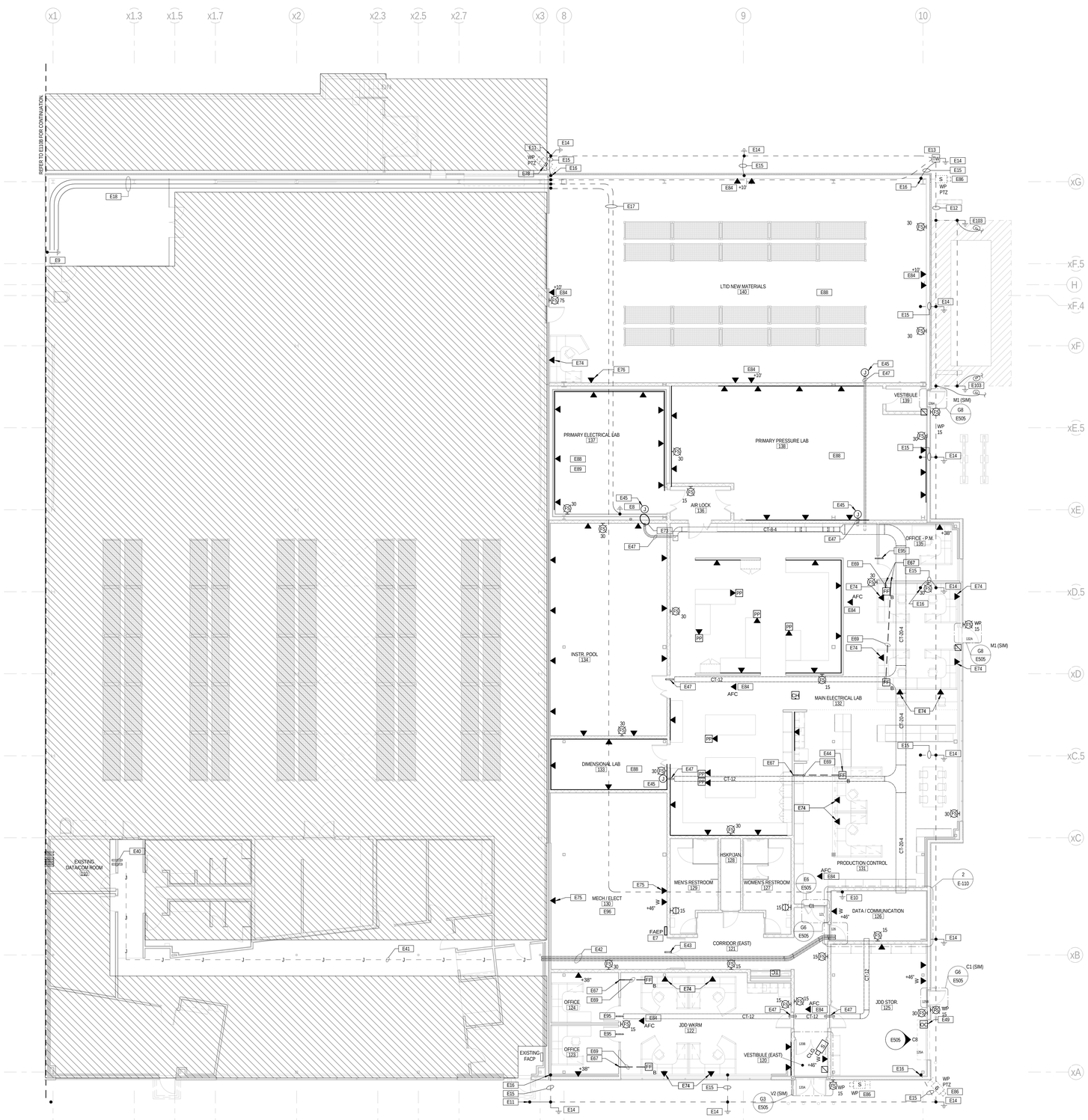
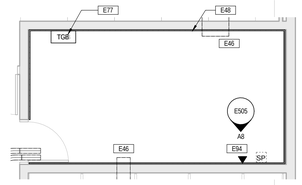


1 E-110 FIRST FLOOR EAST - SYSTEMS - PART A
1/8" = 1'-0"



2 E-110B/110 ENLARGED PLAN - SYSTEMS - DATA/COMMUNICATION 19
1/4" = 1'-0"

GENERAL NOTES

1. SEE DRAWING NUMBER E001 FOR GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS. ALL NOTES ON DRAWING E001 APPLY TO THIS DRAWING.
2. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
3. REFER TO SPECIFICATION SECTIONS ON GROUNDING AND LIGHTNING PROTECTION FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
4. PROVIDE WHITE WIRING DEVICES WITH WHITE NYLON COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE OFFICE AND LAB SPACE.
5. PROVIDE BROWN WIRING DEVICES WITH GALVANIZED STEEL COVERPLATES FOR ALL ELECTRICAL DEVICES IN THE SHOP AND MATERIALS STORAGE AREA.
6. ALL EXPOSED CONDUIT ON THE WALLS OF THE SHOP OR STORAGE AREA SHALL BE RIGID GALVANIZED STEEL, UNLESS NOTED OTHERWISE.
7. TELECOMMUNICATIONS OUTLETS FOR WIRELESS ACCESS POINTS SHALL BE PROVIDED BY NASA SUPPORT CONTRACTOR.
8. TELECOMMUNICATIONS CABLING AND TERMINATIONS SHALL BE PROVIDED BY NASA SUPPORT CONTRACTOR.
9. TELECOMMUNICATIONS OPEN TOP J-HOOKS SHALL BE PROVIDED BY NASA SUPPORT CONTRACTOR UNLESS SHOWN ON DRAWINGS.

KEY NOTES

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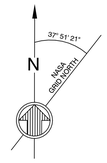
E7	REFER TO FIRE ALARM RISER DIAGRAM DETAIL G8/E802.
E8	GROUND BAR FOR SHIELDED LAB. REFER TO ARCHITECTURAL SPECIFICATIONS FOR REQUIREMENTS OF GROUND BAR. TIE GROUND BAR TO EXISTING MAIN GROUND BUS AS INDICATED.
E9	EXISTING MAIN GROUND BUS IN EXISTING MAIN ELECTRICAL ROOM. PROVIDE CONNECTIONS TO NEW GROUNDING ELEMENTS AS INDICATED.
E10	TELECOMMUNICATIONS ROOM GROUND BUS. COORDINATE LOCATION WITH ENLARGED TELECOMMUNICATIONS ROOM PLAN, DETAIL 2/E106A. REFER TO DETAIL G6/E501 FOR ADDITIONAL INFORMATION.
E11	PROVIDE CONNECTION TO EXISTING COUNTERPOISE TO REMAIN AROUND EXISTING BUILDING. PROVIDE EXOTHERMIC WELD OF NEW COUNTERPOISE TO EXISTING COUNTERPOISE FOR A COMPLETELY INTERCONNECTED SYSTEM. REFER TO DRAWING E101 FOR ADDITIONAL INFORMATION.
E12	PROVIDE #4/0 AWG COPPER COUNTERPOISE CONDUCTOR 30" BELOW GRADE.
E13	PROVIDE GROUND ROD TEST WELL. REFER TO DETAIL G8/E501 FOR ADDITIONAL INFORMATION.
E14	PROVIDE DRIVEN GROUND ROD AND BOND TO COUNTERPOISE WITH #4/0 AWG AND EXOTHERMIC WELDS.
E15	BOND COUNTERPOISE LOOP TO STEEL COLUMN WITH #4/0 AWG COPPER. PROVIDE EXOTHERMICALLY WELDED CONNECTIONS AT BOTH ENDS OF BONDING JUMPER.
E16	PROVIDED COPPER LIGHTNING PROTECTION SYSTEM DOWN CONDUCTOR IN 1 ½" PVC CONDUIT. BOND TO DRIVEN GROUND ROD. REFER TO DRAWING E112 FOR CONTINUATION OF DOWN CONDUCTOR TO ROOF LIGHTNING PROTECTION SYSTEM.
E17	TIE GROUND BARS AND TEST WELL TO EXISTING MAIN GROUND BUS. ROUTE #4/0 AWG COPPER CONDUCTOR 30" BELOW GRADE TO LOCATION INDICATED. ROUTE CONDUCTORS IN 1 ½" PVC CONDUIT UP WALL AND ACROSS EXISTING HIGHBAY AREA OF EXISTING WAREHOUSE TO EXISTING ELECTRICAL ROOM AS INDICATED. PROVIDE CONNECTIONS TO EXISTING GROUND BUS. ROUTE CONDUITS AS TIGHT TO CEILING AS POSSIBLE.
E18	TIE GROUND BAR TO EXISTING MAIN GROUND BUS. ROUTE #4/0 AWG COPPER CONDUCTOR 30" BELOW GRADE TO LOCATION INDICATED. ROUTE CONDUCTOR IN 1 ½" PVC CONDUIT UP WALL AND TO EXISTING ELECTRICAL ROOM AS INDICATED. PROVIDE CONNECTION TO EXISTING GROUND BUS. ROUTE CONDUIT AS TIGHT TO CEILING AS POSSIBLE.
E40	PROVIDE TWO (2) 4" FIRESTOPPED SLEEVES INTO EXISTING DATACOM ROOM.
E41	PROVIDE J-HOOK OPEN TOP CABLE SUPPORTS FOR ROUTING RISER CABLING TO EXPANSION AREA.
E42	PROVIDE TWO (2) 4" CONDUIT.
E43	PROVIDE ONE (1) 3" CONDUIT SLEEVE FOR TELECOMMUNICATIONS.
E44	PROVIDE POWER, NETWORK, AND AUDIOVISUAL FLOOR BOX. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
E45	PROVIDE TELECOMMUNICATIONS JUNCTION BOX ADJACENT TO FIBER WAVEGUIDE FILTERS. SERVE TELECOMMUNICATIONS OUTLETS IN LAB WITH CONDUIT FROM JUNCTION BOX.
E46	PROVIDE REENTERABLE PENETRATION FIRESTOPPING SYSTEM.
E47	PROVIDE ONE (1) 4" CONDUIT.
E48	PROVIDE 4'x8'x3/4" FIRE RATED GRADE AC PLYWOOD BACKBOARD MOUNTED VERTICALLY, LINING WALLS AS SHOWN, FROM 0'-6" AFF (MOUNTED ABOVE CURB AT FLOOR)TO 8'-6" AFF. PAINT WITH TWO COATS OF FIRE RETARDENT PAINT. DO NOT PAINT OVER PLYWOOD LISTING BADGES.
E49	PROVIDE OVERHEAD DOOR BALANCED MAGNETIC CONTACT ON OUTER SECURITY GRILL DOOR.
E67	PROVIDE CONDUIT FROM FLOOR BOXES ROUTED UP THROUGH WALL AND STUBBED OUT ABOVE ACCESSIBLE CEILING.
E69	PROVIDE THREE (3) 1-1/4" CONDUIT FOR TELECOMMUNICATIONS.
E73	REFER TO LAB RF SHIELDING DETAILS. PROVIDE FOUR (4) FIBER OPTIC WAVEGUIDE FILTERS THROUGH SHIELDING SIM TO FIBERFLEX WGF-4. PROVIDE 2" EMT SLEEVES ON BOTH SIDES OF EACH WAVEGUIDE THROUGH ADJACENT WALL CONSTRUCTION. SLEEVES SHALL NOT CONTACT SHIELDING.
E74	TELECOM OUTLET PROVIDED BY NASA SUPPORT CONTRACTOR IN SYSTEMS FURNITURE.
E75	COORDINATE WITH TRADES TO PROVIDE FINAL LOCATION OF OUTLET AT EQUIPMENT POINT OF USE.
E76	PROVIDE OUTLET TO SERVE SYSTEMS FURNITURE.
E77	PROVIDE 3/0 AWG BARE TELECOMMUNICATIONS BONDING BACKBONE GROUNDING CONDUCTOR IN 1 1/4" PLENUM RATED INNERDUCT FROM TGB TO EXISTING TMGB IN EXISTING DATA ROOM 110.
E78	EXISTING CAMERA TO BE REMOVED AND TURNED OVER TO GOVERNMENT AS SPARE.
E84	PROVIDE OUTLET LOCATION TO SERVE WIRELESS ACCESS POINT.
E86	SECURITY SYSTEM CAMERA AND MOUNT PROVIDED BY OWNER. REFER TO SECURITY SYSTEM CCTV RISER DIAGRAM CS/E-802. COORDINATE MOUNTING HEIGHT WITH OWNER.
E88	PROVIDE CONDUIT IN LAB AREA FROM TELECOMMUNICATIONS JUNCTION BOX TO SERVE TELECOM OUTLETS. PROVIDE QUANTITIES AND SIZES AS REQUIRED.
E89	REFER TO LAB RF SHIELDING DETAILS FOR REQUIREMENTS FOR ROUTING SERVICES THROUGH LAB.
E94	PROVIDE TELECOM ROUGH-IN TO SERVE SECURITY HEADEND.
E95	PROVIDE ONE (1) 2" CONDUIT SLEEVE FOR TELECOMMUNICATIONS.
E96	ROUTE TELECOM CABLING IN CONDUIT THROUGHOUT ROOM.
E103	PROVIDE TANK FARM GROUNDING – PROVIDE GROUND RODS AT EAST SIDE CORNERS OF TANK ASSEMBLY. AT WEST/BUILDING SIDE, TIE GROUNDING TO COUNTER-POISE SYSTEM. PROVIDE #0 GROUND CONDUTOR AND EXOTHERMIC WELDS AS APPLICABLE. PROVIDE 1/0 GROUND CONDUCTOR FROM CORNER GROUND RODS FOR CONNECTION TO TANK ASSEMBLY. PROVIDE TANK TRUCK GROUNDING – 16ft COIL OF 1/0 GROUND CONDUCTOR WITH GROUNDING CLIP FOR CONNECTION TO TANKER TRUCK. COORDINATE WITH OWNER TO MATCH EXISTING INSTALLATION. COORDINATE REQUIREMENTS, LOCATION, AND INSTALLATION WITH PLUMBING TRADE AND ARCHITECT.



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CONTRACT NO: NNC09CA01C
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DRAWN: JRH | DESIGNED: | CHECKED:
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DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
BLDG			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:

RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED			
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TECH LEAD: | FAC-SYS MGR: | REV DATE:

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FY14 B351 WAREHOUSE ADDITION

FIRST FLOOR EAST - SYSTEMS - PART A

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	110

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION: - | VER: 1
SCALE: As indicated | OFFICIAL DATE: 06-24-2014

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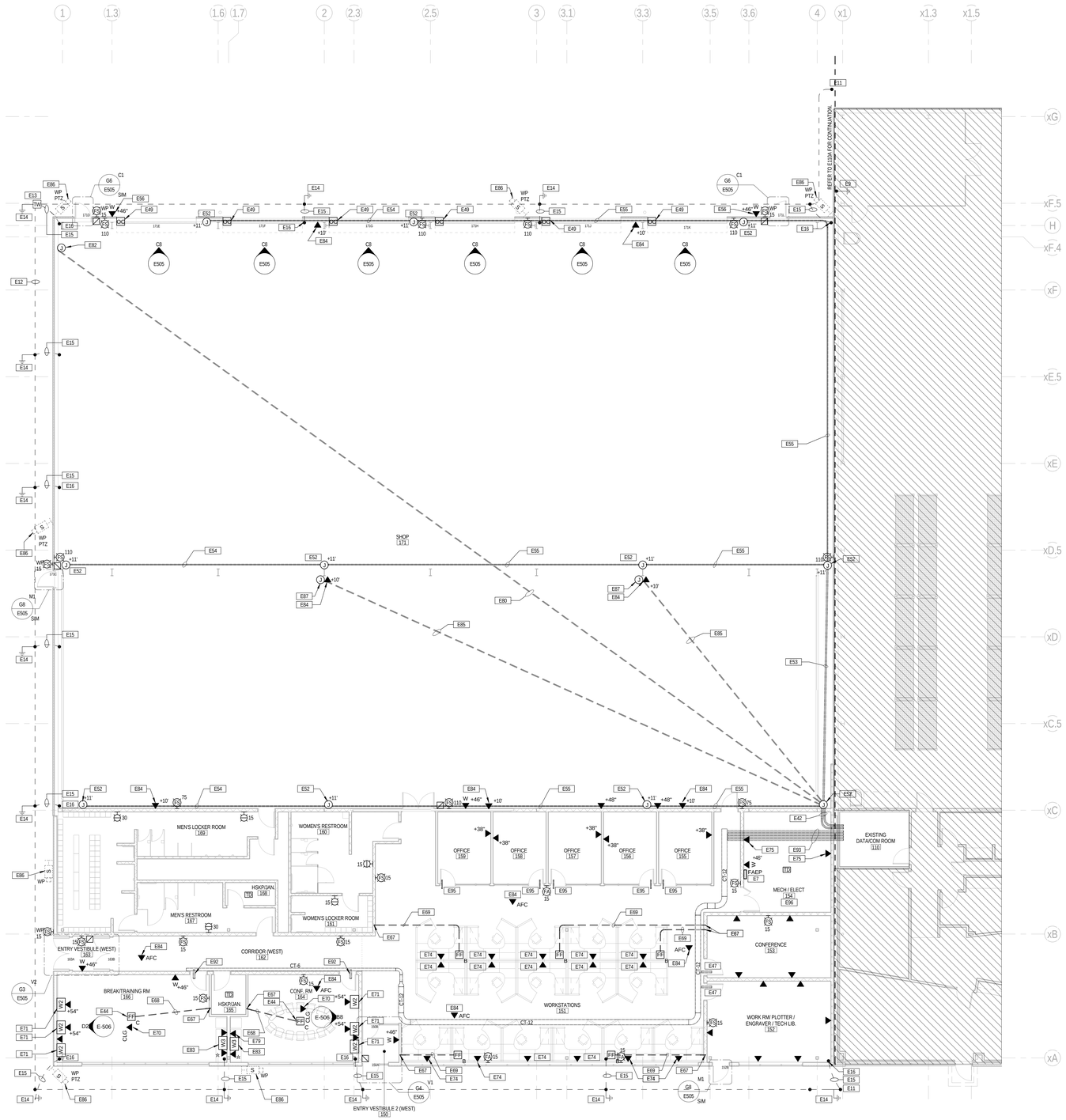
E-110


SHOP
171
MEN'S LOCKER ROOM
169
WOMEN'S RESTROOM
160
HSKPJAN.
166
MEN'S RESTROOM
167
WOMEN'S LOCKER ROOM
161
ENTRY VESTIBULE (WEST)
163
CORRIDOR (WEST)
162
BREAK/TRAINING RM
166
HSKPJAN
165
CONF. RM
164
E-506
OFFICE
159
OFFICE
158
OFFICE
157
OFFICE
156
OFFICE
155
MECH / ELECT
154
CONFERENCE
153
WORKSTATIONS
151
WORK RM/ PLOTTER / ENGRAVER / TECH LIB.
152
EXISTING DATA/COM ROOM
110
ENTRY VESTIBULE 2 (WEST)
150
REFER TO E110A FOR CONTINUATION
CT-6
CT-12
CT-13
AFC
FAEP
E7
WP
PTZ
SIM
C1
G6
E505
C8
E505
G8
E505
G3
E505
G4
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M1
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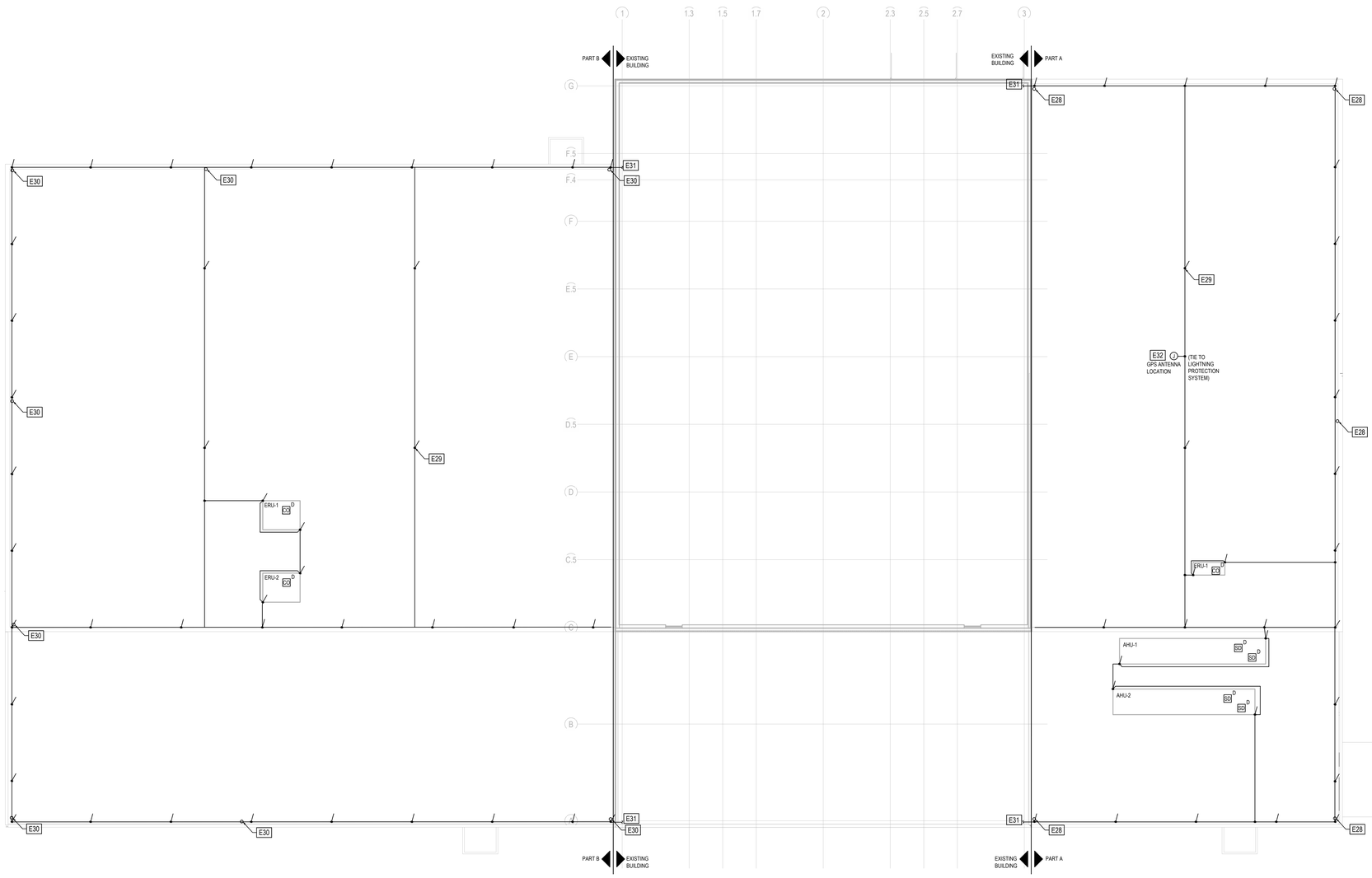

1 ROOF - SYSTEMS
3/32" = 1'-0"

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET E001 FOR ELECTRICAL SYMBOL LEGEND.
3. PROVIDE U.L. MASTER LABEL LIGHTNING PROTECTION SYSTEM. PROVIDE SYSTEM WITH EQUIPMENT AND ASSOCIATED APPURTENANCES AS APPLICABLE, INCLUDING AIR TERMINALS, CONDUCTORS, CONNECTIONS, DOWN CONDUCTORS, EXOTHERMIC WELDS, ETC.

