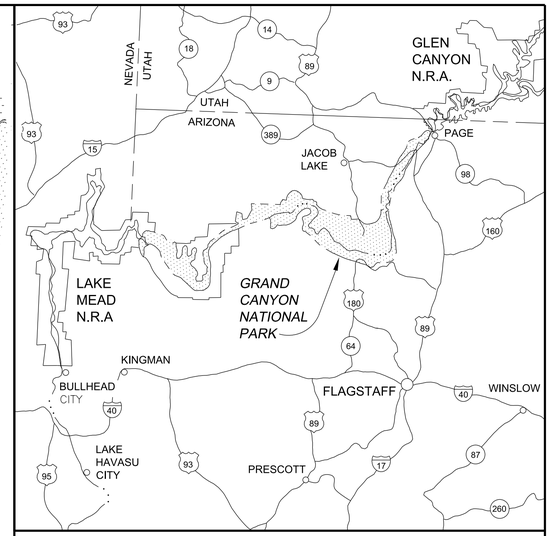
REPLACE WASTEWATER PLANT AT SOUTH RIM VILLAGE
GRCA 257282

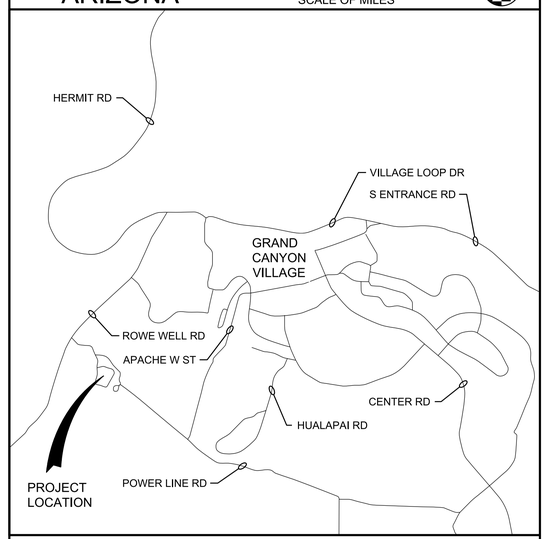
LEGEND

- PARK BOUNDARY
- PAVED ROAD
- UNPAVED ROAD
- TRAIL
- RIVER
- V.C. VISITOR CENTER
- HQ. PARK HEADQUARTERS
- RANGER STATION
- PICNIC AREA

GLEN CANYON N.R.A.
LEE'S FERRY
JACOB LAKE
ALT 89
89
CREEK
KANAB
KAIBAB
NATIONAL
FOREST
INDIAN
RESERVATION
CANYON
CANYON RIM
CANYON RIM
NAVAJO
67
KAIBAB PLATEAU
VALLEY
TOROWEAP
KANAB POINT
TUCKUP CANYON
TAPEATS CREEK
COLORADO RIVER
GREAT THUMB MESA
NORTH RIM
MARBLE
NORTH RIM ENTRANCE STATION
POINT IMPERIAL
BOUNDARY ON CANYON RIM SUBJECT TO CONCURRENCE OF NAVAJO TRIBE
WHITMORE CANYON
UINKARET MTNS.
TUWEEP
TUCKUP POINT
POWELL PLATEAU
LAKE MEAD NATIONAL RECREATION AREA
SHIVWITS PLATEAU
TOROWEAP POINT
HAVASUPAI
INDIAN
RESERVATION
POINT SUBLIME
GRAND CANYON LODGE
BRIGHT ANGEL POINT
CAPE SOLITUDE
HERMITS REST
HQ. V.C.
CAPE ROYAL
DESERT VIEW
LITTLE COLORADO
VULCANS THRONE
MOLLIES NIPPLE
DRY CANYON
HAVASU CREEK
HUALAPAI HILLTOP
68
TO PEACH SPRINGS, SELIGMAN &
66
CATARACT CREEK
GRAND CANYON VILLAGE
SOUTH RIM
180
64
KAIBAB
NATIONAL
FOREST
TO WILLIAMS AND
40
PROJECT LOCATION
COLORADO RIVER
SEPARATION CANYON
INDIAN
DIAMOND CREEK
RESERVATION
BOUNDARY ON SOUTH BANK OF COLORADO RIVER (SUBJECT TO CONCURRENCE OF HUALAPAI TRIBE)



NORTHERN ARIZONA
30 0 30
SCALE OF MILES



VICINITY MAP
0.25 0 0.25
SCALE OF MILES

GRAND CANYON NATIONAL PARK
WORLD HERITAGE SITE

SCALE OF MILES
5 0 5 10
5 0 5 10 15
SCALE OF KILOMETERS

BASIC DATA: LAND STATUS MAP 113/80,011 7/75; PARK MINI FOLDER 1989; REVISED & REDRAWN 2/91. UPDATED 11/98. SGS.

Registered Professional Engineer, Civil
CERTIFICATE NO. 77237
KATARZYNA ROSINSKI
Date Signed
ARIZONA, U.S.A.
Expires 12-31-2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

Mark	Sheet	REVISION	Date	Initial

QUALITY DESIGN CERTIFICATION
- ☐ Prepared in Accordance with Design Development (Title I) ____ Drawing No.
- OR
- ☐ Variance from Design Development (Title I) Approved by Superintendent on ____ Date
- OR
- ☐ Construction Drawing Not Preceded by Design Development (Title I)

Project Manager ____ Date

NATIONAL PARK SERVICE

DESIGN DEVELOPMENT

UNITED STATES
DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE
DENVER SERVICE CENTER

TITLE OF DRAWING
WWTP REPLACEMENT
LOCATION WITHIN PARK
SOUTH RIM VILLAGE
NAME OF PARK
GRAND CANYON NATIONAL PARK
REGION: INTERMOUNTAIN
COUNTY: COCONINO
STATE: ARIZONA

DRAWING NO. 113
PMIS/PKG NO. 175376
257282
SHEET 1 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 8:18:55 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\GRCACOV.dgn

PLOT DATE: 6/16/2025 PLOT TIME: 8:18:35 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0002_D3167666.dgn

SHEET	SUB SHEET	SHEET TITLE/DESCRIPTION
	01 - GENERAL	
1	01G0001	COVER SHEET
2	01G0002	INDEX OF DRAWINGS
3	01G0003	INDEX OF DRAWINGS
4	01G0005	ABBREVIATIONS
5	01G0010	LEGEND
6	01C0001	CIVIL LEGEND
7	01N0001	INSTRUMENTATION AND CONTROL LEGEND
8	01N0002	INSTRUMENTATION AND CONTROL LEGEND
9	01S0001	STRUCTURAL GENERAL NOTES
10	01S0002	STRUCTURAL GENERAL NOTES
11	01S0003	STRUCTURAL GENERAL NOTES
12	01S5001	STRUCTURAL GENERAL BEAM REINFORCEMENT
13	01S5002	STRUCTURAL GENERAL COLUMN REINFORCEMENT
14	01S5003	STRUCTURAL GENERAL STEEL DETAILS
15	01A0001	ARCHITECTURAL NOTES, MATERIAL SYMBOLS, AND LEGEND
16	01A0010	ARCHITECTURAL CODE DATA AND LIFE SAFETY PLAN ADMINISTRATION BUILDING
17	01A0012	ARCHITECTURAL CODE DATA AND LIFE SAFETY PLAN MAINTENANCE BUILDING
18	01A0020	ARCHITECTURAL CODE DATA AND LIFE SAFETY PLAN HEADWORKS
19	01A0032	ARCHITECTURAL CODE DATA AND LIFE SAFETY PLANS PROCESS BUILDING
20	01A0080	ARCHITECTURAL CODE DATA AND LIFE SAFETY PLANS DIGESTER FACILITY
21	01D0001	PROCESS LEGEND
22	01M0001	HVAC LEGEND
23	01M6001	HVAC CONTROL DIAGRAM
24	01M6002	HVAC CONTROL DIAGRAM
25	01M6003	HVAC CONTROL DIAGRAM
26	01M6004	HVAC CONTROL DIAGRAM
27	01M6005	HVAC CONTROL DIAGRAM
28	01M6006	HVAC CONTROL DIAGRAM
29	01M6007	HVAC CONTROL DIAGRAM
30	01M6008	HVAC CONTROL DIAGRAM
31	01P0001	PLUMBING LEGEND
32	01P6001	PLUMBING CONTROL DIAGRAM
33	01P6002	PLUMBING CONTROL DIAGRAM
34	01E0001	ELECTRICAL LEGEND
35	01E0002	ELECTRICAL LEGEND
36	01G0100	LIQUID PROCESS FLOW DIAGRAM
37	01G0110	RESIDUALS PROCESS FLOW DIAGRAM
38	01G0200	HYDRAULIC PROFILE
39	01G0201	HYDRAULIC PROFILE
40	01G0250	AREA CLASSIFICATION AND MATERIALS SELECTION TABLE
41	01G0251	AREA CLASSIFICATION AND MATERIALS SELECTION TABLE
42	01G0260	POWER ACTUATED VALVE SCHEDULE
43	01G0261	SELF REGULATED VALVE SCHEDULE
44	01G0300	PIPING SCHEDULE
45	01G0301	PIPING SCHEDULE
46	01G0302	PIPING SCHEDULE
47	01G0400	DESIGN CRITERIA
48	01G0401	DESIGN CRITERIA
	06 - CIVIL	
49	06X1000	DEMOLITION PLAN - OVERALL
50	06X1001	DEMOLITION PLAN - PHASE 1
51	06X1002	DEMOLITION PLAN - PHASE 2
52	06X1003	DEMOLITION PLAN - EXISTING UTILITIES
53	06X1101	DEMOLITION 90 - CONTROL BUILDING LOWER FLOOR PLAN
54	06X1102	DEMOLITION 90 - CONTROL BUILDING GROUND FLOOR PLAN
55	06X1103	DEMOLITION 90 - CONTROL BUILDING SECTIONS AND DETAILS
56	06X1104	DEMOLITION 91 - PRETREATMENT BLDG LOWER LEVEL PLAN
57	06X1105	DEMOLITION 91 - PRETREATMENT BLDG SECTION E-W
58	06X1106	DEMOLITION 91 - PRETREATMENT BLDG SECTION N-S
59	06X1107	DEMOLITION 91 - PRETREATMENT BLDG TUNNEL PLANS
60	06X1108	DEMOLITION 92B - AERATION BASINS SECTIONS N-S
61	06X1109	DEMOLITION 92A - AERATION TANKS PLAN AND SECTION
62	06X1110	DEMOLITION 92A - AERATION TANKS SECTIONS AND DETAILS
63	06X1111	DEMOLITION 92B - AERATION BASIN PLAN
64	06X1112	DEMOLITION 92B - AERATION BASINS SECTIONS E-W
65	06X1113	DEMOLITION 93 - FINAL SED. TANK PLAN, SECTIONS & DETAILS
66	06X1114	DEMOLITION 94 - SECONDARY CLARIFIER PLAN AND DETAILS
67	06X1115	DEMOLITION 94 - SECONDARY CLARIFIER SECTIONS
68	06X1116	DEMOLITION 96 - AEROBIC DIG. TANKS PLAN
69	06X1117	DEMOLITION 96 - AEROBIC DIG. TANKS SECTIONS AND DETAILS
70	06X1118	DEMOLITION 97 - SLUDGE DRYING BEDS SITE AND GRADING PLAN
71	06X1119	DEMOLITION 97 - SLUDGE DRYING BEDS SECTIONS AND DETAILS
72	06X1120	DEMOLITION 98/99 - BACKWASH POND PIPING AND GRADING
73	06X1121	DEMOLITION 98 - RECLAMATION PLANT CLEARWELL PLAN
74	06X1122	DEMOLITION 98 - RECLAMATION PLANT GALLERY PLAN
75	06X1123	DEMOLITION 98 - RECLAMATION PLANT SECTION E-W
76	06X1124	DEMOLITION 98 - RECLAMATION PLANT SECTION N-S
77	06C1000	EXISTING SITE PLAN
78	06C2000	SITE PLAN - OVERALL
79	06C2001	SITE PLAN - AREA 1
80	06C2002	SITE PLAN - AREA 2
81	06C2003	SITE PLAN - AREA 3
82	06C2004	SITE PLAN - AREA 4
83	06C2020	COORDINATE TABLES
84	06C2100	TESC PLAN PRECONSTRUCTION
85	06C2101	TESC PLAN PHASE 1
86	06C2102	TESC PLAN PHASE 2
87	06C2103	TESC PLAN PERMANENT STABILIZATION
88	06C2400	GRADING PLAN - OVERALL
89	06C2401	GRADING PLAN - AREA 1
90	06C2402	GRADING PLAN - AREA 2
91	06C2403	GRADING PLAN - AREA 3
92	06C2404	GRADING PLAN - AREA 4
93	06C3001	CROSS SECTIONS
94	06C3002	CROSS SECTIONS
95	06L2000	LANDSCAPE PLAN - OVERALL
96	06L2001	LANDSCAPE PLAN - AREA 1
97	06L5001	LANDSCAPE SCHEDULE NOTES AND DETAILS
98	06I2001	IRRIGATION PLAN - AREA 1
99	06I5001	IRRIGATION DETAILS

SHEET	SUB SHEET	SHEET TITLE/DESCRIPTION
	07 - YARD PIPING	
100	07Y1000	EXISTING UTILITIES PLAN - OVERALL
101	07Y2000	PLAN - OVERALL
102	07Y2001	PLAN - AREA 1
103	07Y2002	PLAN - AREA 2
104	07Y2003	PLAN - AREA 3
105	07Y2004	PLAN - AREA 4
106	07Y3001	PIPE PROFILES
107	07Y3002	PIPE PROFILE
108	07Y3003	PIPE PROFILE
109	07Y3004	SECTIONS
110	07Y4001	ENLARGED PLAN
111	07Y5001	INFLUENT MANHOLE DETAIL
112	07Y5002	DETAILS
	08 - SITE ELECTRICAL	
113	08E2000	PLAN - OVERALL
114	08E2001	PLAN - AREA 1
115	08E2002	PLAN - AREA 2
116	08E2003	PLAN - AREA 3
117	08E2004	PLAN - AREA 4
118	08E6001	LUMINAIRE SCHEDULE
119	08E6002	LUMINAIRE SCHEDULE
120	08E7001	DUCTBANK SCHEDULE
121	08E7002	DUCTBANK SCHEDULE
122	08E7003	DUCTBANK SCHEDULE
123	08E7004	DUCTBANK SCHEDULE
124	08E7100	MOTOR CONTROL DIAGRAMS
125	08E7101	MOTOR CONTROL DIAGRAMS
126	08E7102	MOTOR CONTROL DIAGRAMS
127	08E7103	MOTOR CONTROL DIAGRAM
128	08E7104	MOTOR CONTROL DIAGRAMS
129	08E7105	MOTOR CONTROL DIAGRAM
130	08E7106	MOTOR CONTROL DIAGRAM
131	08E7110	EXTERIOR LIGHTING CONTROL DIAGRAM
	09 - INSTRUMENTATION AND CONTROL	
132	09N0001	COMMUNICATION FIBER BACKBONE
133	09N0002	COMMUNICATION NETWORK DIAGRAM
134	09N0003	COMMUNICATION NETWORK DIAGRAM
135	09N0004	COMMUNICATION NETWORK DIAGRAM
136	09N0005	COMMUNICATION NETWORK DIAGRAM
137	09N0006	COMMUNICATION NETWORK DIAGRAM
138	09N0007	COMMUNICATION NETWORK DIAGRAM
139	09N0040	NETWORK ARCHITECTURE DRAWING
140	09N0100	FACILITY 10 ADMIN BUILDING NETWORK INTERFACE PANELS
141	09N0101	FACILITY 20 HEADWORKS LCP-2001 CONTROL PANEL LAYOUT
142	09N0102	FACILITY 20 HEADWORKS LCP-2001 CONTROL PANEL LAYOUT
143	09N0103	FACILITY 80 DIGESTION LCP-8001 CONTROL PANEL LAYOUT
144	09N0104	FACILITY 12 MAINTENANCE BUILDING NIP-1201 NETWORK INTERFACE PANEL
145	09N0801	GENERATOR P&ID
146	09N1801	SEPTAGE RECEIVING P&ID
147	09N2001	INFLUENT SCREENING P&ID
148	09N2002	GRIT BASIN P&ID
149	09N2003	GRIT WASHING AND DEWATERING P&ID
150	09N2004	FINE SCREENING P&ID
151	09N2005	HEADWORKS UTILITIES P&ID
152	09N2201	ODOR CONTROL P&ID
153	09N2501	EQUALIZATION BASIN AND TANK DRAIN PUMP STATION P&ID
154	09N2502	BIOREACTORS P&ID
155	09N2503	MIXED LIQUOR SPLITTER WAS PUMPS P&ID
156	09N3201	MEMBRANE SYSTEM P&ID
157	09N3202	MBR PERMEATE PUMPS P&ID
158	09N3203	MEMBRANE AIR SCOUR BLOWERS P&ID
159	09N3204	DISINFECTION AND UV EFFLUENT BOOSTER PUMPS P&ID
160	09N3205	MEMBRANE CLEANING SODIUM HYPOCHLORITE PUMPS P&ID
161	09N3206	SODIUM HYPOCHLORITE PUMPS P&ID
162	09N3207	MEMBRANE CLEANING CITRIC ACID PUMPS P&ID
163	09N3208	SUPPLEMENTAL CARBON PUMPS P&ID
164	09N3209	MAGNESIUM HYDROXIDE PUMPS P&ID
165	09N3210	AERATION BLOWERS P&ID
166	09N3211	MEMBRANE AIR COMPRESSOR P&ID
167	09N3212	RECLAIMED WATER AND NONPOTABLE WATER PUMPS P&ID
168	09N3213	PROCESS UTILITIES P&ID
169	09N8001	AEROBIC DIGESTER BLOWERS P&ID
170	09N8002	DIGESTER SYSTEM P&ID
171	09N8003	DIGESTER UTILITIES P&ID
172	09N8501	DRYING BED P&ID
173	09N8601	PLANT DRAIN PUMP STATION P&ID
174	09N8701	AERATED COMPOST P&ID

SHEET	SUB SHEET	SHEET TITLE/DESCRIPTION
	10 - ADMINISTRATION BUILDING	
175	10S1030	STRUCTURAL FOUNDATION/FLOOR PLAN
176	10S1040	STRUCTURAL ROOF PLAN
177	10S3001	STRUCTURAL SECTION
178	10S3002	STRUCTURAL SECTIONS
179	10S3003	STRUCTURAL SECTIONS
180	10A1030	ARCHITECTURAL FLOOR PLAN
181	10A1039	ARCHITECTURAL REFLECTED CEILING PLAN
182	10A1040	ARCHITECTURAL ROOF PLAN
183	10A2001	ARCHITECTURAL ELEVATIONS
184	10A2002	ARCHITECTURAL ELEVATIONS
185	10A3001	ARCHITECTURAL SECTIONS
186	10A4001	ARCHITECTURAL ENLARGED PLANS
187	10A4002	ARCHITECTURAL INTERIOR ELEVATIONS
188	10A4003	ARCHITECTURAL ENLARGED PLANS
189	10A4004	ARCHITECTURAL INTERIOR ELEVATIONS
190	10A6001	ARCHITECTURAL SCHEDULES
191	10A6002	ARCHITECTURAL SCHEDULES
192	10M1030	HVAC FLOOR PLAN
193	10P1020	PLUMBING UNDERFLOOR PLAN
194	10P1030	PLUMBING FLOOR PLAN
195	10P1040	PLUMBING ROOF PLAN
196	10P4001	PLUMBING ENLARGED PLANS
197	10P6001	PLUMBING RO WATER SYSTEM DIAGRAM
198	10P9001	PLUMBING ISOMETRIC
199	10P9002	PLUMBING ISOMETRIC
200	10P9003	PLUMBING ISOMETRIC
201	10P9004	PLUMBING ISOMETRIC
202	10EP1030	ELECTRICAL POWER PLAN
203	10EL1030	ELECTRICAL LIGHTING PLAN
204	10E1040	ELECTRICAL ROOF PLAN
205	10E4001	ELECTRICAL POWER PLAN - ENLARGED
206	10E6001	ELECTRICAL PANELBOARD SCHEDULES
207	10E6002	ELECTRICAL PANELBOARD SCHEDULES
	12 - MAINTENANCE BUILDING	
208	12S1030	STRUCTURAL FOUNDATION/FLOOR PLAN
209	12S1040	STRUCTURAL ROOF PLAN
210	12S3001	STRUCTURAL SECTION
211	12S3002	STRUCTURAL SECTION
212	12S3003	STRUCTURAL SECTIONS
213	12A1030	ARCHITECTURAL FLOOR PLAN
214	12A1039	ARCHITECTURAL REFLECTED CEILING PLAN
215	12A1040	ARCHITECTURAL ROOF PLAN
216	12A2001	ARCHITECTURAL ELEVATIONS
217	12A2002	ARCHITECTURAL ELEVATIONS
218	12A3001	ARCHITECTURAL SECTIONS
219	12A4001	ARCHITECTURAL INTERIOR ELEVATIONS
220	12A6001	ARCHITECTURAL SCHEDULES
221	12M1030	HVAC FLOOR PLAN
222	12M3001	HVAC SECTION
223	12P1020	PLUMBING BELOW GRADE PLAN
224	12P1030	PLUMBING FLOOR PLAN
225	12P1040	PLUMBING ROOF PLAN
226	12P9001	PLUMBING ISOMETRIC
227	12P9002	PLUMBING ISOMETRIC
228	12EP1030	ELECTRICAL POWER PLAN
229	12EL1030	ELECTRICAL LIGHTING PLAN
230	12E1040	ELECTRICAL ROOF PLAN
231	12E6001	ELECTRICAL PANELBOARD SCHEDULES
	18 - RECEIVING STATION	
232	18S1030	STRUCTURAL PLAN AND SECTION
233	18D1030	MECHANICAL PLAN, SECTION AND DETAIL
234	18E1030	ELECTRICAL PLAN

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer (Civil) CERTIFICATE NO. 77237 KATARZYNA ROSINSKI Date Signed 6-16-2025 ARIZONA, U.S.A.
Expires 12-31-2025

A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	R COWAN CADD: R COWAN TECH. REVIEW: K WEBSTER DATE: 06/2025	01G0002	GENERAL INDEX OF DRAWINGS GRAND CANYON, SOUTH RIM	113 / 175376 PMIS/PKG NO. 257282 SHEET 2 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

SHEET	SUB SHEET	SHEET TITLE/DESCRIPTION
	20 - HEADWORKS	
235	20S1020	STRUCTURAL LOWER LEVEL PLAN
236	20S1030	STRUCTURAL FLOOR PLAN
237	20S1040	STRUCTURAL ROOF FRAMING PLAN
238	20S3001	STRUCTURAL SECTIONS
239	20S3002	STRUCTURAL SECTION
240	20S3003	STRUCTURAL SECTIONS
241	20S3004	STRUCTURAL SECTIONS
242	20S3005	STRUCTURAL SECTIONS
243	20S4001	STRUCTURAL ENLARGED PLAN
244	20S4002	STRUCTURAL ENLARGED PLANS
245	20S4003	STRUCTURAL ENLARGED PLANS AND SECTION
246	20S5001	STRUCTURAL DETAILS
247	20S5010	STRUCTURAL STEEL DETAILS
248	20A1030	ARCHITECTURAL FLOOR PLAN
249	20A1040	ARCHITECTURAL ROOF PLAN
250	20A2001	ARCHITECTURAL ELEVATIONS
251	20A2002	ARCHITECTURAL ELEVATIONS
252	20A3001	ARCHITECTURAL SECTIONS
253	20A6001	ARCHITECTURAL SCHEDULES
254	20D1030	MECHANICAL PLAN
255	20D3001	MECHANICAL SECTION
256	20D3002	MECHANICAL SECTIONS
257	20D3003	MECHANICAL SECTION
258	20D4001	MECHANICAL ENLARGED PLAN
259	20D4002	MECHANICAL ENLARGED PLANS AND SECTIONS
260	20D5001	MECHANICAL ISOMETRIC
261	20D5002	MECHANICAL ISOMETRIC
262	20D5003	MECHANICAL ISOMETRIC
263	20M1030	HVAC PLAN
264	20M3001	HVAC SECTIONS
265	20P1020	PLUMBING LOWER LEVEL PLAN
266	20P1030	PLUMBING PLAN
267	20P9001	PLUMBING ISOMETRIC
268	20EP1030	ELECTRICAL PROCESS PLAN
269	20EF1030	ELECTRICAL FACILITY PLAN
270	20E1040	ELECTRICAL ROOF PLAN
271	20E5001	ELECTRICAL ONE-LINE DIAGRAM 20-MCC-01
272	20E6001	ELECTRICAL PANELBOARD SCHEDULES
	22 - ODOR CONTROL	
273	22S1030	STRUCTURAL PLAN AND SECTION
274	22D1030	MECHANICAL PLAN
275	22D3001	MECHANICAL SECTIONS
276	22E1030	ELECTRICAL PLAN
	25 - PROCESS TANKS	
277	25S1020	STRUCTURAL LOWER LEVEL PLAN
278	25S1030	STRUCTURAL UPPER LEVEL PLAN
279	25S1040	STRUCTURAL MONORAIL FRAME PLAN
280	25S3001	STRUCTURAL SECTIONS
281	25S3002	STRUCTURAL SECTIONS
282	25S3003	STRUCTURAL SECTIONS
283	25S3004	STRUCTURAL SECTION
284	25S4001	STRUCTURAL ENLARGED PLANS
285	25S5001	STRUCTURAL DETAILS
286	25D1020	MECHANICAL LOWER PLAN
287	25D1030	MECHANICAL UPPER PLAN
288	25D3001	MECHANICAL SECTION
289	25D3002	MECHANICAL SECTIONS
290	25D3003	MECHANICAL SECTIONS
291	25D3004	MECHANICAL SECTIONS
292	25P1030	PLUMBING UPPER PLAN
293	25EP1020	ELECTRICAL LOWER PROCESS PLAN
294	25EP1030	ELECTRICAL UPPER PROCESS PLAN
295	25EF1030	ELECTRICAL UPPER FACILITY PLAN
	32 - PROCESS BUILDING	
296	32S1020	STRUCTURAL LOWER LEVEL PLAN
297	32S1030	STRUCTURAL MAIN LEVEL PLAN
298	32S1040	STRUCTURAL ROOF FRAMING PLAN
299	32S3001	STRUCTURAL SECTION
300	32S3002	STRUCTURAL SECTION
301	32S3003	STRUCTURAL SECTIONS
302	32S5001	STRUCTURAL BEAM REINFORCEMENT
303	32S5010	STRUCTURAL STEEL DETAILS
304	32A1020	ARCHITECTURAL LOWER LEVEL PLAN
305	32A1030	ARCHITECTURAL MAIN LEVEL PLAN
306	32A1040	ARCHITECTURAL ROOF PLAN
307	32A2001	ARCHITECTURAL ELEVATIONS
308	32A2002	ARCHITECTURAL ELEVATIONS
309	32A3001	ARCHITECTURAL SECTIONS
310	32A3002	ARCHITECTURAL SECTION
311	32A6001	ARCHITECTURAL SCHEDULES
312	32D1020	MECHANICAL LOWER PLAN
313	32D1030	MECHANICAL UPPER PLAN
314	32D3001	MECHANICAL SECTIONS
315	32D3002	MECHANICAL SECTIONS
316	32D3003	MECHANICAL SECTIONS
317	32D3004	MECHANICAL SECTIONS
318	32D5001	MECHANICAL DETAILS
319	32M1020	HVAC LOWER LEVEL PLAN
320	32M1030	HVAC MAIN LEVEL PLAN
321	32M3001	HVAC SECTION
322	32M3002	HVAC SECTION
323	32P1010	PLUMBING BELOW SLAB PLAN
324	32P1020	PLUMBING LOWER LEVEL PLAN
325	32P1030	PLUMBING MAIN LEVEL PLAN
326	32P1040	PLUMBING ROOF PLAN
327	32P9001	PLUMBING ISOMETRIC
328	32P9002	PLUMBING ISOMETRIC
329	32FP1020	FIRE PROTECTION LOWER LEVEL PLAN
330	32FP1030	FIRE PROTECTION MAIN LEVEL PLAN
331	32EP1020	ELECTRICAL LOWER LEVEL PROCESS PLAN
332	32EP1030	ELECTRICAL MAIN LEVEL PROCESS PLAN
333	32EF1020	ELECTRICAL LOWER LEVEL FACILITY PLAN
334	32EF1030	ELECTRICAL MAIN LEVEL FACILITY PLAN
335	32E1040	ELECTRICAL ROOF PLAN
336	32E5001	ELECTRICAL ONE-LINE DIAGRAM 32-SWBD-01
337	32E5002	ELECTRICAL ONE-LINE DIAGRAM 32-MCC-01
338	32E6001	ELECTRICAL PANELBOARD SCHEDULES
339	32E6002	ELECTRICAL PANELBOARD SCHEDULES

SHEET	SUB SHEET	SHEET TITLE/DESCRIPTION
	70 - RECLAIMED WATER TANK	
340	70S1030	STRUCTURAL PLAN AND SECTION
341	70D1030	MECHANICAL PLAN
342	70D3001	MECHANICAL SECTIONS
343	70EP1030	ELECTRICAL PROCESS PLAN
	80 - DIGESTER FACILITY	
344	80S1030	STRUCTURAL LOWER LEVEL PLAN
345	80S1040	STRUCTURAL INTERMEDIATE LEVEL PLAN
346	80S1050	STRUCTURAL UPPER LEVEL PLAN
347	80S3001	STRUCTURAL SECTIONS
348	80S3002	STRUCTURAL SECTIONS
349	80S4001	STRUCTURAL ENLARGED PLAN AND SECTIONS
350	80S5001	STRUCTURAL BEAM REINFORCEMENT
351	80A1030	ARCHITECTURAL LOWER LEVEL PLAN
352	80A1040	ARCHITECTURAL UPPER LEVEL PLAN
353	80A1050	ARCHITECTURAL ROOF PLAN
354	80A2001	ARCHITECTURAL ELEVATIONS
355	80A2002	ARCHITECTURAL ELEVATIONS
356	80A3001	ARCHITECTURAL SECTIONS
357	80A6001	ARCHITECTURAL SCHEDULES
358	80D1030	MECHANICAL LOWER LEVEL PLAN
359	80D1040	MECHANICAL UPPER LEVEL PLAN
360	80D3001	MECHANICAL SECTIONS
361	80D3002	MECHANICAL SECTIONS
362	80D3003	MECHANICAL SECTION
363	80M1030	HVAC LOWER LEVEL PLAN
364	80M1040	HVAC UPPER LEVEL PLAN
365	80M1050	HVAC ROOF PLAN
366	80M3001	HVAC SECTION
367	80P1020	PLUMBING UNDER FLOOR PLAN
368	80P1030	PLUMBING LOWER LEVEL PLAN
369	80P1040	PLUMBING UPPER LEVEL PLAN
370	80P1050	PLUMBING ROOF PLAN
371	80P9001	PLUMBING ISOMETRICS
372	80EP1030	ELECTRICAL LOWER LEVEL PROCESS PLAN
373	80EP1040	ELECTRICAL UPPER LEVEL PROCESS PLAN
374	80EP1050	ELECTRICAL ROOF LEVEL PROCESS PLAN
375	80EF1030	ELECTRICAL LOWER LEVEL FACILITY PLAN
376	80EF1040	ELECTRICAL UPPER LEVEL FACILITY PLAN
377	80EF1050	ELECTRICAL ROOF LEVEL FACILITY PLAN
378	80E5001	ELECTRICAL ONE-LINE DIAGRAM 80-MCC-01
379	80E6001	ELECTRICAL PANELBOARD SCHEDULES
	85 - DRYING BEDS	
380	85S1030	STRUCTURAL PLAN - OVERALL
381	85S1031	STRUCTURAL PLAN - AREA A
382	85S1032	STRUCTURAL PLAN - AREA B
383	85S3001	STRUCTURAL OVERALL SECTION
384	85S3002	STRUCTURAL SECTIONS
385	85S4001	STRUCTURAL ENGLARGED PLAN
386	85S5001	STRUCTURAL DETAILS
387	85D1030	MECHANICAL PLAN - OVERALL
388	85D4001	MECHANICAL ENLARGED PLAN AND SECTIONS
	86 - PLANT DRAIN PUMP STATION	
389	86D1030	MECHANICAL PLAN AND SECTION
390	86E1030	ELECTRICAL PLAN
	87 - COMPOST FACILITY	
391	87S1030	STRUCTURAL FOUNDATION PLAN AND DETAIL
392	87S1040	STRUCTURAL ROOF PLAN
393	87S3001	STRUCTURAL SECTION
394	87S3002	STRUCTURAL SECTION
395	87S5001	STRUCTURAL DETAILS
396	87A1040	ARCHITECTURAL ROOF PLAN AND SCHEDULES
397	87D1030	MECHANICAL PLAN, SECTIONS AND DETAIL
398	87E1030	ELECTRICAL POWER PLAN
	88 - COVERED STORAGE	
399	88S1030	STRUCTURAL PLAN AND SECTION
400	88S1040	STRUCTURAL ROOF PLAN
401	88A1040	ARCHITECTURAL ROOF PLAN AND SCHEDULES

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 8:18:35 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0003_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer CERTIFICATE NO. 77237 KATARZYNA ROSINSKI Date Signed/Sealed STATE OF ARIZONA U.S.A.
Expires 12-31-2025

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: R COWAN	SUB SHEET NO. 01G0003	TITLE OF SHEET: GENERAL INDEX OF DRAWINGS	DRAWING NO. 113 175376
	CADD: R COWAN			PMIS/PKG NO. 257282
	TECH. REVIEW: K WEBSTER			SHEET 3 OF 401
	DATE: 06/2025		GRAND CANYON, SOUTH RIM	

ABBREVIATIONS

SYMBOLS	
@	AT
A	
AB	AERATION BASIN
ADD'L	ADDITIONAL
AE	ANALYZER ELEMENT
AFF	ABOVE FINISH FLOOR
AIT	ANALYZER INDICATOR TRANSMITTER
AL	ALUMINUM
ALP	AIR, LOW PRESSURE
APS	ARIZONA PUBLIC SERVICE
ARCH	ARCHITECTURAL
ARWB	ABUSE-RESISTANT GWB
B	
BH	BORE HOLE
BTM	BOTTOM
BYP	BYPASS
C	
CL	CENTERLINE
CLR	CLEAR
CDW	COLD DRINKING WATER
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUED, CONTINUOUS, CONTINUATION
COORD	COORDINATE
D	
D, DR	DRAIN
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DMZ	DEMILITARIZED ZONE
DN	DOWN
DP	DISTRIBUTION PANEL
DPM	DIGITAL POWER METER
DWG	DRAWINGS
E	
E	EAST, EASTING
EA	EACH
EF	EACH FACE
EL	ELEVATION
ELEC	ELECTRIC, ELECTRICAL
EQ	EQUAL
EQPT	EQUIPMENT
EW	EACH WAY
F	
FBV	FURNISHED BY VENDOR
FD	FLOOR DRAIN
F. EXT	FIRE EXTINGUISHER
FF	FINISH FLOOR
FIT	FLOW INDICATOR TRANSMITTER
FL, FLG	FLANGE(D)
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET
G	
GALV	GALVANIZED
GEN	GENERATOR
GRS	GREASE
GRT	GRIT
GWB	GYPSUM WALL BOARD
H	
HORIZ	HORIZONTAL
HP	HORSE POWER, HIGH POINT
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
I	
I&C	INSTRUMENTATION AND CONTROL
IE	INVERT ELEVATION
INF	INFLUENT
L	
L	LENGTH
LCP	LOCAL CONTROL PANEL
LCS	LOCAL CONTROL STATION
LE	LEVEL ELEMENT
LF	LINEAR FEET
LIT	LEVEL INDICATOR TRANSMITTER
LLV	LONG LEG VERTICAL
LP	LOW VOLTAGE PANEL, LOW POINT
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
M	
M	MOTOR
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MIN	MINIMUM
MO	MASONRY OPENING
N	
N	NORTH, NORTHING
NO., #	NUMBER
NPW	NON POTABLE WATER

O	
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OVH	OVERHEAD
P	
PDPS	PLANT DRAIN PUMP STATION
PEMB	PRE-ENGINEERED METAL BUILDING
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PIT	PRESSURE INDICATING TRANSMITTER
PJF	PREMOULDED JOINT FILLER
PL	PLATE (STEEL)
POB	POINT OF BEGINNING
POE	POINT OF ENDING
POLY	POLYMER
PS	PUMP STATION
PSH	PRESSURE SWITCH
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY
R	
R	RADIUS
REINF	REINFORCED, REINFORCING, REINFORCE
REQD	REQUIRED
RO	ROUGH OPENING
RR	RAILROAD
RW	RECLAIMED WATER
RW/OF	RECLAIMED WATER, OVERFLOWS
S	
SEP	SEPTAGE
SCHD	SCHEDULED
SD	SIGHT DISTANCE
SHLDR	SHOULDER
SIM	SIMILAR
SP	SPACE OR SPACES
SPD	SURGE PROTECTION DEVICE
SQ	SQUARE
SS	SANITARY SEWER
SSMH	SANITARY SEWER MANHOLE
SST	STAINLESS STEEL
STA	STATION
STRUCT	STRUCTURE, STRUCTURAL
SV	SOLENOID VALVE
T	
T&B	TOP AND BOTTOM
T.O.	TOP OF
TOC	TOP OF CONCRETE
TOF	TOP OF FOUNDATION
TOS	TOP OF SLAB
TOW	TOP OF WALL
TYP	TYPICAL
U	
ULP	UNIVERSAL LOGIC PLUG
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
UV	ULTRA VIOLET
V	
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
W	
W/	WITH
WF	WIDE FLANGE
WRB	WATER RESISTANT GWB
WRP	WASTE RECLAMATION PLANT
WS	WATER SURFACE, WATERSTOP, WELDED STEEL
WWTP	WASTEWATER TREATMENT PLANT

NOTES:
1. FLOW STREAMS ARE IDENTIFIED ON THE PIPE SCHEDULE.

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer (Civil) CERTIFICATE NO. 77237 KATARZYNA ROSINSKI Date Signed 6-16-25 ARIZONA U.S.A.

Expires 12-31-2025

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	R COWAN
CADD:	R COWAN
TECH. REVIEW:	K GRIEBEL
DATE:	06/2025
SUB SHEET NO.	01G0005
TITLE OF SHEET	GENERAL ABBREVIATIONS GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	4 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 8:18:35 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0005_D3167666.dgn

SUB SHEET NUMBER DESIGNATION

FACILITY DESIGNATION, SEE LIST BELOW

XXXC0001

INDICATES DRAWING TYPE

1000 SERIES	PLAN
2000 SERIES	ELEVATION
3000 SERIES	SECTION
4000 SERIES	ENLARGED PLAN
5000 SERIES	DETAIL
6000 SERIES	SCHEDULE

INDICATES DISCIPLINE(S):

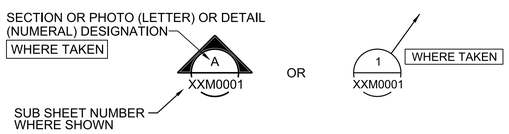
A	ARCHITECTURE
C	CIVIL
D	PROCESS
E	ELECTRICAL
EP	POWER PLAN
EL	LIGHTING PLAN
FP	FIRE PROTECTION
G	GENERAL
I	IRRIGATION
L	LANDSCAPE
M	HVAC
N	INSTRUMENTATION AND CONTROL
P	PLUMBING
S	STRUCTURAL
X	DEMOLITION
Y	YARD PIPING

FACILITY DESIGNATION

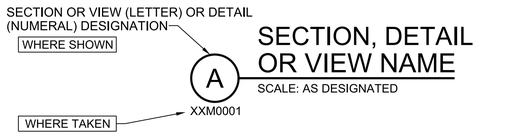
01	GENERAL
06	CIVIL
07	YARD PIPING
08	ELECTRICAL SITE
09	INSTRUMENTATION AND CONTROL
10	ADMINISTRATION BUILDING
12	MAINTENANCE BUILDING
18	VAULT WASTE/SEPTAGE RECEIVING
20	HEADWORKS
22	ODOR CONTROL
25	PROCESS TANKS
32	PROCESS BUILDING
80	DECANT THICKENER DIGESTER
85	DEWATERING AND RECLAIMED WATER PS
87	COMPOST FACILTY
88	COVERED STORAGE

SECTION, DETAIL AND VIEW DESIGNATION

ON DRAWING WHERE DETAIL IS TAKEN:



ON DRAWING WHERE DETAIL IS DRAWN:



STANDARD DETAIL DESIGNATION

ON DRAWING WHERE DETAIL IS TAKEN:

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer
CERTIFICATE NO.
77237
KATARZYNA ROSINSKI
Date Signed
ARIZONA U.S.A.
Expires 12-31-2025

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	R COWAN
CADD:	R COWAN
TECH. REVIEW:	K GRIEBEL
DATE:	06/2025
SUB SHEET NO.	01G0010
TITLE OF SHEET	GENERAL LEGEND
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	5 OF 401

PLOT DATE: 6/16/2025 PLOT TIME: 8:18:36 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0010_D3167666.dgn

GENERAL SITE NOTES:

1. SOURCE OF TOPOGRAPHY SHOWN ON THE CIVIL PLANS ARE BASE MAPS PROVIDED BY ANDERSON PERRY. ADDITIONAL MAPPING HAS BEEN ADDED FROM AS-BUILT DATA AND SUPPLEMENT SURVEY FROM NATIONAL PARK SERVICE. EXISTING CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND ADJUST WORK PLAN ACCORDINGLY PRIOR TO BEGINNING CONSTRUCTION.
2. EXISTING TOPOGRAPHY, STRUCTURES, AND SITE FEATURES ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW FINISH GRADE, STRUCTURES, AND SITE FEATURES ARE SHOWN HEAVY-LINED.
3. HORIZONTAL DATUM: ARIZONA CENTRAL ZONE SPC NAD83 (CORS2011)
4. VERTICAL DATUM: NAVD88 GEOID18
5. MAINTAIN, RELOCATE, OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS, AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGINAL MONUMENT(S) IN A TIMELY MANNER, AND AT THE CONTRACTOR'S EXPENSE.
6. FOR LOCATION OF CONTROL POINT ON STRUCTURES, SEE STRUCTURAL DRAWINGS.
7. COORDINATES AND DIMENSIONS SHOWN FOR ROADWAY IMPROVEMENTS ARE TO FACE OF CURB OR EDGE OF PAVEMENT.
8. STAGING AREA SHALL BE FOR CONTRACTOR'S EMPLOYEE PARKING, CONTRACTOR'S TRAILERS AND ON-SITE STORAGE OF MATERIALS.
9. PROVIDE TEMPORARY FENCING AS NECESSARY TO MAINTAIN SECURITY AND PROHIBIT ANIMALS FROM ENTERING THE SITE AT ALL TIMES.
10. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE SHOWN.
11. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
12. UNLESS SHOWN ON THE LANDSCAPING PLANS, ALL DISTURBED AREAS NOT RECEIVING A HARD SURFACE SHALL BE COVERED WITH GRASS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION. EROSION CONTROL DEVICES CONSTRUCTION ENTRANCE, CHECK DAM, AND SILT FENCE ARE THE MINIMUM REQUIRED.
14. CONTRACTOR SHALL TAKE ALL OTHER MEASURES TO POSITIVELY PRECLUDE EROSION MATERIALS FROM LEAVING THE SITE. CONTRACTOR TO SUBMIT EROSION CONTROL PLAN.

GENERAL YARD PIPING AND UTILITIES NOTES:

1. EXISTING UNDERGROUND UTILITIES OBTAINED FROM AS-BUILTS AND FROM FIELD SURVEY. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION PRIOR TO EXCAVATION. PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION.
2. EXISTING PIPING AND EQUIPMENT ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW PIPING AND EQUIPMENT ARE SHOWN HEAVY-LINED.
3. ALL PIPES SHALL HAVE A CONSTANT SLOPE BETWEEN INVERT ELEVATIONS UNLESS A FITTING IS SHOWN.
4. ALL NEW WATER PIPES MUST BE PROPERLY FLUSHED, PRESSURE TESTED, CHLORINATED AND BACTERIOLOGICALLY TESTED, AS SPECIFIED.
5. UNLESS EXTRA PROTECTION IS PROVIDED, A POTABLE WATER PIPE SHALL NOT BE PLACED WITHIN 6 FEET, HORIZONTAL DISTANCE FROM THE SEWER MAIN, AND WITHIN 2 FEET VERTICAL DISTANCE FROM THE TOP OF THE SEWER MAIN. THE WATER PIPE SHALL NOT CROSS BELOW THE SEWER MAIN. EXTRA PROTECTION SHALL CONSIST OF ENCASING BOTH THE WATER AND SEWER MAINS IN AT LEAST 6 INCHES OF CLSM FOR AT LEAST 10 FEET BEYOND THE AREA COVERED. WITH EXTRA PROTECTION PROVIDED A POTABLE WATER PIPE MAY BE PLACED UP TO 2 FEET HORIZONTALLY AND 2 FEET BELOW THE SEWER MAIN.
6. ALL PIPES SHALL BE BURIED BELOW FROST DEPTH OF 30".

CIVIL LEGEND

EXISTING	THIS CONTRACT	
× 157.7	⊗ 158.5	SPOT ELEVATION
155	155	CONTOUR LINE
	3:1	EMBANKMENT AND SLOPE
		DRAINAGEWAY OR DITCH
	CB OR (CB)	CATCH BASIN OR INLET
		TRENCH DRAIN
	OR	SIGN
	(D) OR (S)	MANHOLE
E	E	ELECTRICAL MANHOLE
H	H	ELECTRIC HANDHOLE
		POST OR GUARD POST
		FIRE HYDRANT
		UTILITY POLE
		LIGHT POLE
	BM	BENCH MARK
		SURVEY CONTROL POINT OR POINT OF INTERSECTION
		TREE
		PROPERTY LINE
		CENTER LINE, BUILDING, ROAD, ETC.
		STAGING OR WORK AREA LIMITS
	N 1000.00 E 1000.00	STRUCTURE, BUILDING OR FACILITY LOCATION POINT - COORDINATES
OR OR		DEMOLITION
OR	OR	STRUCTURE, BUILDING OR FACILITY
		ASPHALT CONCRETE PAVEMENT
		GRAVEL SURFACING
		CONCRETE PAVEMENT
		CURB
		CURB AND GUTTER
		DOUBLE SWING GATE
		CHAIN LINK FENCE
		CULVERT
		RIPRAP
P		ELECTRICAL DUCTBANK
E-OVH		ELECTRICAL OVERHEAD
U		ELECTRICAL UNDERGROUND
T		UNDERGROUND TELECOM
W		WATER LINE
G		NATURAL GAS
S		SEWER LINE
OE		OVERHEAD ELECTRIC
OC		OVERHEAD COMMUNICATION

YARD PIPING LEGEND

EXISTING	THIS CONTRACT	
	8" PE	NOMINAL PIPE DIAMETER PIPE USE IDENTIFICATION
8" PE		PIPING < 30" DIAMETER
		PIPING ≥ 30" DIAMETER
		EXISTING PIPE TO BE ABANDONED
		EXISTING PIPE TO BE REMOVED
		NON-FREEZE HOSE VALVE (V-X) X = NO. IN SPECIFICATIONS
		NON-FREEZE HOSE VALVE WITH HOSE RACK (V-X) X = NO. IN SPECIFICATIONS
		INDICATOR POST VALVE
		GATE VALVE AND VALVE BOX
		BUTTERFLY VALVE AND VALVE BOX
		PLUG VALVE AND VALVE BOX
		FLEXIBLE COUPLING
		90° ELBOW UP
		90° ELBOW DOWN
		BEND < 90° UP
		BEND < 90° DOWN
		CONCENTRIC REDUCER
		CAP OR PLUG
		CLEANOUT
		FIRE HYDRANT

EROSION CONTROL LEGEND

COVER PRACTICES	SYMBOL
CONSTRUCTION ENTRANCE	
CHECK DAMS	
OUTLET PROTECTION / RIPRAP	
FILTER FENCE	

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

83022 KAYLA D. ARCHER REGISTERED ARCHITECT Expiration 6-30-2026 ARIZONA, U.S.A.	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 01C0001	TITLE OF SHEET GENERAL CIVIL LEGEND GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 6 OF 401

PLOT DATE: 17-JUN-2025 PLOT TIME: 12:53 SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01C0001_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

INSTRUMENT IDENTIFICATION

P&ID TAG NUMBER CONSISTS OF 3 MAIN PARTS.

- XXX-APPPT#-ZZZ
  - XXX- PREFIX
  - APPPT#-- LOOP NUMBER
  - ZZZ- SUFFIX

1. XXX - PREFIX PER ISA 5.1 IS A STANDARD FOR INSTRUMENT PREFIXES THAT INDICATE A CODE OF EQUIPMENT.

2. APPPT#-LOOP NUMBERING
   - TYPICALLY, 2-TO-6-DIGIT NUMBER BASED ON PROCESS COMPLEXITY.
     - A - AREA NUMBER
     - PPP - PROCESS NUMBERING SCHEME
       - 100 TO 999, 10-99, 1-9
       - NUMBER DESIGNATION BASED ON PROCESS COMPLEXITY
     - T - TYPE
       - 0 - OVERVIEW- NO INSTRUMENTATION
       - 1 - MAIN PROCESS ELEMENT
       - 2-4 - AUXILIARY ELEMENTS
       - 5-9 - INTRUMENTATION
         - 5# - LEVEL
         - 6# - PRESSURE
         - 7# - FLOW
         - 8# - ANALYTICAL
         - 9# - POSITION

EXAMPLE SYMBOLS

FIT
WWW-XY

CLARIFYING ABBREVIATIONS

SET NUMBER (USED WHEN THERE ARE MULTIPLE SETS OF UNITS WITH THE SAME W-X DESIGNATIONS)

UNIT NUMBER (USED WHEN THERE ARE MULTIPLE UNITS WITH THE SAME W DESIGNATIONS)

LOOP NUMBER

TT — FIELD MOUNTED INSTRUMENT

YL — PANEL MOUNTED INSTRUMENT

ANALYZERS

CL	FREE CHLORINE RESIDUAL
DO	DISSOLVED OXYGEN
INT	ULTRAVIOLET INTENSITY
LEL	LOWER EXPLOSIVE LIMIT
NO3	NITRATE
ORP	OXYDATION REDUCTION POTENTIAL
PH	POTENTIAL OF HYDROGEN
TSS	TOTAL SUSPENDED SOLIDS
TURB	TURBIDITY
UVT	ULTRAVIOLET TRANSMITTANCE

AIT XXX

SPECIAL CASES

YL OO — ON AND OFF EVENT LIGHTS

ZL OC — OPENED AND CLOSED POSITION LIGHTS

ZS OC — OPENED AND CLOSED POSITION SWITCHES

HS OO — ON-OFF HAND SWITCH. MAINTAINED CONTACT SWITCH (CONTROLLED DEVICE WILL RESTART ON RETURN OF POWER AFTER POWER FAILURE).

HS SS — STOP-START HAND SWITCH MOMENTARY CONTACT SWITCHES (CONTROLLED DEVICE WILL NOT RESTART ON RETURN OF POWER AFTER POWER FAILURE)

YA ANN — ANNUNCIATOR WINDOW IN PANEL MOUNTED ANNUNCIATOR

YA ANN — COMMON ALARM OUTPUT OF PANEL MOUNTED ANNUNCIATOR

HS OC — OPEN-CLOSE HAND SWITCH. MOMENTARY CONTACT SWITCHES.

HS OSC — OPEN-STOP-CLOSE HAND SWITCH. MAINTAINED CONTACT SWITCHES.

HS LR — LOCAL-REMOTE HAND SWITCH. MAINTAINED CONTACT SWITCHES.

ABBREVIATIONS

PREFIX	PROCESS	INSTRUMENTATION	I/O	DESCRIPTION
ACP	NO	NO	N/A	ACCESS CONTROL PANEL
AE	YES		N/A	ANALYTICAL ELEMENT
AI		YES	N/A	ANALYTICAL INDICATOR
AIT		YES	AI	ANALYTICAL INDICATING TRANSMITTER
ARV	YES		N/A	AIR RELEASE VALVE
AVRV	YES		N/A	AIR/VACUUM COMBO RELEASE VALVE
B	YES		N/A	BLOWER
CA	YES		N/A	COMPRESSED AIR
CIT	YES		N/A	CITRIC ACID SYSTEM
CKV	YES		N/A	CHECK VALVE
CMP	YES		N/A	COMPRESSOR
CTR			N/A	MOTOR CYCLE COUNTER
DRY	YES		N/A	DRYER
EEW	YES		N/A	EMERGENCY EYE WASH
ES		YES	DI	ELECTRICAL SWITCH
ESEW	YES		N/A	EYE WASH SHOWER-EYE WASH
ETM			N/A	ELAPSE TIMER METER
FAH		YES	N/A	FLOW ALARM HIGH
FBD	YES		N/A	FINE BUBBLE DIFFUSION SYSTEM
FCV	YES		N/A	AUTOMATED MODULATING FLOW CONTROL VALVE
FE	YES		N/A	FLOW ELEMENT
FI	YES		N/A	FLOW INDICATOR
FIT		YES	AI	FLOW INDICATING TRANSMITTER
FL	YES		N/A	FLOCCULATORS
FQI		YES	DI	FLOW TOTALIZE INDICTOR
FS	YES		N/A	FLOW SWITCH
FSH		YES	DI	FLOW SWITCH HIGH
FT		YES	AI	FLOW TRANSMITER
FV	YES		N/A	AUTOMATED OPEN/CLOSE VALVE
HCL	YES		N/A	HYDROCHLORIC ACID
HS	YES		N/A	HAND SWITCH
HSA		YES	DI	HAND SWITCH AUTO
HSR		YES	DI	HAND SWITCH REMOTE
HYPO	YES		N/A	SODIUM HYPOCHLORITE
INT				UV INTENSITY
JL	NO	NO	N/A	POWER TRANSMITTER
KGV	YES		N/A	KNIFEGATE VALVE
LAH		YES	N/A	LEVEL ALARM HIGH
LAHH		YES	N/A	LEVEL ALARM HIGH HIGH
LAL		YES	N/A	LEVEL ALARM LOW
LCP	YES		N/A	MASTER CONTROL PANEL
LE	YES		N/A	LEVEL ELEMENT
LI		YES	N/A	LEVEL INDICATION
LIT		YES	AI	LEVEL INDICATING TRANSMITTER
LSH		YES	DI	LEVEL SWITCH HIGH
LSHH		YES	DI	LEVEL SWITCH HIGH HIGH
LSL		YES	DI	LEVEL SWITCH LOW
LSLL		YES	DI	LEVEL SWITCH LOW LOW
LT		YES	AI	LEVEL TRANSMITTER
M	YES		N/A	MOTOR
MAH		YES	N/A	MOISTURE ALARM HIGH
MEM	YES		N/A	MEMBRANE
MSH		YES	DI	MOISTURE INDICATION HIGH
MX	YES		N/A	MIXER
NC		YES	DI	GENERATOR CALLED TO RUN
NE		YES	DO	RUN ENABLE
NI		YES	DI	RUN STATUS
PAL		YES	N/A	PRESSURE ALARM LOW
PAH	YES		N/A	PRESSURE ALARM HIGH
PB	YES		N/A	PUSHBUTTON
PE	YES		N/A	PRESSURE ELEMENT
PI	YES		N/A	PRESSURE INDICATION
PT		YES	AI	PRESSURE TRANSMITTER
PIT	YES	YES	AI	PRESSURE INDICATING TRANSMITTER
PMP	YES		N/A	AUX. PUMP (i.e. CHEM INJECTION)
PMP	YES		N/A	PUMP
PRV	YES		N/A	PRESSURE REGULATING/RELIEF VALVE
PSH		YES	DI	PRESSURE SWITCH HIGH
PSL		YES	DI	PRESSURE SWITCH LOW
PW	YES		N/A	PERMEATE WATER
RDT	YES		N/A	ROTARY DRUM THICKENER
RW	YES		N/A	RAW WATER
SC		YES	AO	SPEED COMMAND
SC	YES		N/A	SLUDGE COLLECTOR
SCL	YES		N/A	WEIGHT SCALE
SCN	YES		N/A	SCREEN
SG	YES		N/A	SLIDE GATE
SI		YES	AI	SPEED INDICATION
SLG	YES		N/A	SLUDGE
SMP	YES		N/A	SUMP
SP	YES		N/A	SUMP PUMP
STR	YES		N/A	STRAINER (MANUAL)
SV	YES		N/A	SOLENOID VALVE
SW	YES		N/A	SOFTENED WATER
TAH		YES	DI	TEMPERATURE ALARM HIGH
TE	YES		N/A	TEMPERATURE EMITTER
TI		YES	AI	TEMPERATURE INDICATOR
TIT		YES	AI	TEMPERATURE INDICATING TRANSMITTER
TK	YES		N/A	TANK
TSH		YES	DI	TEMPERATURE SWITCH HIGH
TSL		YES	DI	TEMPERATURE SWITCH LOW
UA		YES	N/A	MULTIVARIABLE ALARM
UV	YES		N/A	ULTRAVIOLET
V	YES		N/A	VALVE
VFD			N/A	VARIABLE FREQUENCY DRIVE
VI		YES	AI	VIBRATION INDICATOR
VT	YES		N/A	VIBRATION TRANSMITTER
WI		YES	AI	WEIGHT INDICATOR
WIT		YES	AI	WEIGHT INDICATING TRANSMITTER
WST	YES		N/A	WASTE
XC	NO	YES	DO	START/STOP COMMAND
YL		YES	NO	RUNNING
ZCC		NO	DO	POSITION COMMAND CLOSE
ZCO		YES	DO	POSITION COMMAND OPEN
ZCS		YES	DO	POSITION COMMAND STOP
ZI		YES	AI	POSITION INDICATOR
ZS		YES	DI	POSITION SWITCH

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

LINE LEGEND

PROCESS (CLOSED CONDUIT, DASHED LINE INDICATES ALTERNATE FLOW STREAM)

PROCESS (OPEN CHANNEL)

ANALOG SIGNAL (4 TO 20 mAdc, ETC.)

DISCRETE SIGNAL (ON/OFF, ETC.)

---- PD ---- PULSE DURATION SIGNAL

---- PF ----- PULSE FREQUENCY SIGNAL

PNEUMATIC SIGNAL

—X—X—X— FILLED SYSTEM SIGNAL

HYDRAULIC SYSTEM SIGNAL

——o—— NETWORK

——FO—— FIBER OPTIC

BUILDING OR FACILITY BOUNDARY

(3) (8) (3) PARALLELING LINES (PARENTHETICAL NUMBER INDICATES THE NUMBER OF SIGNALS REPRESENTED)

CONNECTING LINES

NON-CONNECTING LINES

ET — ETHERNET POINT NOTE 5

DISCRETE POINT

ANALOG POINT

—— E —— ETHERNET

——MB—— MODBUS

INTERFACE SYMBOLS

S | WA →   - - - WA | D

= PROCESS INTERFACE

= SIGNAL INTERFACE

W = SOURCE UNIT PROCESS NO. (1 OR 2 DIGITS)

A = INTERFACE NO. (2 DIGITS)

D = DESTINATION DRAWING NO.

S = SOURCE DRAWING NO.

(N) PROCESS OR SIGNAL LINE CONTINUATION N=1,2,3,ETC (N)

INTERFACE TO OR FROM EXTERNAL PROCESS

SELF CONTAINED VALVE & EQUIPMENT TAG NUMBERS

D-W-X-Y

D: ARV = AIR RELEASE VALVE
AVRV = AIR AND VACUUM RELEASE VALVE
E = EJECTOR
FCV = FLOW CONTROL VALVE
G = GATE
LCV = LEVEL CONTROL VALVE
M = MECHANICAL EQUIPMENT
P = PUMP
PCV = PRESSURE CONTROL VALVE
PSE = RUPTURE DISK
PSV = PRESSURE RELIEF VALVE
T = TANK
TCV = TEMPERATURE CONTROL VALVE
W = UNIT PROCESS NUMBER
X = LOOP NUMBER
Y = UNIT NUMBER

GENERAL SHEET NOTES

1. COMPONENTS AND PANELS SHOWN WITH A SINGLE ASTERISK (∗) ARE TO BE PROVIDED AS PART OF A PACKAGE SYSTEM.
2. COMPONENTS AND PANELS SHOWN WITH A DOUBLE ASTERISK (∗∗) ARE TO BE PROVIDED UNDER DIVISION 26, ELECTRICAL.
3. THIS IS A STANDARD LEGEND. THEREFORE, NOT ALL OF THIS INFORMATION MAY BE USED ON THIS PROJECT.
4. ALTHOUGH NOT SHOWN ON P&ID/S, ALL MCC STARTER BUCKETS WILL HAVE ON/OFF LIGHTS.
5. COVERS BUT NOT LIMITED TO MODBUS TCP/IP, ETHERNET/IP, OR DO-MORE ETHERNET RIO.

Registered Professional Engineer (Control Systems) CERTIFICATE NO. 83873 ANDREW WILLIAMS Date Signed 06-20-2025 ARIZONA, U.S.A.

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO

DESIGNED: D THOMAS
CADD: J BOSS
TECH. REVIEW: D ATURALIYE
DATE: 06/2025

SUB SHEET NO. 01N0001

TITLE OF SHEET: GENERAL INSTRUMENTATION AND CONTROL LEGEND
GRAND CANYON, SOUTH RIM

NO SCALE
DRAWING NO. 113 / 175376
PMIS/PKG NO. 257282
SHEET 7 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

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VALVE SYMBOLS

- GATE
- KNIFE GATE
- BUTTERFLY
- GLOBE
- BALL
- VEE- BALL
- PLUG
- SEAT PORT ECCENTRIC PLUG
- DIAPHRAGM
- PINCH
- NEEDLE
- SWING CHECK
- BALL CHECK
- SAMPLE
- MUD
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE
- REGULATED SIDE PRESSURE CONTROL
- MULTI-PORT VALVES (BALL VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN). ARROWS INDICATE FLOW PATTERN. SEAT PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
- TELESCOPE

GATE SYMBOLS

- SLUICE
- BUTTERFLY
- FLAP
- FABRICATED SLIDE
- SHEAR

ACTUATOR SYMBOLS

- XX PNEUMATIC DIAPHRAM SPRING-OPPOSED
- XX PNEUMATIC CYLINDER SINGLE OR DOUBLE ACTING ACTUATED BY ONE INPUT
- XX ELECTRIC MOTOR
- XX SOLENOID
- XX HYDRAULIC
- XX PNEUMATIC DIAPHRAM DOUBLE ACTING SPRING-OPPOSED
- MANUAL
- XX ELECTROHYDRAULIC

NOTE:
ON LOSS OF PRIMARY POWER (PNEUMATIC, ELECTRICAL OR HYDRAULIC)
XX: FO = FAIL OPEN
FC = FAIL CLOSED
FLP = FAIL TO LAST POSITION

PRIMARY ELEMENT SYMBOLS

- PARSHALL FLUME
- WEIR
- ROTAMETER (FI)
- PRESSURE GAUGE (PI)
- SUBMERSIBLE PRESSURE TRANSDUCER
- ELECTROMAGNETIC FLOWMETER (M)
- LEVEL (FLOAT) (LS)
- LEVEL (RADAR) (LE)
- LEVEL (ULTRASONIC) (LE)

MISCELLANEOUS SYMBOLS

- DIAPHRAGM SEAL
- BLIND FLANGE
- AIR GAP
- VENT TO ATMOSPHERE (V)
- AERATOR
- PLUG
- RECEPTACLE
- SELF CONTAINED AIR SUPPLY (A)
- COMPOSITE SAMPLER (DIPPER TYPE) (SD, D)
- COMPOSITE SAMPLER (SUCTION TYPE) (SS)
- TV CAMERA (TV)
- RADIO ANTENNA
- PURGE SET (X)
  X : W = WATER
  A = AIR
  SEE ○
- AIR SET (XX)
  XX= SUPPLY PRESSURE IN PSIG.
- FLEXIBLE CONNECTOR
- PULSATION DAMPENER
- FLOATING DECANTER
- BACKDRAFT DAMPER
- Y-STRAINER
- BACKFLOW PREVENTER
- 120V — 120 VOLT, 60 HZ POWER
- 480V — 480 VOLT, 60 HZ POWER
- ANNULAR DIAPHRAGM SEAL
- RUPTURE DISK (PRESSURE)
- RUPTURE DISK (VACUUM)
- MIXER
- ELECTRIC MOTOR (M)
- FLUSHING CONNECTION (F)
- HOSE ADAPTOR
- SEAL WATER SET (S)
- AUDIBLE ALARM
- QUICK DISCONNECT

PUMP AND COMPRESSOR SYMBOLS

NOTE:
XX: AS ADJUSTABLE SPEED
CS CONSTANT SPEED (SINGLE SPEED)
CS-2 CONSTANT SPEED (TWO SPEED)

- CHOPPER PUMP (XX)
- CENTRIFUGAL PUMP (DRY PIT) (XX)
- CENTRIFUGAL WET PIT PUMP OR TURBINE PUMP (XX)
- VERTICAL INLINE MULTISTAGE CENTRIFUGAL PUMP
- CHEMICAL FEED PUMP (XX)
- PISTON PUMP (XX)
- GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT) (XX)
- SUBMERSIBLE SUMP PUMP (XX)
- PROGRESSIVE CAVITY PUMP (XX)
- COMPRESSOR (CENTRIFUGAL) (XX)
- COMPRESSOR (PISTON) (XX)
- BLOWER OR FAN (CENTRIFUGAL) (XX)
- EJECTOR
- PERISTALTIC PUMP

FLOW STREAM IDENTIFCATION

AW/AV	ACID WASTE / ACID VENT
BA	BUNKER AIR
BYP	BYPASS
CA	CITRIC ACID
CD	CONDENSATE DRAIN
DEC	DECANT
DR	DRAIN
DS	DIGESTED SLUDGE
FA	FOUL AIR
GS	GRIT SLURRY
HW	HOT WATER 132F (POTABLE)
IA	INSTRUMENT AIR
IRR	IRRIGATION WATER
MHO	MAGNESIUM HYDROXIDE
NPW (W2)	NON-POTABLE WATER OR BACKFLOW-PREVENTED POTABLE WATER
OF	OVERFLOW
PA	PROCESS AIR
PD	PROCESS DRAIN
PE	PLANT EFFLUENT
PER OR PERM	PERMEATE
PMPD	PUMPED DRAIN
RAS	RETURN ACTIVATED SLUDGE
RG	REFRIGERANT - GAS
RL	REFRIGERANT - LIQUID
ROR	REVERSE OSMOSIS RETURN
ROS	REVERSE OSMOSIS SUPPLY
RS	RAW SEWAGE
RW	RECLAIMED WATER
RWH	RECLAIMED WATER HIGH PRESSURE
RWL	RECLAIMED WATER LOW PRESSURE
SA	SAMPLE
SC	SUPPLEMENTAL CARBON
SD	STORM DRAIN
SHC	SODIUM HYPOCHLORITE
SPD	SUMP PUMP DISCHARGE
SS	SANITARY SEWER
TW	TEPID WATER
TWR	TEPID WATER RETURN
UVE	UV EFFLUENT
UVI	UV INFLUENT
V	VENT
V/VTR	VENT OR VENT THROUGH ROOF (SANITARY)
VAC	LABORATORY VACUUM
W1	POTABLE WATER
W2 (NPW)	NON-POTABLE WATER OR BACKFLOW-PREVENTED POTABLE WATER
WAS	WASTE ACTIVATED SLUDGE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

Registered Professional Engineer (Control Systems) CERTIFICATE NO. 83873 ANDREW WILLIAMS Date Signed 06-17-2025 ARIZONA, U.S.A.

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: D THOMAS CADD: J BOSS TECH. REVIEW: D ATURALIYE DATE: 06/2025	SUB SHEET NO. 01N0002	TITLE OF SHEET: GENERAL INSTRUMENTATION AND CONTROL LEGEND GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 8 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

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DESIGN CRITERIA

1. APPLICABLE CODE: 2021 INTERNATIONAL BUILDING CODE (IBC) AND ASCE 7-16.

2. REFER TO THE DRAWINGS FOR ADDITIONAL AND SPECIFIC STRUCTURE LOADINGS AND REQUIREMENTS.

3. ALL LOADS SHOWN ARE SERVICE LEVEL (UNFACTORED) UNLESS SPECIFICALLY NOTED OTHERWISE.

4. DEAD LOADS:
   SELF WEIGHT
   SUPERIMPOSED ROOF MECHANICAL & ELECTRICAL (PROCESS FACILITIES) = 40 PSF
   SUPERIMPOSED ROOF MECHANICAL & ELECTRICAL (NON-PROCESS FACILITIES) = 5 PSF

5. ROOF LOADS:

GROUND SNOW LOAD, Pg	= 60 PSF (ASD) PER COCONINO COUNTY
SNOW EXPOSURE FACTOR, Ce	= 1.0
THERMAL FACTOR, Ct	= 1.1 (ENCLOSED BUILDINGS) = 1.2 (CANOPIES AND OPEN STRUCTURES)
SLOPE FACTOR, Cs	= 1.0
MINIMUM FLAT ROOF SNOW LOAD, Pf	= 51 PSF (ASD) HEATED STRUCTURES = 56 PSF (ASD) CANOPIES AND OPEN STRUCTURES
IMPORTANCE FACTOR, Is	= 1.1

   SEE SNOW LOAD DIAGRAMS ON ROOF PLAN(S) FOR UNBALANCED SNOW LOADS AND FOR AREAS WITH INCREASED DRIFT LOADS.

LIVE LOAD	= 20 PSF SLOPED ROOFS = 50 PSF CONCRETE LIDS

   STRUCTURES HAVE BEEN DESIGNED FOR REDUCED ROOF LIVE LOADS IN ACCORDANCE WITH THE IBC.

   DEFLECTION CRITERIA FOR CONTRACTOR DESIGNED ROOF FRAMING MEMBERS:

TOTAL LOAD	L/180
LIVE LOAD	L/240
SNOW LOAD	L/240

6. FLOOR LIVE LOADS:

OFFICE	100 PSF
ELECTRICAL ROOM	300 PSF
MECHANICAL ROOM	200 PSF
CORRIDORS, EXITS, STAIRS	100 PSF
WALKWAYS AND ELEVATED PLATFORMS	100 PSF

   COLUMNS, FOOTINGS, AND FLOOR FRAMING MEMBERS HAVE BEEN DESIGNED FOR REDUCED LIVE LOADS IN ACCORDANCE WITH THE BUILDING CODE.

7. WIND LOADS:

ASCE 7 METHOD	= MWFRS DIRECTIONAL PROCEDURE
BASIC WIND SPEED (3-SECOND GUST)	= 107 MPH (LRFD)
EXPOSURE CATEGORY	= C
INTERNAL PRESSURE COEFFICIENT, GCpi	= +/- 0.18
RISK CATEGORY	= III
COMPONENT AND CLADDING WALL ELEMENTS (WINDOWS, DOORS, LOUVERS, SIDING ETC FOR STRUCTURES UNDER 60 FEET IN HEIGHT)	= 35 PSF

8. SEISMIC LOADS:

MAPPED SPECTRAL RESPONSE ACCELERATIONS	
S_S	= 0.374g
S_1	= 0.114g
DESIGN SPECTRAL RESPONSE ACCELERATIONS	
S_{DS}	= 0.324g
S_{D1}	= 0.114g
SITE CLASS	= C
SEISMIC DESIGN CATEGORY	= B
RISK CATEGORY	= III
IMPORTANCE FACTOR, Ie	= 1.25

   STRUCTURES HAVE BEEN ANALYZED USING THE EQUIVALENT LATERAL FORCE PROCEDURES OF ASCE 7.

9. LATERAL FORCE-RESISTING SYSTEMS

FACILITY NUMBER	FACILITY NAME	LATERAL FORCE RESISTING SYSTEM	ANALYSIS PROSEDURE	RESPONSE MODIFICATION FACTOR, R	SEISMIC RESPONSE COEFF,C	DESIGN BASE SHEAR, V
10	ADMINISTRATION BLDG	INTERMEDIATE REINFORCED CMU SHEAR WALLS	EQUIVALENT LATERAL FORCE	3 1/2	Cs = 0.116	58 K
10	MAINTAINCE BLDG				CS = 0.116	47 K
10	HEADWORKS				Cs = 0.116	80 K
10	PROCESS BLDG				Cs = 0.116	147 K
10	MAINTENANCE COVERED STORAGE	PRE-ENGINEERED METAL BUILDING SYSTEM WITH STEEL MOMENT FRAMES	DEFERED SUBMITTAL (BY PRE-ENGINEERED METAL BLDG SUPPLIER)			
10	COVERED STORAGE					
10	PROCESS TANKS	BURIED, FLAT-BOTTOM, GROUND SUPPORTED REINFORCED CONCRETE TANK W/ NON-SLIDING BASE	ACI 350.3 -20 (MODIFIED PER ASCE 7-16 SECTION 15.7.7.3	Ri = 2.0 Rc = 1.0	Ci = 0.324 Cc VARIES: 0.123 MAX 0.022 MIN	741 K (E/W) 952 K (N/S]
10	DIGESTER FACILITY	AT-GRADE, FLAT - BOTTOM, GROUND SUPPORTED REINFORCED CONCRETE TANK W/ NON-SLIDING BASE		Ri = 2.0 Rc = 1.0	Ci = 0.324 Cc = 0.045	1055 K
10	COMP0ST FACILITY	ORDINARY REINFORCED CONCRETE SHEAR WALLS	EQUIVALENT LATERAL FORCE	4	Cs = 0.125	1.9 K
10	RECLAIMED WATER TANK	AT-GRADE, FLAT - BOTTOM, GROUND SUPPORTED, MECHANICALLY ANCHORED WELDED STEEL TANK	DEFFERED SUBMITTAL (BY WELDED STEEL TANK SUPPLIER)			

10. SPECIAL LOADS: SEE PLANS FOR STRUCTURE SPECIFIC LOADS

11. HYDRAULIC LOADS: SEE PLANS FOR STRUCTURE SPECIFIC LOADS

12. SOIL DESIGN PARAMETERS:
    A. NET ALLOWABLE SOIL BEARING PRESSURES: 10,000 PSF (BEDROCK)
       4,000 PSF (GRANULAR FILL)
    B. GROUND WATER (GW) ELEVATION:
       NORMAL HIGH GW NOT ENCOUNTERED
    C. EQUIVALENT DRAINED FLUID PRESSURES (ABOVE GW):
       ACTIVE: 36 PCF
       AT REST: 56 PCF
       PASSIVE: 410 PCF (INCLUDES FACTOR OF SAFETY OF 2.0)

DESIGN CRITERIA - CONTINUED

   D. VERTICAL SURCHARGE: 2 FT OF SOIL WEIGHT
   E. EARTH PRESSURE COEFFICIENTS:
      ACTIVE, Ka 0.28
      AT REST, Ko 0.44
      PASSIVE, Kp 3.3 (INCLUDES FACTOR OF SAFETY OF 2.0)
   F. COEFFICIENT OF FRICTION: 0.45 (BEDROCK)
      0.35 (GRANULAR FILL)
   G. MODULUS OF SUBGRADE REACTION 100-250 PCI (BEDROCK)
      25-75 PCI (GRANULAR FILL)
   H. FILL UNIT WEIGHT 125 PCF
   I. FACTOR OF SAFETY FOR UPLIFT RESISTANCE (SOIL FRICTION AND WEDGE FAILURE NOT CONSIDERED):
      NORMAL HIGH GW ELEVATION FOS = 1.25
      100 YEAR FLOOD ELEVATION FOS = 1.10

13. FROST DEPTH: 30 IN

GENERAL INFORMATION

1. FOR ABBREVIATIONS NOT LISTED, SEE ASME Y14.38 "ABBREVIATIONS AND ACRONYMS: PUBLICATION AS DISTRIBUTED BY THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME).

2. DESIGN DETAILS ARE INTENDED TO BE TYPICAL AND SHALL APPLY TO SIMILAR SITUATIONS OCCURRING THROUGHOUT THE PROJECT, WHETHER OR NOT THEY ARE INDIVIDUALLY CALLED OUT.

3. VERIFY FINAL OPENING DIMENSIONS IN WALLS, SLABS, AND DECKS WITH OTHER DISCIPLINE DRAWINGS PRIOR TO CONSTRUCTION OF THESE ELEMENTS.

4. FOR NUMBER, TYPE, SIZE, ARRANGEMENT, AND/OR LOCATION OF EQUIPMENT PADS, SEE OTHER DISCIPLINE DRAWINGS. COORDINATE WITH EQUIPMENT SUPPLIER PRIOR TO PLACING SLABS, WALLS AND FOUNDATIONS. COORDINATE PIPING OPENINGS WITH OTHER DISCIPLINE DRAWINGS.

5. DO NOT CUT OR MODIFY STRUCTURAL MEMBERS FOR PIPES, DUCTS, ETC, UNLESS SPECIFICALLY DETAILED OR APPROVED IN WRITING BY THE CONTRACTING OFFICER.

6. VISITS TO THE JOB SITE BY THE ENGINEER TO OBSERVE THE CONSTRUCTION DO NOT IN ANY WAY MEAN THAT ENGINEER IS GUARANTOR OF CONSTRUCTOR'S WORK, NOR RESPONSIBLE FOR THE COMPREHENSIVE OR SPECIAL INSPECTIONS, COORDINATION, SUPERVISION, OR SAFETY AT THE JOB SITE.

7. INFORMATION (DETAILING, DIMENSIONS, CONFIGURATIONS, AND ELEVATIONS, ETC.) OF EXISTING CONSTRUCTION SHOWN REFLECTS AVAILABLE EXISTING DESIGN DOCUMENTS, AND DOES NOT NECESSARILY REPRESENT THE AS-CONSTRUCTED CONDITIONS. THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS, ELEVATIONS AND DETAILING OF THE EXISTING STRUCTURES PRIOR TO UNDERTAKING ANY WORK THAT IS AFFECTED BY THE EXISTING STRUCTURE. NOTIFY CONTRACTING OFFICER IF CONDITIONS VARY FROM THAT SHOWN PRIOR TO STARTING WORK

INSPECTION AND TESTING

1. SPECIAL INSPECTION DOES NOT INCLUDE OR WAIVE THE RESPONSIBILITY FOR INSPECTIONS REQUIRED BY THE BUILDING OFFICIAL. THE CONTRACTOR SHALL SCHEDULE BOTH INSPECTIONS.

2. SPECIFIED CONCRETE AND MASONRY AND OTHER MATERIAL TESTING RELATED TO SPECIAL INSPECTION DURING CONSTRUCTION WILL BE CONTRACTOR FURNISHED.

3. SPECIFIED LABORATORY TEST MIXES AND SIMILAR TEST RESULTS TO VERIFY MATERIAL QUALITY AND CONFORMANCE TO SPECIFICATIONS, AND SUBMITTED FOR REVIEW PRIOR TO ACCEPTANCE FOR USE ON THE PROJECT, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

4. SPECIAL INSPECTION, TESTING AND OBSERVATION (CONTRACTOR FURNISHED) IS REQUIRED IN ACCORDANCE WITH IBC SECTIONS 110 AND 1704 AS INDICATED IN THE STATEMENT OF SPECIAL INSPECTIONS. REFER TO SPECIFICATION 01 45 33B SPECIAL INSPECTION, OBSERVATION, AND TESTING.

FOUNDATIONS

1. REFER TO PRELIMINARY GEOTECHNICAL REPORT: NATIONAL PARK SERVICE - GRCA - 257282. REPLACE WASTEWATER PLANT SOUTH RIM VILLAGE BY SHANNON & WILSON DATED APRIL 2022 AND GEOTECHNICAL RECOMMENDATION REPORT BY JACOBS GOVERNMENT SERVICES COMPANY, DATED JANUARY 13, 2025. GEOTECHNICAL REPORT,GRAND CANYON NATIONAL PARK - SOUTH RIM WWTP ACESS ROAD, SOUTH RIM VILLAGE, ARIZONA, DECEMBER 2024, PREPARED BY SHANNON AND WILSON.

2. EXCAVATIONS SHALL BE SHORED TO PREVENT SUBSIDENCE AND DAMAGE TO ADJACENT EXISTING STRUCTURES, ROADS, UTILITIES, ETC.

3. FOUNDATION SLAB, SLABS-ON-GRADE AND WALL AND COLUMN FOUNDATIONS SHALL BEAR ON MINIMUM 8 INCHES OF COMPACTED GRANULAR FILL OR UNDISTURBED BEDROCK. IF FOUNDATION SLABS, SLABS-ON-GRADE AND WALL AND COLUMN FOUNDATION PARTIALLY BEAR ON UNDISTURBED BEDROCK, PORTION OF FOUNDATION THAT IS ON SOIL SHALL BEAR ON UP TO 18 INCHES OF COMPACTED GRANULAR FILL. COORDINATE WITH VAPOR RETARDER REQUIREMENTS.

4. FOUNDATION SLABS, SLABS-ON-GRADE AND WALL AND COLUMN FOUNDATION THAT ARE LOCATED IN DOMOLITION AREA AND ARE FOUNDATED ON EXISTING STRUCTURES, SHALL BEAR ON MINIMUM 18 INCHES OF COMPACTED GRANULAR FILL.