KEY NOTES

E28 ROOF PENETRATION AND DOWN CONDUCTOR IN 1 1/4" PVC CONDUIT IN COLUMN TO GROUND LOOP. REFER TO DETAIL D8/E503 FOR ADDITIONAL INFORMATION. DOWN CONDUCTOR SHALL BE TIED TO BUILDING COUNTERPOISE. REFER TO SHEET E110 FOR ADDITIONAL INFORMATION.

E29 AIR TERMINAL FOR LIGHTNING PROTECTION SYSTEM. REFER TO DETAIL D8/E503 FOR ADDITIONAL INFORMATION. (TYPICAL)

E30 ROOF PENETRATION AND DOWN CONDUCTOR IN 1 1/4" PVC CONDUIT IN COLUMN TO GROUND LOOP. REFER TO DETAIL D8/E503 FOR ADDITIONAL INFORMATION. DOWN CONDUCTOR SHALL BE TIED TO BUILDING COUNTERPOISE. REFER TO SHEET E111 FOR ADDITIONAL INFORMATION.

E31 TIE LIGHTNING PROTECTION SYSTEM ON NEW ROOF AREA TO EXISTING BUILDING LIGHTNING PROTECTION. PROVIDE CONDUCTOR IN 1 1/4" PVC CONDUIT CONCEALED IN BUILDING TO TIE BUILDINGS TOGETHER.

E32 GPS ANTENNA LOCATION - PROVIDE 2in CONDUIT FROM ANTENNA LOCATION TO RECEIVER LOCATION AT FIRST FLOOR MAIN ELECTRIC LAB. COORDINATE LOCATIONS, REQUIREMENTS, AND INSTALLATION WITH ARCHITECT AND OWNER.

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CONSULTANT: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
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EDMS REVISION			REV DATE:

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FY14 B351 WAREHOUSE ADDITION

ROOF - SYSTEMS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	E-	112

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: 3/32" = 1'-0" | OFFICIAL DATE: 06-24-2014

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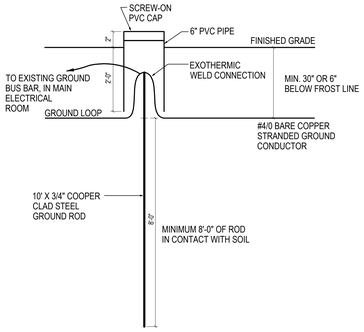
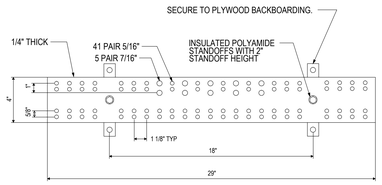
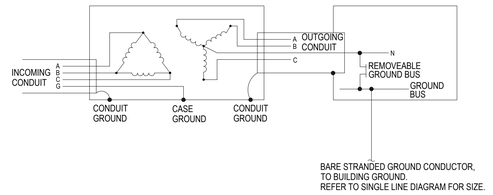
TEMPLATE DATE: 02/28/2011



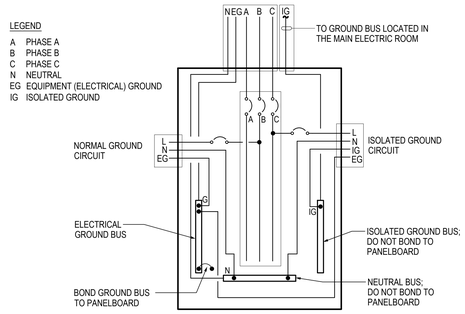
G8 GROUND ROD TEST WELL DETAIL
NTS



G6 DATA/COMM ROOM GROUND BUS
NTS

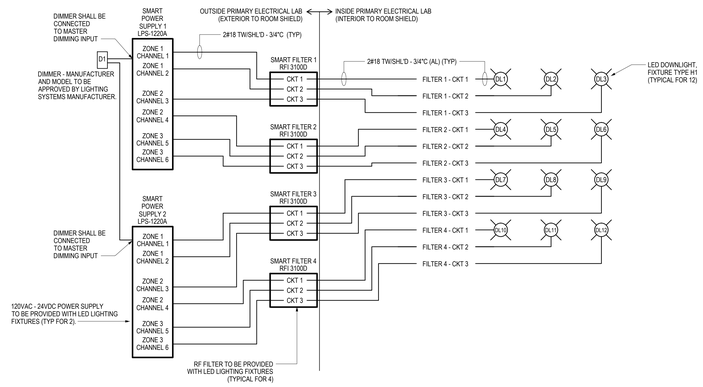


G4 BUILDING SERVICE TRANSFORMER GROUNDING DETAIL
NTS

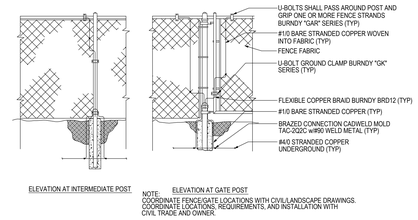


NOTE: PROVIDE AN ADDITIONAL NEUTRAL CONDUCTOR FOR PANELS WITH 200% RATED NEUTRALS AND DERATE (80%) ALL CONDUCTORS FOR 5 CURRENT CARRYING CONDUCTORS IN THE SAME RACEWAY. SEE TABLE IN NEC, ARTICLE 310.

E8 ISOLATION PANEL GROUNDING DETAIL
NTS

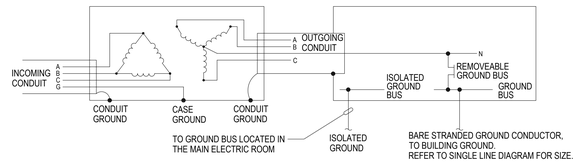


E5 DC LIGHTING CONTROL DETAIL
NTS



NOTE: COORDINATE FENCE/GATE LOCATIONS WITH CIVIL/LANDSCAPE DRAWINGS. COORDINATE LOCATIONS, REQUIREMENTS, AND INSTALLATION WITH CIVIL TRADE AND OWNER.

E3 FENCE GROUNDING DETAIL
NTS



C4 TRANSFORMER GROUNDING DETAIL
NTS

1 - ELECTRICAL FILTER & GROUND STUD TYP. DETAILS:

EACH ELECTRICAL FILTER WILL CREATE A GROUND POINT IN THE SHIELD ONCE POWER IS CONNECTED TO THE FILTER. DUE TO THIS FACT THE FILTERS, ALONG WITH THE GROUND STUD MUST BE INSTALLED WITH IN THE AREA OF THE MAGNET'S INTERFACE PANEL IN ORDER TO PREVENT GROUND LOOPS IN THE SHIELDING. THE MAGNET MANUFACTURER TYPICALLY WILL SPECIFY A DISTANCE FROM THE INTERFACE PANEL IN WHICH ALL OF THE FILTERS AND THE GROUND STUD MUST BE LOCATED. IF NO SPECIFIC DISTANCE IS GIVEN,THESE ITEMS WILL BE INSTALLED WITHIN 39" (1000MM) OF THE INTERFACE PANEL. WE RECOMMEND THAT THE FILTERS BE MOUNTED IN AN ACCESSIBLE AREA ON EITHER THE WALL OR THE CEILING.

CARE SHOULD BE TAKEN TO ENSURE THAT THE CONNECTION BETWEEN THE BRASS RF FILTER NUT AND THE SHIELD IS NOT TO BE DISTURBED. THIS CONNECTION IS CRITICAL TO PREVENT AN RF LEAK. NEVER REMOVE THIS NUT FOR ANY REASON.

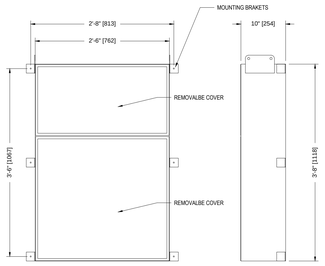
JUNCTION BOXES CAN BE MOUNTED DIRECTLY ON THE FILTER NIPPLE WITH STANDARD ELECTRICAL LOCK NUTS. THE NIPPLE IS A STANDARD 1" RUNNING THREAD. LOCK NUTS AND JUNCTION BOXES ARE BY OTHERS.

ALL CONDUIT RUN TO THE FILTERS ON THE OUTSIDE OF THE ROOM SHOULD BE CONNECTED WITH A PLASTIC OR DIELECTRIC CONNECTOR TO ENSURE THE FILTER DOES NOT GROUND TO THE CONDUIT.

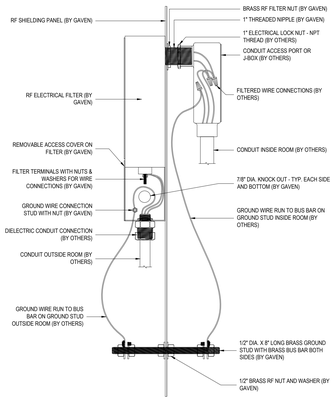
ALL GROUND WIRES OUTSIDE THE SHIELDING SHOULD BE RUN TO THE GROUND TERMINAL IN THE FILTER AND THEN TO THE GROUND STUD. ALL GROUND WIRES INSIDE THE SHIELDING SHOULD BE RUN DIRECTLY TO THE GROUND BAR.

FOLLOW THE MRI EQUIPMENT MANUFACTURER'S GUIDELINES FOR GROUNDING THE SYSTEM.

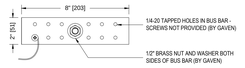
FOR SAFETY REASONS, BE SURE THE GROUND STUD IS INSTALLED AND PROPERLY GROUNDED BEFORE APPLYING POWER TO THE FILTER(S) TO AVOID POSSIBLE ELECTRICAL SHOCK.



1 - CORCOM CDEUX400100A6 ELECTRICAL FILTER



2 - ELECTRICAL FILTER AND GROUND STUD DETAILS



3 - BUS BAR DETAIL
3/16" THICK BRASS BAR

B8 ELECTRICAL FILTER & GROUND TYPICAL DETAILS
NTS

NOTE - FOR REFERENCE ONLY - COORDINATE THIS WORK WITH SHIELDING ROOM SUPPLIER/INSTALLER.

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET E001 FOR ELECTRICAL SYMBOL LEGEND.

KEY NOTES

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
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Thorson Baker + Associates
3030 West Streetsboro Road
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Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: DESIGNED: CHECKED:
APPROVED: APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: DES:
D.ENG: PROJ. MGR: KJS
RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	501

AREA: SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: NTS | OFFICIAL DATE: 06-24-2014

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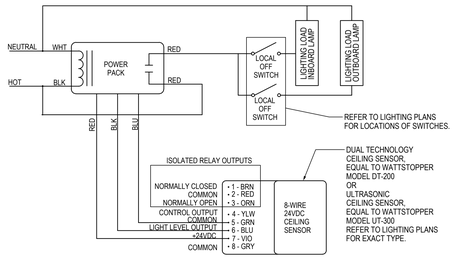
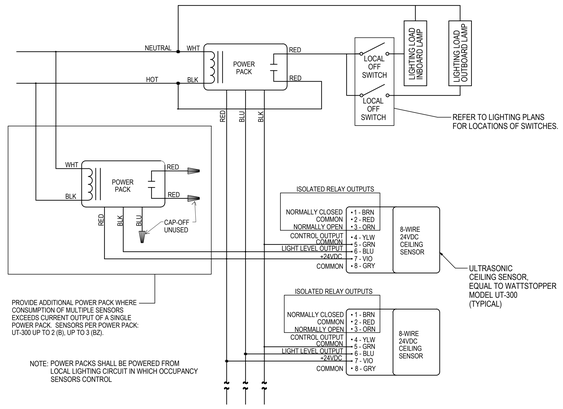
TEMPLATE DATE: 02/28/2011



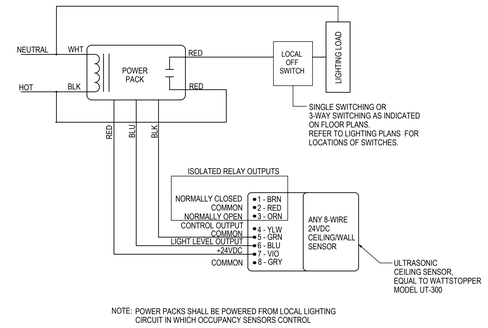
NOTE: POWER PACKS SHALL BE POWERED FROM LOCAL LIGHTING CIRCUIT IN WHICH OCCUPANCY SENSORS CONTROL

F8 SINGLE OCCUPANCY SENSOR WIRING DETAIL - DUAL LEVEL SWITCHES
NTS



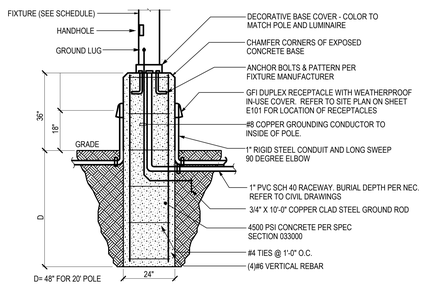
NOTE: POWER PACKS SHALL BE POWERED FROM LOCAL LIGHTING CIRCUIT IN WHICH OCCUPANCY SENSORS CONTROL

F6 MULTIPLE OCCUPANCY SENSORS CONTROLLING LOAD - DUAL LEVEL SWITCHES
NTS

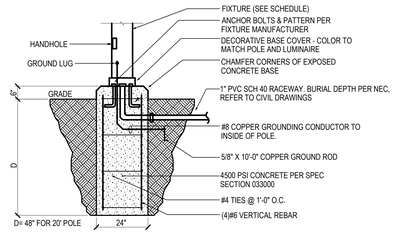


NOTE: POWER PACKS SHALL BE POWERED FROM LOCAL LIGHTING CIRCUIT IN WHICH OCCUPANCY SENSORS CONTROL

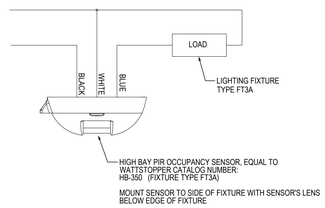
F4 OCCUPANCY SENSOR WIRING DETAIL
NTS



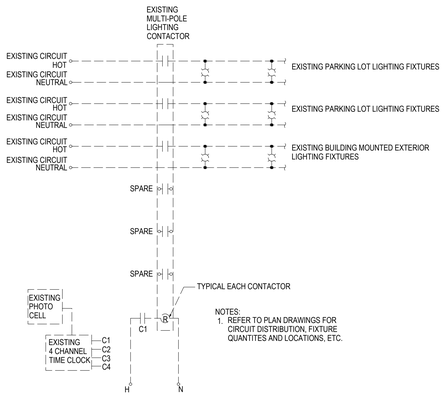
D8 36" POLE BASE
NTS



D6 6" POLE BASE
NTS

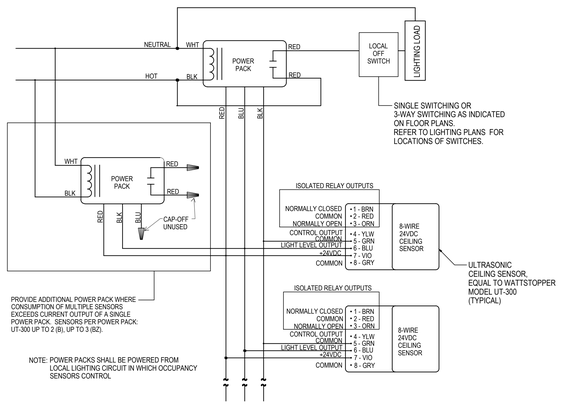


D4 HIGH BAY OCCUPANCY SENSOR WIRING DIAGRAM
NTS



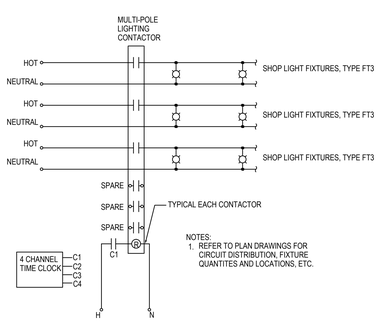
B8 EXTERIOR LIGHTING CONTROL DETAIL
NTS

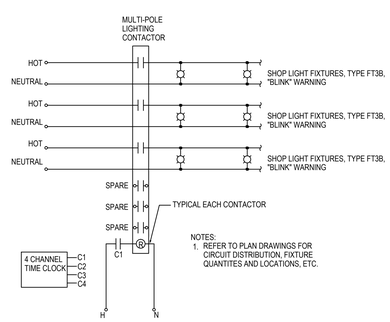
B6 FIXTURE TYPE S2 MOUNTING DETAIL
NTS



NOTE: POWER PACKS SHALL BE POWERED FROM LOCAL LIGHTING CIRCUIT IN WHICH OCCUPANCY SENSORS CONTROL

B4 MULTIPLE OCCUPANCY SENSORS CONTROLLING LOAD
NTS





A8 SHOP LIGHTING CONTROL DETAIL
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET E001 FOR ELECTRICAL SYMBOL LEGEND.

KEY NOTES

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL DETAILS

STANTEC
3700 Park East Drive, # 200
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Fax: 216/454-9995

Thorson Baker + Associates
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Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT: NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	E-	502

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: NTS | OFFICIAL DATE: 06-24-2014

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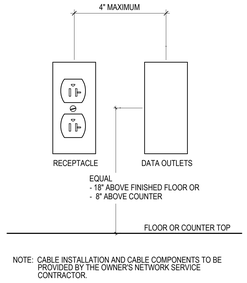
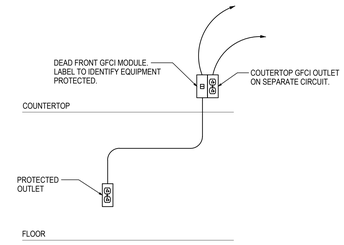
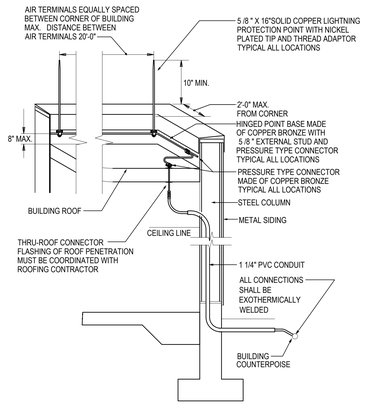


NOTE: CABLE INSTALLATION AND CABLE COMPONENTS TO BE PROVIDED BY THE OWNER'S NETWORK SERVICE CONTRACTOR.