5. FOUNDATION BEARING SURFACES, AT BOTH THE PREPARED SUBGRADE AND TOP OF GRANULAR FILL ELEVATIONS, SHALL BE OBSERVED BY THE CONTRACTING OFFICER AND THE GEOTECHNICAL ENGINEER OR QUALIFIED DESIGNEE. THE TOP OF GRANULAR FILL SHALL BE OBSERVED PRIOR TO PLACEMENT OF FORMWORK OR REINFORCING STEEL. THE OBSERVATION SHALL VERIFY IF THE ACTUAL EXPOSED SUBGRADE IS AS ANTICIPATED BY THE SITE SPECIFIC BORINGS, TEST PITS, TESTING AND GEOTECHNICAL REPORTS.

6. NO BACKFILL SHALL BE PLACED BEHIND WALLS UNTIL THE WALL'S CONCRETE HAS ATTAINED 100 PERCENT AND TOP SUPPORTING SLAB'S CONCRETE HAS ATTAINED 80 PERCENT OF THEIR SPECIFIED 28 DAY COMPRESSIVE STRENGTH, OR UNTIL TOP-OF-WALL FRAMING SYSTEMS, INCLUDING STEEL OR WOOD DIAPHRAGMS, HAVE BEEN COMPLETED.

7. NO BACKFILL SHALL BE PLACED BEHIND CANTILEVERED, FREE TOP WALLS UNTIL THE CONCRETE HAS ATTAINED 100 PERCENT OF ITS SPECIFIED 28 DAY COMPRESSIVE STRENGTH.

8. USE OF EXPLOSIVES IS NOT ALLOWED.

9. PARTIALLY DEMOLISHED EXISTING FACILITIES OCCURING UNDER NEW FOUNDATIONS SHALL BE FILLED IN WITH CLSM OR COMPACTED GRANULAR FILL WITHIN THE INFLUENCE ZONE OF THE NEW FOUNDATION. ALL EXISTING CONCRETE SHALL BE DEMOLISHED DOWN TO 18 INCHES MINIMUM BELOW THE BEARING ELEVATION OF THE NEW FOUNDATION AND FILLED WITH COMPACTED GRANULAR FILL BETWEEN EXISTING AND NEW CONCRETE.

FORMWORK, SHORING, AND BRACING

1. ROOF TRUSSES AND OTHER STRUCTURES SHOWN ON THE DRAWINGS HAVE BEEN DESIGNED FOR STABILITY UNDER FINAL CONDITIONS ONLY. DESIGN SHOWN DOES NOT INCLUDE NECESSARY COMPONENTS OR EQUIPMENT FOR STABILITY OF THE STRUCTURES DURING CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR WORK RELATING TO CONSTRUCTION ERECTION METHODS, BRACING, SHORING, RIGGING, GUYS, SCAFFOLDING, FORMWORK, AND OTHER WORK AIDS REQUIRED TO SAFELY PERFORM THE WORK SHOWN.

2. TEMPORARY SHORING SHALL REMAIN IN PLACE UNTIL ELEVATED CONCRETE FLOOR OR SLABS HAVE REACHED 80 PERCENT OF THE 28 DAY COMPRESSIVE STRENGTH AS DETERMINED BY FIELD CYLINDER BREAKS.

3."BURY" BARS OR "CARRIER" BARS ARE NOT ALLOWED FOR THE BOTTOM MATS OF REINFORCING IN ALL ELEVATED SLABS AND ARE NOT ALLOWED FOR THE TOP MATS OF REINFORCING IN ELEVATED SLABS LESS THAN 12 INCHES THICK.

CONCRETE REINFORCING

1. REINFORCING STEEL:
   TYPICAL: ASTM A615, GRADE 60

2. FABRICATION AND PLACEMENT OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CRSI MSP-1 "MANUAL OF STANDARD PRACTICE" AND ACI 301 "SPECIFICATIONS FOR STRUCTURAL CONCRETE".

3. FOR REINFORCED CONCRETE FRAME MEMBERS AND DESIGNATED BOUNDARY ELEMENTS OF CONCRETE SHEAR WALL STRUCTURES, REINFORCING STEEL SHALL MEET THE FOLLOWING REQUIREMENTS:
   A. ACTUAL YIELD STRENGTH BASED ON MILL TESTS SHALL NOT EXCEED SPECIFIED YIELD STRENGTH BY MORE THAN 18,000 PSI. (RETESTS SHALL NOT EXCEED THIS VALUE BY MORE THAN AN ADDITIONAL 3000 PSI.)
   B. RATIO OF THE ACTUAL ULTIMATE TENSILE STRESS TO ACTUAL TENSILE YIELD STRENGTH SHALL NOT BE LESS THAN 1.25.

4. MINIMUM REINFORCING FOR CONCRETE WALLS AND SLABS SHALL BE AS FOLLOWS:

THICKNESS	REINF EACH WAY	LOCATION
6"	#4@12"	CENTERED
8"	#5@12"	CENTERED
10"	#4@12"	EACH FACE
12"	#5@12"	EACH FACE

   PROVIDE LARGER SIZES AND MORE REINFORCING IN SECTIONS OF CONCRETE WHERE REQUIRED BY THE DETAILS ON THE DRAWINGS OR BY THE SPECIFICATIONS.

5. CONCRETE COVER FOR REINFORCING, UNLESS SHOWN OTHERWISE, SHALL BE:

WHEN CAST AGAINST EARTH:	3"
EXPOSED TO OZONE OR OZONATED WATER:	3"
INTERIOR, DRY, HUMIDITY CONTROLLED AREAS:	
WALLS, SLABS AND JOISTS	3/4"
BEAM STIRRUPS AND COLUMN TIES	1 1/2"
CONCRETE EXPOSED TO EARTH, LIQUID, WASHDOWN, OR WEATHER:	
WALLS AND SLABS	2"
BEAM STIRRUPS AND COLUMN TIES	2"
BEAM AND COLUMN PRIMARY REINFORCING	2 1/2"

6. REFER TO WALL CORNER AND WALL INTERSECTION REINFORCING DETAIL 0330-003. WALL CORNER REINFORCING SIZES AND SPACINGS SHALL BE AS SHOWN ON THE DRAWINGS AND REFERENCED TO THIS DETAIL. TYPICAL HORIZONTAL WALL REINFORCING SHALL LAP WITH THE CORNER HORIZONTAL REINFORCING.

7. 90 DEGREE BENDS, UNLESS OTHERWISE SHOWN, SHALL BE ACI 318 STANDARD HOOKS.

8. WALL CORNER AND WALL INTERSECTION REINFORCEMENT BARS SHALL BE CONTINUOUS AROUND CORNERS AND THROUGH COLUMNS OR PILASTERS. REINFORCEMENT SHALL BE EXTENDED INTO CONNECTING WALLS AND LAPPED ON THE OPPOSITE FACE OF THE CONNECTING WALLS, AS INDICATED IN DETAIL 0330-003.

9. WALL FOOTING CORNER AND INTERSECTION REINFORCEMENT BARS SHALL BE EXTENDED INTO CONNECTING FOOTINGS AND LAPPED ON THE OPPOSITE FACE OF THE CONNECTING FOOTING. OUTSIDE FACE WALL FOOTING REINFORCEMENT SHALL BE LAPPED WITH CORNER BARS. ALL WALL FOOTING REINFORCEMENT SHALL BE CONTINUOUS THROUGH COLUMNS OR PILASTERS FOOTINGS.

10. LAP VERTICAL WALL BARS WITH DOWELS FROM BASE SLABS AND EXTEND INTO TOP FACE OF ROOF SLABS AND LAP WITH TOP SLAB REINFORCEMENT. PROVIDE A MINIMUM OF FOUR FULL HEIGHT VERTICAL BARS WITH MATCHING DOWELS AT WALL ENDS, CORNERS AND INTERSECTIONS WITH SIZE TO MATCH TYPICAL VERTICAL REINFORCING STEEL SHOWN OR REQUIRED BY NOTES ABOVE.

11. LOCATE ELEVATED SLAB AND BEAM TOP BAR SPLICES AT MIDSPAN AND BOTTOM BAR SPLICES AT SUPPORTS.

12. REINFORCING STEEL FOR FOOTINGS AND SLABS ON GRADE SHALL BE ADEQUATELY SUPPORTED ON BAR SUPPORTS WITH SPACERS TO KEEP REINFORCING ABOVE THE PREPARED GRADE. LIFTING REINFORCING OFF GRADE DURING CONCRETE PLACEMENT IS NOT PERMITTED.

13. REFER TO OPENING REINFORCING DETAILS 0330-001 AND 0330-002.

14. REINFORCEMENT BENDS AND LAPS, UNLESS OTHERWISE NOTED, SHALL SATISFY THE FOLLOWING MINIMUM REQUIREMENTS:

CONCRETE DESIGN STRENGTH = 4,000 PSI MIN AT 28 DAYS[3]		GRADE 60 REINFORCING STEEL								
BAR SIZE		#3	#4	#5	#6	#7	#8	#9	#10	#11
LAP SPLICE LENGTH										
SPACING = 3"	TOP BAR [2]	1'-4"	1'-8"	2'-1"	3'-0"	5'-2"	6'-8"	8'-6"	10'-10"	13'-4"
	OTHER BAR	1'-4"	1'-4"	1'-8"	2'-4"	4'-0"	5'-2"	6'-7"	8'-4"	10'-3"
SPACING = 4"	TOP BAR [2]	1'-4"	1'-8"	2'-0"	2'-5"	3'-10"	5'-0"	6'-5"	8'-1"	10'-0"
	OTHER BAR	1'-4"	1'-4"	1'-7"	1'-10"	3'-0"	3'-11"	4'-11"	6'-3"	7'-8"
SPACING ≥ 6"	TOP BAR [2]	1'-4"	1'-8"	2'-0"	2'-5"	3'-6"	4'-0"	5'-0"	6'-2"	7'-5"
	OTHER BAR	1'-4"	1'-4"	1'-7"	1'-10"	2'-9"	3'-1"	3'-10"	4'-9"	5'-8"
EMBEDMENT LENGTH										
SPACING = 3"	TOP BAR [2]	1'-0"	1'-3"	1'-8"	2'-4"	4'-0"	5'-2"	6'-7"	8'-4"	10'-3"
	OTHER BAR	1'-0"	1'-0"	1'-3"	1'-10"	3'-1"	4'-0"	5'-1"	6'-5"	7'-11"
SPACING = 4"	TOP BAR [2]	1'-0"	1'-3"	1'-7"	1'-10"	3'-0"	3'-11"	4'-11"	6'-3"	7'-8"
	OTHER BAR	1'-0"	1'-0"	1'-3"	1'-5"	2'-4"	3'-0"	3'-10"	4'-10"	5'-11"
SPACING ≥ 6"	TOP BAR [2]	1'-0"	1'-3"	1'-7"	1'-10"	2'-9"	3'-1"	3'-10"	4'-9"	5'-8"
	OTHER BAR	1'-0"	1'-0"	1'-3"	1'-5"	2'-1"	2'-5"	3'-0"	3'-8"	4'-5"

1. LAP LENGTHS ARE BASED ON MINIMUM CONCRETE COVER OF 2". LONGER LENGTHS ARE REQUIRED FOR CONCRETE COVER LESS THAN 2".
2. TOP BARS SHALL BE DEFINED AS ANY HORIZONTAL BARS PLACED SUCH THAT MORE THAN 12 INCHES OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR IN ANY SINGLE POUR. HORIZONTAL WALL BARS ARE CONSIDERED TOP BARS.
3. WHERE 3000 PSI CONCRETE IS USED, INCREASE ABOVE LENGTHS BY 16 PERCENT. WHERE 3500 PSI CONCRETE IS USED, INCREASE ABOVE LENGTHS BY 7 PERCENT.

NO SCALE

FULL SIZE DRAWINGS = 22"x34" 0" 1"
BAR MEASURES 1" LONG

WAYNE W. KOHLER 81476 REGISTERED PROFESSIONAL ENGINEER ARIZONA U.S.A.

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: W KOHLER CADD: B CLEGG TECH. REVIEW: N MATUS DATE: 06/2025	SUB SHEET NO. 01S0001	TITLE OF SHEET: GENERAL STRUCTURAL GENERAL NOTES GRAND CANYON, SOUTH RIM	DRAWING NO. 113 / 175376 PMIS/PKG NO. 257282 SHEET 9 OF 401

PLOT DATE: 6/16/2025 PLOT TIME: 2:39:05 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01S0001_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

CAST IN PLACE CONCRETE

1. 28-DAY COMPRESSIVE STRENGTHS (TO MEET STRUCTURAL STRENGTH REQUIREMENTS):
   - HYDRAULIC STRUCTURES: 4000 PSI
   - BUILDING STRUCTURES: 4000 PSI
   - WALL SLURRY MIXTURE: SAME AS WALL CONCRETE
   - CONCRETE FILL: 3500 PSI
   - CURBS AND SIDEWALKS: 3500 PSI
   - DUCT BANKS AND PIPE ENCASEMENTS NOT INTEGRAL WITH FOUNDATIONS: 3500 PSI
2. 56-DAY COMPRESSIVE STRENGTHS (TO MEET DURABILITY REQUIREMENTS OF ACI 318 AND ACI 350):
   - HYDRAULIC STRUCTURES: 5000 PSI
   - BUILDING STRUCTURES: 4500 PSI
   - CONCRETE FILL: 4500 PSI
   - CURBS AND SIDEWALKS: 4500 PSI
   - DUCT BANKS AND PIPE ENCASEMENTS NOT INTEGRAL WITH FOUNDATIONS: 4500 PSI
3. DESIGN STRENGTHS ARE SAME AS 28-DAY COMPRESSIVE STRENGTHS.
4. CONTINUOUS WATERSTOP AS SPECIFIED SHALL BE INSTALLED IN CONSTRUCTION JOINTS OF HYDRAULIC STRUCTURES, CHANNELS, AND BELOW GRADE STRUCTURES, EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE.
5. CONSTRUCTION JOINTS INDICATED ARE SUGGESTED LOCATIONS. CONTRACTOR MAY REVISE LOCATION OF JOINTS, SUBJECT TO SPECIFIED REQUIREMENTS. LAYOUT SHOWING ALL CONSTRUCTION JOINT LOCATIONS SHALL BE SUBMITTED FOR REVIEW BY CONTRACTING OFFICER.
6. ROUGHEN AND CLEAN CONSTRUCTION JOINTS IN WALLS AND SLABS AS SPECIFIED PRIOR TO PLACING ADJACENT CONCRETE.
7. COORDINATE PLACEMENT OF OPENINGS, PIPE PENETRATIONS, CURBS, DOWELS, SLEEVES, CONDUITS, BOLTS AND INSERTS PRIOR TO PLACEMENT OF CONCRETE.
8. NO ALUMINUM CONDUIT OR PRODUCTS CONTAINING ALUMINUM OR ANY OTHER MATERIAL INJURIOUS TO THE CONCRETE SHALL BE EMBEDDED IN THE CONCRETE.
9. DO NOT PLACE CONDUIT PARALLEL TO BEAM OR COLUMN REINFORCEMENT UNLESS SPECIFICALLY INDICATED IN DRAWINGS.
10. PATCH FORM TIE HOLES IN ACCORDANCE WITH DETAILS 0310-051 AND/OR 0310-052.

CONCRETE UNIT MASONRY

1. MASONRY WALL TYPE: INTERMEDIATE REINFORCED WALLS.
2. DESIGN COMPRESSIVE STRENGTH, f'm, OF THE FINISHED ASSEMBLY AND MATERIAL PROPERTIES SHALL BE PER THE TABLE BELOW.
3. MORTAR: ASTM C270, TYPE S, HYDRATED. DO NOT USE MASONRY CEMENT.
4. GROUT: ASTM C476 COARSE GROUT. USE OF WATER REDUCERS OR SUPERPLASTICIZERS IS NOT PERMITTED.
5. CONCRETE MASONRY UNITS: ASTM C90, MEDIUM WEIGHT, LINEAR SHRINKAGE SHALL NOT EXCEED 0.065 PERCENT.
6.

DESIGN COMPRESSIVE STRENGTH f'm (PSI)	UNIT STRENGTH (PSI)	GROUT STRENGTH (PSI) MIN / MAX	MORTAR PROPERTIES
2,000	2,800	2,000 / 3500	Type S

7. PLACE COURSES IN WALLS, COLUMNS, AND PILASTERS IN RUNNING BOND PATTERN.
8. PROVIDE MATCHING FOUNDATION DOWELS FOR ALL TYPICAL AND ADDITIONAL VERTICAL BARS.
9. PROVIDE VERTICAL BARS AND DOWELS WITH LAP LENGTHS AS SHOWN IN DETAIL 0422-004.
10. STAGGER ADJACENT LAP SPLICES BY 24 INCHES WHEN SEPARATED BY 3 INCHES OR LESS.
11. PROVIDE NUMBER OF FULL HEIGHT VERTICAL BARS AT EDGES OF OPENINGS AS SHOWN IN DETAIL 0422-004.
12. PROVIDE FULL HEIGHT VERTICAL BARS IN 3 CELLS AT WALL CORNERS AND INTERSECTIONS AS SHOWN IN DETAIL 0422-001.
13. PROVIDE HORIZONTAL CORNER AND INTERSECTION BARS WITH LAP LENGTHS AS SHOWN IN DETAIL 0422-001.
14. PROVIDE REINFORCED LINTELS ABOVE AND REINFORCED BOND BEAMS BELOW OPENINGS AS SHOWN IN DETAIL 0422-004.
15. PROVIDE FULL HEIGHT VERTICAL BARS WITH MATCHING DOWELS IN CELLS ADJACENT TO OPENINGS AS SHOWN IN DETAIL 0422-004.
16. GROUTING: PARTIALLY GROUT WALLS;
    - A. DO NOT SOLID GROUT WALLS UNLESS INDICATED ON THE DRAWINGS.
    - B. GROUT ONLY CELLS WITH REINFORCING WHERE REBAR IS SPACED AT 32 INCHES ON CENTER OR GREATER EACH WAY.
    - C. SOLID GROUT ALL CELLS IN CMU WALLS WHERE REBAR IS SPACED AT 24 INCHES ON CENTER OR LESS, EITHER WAY.
    - D. SOLID GROUT ALL PIERS, COLUMNS, HEADERS, AND BOND BEAMS.
    - E. SOLID GROUT ADDITIONAL MASONRY AREAS SPECIFICALLY INDICATED ON THE DRAWINGS.
17. MASONRY UNIT AND GROUT TESTING SHALL BE IN CONFORMANCE WITH IBC "UNIT STRENGTH METHOD". TESTING WILL BE CONTRACTOR FURNISHED AS INDICATED ON THE STATEMENT OF SPECIAL INSPECTIONS PLAN PROVIDED ON THE DRAWINGS. PRISM TEST METHOD MAY BE SUBMITTED AS AN ALTERNATIVE OR MAY BE REQUIRED BY CONTRACTING OFFICER REPRESENTATIVE TO VERIFY WORK.
18. THE MINIMUM REINFORCING FOR INTERMEDIATE REINFORCED CONCRETE BLOCK WALLS SHALL BE AS FOLLOWS. PROVIDE LARGER SIZES AND MORE REINFORCING IN SECTIONS OF WALLS WHERE REQUIRED BY THE DETAILS ON THE DRAWINGS OR BY THE SPECIFICATIONS.

WALL THICKNESS	VERTICAL REINFORCING	VERTICAL BAR LOCATION	HORIZONTAL REINFORCING	HORIZONTAL BAR LOCATION
8"	#5@48"	CENTERED	#5@48"	CENTERED
12"	#5@48"	EACH FACE	#5@48"	EACH FACE

* EXCEPT WITH BOND BEAMS AT TOP OF WALL AND BOTTOM OF WALL

20. DO NOT PLACE CONDUIT IN CELLS CONTAINING PARALLEL REINFORCEMENT.

WELDING

1. WELDS SHALL CONFORM TO AMERICAN WELDING SOCIETY (AWS):
   - D1.1, STRUCTURAL WELDING CODE STEEL
   - D1.2, STRUCTURAL WELDING CODE ALUMINUM
   - D1.6, STRUCTURAL WELDING CODE STAINLESS STEEL
2. REPAIR WELDS FOUND DEFECTIVE IN ACCORDANCE WITH AWS D1.1 SECTION 5.26.
3. USE INTERMITTENT WELDS AT FIELD WELDS OF EMBED PLATES AND ANGLES TO AVOID SPALLING OR CRACKING OF THE EXISTING CONCRETE.
4. BUTT JOINT WELDS SHALL BE COMPLETE JOINT PENETRATION (CJP) UNLESS INDICATED OTHERWISE.

STRUCTURAL STEEL AND METAL FABRICATIONS

1. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:
   - W-SHAPES: A992
   - MISCELLANEOUS SHAPES INCLUDING ANGLES, CHANNELS, PLATES, ETC.: A36
   - HOLLOW STRUCTURAL SECTIONS (HSS): A500, GRADE C
   - STEEL PIPE: A53, GRADE B
   - STAINLESS STEEL SHAPES: A276
2. ALUMINUM SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:
   - STRUCTURAL SHAPES: B308
   - PLATES: B209
3. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, CURRENT EDITION, AND CURRENT OSHA STANDARDS.
4. FASTENERS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO THE FOLLOWING ASTM STANDARDS EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE:
   - UNLESS SHOWN OTHERWISE: A325-N
     - SLIP CRITICAL: A325-SC
     - TENSION CONTROL (TC) BOLTS: ASTM A325 AND ASTM F1852
   - ANCHOR BOLTS (AB)
     - STAINLESS STEEL: F593, AISI TYPE 316, CONDITION CW
     - STEEL OR GALVANIZED STEEL: F1554, GR 36 / A153
   - MACHINE BOLTS (MB)
     - STEEL: A307
     - STAINLESS STEEL: F593, AISI TYPE 316, CONDITION CW
     - GALVANIZED STEEL: A307 / A153
     - ALUMINUM: F468, ALLOY 2024-T4
5. ITEMS TO BE EMBEDDED IN CONCRETE SHALL BE CLEAN AND FREE OF OIL, DIRT AND PAINT.
6. NO HOLES OTHER THAN THOSE SPECIFICALLY DETAILED SHALL BE ALLOWED THROUGH STRUCTURAL STEEL MEMBERS. NO CUTTING OR BURNING OF STRUCTURAL STEEL IS PERMITTED WITHOUT THE APPROVAL OF THE CONTRACTING OFFICER.

STEEL DECKING

1. FOR DECK SIZE, GAGE, AND FASTENING CONFIGURATIONS, SEE FRAMING PLANS. FASTENING CONFIGURATIONS SHOWN ARE SPECIFIC TO THE DECK PRODUCT USED AS BASIS OF DESIGN. CONTRACTOR SHALL FASTEN THE DECKING IN ACCORDANCE WITH INSTALLED DECK MANUFACTURER'S RECOMMENDATIONS TO MEET SPECIFIED CAPACITY REQUIREMENTS.
2. WELDING SHALL BE IN ACCORDANCE WITH AWS D1.3 "STRUCTURAL WELDING CODE SHEET STEEL".
3. DECKING SHALL HAVE A MINIMUM 1 1/2 INCHES BEARING ON SUPPORTS.
4. DECKING SHALL BE CONTINUOUS OVER THREE SPANS MINIMUM, EXCEPT WHERE SHOWN OTHERWISE.
5. FLOOR DECK RECEIVING CONCRETE FILL SHALL BE COMPOSITE TYPE.
6. SCREW DECK TO DRAG STRUTS AND TOP OF WALL ANGLE TIES WITH #12 SELF-TAPPING SCREWS (STS) AT 1'-0" ON CENTER, UNLESS NOTED OTHERWISE. LOCATE ANGLE IN DECK VALLEY.
7. LOCATE OPENINGS FOR EQUIPMENT PER OTHER DISCIPLINE DRAWINGS.
8. REINFORCE DECK FOR LARGER OPENINGS PER DETAIL 0531-021. REINFORCE SMALL OPENINGS AS SPECIFIED.
9. COMPOSITE STRUCTURAL STEEL BEAMS HAVE BEEN DESIGNED FOR "UNSHORED CONDITION" DURING CONSTRUCTION, AND WILL DEFLECT UNDER WET CONCRETE LOADS. TO ACHIEVE THE FINISHED TOP OF CONCRETE INDICATED ON THE DRAWINGS, THE CONTRACTOR SHALL, AT NO ADDITIONAL COST TO THE GOVERNMENT, PROVIDE THE ADDITIONAL CONCRETE.

X	METAL DECK SCHEDULE						DECK ATTACHMENT AND COMMENTS
TYP NO.	TYPE	DEPTH (IN)	GAGE NO.	I_{MIN} (IN^4)	S^+ (IN^3)	S^- (IN^3)	
1	TYPE B DECK	1.5	18	0.277	0.308	0.318	NOTE 3

NOTES:

1. ALL METAL (ROOF AND FLOOR DECK) SHALL BE MANUFACTURED BY A SINGLE MANUFACTURER WITH MINUMUM SECTION PROPERTIES LISTED IN THE SCHEDULE ABOVE. THE STEEL SHALL BE ZINC COATED CONFORMING TO ASTM A525, CLASS G60 AND COATED WITH FACTORY PRIMER. DECK GRADE SHALL BE OF 50 KSI MATERIAL.
2. MINIMUM BEARING OF METAL DECK ON SUPPORTS SHALL BE 2 INCHES UNLESS OTHERWISE NOTED. METAL DECK UNITS SHALL BE CONTINUOUS OVER TWO OR MOR SPANS WHERE POSSIBLE. WHERE SINGLE SPAN CONDITIONS OCCUR: DECK RECEIVING CONCRETE TOPPING SHALL BE SHORED, AND DECK WITHOUT CONCRETE TOPPING SHALL BE NEXT HEAVIER GAGE.
3. ATTACH TYPE B DECK AT PERPENDICULAR SUPPORTS WITH (4) #12 SCREWS PER 35" PANEL AND AT PARALLEL SUPPORTS WITH #12 SCREWS @ 12" O.C. ATTACH TYPE B DECK SIDE LAPS WITH #12 SCREWS AT 8" O.C.
4. PROVIDE VENTED DECK WHERE MEMBRANE ROOFING SYSTEM WILL BE APPLIED.
5. SEE PLANS FOR CALLOUTS AND LOCATIONS OF DECK TYPES USED.

ROUGH CARPENTRY

1. FRAMING LUMBER SHALL BE DOUGLAS FIR-LARCH, NO. 1 OR BETTER UNLESS INDICATED OTHERWISE. PLATES, SILLS, AND BLOCKING MAY BE DOUGLAS FIR-LARCH NO. 2 OR BETTER.
2. STRUCTURAL WOOD MEMBERS SHALL HAVE A MAXIMUM MOISTURE CONTENT OF 19 PERCENT. FOR MEMBERS GREATER THAN 20'-0" IN LENGTH, ADVANCE PURCHASE AND AIR DRYING MAY BE REQUIRED TO ACHIEVE THIS MOISTURE CONTENT.
3. PRESSURE TREAT WOOD IN CONTACT WITH CONCRETE OR MASONRY.
4. FOR ROOF TRUSSES AND OUTRIGGERS, PROVIDE SOLID BLOCKING AT SUPPORTS. PROVIDE CROSS BRIDGING AT 8'-0"ON CENTER MAXIMUM.
5. ROOF SHEATHING SHALL BE MINIMUM 15/32 INCH THICK, EXTERIOR, STRUCTURAL I. ROOF SHEATHING AT UNENCLOSED PORTIONS OF STRUCTURES SHALL BE 15/32 INCH THICK.
6. SEE DRAWINGS FOR MINIMUM NAILING REQUIREMENTS. NAILS SHALL BE GALVANIZED, COMMON. DO NOT USE BOX NAILS UNLESS A NAIL SPACING REDUCTION IS APPROVED.
7. MINIMUM STANDARD NAILING SHALL CONFORM TO IBC TABLE 2304.10.2, TYPICAL UNLESS INDICATED OTHERWISE.
8. FRAMING CONNECTORS SHALL BE ICC-ES APPROVED. FRAMING CONNECTORS AND PARTS SHALL BE HOT-DIPPED GALVANIZED.
9. WOOD MEMBERS SHALL BE FASTENED TOGETHER AS INDICATED IN THE FOLLOWING TABLE UNLESS INDICATED OTHERWISE.

MINIMUM FASTENING TABLE FOR WOOD BUILDINGS		
CONNECTION	FASTENING	LOCATION
SUB-FASCIA TO RAFTERS, TRUSSES OR LOOKOUTS		
6" OR LESS DEEP MEMBER	2 – 16d	END NAIL
LARGER THAN 6" DEEP MEMBER	3 – 16d	END NAIL
SOFFIT TO RAFTERS, TRUSSES OR LOOKOUTS	8d@4" PANEL EDGES	FACE NAIL
	8d@6" FIELD	FACE NAIL
TOP PLATE TO STUD	2 - 16d COMMON (3 1/2" x 0.162")	
	3 - 3" x 0.131" BOX	END NAIL
STUD TO SOLE PLATE	4 - 8d COMMON (2 1/2" x 0.131")	
	4 - 3" x 0.131" BOX	TOE NAIL
	2 - 16d COMMON (3 1/2" x 0.162")	
	3 - 3" x 0.131" BOX	END NAIL
DIMENSIONAL LUMBER JOIST TO SILL PLATE, TOP PLATE, OR DROPPED GIRDER	3-8d	TOE NAIL

1. THIS FASTENING SCHEDULE IS BASED ON IBC TABLE 2304.10.2
2. ROOF SHEATHING AND SOFFIT NAILS SHALL BE HOT-DIPPED ZINC-COATED GALVANIZED STEEL OR STAINLESS.
3. ALL NAILS PENETRATING PRESSURE TREATED WOOD SHALL BE HOT DIPPED ZINC COATED IN ACCORDANCE WITH ASTM G185.

10. FRAMING LUMBER SHALL BE DOUGLAS FIR-LARCH, NO. 1 OR BETTER UNLESS INDICATED OTHERWISE. PLATES, SILLS, AND BLOCKING MAY BE DOUGLAS FIR-LARCH NO. 2 OR BETTER.

FASTENER TABLE

COMMON NAIL SIZE AND SPACING	COMMON NAIL D	COMMON NAIL LENGTH	PNEUMATIC BOX NAIL SIZE AND SPACING	PNEUMATIC BOX NAIL D	PNEUMATIC BOX NAIL LENGTH	STAPLES SIZE AND SPACING
6d @ 6"	.113"	2"	8d @ 6"	.113"	2.5"	14 gage @ 6"
			6d @ 4"	.099"	2.0"	15 gage @ 6"
						16 gage @ 4"
6d @ 12"	.113"	2"	8d @ 12"	.113"	2.5"	NA
8d @ 6"	.131"	2.5"	16d @ 6"	.135"	3.5"	14 gage @ 4"
			8d @ 4"	.113"	2"	15 gage @ 4"
						15 gage @ 2½"
8d @ 12"	.131"	2.5"	16d @ 12"	.135"	3.5"	NA
10d @ 6"	.148"	3"	20d @ 6"	.148'	4"	14 gage @ 4"
			10d @ 4"	.128'	3"	15 gage @ 2½"
						16 gage @ 2½"
10d @ 12"	.148"	3"	20d @ 12"	.148"	4"	NA
12d @ 6"	.148"	3.25"	20d @ 6"	.148"	4"	NA
			12d @ 4"	.128"	3.25"	NA
12d @ 12"	.148"	3.25"	20d @ 12"	.148"	4"	NA
20d @ 2'-8"	.192"	4"	NA			NA

NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
JACOBS GOVERNMENT SERVICES COMPANY	W KOHLER	01S0002	GENERAL STRUCTURAL GENERAL NOTES	113 / 175376
GREENWOOD VILLAGE, CO	CADD: B CLEGG		GRAND CANYON, SOUTH RIM	PMIS/PKG NO. 257282
	TECH. REVIEW: N MATUS			SHEET
	DATE: 06/2025			10 OF 401

Registered Professional Engineer (Structural) CERTIFICATE NO. 81476 WAYNE W. KOHLER DATE SIGNED 6/20/25 ARIZONA U.S.A.

100% COMPLETE CONSTRUCTION DOCUMENTS

SHOP FABRICATED WOOD TRUSSES

1. PROVIDE CALCULATIONS, PRODUCT DATA, LUMBER GRADES, AND CONNECTION DETAILS, FOR ALL TYPES OF PREFABRICATED WOOD ROOF TRUSSES USED ON THE PROJECT. CALCULATIONS MUST BE STAMPED AND SIGNED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF ARIZONA. DO NOT INSTALL COMPONENTS OR CONNECTIONS PRIOR TO REVIEW AND ACCEPTANCE BY CONTRACTING OFFICER AND PERMITTING AGENCY.

2. DESIGN PREFABRICATED WOOD ROOF TRUSSES FOR THE FOLLOWING LOADS:
   A. ROOFING: 2 PSF (TOP CHORD)
   B. PLYWOOD SHEATHING: 3 PSF (TOP CHORD)
   C. INSULATION: 6 PSF (TOP CHORD)
   D. GYPSUM OR ACCOUSTICAL TILE CEILING: 2 PSF (BOTTOM CHORD)
   E. MECH/ELECT AT NON-PROCESS: 5 PSF (BOTTOM CHORD)

3. THE ABOVE SUPERIMPOSED DEAD LOADS SHALL NOT BE CONSTRUED TO BE ALL OF THE DEAD LOADS THAT COULD BE INCLUDED IN THE DESIGN OF THE PREFABRICATED WOOD ROOF TRUSSES. REVIEW THE DRAWINGS FOR ANY ADDITIONAL DEAD LOAD WHICH WOULD NORMALLY BE INCLUDED IN COMMON PRACTICE.

4. ROOF SNOW LOAD FOR THE DESIGN OF THE PREFABRICATED WOOD ROOF TRUSSES SHALL BE:
   A. BALANCED SNOW LOAD TOP CHORD: SEE 01S0001.
   B. DRIFTING AND UNBALANCED SNOW LOAD SHALL BE APPLIED PER THE REQUIREMENTS OF ASCE 7-16.

5. SNOW LOADS SHALL BE APPLIED TO THE PREFABRICATED WOOD ROOF TRUSSES PER THE REQUIREMENTS OF IBC AND ASCE 7 -16 CHAPTER 7.

6. TOTAL UPLIFT LOADS ON THE PREFABRICATED WOOD ROOF TRUSSES SHALL BE APPLIED AS NOTED ON ROOF PLANS.

7. WIND ANALYSIS FOR THE PREFABRICATED WOOD ROOF TRUSSES SHALL USE THE PROVISIONS OF THE IBC AND ASCE 7 -16 FOR ELEMENTS AND COMPONENTS.

8. VERIFY AND COORDINATE EQUIPMENT WEIGHTS, LOCATIONS, AND ATTACHMENT REQUIREMENTS PRIOR TO TRUSS FABRICATION. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE VERTICAL AND LATERAL SUPPORT OF THEIR EQUIPMENT. CONTRACTOR SHALL SUPPLY TO THE TRUSS MANUFACTURER ALL VERTICAL AND LATERAL LOADS FROM EQUIPMENT AND RELATED SUPPORTS.

9. TOP CHORDS SHALL BE A 2x6 MINIMUM. DESIGN THE TOP CHORD AT THE END OF THE ROOF SUB-DIAPHRAGMS FOR THE ADDITIONAL AXIAL LOADS (BOTH TENSION AND COMPRESSION) AS INDICATED ON THE ROOF FRAMING PLAN DRAWINGS.

10. TRUSS BRIDGING AND OTHER ACCESSORIES SHALL BE PER THE MANUFACTURER'S STANDARDS. PROVIDE ONE ROW OF BLOCKING AT MID SPAN MINIMUM. PROVIDE ADDITIONAL BLOCKING AS SHOWN ON THE DRAWINGS.

11. SOLID BLOCK TRUSS ENDS.

12. TRUSSES SHALL NOT BE ALTERED, CUT, OR MODIFIED IN ANY WAY WITHOUT WRITTEN APPROVAL OF TRUSS MANUFACTURER.

METAL BUILDING SYSTEMS

1. FOR DESIGN LOADS REFER TO DESIGN CRITERIA SECTION ABOVE WITH THE FOLLOWING ADDITIONS:
   A. COLLATERAL LOAD: 5 PSF

2. METAL BUILDING FOUNDATIONS HAVE BEEN DESIGNED FOR PRELIMINARY METAL BUILDING COLUMN REACTIONS SHOWN ON THE DRAWINGS. DO NOT CAST METAL BUILDING FOUNDATIONS UNTIL THEIR SIZES HAVE BEEN VERIFIED BY THE CONTRACTING OFFICER FOR THE ACTUAL COLUMN REACTIONS TO BE PROVIDED BY THE METAL BUILDING MANUFACTURER.

3. COLUMN ANCHOR BOLTS SHALL BE DESIGNED BY THE METAL BUILDING MANUFACTURER. ANCHORAGE DESIGN SHALL INCLUDE DETERMINATION OF ANCHOR BOLT MATERIAL, DIAMETER, EMBEDMENT DEPTH, QUANTITY, AND LAYOUT.

4. METAL BUILDING MANUFACTURER TO VERIFY THAT CONCRETE COLUMN PIER DIMENSIONS SHOWN ON THE DRAWINGS ARE LARGE ENOUGH TO ACCOMMODATE METAL BUILDING COLUMN BASE PLATES AND PROVIDE SUFFICIENT EDGE DISTANCE FOR COLUMN ANCHOR BOLTS.

DEFERRED SUBMITTALS

1. DEFERRED SUBMITTALS ARE THOSE PORTIONS OF THE DESIGN WHICH ARE NOT SUBMITTED AT THE TIME OF PERMIT APPLICATION AND WHICH ARE TO BE SUBMITTED TO THE PERMITTING AGENCY FOR ACCEPTANCE PRIOR TO INSTALLATION OF THAT PORTION OF THE WORK OR ARE REQUIRED TO BE SUBMITTED FOR REVIEW ONLY BY THE CONTRACTING OFFICER.

2. WHERE DEFERRED SUBMITTALS INCLUDE ADDITIONAL MATERIALS, INSTALLATION, ANCHORAGE, OR CERTIFICATION OF COMPONENTS THAT REQUIRE SPECIAL INSPECTION AND/OR STRUCTURAL OBSERVATION TO MEET CODE REQUIREMENTS, THE DEFERRED SUBMITTAL SHALL INCLUDE SPECIFIC LINE ITEMS TO BE ADDED TO THE APPROPRIATE TABLES IN THE PROJECT'S STATEMENT OF SPECIAL INSPECTIONS PLAN IF THEY ARE NOT ALREADY IDENTIFIED.

3. THE FOLLOWING IS A LIST OF DEFERRED SUBMITTALS PER IBC SECTION 107.3.4.1 OF 2021 IBC THAT ARE EXPECTED TO CONTAIN STRUCTURAL CALCULATIONS OR SAFETY RELATED SYSTEM INFORMATION FOR REVIEW TO MEET BUILDING PERMITTING REQUIREMENTS FOR DESIGNED SYSTEMS. PRIOR TO INSTALLATION OF THE INDICATED STRUCTURAL ELEMENT, EQUIPMENT, DISTRIBUTION SYSTEM, OR COMPONENT OR ITS ANCHORAGE, THE CONTRACTOR SHALL SUBMIT THE REQUIRED CALCULATIONS AND SUPPORTING DATA AND DRAWINGS FOR REVIEW AND ACCEPTANCE BY THE CONTRACTING OFFICER. ADDITIONALLY, ACCEPTANCE INDICATED ON THE CONTRACTING OFFICER COMMENT FORM, ALONG WITH THE COMPLETED, FINAL SUBMITTAL SHALL THEN BE SUBMITTED BY THE CONTRACTOR TO THE PERMITTING AGENCY AND APPROVED PRIOR TO INSTALLATION OF THESE ITEMS.

SPECIFICATION SECTION	CODE REQUIRED DEFERRED SUBMITTALS FOR REVIEW BY PERMITTING AGENCY
01 88 15	ANCHORAGE AND BRACING
05 52 16	ALUMINUM RAILINGS
06 17 53	SHOP-FABRICATED WOOD TRUSSES
06 82 00	GLASS-FIBER-REINFORCED PLASTIC
13 34 19	METAL BUILDING SYSTEMS
21 13 00	FIRE-PROTECTION SPRINKLER SYSTEMS
33 16 13.13	WELDED STEEL TANK
40 05 15	PIPING SUPPORT SYSTEMS
41 22 13.23	OVERHEAD CRANES
41 22 23.19	MONORAIL HOISTS
45 42 25.02	PREFABRICATED ALUMINUM FLAT COVER
OTHER	ANY EQUIPMENT OR COMPONENT IN WHICH A TECHNICAL SPECIFICATION REQUIRES SUBMITTAL OF EQUIPMENT OR ANCHORAGE SYSTEM CALCULATIONS

PLOT DATE: 6/16/2025 PLOT TIME: 2:38:48 PM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01S0003_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: W KOHLER
CADD: B CLEGG
TECH. REVIEW: N MATUS
DATE: 06/2025

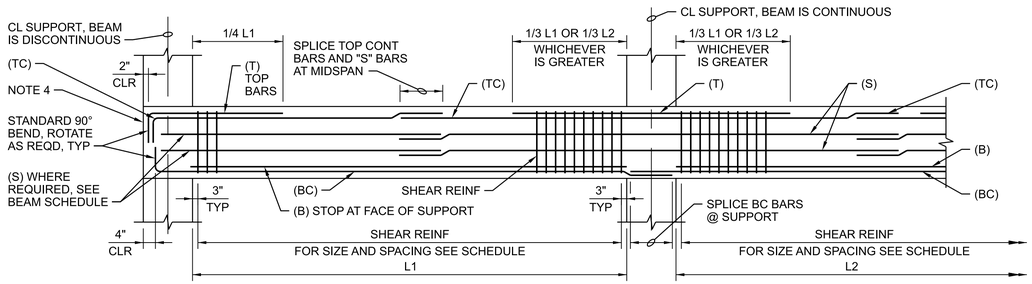
SUB SHEET NO. 01S0003

TITLE OF SHEET
GENERAL STRUCTURAL GENERAL NOTES
GRAND CANYON, SOUTH RIM

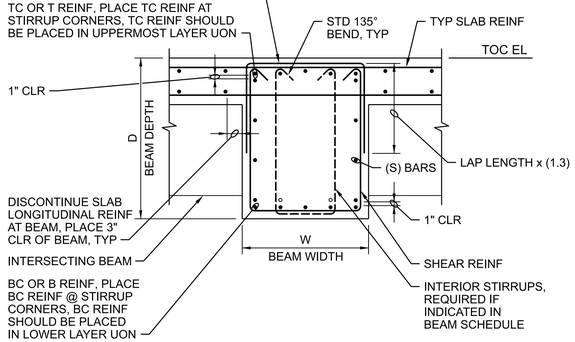
NO SCALE

DRAWING NO. 113
175376
PMIS/PKG NO. 257282
SHEET 11 OF 401

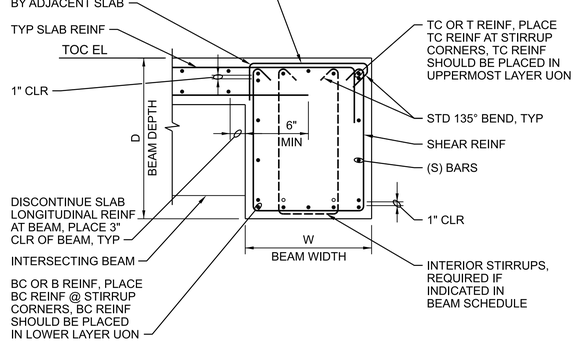
NOTES:
1. PLACE TOP (T & TC) AND BOTTOM (B & BC) BARS IN MULTIPLE ROWS ONLY WHERE INDICATED IN SCHEDULE.
2. PROVIDE CLOSED STIRRUPS UNLESS OTHERWISE INDICATED IN BEAM SCHEDULE. CLOSED STIRRUPS MAY BE SINGLE PIECE CLOSED STIRRUPS ([1]), TWO PIECE WITH CROSS TIE AS SHOWN ([2]), OR AS SHOWN ON "TYPICAL SECTION". 90 DEGREE HOOK ONLY ALLOWED WHERE CROSS TIE CONFINED BY ADJACENT SLAB.
3. PROVIDE MINIMUM 1 - #5 CONTINUOUS AT EACH CORNER OF STIRRUPS.
4. CAST BEAM INTEGRAL WITH SUPPORT OR PROVIDE BEAM POCKET THE FULL WIDTH AND DEPTH OF BEAM.
5. FOR ADDITIONAL NOTES, SEE BEAM SCHEDULE, THIS SHEET.



LONGITUDINAL BEAM SECTION



TYPICAL BEAM SECTION



PERIMETER BEAM SECTION

1 BEAM REINFORCEMENT
NTS
32S1030

FACILITY NUMBER	BEAM NO. (SEE PLANS)	SIZE		* TOP REINF AT LEFT SUPPORT		BOTTOM REINF		* TOP REINF AT RIGHT SUPPORT		S BARS	SHEAR REINF				REMARKS
		W	D	T	TC	B	BC	T	TC		NO. (NOTE 5)	SIZE	TYPE	SPACING FROM LEFT & RIGHT SUPP.	
80	B1	12	16	—	(2) #5	—	(2) #5	—	(2) #5	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	PLACE BARS IN SINGLE LAYER, TOP AND BOTTOM
80	B2	12	20	—	(2) #5	—	(2) #5	—	(2) #5	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
80	B3	12	24	(2) #6	(3) #6	(2) #6	(2) #6	(2) #6	(3) #6	#5	1	#4	CLOSED	(1) @ 2", REM @ 9"	—
80	B4	12	20	—	(3) #5	—	(3) #5	—	(3) #5	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
80	B5	16	28	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	#5	1	#4	CLOSED	(1) @ 2", REM @ 12"	—
80	B6	16	28	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	#5	1	#4	CLOSED	(1) @ 2", REM @ 12"	—
80	B7	16	28	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	#5	1	#4	CLOSED	(1) @ 2", REM @ 12"	—
80	B8	16	28	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	(2) #7	#5	1	#4	CLOSED	(1) @ 2", REM @ 12"	—
80	B9	16	28	(2) #8	(3) #8	(3) #8	(3) #8	(2) #8	(3) #8	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
80	B10	16	28	(2) #8	(3) #8	(3) #8	(3) #8	(2) #8	(3) #8	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
80	B11	16	28	—	(3) #7	(2) #7	(3) #7	—	(3) #7	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
80	B12	12	20	—	(3) #5	—	(3) #5	—	(3) #5	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
80	B13	12	20	—	(3) #5	—	(3) #5	—	(3) #5	#5	1	#4	CLOSED	(1) @ 2", REM @ 8"	—
80	B14	12	20	—	(3) #5	—	(3) #5	—	(3) #5	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	PLACE BARS IN SINGLE LAYER, TOP AND BOTTOM
32	B15	24	24	(2) #8	(5) #8	—	(5) #8	(2) #8	(5) #8	#5	2	#4	CLOSED	(1) @ 2", REM @ 6"	PLACE BOTTOM IN SINGLE LAYER; TOP WITH TWO LAYERS (5) & (2).
32	B16	24	24	(2) #8	(5) #8	—	(5) #8	(2) #8	(5) #8	#5	2	#4	CLOSED	(1) @ 2", REM @ 6"	PLACE BOTTOM IN SINGLE LAYER; TOP WITH TWO LAYERS (5) & (2).
32	B17	16	24	—	(3) #8	—	(3) #8	—	(3) #8	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
32	B18	12	20	—	(2) #6	—	(2) #6	—	(2) #6	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
32	B19	16	24	—	(3) #8	—	(3) #8	—	(3) #8	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
32	B20	16	24	—	(3) #8	—	(3) #8	—	(3) #8	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—
32	B21	16	24	—	(3) #8	—	(3) #8	—	(3) #8	#5	1	#4	CLOSED	(1) @ 2", REM @ 6"	—

NOTES:
1. * TOP REINFORCEMENT MAY BE CALLED-OUT TWICE IN SCHEDULE. (I.E. "TOP REINFORCEMENT AT RIGHT SUPPORT" OF BEAM THAT IS CONTINUOUS OVER THE RIGHT SUPPORT IS CALLED-OUT AS "TOP REINFORCEMENT AT LEFT SUPPORT" OF ADJACENT BEAM.)
2. LEFT SUPPORT IS DESIGNATED AS THE SUPPORT CLOSEST TO THE LEFT SIDE OR BOTTOM OF SHEET ON WHICH FRAMING PLAN IS DRAWN, UNLESS OTHERWISE NOTED ON PLAN.
3. WHERE FLOOR SLOPES, DEPTH OF BEAM (D) SHOWN IS MINIMUM DEPTH. BOTTOM ELEVATION OF BEAM SHALL BE CONSTANT, UNLESS INDICATED OTHERWISE.
4. WHERE SHEAR REINFORCEMENT "TYPE" IS INDICATED AS "STIRRUP", PROVIDE SHEAR REINFORCEMENT AND CLOSURES AS SHOWN IN BEAM REINFORCEMENT DETAIL. WHERE SHEAR REINFORCEMENT "TYPE" IS INDICATED AS "CLOSED TIE", PROVIDE CLOSED TIES IN LIEU OF STIRRUPS AND CLOSURE BARS.
5. "NO." INDICATES NUMBER OF STIRRUPS OR TIES PER SET.
6. WHERE BEAMS FRAME INTO CONCRETE WALLS, WALLS SHALL BE BLOCKED OUT FULL HEIGHT AND WIDTH OF BEAM TO PROVIDE A MINIMUM 8" SEAT FOR BEAM BEARING. WALL REINFORCEMENT SHALL NOT BE INTERRUPTED THROUGHOUT BLOCKOUT.

BEAM SCHEDULE

PLOT DATE: 16-JUN-2025 PLOT TIME: 14:40 SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01S5001_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

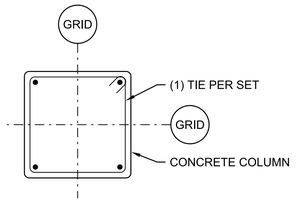
Wayne W. Kohler
81476
WAYNE W. KOHLER
Professional Engineer
ARIZONA U.S.A.
A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: C WEBSTER
CADD: B CLEGG
TECH. REVIEW: A FIRTH
DATE: 06/2025

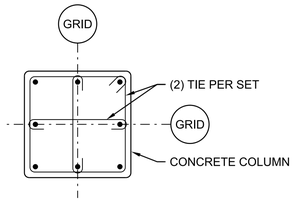
SUB SHEET NO. 01S5001

TITLE OF SHEET
GENERAL STRUCTURAL - GENERAL BEAM REINFORCEMENT
GRAND CANYON, SOUTH RIM

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 12 OF 401



TYPE R1

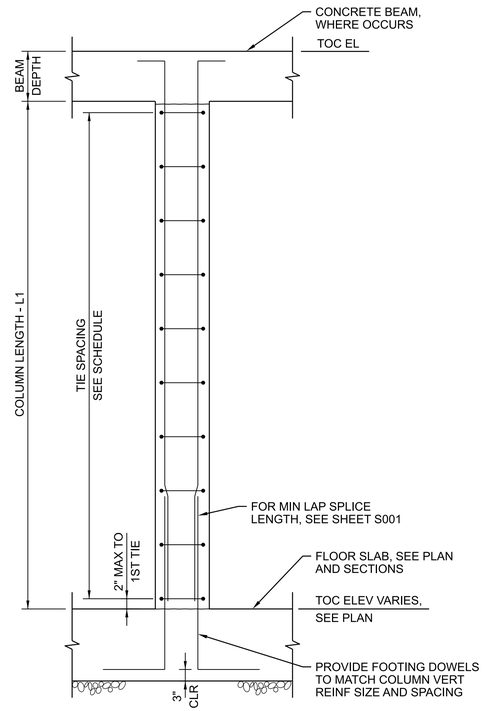


TYPE R2

COLUMN REINFORCEMENT TYPE

NOTES:

1. ALL CONCRETE FOR COLUMNS SHALL HAVE A 28-DAY STRENGTH OF 5,000 PSI MINIMUM.
2. ALL COLUMNS SHALL BE CENTERED ON COLUMN GRIDLINES UNLESS OTHERWISE NOTED.
3. SEE PLANS FOR ORIENTATION OF CONCRETE COLUMNS.
4. SEE SCHEDULES FOR COLUMN SIZE AND VERTICAL REINFORCING.



TYPICAL SECTION

CONCRETE COLUMN SCHEDULE

FACILITY	COLUMN MARK	SIZE	COLUMN REINF TYPE	VERT	TIES
80	C1	18" x 18"	R2	(8) #6	#3 @ 12"
32	C2	12" x 12"	R1	(4) #6	#3 @ 6"

2 CONCRETE COLUMN SCHEDULE AND DETAILS

NTS

32S1020
32S3001
32S3002

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

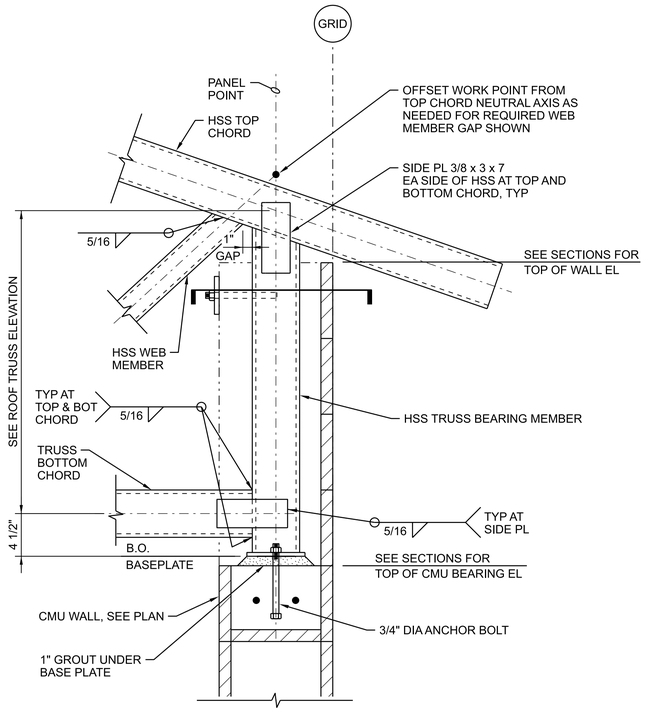
Wayne W. Kohler
Registered Professional Engineer (Structural)
81476
WAYNE W. KOHLER
DATE SIGNED 6/20/25
ARIZONA U.S.A.

A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	NO SCALE
JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	C WEBSTER CADD: B CLEGG TECH. REVIEW: A FIRTH DATE: 06/2025	01S5002	GENERAL STRUCTURAL - GENERAL COLUMN REINFORCEMENT GRAND CANYON, SOUTH RIM	DRAWING NO. 113 / 175376 PMIS/PKG NO. 257282 SHEET 13 OF 401

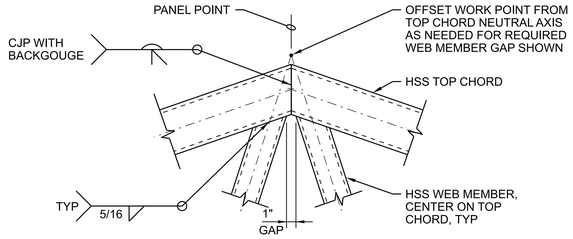
100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 16-JUN-2025 PLOT TIME: 14:37 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01S5002_D3167666.dgn



ELEVATION



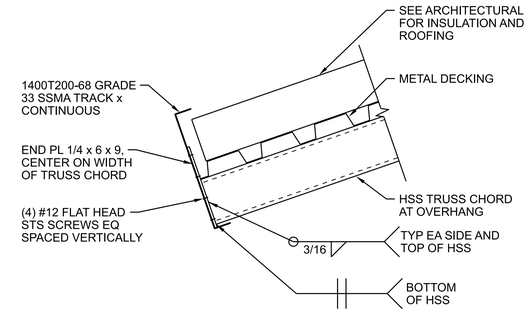
4 TRUSS CENTER CONNECTION

20S5010
32S5010

1 1/2"=1'-0"

0 1 2

1 1/2"=1'-0"



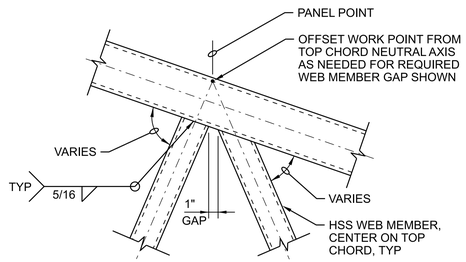
7 EAVE CONNECTION

20S5010
32S5010

1 1/2"=1'-0"

0 1 2

1 1/2"=1'-0"



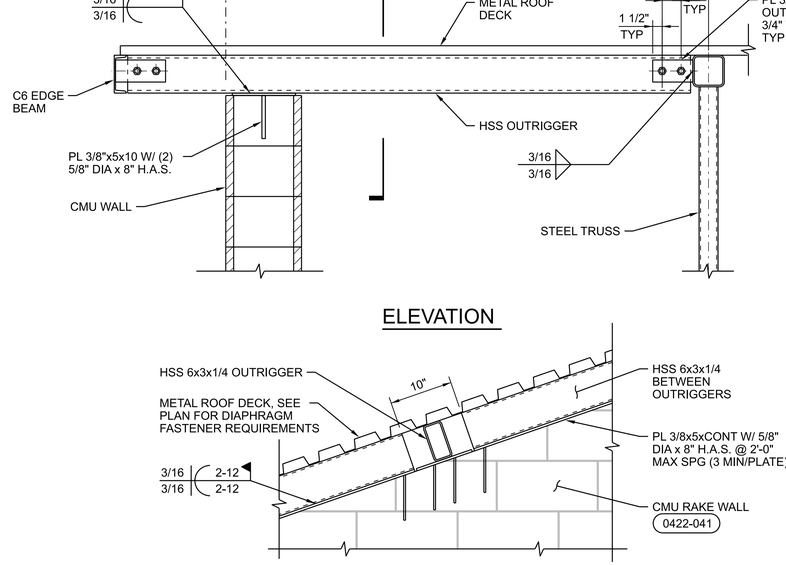
5 TRUSS TOP CHORD CONNECTION

20S5010
32S5010

1 1/2"=1'-0"

0 1 2

1 1/2"=1'-0"



ELEVATION

SECTION

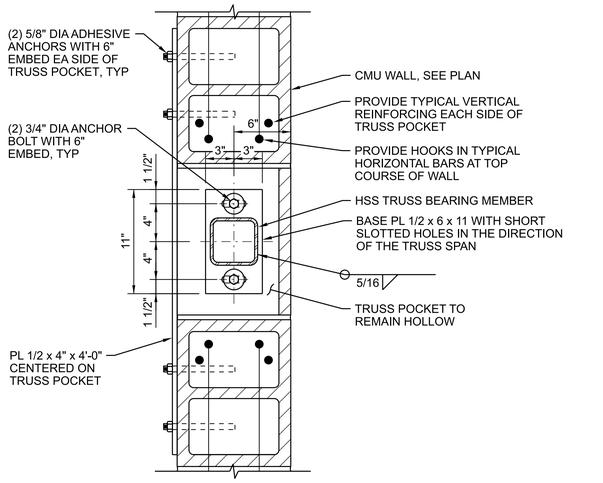
8 OUTRIGGER CONNECTION

20S1040
32S1040

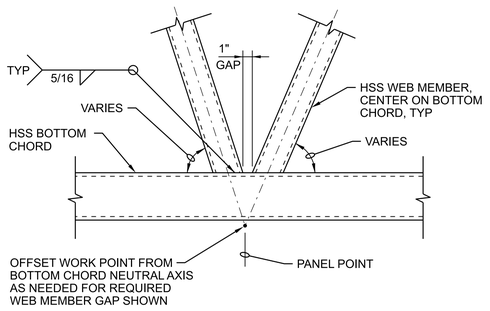
1"=1'-0"

0 1 2 3

1"=1'-0"



SECTION



3 TRUSS END BEARING

20S5010
32S5010

1 1/2"=1'-0"

0 1 2

1 1/2"=1'-0"

6 TRUSS BOTTOM CHORD CONNECTION

20S5010
32S5010

1 1/2"=1'-0"

0 1 2

1 1/2"=1'-0"

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Professional Engineer
81476
WAYNE W. KOHLER
ARIZONA U.S.A.
Date Signed 6/30/25

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: C WEBSTER CADD: B CLEGG TECH. REVIEW: A FIRTH DATE: 06/2025	SUB SHEET NO.: 01S5003	TITLE OF SHEET: GENERAL STRUCTURAL - GENERAL STEEL DETAILS GRAND CANYON, SOUTH RIM	DRAWING NO.: 113 175376 PMIS/PKG NO.: 257282 SHEET: 14 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 16-JUN-2025 PLOT TIME: 14:46 SS6/V8I D3167666 - South Rim4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01S5003_D3167666.dgn

GENERAL ARCHITECTURAL NOTES

1. UNLESS OTHERWISE INDICATED, PLAN DIMENSIONS ARE TO COLUMN GRID ON CENTERLINES, NOMINAL SURFACE OF MASONRY, FACE OF STUDS AND FACE OF CONCRETE WALLS.
2. "FLOOR LINE" REFERS TO TOP OF CONCRETE SLABS. FINISH FLOORING IS INSTALLED ABOVE THE FLOOR LINE. FOR DEPRESSED FLOORS AND CURBS, SEE STRUCTURAL DRAWINGS.
3. REPETITIVE FEATURES ARE NOT DRAWN IN THEIR ENTIRETY AND SHALL BE COMPLETELY PROVIDED AS IF DRAWN IN FULL.
4. WHERE DOOR IS LOCATED NEAR CORNER OF ROOM AND IS NOT LOCATED BY DIMENSION ON PLAN OR DETAILS, DIMENSION SHALL BE 3" FROM FACE OF STUD (WALL) TO FACE OF ROUGH OPENING. DIMENSION SHALL BE 6" FROM FACE OF WALL TO EDGE OF ROUGH OPENING AT CONCRETE WALLS, 8" AT CMU WALLS.
5. AT SOUND INSULATED WALLS, FULL HEIGHT PARTITIONS SHALL BE SEALED BOTH SIDES WITH ACOUSTIC SEALANT; TOP, BOTTOM, INTERSECTION, DOOR FRAMES, GLAZED OPENING FRAMES, AND OTHER PENETRATIONS.
6. LINE OF EXISTING GRADES, AS SHOWN ON THE BUILDING ELEVATIONS AND SECTIONS ARE APPROXIMATE. THEY ARE AT THE BUILDING FACE, OR ON THE SECTION END EXCEPT AS NOTED.
7. VERIFY ALL ROUGH-IN DIMENSIONS FOR EQUIPMENT PROVIDED IN THIS CONTRACT, OR BY OTHERS.
8. REFER TO ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL AND OTHER CATEGORIES OF DRAWINGS FOR ADDITIONAL NOTES.
9. VERIFY SIZE AND LOCATION OF, AND PROVIDE: REQUIRED OPENINGS THROUGH FLOORS AND WALLS, ACCESS DOORS, FURRING, CURBS, ANCHORS AND INSERTS. PROVIDE ALL BASES AND BLOCKING REQUIRED FOR ACCESSORIES, MECHANICAL, ELECTRICAL AND OTHER EQUIPMENT.

ARCHITECTURAL MATERIAL SYMBOLS

SYMBOL	LEGEND
	GRATING, SPAN DIRECTION INDICATED
	CHECKERED PLATE
	GROUT
	WALK OFF MAT
	GRANULAR FILL
	EARTH OR FINISH GRADE
	CONCRETE
	CMU WALL (PLAN)
	CMU WALL (SECTION)
	MASONRY WALL
	RIGID INSULATION
	METAL STUD WALL (PLAN)
	STEEL
	ALUMINUM
	PLYWOOD
	GYPSUM WALLBOARD
	ACOUSTICAL TILE
	WOOD, ROUGH CONTINUOUS
	WOOD, ROUGH NON-CONTINUOUS
	WOOD, FINISHED

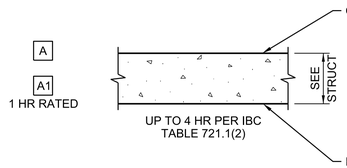
ARCHITECTURAL LEGEND

SYMBOL	LEGEND
A	NEW REFERENCE GRID INDICATOR
ROOM NAME, XX101, "XX" = FACILITY INDICATOR, DOOR LETTER, ROOM NUMBER, XX101A	ROOM IDENTIFIER
	DOOR IDENTIFIER
XXL-1	LOUVER IDENTIFIER
XXW-1	WINDOW IDENTIFIER
A	WALL TYPE INDICATOR
1, XXA3001	EXTERIOR ELEVATION INDICATOR
QUANTITY AND DIRECTION OF POINTERS AS REQUIRED; A, B, D, E, 1, XXA3001	INTERIOR ELEVATION INDICATOR
⊗ 110.50	SPOT ELEVATION INDICATOR
	DIRECTION OF SLOPE DOWN
HINGE SIDE	DOOR/HATCH SWING INDICATOR
ACTIVE, INACTIVE	INDICATES PAIR OF DOORS
F.EXT-X (IN CABINET), F.EXT-X (ON BRACKET)	FIRE EXTINGUISHER: F.EXT-1 MULTIPURPOSE F.EXT-2 CARBON MONOXIDE
	CONTROL JOINT
	EXPANSION JOINT
POST	RAILINGS

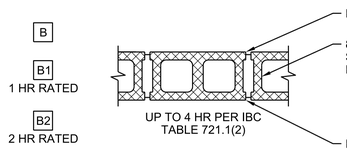
WALL TYPES

1. WALL TYPE A/A1: EXTERIOR FACE OF BASEMENT WALLS, BELOW GRADE, OR WHERE INDICATED ON SECTION, SHALL BE FINISHED WITH FLUID APPLIED WATERPROOFING AND COVERED WITH MINIMUM R-15 OF RIGID INSULATION.
2. SEE SCHEDULES AND DRAWINGS FOR INTERIOR AND EXTERIOR WALL FINISHES.
3. WHERE MORE THAN ONE WALL TYPE IS INDICATED FOR SINGLE LOCATION PLANS, CONSTRUCTION VARIES IN THE HEIGHT OF THE WALL. WALL TYPES ARE SHOWN IN THE ORDER IN WHICH THEY OCCUR, WITH THE LOWEST LOCATED NEAREST THE WALL.
4. ● DENOTES LOCATION OF WALL TYPE INDICATOR ON PLANS.

A / A1 — 1 HR RATED



B / B1 — 1 HR RATED; B2 — 2 HR RATED



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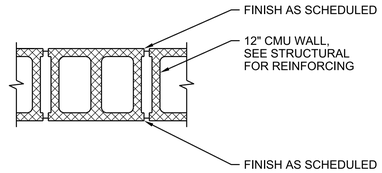

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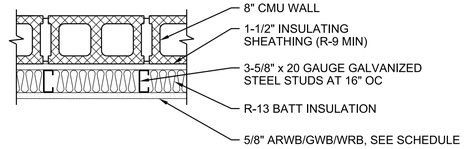

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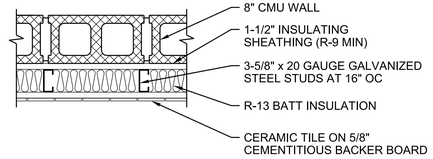

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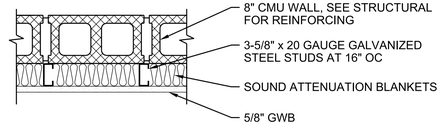

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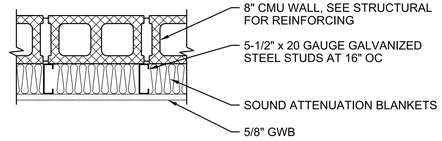

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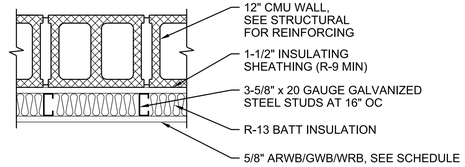

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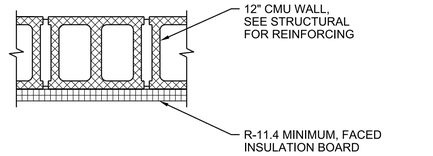
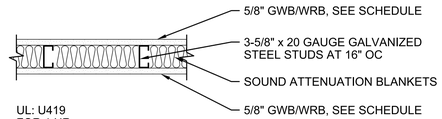


I / I1 — 1 HR RATED



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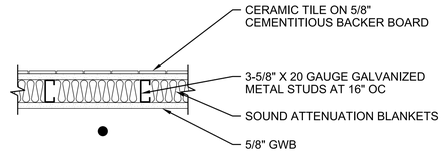

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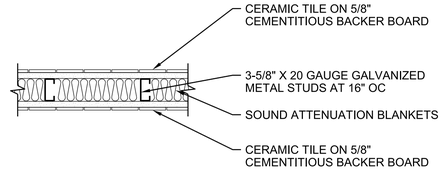

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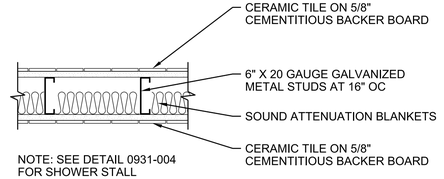
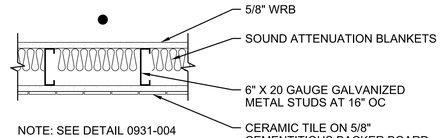


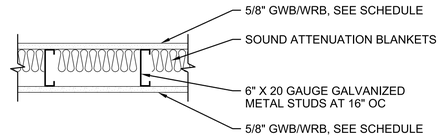
NOTE: SEE DETAIL 0931-004 FOR SHOWER STALL

M



NOTE: SEE DETAIL 0931-004 FOR SHOWER STALL

N



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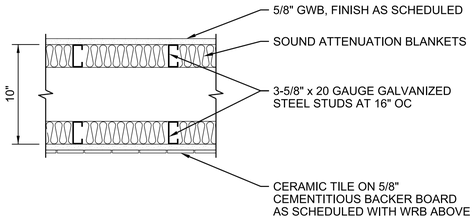
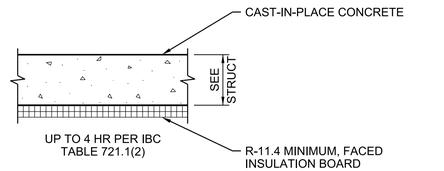


P / P1 — 1 HR RATED



NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

REGISTERED ARCHITECT — 80685 MORGAN SHOEMAKER — Date Signed 06/25/25 — ARIZONA, U.S.A. — Expires 06-30-2027

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	M SHOEMAKER
CADD:	M COLLINS
TECH. REVIEW:	G KIRSTEN
DATE:	06/2025
SUB SHEET NO.	01A0001
TITLE OF SHEET	GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, AND LEGEND GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	15 OF 401

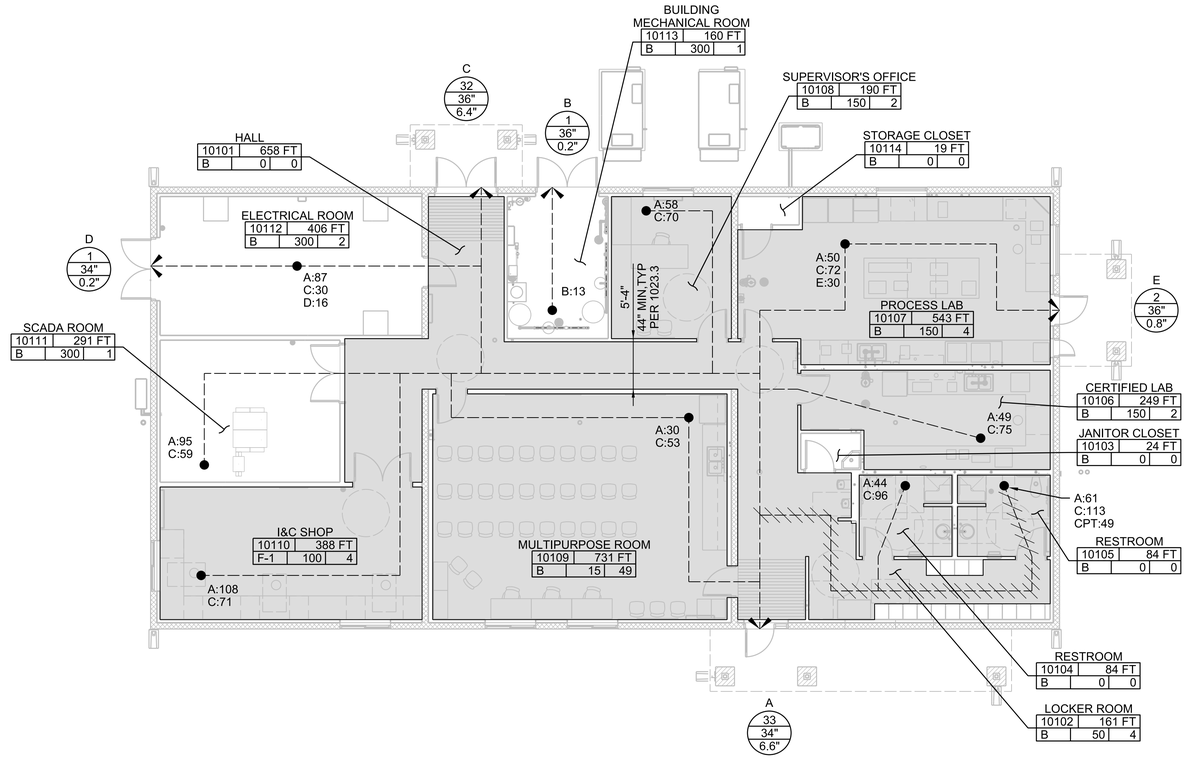
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 6:03:41 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01A0001_D3167666.dgn

CODE DATA TABLE

2021 INTERNATIONAL BUILDING CODE		
FACILITY NAME AND NUMBER: ADMINISTRATION BUILDING **(10)**		
PROJECT DESCRIPTION		
SINGLE-STORY BUILDING WITH CONCRETE FOUNDATION, CMU WALLS AND STANDING-SEAM METAL ROOFING SYSTEM, HOUSING OFFICES, LABORATORIES AND NON-PROCESS SPACES.		
OCCUPANCY GROUP [IBC, SEC. 304.1, 306.2]	**SPACE**	**OCCUPANCY GROUP**
	OFFICES, LABS, AND SUPPORT SPACES	B
	I&C SHOP, SCADA ROOM	F-1
HAZARDOUS MATERIALS		N/A
TYPE	**HAZARD**	**ALLOWABLE STORAGE / ACTUAL STORAGE**
INDOOR STORAGE		
N/A	N/A	CHEMICALS USED IN LAB ARE BELOW EXEMPT AMOUNTS
INCIDENTAL ACCESSORY USE SEPARATIONS		N/A
OCCUPANCY SEPARATION/FIRE RATING: DESIGNED AS NONSEPARATED OCCUPANCIES PER SECTION IBC 508.3		NO OCCUPANCY SEPARATION WALLS
CONSTRUCTION TYPE [IBC, SEC. 602.2]		TYPE II-B
GENERAL BUILDING LIMITATIONS		
MAXIMUM STORIES/HEIGHT ALLOWED [IBC TABLES 504.3 & 504.4]		
	B (NS DESIGNATION)	3 STORIES/ 55 FT
	F-1 (NS DESIGNATION)	2 STORIES/ 55 FT (MOST RESTRICTIVE GOVERNS)
ACTUAL NUMBER OF STORIES/HEIGHT ABOVE GROUND PLANE		
	B (NS DESIGNATION)	1 STORY/ 19 FT 0 IN (TOP OF RIDGE)
	F-1 (NS DESIGNATION)	1 STORY/ 19 FT 0 IN (TOP OF RIDGE)
MAXIMUM AREA ALLOWED PER FLOOR [IBC TABLE 506.2]		
	B (NS DESIGNATION)	23,000 SF
	F-1 (NS DESIGNATION)	15,500 SF (MOST RESTRICTIVE GOVERNS)
ACTUAL AREA PER FLOOR		
	B (NS DESIGNATION)	3,556 SF
	F-1 (NS DESIGNATION)	388 SF
	TOTAL FOR BULDING:	3,944 SF
FIRE RESISTANCE OF BUILDING ELEMENTS [IBC, TABLE 601]		
REQUIRED RATINGS	UNRATED FOR CONSTRUCTION TYPE II-B	
EXTERIOR OPENING PROTECTION [IBC, TABLE 705.5]		
ACTUAL FIRE SEPARATION DISTANCE	ALL SIDE: 10+FT	
REQUIRED WALL RATING	UNRATED WHEN OVER 10 FEET FIRE SEPARATION	
ACTUAL WALL RATING	UNRATED ALL WALLS	
FIRE PROTECTION SYSTEMS [IBC, CHAPTER 9 AND NATIONAL FIRE PROTECTION ASSOCIATION REQUIREMENTS]		
AUTOMATIC SPRINKLER SYSTEMS [IBC SEC 903]		NOT REQUIRED, NOT PROVIDED
ALTERNATIVE AUTOMATIC FIRE EXTINGUISHER SYSTEM [IBC, SEC. 904]		N/A
FIRE EXTINGUISHERS [IBC, SEC 906.1]	HAND HELD, MULTIPURPOSE FIRE EXTINGUISHERS THROUGHOUT BUILDING AT 75 FOOT MAX SPACING	
FIRE ALARM SYSTEM [IBC, CHAPTER 9]		PROVIDED, REFER TO ELECTRICAL DWG'S
MEANS OF EGRESS [IBC. CHAPTER 10]		
OCCUPANT LOAD FACTOR [IBC, TABLE 1004.5]		
	BUSINESS AREAS	FACTOR: 150 SF (GROSS)
	ASSEMBLY - UNCONCENTRATED	FACTOR: 15 SF (NET)
	LOCKER AREA	FACTOR: 50 SF (GROSS)
	ACCESSORY STORAGE/ MECHANICAL EQUIPMENT ROOM	FACTOR: 300 (GROSS)
	INDUSTRIAL AREA	FACTOR: 100 (GROSS)
	B OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
	F-1 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
ALLOWABLE TRAVEL DISTANCE [IBC, TABLE 1017.2]		
	B	200 FEET (NON-SPRINKLERED)
	F-1	200 FEET (NON-SPRINKLERED)
ACTUAL TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
COMMON PATH OF TRAVEL DISTANCE [IBC 1006.2.1]		B = 100 FT (OCCUPANT LOAD OF 30 OR LESS), B = 75 FT (OCCUPANT LOAD OVER 30), F = 75 FT (NON-SPRINKLERED)
ACTUAL COMMON PATH OF TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
EXITS REQUIRED [IBC 1007]	TWO EXITS REQUIRED IF OCC LOAD EXCEEDS 49 OR CPT EXCEEDS 75 FT.	EXITS PROVIDED
GROUND LEVEL	TWO	TWO; SEE LIFE SAFETY PLAN
ACCESSIBILITY	**ARCHITECTURAL BARRIERS ACT ACCESSIBILITY STANDARDS (ABAAS)**	
THE HALL, MULTIPURPOSE ROOM, LOCKER AREA, RESTROOMS, LABS, SUPERVISOR'S OFFICE AND I&C SHOP WILL BE ACCESSIBLE, SEE LIFE SAFETY PLAN.		
ENERGY CODE	**2021 INTERNATIONAL ENERGY CONSERVATION CODE, TABLE C402.1.3**	
ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 5B (COCONINO COUNTY)		
ELEMENT	(PRESCRIPTIVE METHOD)	PROPOSED DESIGN
ROOF (INSULATION ENTIRELY ABOVE)	MIN R-VALUE OF 30 CONTINUOUS INSULATION	R-35 CONTINUOUS INSULATION
WALLS (MASS)	MIN R-VALUE OF 11.4 CONTINUOUS INSULATION (MIN U-0.090)	R-9 CONTINUOUS INSULATION AND R-13 BATT INSULATION (U-0.061 PER COMCHECK)
FLOOR (SLAB ON GRADE-UNHEATED)	MIN R-VALUE OF 15 FOR 24" BELOW GRADE	R-15 FOR 24" BELOW GRADE
EXTERIOR DOORS (SWINGING)	MAX U-FACTOR OF 0.37	R-2.7
VERICAL FENESTRATION (FIXED)	MAX U-FACTOR OF 0.34, MAX SHGC OF 0.61 AND MIN VT OF 0.42	U-0.24, SHGC 0.42, AND VT OF 0.40
VERTICAL FENESTRATION (OPERABLE)	MAX U-FACTOR OF 0.45, MAX SHGC OF 0.53 AND MIN VT OF 0.37	U-0.24, SHGC 0.42, AND VT OF 0.40
VERTICAL FENESTRATION (GLAZED DOORS)	MAX U-FACTOR OF 0.63, MAX SHGC OF 0.53 AND MIN VT OF 0.37	U-0.36, SHGC 0.23, AND VT OF 0.40
AIR BARRIER	REQUIRED	PROVIDED
PLUMBING FIXTURES	**2024 INTERNATIONAL BUILDING CODE CHAPTER 29**	
OCCUPANT LOAD PER LIFE SAFETY PLAN = 69 OCCUPANTS		
REQUIRED: ONE WATER CLOSET FOR MALE, ONE WATER CLOSET FOR FEMALE, ONE LAV, ONE DRINKING FOUNTAIN, ONE SERVICE SINK, ZERO SHOWERS.		
PROVIDED: 1 WATER CLOSET, 1 LAV, 1 SHOWER FOR FEMALE, 1 WATER CLOSETS, 1 LAV, 1 SHOWER FOR MALE, 1 SERVICE SINK, 1 DRINKING FOUNTAIN, ONE KITCHEN SINK, TWO LAB SINKS.		