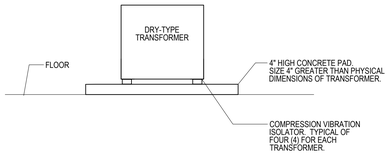
G8 TYPICAL WALL OUTLET ORIENTATION
NTS



G4 DEAD FRONT GFCI MODULE WIRING DETAIL
NTS



D8 LIGHTNING PROTECTION DETAIL
NTS



NOTES:
1. REFER TO STRUCTURAL DRAWINGS AND SPECIFICATIONS FOR DETAILED REQUIREMENTS.
2. PROVIDE A MINIMUM OF 6" AIRSPACE BETWEEN TRANSFORMER AND ALL WALLS AND CEILING.

D4 PAD-MOUNTED TRANSFORMER MOUNTING DETAIL
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET E001 FOR ELECTRICAL SYMBOL LEGEND.

KEY NOTES

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NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
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LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	E-	503

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
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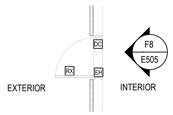
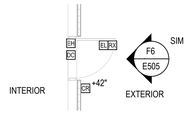
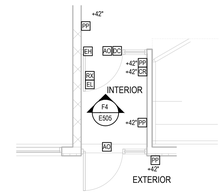


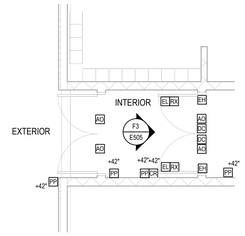
G8 ACCESS CONTROL DOOR TYPE M1
1/4"=1'-0"



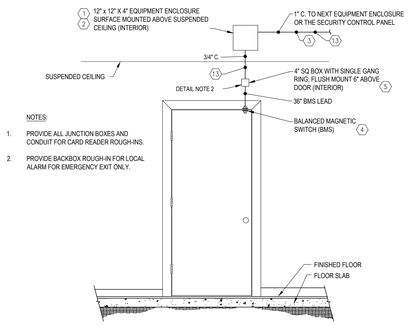
G6 ACCESS CONTROL DOOR TYPE C1
1/4"=1'-0"



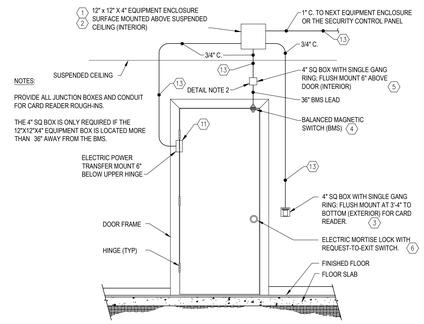
G4 ACCESS CONTROL DOOR TYPE V1
1/4"=1'-0"



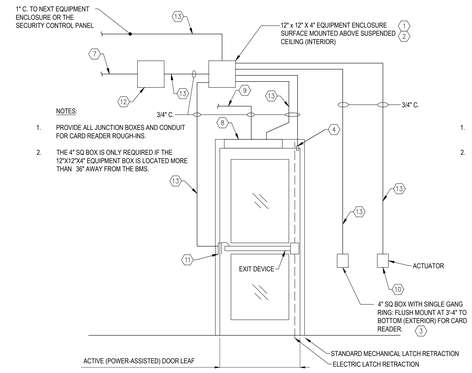
G3 ACCESS CONTROL DOOR TYPE V2
1/4"=1'-0"



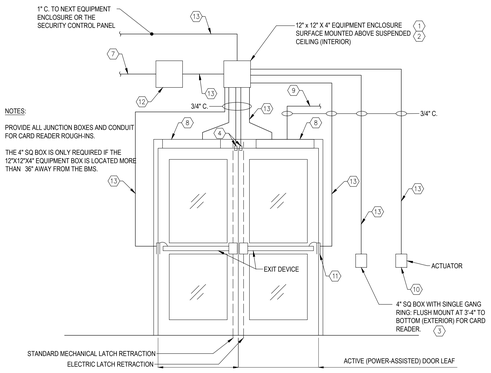
F8 ACCESS CONTROL DOOR TYPE M1 ELEVATION
NTS



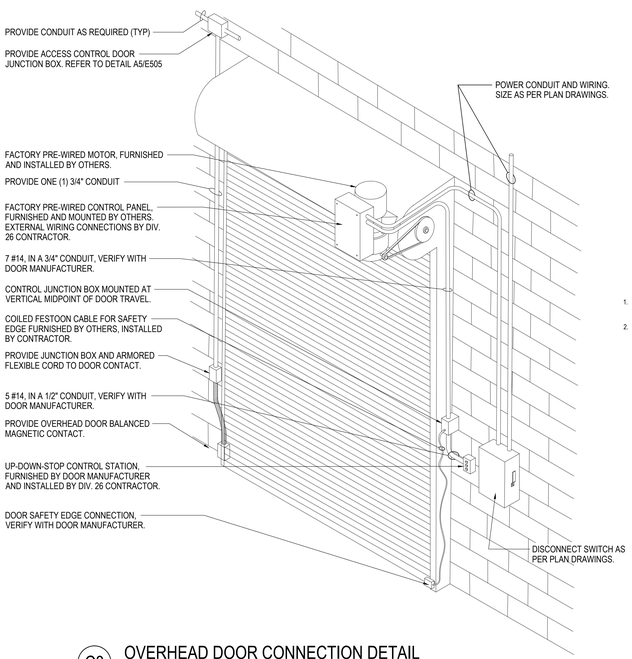
F6 ACCESS CONTROL DOOR TYPE C1 ELEVATION
NTS



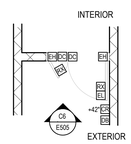
F4 ACCESS CONTROL DOOR TYPE V1 ELEVATION
NTS



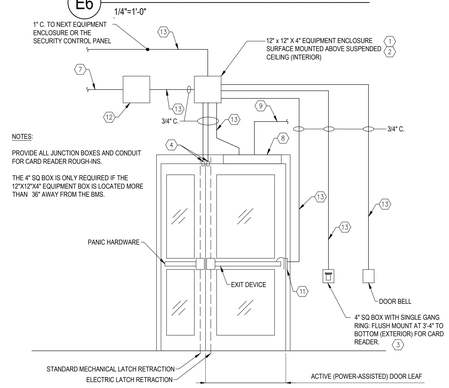
F3 ACCESS CONTROL DOOR TYPE V2 ELEVATION
NTS



C8 OVERHEAD DOOR CONNECTION DETAIL
1/2"=1'-0"



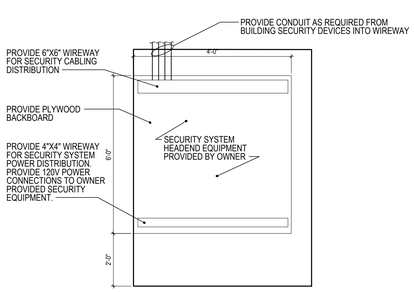
E6 ACCESS CONTROL DOOR TYPE V3
1/4"=1'-0"



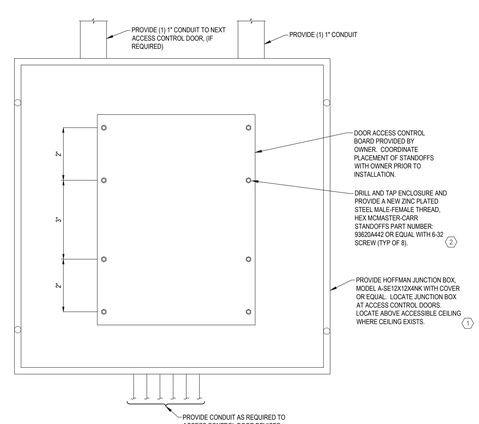
C6 ACCESS CONTROL DOOR TYPE V3 ELEVATION
NTS

CODED NOTES:

1. READER INTERFACE JUNCTION BOX: (THE CARD READER/KEYPAD INTERFACE MODULE WILL BE FURNISHED BY THE GOVERNMENT AND INSTALLED BY OTHERS.) PROVIDE A NEW 12"(W) X12"(H) X4"(D) STEEL JUNCTION BOX WITH SCREW COVER, WITHOUT KNOCKOUTS, PAINTED WITH ANSI 61 POLYESTER POWDER FINISH; HOFFMAN MODEL A-SE12X12XANK, OR APPROVED EQUAL, TO HOUSE THE CARD READER/KEYPAD INTERFACE MODULE. SURFACE MOUNT THE READER INTERFACE JUNCTION BOX ABOVE THE ACCESS CONTROLLED DOOR ON THE SECURED SIDE OF THE ROOM.
2. STANDOFFS: PROVIDE EIGHT (8) NEW ZINC-PLATED STEEL MALE-FEMALE THREAD HEX STANDOFFS; EACH MCMASTER-CARR PART NUMBER 93620A442, OR APPROVED EQUAL, WITH A 6-32 SCREW. DRILL AND TAP THE JUNCTION BOX. INSTALL THE STANDOFFS IN THE READER INTERFACE JUNCTION BOX ARRANGED IN THE PATTERN SHOWN ON THE ELECTRICAL DETAIL.
3. READER BACKBOX: (THE NEW CARD READER/KEYPAD WILL BE FURNISHED BY THE GOVERNMENT AND INSTALLED BY OTHERS.)PROVIDE A NEW 4" SQUARE BOX WITH SINGLE GANG RING TO SERVE AS THE CARD READER/KEYPAD BACKBOX. FLUSH MOUNT THE BOX IN THE WALL ADJACENT TO THE LOCKSET LEVER HANDLE, WITH THE BOTTOM OF THE BOX 3'4" ABOVE THE FINISHED FLOOR AND THE BOX OPENING TO THE UNSECURED SIDE OF THE ROOM.
4. BMS: THE BMS IS SUPPLIED WITH A 3' STAINLESS STEEL ARMORED CABLE LEAD. INSTALL THE CABLE IN A NEW ½" METAL RACEWAY CONCEALED IN THE WALL. COIL A MINIMUM OF 12" EXCESS CABLE WITHIN THE READER INTERFACE JUNCTION BOX.
5. BMS EXTENSION CABLE TERMINATION BOX: PROVIDE A NEW 4" SQUARE BOX WITH SINGLE GANG RING AND COVER PLATE. FLUSH MOUNT THE BOX ABOVE THE ACCESS CONTROLLED DOOR, WITH THE BOX OPENING TO THE SECURED SIDE OF THE ROOM. (THE BMS EXTENSION CABLE TERMINATION BOX IS NOT REQUIRED IF THE BMS ARMORED CABLE FULLY EXTENDS INTO THE READER INTERFACE JUNCTION BOX)
6. LOCKSET: THE LOCKSET REQUIRES A CABLE RUN BETWEEN IT AND THE EPT, AND BETWEEN THE EPT AND THE READER INTERFACE JUNCTION BOX. IN ADDITION, THE LOCKSET REQUIRES END-OF-LINE (EOL) RESISTORS FOR CONDUCTOR SUPERVISION.
7. POWER: PROVIDE NEW 3-#12 AWG POWER CONDUCTORS TO PROVIDE 120 VAC POWER FROM A DEDICATED 20 A BREAKER FOR THE AUXILIARY POWER SUPPLY. TERMINATE THE CONDUCTORS AT THE BREAKER PANEL. COIL A MINIMUM OF 12" EXCESS CONDUCTORS WITHIN THE AUXILIARY POWER SUPPLY JUNCTION BOX. (ALL TERMINATIONS WITHIN THE AUXILIARY POWER SUPPLY JUNCTION BOX WILL BE PERFORMED BY OTHERS.)
8. CLOSER: THE ACTIVE DOOR CLOSER REQUIRES 120 VAC POWER AND A CABLE RUN BETWEEN IT AND THE READER INTERFACE JUNCTION BOX.
9. POWER: PROVIDE NEW 3-#12 AWG POWER CONDUCTORS TO PROVIDE 120 VAC POWER FROM A DEDICATED 20 A BREAKER FOR THE ACTIVE DOOR CLOSER. TERMINATE THE CONDUCTORS AT THE BREAKER PANEL AND AT THE DOOR CLOSER.
10. INSTALL WALL ACTUATOR.
11. ELECTRIC HINGE: THE ELECTRIC HINGE (EH) REQUIRES A CABLE RUN BETWEEN IT AND THE READER INTERFACE JUNCTION BOX. IN ADDITION, THE EH REQUIRES END-OF-LINE (EOL) RESISTORS FOR CONDUCTOR SUPERVISION.
12. AUXILIARY POWER SUPPLY JUNCTION BOX: (THE AUXILIARY POWER SUPPLY WILL BE FURNISHED BY THE GOVERNMENT AND INSTALLED BY OTHERS.) PROVIDE A NEW 12"(W) X12"(H) X4"(D) STEEL JUNCTION BOX WITH SCREW COVER, WITHOUT KNOCKOUTS, PAINTED WITH ANSI 61 POLYESTER POWDER FINISH; HOFFMAN MODEL A-SE12X12XANK, OR APPROVED EQUAL, TO HOUSE THE AUXILIARY POWER SUPPLY . SURFACE MOUNT THE AUXILIARY POWER SUPPLY JUNCTION BOX ADJACENT TO THE READER INTERFACE JUNCTION BOX, ABOVE THE ACCESS CONTROLLED DOOR ON THE SECURED SIDE OF THE ROOM.
13. SYSTEM CABLING, SHALL BE GFGI.



A8 SECURITY SYSTEM HEADEND ELEVATION
1/2"=1'-0"



A5 READER INTERFACE JUNCTION BOX DETAIL
NTS

GENERAL NOTES

1. REFER TO SHEET E001 FOR ELECTRICAL SYMBOLS LEGEND.

KEY NOTES

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.	
CONTRACT NO.: NNC09CA01C	
TASK ORDER	
DRAWN / DESIGNED / CHECKED	
APPROVED / APPROVAL DATE	

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT

SYSTEM:	SUB-SYS:	FACILITY:	CONFIG:
HVAC			

NASA APPROVALS

DR:	DES:
D.ENG:	PROJ. MGR: KJS
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE APPROVAL:	DATE:
RELEASE STATUS: WORKING	

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	505

AREA: SHEET 1 OF

UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION: - | VER: 1

SCALE: NTS | OFFICIAL DATE: 06-24-2014

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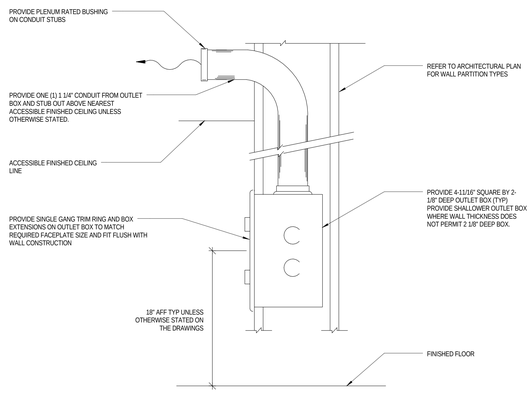
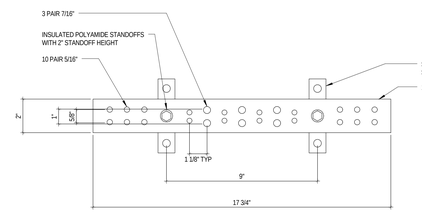
TEMPLATE DATE: 02/28/2011



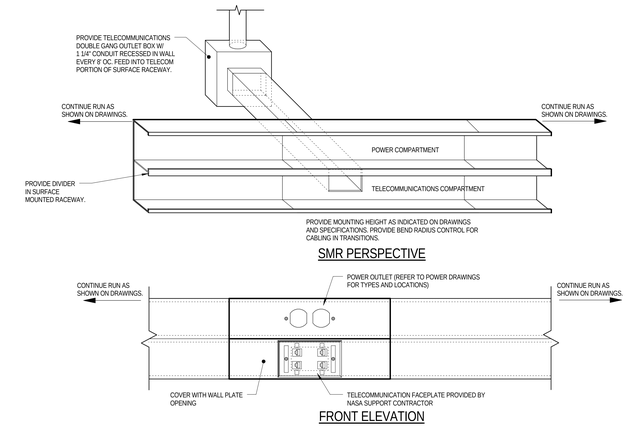
TELECOMMUNICATIONS OUTLET CONDUIT AND BACKBOX

F8 / E-506 — Not to Scale



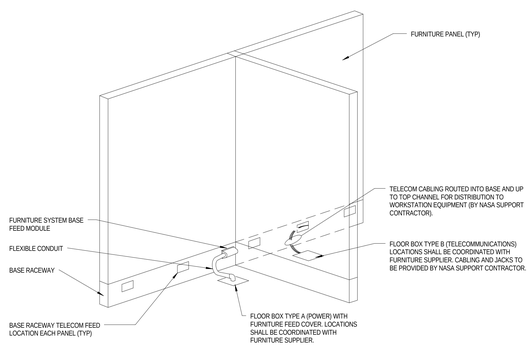
TELECOMMUNICATIONS GROUNDING BUSBAR (TGB) DETAIL

F4 / E-506 — Not to Scale



SURFACE RACEWAY FEEDER AND FACEPLATE DETAIL

F2 / E-506 — Not to Scale



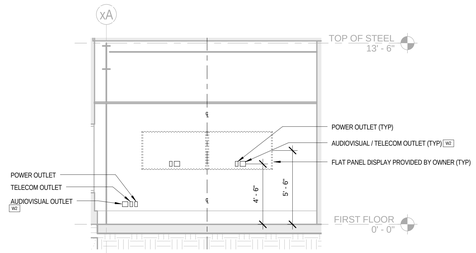
FURNITURE SYSTEM - POWER AND TELECOM FEEDS

D8 / E-506 — Not to Scale

SYMBOL	BACKBOX	MOUNTING	MANUFACTURER
W1	SINGLE GANG OUTLET BOX/ WALL CADDY	WALL RECESSED	SEE SPECIFICATIONS
W2	DOUBLE GANG OUTLET BOX/ WALL CADDY	WALL RECESSED	SEE SPECIFICATIONS
W3	THREE GANG OUTLET BOX/ WALL CADDY	WALL RECESSED	SEE SPECIFICATIONS

AUDIOVISUAL BACKBOX SCHEDULE

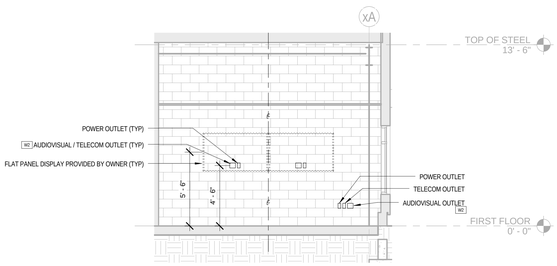
D6 / E-506 — Not to Scale



AUDIOVISUAL SYSTEMS ROUGH-IN ELEVATION

D2 / E-506 — 1/4" = 1'-0"

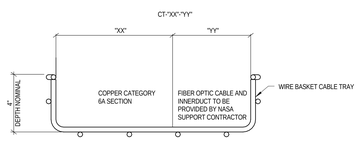
NOTE: COORDINATE FINAL LOCATIONS WITH OWNER PRIOR TO ROUGH-IN.



AUDIOVISUAL SYSTEMS ROUGH-IN ELECATION

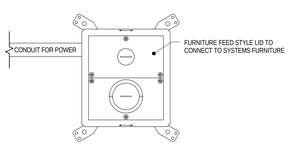
B8 / E-506 — 1/4" = 1'-0"

NOTE: COORDINATE FINAL LOCATIONS WITH OWNER PRIOR TO ROUGH-IN.