LIFE SAFETY PLAN - FACILITY 10 ADMINISTRATION BUILDING

1/8"=1'-0"

0 8 16 24

1/8"=1'-0"

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

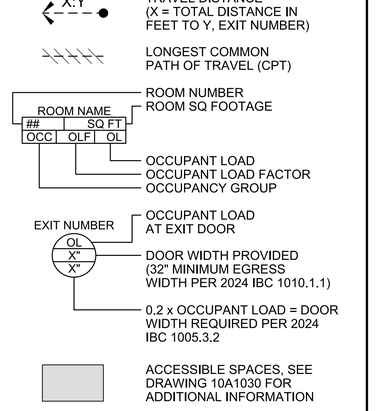
GENERAL SHEET NOTES

A. FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND AND ABBREVIATIONS, SEE DRAWING 01A0001.

B. FOR ABBREVIATIONS, SEE DRAWING 01G0005.

C. FOR FIRE EXTINGUISHER LOCATIONS. SEE DRAWING 10A1030.

LIFE SAFETY PLAN LEGEND



REGISTERED ARCHITECT
CERTIFICATE
80680
MORGAN SHOEMAKER
Do Not Signature
ARIZONA, U.S.A.
Expires 06-30-2027

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: M SHOEMAKER	SUB SHEET NO. 01A0010	TITLE OF SHEET: ARCHITECTURAL CODE DATA AND LIFE SAFETY PLAN ADMINISTRATION BUILDING; GRAND CANYON, SOUTH RIM	DRAWING NO. 113 / 175376
	CADD: M COLLINS			PMIS/PKG NO. 257282
	TECH. REVIEW: G KIRSTEN			SHEET 16 OF 401
	DATE: 06/2025			

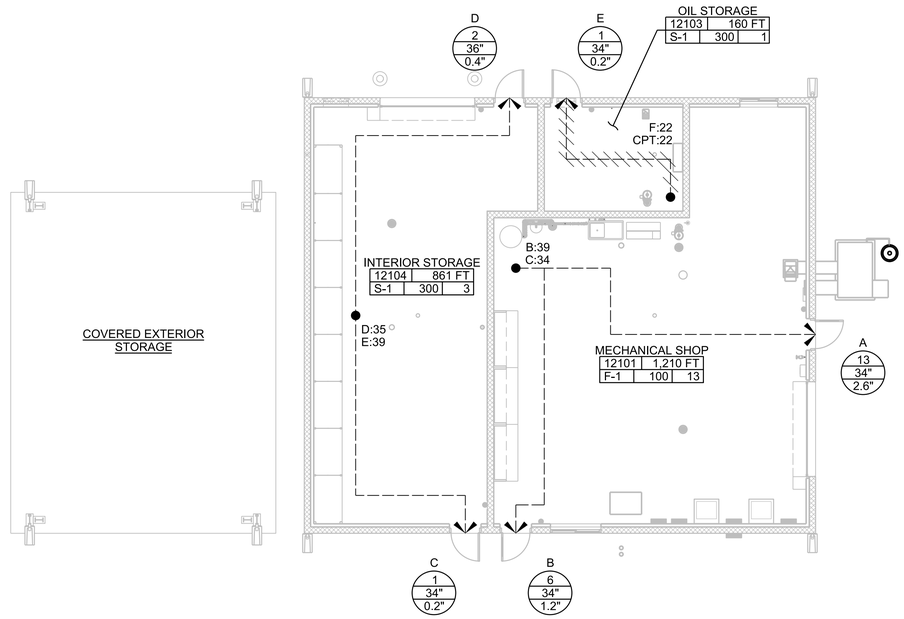
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 6:04:01 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01A0010_D3167666.dgn

CODE DATA TABLE

2024 INTERNATIONAL BUILDING CODE		
FACILITY NAME AND NUMBER: MAINTENANCE BUILDING **(12)**		
PROJECT DESCRIPTION		
SINGLE-STORY BUILDING WITH CONCRETE FOUNDATION, CMU WALLS AND STANDING-SEAM METAL ROOFING SYSTEM, HOUSING A SHOP, AND STORAGE SPACES.		
OCCUPANCY GROUP [IBC, SEC. 306.2, 311.2]	**SPACE**	**OCCUPANCY GROUP**
	SHOP	F-1
	INTERIOR STORAGE	S-1
HAZARDOUS MATERIALS		
TYPE	**HAZARD**	**ALLOWABLE STORAGE / ACTUAL STORAGE**
INDOOR STORAGE		
OILS AND GREASES	FLAMMABLE LIQUID	120 GALLONS/QUANTITIES BELOW MAXIMUM ALLOWABLE WITHOUT TRIGGERING H OCCUPANCY
OUTDOOR STORAGE		
N/A	N/A	N/A
INCIDENTAL ACCESSORY USE SEPARATIONS		N/A
OCCUPANCY SEPARATION/FIRE RATING: DESIGNED AS NONSEPARATED OCCUPANCIES PER SECTION IBC 508.3		F-1 TO S-1 = 0 HR, NO OCCUPANCY SEPARATION WALLS
CONSTRUCTION TYPE [IBC, SEC. 602.2]		TYPE II-B
GENERAL BUILDING LIMITATIONS		
MAXIMUM STORIES/HEIGHT ALLOWED [IBC TABLES 504.3 & 504.4]		
	F-1 (NS DESIGNATION)	2 STORIES/ 55 FT
	S-1 (NS DESIGNATION)	2 STORIES/ 55 FT
ACTUAL NUMBER OF STORIES/HEIGHT ABOVE GROUND PLANE		
	F-1 (NS DESIGNATION)	1 STORY/ 17 FT 3 IN (TOP OF RIDGE)
	S-1 (NS DESIGNATION)	1 STORY/ 17 FT 3 IN (TOP OF RIDGE)
MAXIMUM AREA ALLOWED PER FLOOR [IBC TABLE 506.2]		
	F-1 (NS DESIGNATION)	15,500 SF (MOST RESTRICTIVE GOVERNS)
	S-1 (NS DESIGNATION)	17,500 SF
ACTUAL AREA PER FLOOR		
	F-1 (NS DESIGNATION)	1,178 SF
	S-1 (NS DESIGNATION)	2,029 SF
	TOTAL FOR BUILDING:	3,029 SF (DOES NOT INCLUDE WEATHER PROTECTED EXTERIOR STORAGE)
FIRE RESISTANCE OF BUILDING ELEMENTS [IBC, TABLE 601]		
REQUIRED RATINGS	UNRATED FOR CONSTRUCTION TYPE II-B	
EXTERIOR OPENING PROTECTION [IBC, TABLE 705.5]		
ACTUAL FIRE SEPARATION DISTANCE	ALL SIDES: 30+FT	
REQUIRED WALL RATING	UNRATED WHEN OVER 10 FEET FIRE SEPARATION	
ACTUAL WALL RATING	ALL WALLS: UNRATED	
FIRE PROTECTION SYSTEMS [IBC, CHAPTER 9 AND NATIONAL FIRE PROTECTION ASSOCIATION REQUIREMENTS]		
AUTOMATIC SPRINKLER SYSTEMS [IBC SEC 903]		NOT REQUIRED, NOT PROVIDED
ALTERNATIVE AUTOMATIC FIRE EXTINGUISHER SYSTEM [IBC, SEC. 904]		N/A
FIRE EXTINGUISHERS [IBC, SEC 906.1]	HAND HELD, MULTIPURPOSE FIRE EXTINGUISHERS THROUGHOUT BUILDING AT 75 FOOT MAX SPACING	
FIRE ALARM SYSTEM [IBC, CHAPTER 9]		PROVIDED, REFER TO ELECTRICAL DWG'S
MEANS OF EGRESS [IBC, CHAPTER 10]		
OCCUPANT LOAD FACTOR [IBC, TABLE 1004.5]		
	ACCESSORY STORAGE/ MECHANICAL EQUIPMENT ROOM	FACTOR: 300 (GROSS)
	INDUSTRIAL AREA	FACTOR: 100 (GROSS)
	F-1 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
	S-1 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
ALLOWABLE TRAVEL DISTANCE [IBC, TABLE 1017.2]		
	F-1	200 FEET (NON-SPRINKLERED)
	S-1	200 FEET (NON-SPRINKLERED)
ACTUAL TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
COMMON PATH OF TRAVEL DISTANCE [IBC 1006.2.1]		F-1 = 75 FT, S-1 = 75 FT (NON-SPRINKLERED)
ACTUAL COMMON PATH OF TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
EXITS REQUIRED [IBC 1015.1]	TWO EXITS REQUIRED IF OCC LOAD EXCEEDS 49 OR CPT EXCEEDS 75 FT.	EXITS PROVIDED
GROUND LEVEL	FOUR	FIVE; SEE LIFE SAFETY PLAN
ACCESSIBILITY	**ARCHITECTURAL BARRIERS ACT (ABA)**	
SHOP SPACES IS FOR SERVICE PERSONNEL FOR EQUIPMENT REPAIR AND, STORAGE SPACES ARE FOR MACHINERY AND PART STORAGE AND EXEMPT PER ABA F203.5.		
ENERGY CODE	**2021 INTERNATIONAL ENERGY CONSERVATION CODE, TABLE C402.1.3**	
ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 5B (COCONINO COUNTY)		
ELEMENT	(PRESCRIPTIVE METHOD)	PROPOSED DESIGN
ROOF (INSULATION ENTIRELY ABOVE)	MIN R-30 CI	R-36 CONTINUOUS INSULATION
WALLS (MASS)	MIN R-11.4 CI(MIN U-0.090)	R-9 CONTINUOUS INSULATION AND R-13 BATT INSULATION (U-0.090 PER COMCHECK)
FLOOR (SLAB ON GRADE- UNHEATED)	MIN R-15 FOR 24" BELOW GRADE	R-15 FOR 24" BELOW GRADE
EXTERIOR DOORS (SWINGING)	MAX U-FACTOR OF 0.37	R-2.7
EXTERIOR DOORS (NON-SWINGING)	MAX U-FACTOR OF 0.31	R-2.7
AIR BARRIER	REQUIRED	PROVIDED
PLUMBING FIXTURES	**2024 INTERNATIONAL BUILDING CODE CHAPTER 29**	
OCCUPANT LOAD PER LIFE SAFETY PLAN = 15 OCCUPANTS		
REQUIRED: FOR MALE ONE WATER CLOSET AND ONE LAV, FOR FEMALE ONE WATER CLOSET AND ONE LAV, ONE SERVICE SINK (COUNT IS FACILITY AVERAGE).		
PROVIDED: ONE UTILITY SINK, PROVIDED AT THE ADMINISTRATION BUILDING: WATER CLOSETS, LAVS, AND DRINKING FOUNTAIN , A WAIVER IS REQUIRED FOR THE REDUCTION IN TOTAL PROJECT PLUMBING COUNT.		



N

LIFE SAFETY PLAN - FACILITY 12 MAINTENANCE BUILDING

1/8"=1'-0"

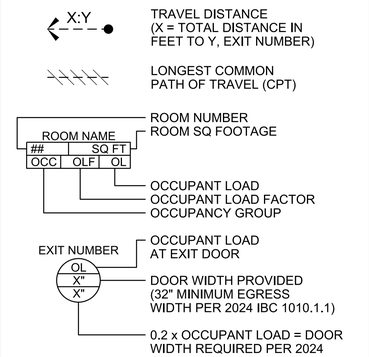
GENERAL SHEET NOTES

A. FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND, ABBREVIATIONS AND WALL TYPES, SEE DRAWING 01A0001.

B. FOR ABBREVIATIONS, SEE DRAWING 01G0005.

C. FOR FIRE EXTINGUISHER LOCATIONS, SEE DRAWING 12A1030.

LIFE SAFETY PLAN LEGEND



0 8 16 24

1/8"=1'-0"

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

REGISTERED ARCHITECT MORGAN SHOEMAKER Date Signed 06-30-25 ARIZONA, U.S.A.

Expires 06-30-2027

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: M SHOEMAKER	SUB SHEET NO.	TITLE OF SHEET: ARCHITECTURAL CODE DATA AND LIFE SAFETY PLAN MAINTENANCE BUILDING, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376	
	CADD: M COLLINS	01A0012		PMIS/PKG NO. 257282	
	TECH. REVIEW: G KIRSTEN			SHEET 17 OF 401	
	DATE: 06/2025				

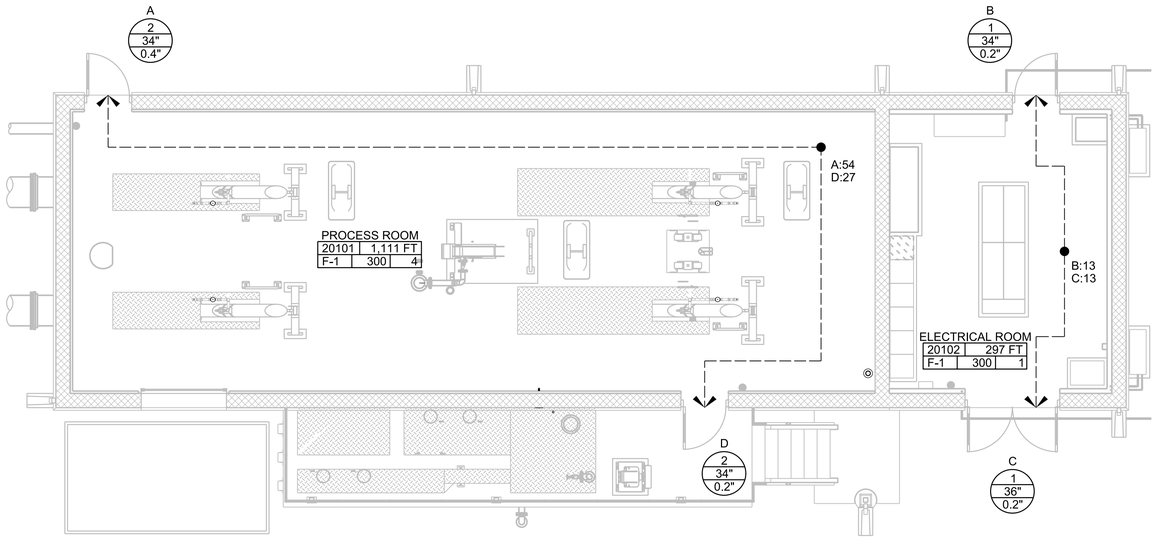
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 6:03:27 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01A0012_D3167666.dgn

CODE DATA TABLE

2024 INTERNATIONAL BUILDING CODE		
FACILITY NAME AND NUMBER: HEADWORKS **(20)**		
PROJECT DESCRIPTION		
SINGLE-STORY BUILDING WITH CONCRETE FOUNDATION, CMU WALLS AND STANDING-SEAM METAL ROOFING SYSTEM, HOUSING HEADWORKS AND ELECTRICAL SPACES.		
OCCUPANCY GROUP [IBC, SEC. 306.2]	**SPACE** HEADWORKS, ELECTRICAL	**OCCUPANCY GROUP** F-1
HAZARDOUS MATERIALS		
TYPE	**HAZARD**	**ALLOWABLE STORAGE / ACTUAL STORAGE**
INDOOR STORAGE		
N/A	N/A	NO CHEMICALS USED IN HEADWORKS
INCIDENTAL ACCESSORY USE SEPARATIONS		N/A
OCCUPANCY SEPARATION/FIRE RATING:		N/A
CONSTRUCTION TYPE [IBC, SEC. 602.2]		TYPE II-B
GENERAL BUILDING LIMITATIONS		
MAXIMUM STORIES/HEIGHT ALLOWED [IBC TABLES 504.3 & 504.4]		
	F-1 (NS DESIGNATION)	2 STORIES/ 55 FT
ACTUAL NUMBER OF STORIES/HEIGHT ABOVE GROUND PLANE		
	F-1 (NS DESIGNATION)	1 STORY/ 29 FT 1 IN (TOP OF RIDGE)
MAXIMUM AREA ALLOWED PER FLOOR [IBC TABLE 506.2]		
	F-1 (NS DESIGNATION)	15,500 SF
ACTUAL AREA PER FLOOR		
	F-1 (NS DESIGNATION)	1,408 SF
	TOTAL FOR BUILDING:	1,408 SF
FIRE RESISTANCE OF BUILDING ELEMENTS [IBC, TABLE 601]		
REQUIRED RATINGS	UNRATED FOR CONSTRUCTION TYPE II-B	
EXTERIOR OPENING PROTECTION [IBC, TABLE 705.5]		
ACTUAL FIRE SEPARATION DISTANCE	ALL SIDES: 10+FT	
REQUIRED WALL RATING	UNRATED WHEN OVER 10 FEET FIRE SEPARATION	
ACTUAL WALL RATING	ALL WALLS UNRATED	
FIRE PROTECTION SYSTEMS [IBC, CHAPTER 9 AND NATIONAL FIRE PROTECTION ASSOCIATION REQUIREMENTS]		
AUTOMATIC SPRINKLER SYSTEMS [IBC SEC 903]		NOT REQUIRED, NOT PROVIDED
ALTERNATIVE AUTOMATIC FIRE EXTINGUISHER SYSTEM [IBC, SEC. 904]		N/A
FIRE EXTINGUISHERS [IBC, SEC 906.1]	HAND HELD, MULTIPURPOSE FIRE EXTINGUISHERS THROUGHOUT BUILDING AT 75 FOOT MAX SPACING	
FIRE ALARM SYSTEM [IBC, CHAPTER 9]		PROVIDED, REFER TO ELECTRICAL DWG'S
MEANS OF EGRESS [IBC, CHAPTER 10]		
OCCUPANT LOAD FACTOR [IBC, TABLE 1004.5]		
	MECHANICAL EQUIPMENT ROOM	FACTOR: 300 (GROSS)
	F-1 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
ALLOWABLE TRAVEL DISTANCE [IBC, TABLE 1017.2]		
	F-1	200 FEET (NON-SPRINKLERED)
ACTUAL TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
COMMON PATH OF TRAVEL DISTANCE [IBC 1006.2.1]		F-1 = 75 FT (NON-SPRINKLERED)
ACTUAL COMMON PATH OF TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
EXITS REQUIRED [IBC 1015.1]	TWO EXITS REQUIRED IF OCC LOAD EXCEEDS 49 OR CPT EXCEEDS 75 FT.	EXITS PROVIDED
GROUND LEVEL	THREE	FOUR; SEE LIFE SAFETY PLAN
ACCESSIBILITY	**ARCHITECTURAL BARRIERS ACT (ABA)**	
NOT REQUIRED TO BE ACCESSIBLE PER ABA F203.5 MACHINERY SPACES		
ENERGY CODE	**2021 INTERNATIONAL ENERGY CONSERVATION CODE, TABLE C402.1.3**	
ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 5B (COCONINO COUNTY)		
ELEMENT	(PRESCRIPTIVE METHOD)	PROPOSED DESIGN
ROOF (INSULATION ENTIRELY	MIN R-30 CI	R-35 CONTINUOUS INSULATION
WALLS (MASS)	MIN R-11.4 CI (MIN U-0.090)	R-11.4 CONTINUOUS INSULATION; R-9 CONTINUOUS INSULATION AND R-13 BATT INSULATION (U-0.060 PER COMCHECK)
FLOOR (SLAB ON GRADE-UNHEATED)	MIN R-15 FOR 24" BELOW GRADE	R-15 FOR 24" BELOW GRADE
EXTERIOR DOORS (SWINGING)	MAX U-FACTOR OF 0.37	R-2.7
AIR BARRIER	REQUIRED	PROVIDED
PLUMBING FIXTURES	**2024 INTERNATIONAL BUILDING CODE CHAPTER 29**	
OCCUPANT LOAD FACTOR FOR F-1 IS 1:300 (MECHANICAL EQUIPMENT ROOM). PLUMBING OCCUPANT LOAD = 5		
REQUIRED: FOR MALE ONE WATER CLOSET AND ONE LAV, FOR FEMALE ONE WATER CLOSET AND ONE LAV, ONE DRINKING FOUNTAIN, ONE SERVICE SINK		
PROVIDED: WATER CLOSETS, LAVS, AND DRINKING FOUNTAIN ARE PROVIDED AT THE ADMINISTRATION BUILDING, A WAIVER IS REQUIRED FOR THE REDUCTION IN TOTAL PROJECT PLUMBING COUNT.		



LIFE SAFETY PLAN - FACILITY 20 HEADWORKS

3/16"=1'-0"

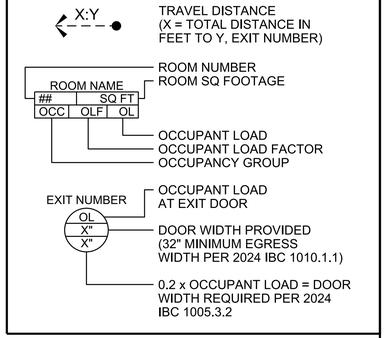
GENERAL SHEET NOTES

A. FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND, ABBREVIATIONS AND WALL TYPES, SEE DRAWING 01A0001.

B. FOR ABBREVIATIONS, SEE DRAWING 01G0005.

C. FOR FIRE EXTINGUISHER LOCATIONS, SEE DRAWING 20A1030.

LIFE SAFETY PLAN LEGEND



0 4 8 16
3/16"=1'-0"

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

REGISTERED ARCHITECT
BRIAN MORGAN SHOEMAKER
Date Signed
ARIZONA, U.S.A.
Expires 06-30-2027

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: M SHOEMAKER	SUB SHEET NO. 01A0020	TITLE OF SHEET: ARCHITECTURAL CODE DATA AND LIFE SAFETY PLAN HEADWORKS, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376
	CADD: M COLLINS			PMIS/PKG NO. 257282
	TECH. REVIEW: G KIRSTEN			SHEET 18 OF 401
	DATE: 06/2025			

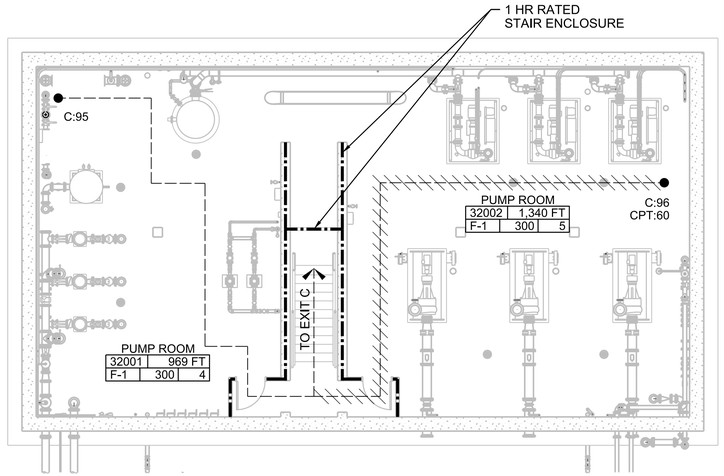
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

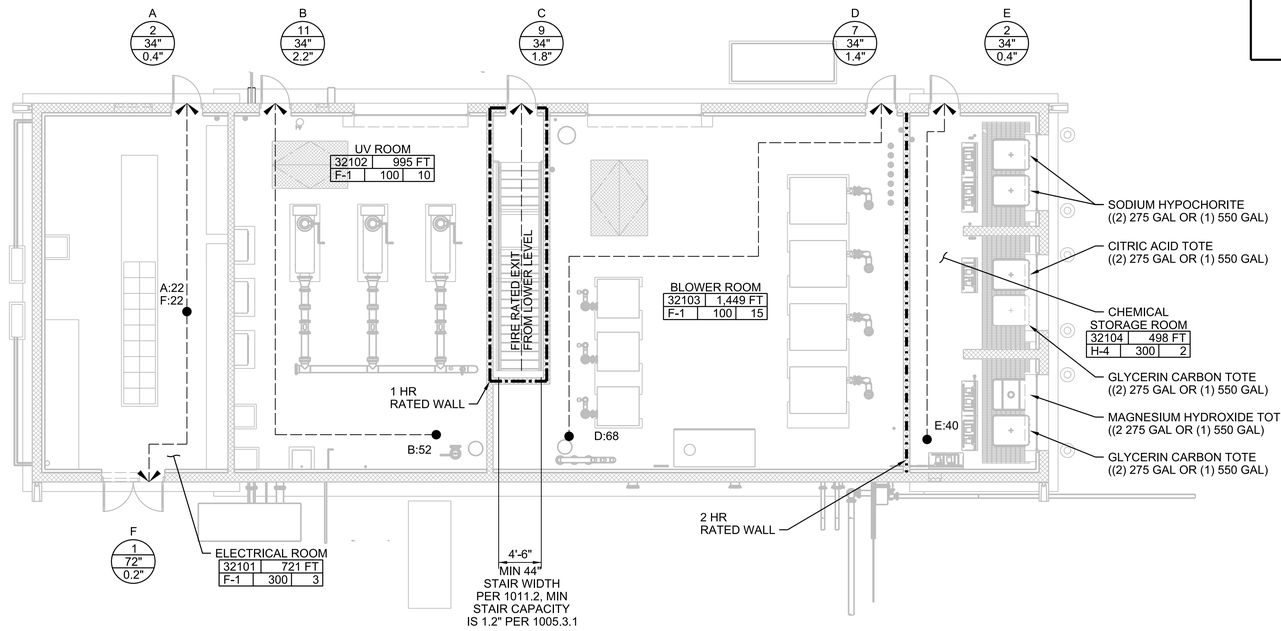
PLOT DATE: 6/16/2025 PLOT TIME: 6:10:12 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01A0020_D3167666.dgn

CODE DATA TABLE

2024 INTERNATIONAL BUILDING CODE		
FACILITY NAME AND NUMBER: PROCESS BUILDING **(32)**		
PROJECT DESCRIPTION		
SINGLE-STORY BUILDING WITH A BASEMENT, CONCRETE FOUNDATION, CMU WALLS AND STANDING SEAM METAL ROOFING SYSTEM, HOUSING PROCESS SPACES.		
	SPACE	**OCCUPANCY GROUP**
OCCUPANCY GROUP [IBC, SEC. 306.2, 307.6]	HAZARDOUS STORAGE	H-4
	UV, MEMBRANE, AND ELECTRICAL ROOM	F-1
HAZARDOUS MATERIALS		
TYPE	**HAZARD**	**ALLOWABLE STORAGE / ACTUAL STORAGE**
INDOOR STORAGE		
CITRIC ACID (50%)	IRRITANT	NOT LIMITED/ 550 GAL
GLYCERIN CARBON (70%)	IRRITANT	NOT LIMITED/ 1,100 GAL
MAGNESIUM HYDROXIDE (53%)	IRRITANT	NOT LIMITED/ 550 GAL
SODIUM HYPOCHLORITE (12%)	CORROSIVE	500/ 1,100 GAL
OUTDOOR STORAGE		
NONE	N/A	N/A
INCIDENTAL ACCESSORY USE SEPARATIONS		N/A
OCCUPANCY SEPARATION/FIRE RATING: DESIGNED AS SEPARATED OCCUPANCIES PER SECTION IBC 508.3		2 HOUR SEPARATION WALLS BETWEEN H-4 AND F-1 OCCUPANCIES
CONSTRUCTION TYPE [IBC, SEC. 602.2]		TYPE II-B
GENERAL BUILDING LIMITATIONS		
MAXIMUM STORIES/HEIGHT ALLOWED [IBC TABLES 504.3 & 504.4]		
	H-4 (S DESIGNATION)	4 STORIES/ 75 FT
	F-1 (NS DESIGNATION)	2 STORIES/ 55 FT (MOST RESTRICTIVE)
ACTUAL NUMBER OF STORIES/HEIGHT ABOVE GROUND PLANE		
	H-4 (NS DESIGNATION)	1 STORY/ 26 FT 2 IN (TOP OF RIDGE)
	F-1 (NS DESIGNATION)	1 STORY/ 26 FT 2 IN (TOP OF RIDGE)
MAXIMUM AREA ALLOWED PER FLOOR [IBC TABLE 506.2]		
	H-4 (S1 DESIGNATION)	70,000 SF
	F-1 (NS DESIGNATION)	15,500 SF (MOST RESTRICTIVE)
ACTUAL AREA PER FLOOR		
	H-4 (S DESIGNATION)	498 SF
	F-1 (NS DESIGNATION)	5,474 SF
	TOTAL FOR BUILDING:	5,972 SF
FIRE RESISTANCE OF BUILDING ELEMENTS [IBC, TABLE 601]		
REQUIRED RATINGS	UNRATED FOR CONSTRUCTION TYPE II-B	
EXTERIOR OPENING PROTECTION [IBC, TABLE 705.5]		
ACTUAL FIRE SEPARATION DISTANCE	ALL SIDES: 15+FT	
REQUIRED WALL RATING	UNRATED WHEN OVER 10 FEET FIRE SEPARATION	
ACTUAL WALL RATING	UNRATED FOR ALL WALLS	
FIRE PROTECTION SYSTEMS [IBC, CHAPTER 9 AND NATIONAL FIRE PROTECTION ASSOCIATION REQUIREMENTS]		
AUTOMATIC SPRINKLER SYSTEMS [IBC SEC 903]		REQUIRED AT BASEMENT AND H-4 OCCUPANCY, ALTERNATIVE PROVIDED
ALTERNATIVE AUTOMATIC FIRE EXTINGUISHER SYSTEM [IBC, SEC. 904]		DRY CHEMICAL SUPPRESSION
FIRE EXTINGUISHERS [IBC, SEC 906.1]	HAND HELD, MULTIPURPOSE FIRE EXTINGUISHERS THROUGHOUT BUILDING AT 75 FOOT MAX SPACING	
FIRE ALARM SYSTEM [IBC, CHAPTER 9]		PROVIDED, REFER TO ELECTRICAL DWG'S
MEANS OF EGRESS [IBC, CHAPTER 10]		
OCCUPANT LOAD FACTOR [IBC, TABLE 1004.5]		
	ACCESSORY STORAGE/ MECHANICAL EQUIPMENT ROOM	FACTOR: 300 (GROSS)
	INDUSTRIAL AREA:	FACTOR: 100 (GROSS)
	H-4 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
	F-1 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
ALLOWABLE TRAVEL DISTANCE [IBC, TABLE 1017.2]		
	H-4	175 FEET (SPRINKLERED)
	F-1	200 FEET (NON-SPRINKLERED)
ACTUAL TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
COMMON PATH OF TRAVEL DISTANCE [IBC 1006.2.1]		H-4 = 75 FT (SPRINKLERED), F-1 = 75 FT (NON-SPRINKLERED)
ACTUAL COMMON PATH OF TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
INTERIOR EXIT STAIRWAY [IBC 1023.7	WHERE FIRE RATED INTERIOR EXIT STAIRWAY IS PROVIDED, THAT PATH OF TRAVEL ENDS AT THE FIRE RATED DOOR AND RESTARTS IN THE STAIRWAY	
EXITS REQUIRED [IBC 1015.1]	TWO EXITS REQUIRED IF OCC LOAD EXCEEDS 49 OR CPT EXCEEDS 75 FT.	EXITS PROVIDED
GROUND LEVEL	SIX	SEVEN; SEE LIFE SAFETY PLAN
ACCESSIBILITY	**ARCHITECTURAL BARRIERS ACT (ABA)**	
NOT REQUIRED AT EQUIPMENT SPACE PER ABA F203.5 MACHINERY SPACES		
ENERGY CODE	**2021 INTERNATIONAL ENERGY CONSERVATION CODE, TABLE C402.1.3**	
ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 5B (COCONINO COUNTY)		
ELEMENT	(PRESCRIPTIVE METHOD)	PROPOSED DESIGN
ROOF (INSULATION ENTIRELY ABOVE)	MIN R-30 CI	R-36 CONTINUOUS INSULATION
WALLS (MASS)	MIN R-11.4 CI (MIN U-0.090)	R-9 CONTINUOUS INSULATION AND R-13 BATT INSULATION (U-0.060 PER COMCHECK)
FLOOR (SLAB ON GRADE- UNHEATED)	MIN R-15 FOR 24" BELOW GRADE	R-15 FOR 24" BELOW GRADE
EXTERIOR DOORS (SWINGING)	MAX U-FACTOR OF 0.37	R-2.7
EXTERIOR DOORS (NON-SWINGING)	MAX U-FACTOR OF 0.31	R-2.7
AIR BARRIER	REQUIRED	PROVIDED
PLUMBING FIXTURES	**2024 INTERNATIONAL BUILDING CODE CHAPTER 29**	
OCCUPANT LOAD FACTOR FOR H-4 IS 1:100. PLUMBING OCCUPANT LOAD = 588/100 = 5.88 (6)		
OCCUPANT LOAD FACTOR FOR F-1 IS 1:300 (MECHANICAL EQUIPMENT ROOM). PLUMBING OCCUPANT LOAD = 4,136/300 = 13.79 (14)		
OCCUPANT LOAD FACTOR FOR F-1 IS 1:100. PLUMBING OCCUPANT LOAD = 726/100 = 7.26 (8)		
REQUIRED: FOR MALE ONE WATER CLOSET AND ONE LAV, FOR FEMALE ONE WATER CLOSET AND ONE LAV, ONE DRINKING FOUNTAIN, ONE SERVICE SINK (COUNT IS FACILITY AVERAGE).		
PROVIDED: ONE SERVICE SINK. WATER CLOSETS, LAVS, AND DRINKING FOUNTAIN ARE PROVIDED AT THE ADMINISTRATION BUILDING, A WAIVER IS REQUIRED FOR THE REDUCTION IN TOTAL PROJECT PLUMBING COUNT.		



LIFE SAFETY PLAN - LOWER LEVEL
FACILITY 32 - PROCESS BUILDING
1/8"=1'-0"



LIFE SAFETY PLAN - MAIN LEVEL
FACILITY 32 - PROCESS BUILDING
1/8"=1'-0"

0 8 16 24
1/8"=1'-0"

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

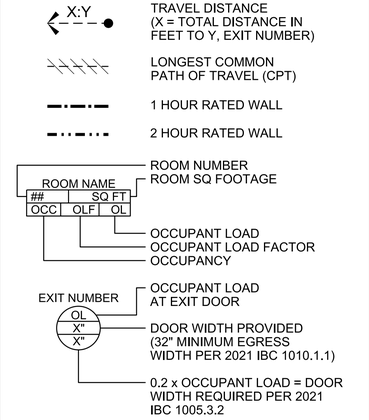
GENERAL SHEET NOTES

A. FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND, ABBREVIATIONS AND WALL TYPES, SEE DRAWING 01A0001.

B. FOR ABBREVIATIONS, SEE DRAWING 01G0005.

C. FOR FIRE EXTINGUISHER LOCATIONS, SEE DRAWING 32A1030.

LIFE SAFETY PLAN LEGEND



A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: M SHOEMAKER CADD: M COLLINS TECH. REVIEW: G KIRSTEN DATE: 06/2025	SUB SHEET NO.: 01A0032	TITLE OF SHEET: ARCHITECTURAL CODE DATA AND LIFE SAFETY PLANS PROCESS BUILDING GRAND CANYON, SOUTH RIM	DRAWING NO.: 113 175376 PMIS/PKG NO.: 257282 SHEET: 19 OF 401

REGISTERED ARCHITECT — 80681 — MORGAN SHOEMAKER — Do not Signature — ARIZONA, U.S.A. — Expires 06-30-2027

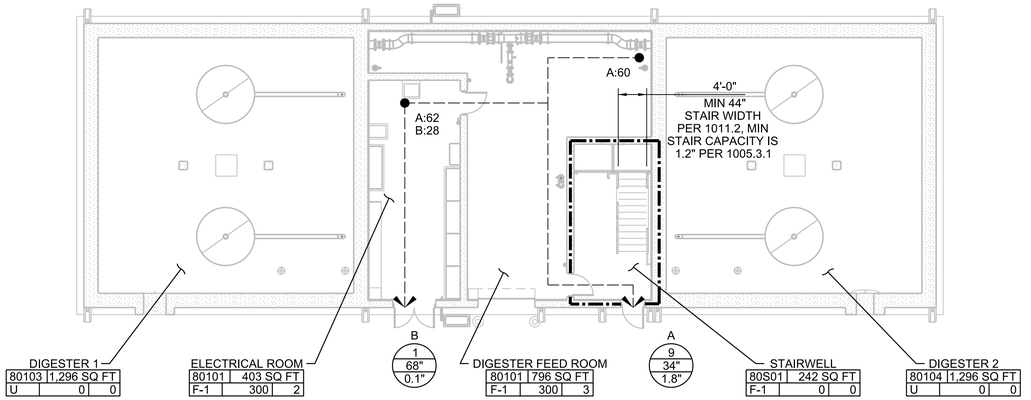
GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 6:03:48 PM D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01A0032_D3167666.dgn SS6/V8i

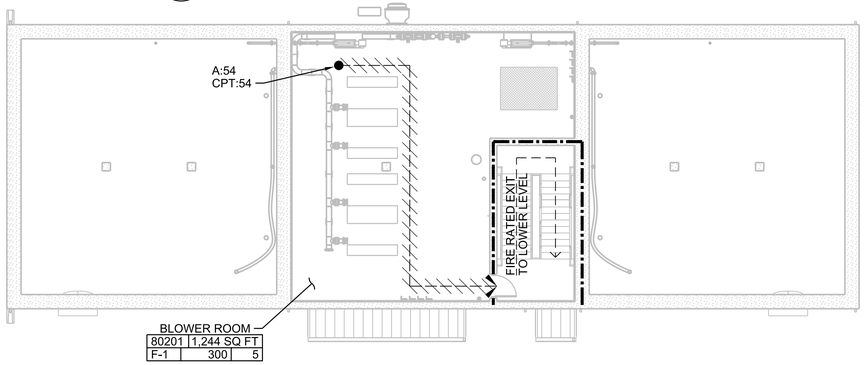
BUILDING CODE DATA TABLE

2024 INTERNATIONAL BUILDING CODE		
FACILITY NAME AND NUMBER: DIGESTER FACILITY **(80)**		
PROJECT DESCRIPTION		
TWO-STORY BUILDING WITH CONCRETE FOUNDATION, CONCRETE WALLS AND SINGLE-PLY MEMBRANE ROOFING SYSTEM, HOUSING DIGESTER FEED ROOM AND BLOWER ROOM SPACES.		
OCCUPANCY GROUP [IBC, SEC. 306.1, 312.1]	**SPACE**	**OCCUPANCY GROUP**
	PROCESS/ INDUSTRIAL	F-1
	DIGESTER	U
HAZARDOUS MATERIALS		
TYPE	**HAZARD**	**ALLOWABLE STORAGE / ACTUAL STORAGE**
INDOOR STORAGE		
N/A	N/A	N/A
INCIDENTAL ACCESSORY USE SEPARATIONS		N/A
OCCUPANCY SEPARATION/FIRE RATING (TABLE 508.4):		REQUIRED: 2 HR/ PROVIDED: 4+ HR
CONSTRUCTION TYPE [IBC, SEC. 602.2]		TYPE II-B
GENERAL BUILDING LIMITATIONS		
MAXIMUM STORIES/HEIGHT ALLOWED [IBC TABLES 504.3 & 504.4]		
	F-1 (NS DESIGNATION)	2 STORIES/ 55 FT
	U (NS DESIGNATION)	2 STORIES/ 55 FT
ACTUAL NUMBER OF STORIES/HEIGHT ABOVE GROUND PLANE		
	F-1 (NS DESIGNATION)	2 STORIES/ 27'-8" (TOP OF ROOF)
	U (NS DESIGNATION)	2 STORIES/ 26'-7"
MAXIMUM AREA ALLOWED PER FLOOR [IBC TABLE 506.2]		
	F-1 (NS DESIGNATION)	15,500 SF
	U (NS DESIGNATION)	8,500 SF
ACTUAL AREA PER FLOOR		
	F-1 (NS DESIGNATION)	2,443 SF
	U (NS DESIGNATION)	2,592 SF
	TOTAL FOR BUILDING:	2,443 SF
FIRE RESISTANCE OF BUILDING ELEMENTS [IBC, TABLE 601]		
REQUIRED RATINGS	UNRATED FOR CONSTRUCTION TYPE II-B	
EXTERIOR OPENING PROTECTION [IBC, TABLE 705.5]		
ACTUAL FIRE SEPARATION DISTANCE	ALL SIDES: 10+FT	
REQUIRED WALL RATING	UNRATED WHEN OVER 10 FEET FIRE SEPARATION	
ACTUAL WALL RATING	ALL WALLS UNRATED	
FIRE PROTECTION SYSTEMS [IBC, CHAPTER 9 AND NATIONAL FIRE PROTECTION ASSOCIATION REQUIREMENTS]		
AUTOMATIC SPRINKLER SYSTEMS [IBC SEC 903]		NOT REQUIRED, NOT PROVIDED
ALTERNATIVE AUTOMATIC FIRE EXTINGUISHER SYSTEM [IBC, SEC. 904]		N/A
FIRE EXTINGUISHERS [IBC, SEC 906.1]	HAND HELD, MULTIPURPOSE FIRE EXTINGUISHERS THROUGHOUT BUILDING AT 75 FOOT MAX SPACING	
FIRE ALARM SYSTEM [IBC, CHAPTER 9]		PROVIDED, REFER TO ELECTRICAL DWG'S
MEANS OF EGRESS [IBC, CHAPTER 10]		
OCCUPANT LOAD FACTOR [IBC, TABLE 1004.5]		
	MECHANICAL EQUIPMENT ROOM	FACTOR: 300 (GROSS)
	F-1 OCCUPANT LOAD:	SEE LIFE SAFETY PLAN
	U OCCUPANT LOAD: NON-OCCUPIED LIQUID HOLDING TANK	
ALLOWABLE TRAVEL DISTANCE [IBC, TABLE 1017.2]		
	F-1	200 FEET (NON-SPRINKLERED)
	U	N/A
ACTUAL TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
COMMON PATH OF TRAVEL DISTANCE [IBC 1006.2.1]		F-1 = 75 FT (NON-SPRINKLERED); U = N/A
ACTUAL COMMON PATH OF TRAVEL DISTANCE		SEE LIFE SAFETY PLAN
INTERIOR EXIT STAIRWAY [IBC 1023.7]	WHERE FIRE RATED INTERIOR EXIT STAIRWAY IS PROVIDED, THE PATH OF TRAVEL ENDS AT THE FIRE RATED DOOR AND RESTARTS IN THE STAIRWAY	
EXITS REQUIRED [IBC 1015.1]	TWO EXITS REQUIRED IF OCC LOAD EXCEEDS 49 OR CPT EXCEEDS 75 FT.	EXITS PROVIDED
GROUND LEVEL	ONE	TWO; SEE LIFE SAFETY PLAN
ACCESSIBILITY	**ARCHITECTURAL BARRIERS ACT (ABA)**	
NOT REQUIRED TO BE ACCESSIBLE PER IBC 1103.2.9 EQUIPMENT SPACES		
ENERGY CODE	**2021 INTERNATIONAL ENERGY CONSERVATION CODE, TABLE C402.1.3**	
ENVELOPE REQUIREMENTS FOR CLIMATE ZONE 5B (COCONINO COUNTY)		
ELEMENT	(PRESCRIPTIVE METHOD)	PROPOSED DESIGN
ROOF (INSULATION ENTIRELY ABOVE)	MIN R-30 CI	R-36 CONTINUOUS INSULATION
WALLS (MASS)	MIN R-11.4 CI	R-11.4 CONTINUOUS INSULATION
FLOOR (SLAB ON GRADE- UNHEATED)	MIN R-15 FOR 24" BELOW GRADE	R-10 FOR 24" BELOW GRADE
EXTERIOR DOORS (SWINGING)	MAX U-FACTOR OF 0.37	R-2.7
EXTERIOR DOORS (NON-SWINGING)	MAX U-FACTOT OF 0.31	R-2.7
AIR BARRIER	REQUIRED	PROVIDED
PLUMBING FIXTURES	**2024 INTERNATIONAL BUILDING CODE CHAPTER 29**	
OCCUPANT LOAD FACTOR FOR F-1 IS 1:300 (MECHANICAL EQUIPMENT ROOM). PLUMBING OCCUPANT LOAD = 10		
REQUIRED: ONE UNISEX WATER CLOSET AND ONE UNISEX LAV (PER 2902.2 EXCEPTION 2), ONE SERVICE SINK (COUNT IS FACILITY AVERAGE).		
PROVIDED: WATER CLOSETS, LAVS, AND DRINKING FOUNTAIN ARE PROVIDED AT THE ADMINISTRATION BUILDING, A WAIVER IS REQUIRED FOR THE REDUCTION IN TOTAL PROJECT PLUMBING COUNT.		



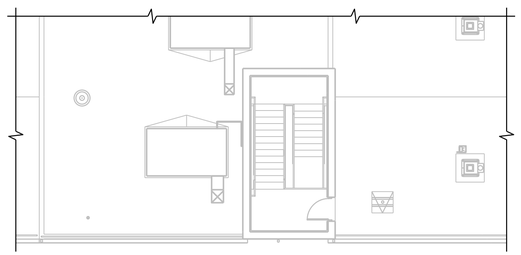
LIFE SAFETY PLAN - LOWER LEVEL
FACILITY 80 - DIGESTER FACILITY

3/32"=1'-0"



LIFE SAFETY PLAN - UPPER LEVEL
FACILITY 80 - DIGESTER FACILITY

3/32"=1'-0"



LIFE SAFETY PLAN - ROOF ACCESS LEVEL
FACILITY 80 - DIGESTER FACILITY

3/32"=1'-0"

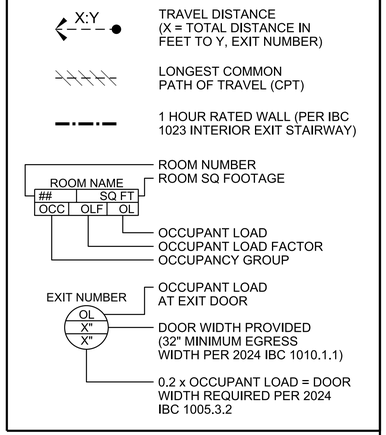
GENERAL SHEET NOTES

A. FOR GENERAL ARCHITECTURAL NOTES, MATERIAL SYMBOLS, LEGEND, ABBREVIATIONS AND WALL TYPES, SEE DRAWING 01A0001.

B. FOR ABBREVIATIONS, SEE DRAWING 01G0005.

C. FOR FIRE EXTINGUISHER LOCATIONS, SEE DRAWINGS 80A1030 AND 80A1040.

LIFE SAFETY PLAN LEGEND



0 8 16 24

3/32"=1'-0"

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

REGISTERED ARCHITECT
MORGAN D SHOEMAKER
Date Signed 06-30-25
ARIZONA, U.S.A.
Expires 06-30-2027

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: M SHOEMAKER	SUB SHEET NO. 01A0080	TITLE OF SHEET: ARCHITECTURAL CODE DATA AND LIFE SAFETY PLANS DIGESTER FACILITY, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376
	CADD: M COLLINS			PMIS/PKG NO. 257282
	TECH. REVIEW: G KIRSTEN			SHEET 20 OF 401
	DATE: 06/2025			

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/16/2025 PLOT TIME: 6:04:03 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01A0080_D3167666.dgn

PIPE AND FITTING SYMBOLS

DOUBLE LINE	SINGLE LINE	
		EXISTING PIPE
		NEW PIPE
		EXISTING PIPE TO BE ABANDONED
		EXISTING PIPE TO BE REMOVED
		WELDED JOINT
		GROOVED END JOINT
		FLANGED JOINT
		MECHANICAL JOINT & PROPRIETARY RESTRAINED JOINT
		BELL & SPIGOT JOINT (LEADED)
		HUB & SPIGOT JOINT (RUBBER GASKET)
		BALL JOINT
		ADAPTER SIDE GROOVED END ADAPTER FLANGE
		FLANGED COUPLING ADAPTER
		FLEXIBLE COUPLING
		METAL BELLOWS EXP JOINT
		ELASTOMER BELLOWS EXP JOINT
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER

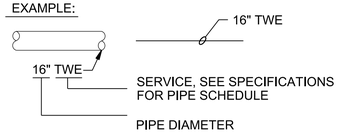
DOUBLE LINE	SINGLE LINE	
		REDUCING BUSHING
		UNION
		CAP
		ANCHOR
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		LATERAL

NOTES:

1. ONLY FLANGED END CONNECTIONS ARE SHOWN HERE FOR DOUBLE LINE FITTINGS. FITTINGS WITH OTHER END PATTERNS ARE SHOWN SIMILARLY ON THE CONSTRUCTION DRAWINGS. ALSO SEE PIPING SPECIFICATIONS.
2. SYMBOLS SHOWN HERE FOR SINGLE LINE FITTINGS ARE GENERIC ONLY. REFER TO PIPING SPECIFICATIONS FOR SPECIFIC END CONNECTIONS FOR SINGLE LINE PIPE AND FITTINGS.
3. EXISTING PIPE AND EQUIPMENT IS SHOWN LIGHT-LINED AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN HEAVY-LINED.

PIPING DESIGNATION

EXAMPLE:



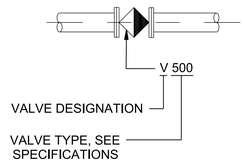
VALVE SYMBOLS

SINGLE LINE	DOUBLE LINE
	GATE
K	KNIFE GATE
	BUTTERFLY
	GLOBE
	BALL
	SEATING PORT
	ECCENTRIC PLUG
	PLUG OR COCK
	NEEDLE
	DIAPHRAGM
	PINCH
	SWING CHECK
	BALL CHECK
	HOSE VALVE (HV- X) OR (V-X) X = NO. IN SPECS
S	SAMPLE
	MUD
	PRESSURE RELIEF
	AIR AND/OR VACUUM RELEASE
	REGULATED SIDE PRESSURE CONTROL (INTERNAL PILOT)
	REGULATED SIDE PRESSURE CONTROL (EXTERNAL PILOT)
	MULTI-PORT VALVE, ARROWS INDICATE FLOW PATTERN. SEATING PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
	TELESCOPING SCUM VALVE

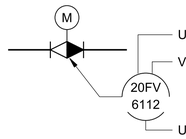
OR

VALVE DESIGNATIONS

MANUAL VALVES AND CHECK VALVES



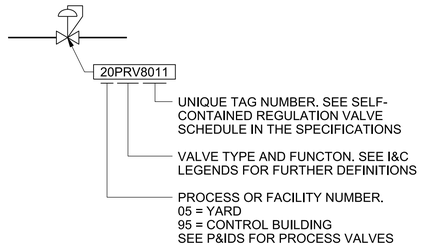
CONTROL VALVES



NOTE:

SEE I&C LEGENDS FOR FURTHER DEFINITIONS AND ACTUATOR TYPES.

SELF-CONTAINED REGULATING VALVES



ACTUATOR SYMBOLS

PNEUMATIC DIAPHRAGM	H HYDRAULIC
PNEUMATIC CYLINDER	MANUAL
	S SOLENOID
M ELECTRIC MOTOR	E/H ELECTRO HYDRAULIC

MECHANICAL LEGEND AND NOTES

GENERIC PIPING NOTES

1. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS.
2. SIZE OF FITTINGS SHOWN ON DRAWINGS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN OF PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
3. LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. CONTRACTOR SHALL DESIGN SUPPORTS AS SPECIFIED.
4. ALL JOINTS SHALL BE WATERTIGHT. WALL PIPES SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.
5. ALL FLEXIBLE CONNECTORS AND COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST PROTECTION AS SPECIFIED, UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED.
6. SYMBOLS, LEGENDS, AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE DRAWINGS, WHEREVER APPLICABLE. NOT ALL OF THE VARIOUS PIPING COMPONENTS ARE NECESSARILY USED IN THE PROJECT.
7. ALL BURIED PIPING SPECIFIED TO BE PRESSURE TESTED, EXCEPT FLANGED, WELDED, OR SCREWED PIPING, SHALL BE PROVIDED WITH THRUST PROTECTION AS SPECIFIED, UNLESS OTHERWISE NOTED.
8. NUMBER AND LOCATION OF UNIONS SHOWN ON DRAWINGS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.
9. WHERE A GROOVED END COUPLING IS SHOWN, IT SHALL BE THE RIGID JOINT TYPE, UNLESS OTHERWISE SPECIFIED. WHERE A FLANGED COUPLING ADAPTER IS SHOWN, A STANDARD FLANGE SHALL BE JOINED TO THE COUPLING ADAPTER.

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

JUNE 19, 2025

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	D EDWARDS
CADD:	R COWAN
TECH. REVIEW:	D BRUNKOW
DATE:	06/2025
SUB SHEET NO.	01D0001
TITLE OF SHEET	GENERAL PROCESS LEGEND
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	21 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 11:27:42 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01D0001_D3167666.dgn

HEATING, VENTILATING, AND AIR CONDITIONING PIPE AND FITTING SYMBOLS

DOUBLE LINE	SINGLE LINE	
		EXISTING PIPE (SCREENED)
		NEW PIPE
		EXISTING PIPE TO BE ABANDONED
		EXISTING PIPE TO BE REMOVED
		WELDED JOINT
		GROOVED END JOINT
		FLANGED JOINT
		FLEXIBLE COUPLING
		GROOVED END GROOVED END ADAPTER FLANGE
		STEEL BELLOWS EXP JOINT
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		UNION
		ANCHOR
		PIPE ALIGNMENT GUIDE
		FLEXIBLE (ELASTOMER) PIPE CONNECTION

NOTES:

1. ONLY FLANGED FITTINGS ARE SHOWN FOR DOUBLE LINE PIPING. FITTINGS WITH OTER END PATTERNS ARE SIMILAR.
2. EXISTING PIPING AND EQUIPMENT IS SHOWN LIGHT LINED AND/OR SCREENED AND IS NOTED AS EXISTING. NEW PIPING AND EQUIPMENT IS SHOWN HEAVY-LINED.-

VALVE SYMBOLS

SINGLE LINE	DOUBLE LINE
GATE	
BUTTERFLY	OR
GLOBE	OR
BALL	OR
SEATING PORT ECCENTRIC PLUG	OR
PLUG OR COCK	OR
NEEDLE	OR
SWING CHECK	OR
BALL CHECK	OR

- BALANCING FITTING (B)
- COMBINATION FLOWMETER AND BALANCING FITTING (F, B)
- COMBINATION FLOWMETER, BALANCING FITTING AND SHUT-OFF VALVE (F, B, S.O.)
- PRESSURE RELIEF
- AIR VENT (AUTO)
- AIR VENT (MANUAL)
- REGULATED SIDE PRESSURE CONTROL
- MULTI-PORT VALVE (GLOBE VALVE SHOWN. FOR OTHER VALVE TYPES, APPROPRIATE VALVE SYMBOL SHOWN). ARROWS INDICATE FLOW PATTERN. SEATING PORTS ARE IMPLIED BY INDICATED FLOW PATTERN.
- SOLENOID VALVE (S)
- TO TEMPERATURE SENSOR (T)
- TEMPERATURE SENSING VALVE

MISCELLANEOUS PIPING SYMBOLS

- STEAM TRAP (X) X = NO. IN SPECS
- FLOW SWITCH (FS)
- FLOW METER (FM) X = NO. SHOWN IN SPECS
- PRESSURE SWITCH (PS)
- STRAINER
- GAUGE WITH COCK (H)
- THERMOMETER
- GAUGE GLASS WITH COCKS

VALVE DESIGNATIONS

MANUAL VALVES AND CHECK VALVES

V 400
- VALVE TYPE, SEE SPECIFICATIONS
- VALVE DESIGNATION

CONTROL VALVES

(M)
- ACTUATOR SYMBOL
- FLOW DIRECTION

HVAC EQUIPMENT IDENTIFICATION

ACC	AIR-COOLED CONDENSER
ACCU	AIR-COOLED CONDENSING UNIT
ACU	AIR CONDITIONING UNIT
AHU	AIR HANDLING UNIT
AWC	ABSORPTION WATER CHILLER
BC	BOOSTER HEATING COIL
BD	BUTTERFLY DAMPER
CD	CEILING DIFFUSER
CG	CEILING GRILLE
CHWP	CHILLED WATER PUMP
CRP	CONDENSATE RETURN PUMP
CRU	CONDENSATE RETURN UNIT
CT	COOLING TOWER
CTP	COOLING TOWER PUMP
CUH	CABINET UNIT HEATER
CWP	CONDENSER WATER PUMP
DA	DEARATOR
DG	DOOR GRILLE
ECP	ENVIRONMENTAL CONTROL PANEL
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EUH	ELECTRIC UNIT HEATER
FG	FLOOR GRILLE
FD	FIRE DAMPER
HRU	HEAT RECOVERY UNIT
HCG	HIGH-CAPACITY GRILLE
HCSG	HIGH-CAPACITY SUPPLY GRILLE
HTP	HEAT PUMP
HU	HUMIDIFIER
HTR	HIGH THROW REGISTER
HWP	HEATING WATER PUMP
HX	HEAT EXCHANGER
LD	LINEAR DIFFUSER
MD	MOTORIZED DAMPER
ML	MOTORIZED LOUVER
OBD	OPPOSED BLADE DAMPER
PCG	PERFORATED CEILING GRILLE
PCD	PERFORATED CEILING DIFFUSER
PEF	PORTABLE EXHAUST FAN
RAC	ROOM AIR CONDITIONER
SF	SUPPLY FAN
SD	SLOT DIFFUSER
TAC	TERMINAL AIR CONDITIONER
TCU	TERMINAL CONTROL UNIT
UH	UNIT HEATER
WC	WATER CHILLER
WCC	WATER-COOLED CONDENSER
WCCU	WATER-COOLED CONDENSING UNIT
WG	WALL GRILLE
WR	WALL REGISTER
WSG	WATER SUPPLY GRILLE
WSHP	WATER SOURCE HEAT PUMP
WSR	WALL SUPPLY REGISTER

NOTE:
ABBREVIATIONS ARE SHOWN ON GENERAL LEGENDS.

FLOW STREAM IDENTIFICATION

IDENTIFICATION	SERVICE
CO	CONDENSATE DRAIN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION

HEATING, VENTILATING, AND AIR CONDITIONING SYMBOLS

- WALL REGISTER OR GRILLE (SUPPLY)
- CEILING DIFFUSER OR REGISTER (SUPPLY)
- CEILING REGISTER OR GRILLE (RETURN AND EXHAUST)
- WALL REGISTER OR GRILLE (RETURN AND EXHAUST)
- TURNING VANES
- 45 DEGREE ENTRY
- CONICAL TEE
- BELLMOUTH
- SD — SMOKE DAMPER
- FD — FIRE DAMPER
- MANUAL OPPOSED-BLADE DAMPER
- MANUAL BUTTERFLY DAMPER
- MOTORIZED DAMPER (M)
- SOUND ATTENUATED DUCT
- FLEXIBLE CONNECTION
- FLEXIBLE DUCTWORK
- R — INCLINED RISE IN DUCT
- D — INCLINED DROP IN DUCT
- SUPPLY DUCT (SECTION)
- INTAKE, RETURN, OR EXHAUST DUCT (SECTION)
- (T) ROOM TEMPERATURE SENSOR
- (P) ROOM PRESSURE SENSOR
- (H) ROOM HUMIDITY SENSOR
- ECP — ENVIRONMENTAL CONTROL PANEL
- (200) — 200 SCFM
- (M) MOTORIZED VALVE - 3 WAY
- (M) MOTORIZED VALVE - 2 WAY

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer, Manuscript
CERTIFICATE NO.
46267
SCOTT HINTE
Date Signed 6-30-25
ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: J RIVERA CADD: S HOSTETLER TECH. REVIEW: J SACKINGER DATE: 06/2025	SUB SHEET NO. 01M0001	TITLE OF SHEET GENERAL HVAC LEGEND GRAND CANYON, SOUTH RIM	NO SCALE DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 22 OF 401

GRCA-257282

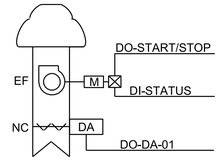
100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 3:32:57 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01M0001_D3167666.dgn

PLOT DATE: 6/17/2025 PLOT TIME: 3:39:35 PM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01M6001_D3167666.dgn

GENERAL EXHAUST FAN (10-EF-01, 12-EF-01, 12-EF-02) I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE				SOFTWARE						COMMENTS
		ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT	ANALOG VALUE	DIGITAL VALUE	SCHEDULE	TREND	ALARM	GRAPHIC	
EXHAUST FAN CONTROL DIAGRAM & SEQUENCE												
EF START/STOP	START/STOP				X				X	X	X	
EF STATUS	STATUS			X					X	X	X	
EA DAMPER	DA-01				X				X	X	X	ELECTRIC DAMPER ACTUATOR - OPEN/CLOSE
EA DAMPER CONFIRMATION	DA-01			X					X	X	X	DAMPER END SWITCH
LOSS OF VENTILATION	STATUS				X					X		SENT TO GO/NO-GO PANEL (EXCEPT 10-EF-01)



EXHAUST FAN

UNIT CONFIGURATION:
EXHAUST FAN SERVES AS GENERAL EXHAUST (12-EF-01, 12-EF-02), INCLUDING RESTROOM EXHAUST (10-EF-01).

RUN CONDITIONS - CONTINUOUS:
EXHAUST FAN SHALL RUN ACCORDING TO THE USER INTERFACE, OR AS COMMANDED BY THE BASE BAS OPERATOR INTERFACE.

WHEN COMMANDED ON THE EXHAUST AIR DAMPER SHALL OPEN, IF THE DAMPER STATUS IS NOT CONFIRMED AFTER 1 MINUTE (ADJUSTABLE), AN ALARM SHALL BE SENT TO THE BAS AND THE EXHAUST FAN SHALL BE DISABLED.

FAN:
THE FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE).

FAN STATUS:
THE BAS SHALL MONITOR THE FAN STATUS AND GENERATE AN ALARM AT THE USER INTERFACE UPON THE FOLLOWING CONDITIONS:
1. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
2. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
3. FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE).
4. DAMPER FAILURE: COMMANDED OPEN, BUT STATUS IS CLOSED.

UNIT SHUTDOWN:
THE BAS SHALL SHUTDOWN THE UNIT AND GENERATE AN ALARM AT THE USER INTERFACE UPON ONE OF THE FOLLOWING CONDITIONS:
1. FAN: FAILURE AS INDICATED ABOVE.

THE UNIT SHALL SHUTDOWN WHEN COMMANDED OFF BY THE BAS.

UPON UNIT SHUTDOWN, THE COMPONENT SHALL BE ALIGNED TO THE FOLLOWING: EXHAUST FAN OFF, DAMPER CLOSED.

EXHAUST FAN CONTROL DIAGRAM & SEQUENCE OF OPERATION

NTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

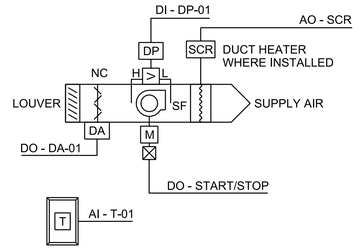
Registered Professional Engineer (Mechanical) CERTIFICATE NO. 46267 SCOTT HINTE Date Signed 6-30-25 ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	S HINTE
CADD:	S HOSTETLER
TECH. REVIEW:	J SACKINGER
DATE:	06/2025
SUB SHEET NO.	01M6001
TITLE OF SHEET	GENERAL HVAC CONTROL DIAGRAM
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	23 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

SUPPLY FAN (12-SF-01, 32-SF-01) I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
SUPPLY FAN CONTROL DIAGRAM & SEQUENCE												
SA DAMPER	DA-O1			X	X				X	X	X	DAMPER ACTUATOR - WITH END SWITCH
SF START/STOP	START/STOP				X				X	X	X	
SPACE TEMPERATURE	T-01	X							X	X	X	TEMPERATURE SENSOR
32-SF-01 D/P					X						X	FROM FIELD TO HVAC-3201
LOSS OF VENTILATION (32-SF-01)	STATUS				X					X		SENT TO LCP-3201 GO/NOGO PANEL
12-SF-01 D/P					X						X	FROM FIELD TO HVAC-1201
LOSS OF VENTILATION (12-SF-01)	STATUS				X					X		SENT TO LCP-1201 GO/NOGO PANEL



UNIT CONFIGURATION:
SUPPLY FAN (12-SF-01, 32-SF-01) SHALL SERVE AS GENERAL VENTILATION FOR ROOMS AS IDENTIFIED ON PLANS.

RUN CONDITIONS - CONTINUOUS:
THE SUPPLY FAN SHALL RUN TO MAINTAIN THE SPACE TEMPERATURE (T-01) 10°F (ADJUSTABLE) ABOVE AMBIENT WHEN THE INDOOR TEMPERATURE IS ABOVE 50°F (ADJUSTABLE) OR AS COMMANDED BY THE BASE BAS OPERATOR INTERFACE.

FAN:
THE FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 10 MINUTES (ADJUSTABLE).

FAN STATUS:
THE BAS SHALL MONITOR THE FAN STATUS AND GENERATE AN ALARM AT THE USER INTERFACE UPON THE FOLLOWING CONDITIONS:
1. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
2. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
3. FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE).
4. DAMPER FAILURE: COMMANDED OPEN, BUT STATUS IS CLOSED.

ELECTRIC HEATER OPERATION (WHERE INSTALLED):
HEAT MODE SHALL BE ENABLED WHENEVER:
1. OUTSIDE AIR TEMPERATURE IS LESS THAN 50°F (ADJUSTABLE).
2. SUPPLY FAN STATUS IS ON.

THE BAS SHALL MODULATE ELECTRIC HEATER SCR CONTROL TO MAINTAIN THE SPACE TEMPERATURE (T-01) TO THE SPACE TEMPERATURE SETPOINT.

UNIT SHUTDOWN:
THE BAS SHALL SHUTDOWN THE UNIT AND GENERATE AN ALARM AT THE USER INTERFACE UPON ONE OF THE FOLLOWING CONDITIONS:
1. FAN:FAN FAILURE AS INDICATED ABOVE.

THE UNIT SHALL SHUTDOWN WHEN COMMANDED OFF BY THE BAS.

UPON UNIT SHUTDOWN, THE COMPONENTS SHALL BE ALIGNED TO THE FOLLOWING:
SUPPLY FAN OFF, RELIEF AIR DAMPER CLOSED, SUPPLY AIR DAMPER CLOSED.

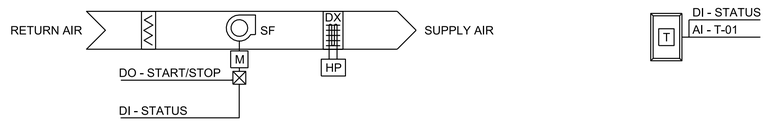
SUPPLY FAN CONTROL DIAGRAM & SEQUENCE OF OPERATION

NTS

DX SPLIT SYSTEM I/O POINTS LIST

(10-AC-01, 20-AC-01, 20-AC-02, 32-AC-01, 32-AC-02, 80-AC-01, 80-AC-02)
(10-CU-01, 20-CU-01, 20-CU-02, 32-CU-01, 32-CU-02, 80-CU-01, 80-CU-02)

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
DX SPLIT SYSTEM CONTROL DIAGRAM & SEQUENCE												
SF START/STOP	START/STOP				X				X		X	
SF STATUS	STATUS			X					X	X	X	
ROOM TEMPERATURE SENSOR	T-01	X							X	X	X	TEMPERATURE SENSOR



DX SPLIT SYSTEM SEQUENCE OF OPERATION

RUN CONDITIONS - SCHEDULED:
DUCTLESS SPLIT HEAT PUMP SYSTEM SHALL RUN CONTINUOUSLY. THE UNIT SHALL RUN SUBJECT TO ITS OWN INTERNAL SAFETIES AND CONTROLS TO MAINTAIN A 80° F (ADJUSTABLE) SETPOINT. AN ALARM SHALL BE GENERATED IF THE SPACE TEMPERATURE EXCEEDS 85° F.

UNIT SHUTDOWN:
THE UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING: SUPPLY FAN OFF AND OUTDOOR HEAT PUMP UNIT OFF.

THE UNIT SHALL SHUTDOWN WHEN COMMANDED OFF BY THE BAS.

DX SPLIT SYSTEM CONTROL DIAGRAM & SEQUENCE

NTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

Registered Professional Engineer, Member Arizona CERTIFICATE NO. 46267 SCOTT HINTE Date Signed 6-30-25 ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	S HINTE CADD: S HOSTETLER TECH. REVIEW: J SACKINGER DATE: 06/2025	01M6002	GENERAL HVAC CONTROL DIAGRAM GRAND CANYON, SOUTH RIM	113 175376 PMIS/PKG NO. 257282 SHEET 24 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 3:32:58 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01M6002_D3167666.dgn

MAKE-UP AIR UNIT (20-MAU-01, 32-MAU-01, 32-MAU-02, 80-MAU-01, 80-MAU-02) SEQUENCE OF OPERATION

RUN CONDITIONS - SCHEDULED:
THE UNIT FAN SHALL RUN AS DEFINED BY THE BAS OPERATOR FOR OCCUPIED OR UNOCCUPIED HOURS CONSISTENT WITH THE BUILDING'S OPERATING SCHEDULE. THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN AND EXHAUST FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE). THE BAS SHALL ALLOW THE UNIT TO BE PROGRAMMED FOR START AND STOP BASED ON A USER DEFINABLE SCHEDULE UNIQUE TO EACH DAY OF THE WEEK (SUNDAY THROUGH SATURDAY). THE BAS SHALL ALSO MONITOR THE SPACE TEMPERATURE AND AUTOMATICALLY START THE AIR HANDLING UNIT.

UNIT START:
WHEN THE BAS CALLS FOR THE UNIT TO START, THE FOLLOWING SEQUENCES SHALL BE ACTIVATED:
1. SUPPLY FAN COMMANDED ON
2. OUTSIDE AIR DAMPER (DA-01) OPEN
3. ELECTRIC HEATER ENABLED
4. CONDENSING UNIT, COOLING COIL (IF APPLICABLE) ENABLED TO MAINTAIN TEMPERATURE SETPOINTS

SUPPLY AIR TEMPERATURE SETPOINT CONTROL:
THE BAS SHALL MONITOR THE ROOM AIR TEMPERATURE (T-03) AND MAINTAIN A ROOM AIR TEMPERATURE SETPOINT OF 85°F COOLING AND 50°F HEATING (ADJUSTABLE).

SUPPLY FAN OPERATION:
THE SUPPLY FAN WILL OPERATE CONTINUOUSLY. THE SUPPLY FAN VFD WILL DECREASE FAN SPEED TO 50% IN THE FOLLOWING CONDITIONS:
1. OUTDOOR TEMPERATURE IS LESS THAN 50°F.
2. NO GAS DETECTION ALARMS FROM THE SCADA SYSTEM ARE PRESENT.
3. THE ROOM IS NOT OCCUPIED.

SUPPLY FAN DIFFERENTIAL PRESSURE MONITORING:
THE BAS SHALL MEASURE AND MONITOR THE SUPPLY FAN STATIC PRESSURE AT A DUCT MOUNTED STATIC PRESSURE SENSOR (DP-02) STATIC PRESSURE CONTROL ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. LOW SUPPLY AIR STATIC PRESSURE IF THE SUPPLY AIR STATIC PRESSURE IS 25° (ADJUSTABLE) LESS THAN THE SETPOINT.

DX COOLING COIL OPERATION:
THE DX COOLING COIL (80-MAU-01, ONLY) AND CONDENSING UNIT SHALL OPERATE UNDER ITS OWN SAFTIES TO MAINTAIN THE SPACE TEMPERATURE SETPOINTS.

ELECTRIC HEATER OPERATION:
PRE-HEAT MODE CONTROL SHALL BE ENABLED WHENEVER"
1. OUTSIDE AIR TEMPERATURE IS LESS THAN 50°F (ADJUSTABLE)
2. AND THE SUPPLY FAN STATUS IS ON
3. AND THE COOLING COIL OPERATION IS DE-ENERGIZED

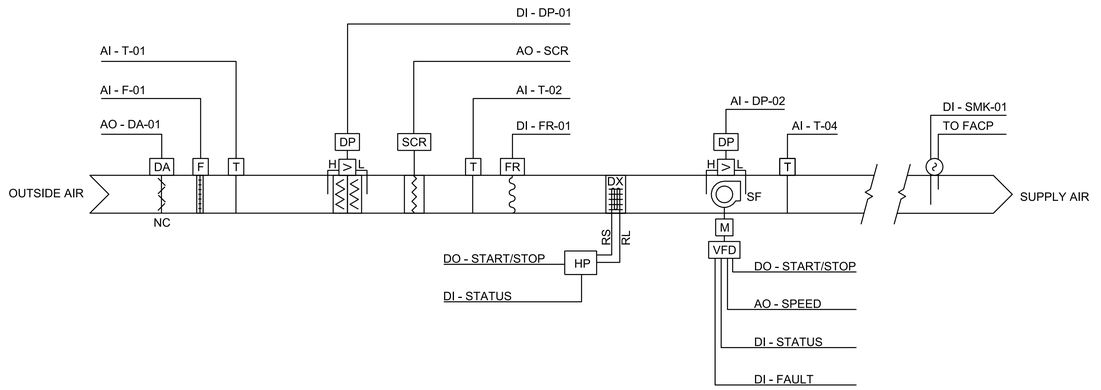
THE BAS SHALL MODULATE ELECTRIC HEATER SCR CONTROL TO MAINTAIN THE SPACE TEMPERATURE (T-03) TO THE SPACE TEMPERATURE SETPOINT OF 50°F.

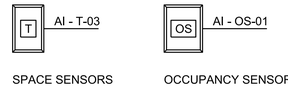
ELECTRIC HEATER ALARM:
AN ALARM SHALL BE PROVIDED FOR LOW SUPPLY AIR TEMPERATURE IF THE SUPPLY AIR TEMPERATURE AT (T-02) IS 5°F (ADJUSTABLE) LESS THAN THE COIL DISCHARGE SETPOINT.

FILTER DIFFERENTIAL PRESSURE MONITOR:
THE BAS SHALL MONITOR THE DIFFERENTIAL PRESSURE (DP-01) ACROSS THE FILTER BANK. ALARM SHALL BE PROVIDED WHEN FILTER DIFFERENTIAL PRESSURE EXCEEDS SETPOINT (ADJUSTABLE).

UNIT SHUTDOWN:
THE UNIT SHALL SHUT DOWN IF ONE OF THE FOLLOWING CONDITIONS OCCURS:
1. FREEZESTAT: FREEZESTAT (FR-01) ACTIVATION WHEN COOLING COIL ENTERING AIR TEMPERATURE DROPS BELOW 35°F (ADJUSTABLE)
2. SUPPLY FAN: SUPPLY FAN FAILURE ALARM PER THE FOLLOWING:
   A. SUPPLY FAN FAILURE: COMMANDED ON BUT STATUS IS OFF
   B. SUPPLY FAN IN HAND: COMMANDED OFF BUT STATUS I ON
   C. SUPPLY FAN VFD SIGNAL FAULT
3. SUPPLY AIR SMOKE DETECTION: SA DUCT DETECTORS SHALL BE HARDWIRED TO SHUT DOWN THE UNIT SUPPLY FAN UPON DETECTIONS OF SMOKE. THE SA SMOKE DETECTOR SHALL ALSO ADDRESS THE FIRE ALARM CONTROL PANEL, RE: FIRE PROTECTION.

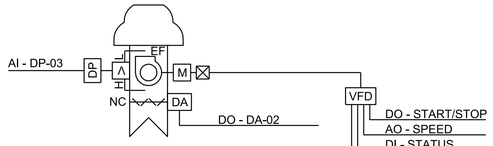
UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING (REFER TO CONTROL DIAGRAM FOR ABBREVIATIONS): SUPPLY FAN (SF) OFF. COOLING COIL DE-ENERGIZED, ELECTRIC HEATER DE-ENERGIZED, AND OUTSIDE AIR DAMPER CLOSED.





SPACE SENSORS

OCCUPANCY SENSOR



EXHAUST FAN
(20-EF-01, 32-EF-02, 32-EF-03, 80-EF-01, 80-EF-02)

NOTES:

1. ALL OUTDOOR AIR AND RELIEF AIR DAMPERS SHALL BE LOW LEAKAGE DAMPERS WITH MAXIMUM LEAKAGE OF 3 CFM/SF AT 1 IN W.C.
2. EXHAUST FAN STATUS SHALL BE PROVIDED BY DIFFERENTIAL PRESSURE SENSOR.

PACKAGED 100% OA SINGLE ZONE MAU & EF I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	TREND	ALARM	GRAPHIC	COMMENTS
SUPPLY FAN CONTROL DIAGRAM & SEQUENCE												
OUTSIDE AIR FLOW	F-01	X							X		X	AIR FLOW MEASURING STATION
OUTSIDE AIR TEMPERATURE	T-01	X							X	X	X	TEMPERATURE SENSOR
HEATING COIL TEMPERATURE	T-02	X							X	X	X	TEMPERATURE SENSOR (AVERAGING)
FILTER STATUS	DP-01			X					X	X	X	DIFFERENTIAL PRESSURE SWITCH
ELECTRIC HEAT	SCR		X						X	X	X	SCR ELECTRIC HEATER
FREEZE STATUS	FR-01			X					X	X	X	FREEZE STATUS (AVERAGING)
SPACE TEMPERATURE	T-03				X				X	X	X	FROM FIELD TO HVAC-8001
SF STATUS	STATUS	X							X	X	X	
SF START/STOP	START/STOP				X				X		X	
SF FAULT	FAULT			X					X	X	X	AUX CONTACT FOR VFD
UNIT LEAVING AIR TEMPERATURE	T-04	X				X			X	X	X	TEMPERATURE SENSOR
SUPPLY FAN DIFFERENTIAL PRESSURE	DP-02	X							X	X	X	DIFFERENTIAL PRESSURE SENSOR
EXHAUST FAN START/STOP	START/STOP				X				X	X	X	START/STOP
EXHAUST FAN STATUS	DP-03			X					X	X	X	CURRENT SENSING RELAY OR DIFFERENTIAL PRESSURE SENSOR
DAMPER ACTUATOR	DA-02			X	X				X	X	X	DAMPER ACTUATOR WITH END SWITCH
ROOM AIR TEMPERATURE	T-05	X							X	X	X	TEMPERATURE SENSOR
GAS DETECTION	STATUS			X						X	X	GAS MONITORING SENSOR
DAMPER ACTUATOR	DA-01				X					X	X	FROM FIELD TO HVAC-3201
ROOM OCCUPANCY SENSOR	OS-01			X							X	
SA SMOKE DETECTOR	SMK-01			X					X	X	X	
20-MAU-01 D/P				X						X	X	FROM FIELD TO HVAC-2001
32-MAU-01 D/P				X						X	X	FROM FIELD TO HVAC-3201
32-MAU-02 D/P				X						X	X	FROM FIELD TO HVAC-3201
80-MAU-01 D/P				X						X	X	FROM FIELD TO HVAC-8001
80-MAU-02 D/P				X						X	X	FROM FIELD TO HVAC-8001
SF FAN SPEED			X						X		X	
EF FAN SPEED			X						X		X	

EXHAUST FAN (20-EF-01, 32-EF-02, 32-EF-03, 80-EF-01, 80-EF-02) SEQUENCE OF OPERATION

EXHAUST FAN:
EXHAUST FAN SERVES TO MAINTAIN ROOM AIR CHANGE RATE

RUN CONDITIONS - CONTINUOUS:
EXHAUST FAN SHALL RUN WHENEVER THE MAU IS COMMANDED TO RUN ACCORDING TO THE USER INTERFACE, OR AS COMMANDED BY THE BASE BAS OPERATOR INTERFACE.

WHEN COMMANDED ON THE EXHAUST AIR DAMPER SHALL OPEN IF THE DAMPER STATUS IS NOT CONFIRMED AFTER 1 MINUTE (ADJUSTABLE) AN ALARM SHALL BE SENT TO THE BAS AND THE EXHAUST FAN SHALL BE DISABLED.

FAN:
THE FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE).

EXHAUST FAN OPERATION:
THE EXHAUST FAN WILL OPERATE CONTINUOUSLY. THE EXHAUST FAN VFD WILL REDUCE AIRFLOW TO 50% IN THE FOLLOWING CONDITIONS:
1. OUTDOOR TEMPERATURE IS LESS THAN 50°F.
2. NO GAS DETECTION ALARM FROM THE SCADA SYSTEM ARE PRESENT.
3. THE ROOM IS NOT OCCUPIED.
4. THE SUPPLY FAN IS RUNNING AT 50%.