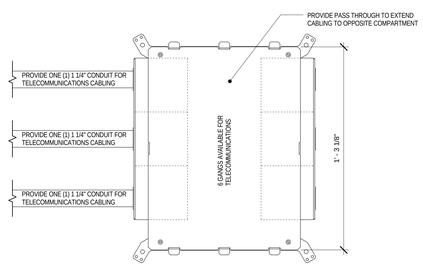
CABLE TRAY SECTION

B6 / E-506 — Not to Scale



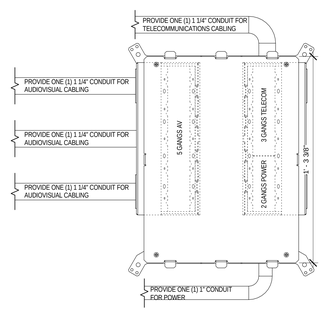
FLOOR BOX TYPE A

A8 / E-506 — Not to Scale



FLOOR BOX TYPE B

A6 / E-506 — Not to Scale



FLOOR BOX TYPE C

A4 / E-506 — Not to Scale

PROVIDE CONDUIT REDUCERS OR PUNCH FLOOR BOX AS NEEDED TO MATCH CONDUIT SIZE TO LARGER KNOCKOUTS

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT — SYSTEM: BLDG | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES: | D.ENG: | PROJ. MGR:

CONTRACTOR: STANTEC ARCHITECTURE INC. | CONTRACT NO.: NNC09CA01C | TASK ORDER | DRAWN: RJM | DESIGNED | CHECKED | APPROVED: Approver | APPROVAL DATE

RELEASE APPROVAL: | DATE: | RELEASE APPROVAL: | DATE: | RELEASE APPROVAL: | DATE:

RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	506

AREA: | SHEET 1 OF 1 | UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1 | SCALE: As indicated | OFFICIAL DATE: 06-24-2014

E-506

0351-COF20244-E-506_CE_1.dwg TEMPLATE DATE: 02/28/2011

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LIGHTING CALCULATIONS - FIRST FLOOR - AREA A

Room Name	LTID New Materials	Primary Elect Lab	Primary Pressure Lab	Main Electrical Lab (north)	Main Electrical Lab (south)	Dimensional Lab
Room Number	140	137	138	132	132	133
Length	75	25	50.5	29	29	23
Width	40	22.5	24	22	24	10
Height	18	9	9	9	9	9
Illuminance (fc)	30	100	100	100	100	100
Fixture Type	FT3A	FT4	FT5	FT4	FT4	FT4
Lamp Lumens	9000	2950	2950	2950	2950	2950
Number of Lamps	1	3	3	3	3	3
RCR	1.73	1.90	1.38	1.80	1.71	3.23
CU	0.8	0.88	0.88	0.88	0.88	0.8
LLF	0.85	0.85	0.85	0.85	0.85	0.85
Required Fixtures	14.71	8.50	18.31	9.64	10.51	3.82
Actual Fixtures	30	9	21	12	12	2
Average Illuminance	61.20	105.92	114.70	124.51	114.13	52.33
Watts/Fixture	95	93	93	93	93	93
Watts/SF	0.95	1.49	1.61	1.75	1.60	0.81

FIXTURE TAG	DESCRIPTION	MOUNTING	LAMP QUANTITY/ TYPE	WATTS	VOLTAGE	MANUFACTURER	CATALOG NUMBER OR SERIES	NOTES
EB1A	EMERGENCY LIGHTING UNIT, TOP MOUNTED (2) HEADS, STEEL ENCLOSED, EQUIPPED WITH ADVANCED DIAGNOSTICS, NO REMOTE CAPABILITY.	WALL 8' AFF	(2) 9W	18	120/277	EMERGI-LITE	JSE18-2-AD-NASA	
EB1B	EMERGENCY LIGHTING UNIT, TOP MOUNTED (2) HEADS, STEEL ENCLOSED, EQUIPPED WITH ADVANCED DIAGNOSTICS WREMOTE CAPABILITY.	WALL 8' AFF	(2) 9W	27	120/277	EMERGI-LITE	JSE27-2-AD-NASA	
EB2	EMERGENCY LIGHTING SINGLE REMOTE HEAD	WALL 8' AFF	(1) 9W	9	120/277	EMERGI-LITE	EF11-2F-G-NASA	
EX1A	SELF-LUMINOUS EXIT SIGN WITH ALUMINUM HOUSING, SINGLE FACE	AS NOTED	-	-	-	ISOLITE	2040-01-R-20-BA	1
EX1B	SELF-LUMINOUS EXIT SIGN WITH ALUMINUM HOUSING, DOUBLE FACE	AS NOTED	-	-	-	ISOLITE	2040-07-R-20-BA	1
FD1	6" HORIZONTAL COMPACT FLUORESCENT DOWNLIGHT WITH CLEAR SEMI-SPECULAR OPEN REFLECTOR	RECESSED	(1) CFTR32	35	277	LITHONIA	LFEN 1/26-42TRT F601AZ MVOLT	
FP1	4' DIRECT/INDIRECT RECTANGULAR PENDANT, SINGLE CIRCUIT WITH T-BAR MOUNTING BRACKETS FOR 15" OVERALL SUSPENSION AND ADJUSTABLE CABLE GRIPPERS, SATIN ANODIZED FINISH	PENDANT	(2) F54TSHO PER 4' SECTION	131	277	PEERLESS	EGRMB-2-54TSHO-X-RB-277-GEB10-SCT-LP840-F1-15-C100-ACG	8,9
FS1	4' INDUSTRIAL LED STRIP LIGHTING FIXTURE WITH CHAIN HANGERS	PENDANT 12" BELOW CEILING	5,000 LUMEN LED	72	277	LITHONIA	ZL2N L48 3000LM MDD MVOLT 41K 80 CRI PLR WH HC36	
FT1	2' X 4' RECESSED BASKET TYPE FLUORESCENT HIGH EFFICIENCY TROFFER WITH ACRYLIC LENS AND (1) 2-LAMP ELECTRONIC BALLAST	RECESSED	(2) F32T8	62	277	HE WILLIAMS	HETG-S24-232-A-EB2-277	7
FT2A	14' PERIMETER FLUORESCENT WALL WASH SYSTEM WITH WHITE REFLECTOR SYSTEM AND <10% THD ELECTRONIC BALLAST	RECESSED	(3) F32T8	93	277	PRUDENTIAL	P-59-1T8-R14-W-277-X1-10THD	
FT2B	15' PERIMETER FLUORESCENT WALL WASH SYSTEM WITH WHITE REFLECTOR SYSTEM AND <10% THD ELECTRONIC BALLAST	RECESSED	(3) F32T8	93	277	PRUDENTIAL	P-59-1T8-R15-W-277-X1-10THD	
FT2C	16' PERIMETER FLUORESCENT WALL WASH SYSTEM WITH WHITE REFLECTOR SYSTEM AND <10% THD ELECTRONIC BALLAST	RECESSED	(4) F32T8	124	277	PRUDENTIAL	P-59-1T8-R16-W-277-X1-10THD	
FT2D	20'-6" PERIMETER FLUORESCENT WALL WASH SYSTEM WITH WHITE REFLECTOR SYSTEM AND <10% THD ELECTRONIC BALLAST	RECESSED	(5) F32T8	155	277	PRUDENTIAL	P-59-1T8-R20.5-W-277-X1-10THD	
FT3	4' LED HIGH BAY LIGHTING FIXTURE, WIDE DISTRIBUTION LIGHT PATTERN, INTEGRAL 360° OCCUPANCY SENSOR, CHAIN HANGERS	PENDANT	9,000 LUMENS LED	95	277	LITHONIA	IBL 9L WD 277V LP840 MSE360 HC36	2, 4
FT3A	4' LED HIGH BAY LIGHTING FIXTURE, NARROW DISTRIBUTION LIGHT PATTERN, INTEGRAL 360° OCCUPANCY SENSOR, CHAIN HANGERS	PENDANT	9,000 LUMENS LED	95	277	LITHONIA	IBL 9L ND 277V LP840 MSE360 HC36	2, 4
FT3B	4' LED HIGH BAY LIGHTING FIXTURE, WIDE DISTRIBUTION LIGHT PATTERN, INTEGRAL 360° OCCUPANCY SENSOR, CHAIN HANGERS	PENDANT	9,000 LUMENS LED	95	277	LITHONIA	IBL 9L WD 277V LP840 MSE360 HC36	2,3,4
FT3C	4' LED HIGH BAY LIGHTING FIXTURE, NARROW DISTRIBUTION LIGHT PATTERN, INTEGRAL 360° OCCUPANCY SENSOR, PHOTOCELL, CHAIN HANGERS	PENDANT	9,000 LUMENS LED	95	277	LITHONIA	IBL 9L ND 277V LP840 LAPZU HC36	2,4,11
FT4	2' X 4', 4 LAMP, RECESSED LENSED FLUORESCENT TROFFER WITH HIGH EFFICIENCY <10% ELECTRONIC BALLAST	RECESSED	(3) F32T8	93	277	LITHONIA	2GT8-F-332-XX-A12125-MVOLT-GEB10IS-LP741	10
FT5	2' X 4', 4 LAMP, RECESSED LENSED AND GASKETED FLUORESCENT TROFFER WITH HIGH EFFICIENCY <10% ELECTRONIC BALLAST	RECESSED	(3) F32T8	93	277	LITHONIA	2WRT-G-332-A12125-MVOLT-GEB10IS-LP741	10
FT6	2' X 4', 3 LAMP, RECESSED LENSED FLUORESCENT TROFFER WITH HIGH EFFICIENCY <10% ELECTRONIC BALLAST	RECESSED	(3) F32T8	93	277	LITHONIA	2GT8-F-332-XX-A12125-MVOLT-GEB10IS-LP741	
FW1	EXTERIOR DECORATIVE LED LIGHTING FIXTURE MOUNTED OVER MAN-DOOR, SURFACE MOUNTED BACK BOX, PHOTOCELL CONTROL, EMERGENCY BATTERY BACKUP WITH TEXTURED NATURAL ALUMINUM FINISH	WALL	LED	47	277	LITHONIA	WSR LED 2 10A700/40K SR4 277 DBW ELCW SF PE DNATXD	
FW2	EXTERIOR DECORATIVE LED LIGHTING FIXTURE MOUNTED OVER GARAGE DOOR, FORWARD THROW LIGHT DISTRIBUTION WITH TEXTURED NATURAL ALUMINUM FINISH	WALL	LED	45	277	LITHONIA	DSX0 20C 700 40K TFTM 277 WBA HS SF DNATXD	
H1	7" RECESSED LED DOWNLIGHT, LENSED, WHITE REFLECTOR, REMOTE POWER SUPPLY, DRIVER & RFI FILTER	RECESSED	1,850 LUMENS LED	38	277	KIRLIN	MRJX-07382-41K-WFL-30	
S2	WALL MOUNTED EXTERIOR UTILITY LIGHTING FIXTURE	WALL	(1) 42W CF	45	120	LITHONIA	WWX2L	
SA1A	METAL HALIDE AREA LIGHTING FIXTURE, TYPE II DISTRIBUTION, SINGLE, wPHOTOCELL CONTROL	20' POLE	(1) 175W MH	205	480	LITHONIA	MR1-175M-SR2-480-SCWA-SPA-DF-PER-PE4-LP1	5, 6
SA1B	METAL HALIDE AREA LIGHTING FIXTURE, TYPE IV DISTRIBUTION, SINGLE, WPHOTOCELL CONTROL	20' POLE	(1) 175W MH	205	480	LITHONIA	MR1-175M-SR4SC-480-SCWA-SPA-DF-PER-PE4-LP1	5, 6

LIGHTING FIXTURE SCHEDULE NOTES

1. VERIFY MOUNTING AND PROVIDE REQUIRED CHEVERON(S) AS SHOWN ON ELECTRICAL PLANS.
2. PROVIDE FIXTURE WITH INTEGRAL HIGH BAY PIR OCCUPANCY SENSOR, EQUAL TO WATTSTOPPER MODEL NO. HB-350. PROVIDE SENSOR WITH LENS EQUAL TO WATTSTOPPER MODEL NO. HB-L3.
3. FIXTURE SHALL BE PROGRAMMED TO BLINK AT INTERVALS AS DESIGNATED BY THE BUILDING AUTOMATION SYSTEM. REFER TO FLOOR PLANS FOR ADDITIONAL INFORMATION.
4. MOUNT BOTTOM OF FIXTURE 18'-6" ABOVE FINISHED FLOOR.
5. PROVIDE FIXTURE WITH NATURAL ALUMINUM FINISH.
6. PROVIDE 20', 5" SQUARE ALUMINUM POLE EQUAL TO LITHONIA CATALOG NUMBER SSA 20 5G-T20-DNA.
7. PROVIDE FIXTURE WITH ELECTRONIC BALLAST WITH STEP-DIMMING CAPABILITY FOR (2) F32T8 LAMPS.
8. MOUNT FIXTURE 7'-6" AFF TO BOTTOM OF FIXTURE. CONTRACTOR TO VERIFY MOUNTING REQUIREMENTS AND PROVIDE MOUNTING ACCESSORIES IF NEEDED.
9. PROVIDE FIXTURE WITH ELECTRONIC BALLAST WITH STEP-DIMMING CAPABILITY FOR (2) F54TSHO LAMPS.
10. PROVIDE FIXTURE WITH DUAL ELECTRONIC BALLASTS FOR DUAL-SWITCHING. FIRST SWITCH SHALL CONTROL OUTSIDE LAMPS. SECOND SWITCH SHALL CONTROL INSIDE LAMP(S).
11. PROVIDE FIXTURE WITH INTEGRAL PHOTOCELL FOR DAYLIGHTING CONTROL.

GENERAL NOTES

1. IF DISCREPANCY EXISTS BETWEEN FIXTURE CATALOG NUMBER AND FIXTURE DESCRIPTION, FIXTURE DESCRIPTION SHALL TAKE PRECEDENCE.
2. PROVIDE ALL FLUORESCENT AND COMPACT FLUORESCENT LAMPS WITH A MXIMUM CCT OF 4100 KELVIN AND A MINIMUM CRI OF 86.

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL SCHEDULES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	600

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: NTS | OFFICIAL DATE: 06-24-2014

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TEMPLATE DATE: 02/28/2011

PANEL PXR0301A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
250 AMP MAIN BREAKER 250 AMP BUS
VOLTAGE: 240 VOLTS 3-WIRE, 3 PHASE

FED FROM: F0102C VIA XFMR
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 250/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
2500	1. SPECIALTY RCPT - ROOM 138	30/2	2U	2U 20/2 SPECIALTY RCPT - ROOM 138	2. 2500
2500	3.				4. 2500
	5. SPARE	30/2	2U	2U 20/2 SPARE	6.
	7.				8.
	9. SPARE	30/2	2U	2U 20/2 SPARE	10.
	11.				12.
	13.				14.
	15. SPARE	30/3	3U	3U 30/3 SPARE	16.
	17.				18.
	19.				20.
	21. SPARE	30/3	3U	3U 30/3 SPARE	22.
	23.				24.
	25. PROVISION			PROVISION	26.
	27. PROVISION			PROVISION	28.
	29. PROVISION			PROVISION	30.
	31. PROVISION			PROVISION	32.
	33. PROVISION			PROVISION	34.
	35. PROVISION			PROVISION	36.
	37. PROVISION			PROVISION	38.
	39. PROVISION			PROVISION	40.
	41. PROVISION			PROVISION	42.

NOTES:
1. PROVIDE PANEL WITH THRU-FEED LUGS (FEED TO PANEL PXR0301B).

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

5000 | 5000

PNL VA		A	x 1.25
10000	@240V	24.04	30.05

PANEL PXR0401A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
250 AMP MAIN BREAKER 250 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: F0102C VIA XFMR PXR04
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 250/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
2500	1.				2. 2500
2500	3. SPECIALTY RCPT - ROOM 138	30/3	3U	3U 30/3 SPECIALTY RCPT - RM 138	4. 2500
2500	5.				6. 2500
2500	7.				8. 2500
2500	9. SPECIALTY RCPT - ROOM 138	30/3	3U	3U 30/3 SPECIALTY RCPT - RM 132	10. 2500
2500	11.				12. 2500
	13. SPARE	20/1	1U	1U 20/1 SPARE	14.
	15. SPARE	20/1	1U	1U 20/1 SPARE	16.
	17. SPARE	20/1	1U	1U 20/1 SPARE	18.
	19. SPARE	20/1	1U	1U 20/1 SPARE	20.
	21. SPARE	20/1	1U	1U 20/1 SPARE	22.
	23. PROVISION			PROVISION	24.
	25. PROVISION			PROVISION	26.
	27. PROVISION			PROVISION	28.
	29. PROVISION			PROVISION	30.
	31. PROVISION			PROVISION	32.
	33. PROVISION			PROVISION	34.
	35. PROVISION			PROVISION	36.
	37. PROVISION			PROVISION	38.
	39. PROVISION			PROVISION	40.
	41. PROVISION			PROVISION	42.

NOTES:

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

15000 | 15000

PNL VA	AMPS	AMPS x 1.25
30000	@208V	83.33	104.17

PANEL PXR0501C SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
225 AMP MAIN BREAKER 225 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: PXR0501A
FEEDER: SEE RISER ON E801
NEUTRAL: (NOTE 1) SEE RISER ON E801
GROUND: (NOTE 1) SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 225/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
360	1. IG RCPT - ROOM 137 (NOTE 2.)	20/1	1U	1U 20/1 IG RCPT - ROOM 137 (NOTE 2.)	2. 360
540	3. IG RCPT - ROOM 137 (NOTE 2.)	20/1	1U	1U 20/1 FLOOR BOX - ROOM 137	4. 540
540	5. RCPT - ROOM 137	20/1	1U	1U 20/1 RCPT - ROOM 137	6. 540
540	7. RCPT - ROOM 137	20/1	1U	1U 20/1 RCPT - ROOM 137	8. 540
540	9. RCPT - ROOM 137	20/1	1U	1U 20/1 FLOOR BOX - ROOM 137	10. 540
	11. SPARE	20/1	1U	1U 20/1 SPARE	12.
	13. SPARE	20/1	1U	1U 20/1 SPARE	14.
	15. SPARE	20/1	1U	1U 20/1 SPARE	16.
	17. PROVISION			PROVISION	18.
	19. PROVISION			PROVISION	20.
	21. PROVISION			PROVISION	22.
	23. PROVISION			PROVISION	24.
	25. PROVISION			PROVISION	26.
	27. PROVISION			PROVISION	28.
	29. PROVISION			PROVISION	30.
	31. PROVISION			PROVISION	32.
	33. PROVISION			PROVISION	34.
	35. PROVISION			PROVISION	36.
	37. PROVISION			PROVISION	38.
	39. PROVISION			PROVISION	40.
	41. PROVISION			PROVISION	42.

NOTES:
1. PROVIDE PANEL WITH 200% RATED NEUTRAL BUS AND ISOLATED GROUND BUS.
2. PROVIDE ISOLATED GROUND CIRCUIT.

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

2340 | 2520

PNL VA	AMPS	AMPS x 1.25
4860	@208V	13.500000	16.875000

PANEL PXR0601A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
60 AMP MAIN BREAKER 60 AMP BUS
VOLTAGE: 120 VOLTS 2-WIRE, 1 PHASE

FED FROM: PXR0501C VIA XFMR PXR06
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 60/1 3U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
180	1. VREG IG RCPT - ROOM 137	20/1	1U	1U 20/1 VREG IG RCPT - ROOM 137	2. 180
180	3. VREG IG RCPT - ROOM 137	20/1	1U	1U 20/1 VREG IG RCPT - ROOM 137	4. 180
180	5. VREG IG RCPT - ROOM 137	20/1	1U	1U 20/1 VREG IG RCPT - ROOM 137	6. 180
	7. SPARE	20/1	1U	1U 20/1 SPARE	8.
	9. SPARE	20/1	1U	1U 20/1 SPARE	10.
	11. SPARE	20/1	1U	1U 20/1 SPARE	12.
	13. PROVISION			PROVISION	14.
	15. PROVISION			PROVISION	16.
	17. PROVISION			PROVISION	18.
	19. PROVISION			PROVISION	20.
	21. PROVISION			PROVISION	22.
	23. PROVISION			PROVISION	24.
	25. PROVISION			PROVISION	26.
	27. PROVISION			PROVISION	28.
	29. PROVISION			PROVISION	30.
	31. PROVISION			PROVISION	32.
	33. PROVISION			PROVISION	34.
	35. PROVISION			PROVISION	36.
	37. PROVISION			PROVISION	38.
	39. PROVISION			PROVISION	40.
	41. PROVISION			PROVISION	42.

NOTES:

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

540 | 540

PNL VA	AMPS	AMPS x 1.25
1080	@120V	9.00	11.25

PANEL F0203A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
100 AMP MAIN BREAKER 100 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F02
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 100/3 3U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
2850	1. LIGHTING	20/1	1U	1U 20/1 LIGHTING	2. 1902
2976	3. LIGHTING	20/1	1U	1U 20/1 LIGHTING	4. 2580
3255	5. LIGHTING	20/1	1U	1U 20/1 LIGHTING	6. 150
	7. SPARE	20/1	1U	1U 20/1 SPARE	8.
	9. SPARE	20/1	1U	1U 20/1 SPARE	10.
	11. SPARE	20/1	1U	1U 20/1 SPARE	12.
	13. SPARE	20/1	1U	1U 20/1 SPARE	14.
	15. SPARE	20/1	1U	1U 20/1 SPARE	16.
	17. SPARE	20/1	1U	1U 20/1 SPARE	18.
	19. SPARE	20/1	1U	1U 20/1 SPARE	20.
	21. SPARE	20/1	1U	1U 20/1 SPARE	22.
	23. SPARE	20/1	1U	1U 20/1 SPARE	24.

NOTES:
1. CIRCUIT SHALL BE CONTROLLED VIA PHOTOCELL. REFER TO DETAIL A8/E501.

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

9081 | 4632

PNL VA	AMPS	AMPS x 1.25
13713	@480V	16.50	20.63

PANEL F0205A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
225 AMP MAIN BREAKER 225 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F0102A
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
	1. SPARE	20/1	1U	1U 20/1 SPARE	2.
	3. SPARE	20/1	1U	1U 20/1 SPARE	4.
	5. SPARE	20/1	1U	1U 20/1 SPARE	6.
	7. SPARE	20/1	1U	1U 20/1 SPARE	8.
	9. SPARE	20/1	1U	1U 20/1 SPARE	10.
	11. SPARE	20/1	1U	1U 20/1 SPARE	12.
	13. SPARE	20/1	1U	1U 20/1 SPARE	14.
	15. SPARE	20/1	1U	1U 20/1 SPARE	16.
	17. SPARE	20/1	1U	1U 20/1 SPARE	18.
	19. SPARE	20/1	1U	1U 20/1 SPARE	20.
	21. SPARE	20/1	1U	1U 20/1 SPARE	22.
	23. SPARE	20/1	1U	1U 20/1 SPARE	24.
	25. SPARE	20/1	1U	1U 20/1 SPARE	26.
	27. SPARE	20/1	1U	1U 20/1 SPARE	28.
	29. SPARE	20/1	1U	1U 20/1 SPARE	30.
	31. PANEL PXR0301A VIA XFMR PXR03 (NOTE 1)	150/3	3U	3U 30/3 SPARE	32.
	33.				34.
	35.				36.
	37.				38.
	39. PANEL PXR0401A VIA XFMR PXR04 (NOTE 1)	150/3	3U	3U 225/3 PANEL PXR0501A VIA XFMR PXR05 (NOTE 1)	40.
	41.				42.

NOTES:
1. REFER TO RISER DIAGRAM ON SHEET E801 FOR CONDUIT AND WIRE SIZES.

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

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PNL VA	AMPS	AMPS x 1.25
####	@480V	####	####

PANEL PXR0501D SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
100 AMP MAIN BREAKER 100 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: PXR0501A
FEEDER: SEE RISER ON E801
NEUTRAL: (NOTE 1) SEE RISER ON E801
GROUND: (NOTE 1) SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 100/3 3U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
500	1. EQUIPMENT RCPT - ROOM 126	20/1	1U	1U 20/1 EQUIPMENT RCPT - ROOM 126	2. 500
500	3. EQUIPMENT RCPT - ROOM 126	20/1	1U	1U 20/1 EQUIPMENT RCPT - ROOM 126	4. 500
500	5. EQUIPMENT RCPT - ROOM 126	20/1	1U	1U 20/1 EQUIPMENT RCPT - ROOM 126	6. 500
500	7. EQUIPMENT RCPT - ROOM 126	20/1	1U	1U 20/1 EQUIPMENT RCPT - ROOM 126	8. 500
500	9. DATA / COMM EQUIP - ROOM 126	20/1	1U	1U 20/1 DATA / COMM EQUIP - ROOM 126	10. 500
500	11. DATA / COMM EQUIP - ROOM 126	20/1	1U	1U 20/1 EQUIPMENT RCPT - ROOM 126	12. 500
500	13. EQUIPMENT RCPT - ROOM 126	20/1	1U	1U 20/1 EQUIPMENT RCPT - ROOM 126	14. 500
500	15. EQUIPMENT RCPT - ROOM 126	20/1	1U	1U 20/1 SPARE	16.
	17. SPARE	20/1	1U	1U 20/1 SPARE	18.
	19. SPARE	20/1	1U	1U 20/1 SPARE	20.
	21. SPARE	20/1	1U	1U 20/1 SPARE	22.
	23. PROVISION			PROVISION	24.
	25. PROVISION			PROVISION	26.
	27. PROVISION			PROVISION	28.
	29. PROVISION			PROVISION	30.
	31. PROVISION			PROVISION	32.
	33. PROVISION			PROVISION	34.
	35. PROVISION			PROVISION	36.
	37. PROVISION			PROVISION	38.
	39. PROVISION			PROVISION	40.
	41. PROVISION			PROVISION	42.

NOTES:
1. PROVIDE PANEL WITH 200% RATED NEUTRAL BUS AND ISOLATED GROUND BUS.

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

4000 | 3500

PNL VA	AMPS	AMPS x 1.25
7500	@208V	20.833333	26.041667

PANEL PXR0501E SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
225 AMP MAIN BREAKER 225 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: PXR0501B
FEEDER: SEE RISER ON E801
NEUTRAL: (NOTE 1) SEE RISER ON E801
GROUND: (NOTE 1) SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 225/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
540	1. RCPT - ROOM 138	20/1	1U	1U 20/1 RCPT - ROOM 138	2. 540
540	3. RCPT - ROOM 138	20/1	1U	1U 20/1 RCPT - ROOM 138	4. 540
540	5. RCPT - ROOM 138	20/1	1U	1U 20/1 RCPT - ROOM 138	6. 360
720	7. IG RCPT - ROOM 138 (NOTE 2.)	20/1	1U	1U 20/1 IG RCPT - ROOM 138 (NOTE 2.)	8. 720
540	9. IG RCPT - ROOM 138 (NOTE 2.)	20/1	1U	1U 20/1 IG RCPT - ROOM 138 (NOTE 2.)	10. 540
540	11. IG RCPT - ROOM 138 (NOTE 2.)	20/1	1U	1U 20/1 MECH CTRL POWER	12. 500
500	13. OVERHEAD DOOR - ROOM 140	20/1	1U	1U 20/1 (2) UH-1 - ROOM 140	14. 1000
1000	15. (2) UH-1 - ROOM 140	20/1	1U	2U 30/2 NITROGEN TANK RCPT	16. 2400
360	17. RCPT - ROOM5 136, 139	20/1	1U		18. 2400
1000	19. RCPT - INTENSIFIER - ROOM 138	20/1	1U	1U 20/1 FLOOR BOX - ROOM 138	20. 540
540	21. FLOOR BOX - ROOM 138	20/1	1U	1U 20/1 FLOOR BOX - ROOM 138	22. 540
540	23. FLOOR BOX - ROOM 138	20/1	1U	1U 20/1 RCPT - ROOM 140	24. 1080
1080	25. RCPT - ROOM 140	20/1	1U	1U 20/1 RCPT - ROOM 140	26. 1080
180	27. RCPT - ROOM 140	20/1	1U	1U 20/1 RCPT - ROOM 140	28. 180
300	29. (8) CP-1 - ROOM 140	20/1	1U	1U 20/1 SPARE	30.
	31. SPARE	20/1	1U	1U 20/1 SPARE	32.
	33. SPARE	20/1	1U	1U 20/1 SPARE	34.
	35. SPARE	20/1	1U	1U 20/1 SPARE	36.
	37. PROVISION			PROVISION	38.
	39. PROVISION			PROVISION	40.
	41. PROVISION			PROVISION	42.

NOTES:
1. PROVIDE PANEL WITH 200% RATED NEUTRAL BUS AND ISOLATED GROUND BUS.
2. PROVIDE ISOLATED GROUND CIRCUIT.

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

8920 | 12420

PNL VA	AMPS	AMPS x 1.25
21340	@208V	59.277778	74.097222

PANEL F0204A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
400 AMP MAIN BREAKER 400 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F02
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 400/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
3880	1. PUMP P-1				2. 18706
3880	3. 10 HP	30/3	3U	3U 90/3 HUMIDIFIER H-1	4. 18706
3880	5. 14 FLA			67.5 FLA	6. 18706
3880	7. PUMP P-2				8. 12470
3880	9. 10 HP	30/3	3U	3U 60/3 HUMIDIFIER H-2	10. 12470
3880	11. 14 FLA			45 FLA	12. 12470
3048	13. PUMP P-3				14. 1524
3848	15. 7.5 HP	20/3	3U	3U 20/3 FCU-1	16. 1524
3848	17. 11 FLA			5.5 FLA	18. 1524
3848	19. PUMP P-4				20. 1330
3848	21. 7.5 HP	20/3	3U	3U 20/3 FCU-2	22. 1330
3848	23. 11 FLA			4.8 FLA	24. 1330
3848	25. PUMP P-5				26. 1330
3848	27. 7.5 HP	20/3	3U	3U 20/3 CT-1 FAN-1	28. 1330
3848	29. 11 FLA			4.8 FLA	30. 1330
3848	31. PUMP P-6				32. 1330
3848	33. 7.5 HP	20/3	3U	3U 20/3 CT-1 FAN-2	34. 1330
3848	35. 11 FLA			4.8 FLA	36. 1330
3848	37. CT-1 P-7 / 8				38. 1330
1386	39. 2 @ 1.5HP OP/SB	20/3	3U	3U 20/3 CT-1 HTR 4 KW	40. 1660
1386	41. 5 FLA			5 FLA	42. 1660
1386	SECTION 2				1660
	43. AHU-1 SF-1				44.
6097	45. 2 @ 7.5 HP	30/3	3U	3U 20/3 SF-4	46. 942
6097	47. 22 FLA			2 HP	48. 942
6097	49. AHU-1 RF-1			3.4 FLA	50. 942
6097	51. 2 @ 7.5 HP	30/3	3U	3U 20/3 EF-3	52. 942
6097	53. 22 FLA			2 HP	54. 942
11640	55. AHU-2 SF-2			3.4 FLA	56. 942
11640	57. 2 @ 15 HP	60/3	3U	3U 20/3 ERU-1	58. 3187
11640	59. 42 FLA			11.5 FLA	60. 3187
1330	61. AHU-2 EF-4				62. 3187
1330	63. 3 HP	20/3	3U	3U 20/3 DOM HOT WTR PMP	64. 1330
1330	65. 4.8 FLA			3 HP	66. 1330
1330	67.			4.8 FLA	68. 1330
	69. SPARE	20/3	3U	3U 20/3 SPARE	70.
	71.				72.
	73.				74.
	75. SPARE	20/3	3U	3U 20/3 SPARE	76.
	77.				78.
	79. PROVISION			PROVISION	80.
	81. PROVISION			PROVISION	82.
	83. PROVISION			PROVISION	84.

NOTES:
1. PROVIDE PANEL WITH THRU-FEED LUGS (FEED TO PANEL F0204B).

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

148306 | 134253

PNL VA	AMPS	AMPS x 1.25
282559	@480V	340.022864	425.028580

PANEL PXR0501A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
400 AMP RGPT BROKER 400 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: F0102C VIA XFMR PXR05
FEEDER: SEE RISER ON E801
NEUTRAL: (NOTE 2.) SEE RISER ON E801
GROUND: (NOTE 2.) SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 400/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
720	1. RCPT - OFFICE 124	20/1	1U	1U 20/1 RCPT - OFFICE 123	2. 720
540	3. FLOOR BOX - ROOM 122	20/1	1U	1U 20/1 FLOOR BOX - ROOM 122	4. 540
540	5. FLOOR BOX - ROOM 122	20/1	1U	1U 20/1 FLOOR BOX - ROOM 122	6. 540
540	7. RCPT - CORR 121, ROOM 128	20/1	1U	1U 20/1 RCPT - ROOM 125	8. 900
1000	9. COFFEE RCPT - ROOM 122	20/1	1U	1U 20/1 MICROWAVE RCPT - ROOM 122	10. 1500
1000	11. FRIDGE RCPT - ROOM 122	20/1	1U	1U 20/1 PRINTER RCPT - ROOM 122	12. 1000
1000	13. PRINTER RCPT - ROOM 122	20/1	1U	1U 20/1 RCPT - RESTROOM 129	14. 180
180	15. RCPT - RESTROOM 127	20/1	1U	1U 20/1 RCPT - ROOM 122	16. 360
720	17. RCPT - ROOM 130	20/1	1U	1U 20/1 MICROWAVE RCPT - ROOM 131	18. 1500
1000	19. COFFEE RCPT - ROOM 131	20/1	1U	1U 20/1 FRIDGE RCPT - ROOM 131	20. 1000
720	21. RCPT - ROOM 131	20/1	1U	1U 20/1 RCPT - ROOM 131	22. 540
540	23. RCPT - ROOM 131	20/1	1U	1U 20/1 FLOORBOX - ROOM 131	24. 540
540	25. FLOORBOX - ROOM 131	20/1	1U	1U 20/1 FLOORBOX - ROOM 131	26. 540
500	27. AUDIBLE ALARM - ROOM 132	20/1	1U	1U 20/1 SPARE	28.
1000	29. CHEM TREATMENT - ROOM 130	20/1	1U	1U 20/1 SPARE	30.
	31. SPARE	20/1	1U		32.
	33. SPARE	20/1	1U	3U 100/3 PANEL PXR0501D (NOTE 1)	34.
	35. SPARE	20/1	1U		36.
	37.				38.
	39. PANEL PXR0501C (NOTE 1)	225/3	3U	3U 225/3 PANEL PXR0501B (NOTE 1)	40.
	41.				42.
	SECTION 2				
500	43. MECH CTRL POWER	20/1	1U	1U 20/1 CUH-1	44. 300
1000	45. AIR CURTAIN - ROOM 125	20/1	1U	1U 20/1 FIRE ALARM EXT PNL - ROOM 130	46. 500
300	47. GF-1 TANK/PMP - ROOM 130	20/1	1U	1U 20/1 CHEM TREATMENT - ROOM 130	48. 300
2880	49. AIR COMP - ROOM 130	40/1	1U	1U 20/1 DOOR CTRL PANEL - ROOM 130	50. 500
500	51. DHW HEATER/CTRL - ROOM 130	20/1	1U	1U 20/1 CHEM TREATMENT - ROOM 130	52. 300
500	53. ELEC WATER COOLER - CORR 121	20/1	1U	1U 20/1 OVERHEAD DOOR - ROOM 125	54. 500
500	55. ELEC WATER COOLER - CORR 121	20/1	1U	1U 20/1 SPARE	56.
	57. SPARE	20/1	1U	1U 20/1 SPARE	58.
	59. SPARE	20/1	1U	1U 20/1 SPARE	60.
	61. SPARE	20/1	1U	1U 20/1 PROVISION	62.
	63. PROVISION			PROVISION	64.
	65. PROVISION			PROVISION	66.
	67. PROVISION			PROVISION	68.
	69. PROVISION			PROVISION	70.
	71. PROVISION			PROVISION	72.
	73. PROVISION			PROVISION	74.
	75. PROVISION			PROVISION	76.
	77. PROVISION			PROVISION	78.
	79. PROVISION			PROVISION	80.
	81. PROVISION			PROVISION	82.
	83. PROVISION			PROVISION	84.

NOTES:
1. REFER TO RISER DIAGRAM ON SHEET E801 FOR CONDUIT AND WIRE SIZES. PROVIDE CIRCUIT WITH ISOLATED GROUND.
2. PROVIDE PANEL WITH 200% RATED NEUTRAL BUS AND ISOLATED GROUND BUS.

*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

16720 | 12260

PNL VA	AMPS	AMPS x 1.25
28980	@208V	80.500000	100.625000

PANEL PXR0501B SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
225 AMP MAIN BREAKER 225 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: PXR0501A
FEEDER: SEE RISER ON E801
NEUTRAL: (NOTE 1.) SEE RISER ON E801
GROUND: (NOTE 1.) SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

MAIN 225/3 6U

CKT NO.	LOAD DESCRIPTION	BKR A/P	BKR A/P	LOAD DESCRIPTION	CKT NO.
300	1. DOOR BELL - ROOM 132	20/1	1U	1U 20/1 SPARE	2.
100	3. ALARM ANNUNC - ROOM 136	20/1	1U	1U 20/1 SPARE	4.
500	5. MECH CTRL POWER	20/1	1U	1U 20/1 RCPT - ROOM 133	6. 540
360	7. RCPT - ROOM 133	20/1	1U	1U 20/1 RCPT - ROOM 133	8. 540
360	9. RCPT - ROOM 133	20/1	1U	1U 20/1 IG RCPT - ROOM 133 (NOTE 2.)	10. 540
540	11. IG RCPT - ROOM 133 (NOTE 2.)	20/1	1U	1U 20/1 IG RCPT - ROOM 133 (NOTE 2.)	12. 540
360	13. IG RCPT - ROOM 133 (NOTE 2.)	20/1	1U	1U 20/1 RCPT - ROOM 132	14. 540
540	15. RCPT - ROOM 132	20/1	1U	1U 20/1 RCPT - ROOM 132	16. 540
540	17. RCPT - ROOM 132	20/1	1U	1U 20/1 RCPT - ROOM 132	18. 540
540	19. IG RCPT - ROOM 132 (NOTE 2.)	20/1	1U	1U 20/1 IG RCPT - ROOM 132 (NOTE 2.)	20. 540
540	21. IG RCPT - ROOM 132 (NOTE 2.)	20/1	1U	1U 20/1 EXHAUST FAN EF-2 - ROOF	22. 500
180	23. POWER POLE RCPT - ROOM 132	20/1	1U	1U 20/1 EXHAUST FAN EF-1 - ROOF	24. 500
180	25. POWER POLE RCPT - ROOM 132

PANEL PXR0701A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
800 AMP MAIN BREAKER 800 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: F0102B VIA XFMR PXR03
FEEDER: SEE RISER ON E801
NEUTRAL: (NOTE 2) SEE RISER ON E801
GROUND: (NOTE 2) SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
	MAIN	800/3	9U			
1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
7.	SPARE	20/1	1U	1U 20/1	SPARE	8.
9.	SPARE	20/1	1U	1U 20/1	SPARE	10.
11.	SPARE	20/1	1U	1U 20/1	SPARE	12.
13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
23.	SPARE	20/1	1U	1U 20/1	SPARE	24.
25.	SPARE	20/1	1U	1U 20/1	SPARE	26.
27.	SPARE	20/1	1U	1U 20/1	SPARE	28.
29.	SPARE	20/1	1U	1U 20/1	SPARE	30.
31.	SPARE	20/1	1U			32.
33.	SPARE	20/1	1U	3U 225/3	PANEL PXR0701C (NOTE 1)	34.
35.	SPARE	20/1	1U			36.
37.						38.
39.	SPARE	20/3	3U	3U 225/3	PANEL PXR0701B (NOTE 1)	40.
41.						42.

NOTES:
1. REFER TO RISER DIAGRAM ON SHEET E601 FOR CONDUIT AND WIRE SIZES.
2. PROVIDE PANEL WITH 200% RATED NEUTRAL BUS AND ISOLATED GROUND BUS.
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

PNL VA		AMPS	AMPS x 1.25
###	@208V	########	########

PANEL PXR0701B SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
225 AMP MAIN BREAKER 225 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: PXR0301A
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
	MAIN	225/3	6U			
1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
7.	SPARE	20/1	1U	1U 20/1	SPARE	8.
9.	SPARE	20/1	1U	1U 20/1	SPARE	10.
11.	SPARE	20/1	1U	1U 20/1	SPARE	12.
13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
23.	SPARE	20/1	1U	1U 20/1	SPARE	24.
25.	SPARE	20/1	1U	1U 20/1	SPARE	26.
27.	SPARE	20/1	1U	1U 20/1	SPARE	28.
29.	SPARE	20/1	1U	1U 20/1	SPARE	30.
31.	SPARE	20/1	1U			32.
33.	SPARE	20/1	1U	3U 20/3	SPARE	34.
35.	SPARE	20/1	1U			36.
37.						38.
39.	SPARE	20/3	3U	3U 20/3	SPARE	40.
41.						42.

NOTES:
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

PNL VA		AMPS	AMPS x 1.25
###	@208V	########	########

PANEL PXR0701C SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
225 AMP MAIN BREAKER 225 AMP BUS
VOLTAGE: 208/120 VOLTS 4-WIRE, 3 PHASE

FED FROM: PXR0301A
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
	MAIN	225/3	6U			
1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
7.	SPARE	20/1	1U	1U 20/1	SPARE	8.
9.	SPARE	20/1	1U	1U 20/1	SPARE	10.
11.	SPARE	20/1	1U	1U 20/1	SPARE	12.
13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
23.	SPARE	20/1	1U	1U 20/1	SPARE	24.
25.	SPARE	20/1	1U	1U 20/1	SPARE	26.
27.	SPARE	20/1	1U	1U 20/1	SPARE	28.
29.	SPARE	20/1	1U	1U 20/1	SPARE	30.
31.	SPARE	20/1	1U			32.
33.	SPARE	20/1	1U	3U 20/3	SPARE	34.
35.	SPARE	20/1	1U			36.
37.						38.
39.	SPARE	20/3	3U	3U 20/3	SPARE	40.
41.						42.

NOTES:
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 3.