FAN STATUS:
THE BAS SHALL MONITOR THE FAN STATUS AND PROVIDE AN ALARM TO THE USER INTERFACE PANEL FOR THE FOLLOWING:
1. FAN FAILURE: COMMANDED ON BUT FAN STATUS IS OFF
2. FAN IN HAND: COMMANDED OFF BUT FAN STATUS IS ON
3. FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE)

UNIT SHUTDOWN:
THE UNIT SHALL SHUT DOWN IF ONE OF THE FOLLOWING CONDITIONS OCCURS. UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING EXHAUST FAN OFF, DAMPER CLOSED. UPON SHUTDOWN ON ONE OF THE FOLLOWING FAULT CONDITIONS, THE BAS SHALL GENERATE AN ALARM AT THE USER INTERFACE.
1. FAN: FAN FAILURE ALARM PER THE FOLLOWING:
   A. EXHAUST FAN FAILURE: COMMANDED ON BUT STATUS IS OFF
   B. EXHAUST FAN IN HAND: COMMANDED OFF BUT STATUS IS ON

PACKAGED 100% OA SINGLE ZONE MAU & EF CONTROL DIAGRAM & SEQUENCE

NTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer — CERTIFICATE NO. 46267 SCOTT HINTE — Date Signed — ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	S HINTE
CADD:	S HOSTETLER
TECH. REVIEW:	J SACKINGER
DATE:	06/2025
SUB SHEET NO.	01M6003
TITLE OF SHEET	GENERAL HVAC CONTROL DIAGRAM
	GRAND CANYON, SOUTH RIM
NO SCALE	
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	25 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

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PLOT DATE: 6/17/2025 PLOT TIME: 3:26:49 PM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN01M6004_D3167666.dgn

DEDICATED OUTDOOR AIR UNIT (10-DOAU-01, 10-DOAU-02) POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
DOAU - DX CONTROL DIAGRAM & SEQUENCE												
DOAU DAMPER START/STOP	DA-01				X				X	X	X	ELECTRIC DAMPER ACTUATOR - OPEN/CLOSE
DOAU DAMPER STATUS	DA-01			X					X	X	X	
OA FILTER PRESSURE SWITCH	DP-01			X					X	X	X	DIFFERENTIAL PRESSURE SWITCH
OA TEMPERATURE	T-01	X							X	X	X	TEMPERATURE SENSOR
CONDENSER START/STOP	START/STOP				X				X		X	
CONDENSER STATUS	STATUS			X					X		X	
SA TEMPERATURE	T-02	X							X	X	X	TEMPERATURE SENSOR
SF STATUS	DP-02			X					X	X	X	DIFFERENTIAL PRESSURE SWITCH
SF START/STOP	START/STOP				X				X		X	CONTROL RELAY
TEMPERATURE	T-03	X							X	X	X	TEMPERATURE SENSOR
SA SMOKE DETECTOR	SMK-01			X					X	X	X	
ALARM TO FACP	TO FACP											HARD WIRE POINT TO FACP
ELECTRIC PRE-HEAT	SCR		X						X	X	X	SCR ELECTRIC HEATER
EXHAUST FAN START/STOP	START/STOP				X				X	X	X	START/STOP
EXHAUST FAN STATUS	DP-03	X							X	X	X	CURRENT SENSING RELAY OR DIFFERENTIAL PRESSURE SENSOR
EF OA DAMPER OPEN/CLOSE	DA-02				X				X	X	X	ELECTRIC DAMPER ACTUATOR - OPEN/CLOSE
EF OA DAMPER STATUS	DA-02			X					X	X	X	
SF FAN SPEED			X						X		X	
EMERGENCY STOP				X						X	X	10-EF-02 AND 10-EF-03

EXHAUST FAN (10-EF-02, 10-EF-03) SEQUENCE OF OPERATION

EXHAUST FAN:
EXHAUST FAN SERVES AS EXHAUST FOR FUME HOODS AND CANOPY HOOD EXHAUST.

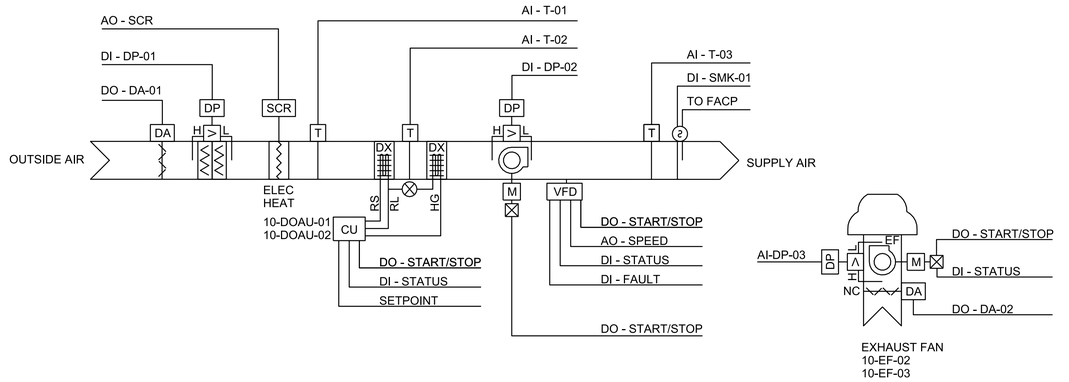
RUN CONDITIONS - CONTINUOUS:
EXHAUST FAN SHALL RUN WHENEVER THE FUME HOOD IS COMMANDED TO RUN ACCORDING TO THE USER INTERFACE, OR AS COMMANDED BY THE BASE BAS OPERATOR INTERFACE.

WHEN COMMANDED ON THE EXHAUST AIR DAMPER, DA-02 SHALL OPEN IF THE DAMPER IS NOT CONFIRMED AFTER 1 MINUTE (ADJUSTABLE) AN ALARM SHALL BE SENT TO THE BAS AND THE EXHAUST FAN SHALL BE DISABLED.

FANS:
THE FAN SHALL HAVE A USER DEFINABLE MINIMUM RUN TIME OF 30 MINUTES (ADJUSTABLE).
THE FAN SHALL BE EQUIPPED WITH A MANUAL ON-OFF SWITCH.

FAN STATUS:
THE BAS SHALL MONITOR THE FAN STATUS AND PROVIDE AN ALARM TO THE USER INTERFACE PANEL FOR THE FOLLOWING:
1. FAN FAILURE: COMMANDED ON BUT FAN STATUS IS OFF
2. FAN IN HAND: COMMANDED OFF BUT FAN STATUS IS ON
3. FAN RUN TIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE)
4. DAMPER FAILURE: COMMANDED OPEN BUT STATUS IS CLOSED.

UNIT SHUTDOWN:
THE UNIT SHALL SHUT DOWN IF ONE OF THE FOLLOWING CONDITIONS OCCURS. UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING EXHAUST FAN OFF, DAMPER CLOSED. UPON SHUTDOWN ON ONE OF THE FOLLOWING FAULT CONDITIONS, THE BAS SHALL GENERATE AN ALARM AT THE USER INTERFACE.
1. FAN: FAILURE ALARM PER THE FOLLOWING:
   A. EXHAUST FAN FAILURE: COMMANDED ON BUT STATUS IS OFF
   B. EXHAUST FAN IN HAND: COMMANDED OFF BUT STATUS IS ON
2. ON ACTIVATION OF EMERGENCY STOP.



DEDICATED OUTDOOR UNIT (DOAU-01/02) - DX SEQUENCE OF OPERATION

DEDICATED OUTSIDE AIR UNIT (DOAU):
THE DEDICATED OUTSIDE AIR UNIT (10-DOAU-01) SHALL BE A CONSTANT VOLUME SYSTEM TO PROVIDE BUILDING VENTILATION FOR THE ADMINISTRATION AREAS. THE LAB WILL BE A VARIABLE AIR VOLUME DOAU (10-DOAU-02) INTERLOCKED TO THE EXHAUST HOOD FANS (10-EF-02, 10-EF-03); IT SHALL HAVE A SUPPLY FAN PKG, DX COIL, HOT GAS REHEAT AND ELECTRIC HEATING COIL VENTILATION AIR SHALL BE DELIVERED TO EACH ROOM DIRECTLY UTILIZING A CENTRAL DUCTWORK DISTRIBUTION SYSTEM.

RUN CONDITIONS:
THE DOAU (10-DOAU-01) SHALL RUN AS DEFINED BY THE BUILDING AUTOMATION SYSTEM (BAS) OPERATOR FOR OCCUPIED OR UNOCCUPIED HOURS CONSISTENT WITH THE BUILDING'S OPERATING SCHEDULE OR ANYTIME THE FUME HOOD/CANOPY HOOD FAN IS ENERGIZED (FOR 10-DOAU-01). THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE FANS SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE). THE BAS SHALL ALLOW DOAU TO BE PROGRAMMED FOR START AND STOP BASED ON A USER DEFINABLE SCHEDULE UNIQUE TO EACH DAY OF THE WEEK (SUNDAY THROUGH SATURDAY). UPON RECEIVING A START COMMAND, THE MOTORIZED CONTROL DAMPERS AT THE INTAKE AIR OPENING SHALL OPEN AND THE STATUS SHALL BE CONFIRMED. IF DAMPER STATUS IS NOT CONFIRMED OPEN AFTER 1 MINUTE (ADJUSTABLE) AN ALARM SHALL BE GENERATED AT THE BAS.

DX COIL:
THE DX COIL SHALL OPERATE UNDER MANUFACTURER SUPPLIED SAFETIES AND CONTROLS TO MAINTAIN THE FOLLOWING CONDITIONS. IN COOLING/ DEHUMIDIFICATION MODE DX COOLING COIL SHALL DEHUMIDIFY SUPPLY AIR DOWN TO 50° F DB (ADJUSTABLE) THEN USING HOT GAS REHEAT, (ADJUSTABLE) THE HOT GAS HEATING SECTION SHALL MODULATE TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 68° F (ADJUSTABLE). AN ALARM SHALL BE PROVIDED FOR SUPPLY AIR TEMPERATURE 5° F (ADJUSTABLE) GREATER THAN THE COIL DISCHARGE SETPOINT.

ELECTRIC HEATER OPERATION:
PRE-HEAT MODE CONTROL SHALL BE ENABLED WHENEVER
1. OUTSIDE AIR TEMPERATURE IS LESS THAN 50°F (ADJUSTABLE)
2. AND THE SUPPLY FAN STATUS IS ON
3. AND THE COOLING COIL OPERATION IS DE-ENERGIZED

THE BAS SHALL MODULATE ELECTRIC HEATER SCR CONTROL TO MAINTAIN THE SUPPLY AIR TEMPERATURE (T-03) TO THE SUPPLY AIR TEMPERATURE SETPOINT.

FILTER DIFFERENTIAL PRESSURE MONITOR:
THE BAS SHALL MONITOR THE DIFFERENTIAL PRESSURE (DP-01) ACROSS THE FILTER BANK. ALARMS SHALL BE PROVIDED FOR THE FOLLOWING: FILTER CHANGE REQUIRED: FILTER DIFFERENTIAL PRESSURE EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE).

UNIT SHUTDOWN:
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM AT THE BAS IF ONE OF THE FOLLOWING CONDITIONS OCCURS:
1. SUPPLY AIR SMOKE DETECTION: SA DUCT DETECTORS SHALL BE HARD WIRED TO SHUT DOWN THE UNIT SUPPLY FAN UPON DETECTION OF SMOKE. THE SA SMOKE DETECTOR SHALL ALSO ADDRESS THE FIRE ALARM CONTROL PANEL, RE:FIRE PROTECTION.
2. SUPPLY FAN: SUPPLY FAN FAILURE ALARM PER THE FOLLOWING:
   A. SUPPLY FAN FAILURE: COMMANDED ON, BUT STATUS IS OFF.
   B. SUPPLY FAN IN HAND: COMMANDED OFF, BUT STATUS IS ON.
3. COMMANDED OFF BY BAS.

THE UNIT SHALL SHUTDOWN WHEN COMMANDED OFF BY THE BAS.

UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING: SUPPLY FAN OFF AND OUTSIDE AIR DAMPER CLOSED. UPON ON ONE OF THE ABOVE FAULT CONDITIONS, THE BAS SHALL GENERATE AN ALARM AT THE USER INTERFACE.

PACKAGED 100% OA SINGLE ZONE DOAU & EF CONTROL DIAGRAM & SEQUENCE

NTS

NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

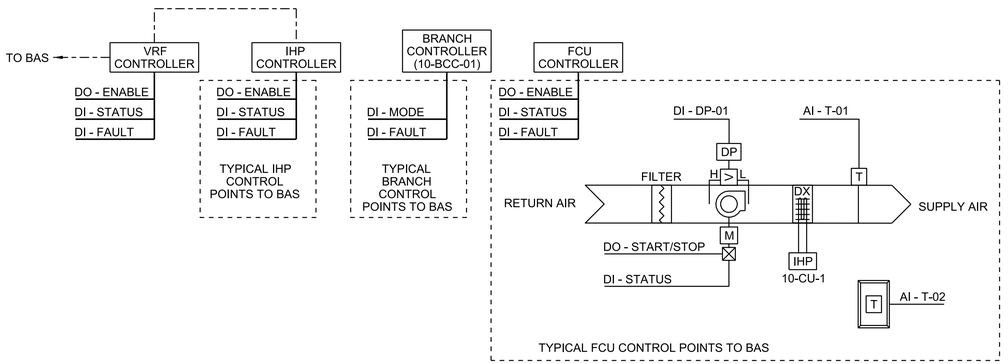
Registered Professional Engineer, Individual
CERTIFICATE NO. 46267
SCOTT HINTE
ARIZONA, U.S.A.
Date Signed 6-30-25
Scott Hinte
Expires 06-30-2026

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	S HINTE
CADD:	S HOSTETLER
TECH. REVIEW:	J SACKINGER
DATE:	06/2025
SUB SHEET NO.	01M6004
TITLE OF SHEET	GENERAL HVAC CONTROL DIAGRAM
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	26 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

VRF SYSTEM I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
VRF SYSTEM CONTROL DIAGRAM & SEQUENCE												
VRF SYSTEM ENABLE	ENABLE			X	X		X	X	X		X	
VRF SYSTEM STATUS	STATUS			X					X		X	
VRF SYSTEM FAULT	FAULT			X			X			X	X	
CU ENABLE	ENABLE			X	X		X	X	X		X	TYP FOR EACH IHP
CU STATUS	STATUS			X					X		X	TYP FOR EACH IHP
CU FAULT	FAULT			X					X		X	TYP FOR EACH IHP
BSB MODE	MODE			X					X		X	MODE-HEATING, COOLING, OFF (TYP FOR EACH)
BSB FAULT	FAULT			X						X	X	TYP FOR EACH BSB
FCU ENABLE	ENABLE			X	X		X	X	X		X	TYP FOR EACH FCU
FCU STATUS	STATUS			X					X		X	TYP FOR EACH FCU
FCU FAULT	FAULT			X						X	X	TYP FOR EACH FCU
FCU FAN START/STOP	START/STOP				X				X		X	TYP FOR EACH FCU
FCU FAN STATUS	DP-01			X					X		X	DIFFERENTIAL PRESSURE SWITCH
FCU SA TEMPERATURE	T-01	X							X	X	X	TEMPERATURE SENSOR (TYP FOR EACH FCU)
ROOM TEMPERATURE	T-02	X							X	X	X	TEMPERATURE SENSOR (TYP FOR EACH ROOM)



VARIABLE REFRIGERANT FLOW SYSTEM (VRF) SEQUENCE

RUN CONDITIONS:
THE VARIABLE REFRIGERANT FLOW (VRF) SYSTEM SHALL RUN ACCORDING TO THE BAS INPUTS AND ITS OWN INTERNAL CONTROLS TO MEET EACH SPACE TEMPERATURE SET POINT IN EACH ZONE. THE VRF SYSTEM'S CONTROLLER SHALL COMMUNICATE WITH THE BAS AT A MINIMUM THE POINTS AS INDICATED FOR EACH PIECE OF EQUIPMENT.

INVERTER HEAT PUMP (IHP) UNIT (10-CU-01):
THE VRF CONTROLLER SHALL OPERATE THE INVERTER HEAT PUMP TO CYCLE ALL COMPRESSORS FOR EQUAL COMPRESSOR RUN TIME. THE VRF CONTROLLER SHALL ALSO MANAGE THE INVERTER HEAT PUMP TO DISABLE COMPRESSORS UNDER FAULT.

BRANCH SELECTOR BOX (BSB):
THE VRF CONTROLLER SHALL POLL THE FAN COIL UNITS (FCU) IN EACH ZONE AND USE INTERNAL CONTROLS TO DETERMINE THE MODE OF OPERATION. IT DELIVERS HEATING OR COOLING REFRIGERANT FLOW REQUIRED FOR EACH INDIVIDUAL FAN COIL UNIT ON THE BRANCH SELECTOR BOX.

FAN COIL UNITS (10-FCU-XX):
THE VRF CONTROLLER SHALL ENABLE AND DISABLE ALL FAN COIL UNITS. THE FCU CONTROLLER SHALL OPERATE THE FCU TO MAINTAIN SPACE TEMPERATURE SETPOINT.

ALARMS SHALL BE PROVIDED AS FOLLOWS:
1. FAN COIL UNIT LEAVING AIR TEMPERATURE IS GREATER THAN 90° F.
2. FAN COIL UNIT LEAVING AIR TEMPERATURE IS LESS THAN 48° F.

FAN COIL UNIT SHUTDOWN:
THE VRF CONTROLLER SHALL DISABLE ANY FAN COIL UNITS IF ONE OF THE FOLLOWING CONDITIONS OCCURS:
1. FCU PRODUCES A FAULT.
2. COMMANDED OFF BY BAS.

INVERTER HEAT PUMP UNIT SHUTDOWN:
1. COMMANDED OFF BY BAS.

BRANCH SELECTOR BOX SHUTDOWN:
1. COMMANDED OFF BY BAS.

VRF SYSTEM SHUTDOWN:
SYSTEM SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING: ALIGN ALL RELATED FAN COIL UNITS, INVERTER HEAT PUMP UNITS, BRANCH SELECTOR BOXES, VALVES AND ANCILLARY EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. THE SYSTEM SHALL SHUTDOWN IF ONE OF THE FOLLOWING CONDITIONS OCCURS:
1. COMMANDED OFF BY BAS.

VRF SYSTEM CONTROL DIAGRAM & SEQUENCE OF OPERATION

NTS

PLOT DATE: 6/17/2025 PLOT TIME: 3:26:47 PM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01M6005_D3167666.dgn

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer, Mechanical
CERTIFICATE NO. 46267 SCOTT HINTE
Date Signed
ARIZONA, U.S.A.
Expires 06-30-2026

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: S HINTE
CADD: S HOSTETLER
TECH. REVIEW: J SACKINGER
DATE: 06/2025

SUB SHEET NO. 01M6005

TITLE OF SHEET
GENERAL HVAC CONTROL DIAGRAM
GRAND CANYON, SOUTH RIM

NO SCALE
DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 27 OF 401

PACKAGED AIR HANDLING UNIT (12-AHU-01) CONTROL SEQUENCE

RUN CONDITIONS - SCHEDULED:
THE UNIT FAN SHALL RUN AS DEFINED BY THE BAS OPERATOR FOR OCCUPIED OR UNOCCUPIED HOURS CONSISTENT WITH THE BUILDING'S OPERATING SCHEDULE. THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN AND RELIEF FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE). THE BAS SHALL ALLOW THE UNIT TO BE PROGRAMMED FOR START AND STOP BASED ON A USER DEFINABLE SCHEDULE UNIQUE TO EACH DAY OF THE WEEK (SUNDAY THROUGH SATURDAY). THE BAS SHALL ALSO MONITOR THE SYSTEM COMPONENTS AND AUTOMATICALLY START AN AIR HANDLING UNIT IF EITHER OF THE FOLLOWING OCCURS:
1. THE AIR HANDLING UNIT SYSTEM CALL FOR COOLING;
2. THE AIR HANDLING UNIT SYSTEM CALL FOR HEATING;

UNIT START:
THE UNIT SHALL EMPLOY AN OPTIMAL START STRATEGY AND SHALL START PRIOR TO SCHEDULED OCCUPANCY BASED ON THE TIME NECESSARY FOR THE ZONES TO REACH THEIR OCCUPIED SETPOINTS. THE START TIME SHALL AUTOMATICALLY ADJUST BASED ON CHANGES IN OUTSIDE AIR TEMPERATURE AND ZONE TEMPERATURES. WHEN THE BAS CALLS FOR THE UNIT TO START, THE FOLLOWING SEQUENCES SHALL BE ACTIVATED:
1. SUPPLY FAN COMMANDED ON.
2. ECONOMIZER OUTSIDE AIR DAMPER (DA-02) CLOSED.
3. RETURN AIR DAMPER (DA-01) OPEN TO BALANCED POSITION.
4. ELECTRIC HEATER ENABLEDTO MAINTAIN TEMPERATURE SETPOINTS.
5. CONDENSING UNIT, COOLING COIL AND HOT GAS BYPASS ENABLED TO MAINTAIN TEMPERATURE SETPOINTS

SUPPLY AIR TEMPERATURE SETPOINT CONTROL:
THE BAS SHALL MONITOR THE UNIT DISCHARGE AIR TEMPERATURE (T-03) AND MAINTAIN A FIXED SUPPLY AIR TEMPERATURE SETPOINT OF 12.7°C (55°F) (ADJUSTABLE).

ECONOMIZER:
THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE (T-01) AND MODULATE THE ECONOMIZER AIR AND RETURN AIR DAMPERS (DA-02 & DA-01, RESPECTIVELY) IN SEQUENCE (OUTSIDE AIR DAMPERS SHALL BE FULLY OPEN BEFORE THE RETURN AIR DAMPER IS CLOSED), ONLY WHEN THE RETURN AIR AND OUTSIDE AIR DAMPER ARE NOT ABLE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE THE DX COOLING COIL IS TO MAINTAIN THE UNIT'S DISCHARGE AIR TEMPERATURE (T-03) AT 12.7°C (55°F) (ADJUSTABLE). THE ECONOMIZER AIR DAMPERS (DA-02) SHALL MAINTAIN A MINIMUM ADJUSTABLE POSITION WHENEVER ENABLED. THE BAS SHALL ENABLE ECONOMIZER OPERATION OF THE ASSOCIATED ERV.

THE ECONOMIZER SHALL BE ENABLED WHENEVER:
1. OUTSIDE AIR TEMPERATURE IS LESS THAN 23.9°C (75°F) (ADJUSTABLE).
2. AND THE OUTSIDE AIR DEWPOINT TEMPERATURE IS LESS THAN 55 F (ADJUSTABLE).
3. AND THE SUPPLY FAN STATUS IS ON.

THE ECONOMIZER SHALL BE DISABLED WHENEVER:
1. OUTSIDE AIR TEMPERATURE EXCEEDS 23.9°C (75°F) (ADJUSTABLE).
2. OR THE OUTSIDE AIR DEWPOINT TEMPERATURE EXCEEDS 12.7°C (55°F) (ADJUSTABLE).
3. OR THE MIXED AIR TEMPERATURE (T-01) IS LESS THAN 10°C (50°F) (ADJUSTABLE) AND THE ECONOMIZER DAMPER)(DA-02) IS AT MINIMUM POSITION FOR 30 MINUTES (ADJUSTABLE).
4. OR THE FREEZESTAT IS ON.
5. OR ON LOSS OF SUPPLY FAN STATUS.

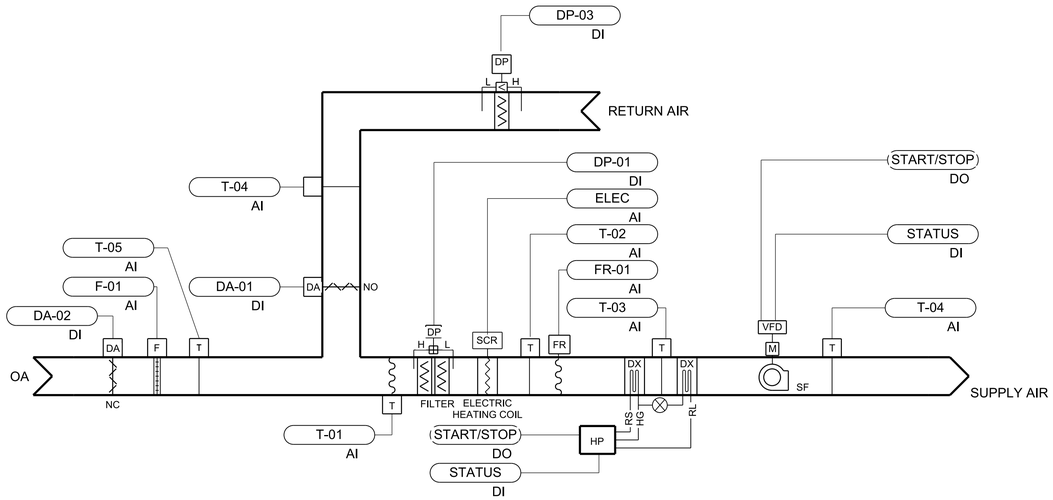
THE OUTSIDE AIR DAMPER SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN WHEN THE UNIT IS OFF.

MIXED AIR TEMPERATURE:
THE BAS SHALL MONITOR THE MIXED AIR TEMPERATURE (T-01) AND USE AS REQUIRED FOR COOLING MODE AND PREHEAT MODE CONTROL.

DX COIL OPERATION:
THE DX COOLING COIL WITH HOTGAS BYPASS AND CONDENSING UNIT SHALL OPERATE UNDER IT'S OWN SAFETIES THE FOLLOWING OPERATIONS:
1. COOLING ONLY MODE: OPERATES WHEN THE COIL'S ENTERING AIR TEMPERATURE (T-02) IS GREATER THAN 12.7°C (55°F)(ADJUSTABLE) AND ENTERING COIL DEWPOINT IS LESS THAN 12.7°C (55°F) (ADJUSTABLE). THE CONTROLLER SHALL OPERATE THE CONDENSING UNIT AND COOLING COIL TO MAINTAIN A 12.7°C (55°F) (ADJUSTABLE) COOLING COIL SUPPLY AIR TEMPERATURE (T-03).

DX COOLING ALARM CONDITIONS:
1. AN ALARM SHALL BE GENERATED AT THE BAS FOR A HIGH SUPPLY AIR TEMPERATURE IF THE COOLING COIL SUPPLY AIR TEMPERATURE (T-05) IS 2.5°C (5°F) (ADJUSTABLE) GREATER THAN THE COIL DISCHARGE SETPOINT
2. AN ALARM CONDITION SHALL BE GENERATED AT THE BAS FOR HIGH SUPPLY AIR TEMPERATURE IF THE HOT GAS BYPASS COIL SUPPLY AIR TEMPERATURE (T-06) IS 2.5°C (5°F)(ADJUSTABLE) GREATER THAN THE COIL DISCHARGE SETPOINT.

DX HEATING OPERATION:
(ENTERING COIL TEMPERATURE IS LESS THAN 12.7°C (55°F) (ADJUSTABLE) AND ENTERING COIL DEWPOINT TEMPERATURE IS LESS THAN 10° C (50°F), THE DX COIL AND HEAT PUMP SHALL OPERATE TO HEAT THE AIR TO 12.7°C (55°F) (ADJUSTABLE).
DX HEATING ALARM CONDITIONS:
AN ALARM SHALL BE PROVIDED FOR HIGH SUPPLY AIR IF THE UNIT'S SUPPLY AIR TEMPERATURE IS 5°F (ADJUSTABLE) GREATER THAN THE SUPPLY AIR SET POINT.



(12-AHU-01) CONTROL SEQUENCE CONTINUED

ELECTRIC HEATER OPERATION:
PREHEAT MODE CONTROL SHALL BE ENABLED WHENEVER:
1. OUTSIDE AIR TEMPERATURE IS LESS THAN 10°C (50°F) (ADJUSTABLE)
2. AND THE SUPPLY FAN STATUS IS ON;
3. AND THE COOLING COIL OPERATION IS DEENERGIZED.

THE BAS SHALL MODULATE ELECTRIC HEATER SCR CONTROL TO MAINTAIN THE HEATING COIL LEAVING AIR TEMPERATURE (T-02) SETPOINT OF 12.8°C (55°F) (ADJUSTABLE). WHEN THE COOLING COIL IS DEACTIVATED AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN 1.7°C (35°F) (ADJUSTABLE) THE SUPPLY AIR TEMPERATURE SHALL BE RESET TO 18.3°C (65°F) (ADJUSTABLE).

ELECTRIC HEATER ALARM:
AN ALARM SHALL BE PROVIDED FOR LOW SUPPLY AIR IF THE SUPPLY AIR TEMPERATURE AT T-02 IS 3°C (5°F) (ADJUSTABLE) LESS THAN THE COIL DISCHARGE SETPOINT.

FILTER DIFFERENTIAL PRESSURE MONITOR:
THE BAS SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER BANK. ALARM SHALL BE PROVIDED WHEN FILTER DIFFERENTIAL PRESSURE EXCEEDS SETPOINT (ADJUSTABLE).

UNIT SHUTDOWN:
THE UNIT SHALL SHUT DOWN IF ONE OF THE FOLLOWING CONDITIONS OCCURS:
1. FREEZESTAT: FREEZESTAT ACTIVATION WHEN COOLING COIL ENTERING AIR TEMPERATURE DROPS BELOW 1.7°C (35°F) (ADJUSTABLE).
2. SUPPLY FAN: SUPPLY FAN FAILURE ALARM PER THE FOLLOWING:
   a. SUPPLY FAN FAILURE: COMMANDED ON, BUT STATUS IS OFF.
   b. SUPPLY FAN IN HAND: COMMANDED OFF, BUT STATUS IS ON.

AIR HANDLING UNIT SHUT DOWN:
UNIT SHUTDOWN SHALL ALIGN THE UNIT COMPONENTS TO THE FOLLOWING (REFER TO CONTROL DIAGRAM FOR ABBREVIATIONS): SUPPLY FAN (SF) OFF, CHILLED COIL DENERGIZED, ELECTRIC HEATER DEENERGIZED, OUTSIDE AIR DAMPER (DA-02) CLOSED, AND RETURN AIR DAMPER (DA-01) OPEN.
UPON SHUTDOWN ON ONE OF THE ABOVE FAULT CONDITIONS, THE BAS SHALL GENERATE AN ALARM AT THE USER INTERFACE.

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 3:32:56 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01M6006_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

Registered Professional Engineer, Mechanical
CERTIFICATE NO.
46267
SCOTT HINTE
Date Signed 6-30-25
ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: S HINTE	SUB SHEET NO.	TITLE OF SHEET: GENERAL HVAC CONTROL DIAGRAM	DRAWING NO. 113 175376
	CADD: S HOSTETLER			PMIS/PKG NO. 257282
	TECH. REVIEW: J SACKINGER	01M6006		SHEET 28 OF 401
	DATE: 06/2025		GRAND CANYON, SOUTH RIM	

PACKAGED AIR HANDLING UNITS (12-AHU-01) I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE				SOFTWARE						COMMENTS
		ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT	ANALOG VALUE	DIGITAL VALUE	SCHEDULE	TREND	ALARM	GRAPHIC	
PACKAGED AHU CONTROL DIAGRAM & SEQUENCE												
HEAT PUMP START/STOP	START/STOP				X				X		X	
HEAT PUMP STATUS	STATUS			X					X		X	
PROVIDE PT DESCRIPTION / NAME	DP-03			X					X	X	X	
ELECTRIC PREHEAT	ELEC				X				X	X	X	SCR ELECTRIC HEATER
RETURN AIR TEMPERATURE	T-04	X							X	X	X	TEMPERATURE SENSOR
RETURN AIR DAMPER	DA-01		X	X					X	X	X	DAMPER ACTUATOR WITH END SWITCH
OUTSIDE AIR TEMPERATURE	T-05	X							X	X	X	TEMPERATURE SENSOR
OUTSIDE AIR FLOW	F-01	X							X		X	AIR FLOW MEASURING STATION
ECONOMIZER DAMPER	DA-02		X	X					X	X	X	DAMPER ACTUATOR WITH END SWITCH
MIXED AIR TEMPERATURE	T-01	X							X	X	X	TEMPERATURE SENSOR (AVERAGING)
FILTER STATUS	DP-01			X					X	X	X	DIFFERENTIAL PRESSURE SWITCH
FREEZE STATUS	FR-01			X					X	X	X	FREEZE STATUS (AVERAGING)
SF START/STOP	START/STOP				X				X		X	
SF SPEED	SPEED		X						X		X	
SF FAULT	FAULT			X					X	X	X	AUX CONTACT FOR VFD
SF VFD STATUS	STATUS			X					X		X	
UNIT LEAVING AIR TEMPERATURE	T-04	X				X			X	X	X	TEMPERATURE SENSOR
HEATING COIL LEAVING TEMPERATURE	T-02	X				X			X	X	X	TEMPERATURE SENSOR
COOLING COIL TEMPERATURE	T-03	X				X			X	X	X	TEMPERATURE SENSOR

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0" 1"

Registered Professional Engineer - Mechanical
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A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: S HINTE
CADD: S HOSTETLER
TECH. REVIEW: J SACKINGER
DATE: 06/2025

SUB SHEET NO. 01M6007

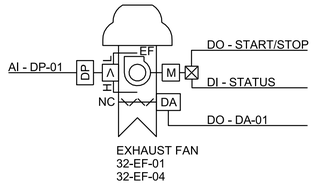
TITLE OF SHEET
GENERAL
HVAC
CONTROL DIAGRAM
GRAND CANYON, SOUTH RIM

NO SCALE

DRAWING NO. 113
175376
PMIS/PKG NO. 257282
SHEET 29 OF 401

PROCESS EXHAUST FAN (32-EF-01, 32-EF-04) I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
PROCESS EXHAUST FAN CONTROL DIAGRAM & SEQUENCE												
EF START/STOP	START/STOP				X				X	X	X	
EF STATUS	DP-01			X					X	X	X	
EA DAMPER	DA-01				X				X	X	X	ELECTRIC DAMPER ACTUATOR - OPEN/CLOSE
EA DAMPER CONFIRMATION	DA-01			X					X	X	X	DAMPER END SWITCH
LOSS OF HEADWORK VENTILATION	STATUS				X					X		SENT TO LCP-2001 GO/NOGO PANEL
EF-20-01 D/P SIGNAL	STATUS			X							X	FROM FIELD TO HVAC-2001
HI-LEL FROM SCADA	STATUS			X							X	FROM LCP-2001
32-EF-01 D/P SIGNAL	STATUS			X							X	FROM FIELD TO HVAC-3201
32-EF-04 D/P SIGNAL	STATUS			X							X	FROM FIELD TO HVAC-3201



PROCESS EXHAUST FAN SEQUENCE OF OPERATIONS

UNIT CONFIGURATION:
EXHAUST FAN SHALL SERVE PROCESS EXHAUST.

RUN CONDITIONS - CONTINUOUS:
EXHAUST FAN SHALL RUN ACCORDING TO THE USER INTERFACE, OR AS COMMANDED BY THE BAS OPERATOR INTERFACE. PROCESS EXHAUST FANS ARE CONTROLLED BY HANDSWITCH OPERATED BY USER.

WHEN COMMANDED ON THE EXHAUST AIR DAMPER SHALL OPEN, IF THE DAMPER STATUS IS NOT CONFIRMED AFTER 1 MINUTE (ADJUSTABLE), AN ALARM SHALL BE SENT TO THE BAS AND THE EXHAUST FAN SHALL BE DISABLED.

FAN:
THE FAN SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME OF 30 MINUTES (ADJUSTABLE).

FAN STATUS:
THE BAS SHALL MONITOR THE FAN STATUS AND GENERATE AN ALARM AT THE USER INTERFACE UPON THE FOLLOWING CONDITIONS:
1. FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
2. FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
3. FAN RUNTIME EXCEEDED: FAN STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT (ADJUSTABLE).
4. DAMPER FAILURE: COMMANDED OPEN BUT STATUS IS CLOSED.

UNIT SHUTDOWN:
THE BAS SHALL SHUTDOWN THE UNIT AND GENERATE AN ALARM AT THE USER INTERFACE UPON ONE OF THE FOLLOWING CONDITIONS:
1. FAN: FAILURE AS INDICATED ABOVE.

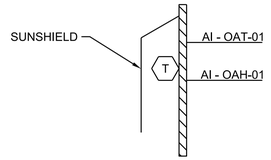
THE UNIT SHALL SHUTDOWN WHEN COMMANDED OFF BY THE BAS.
UPON UNIT SHUTDOWN, THE COMPONENTS SHALL BE ALIGNED TO THE FOLLOWING: EXHAUST FAN OFF, DAMPER CLOSED.

PROCESS EXHAUST FAN CONTROL DIAGRAM & SEQUENCE

NTS

OUTSIDE AIR WEATHER STATION I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
OUTSIDE AIR WEATHER STATION CONTROL DIAGRAM & SEQUENCE												
OUTDOOR AIR TEMPERATURE	OAT-01	X							X		X	TEMPERATURE SENSOR
OUTDOOR AIR HUMIDITY	OAH-01	X							X		X	HUMIDITY SENSOR
OUTDOOR AIR WETBULB						X			X		X	CALCULATED
OUTDOOR AIR DRYBULB						X			X		X	CALCULATED
OUTDOOR AIR ENTHALPY						X			X		X	CALCULATED
SENSOR FAILURE										X		



OUTSIDE AIR WEATHER STATION SEQUENCE OF OPERATION

UNIT CONFIGURATION:
THE UNIT SHALL MONITOR THE OUTSIDE AIR WEATHER CONDITIONS. THE UNIT CONSISTS OF SUN SHASE AND SHALL BE MOUNTED ON BUILDING EXTERIOR WALL.

UNIT SHARED POINTS:
THE UNIT'S POINTS SHALL BE MADE AVAILABLE THROUGH THE BAS TO REQUIRED UNIT/SYSTEM. REFER TO EACH UNIT/SYSTEM SEQUENCE OF OPERATION FOR REQUIRED POINTS.

OUTSIDE AIR CONDITIONS:
THE CONTROLLER SHALL MONITOR THE OUTSIDE AIR DRYBULB AND RELATIVE HUMIDITY AND CALCULATE THE OUTSIDE AIR ENTHALPY, OUTSIDE AIR WETBULB TEMPERATURE, AND THE OUTSIDE DEWPOINT ON A CONTINUAL BASIS. THESE VALUES SHALL BE MADE AVAILABLE TO THE SYSTEM AT ALL TIMES.

ALARM SHALL BE GENERATED AS FOLLOWS:
1. SENSOR FAILURE: SENSOR READING INDICATES SHORTED OR DISCONNECTED SENSOR. IN THE EVENT OF A SENSOR FAILURE, AN ALTERNATE OUTSIDE AIR CONDITIONS SENSOR SHALL BE MADE AVAILABLE TO THE SYSTEM WITHOUT INTERRUPTION IN SENSOR READINGS.

OUTSIDE AIR TEMPERATURE HISTORY:
THE CONTROLLER SHALL MONITOR AND RECORD THE HIGH AND LOW TEMPERATURE AND HUMIDITY READINGS FOR THE OUTSIDE AIR ON A ONCE PER HOUR (DATA/POINT ONLY) BASIS. THESE READINGS SHALL BE RECORDED ON A DAILY, MONTH-TO-DATE, AND YEAR-TO-DATE BASIS.