PNL VA		AMPS	AMPS x 1.25
###	@208V	########	########

PANEL F0204B SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
400 AMP MAIN BREAKER 400 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F0204A VIA THRU-FEED LUGS
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
	MAIN	400/3	6U			
1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
7.	SPARE	20/1	1U	1U 20/1	SPARE	8.
9.	SPARE	20/1	1U	1U 20/1	SPARE	10.
11.	SPARE	20/1	1U	1U 20/1	SPARE	12.
13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
23.	SPARE	20/1	1U	1U 20/1	SPARE	24.
25.	SPARE	20/1	1U	1U 20/1	SPARE	26.
27.	SPARE	20/1	1U	1U 20/1	SPARE	28.
29.	SPARE	20/1	1U	1U 20/1	SPARE	30.
31.	SPARE	20/1	1U			32.
33.	SPARE	20/1	1U	3U 20/3	SPARE	34.
35.	SPARE	20/1	1U			36.
37.						38.
39.	SPARE	20/3	3U	3U 20/3	SPARE	40.
41.						42.

NOTES:
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

PNL VA		AMPS	AMPS x 1.25
####	@480V	####	######

PANEL F0102A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
600 AMP MAIN BREAKER 600 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F01
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
	MAIN	600/3	9U			
1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
7.	SPARE	20/1	1U	1U 20/1	SPARE	8.
9.	SPARE	20/1	1U	1U 20/1	SPARE	10.
11.	SPARE	20/1	1U	1U 20/1	SPARE	12.
13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
23.	SPARE	20/1	1U	1U 20/1	SPARE	24.
25.	SPARE	20/1	1U	1U 20/1	SPARE	26.
27.	SPARE	20/1	1U	1U 20/1	SPARE	28.
29.	SPARE	20/1	1U	1U 20/1	SPARE	30.
31.	SPARE	20/1	1U	1U 20/1	SPARE	32.
33.	SPARE	20/1	1U	1U 20/1	SPARE	34.
35.	SPARE	20/1	1U	1U 20/1	SPARE	36.
37.						38.
39.	PANEL F0102C (NOTE 1)	225/3	3U	3U 125/3	PANEL PXR0301A VIA XFMR PXR03 (NOTE 1)	40.
41.						42.

NOTES:
1. REFER TO RISER DIAGRAM ON SHEET E601 FOR CONDUIT AND WIRE SIZES.
2. PROVIDE PANEL WITH THRU-FEED LUGS (FEED TO PANEL F0102B).
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

PNL VA		AMPS	AMPS x 1.25
####	@480V	####	######

PANEL F0102B SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
600 AMP MAIN BREAKER 600 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F0102A VIA THRU-FEED LUGS
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
	MAIN	600/3	9U			
1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
7.	SPARE	20/1	1U	1U 20/1	SPARE	8.
9.	SPARE	20/1	1U	1U 20/1	SPARE	10.
11.	SPARE	20/1	1U	1U 20/1	SPARE	12.
13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
23.	SPARE	20/1	1U	1U 20/1	SPARE	24.
25.	SPARE	20/1	1U	1U 20/1	SPARE	26.
27.	SPARE	20/1	1U	1U 20/1	SPARE	28.
29.	SPARE	20/1	1U	1U 20/1	SPARE	30.
31.	SPARE	20/1	1U	1U 20/1	SPARE	32.
33.	SPARE	20/1	1U	1U 20/1	SPARE	34.
35.	SPARE	20/1	1U	1U 20/1	SPARE	36.
37.						38.
39.	SPARE	225/3	3U	3U 125/3	SPARE	40.
41.						42.

NOTES:
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

PNL VA		AMPS	AMPS x 1.25
####	@480V	####	######

PANEL F0103A SCHEDULE

LOCATION: BLDG. 0351, 1st. FL.
PANEL MOUNTING: SURFACE
INTERRUPTING CAPACITY: 22,000 AMPS RMS
100 AMP MAIN BREAKER 100 AMP BUS
VOLTAGE: 480/277 VOLTS 4-WIRE, 3 PHASE

FED FROM: F01
FEEDER: SEE RISER ON E801
NEUTRAL: SEE RISER ON E801
GROUND: SEE RISER ON E801
ENTRY: TOP

TAG # xxxxxx
ENCLOSURE: TYPE 1
TYPE: NORMAL
DATE: 06/06/2014

	CKT NO.	LOAD DESCRIPTION	BKR A/P		BKR A/P	LOAD DESCRIPTION	CKT NO.
		MAIN	100/3	3U			
	1.	SPARE	20/1	1U	1U 20/1	SPARE	2.
	3.	SPARE	20/1	1U	1U 20/1	SPARE	4.
	5.	SPARE	20/1	1U	1U 20/1	SPARE	6.
600	7.				1U 20/1	SPARE	8.
600	9.	SITE LIGHTING	20/3	3U	1U 20/1	SPARE	10.
600	11.				1U 20/1	SPARE	12.
	13.	SPARE	20/1	1U	1U 20/1	SPARE	14.
	15.	SPARE	20/1	1U	1U 20/1	SPARE	16.
	17.	SPARE	20/1	1U	1U 20/1	SPARE	18.
	19.	SPARE	20/1	1U	1U 20/1	SPARE	20.
	21.	SPARE	20/1	1U	1U 20/1	SPARE	22.
	23.	SPARE	20/1	1U	1U 20/1	SPARE	24.

NOTES:
*PANEL SHALL BE LABELED AS ARC FLASH CATEGORY 0.

PNL VA		AMPS	AMPS x 1.25
1800	@480V	2.17	2.71

PANEL SCHEDULE KEY

PXR0701A	PXR0701B	PXR0701C	F0204B
F0102A	F0102B	F0103A	

STANTEC
3700 Park East Drive, # 200
Cleveland, OH 44122
Phone:216/454-2150
Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: BID SET

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED		TECH LEAD:	FAC-SYS MGR:
EDMS REVISION			REV DATE:

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL SCHEDULES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E-	602

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: NTS | OFFICIAL DATE: 06-24-2014

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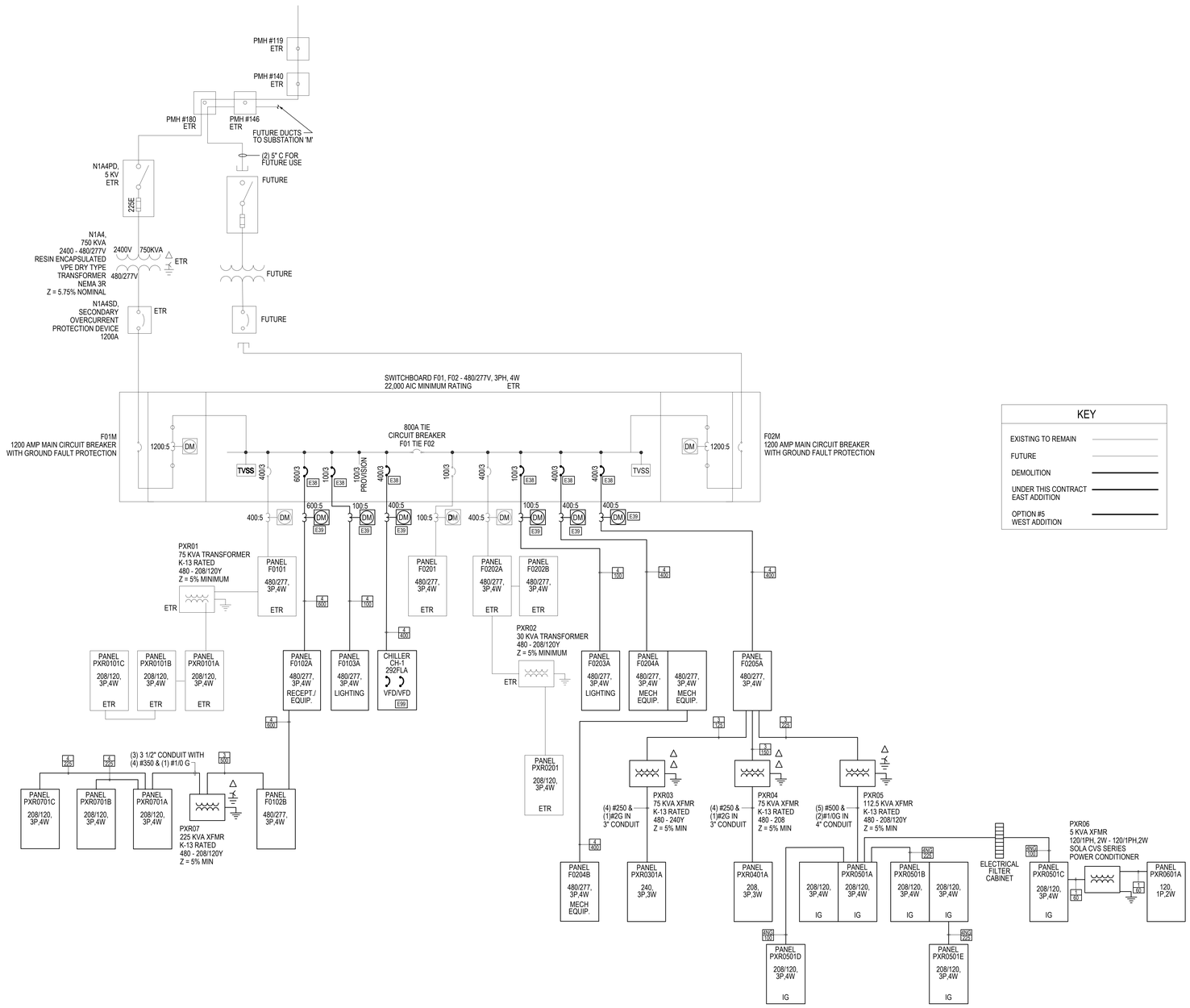
TEMPLATE DATE: 02/28/2011

COPPER FEEDER SCHEDULE

4 / 225	TYPE 1 1PH, 2W, +G	2 OR 3 1PH, 3W, +G or 3PH, 3W, +G	4 3PH, 4W, +G	4N 3PH, 4W, +G, AND 200% N	4NG 3PH, 4W, +G, +G AND 200% N
10	(2) #12 & (1) #12G - 3/4" C	(3) #12 & (1) #12G - 3/4" C	(4) #12 & (1) #12G - 3/4" C	(4) #12 & (1) #12G - 3/4" C	(4) #12 & (2) #12G - 3/4" C
15	(2) #12 & (1) #12G - 3/4" C	(3) #12 & (1) #12G - 3/4" C	(4) #12 & (1) #12G - 3/4" C	(5) #12 & (1) #12G - 3/4" C	(5) #12 & (2) #12G - 3/4" C
20	(2) #12 & (1) #12G - 3/4" C	(3) #12 & (1) #12G - 3/4" C	(4) #12 & (1) #12G - 3/4" C	(5) #12 & (1) #12G - 3/4" C	(5) #12 & (2) #12G - 3/4" C
25	(2) #10 & (1) #10G - 3/4" C	(3) #10 & (1) #10G - 3/4" C	(4) #10 & (1) #10G - 3/4" C	(5) #10 & (1) #10G - 3/4" C	(5) #10 & (2) #10G - 3/4" C
30	(2) #10 & (1) #10G - 3/4" C	(3) #10 & (1) #10G - 3/4" C	(4) #10 & (1) #10G - 3/4" C	(5) #8 & (1) #10G - 1" C	(5) #8 & (2) #10G - 1" C
35	(2) #8& (1) #10G - 3/4" C	(3) #8 & (1) #10G - 3/4" C	(4) #8 & (1) #10G - 3/4" C	(5) #6 & (1) #10G - 1" C	(5) #6 & (2) #10G - 1 1/4" C
40	(2) #8& (1) #10G - 3/4" C	(3) #8 & (1) #10G - 3/4" C	(4) #8 & (1) #10G - 3/4" C	(5) #6 & (1) #10G - 1" C	(5) #6 & (2) #10G - 1 1/4" C
45	(2) #6 & (1) #10G - 3/4" C	(3) #6 & (1) #10G - 3/4" C	(4) #6 & (1) #10G - 1" C	(5) #4 & (1) #10G - 1 1/4" C	(5) #4 & (2) #10G - 1 1/2" C
50	(2) #6 & (1) #10G - 3/4" C	(3) #6 & (1) #10G - 3/4" C	(4) #6 & (1) #10G - 1" C	(5) #4 & (1) #8G - 1 1/4" C	(5) #4 & (2) #8G - 1 1/2" C
60	(2) #4 & (1) #10G - 1" C	(3) #4 & (1) #10G - 1" C	(4) #4 & (1) #10G - 1 1/4" C	(5) #3 & (1) #8G - 1 1/2" C	(5) #3 & (2) #8G - 1 1/2" C
70	(2) #4 & (1) #8G - 1" C	(3) #4 & (1) #8G - 1 1/4" C	(4) #4 & (1) #8G - 1 1/4" C	(5) #2 & (1) #8G - 1 1/2" C	(5) #2 & (2) #8G - 1 1/2" C
80	(2) #3 & (1) #8G - 1" C	(3) #3 & (1) #8G - 1 1/4" C	(4) #3 & (1) #8G - 1 1/4" C	(5) #1 & (1) #8 - 2" C	(5) #1 & (2) #8G - 2" C
90	(2) #2 & (1) #8 - 1"C	(3) #2 & (1) #8 - 1 1/4" C	(4) #2 & (1) #8 - 1 1/2" C	(5) #1/0 & (1) #6G - 2" C	(5) #1/0 & (2) #6G - 2 1/2" C
100	(2) #1 & (1) #8G - 1 1/4" C	(3) #1 & (1) #8G - 1 1/2" C	(4) #1 & (1) #8G - 1 1/2" C	(5) #1/0 & (1) #6G - 2" C	(5) #1/0 & (2) #6G - 2 1/2" C
125	(2) #1 & (1) #6G - 1 1/4" C	(3) #1 & (1) #6 - 1 1/2" C	(4) #1 & #6G - 1 1/2" C	(5) #2/0 & (1) #6G - 2 1/2" C	(5) #2/0 & (2) #6G - 2 1/2" C
150	(2) #1/0 & (1) #6 - 1 1/4" C	(3) #1/0 & (1) #6G - 1 1/2" C	(4) #1/0 & (1) #6 - 2" C	(5) #3/0 & (1) #6G - 2 1/2" C	(5) #3/0 & (2) #6G - 2 1/2" C
175	(2) #2/0 & (1) #6G - 1 1/2" C	(3) #2/0 & (1) #6G - 2" C	(4) #2/0 & (1) #6G - 2" C	(5)#4/0 & (1) #4G - 3" C	(5) #4/0 & (2) #4G - 3" C
200	(2) #3/0 & (1) #6G - 1 1/2" C	(3) #3/0 & (1) #6G - 2" C	(4) #3/0 & (1) #6G - 2" C	(5) 250 kCmil & (1) #4G - 3" C	(5) 250 kCmil & (2) #4G - 3" C
225	(2) #4/0 & (1) #4G - 2" C	(3) #4/0 & (1) #4G - 2" C	(4) #4/0 & (1) #4G - 2 1/2" C	(5) 350 kCmil & (1) #4G - 3 1/2" C	(5) 350 kCmil & (2) #4G - 3 1/2" C
250	(2) 250 kCmil & (1) #4G - 2" C	(3) 250 kCmil & (1) #4G - 2 1/2" C	(4) 250 kCmil & (1) #4G - 3" C	(5) 500 kCmil & (1) #3G - 4" C	(5) 500 kCmil & (2) #3G - 4" C
300	(2) 350 kCmil & (1) #4G - 2" C	(3) 350 kCmil & (1) #4G - 2 1/2" C	(4) 350 kCmil & (1) #4G - 3" C	(5) 500 kCmil & (1) #3G - 4" C	(5) 500 kCmil & (2) #3G - 4" C
350	(2) 500 kCmil & (1) #3G - 2 1/2" C	(3) 500 kCmil & (1) #3G - 3" C	(4) 500 kCmil & (1) #3G - 3 1/2" C	(2) 3" C EACH WITH (5) #4/0 & (1) #2G	(2) 3" C EACH WITH (5) #4/0 & (2) #2G
400	(2) 500 kCmil & (1) #3G - 2 1/2" C	(3) 500 kCmil & (1) #3G - 3" C	(4) 500 kCmil & (1) #3G - 3 1/2" C	(2) 3" C EACH WITH (5) 250 kCmil & (1) #2G	(2) 3" C EACH WITH (5) 250 kCmil & (2) #2G
450	(2) 2" C EACH WITH (2) #4/0 & (1) #2G	(2) 2" C EACH WITH (3) #4/0 & (1) #2G	(2) 2 1/2" C EACH WITH (4) #4/0 & (1) #2G	(2) 3 1/2" C EACH WITH (5) 350 kCmil & (1) #1G	(2) 3 1/2 " C EACH WITH (5) 350 kCmil & (2) #1G
500	(2) 2" C EACH WITH (2) 250 kCmil & (1) #2G	(2) 2 1/2" C EACH WITH (3) 250 kCmil & (1) #2G	(2) 3" C EACH WITH (4) 250 kCmil & (1) #2G	(2) 4" C EACH WITH (5) 500 kCmil & (1) #1/0G	(2) 4" C EACH WITH (5) 500 kCmil & (2) #1/0G
600	(2) 2 1/2" C EACH WITH (2) 350 kCmil & (1) #1G	(2) 2 1/2" C EACH WITH (3) 350 kCmil & (1) #1G	(2) 3" C EACH WITH (4) 350 kCmil & (1) #1G	(2) 4" C EACH WITH (5) 500 kCmil & (1) #1/0G	(2) 4" C EACH WITH (5) 500 kCmil & (2) #1/0G
800	(2) 2 1/2" C EACH WITH (2) 500 kCmil & (1) #1/0G	(2) 3" C EACH WITH (3) 500 kCmil & (1) #1/0G	(2) 3 1/2" C EACH WITH (4) 500 kCmil & (1) #1/0G	(3) 4" C EACH WITH (5) 500 kCmil & (1) #2/0G	(3) 4" C EACH WITH (5) 500 kCmil & (2) #2/0G
900	(3) 2 1/2" C EACH WITH (2) 350 kCmil & (1) #2/0G	(3) 3" C EACH WITH (3) 350 kCmil & (1) #2/0G	(3) 3" C EACH WITH (4) 350 kCmil & (1) #2/0G	(3) 4" C EACH WITH (5) 500 kCmil & (1) #3/0G	(3) 4" C EACH WITH (5) 500 kCmil & (2) #3/0G
1000	(3) 2 1/2" C EACH WITH (2) 500 kCmil & (1) #2/0G	(3) 3" C EACH WITH (3) 500 kCmil & (1) #2/0G	(3) 3 1/2" C EACH WITH (4) 500 kCmil & (1) #2/0G	(4) 4" C EACH WITH (5) 500 kCmil & (1) #4/0G	(4) 4" C EACH WITH (5) 500 kCmil & (2) #4/0G
1200	(4) 2 1/2" C EACH WITH (2) 350 kCmil & (1) #3/0G	(4) 3" C EACH WITH (3) 350 kCmil & (1) #3/0G	(4) 3" C EACH WITH (4) 350 kCmil & (1) #3/0G	(4) 4" C EACH WITH (5) 500 kCmil & (1) #4/0G	(4) 4" C EACH WITH (5) 500 kCmil & (2) #4/0G
1600	(5) 3" C EACH WITH (2) 500 kCmil & (1) #4/0G	(5) 3" C EACH WITH (3) 500 kCmil & (1) #4/0G	(5) 3 1/2" C EACH WITH (4) 500 kCmil & (1) #4/0G	(6) 4" C EACH WITH (5) 500 kCmil & (1) 250 kCmil G	(6) 4" C EACH WITH (5) 500 kCmil & (2) 250 kCmil G
2000	(6) 3" C EACH WITH (2) 500 kCmil & (1) 250 kCmil G	(6) 3" C EACH WITH (3) 500 kCmil & (1) 250 kCmil G	(6) 3 1/2" C EACH WITH (4) 500 kCmil & (1) 250 kCmil G	(7) 4" C EACH WITH (5) 500 kCmil & (1) 350 kCmil G	(7) 4" C EACH WITH (5) 500 kCmil & (2) 350 kCmil G
2500	(7) 3" C EACH WITH (2) 500 kCmil & (1) 350 kCmil G	(7) 3 1/2" C EACH WITH (3) 500 kCmil & (1) 350 kCmil G	(7) 3 1/2" C EACH WITH (4) 500 kCmil & (1) 350 kCmil G	(9) 4" C EACH WITH (5) 500 kCmil & (1) 500 kCmil G	(9) 4" C EACH WITH (5) 500 kCmil & (2) 500 kCmil G
3000	(8) 3" C EACH WITH (2) 500 kCmil & (1) 500 kCmil G	(8) 3 1/2" C EACH WITH (3) 500 kCmil & (1) 500 kCmil G	(8) 4" C EACH WITH (4) 500 kCmil & (1) 500 kCmil G	(10) 4" C EACH WITH (5) 500 kCmil & (1) 500 kCmil G	(10) 4" C EACH WITH (5) 500 kCmil & (2) 500 kCmil G
4000	(11) 3" C EACH WITH (2) 500 kCmil & (1) 500 kCmil G	(11) 3 1/2" C EACH WITH (3) 500 kCmil & (1) 500 kCmil G	(11) 4" C EACH WITH (4) 500 kCmil & (1) 500 kCmil G	(14) 4" C EACH WITH (5) 500 kCmil & (1) 500 kCmil G	(14) 4" C EACH WITH (5) 500 kCmil & (2) 500 kCmil G

NOTES:
CONDUIT SIZES ARE FOR TYPE THHN/THWN COPPER CONDUCTORS ONLY. OTHER CONDUCTOR TYPES MAY REQUIRE LARGER CONDUITS.



1 ELECTRICAL SINGLE LINE DIAGRAM
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET E001 FOR ELECTRICAL SYMBOL LEGEND.

KEY NOTES

E38 PROVIDE CIRCUIT BREAKER IN PROVISIONAL SPACE IN SWITCHBOARD. CIRCUIT BREAKER TO BE PROVIDED WITH ELECTRONIC TRIP. INTERCHANGEABLE MODULE.

E39 LOW VOLTAGE POWER METER EQUAL TO SIEMENS SENTRON PAC3100. METER SHALL COMMUNICATE ON MODBUS RTU SYSTEM FOR INTEGRATION WITH BUILDING EMS SYSTEM.

E99 CHILLER SYSTEM / UNIT: MODULAR STYLE WITH (3) UNITS INSTALLED BY MECHANICAL CONTRACTOR. INSTALL ASSOCIATED ELECTRICAL EQUIPMENT - VARIABLE FREQUENCY DRIVE/CONTROL UNIT - FURNISHED BY MECHANICAL TRADE FOR THE CORRESPONDING UNITS. PROVIDE TAP OF EQUIPMENT FEED FOR EACH UNIT EQUIPMENT / VFD CONNECTION AS APPLICABLE. PROVIDE WIREWAY WITH TAP-BLOCKS AS APPLICABLE TO DIVIDE MAIN FEEDER TO EACH INDIVIDUAL UNIT. PROVIDE UNI-STRUT SUPPORT AND MOUNTING HARDWARE AS REQUIRED. COORDINATE LOCATION, REQUIREMENTS, AND INSTALLATION WITH MECHANICAL TRADE.

KEY

EXISTING TO REMAIN
FUTURE
DEMOLITION
UNDER THIS CONTRACT EAST ADDITION
OPTION #5 WEST ADDITION

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

CAD DRAWING - DO NOT REVISE MANUALLY

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

ELECTRICAL RISER DIAGRAM

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Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

DRAWING/DESIGN STATUS: BID SET
DRAWING MANAGEMENT: SYSTEM: HVAC; SUB-SYS:; FACILITY:; CONFIG:
NASA APPROVALS: DR:; DES:; D.ENG:; PROJ. MGR: KJS
CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO: NNC09CA01C
TASK ORDER:
DRAWN: DESIGNED: CHECKED: APPROVED: APPROVAL DATE:
RELEASE APPROVAL: DATE:
RELEASE STATUS: WORKING

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351 -	COF20244 -	E-	801

AREA: SHEET 1 OF
UNITS: ENGLISH SOFTWARE: AutoCAD 2011 REVISION - VER 1
SCALE: NTS OFFICIAL DATE: 06-24-2014

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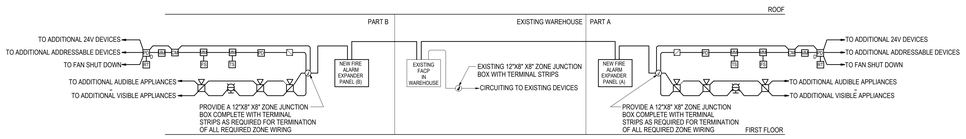
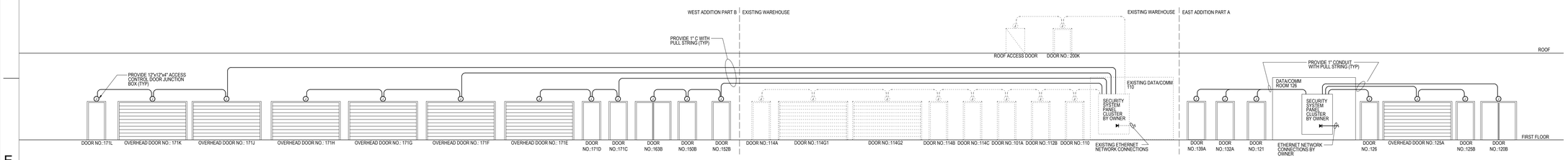
TEMPLATE DATE: 02/28/2011



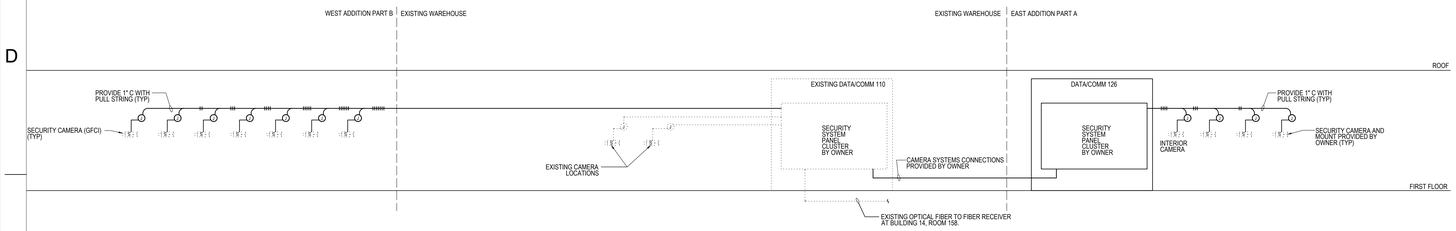
NOTE:
1. DEVICE TYPE AND QUANTITY INDICATED IS FOR SCHEMATIC REPRESENTATION ONLY. REFER TO SYSTEMS PLANS FOR ACTUAL QUANTITIES AND FOR ALL DEVICES TO BE CONNECTED TO FIRE ALARM SYSTEM. CONSULT MANUFACTURER FOR EXACT SYSTEM REQUIREMENTS.

G8 FIRE ALARM RISER DIAGRAM
NTS



E8 ACCESS CONTROL RISER DIAGRAM
NTS

NOTE:
1. SECURITY EQUIPMENT AND CABLING SHALL BE GFGI. COORDINATE FINAL LOCATION AND ROUGH-IN REQUIREMENTS WITH NASA PROJECT MANAGER.



C8 SECURITY SYSTEM CCTV RISER DIAGRAM
NTS

GENERAL NOTES

1. REFER TO SHEET CE-0351-COF12482-G-002 FOR LIST OF PROJECT DRAWINGS.
2. REFER TO SHEET E001 FOR ELECTRICAL SYMBOL LEGEND.

KEY NOTES

STANTEC
3700 Park East Drive, # 200
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Fax: 216/454-9995

Thorson Baker + Associates
3030 West Streetsboro Road
Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER
DRAWN | DESIGNED | CHECKED
APPROVED | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
JOHN H. GLENN RESEARCH CENTER
LEWIS FIELD & PLUM BROOK STATION, OHIO

FY14 B351 WAREHOUSE ADDITION

RISER DIAGRAM

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	E	802

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: NTS | OFFICIAL DATE: 06-24-2014

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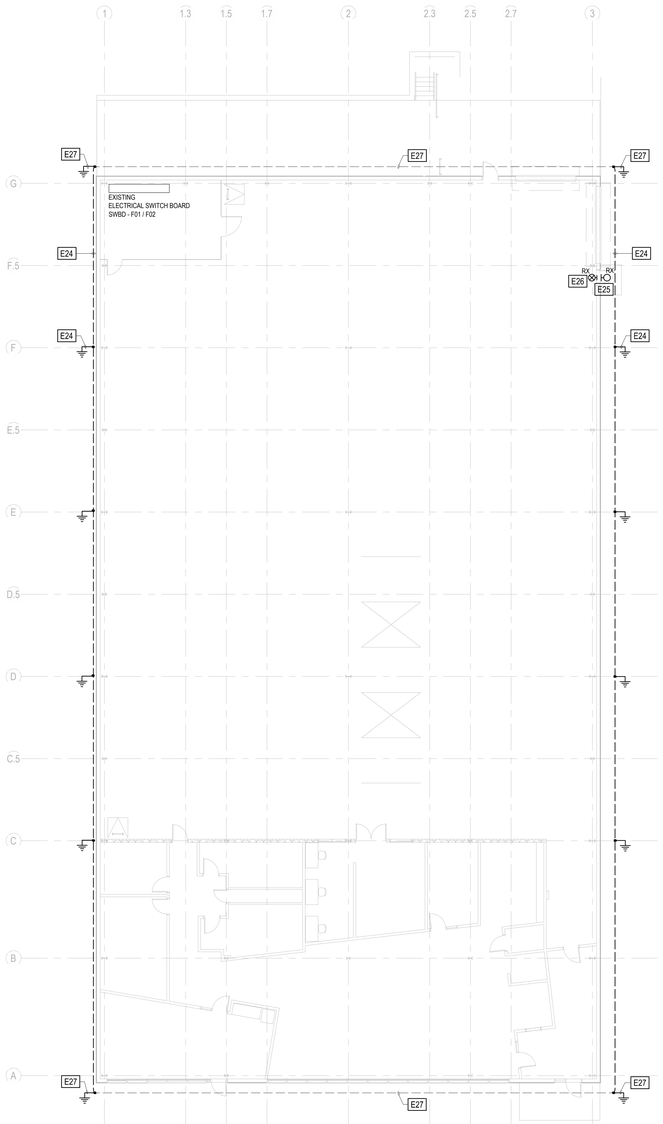
TEMPLATE DATE: 02/28/2011



1 ELECTRICAL DEMOLITION PLAN
3/32" = 1'-0"

GENERAL NOTES

1. REFER TO SHEET E-001 FOR ELECTRICAL SYMBOL LEGEND AND NOTES.

KEY NOTES

E24 EXISTING COUNTERPOISE AND ASSOCIATED GROUND RODS IN THIS AREA: MAINTAIN EXISTING COUNTERPOISE AND CONNECT INTO NEW COUNTERPOISE BEING ADDED UNDER THIS PROJECT. REFER TO DRAWING E112 FOR ADDITIONAL INFORMATION.

E25 REMOVE EXISTING LIGHT FIXTURE. RETURN TO OWNER FOR SALVAGE. PROVIDE BLANK COVERPLATE.

E26 REMOVE EXISTING EXIT SIGN. RETURN TO OWNER FOR SALVAGE. PROVIDE BLANK COVERPLATE.

E27 EXISTING COUNTERPOISE AND ASSOCIATED GROUND RODS TO REMAIN.

STANTEC
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Richfield, OH 44286
Phone:330/659-6688
Fax: 330/659-6675

CONTRACTOR: STANTEC ARCHITECTURE INC.
CONTRACT NO.: NNC09CA01C
TASK ORDER:
DRAWN: DESIGNED: CHECKED:
APPROVED: APPROVAL DATE:

DRAWING/DESIGN STATUS: **BID SET**

DRAWING MANAGEMENT
SYSTEM: HVAC | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE APPROVAL: | DATE:
RELEASE STATUS: WORKING

37° 51' 21"
N
NASA GRID NORTH

CHG	NUM	DESCRIPTION	APP/DATE
LAST APPROVED EDMS REVISION		TECH LEAD: / FAC-SYS MGR:	REV DATE:

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FY14 B351 WAREHOUSE ADDITION

ELECTRICAL DEMOLITION PLAN

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	ED-	101

AREA: | SHEET 1 OF
UNITS: ENGLISH | SOFTWARE: AutoCAD 2011 | REVISION - | VER 1
SCALE: 3/32" = 1'-0" | OFFICIAL DATE: 06-24-2014

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FIRE PROTECTION ABBREVIATIONS

THIS LIST OF ABBREVIATIONS IS PROVIDED FOR CONVENIENCE ONLY. ITEMS LISTED HERE MAY OR MAY NOT BE USED ON THIS PROJECT.

1/C	SINGLE CONDUCTOR
A/C	AIR CONDITIONING UNIT
A	AMPS
AC	ALTERNATING CURRENT
ACT	ABOVE CEILING TILE
A.D.	ACCESS DOOR
AD	AREA DRAIN
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
ADJ	ADJUSTABLE
ALT	ALTERNATE
ARCH	ARCHITECTURAL
AUTO	AUTOMATIC
AVG	AVERAGE
BKR	BREAKER
BLDG	BUILDING
BLK	BLOCK
BTM	BOTTOM
BTU	BRITISH THERMAL UNITS
BTUH	BRITISH THERMAL UNITS/HOUR
C	CONDUIT
CAP	CAPACITY
CFH	CUBIC FEET/HOUR
CFM	CUBIC FEET/MINUTE
C.I.	CAST IRON
CIRC	CIRCULATING
CKT	CIRCUIT
CL	CENTERLINE
CLG	CEILING
CLR	COOLER
CO	COMPANY
C.O.	CLEAN OUT
COL	COLUMN
COMB	COMBINATION
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CONV	CONVECTOR
CPU	CENTRAL PROCESS UNIT
CRT	CATHODE RAY TUBE
CT	CURRENT TRANSFORMERS
CU	COPPER
DF	DRINKING FOUNTAIN
DFU	DRAINAGE FIXTURE UNIT
DED	DEDICATED
DET	DETAIL
DHW	DOMESTIC WATER HEATER
DIAM	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DPR	DAMPER
DWG	DRAWING
EA	EACH
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY ONLY
EM GEN	EMERGENCY GENERATOR
ENCL	ENCLOSURE
EP	ELECTRIC-PNEUMATIC
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXTER	EXTERIOR
F & I	FURNISHED AND INSTALLED
FA	FRESH AIR
FAB	FABRICATE
FAI	FRESH AIR INLET
FACP	FIRE ALARM CONTROL PANEL
FBO	FURNISHED BY OTHERS
FC	FLEXIBLE CONNECTION
FDV	FIRE DEPARTMENT VALVE
FD	FLOOR DRAIN
FH	FIRE HYDRANT
FIN	FINISH
FIXT	FIXTURE
FLASH	FLASHING
FLEX	FLEXIBLE
FLR	FLOOR
FLUOR	FLUORESCENT
FND	FOUNDATION
FTG	FOOTING
FP	FIRE PROTECTION
FPC	FIRE PROTECTION CONTRACTOR
FTN	FOUNTAIN
FU	FIXTURE UNIT
GC	GENERAL CONTRACTOR
GFI	GROUND FAULT INTERRUPTER
GA	GAUGE
GAL	GALLONS
GRD	GROUND
HC	HVAC CONTRACTOR
HGT	HEIGHT
HORIZ	HORIZONTAL
HP	HORSEPOWER
HTG	HEATING
HU	HEATING UNIT
HV	HIGH VOLTAGE
HW	HOT WATER
HWT	HOT WATER TANK
HX	HEAT EXCHANGER
HYD	HYDRAULIC
HZ	HERTZ
INCL	INCLUDE
INST	INSTANTANEOUS
INSUL	INSULATION
JAN	JANITOR
JB	JUNCTION BOX
JC	JANITOR CLOSET
JT	JOINT
KS	KITCHEN SINK
LAV	LAVATORY
LT	LAUNDRY TRAY
LTG	LIGHTING
LTS	LIGHTS
LV	LAB VACUUM
LVR	LOUVER
MAX	MAXIMUM
MB	MOP BASIN
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUG ONLY
MBTUH	THOUSAND OF BTU/HOUR
MMBTUH	MILLIONS OF BTU/HOUR
MR	MOP RECEPTOR
MTD	MOUNTED
MTG	MOUNTING
NC	NORMALLY CLOSED
NE	NORMAL/EMERGENCY
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OC	ON CENTER
OH	OVERHEAD
OPNG	OPENING
OS&Y	OUTSIDE SCREW AND YOKE
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PE	PNEUMATIC-ELECTRIC
PEND	PENDANT
PH	PENTHOUSE
PLMB	PLUMBING
PNL	PANEL
PRESS	PRESSURE
PRESS SW	PRESSURE SWITCH
PRV	PRESSURE REDUCING VALVE
PS	PULL SWITCH
PSI	POUND PER SQUARE INCH
PTs	POTENTIAL TRANSFORMERS
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
REC	RECESSED
RECEPT	RECEPTACLE
REQD	REQUIRED
REV	REVISION
RM	ROOM
RV	ROOF VENT
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SCHED	SCHEDULE
SECT	SECTION
SFU	SUPPLY FIXTURE UNIT
SH	SHOWER
SHT	SHEET
SIM	SIMILAR
SM	SHEET METAL
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SQ FT	SQUARE FOOT
SS	SERVICE SINK
S.S.	STAINLESS STEEL
STAT	THERMOSTAT
STD	STANDARD
STL	STEEL
STOR	STORAGE
STR	STRAINER
STRUCT	STRUCTURAL
SURF	SURFACE
SUSP	SUSPENDED
SUSP CLG	SUSPENDED CEILING
SW	SWITCH
T-STAT	THERMOSTAT
TELE	TELEPHONE
TEMP	TEMPERATURE
TERM	TERMINAL
THK	THICK
TK	TANK
TSP	TOTAL STATIC PRESSURE
TV	TELEVISION
TYP	TYPICAL
U	URINAL
UG	UNDERGROUND
UH	UNIT HEATER
UV	UNIT VENTILATOR
VA	VALVE
VAV	VARIABLE AIR VOLUME
VIB	VIBRATION
VIB ISO	VIBRATION ISOLATION
VT	VAPOR TIGHT
VDT	VISUAL DISPLAY TERMINAL
VERT	VERTICAL
VOL	VOLUME
WC	WATER CLOSET
WC	WATER COLUMN
WF	WIDE FLANGE
WH	WALL HYDRANT
WH	WATER HEATER
WMG	WATER MOTOR GONG
WP	WEATHERPROOF
WT	WEIGHT
XFMR	TRANSFORMER

FIRE PROTECTION SYMBOLS SCHEDULE

THIS LIST OF ABBREVIATIONS IS PROVIDED FOR CONVENIENCE ONLY. ITEMS LISTED HERE MAY OR MAY NOT BE USED ON THIS PROJECT.

VB	VACUUM BREAKER
	INDICATING VALVE WITH TAMPER SWITCH
	PIPE ANCHOR
	PIPE GUIDE
	PIPE PITCH
	PRESSURE/TEMPERATURE TEST PLUG
	PRESSURE GAUGE WITH GAUGE COCK
	STRAINER
F	FLOW SWITCH
P	PRESSURE SWITCH
	THERMOMETER
	CONTROL VALVE
TP	TEMPERATURE AND PRESSURE RELIEF VALVE
P	PRESSURE RELIEF VALVE
	WATER HAMMER ARRESTOR
	BACKFLOW PREVENTER
	BUSHING
	FLEXIBLE PIPE CONNECTION
F	FLOW METER
	GAS COCK VALVE
	UNION
	PRESSURE REGULATOR
	PUMP
	SIGHT GLASS
M	UTILITY METER
	ALARM CHECK VALVE
	AUTO FLOW CONTROL
	CALIBRATED BALANCE VALVE
	BALL VALVE
	BUTTERFLY VALVE
	CHECK VALVE
	DELUGE VALVE
	DIAPHRAGM VALVE
	OS&Y GATE VALVE
	GATE VALVE
	GLOBE VALVE
	LOCKING GATE VALVE
	NEEDLE VALVE
	PRESSURE REDUCING VALVE
S	SOLENOID VALVE
	SPRING CHECK VALVE
	STOP VALVE
T	THERMOSTATIC 3-WAY VALVE
	WALL POST INDICATING VALVE
	PIPE TURNED DOWN
	PIPE TURNED UP
	TRAP
	TEE DOWN
	TEE UP
	TEE TURNED DOWN
	TEE TURNED UP
	PIPE BREAK
	PIPE CAP
C.O.	CLEANOUT FERRULE
F.C.O.	FLOOR CLEANOUT
W.C.O.	WALL CLEANOUT
	FIRE HOSE CABINET
1	KEYNOTE INDICATOR (refer to notes on same sheet)
AV 1	EQUIPMENT MARK (TYPE WC, NUMBER 1)
ST 1	RISER IDENTIFICATION MARK (TYPE ST, NUMBER 1)
1	REVISION INDICATOR
1 F401	DETAIL CALLOUT MARK (DETAIL 1 ON DRAWING F401)
	REVISION BUBBLE
	DENOTES CONNECT TO EXISTING
FW	FIRE PROTECTION PIPE
EX FW	PREFIX "EX" INDICATED EXISTING PIPE (e.g., EXISTING FIRE PROTECTION PIPE)
RX FW	PREFIX "RX" INDICATED EXISTING PIPE TO BE REMOVED (e.g., REMOVED FIRE PROTECTION PIPE)
D	FIRE PROTECTION DRAIN PIPE
	CONCEALED PENDENT SPRINKLER
	UPRIGHT SPRINKLER
	UPRIGHT SPRINKLER WITH GUARD
	SIDEWALL SPRINKLER
D	DRY SIDEWALL SPRINKLER

FIRE PROTECTION PIPING MATERIAL SCHEDULE

SERVICE	SIZE	PIPE	FITTINGS	JOINTS
FIRE PROTECTION/FW	1" THRU 2"	SCH. 30 BLACK CARBON STEEL, WELDED, ASTM A795, TYPE F GRADE A (THREADED ENDS)	175# CAST IRON, ASTM A126, CLASS A, ASME B16.4	THREADED
FIRE PROTECTION/FW	2 1/2" AND LARGER	SCH. 10 BLACK CARBON STEEL, WELDED, ASTM A135 - GRADE A OR ASTM A795, TYPE E, GRADE A (ROLL-GROOVED ENDS)	ROLL GROOVED DUCTILE IRON (ASTM A536)	MECHANICAL (VICTAULIC)

FIRE PROTECTION SYSTEM TEST CRITERIA LIST

EACH PIPING SYSTEM SHALL BE TESTED ACCORDING TO THE FOLLOWING SCHEDULES

SYSTEM	SYSTEM WORKING PRESSURE (PSIG)	MAX. ALLOWABLE WORKING PRESSURE (PSIG)	TEST PRESSURE (PSIG)	WORKING TEMP. (° F.)	DESIGN STANDARD	INSPECTION REQ'D FOR WELDED PIPE
FIRE/FW (NO FIRE PUMP)	65	180	1	80	NFPA 13	VISUAL

NOTES:

1. HYDROSTATIC TESTS SHALL BE MADE AT NOT LESS THAN 200 PSI FOR 2 HOURS OR 50 PSI ABOVE STATIC PRESSURE IN EXCESS OF 150 PSI FOR 2 HOURS.

PIPE IDENTIFICATION

SYSTEM REQUIRING IDENTIFICATION	IDENTIFICATION W/ WHITE LETTERS ON A RED BACKGROUND: ENGLISH	COLOR BANDS*
SPRINKLER PIPING MAINS	FIRE PROTECTION WATER	RED
SPRINKLER PIPING	SPKLR SYSTEM	RED
FIRE ZONE NUMBER	ZONE XX	RED

* COLOR BAND SHALL BE POSITIONED OVER EACH END OF THE LABEL TO SECURE IT IN PLACE AND SHALL NOT OBSCURE THE LABEL LETTERING.

FIRE PROTECTION GENERAL NOTES

1. THE FIRE PROTECTION SYSTEM SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 13, NFPA 14, AND NASA TECHNICAL STANDARD NASA-STD-8719.11A.
2. THE LAYOUT OF AUTOMATIC SPRINKLERS IS DIAGRAMMATIC TO THE EXTENT OF THE TYPES OF HEADS TO BE USED IN EACH ROOM/AREA. THE FIRE PROTECTION CONTRACTOR SHALL PROVIDE THE QUANTITY OF SPRINKLERS IN EACH ROOM/AREA TO MAINTAIN THE MINIMUM COVERAGE, AS REQUIRED BY NFPA-13.
3. ALL PIPING SHOWN ON THE DRAWINGS IS GENERALLY DIAGRAMMATIC, AND SHALL BE FIELD COORDINATED BEFORE FINAL LOCATIONS ARE ESTABLISHED. THE FIRE PROTECTION CONTRACTOR SHALL COORDINATE HIS WORK WITH ELECTRICAL, HVAC,PLUMBING AND GENERAL CONTRACTOR THROUGHOUT THE PROJECT. ANY WORK DONE BY THIS CONTRACTOR, WHICH IS NOT FIRST COORDINATED, SHALL BE REMOVED AND RELOCATED AT THE FIRE PROTECTION CONTRACTOR'S EXPENSE.
4. THE FIRE PROTECTION CONTRACTOR SHALL COORDINATE WITH ALL LIGHTS, DIFFUSERS, CEILING HEIGHTS, AND OBSTRUCTIONS, ETC. TO DETERMINE THE PROPER PLACEMENT OF SPRINKLERS.
5. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR PERFORMING WATER FLOW TESTS, IN THE PRESENCE OF THE AUTHORITIES HAVING JURISDICTION. THESE TESTS SHALL BE THE BASIS OF THE HYDRAULIC DESIGN CALCULATIONS.
6. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING WORKING DRAWINGS AND HYDRAULIC CALCULATIONS, INDICATING THE PIPING LAYOUT AND SIZING OF ALL SYSTEMS, WITH ALL DESIGN CRITERIA AS DESCRIBED IN THE SPECIFICATIONS.
7. WHERE SPRINKLERS ARE TO BE INSTALLED IN A SUSPENDED CEILING, LOCATE SPRINKLERS IN THE CENTER AND MIDDLE OF A CEILING TILE.
8. ALL SPRINKLER PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH NFPA-13. NO PIPING OR EQUIPMENT SHALL BE SUPPORTED FROM THE ROOF DECK.
9. ALL SPRINKLERS ARE TO BE NEW.
10. ELECTRICAL, HVAC, PLUMBING, STRUCTURAL, ETC. COMPONENTS SHOWN ON THE FIRE PROTECTION DRAWINGS IS FOR INFORMATION PURPOSES ONLY. REFER TO THE RESPECTIVE DRAWINGS FOR THE LOCATION OF PIPING, DUCTWORK, DIFFUSERS, BEAMS/JOISTS, AND LIGHTS. THIS CONTRACTOR SHALL VERIFY THE EXACT LOCATION OF THESE COMPONENTS IN THE FIELD.
11. THE ENTIRE BUILDING SHALL BE DESIGNED FOR ORDINARY HAZARD - GROUP 2 OCCUPANCY, OR AS IS ACCEPTABLE TO ALL AUTHORITIES HAVING JURISDICTION WHICHEVER REQUIRES THE GREATER HAZARD CLASSIFICATION, EXCEPT FOR THE FOLLOWING AREAS:
    a. OFFICE AREAS: ORDINARY GROUP 1 HAZARD OCCUPANCY
    b. MECHANICAL ROOMS: ORDINARY GROUP 1 HAZARD OCCUPANCY
12. THE DESIGN WATER DEMAND FOR THE VARIOUS HAZARD CLASSIFICATIONS SHALL BE AS FOLLOWS:
    a. ORDINARY HAZARD GROUP 1: 0.20 GPM/SF OVER 1500 SF
    b. ORDINARY HAZARD GROUP 2: 0.20 GPM/SF OVER 1500 SF
    c. EXTRA HAZARD GROUP 1: 0.30 GPM/SF OVER 2500 SF
    d. EXTRA HAZARD GROUP 2: 0.40 GPM/SF OVER 2500 SF
13. FIRE PROTECTION PIPING TO BE SIZED PER HYDRAULIC CALCULATIONS.
13. THE NASA APPOINTED AUTHORITY HAVING JURISDICTION (AHJ) IS RESPONSIBLE FOR IMPLEMENTING THE FIRE PROVISIONS OF NPR 8715.3 AND COMPLYING WITH PUBLIC LAW 100-678 REQUIRING ALL FEDERAL AGENCIES TO FOLLOW THE LATEST EDITIONS OF NATIONALLY RECOGNIZED FIRE AND LIFE SAFETY CODES. THE AHJ HAS THE FINAL AUTHORITY FOR APPROVING / CONCURRING WITH DESIGN ASSOCIATED INSTALLATIONS, PROCEDURES, AND EQUIPMENT. THE AHJ OR HIS DESIGNEE SHALL WITNESS AND INSPECT ALL INSTALLATIONS OF FIRE / LIFE SAFETY ASSEMBLIES AND / OR EQUIPMENT, TO INCLUDE THE INSTALLATION OR MODIFICATION OF DOMESTIC WATER USED FOR THE PURPOSE OF FIRE PROTECTION. THE AHJ OR HIS DESIGNEE SHALL BE PRESENT AND WITNESS ALL FLUSHING, HYDROSTATIC AND ACCEPTANCE TESTING OF ALL FIRE / LIFE SAFETY EQUIPMENT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE AHJ OF THE COMPLETION OF THE INSTALLATION PRIOR TO COVERING. IF INSTALLATIONS ARE COVERED PRIOR TO INSPECTION, THE CONTRACTOR WILL BE REQUIRED TO UNCOVER THE INSTALLATION AT NO COST TO THE GOVERNMENT. INSPECTION REQUEST SHALL BE PRIOR TO WITH A MINIMUM OF 24 HOUR NOTICE. THE CONTRACTOR IS TO SUBMIT ALL REQUIRED FLUSHING, TESTING AND ACCEPTANCE DOCUMENTATION AT THE TIME OF THE FINAL INSPECTION.

WATER FLOW TEST INFORMATION

TEST HYDRANT #65 (NEAR WAREHOUSE SITE)
STATIC READING: 66 PSI
RESIDUAL: 56 PSI
FLOW HYDRANT #105 (NEAR WAREHOUSE SITE)
PITOT READING: 44 PSI @ 1175 GPM

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

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CONTRACT #: STANTEC ARCHITECTURE INC.
CONTRACT No: NNC09CA01C
TASK ORDER
DRAWN: Author | DESIGNED | CHECKED: Checker
APPROVED: Approver | APPROVAL DATE

DRAWING/DESIGN STATUS: **BID SET**
DRAWING MANAGEMENT
SYSTEM: FIRE | SUB-SYS: | FACILITY: | CONFIG:
NASA APPROVALS
DR: | DES:
D.ENG: | PROJ. MGR: KJS
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FY14 B351 WAREHOUSE ADDITION

FIRE PROTECTION SYMBOLS, ABBREVIATIONS, AND GENERAL NOTES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	F-	001

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION - | VER 1
SCALE: 12" = 1'-0" | OFFICIAL DATE: 06-24-2014

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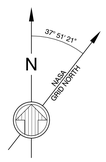
F-101 FIRE PROTECTION FIRST FLOOR

1 / F-101 — 1/8" = 1'-0"

0 4 8 16'



NOTES

1. LTID NEW MATERIALS ROOM 140: STORAGE RACKS ARE APPROXIMATELY 12'-0" HIGH. FIRE PROTECTION SHALL BE BASED ON THE STORAGE OF VARIOUS NONHAZARDOUS ITEMS RANGING FROM BOXES TO CABLE. STORAGE INCLUDES 15 PALLET RACKS (4' x 4' PALLETS). TYPICAL RACK SIZE IS 3' x 9'-4". REFER TO FLOOR PLANS FOR RACK LOCATIONS. FLOOR SPACE STORAGE SHALL ACCOMMODATE 15 SKIDS (4' x 4') FOR TOTE AND RECORD BOXES, A VIDMAR CABINET, AND 8 BINS (3' X 1')
2. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

FIRE PROTECTION LEGEND

- ORDINARY HAZARD GROUP I
- ORDINARY HAZARD GROUP II

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FIRE PROTECTION PLAN

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SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	F-	101

AREA: | SHEET 1 OF 1

UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION = | VER 1
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F-101

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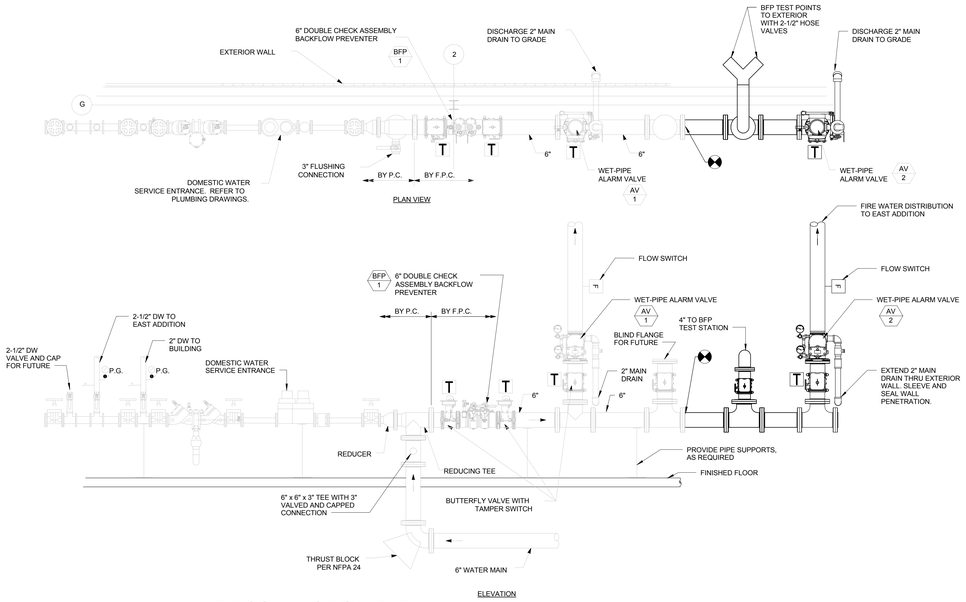
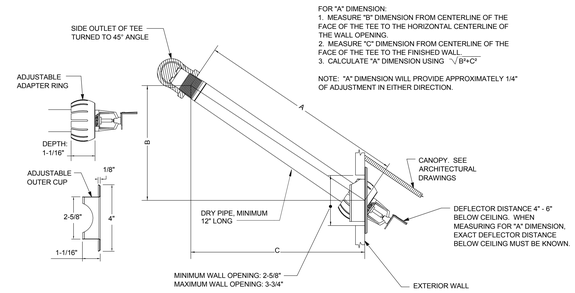


1 F-501 WATER CONNECTION DETAIL

Not to Scale

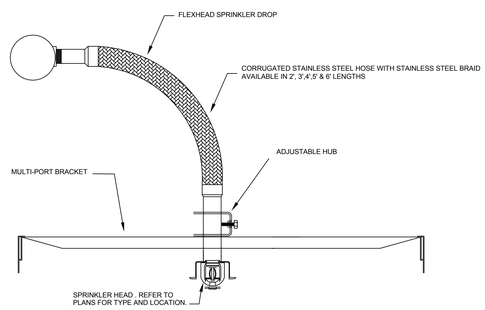


2 F-501 CANOPY DRY SIDEWALL SPRINKLER HEAD DETAIL

Not to Scale

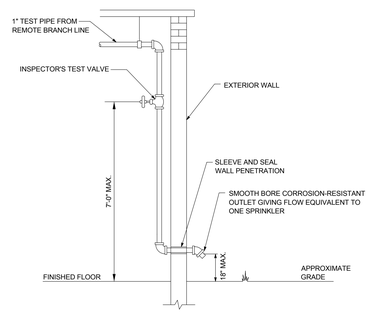
GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.



3 F-501 FLEX HEAD DETAIL

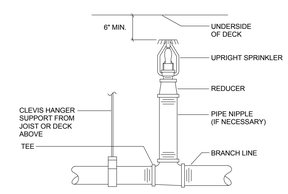
Not to Scale



NOTE: COORDINATE FINAL LOCATION WITH NASA/ARCHITECT. INSTALLATION SHALL NOT BE IN AREA SUBJECT TO FREEZE.

4 F-501 SYSTEM TEST CONNECTION DETAIL

Not to Scale



5 F-501 UPRIGHT SPRINKLER HEAD

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DRAWING MANAGEMENT

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FIRE			

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FY14 B351 WAREHOUSE ADDITION

FIRE PROTECTION DETAILS

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	F-	501

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F-501

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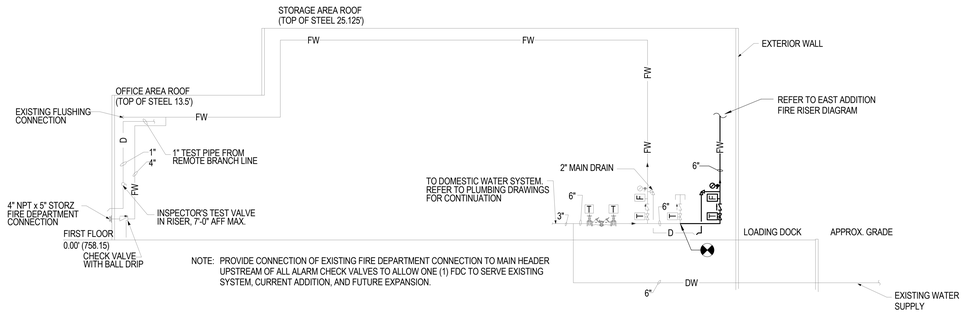
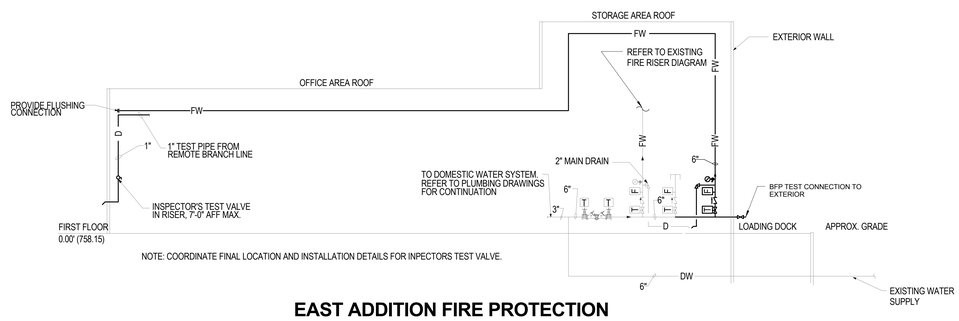


EXISTING FIRE PROTECTION RISER DIAGRAM

1 / F-601 Not to Scale



EAST ADDITION FIRE PROTECTION RISER DIAGRAM

3 / F-601 Not to Scale

GENERAL SHEET NOTES:

1. REFER TO SHEET CE-0351-COF20244-G-002 FOR LIST OF PROJECT DRAWINGS.

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FIRE PROTECTION RISER DIAGRAM

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	F-	601

AREA: | SHEET 1 OF 1
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GENERAL SHEET NOTES:

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FIRE PROTECTION EQUIPMENT SCHEDULE

TAG	DESCRIPTION	CONNECTIONS	REMARKS
FDC 1	FIRE DEPT. CONNECTION	4" NPT X 5" STORZ TYPE	1 2 3
AV 1	WET-PIPE ALARM CHECK VALVE	HYDRAULICALLY CALCULATED	1 2 3
AV 2	WET-PIPE ALARM CHECK VALVE	HYDRAULICALLY CALCULATED	1 2

REMARKS

1. REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
2. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND NFPA-13.
3. EXISTING TO REMAIN.

SPRINKLER HEAD SCHEDULE

SYMBOL	DESCRIPTION	TYCO MODEL NO. (OR EQUAL)	K FACTOR	CONNECTION SIZE	ORIFICE SIZE	REMARKS
◎	CONCEALED PENDENT	RFII	5.6	1/2"	1/2"	1
○	UPRIGHT	TY-FRL	5.6	1/2"	1/2"	1
⊗	UPRIGHT WITH GUARD	TY-FRL	5.6	1/2"	1/2"	1
◁ D	DRY SIDEWALL	DS-1	5.6	1"	1/2"	1

REMARKS:

1. PROVIDE ONE DOZEN (12) SPARE SPRINKLERS FOR EACH TYPE OF SPRINKLER INSTALLED FOR FUTURE REPLACEMENT PURPOSES.

BACKFLOW PREVENTER SCHEDULE

TAG	TYPE	LOCATION	SYSTEM	SIZE	MANUFACTURER & MODEL NUMBER	REMARKS
BFP 1	DOUBLE CHECK ASSEMBLY	WATER SERVICE ENTRANCE	FW	6"	CONBRACO 4A-10C-09 OR EQUAL	1 2 3

REMARKS:

1. INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
2. BACKFLOW PREVENTER TO BE TESTED AT THE COMPLETION OF THE PROJECT TO CERTIFY PROPER OPERATION.
3. EXISTING TO REMAIN.

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DRAWING MANAGEMENT: SYSTEM: FIRE | SUB-SYS: | FACILITY: | CONFIG:

NASA APPROVALS

DR: | DES:
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RELEASE STATUS: WORKING

CHG	NUM	DESCRIPTION	APP/DATE
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FY14 B351 WAREHOUSE ADDITION

FIRE PROTECTION SCHEDULES

SIZE	BLDG/SYS	PROJECT ID	DISCP	TYP SEQ
CE	0351	COF20244	F-	602

AREA: | SHEET 1 OF 1
UNITS: ENGLISH | SOFTWARE: REVIT 2014 | REVISION ■ | VER 1
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