OUTSIDE AIR WEATHER STATION CONTROL DIAGRAM & SEQUENCE

NTS

NO SCALE

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0" 1"

Registered Professional Engineer, Member Arizona
CERTIFICATE NO. 46267 SCOTT HINTE
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A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	S HINTE CADD: S HOSTETLER TECH. REVIEW: J SACKINGER DATE: 06/2025	01M6008	GENERAL HVAC CONTROL DIAGRAM GRAND CANYON, SOUTH RIM	113 175376 PMIS/PKG NO. 257282 SHEET 30 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

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PLUMBING SYMBOLS

- EXISTING PIPE (SCREENED)
- NEW PIPE
- EXISTING PIPE TO BE ABANDONED
- EXISTING PIPE TO BE REMOVED
- ANCHOR
- CAP
- CLEANOUT PLUG
- ELBOW, 90 DEGREE
- ELBOW UP
- ELBOW DOWN
- CROSS
- TEE
- TEE UP
- TEE DOWN
- ELBOW, 45 DEGREE
- LATERAL
- LATERAL UP
- LATERAL DOWN
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- UNION
- GROOVED END JOINT
- FLEXIBLE PIPE CONNECTION
- STEEL BELLOWS EXPANSION JOINT
- STRAINER
- SIGHT GLASS
- PS — PRESSURE SWITCH
- PRESSURE GAUGE WITH COCK
- THERMOMETER
- HOSE RACK (TYPE AS INDICATED)
- EYEWASH
- S — SAFETY SHOWER
- S — SAFETY SHOWER\EYEWASH COMBINATION UNIT
- HOSE VALVE

Z" YCO-X
Z = OUTLET SIZE IN INCHES
Y = F - FLOOR CLEANOUT
W - WALL CLEANOUT
X = NO. IN SPECIFICATION

Z" HD-X — HUB DRAIN
Z = OUTLET SIZE IN INCHES
X = NO. IN SPECIFICATION

Z" FD-X — FLOOR DRAIN
Z = OUTLET SIZE IN INCHES
X = NO. IN SPECIFICATION

Z" RD-X — ROOF DRAIN
Z = OUTLET SIZE IN INCHES
X = NO. IN SPECIFICATION

Z" OD-X — OVERFLOW ROOF DRAIN
Z = OUTLET SIZE IN INCHES
X = NO. IN SPECIFICATION

PLUMBING EQUIPMENT IDENTIFICATION

IDENTIFICATION	EQUIPMENT NAME
AAV	AIR ADMITTANCE VALVE
AD	AREA DRAIN
AC	AIR COMPRESSOR
ANT	ACID NEUTRALIZATION TANK
AR	AIR RECEIVER
BFP	BACKFLOW PREVENTER
BP	BOOSTER PUMP
CO	CLEANOUT
CP	CIRCULATION PUMP
DB	DOWNSPOUT BOOT
DCBP	DOUBLE CHECK BACKFLOW PREVENTER
DCO	DOUBLE CLEANOUT
DN	DOWNSPOUT NOZZLE
DT	DILUTION TANK
DWT	DOMESTIC WATER STORAGE TANK
ET	EXPANSION TANK
ETP	ELECTRONIC TRAP PRIMER
IM	ICE MAKER
HX	HEAT EXCHANGER
OD	OVERFLOW ROOF DRAIN
ON	OVERFLOW NOZZLE
OS	OIL\WATER SEPERATOR
P	PUMP
RD	ROOF DRAIN
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
ST	STORAGE TANK
SP	SUMP PUMP
TP	TRAP PRIMER ASSEMBLY
TWT	TEPID WATER STORAGE TANK
WCO	WALL CLEANOUT
WH	WATER HEATER
WHA	WATER HAMMER ARRESTOR
VP	VACUUM PUMP

EXAMPLE CALLOUT:

70 - WH - 1
- 70 — FACILITY NUMBER OR UNIT PROCESS (IF USED ON PROJECT)
- WH — FIXTURE LEGEND
- 1 — NO. IN SPECIFICATIONS

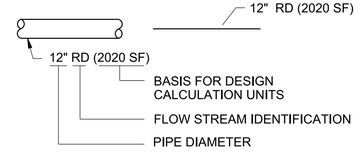
VALVE SYMBOLS

SINGLE LINE	DOUBLE LINE
GATE	
BUTTERFLY	OR
GLOBE	OR
BALL	OR
PLUG OR COCK	OR
SWING CHECK	OR
BALL CHECK	OR

- HOSE VALVE (HV- X) OR (V-X) X = NO. IN SPECS
- PRESSURE RELIEF
- AIR AND/OR VACUUM RELEASE
- REGULATED SIDE
- PRESSURE CONTROL (INTERNAL PILOT)
- BALANCE VALVE (RHW)
- BACKFLOW PREVENTER

PIPING DESIGNATION

EXAMPLE:



PIPE SERVICE IDENTIFICATION	DESCRIPTION	BASIS FOR DESIGN CALCULATION UNITS
AW	ACID WASTE	DRAINAGE FIXTURE DFU
AV	ACID VENT	DRAINAGE FIXTURE UNIT DFU
D	DRAIN	DRAINAGE FIXTURE UNIT - DFU
HW	HOT WATER	FLOW IN GALLONS PER MINUTE GPM
HWR	HOT WATER RETURN	FLOW IN GALLONS PER MINUTE GPM
RW	RECLAIMED WATER	FLOW IN GALLONS PER MINUTE
RD	ROOF DRAIN	DRAINAGE AREA IN SQUARE FOOTAGE - SF
SS	SANITARY SEWER	DRAINAGE FIXTURE UNIT DFU
TW	TEPID WATER	FLOW IN GALLONS PER MINUTE GPM
TWR	TEPID WATER RETURN	FLOW IN GALLONS PER MINUTE GPM
V	SANITARY VENT	DRAINAGE FIXTURE UNIT - DFU
W1	POTABLE WATER	FLOW IN GALLONS PER MINUTE GPM
PD	PLANT DRAIN	DRAINAGE FIXTURE UNIT - DFU

PLUMBING FIXTURE IDENTIFICATION

LEGEND	FIXTURE
DF	DRINKING FOUNTAIN
EE	EMERGENCY EYE WASH
ES	EMERGENCY SAFETY SHOWER
EWC	ELECTRIC WATER COOLER
HB	HOSE BIB
LAV	LAVATORY
LSK	LABORATORY SINK
LP	LABORATORY FAUCET OR COCK
MS	MOP SINK
SH	SHOWER
S	SINK
SSH	SAFETY SHOWER\EYEWASH COMBINATION
SSK	SERVICE SINK
UR	URINAL
WC	WATER CLOSET
WF	WASH FOUNTAIN
HV	HOSE VALVE OR HYDRANT
WS	AUTOMATIC WASHER
YH	YARD HYDRANT

EXAMPLE CALLOUT: SSH - 1
- SSH — FIXTURE LEGEND
- 1 — NO. IN SPECIFICATIONS

PLUMBING FIXTURE SCHEDULE

ITEM	DESCRIPTION	D	V	W1	HW	RW	TW	COMMENTS
WC-1	FLOOR MTD WATER CLOSET	4"	2"	-	-	1 1/4"	-	ADA COMPLIANT 1.28 GPF MANUAL FLUSH VALVE
LAV-1	LAVATORY	1 1/2"	1 1/2"	3/8"	3/8"	-	-	ADA COMPLIANT, PROVIDE WITH ASSE 1070 THERMOSTATIC MIXING VALVE 0.5 GPM MANUAL SINGLE LEVER FAUCET, GRID STRAINER, OFFSET TRAP
S-1	SINK (KITCHEN)	1 1/2"	1 1/2"			-	-	PROVIDE WITH FOOD DISPOSER (120V/1PH/0.75HP)
S-2	SAMPLE SINK (PROCESS)	1 1/2"	1 1/2"	1/2"	1/2"	1/2"	-	PROVIDE WITH UNDERSINK ACID NEUTRALIZATION SYSTEM
MS-1	MOP SINK	3"	1 1/2"	1/2"	1/2"	-	-	
SSK-1	SERVICE SINK	2"	1 1/2"	1/2"	1/2"	-	-	
SH-1	SHOWER	2"	1 1/2"	1/2"	1/2"	-	-	ADA COMPLIANT WITH 1.5 GPM HAND SHOWER WITH NON-POSITIVE SHUTOFF, 60" HOSE, AND VACUUM BREAKER
EWC-1	ELECTRIC WATER COOLER	1 1/2"	1 1/2"	1/2"	-	-	-	ADA COMPLIANT
SSH-1	SAFETY SHOWER\EYEWASH	-	-	-	-	-	1 1/4"	
HB-1	HOSE BIBB	-	-	-	-	3/4"	-	
NFWH-1	NON-FREEZE WALL HYDRANT	-	-	-	-	3/4"	-	

ACID NEUTRALIZATION TANK SCHEDULE

ITEM	DESCRIPTION	CAPACITY	INLET	OUTLET	DIA	HEIGHT	COMMENTS
ANT-1	UNDERSINK ACID NEUTRALIZATION SYSTEM	8 GPM	1 1/2"	1 1/2"	6 9/32"	14 1/4"	

VALVE DESIGNATIONS

MANUAL VALVES AND CHECK VALVES

EXAMPLE CALLOUT:

V 300
- V — VALVE DESIGNATION
- 300 — VALVE TYPE, SEE SPECIFICATIONS

GENERAL DRAWING NOTES

1. THIS IS A STANDARD LEGEND SHEET. SOME SYMBOLS OR ABBREVIATIONS ON THIS SHEET MAY NOT APPEAR ON THE PLANS.
2. FOR ADDITIONAL ABBREVIATIONS OF OTHER DIVISIONS, SEE OTHER LEGENDS SUCH AS GENERAL, HVAC, MECHANICAL, FIRE PROTECTION, STRUCTURAL AND ARCHITECTURAL LEGENDS.
3. FOR ADDITIONAL FLOW STREAM IDENTIFICATIONS OF OTHER DIVISIONS SEE OTHER LEGENDS SUCH AS GENERAL, INSTRUMENTATION AND CONTROL, HVAC, MECHANICAL, FIRE PROTECTION, STRUCTURAL AND ARCHITECTURAL LEGENDS.
4. PLUMBING FIXTURES UTILIZING RECLAIMED WATER SHALL BE LABELED "CAUTION! NON-POTABLE WATER- DO NOT DRINK". REFER TO DETAIL 1014-002.

NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer — CERTIFICATE NO. 46267 — SCOTT HINTE — Date Signed 6-30-25 — ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	S HINTE
CADD:	S HOSTETLER
TECH. REVIEW:	J SAKINGER
DATE:	06/2025
SUB SHEET NO.	01P0001
TITLE OF SHEET	GENERAL PLUMBING LEGEND
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	31 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

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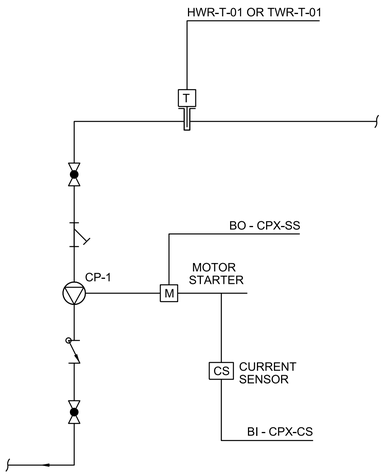
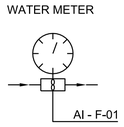


CIRCULATION PUMP POINTS LIST (10-CP-1, 10-CP-2, 32-CP-1) POINTS LIST

POINT NAME	POINT I/O	HARDWARE				SOFTWARE						COMMENTS
		ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT	ANALOG VALUE	DIGITAL VALUE	SCHEDULE	TREND	ALARM	GRAPHIC	
CP-1 START/STOP	START/STOP				X				X		X	
CP-1 TEMPERATURE	T-01	X							X	X	X	TEMPERATURE SENSOR
CP-1 STATUS	STATUS			X						X	X	CURRENT SENSOR

CIRCULATION PUMP CONTROL DIAGRAM

NTS



POTABLE WATER METER POINTS LIST

POINT NAME	POINT I/O	HARDWARE				SOFTWARE						COMMENTS
		ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT	ANALOG VALUE	DIGITAL VALUE	SCHEDULE	TREND	ALARM	GRAPHIC	
WATER METER	GALLONS	X							X		X	

WATER METER CONTROL DIAGRAM

NTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer CERTIFICATE NO. 46267 SCOTT HINTE Date Signed 6-25-25 ARIZONA, U.S.A.
Scott Hinte
Expires 06-30-2026

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: S HINTE
CADD: S HOSTETLER
TECH. REVIEW: J SACKINGER
DATE: 06/2025

SUB SHEET NO. 01P6001

TITLE OF SHEET
GENERAL PLUMBING CONTROL DIAGRAM
GRAND CANYON, SOUTH RIM

NO SCALE

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 32 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 6/17/2025 PLOT TIME: 3:53:36 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01P6001_D3167666.dgn

SANITARY LIFT STATION PUMP I/O POINTS LIST

POINT NAME	POINT ID	HARDWARE: ANALOG INPUT	HARDWARE: ANALOG OUTPUT	HARDWARE: DIGITAL INPUT	HARDWARE: DIGITAL OUTPUT	SOFTWARE: ANALOG VALUE	SOFTWARE: DIGITAL VALUE	SOFTWARE: SCHEDULE	SOFTWARE: TREND	SOFTWARE: ALARM	GRAPHIC	COMMENTS
PUMP SP-1 STATUS	SE1-STAT			X					X			ELECTRIC CURRENT SWITCH
PUMP SP-2 STATUS	SE2-STAT			X					X			ELECTRIC CURRENT SWITCH
HIGH WATER ALARM	SE3-HWA			X						X	X	FURNISHED WITH SE-1/2
PUMP FAILURE ALARM	SE1-PFA					X				X	X	CALCULATED VALUES BASED ON SAME PUMP RUNNING WITHOUT ALTERNATION
MAINTENANCE ALARM	SE1-MAINT					X				X	X	CALCULATED VALUES BASED ON RUN TIME: ONE PER PUMP
LAG PUMP ALARM	SE2-PFA						X			X	X	SIGNAL WHEN TWO PUMPS RUN AT SAME TIME

SANITARY EJECTOR PUMP SEQUENCE OF OPERATION

GENERAL:
THIS SYSTEM IS PROVIDED TO PERFORM THE NECESSARY LIFTING OF SANITARY SEWAGE TO A LEVEL WHERE IT CAN BE REMOVED FROM THE BUILDING BY GRAVITY FLOW.

THIS SYSTEM CONSISTS OF THE FOLLOWING:
1. SANITARY WASTE INLET
2. PUMP BASIN
3. (2) SUBMERSIBLE LIFT STATION PUMPS; EACH SELECTED FOR 100% DUTY
4. FLOATS TO OPERATE THE SYSTEM.
5. A CONTROL PANEL WITH MOTOR STARTERS, WITH PUMP ALTERNATOR AND AUXILIARY CONTACTS TO INDICATE PUMP OPERATION.
6. TWO DIGITAL INPUTS TO THE BAS INDICATING PUMP RUNNING. CURRENT SWITCHES IN THE PUMP STARTER PANEL ARE PROVIDED AS INDICATION THAT THE PUMP IS RUNNING.
7. A DIGITAL INPUT TO INDICATE THE SYSTEM IS IN HIGH WATER ALARM.

FLOAT SWITCHES:
THE FOLLOWING FLOAT SWITCHES ARE PROVIDED:
1. TOP OF SUMP REFERENCE: ELEVATION 6777.0' (+ 12')
2. SANITARY WASTE INLET INVERT: ELEVATION 6772.43' (+ 7.43')
3. HIGH LEVEL ALARM: ELEVATION 6771.9' (+ 6.9' OR 649 GALLONS)
4. PUMP #2 ON: ELEVATION 6771.4' (+ 6.4 OR 602 GALLONS)
5. PUMP #1 ON: ELEVATION 6770.9' (+ 5.9 OR 555 GALLONS)
6. PUMPS OFF: ELEVATION 6767.0' (+ 2.0' OR 188 GALLONS)
7. BOTTOM OF SUMP REFERENCE: ELEVATION 6765.0' (0'-0"/ 0 GALLONS)

MANUAL OPERATION:
A "TEST-OFF-AUTO" SELECTOR SWITCH IS PROVIDED ON THE PUMP CONTROL CABINET FOR EACH PUMP. THE "TEST" POSITION INCLUDES A SPRING RETURN TO THE "OFF" POSITION AND IS USED TO INITIATE THE OPERATION OF EACH PUMP INDEPENDENT OF THE FLOAT CONTROLS.

BAS MONITORING:
THE BAS SYSTEM WILL MONITOR THE FOLLOWING:
1. PUMP RUN TIME (EACH)
2. PUMP RUN TIME (TWO PUMPS RUNNING)
3. "LAG" PUMP IN OPERATION
4. HIGH LEVEL ALARM

THE BAS SYSTEM OPERATORS WILL BE ALERTED WITH THE FOLLOWING EVENTS:
1. HIGH LEVEL ALARM
2. SAME PUMP OPERATING THREE TIMES IN A ROW WITHOUT ALTERNATION
3. MAINTENANCE RUN TIME ALERTS

PUMP OPERATION:
EACH PUMPING SYSTEM INCLUDES A PACKAGED CONTROLLER THAT INCLUDES PUMP MOTOR STARTERS, ALTERNATORS, RELAYS, AND FLOAT SWITCHES.

EACH PUMP CIRCUIT INCLUDES A LATCHING RELAY SYSTEM SUCH THAT WHEN THE "PUMP #1" FLOAT SWITCH CLOSES THE PUMP OPERATION CIRCUIT, A RELAY WILL ENERGIZE THE PUMP CIRCUIT AND LATCH ITSELF IN THE "ON" POSITION. THE LATCHED RELAY WILL HOLD THE PUMP CIRCUIT "ON". UNTIL THE "PUMPS OFF" FLOAT SWITCH IS ENGAGED, AT WHICH TIME THE LATCHING CIRCUIT WILL BE DIS-ENGAGED.

AT THE COMPLETION OF EACH CYCLE, THE SYSTEM ALTERNATOR WILL SWITCH THE "LEAD" PUMP SELECTION.

SANITARY WASTE IS ALLOWED TO FLOW FREELY INTO THE SANITARY WASTE SUMP.

STARTING WITH THE WASTE WATER LEVEL AT THE "PUMPS OFF" POSITION, THE "PUMPS OFF" FLOAT SWITCH CONTACT IS "OPEN", THE "PUMP #1 ON" FLOAT SWITCH CONTACT IS "OPEN", THE "PUMP #2 ON" FLOAT SWITCH CONTACT IS "OPEN" AND THE HIGH WATER ALARM FLOAT SWITCH IS "OPEN" ON RISE IN WASTE WATER LEVEL, INITIALLY THE "PUMPS OFF" FLOAT SWITCH CONTACT WILL CLOSE. THIS WILL ALLOW THE HOLDING RELAYS IN THE PUMP STARTER CIRCUITS TO "ENGAGE". THE "PUMP #1 ON" AND "PUMP #2 OFF" FLOAT SWITCH CONTACTS WILL REMAIN OPEN.

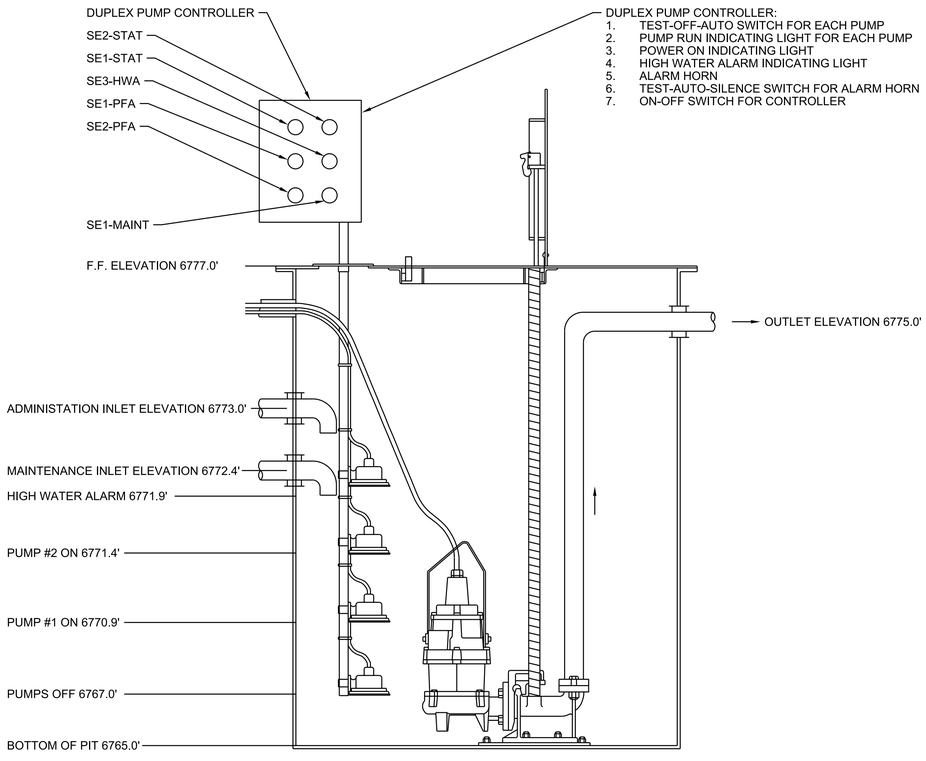
ON RISE IN WASTE WATER LEVEL TO THE "PUMP #1 ON" LEVEL, THE FLOAT SWITCH CONTACT WILL CLOSE, ENERGIZING THE "LEAD" PUMP OPERATION HOLDING RELAY AND THE "LEAD" PUMP STARTER. IF THE WATER LEVEL DROPS, THE "LEAD" PUMP WILL CONTINUE TO OPERATE UNTIL THE "PUMPS OFF" FLOAT SWITCH CONTACT OPENS, DE-ENERGIZING THE PUMP STARTER AND ITS HOLDING CIRCUIT RELAY. WHEN THE PUMP IS IN OPERATION, THE BAS WILL MONITOR ITS RUN TIME THROUGH THE USE OF A CURRENT SWITCH.

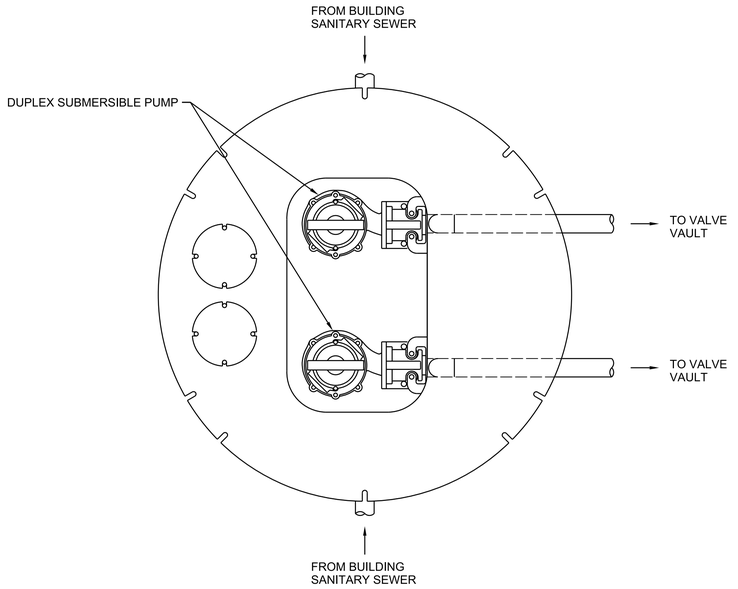
AFTER THE "PUMP #1 ON" FLOAT SWITCH CONTACT IS CLOSED, IF THE WASTE WATER LEVEL CONTINUES TO RISE AND RISES TO THE "PUMP #2 ON" LEVEL, THE FLOAT SWITCH CONTACT WILL CLOSE, ENERGIZING THE "LAG" PUMP OPERATION HOLDING RELAY AND THE "LAG" PUMP STARTER. IF THE WATER LEVEL DROPS, THE "LAG" PUMP AND THE "LEAD" PUMP WILL CONTINUE TO OPERATE UNTIL THE "PUMPS OFF" FLOAT SWITCH CONTACT OPENS, DE-ENERGIZING BOTH PUMP STARTERS AND BOTH HOLDING CIRCUIT RELAYS. WHEN THE PUMPS ARE IN OPERATION, THE BAS WILL MONITOR BOTH PUMP CURRENT SWITCHES RUN TIME AND INDICATE TO THE BAS SYSTEM OPERATOR THAT TWO PUMPS ARE IN OPERATION.

AFTER THE "PUMP #2 ON" FLOAT SWITCH CONTACT IS CLOSED, IF THE WASTE WATER LEVEL CONTINUES TO RISE AND RISES TO THE "HIGH LEVEL ALARM" LEVEL, THE FLOAT SWITCH CONTACT WILL CLOSE, ENERGIZING THE "HIGH WATER ALARM" SIGNAL TO THE BAS SYSTEM OPERATOR.

SANITARY LIFT STATION CONTROL DIAGRAM AND SEQUENCE

NTS





FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer – Mechanical – CERTIFICATE NO. 46267 – SCOTT HINTE – Date Signed 6-30-25 – ARIZONA, U.S.A.
Expires 06-30-2026

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: S HINTE	SUB SHEET NO. 01P6002	TITLE OF SHEET: GENERAL PLUMBNG CONTROL DIAGRAM; GRAND CANYON, SOUTH RIM	NO SCALE
	CADD: S HOSTETLER			DRAWING NO. 113 175376
	TECH. REVIEW: J SACKINGER			PMIS/PKG NO. 257282
	DATE: 06/2025			SHEET 33 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 3:53:35 PM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01P6002_D3167666.dgn

ONE-LINE DIAGRAM-1

SYMBOL	DESCRIPTION
	DRAWOUT AIR CIRCUIT BREAKER, LOW VOLTAGE
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE, UNO
AS/AF or AT/AF	CIRCUIT BREAKER, STATIC TRIP UNIT, SENSOR AMP TRIP AND FRAME RATINGS SHOWN, 3 POLE, UNO
100/M	CIRCUIT BREAKER, MAGNETIC TRIP ONLY, TRIP RATING SHOWN, 3 POLE, UNO
400 400	CIRCUIT BREAKER WITH CURRENT LIMITING FUSES, TRIP AND FUSE RATING INDICATED, 3 POLE, UNO
400 225	FUSED SWITCH, SWITCH AND FUSE CURRENT RATING INDICATED, 3 POLE, UNO
100	SWITCH, CURRENT RATING INDICATED, 3 POLE, UNO
60 (3)	FUSE, CURRENT RATING AND QUANTITY INDICATED
1	MAGNETIC STARTER WITH OVERLOAD, NEMA SIZE INDICATED, FVNR UNO
AFD	ELECTRONIC STARTER/SPEED CONTROL RVSS = REDUCED VOLTAGE SOFT STARTER AFD = AC ADJUSTABLE FREQUENCY DRIVE DC = DC ADJUSTABLE SPEED DRIVE RVAT = REDUCED VOLTAGE AUTO TRANSFORMER TYPE RVRT = REDUCED VOLTAGE REACTOR TYPE
	CABLE OR BUS CONNECTION POINT
K	KEY INTERLOCK
ST	SHUNT TRIP DEVICE
	CAPACITOR - KVAR INDICATED, 3 PHASE
3	AC MOTOR, SQUIRREL CAGE INDUCTION - HORSEPOWER INDICATED
G 500/625	GENERATOR, KW/KVA RATING SHOWN
VS V 0-600V	ANALOG METER WITH SWITCH - SCALE RANGE SHOWN V = VOLTAGE KW = KILOWATTS A = AMPERAGE KVAR = KILOVARS PF = POWER FACTOR
DPM	DIGITAL POWER METER (MULTIFUNCTION)
	UTILITY REVENUE METER
	GROUND
15 KVA 480-120/240V 1 PH	TRANSFORMER, SIZE, VOLTAGE RATINGS, AND PHASE INDICATED
	SHIELDED ISOLATION TRANSFORMER
480-120V (3)	POTENTIAL TRANSFORMER, VOLTAGE RATING AND QUANTITY INDICATED
100:5 (3)	CURRENT TRANSFORMER, RATIO(100:5) AND QUANTITY INDICATED (3)
	CONNECTION POINT TO EQUIPMENT SPECIFIED IN OTHER DIVISIONS. RACEWAY, CONDUCTOR AND CONNECTION IN THIS DIVISION
SPD	SURGE PROTECTIVE DEVICE

ONE-LINE DIAGRAM-2

SYMBOL	DESCRIPTION
	TERMINAL BLOCK LUG
	DELTA CONNECTION
	WYE GROUNDED CONNECTION, SOLID GROUND
R or Z	WYE NEUTRAL GROUND RESISTOR OR IMPEDANCE CONNECTION
86	RELAY OR DEVICE, FUNCTION NUMBER AS INDICATED
50:5 (1)	CURRENT TRANSFORMER, ZERO SEQUENCE, RATIO AND QUANTITY INDICATED
800/1200:5 (3)	BUSHING CURRENT TRANSFORMER, MULTI-RATIO AND QUANTITY INDICATED
MO	MOTOR OPERATOR, BREAKER OR SWITCH
EUM	ENERGY MONITORING UNIT
MRP	MOTOR PROTECTION RELAY
AFD	ADJUSTABLE FREQUENCY DRIVE

CONTROL DIAGRAM-1

SYMBOL	DESCRIPTION
	PUSHBUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSHBUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	PUSHBUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
	3 POSITION SELECTOR SWITCH MAINTAINED CONTACT
HAND OFF REMOTE	SELECTOR SWITCH - MAINTAINED CONTACT - CHART IDENTIFIES OPERATION WHEN NEEDED FOR CLARITY:

	POSITION		
CKT	HAND	OFF	REMOTE
1	X	O	O
2	O	O	X

X - CLOSED CONTACT
O - OPEN CONTACT

SYMBOL	DESCRIPTION
	TOGGLE SWITCH, ON-OFF TYPE
	MUSHROOM HEAD PUSHBUTTON SWITCH
ON OFF	SELECTOR SWITCH, ON-OFF TYPE
A	INDICATING LIGHT, PUSH-TO-TEST, LETTER INDICATES COLOR
A	INDICATING LIGHT - LETTER INDICATES COLOR A - AMBER G - GREEN S - STROBE B - BLUE R - RED C - CLEAR W - WHITE

GENERAL NOTES

1. THESE ARE STANDARD LEGEND SHEETS. SOME SYMBOLS AND ABBREVIATIONS MAY APPEAR ON THE LEGEND AND NOT ON THE DRAWINGS.
2. FOR ABBREVIATIONS OF OTHER DIVISIONS (HVAC, MECHANICAL, STRUCTURAL/ARCHITECTURAL, AND ELECTRICAL), SEE OTHER LEGENDS.

CONTROL DIAGRAM-2

SYMBOL	DESCRIPTION
ETM	ELAPSED TIME METER
M	MOTOR STARTER CONTACTOR COIL
CRX	CONTROL RELAY, X INDICATES NUMERICAL ORDER IN CIRCUIT
TDR X	TIME DELAY RELAY, X INDICATES NUMERICAL ORDER IN CIRCUIT
SV X	SOLENOID VALVE, X INDICATES NUMERICAL ORDER IN CIRCUIT
	CONTACT - NORMALLY OPEN
	CONTACT - NORMALLY CLOSED
	REMOTE DEVICE
	TIME DELAY RELAY CONTACT, NORMALLY OPEN, CLOSES WHEN ENERGIZED AND TIMED OUT
	TIME DELAY RELAY CONTACT, NORMALLY CLOSED, OPENS WHEN ENERGIZED AND TIMED OUT
	TIME DELAY RELAY CONTACT, CLOSES WHEN ENERGIZED, OPENS WHEN DE-ENERGIZED AND TIMED OUT
	TIME DELAY RELAY CONTACT, OPENS WHEN ENERGIZED, CLOSES WHEN DE-ENERGIZED AND TIMED OUT
	MOTOR SPACE HEATER
	TERMINAL BLOCK
	FUSED TERMINAL BLOCK
	FUSE, RATING INDICATED
CPT 120V	TRANSFORMER, CONTROL POWER
	LIMIT SWITCH, NORMALLY OPEN, CLOSES AT END OF TRAVEL
	LIMIT SWITCH, NORMALLY CLOSED, OPENS AT END OF TRAVEL
	TEMPERATURE SWITCH, OPENS ON TEMPERATURE RISE
	TEMPERATURE SWITCH, CLOSES ON TEMPERATURE RISE
	FLOAT SWITCH, NORMALLY OPEN, CLOSES ON DESCENDING LEVEL
	FLOAT SWITCH, NORMALLY OPEN, CLOSES ON RISING LEVEL
	PRESSURE SWITCH, NORMALLY CLOSED, OPENS ON RISING PRESSURE
	PRESSURE SWITCH, NORMALLY OPEN, CLOSES ON RISING PRESSURE
	FLOW SWITCH, CLOSES ON INCREASED FLOW
	FLOW SWITCH, OPENS ON INCREASED FLOW
NGR	NEUTRAL GROUND CURRENT LIMITING RESISTOR
	MULTICONDUCTOR SHIELDED CABLE
L U	RELAY, WITH MECHANICAL LATCH

LIGHTING SYSTEM PLAN

SYMBOL	DESCRIPTION
XX	LUMINAIRE, SEE SCHEDULE
XX	LUMINAIRE, SEE SCHEDULE
XX	LUMINAIRE WITH INTERNAL BATTERY BACKUP, SEE SCHEDULE
XX XX 4 or 4	LUMINAIRE AND POLE, SEE SCHEDULE
XX XX 5 or 5	WALL MOUNTED LUMINAIRE, SEE SCHEDULE
XX 1	FLOOD LIGHTS - AIM IN THE DIRECTION SHOWN
XX	STANDBY LIGHTING UNIT, SURFACE MOUNTED, SEE SCHEDULE
XX or XX	EXIT LIGHTS - FILLED SECTION INDICATES LIGHTED FACE, ARROW INDICATES EGRESS DIRECTIONAL INDICATORS, XX = FIXTURE NUMBER, SEE SCHEDULE
$a or XX (2a)	SMALL LETTER SUBSCRIPT AT SWITCH AND LUMINAIRE INDICATES SWITCHING. SUBSCRIPT NUMBER AT LUMINAIRE INDICATES CIRCUIT XX = FIXTURE NUMBER, SEE SCHEDULE
$3	WALL SWITCH: 2- DOUBLE POLE P- PILOT LIGHT 3- THREE WAY K- KEY OPERATED 4- FOUR WAY D- DIMMER WP- WEATHERPROOF CR- CORROSION RESISTANT EX- EXPLOSIONPROOF L- MOMENTARY 3-WAY M- MOTOR RATED MS- MANUAL STARTER OS- OCCUPANCY SENSOR WITH OVERLOADS
OS	OCCUPANCY SENSOR
LC	LIGHTING CONTACTOR
MD	MOTION DETECTOR
PC	PHOTOCELL
DS	DAYLIGHT SENSOR
	GO / NO GO WARNING LIGHT GAS DETECTION SYSTEM

GROUND SYSTEM PLAN

SYMBOL	DESCRIPTION
	GROUND ROD
	GROUND ROD IN TEST WELL
A	LIGHTNING PROTECTION AIR TERMINAL
G	GROUNDING CONDUCTOR, #4/0 AWG BARE COPPER UNLESS OTHERWISE NOTED
	PIGTAIL FOR CONNECTION TO EQUIPMENT CABINET OR FRAME
G	EQUIPMENT GROUND BUS
N	EQUIPMENT NEUTRAL BUS

FIRE ALARM SYSTEM PLAN AND RISER

SYMBOL	DESCRIPTION
FP	FIRE ALARM STATION, MANUAL
	FIRE ALARM SYSTEM, AUTOMATIC SMOKE DETECTOR
HD	FIRE ALARM SYSTEM, AUTOMATIC, HEAT DETECTOR
F	FIRE ALARM BELL
F	FIRE ALARM HORN
	FIRE ALARM HORN/STROBE LIGHT

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer (Electrical) CERTIFICATE NO. 81240 DAVID BURGER Date Signed 6-19-2025 ARIZONA, U.S.A.
JUNE 19, 2025

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	D BURGER
CADD:	J GARIBAY
TECH. REVIEW:	J LANDMAN
DATE:	06/2025
SUB SHEET NO.	01E0001
TITLE OF SHEET	GENERAL ELECTRICAL LEGEND GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	34 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

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POWER SYSTEM PLAN-1

SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED. RACEWAY, CONDUCTOR,TERMINATION AND CONNECTION IN THIS DIVISION.
MCC-A	MAJOR ELECTRICAL COMPONENT OR DEVICE - NAME OR IDENTIFYING SYMBOL AS SHOWN.
LPXXA	PANELBOARD - SURFACE MOUNTED PANELBOARD LETTER OR NUMBER FACILITY NUMBER LP - LOW VOLTAGE PANEL DP - DISTRIBUTION PANEL
	PANELBOARD - FLUSH MOUNTED
	TERMINAL JUNCTION BOX
M	MOTOR, SQUIRREL CAGE INDUCTION
G	GENERATOR, VOLTAGE AND SIZE AS INDICATED.
LPXXA	HOME RUN - DESTINATION SHOWN
or G	EXPOSED CONDUIT AND CONDUCTORS*
- - - - - or G	CONCEALED CONDUIT AND CONDUCTORS*

NOTE:
1. ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO. 12, ONE NO. 12 GROUND CONDUCTORS IN 3/4" CONDUIT. RUNS MARKED WITH CROSS HATCHES INDICATE NUMBER OF NO. 12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE.

SYMBOL	DESCRIPTION
G	CROSSHATCHES WITH BAR INDICATE NO.10 CONDUCTOR. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
A1	CONDUIT AND CONDUCTOR CALLOUT, SEE CONDUIT AND WIRE ROUTING SCHEDULE.
	CONDUIT DOWN
	CONDUIT UP
	CONDUIT, STUBBED AND CAPPED
	CONDUIT TERMINATION AT CABLE TRAY
EX	EXISTING CONDUIT/ DUCT BANK
BD	BUS DUCT - SEE SPECIFICATIONS
CE	CONCRETE ENCASED CONDUIT
DB	DIRECT BURIED CONDUIT
FO	FIBER OPTIC CONDUIT
E-NET	ETHERNET CABLE
	CONCEALED CONDUIT ROUTING AREA
	CONDUIT ROUTING AREA
[DBXX]	DUCT BANK WHERE XXXX IS THE DUCT BANK NAME, SEE DUCT BANK SCHEDULE
T	TRANSFORMER
J or HH	GENERAL CONTROL OR WIRING DEVICE. LETTER SYMBOLS OR ABBREVIATIONS INDICATE TYPE OF DEVICE
CS	CONTROL STATION, SEE CONTROL DIAGRAMS FOR CONTROL DEVICE(S) REQUIRED.
	NONFUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH FUSE PER EQUIPMENT NAMEPLATE
	COMBINATION CIRCUIT BREAKER AND MAGNETIC STARTER

POWER SYSTEM PLAN-2

SYMBOL	DESCRIPTION
100/40	BREAKER, SEPARATELY MOUNTED, CURRENT RATING INDICATED (100/40, 100 = FRAME SIZE; 40 = TRIP RATING) 3 POLE
C 2	CONTACTOR, MAGNETIC, NEMA SIZE INDICATED
L 30	LIGHTING CONTACTOR, CURRENT RATING INDICATED
2	STARTER, MAGNETIC NEMA SIZE INDICATED
XX (2)	CONVENIENCE RECEPTACLE - DUPLEX UNLESS NOTED OTHERWISE WP - WEATHERPROOF C - CLOCK HANGER TL - TWIST LOCK CR - CORROSION RESISTANT GFCI - GROUND FAULT CIRCUIT INTERRUPTER EX - EXPLOSION PROOF SUBSCRIPT NUMBER AT RECEPTACLE INDICATES CIRCUIT
	240V RECEPTACLE
	CONVENIENCE RECEPTACLE - QUADRUPLEX
	MULTI OUTLET ASSEMBLY
	DUPLEX CONVENIENCE RECEPTACLE - FLUSH IN FLOOR
	CONVENIENCE RECEPTACLE, PEDESTAL, DUPLEX SINGLE FACE UNLESS INDICATED OTHERWISE
L20R 20	RECEPTACLE, SPECIAL PURPOSE-NEMA CONFIGURATION AND AMPERAGE INDICATED
T	THERMOSTAT
	UTILITY REVENUE METERING FACILITY
	UTILITY POLE

COMBINED TELEPHONE/COMPUTER SYSTEM PLAN AND RISER

SYMBOL	DESCRIPTION
TTC	TELEPHONE TERMINAL CABINET
X(Y)	DATA RECEPTACLE FLOOR BOX
X(Y)	DATA RECEPTACLE B-BUSINESS (GREEN PORT) S-SCADA (BLUE PORT) (Y)-NUMBER OF PORTS
(Y)	DATA PORT, COAX
(Y)	DATA PORT, HDMI
(Y)	DATA PORT, HDMI FLOOR BOX
	DATA PORT, COAX AND HDMI

GAS DETECTION AND MONITORING

SYMBOL	DESCRIPTION
	GO/NO-GO LIGHT
H	GO/NO-GO HORN
CH4	METHANE DETECTOR
C6H14	HEXANE DETECTOR
O2	OXYGEN DETECTOR

GENERAL CIRCUIT CONDUCTOR AND CONDUIT IDENTIFICATION

POWER CIRCUIT CALLOUTS

[P1]	[1/2"FLEX, 2#12,#12G]	[P24]	[1"C,3#8,3#14,1#10G]
[P2]	[3/4"C,2#12,1#12G]	[P25]	[1"C,3#8,4#14,1#10G]
[P3]	[3/4"C,3#12,1#12G]	[P26]	[1"C,3#8,5#14,1#10G]
[P4]	[3/4"C,4#12,1#12G]	[P27]	[1"C,2#6, 1#10G]
[P5]	[3/4"C,5#12,1#12G]	[P28]	[1"C,3#6, 1#8G]
[P6]	[3/4"C,6#12,1#12G]	[P284]	[1 1/4"C,4#6,1#8G]
[P7]	[3/4"C,7#12,1#12G]	[P29]	[1"C,3#6, 2#14,1#8G]
[P8]	[3/4"C,8#12,1#12G]	[P30]	[1 1/4"C,3#6, 3#14,1#8G]
[P9]	[3/4"C,3#12,2#14,1#12G]	[P31]	[1 1/4"C,3#6, 4#14,1#8G]
[P10]	[3/4"C,3#12,3#14,1#12G]	[P32]	[1 1/4"C,3#6, 5#14,1#8G]
[P11]	[3/4"C,3#12,4#14,1#12G]	[P33]	[1 1/4"C,3#4,1#8G]
[P12]	[3/4"C,3#12,5#14,1#12G]	[P34]	[1 1/4"C,3#4,3#14,1#8G]
[P13]	[3/4"C,3#12,6#14,1#12G]	[P35]	[1 1/4"C,3#4,5#14,1#8G]
[P14]	[1"C,3#12,7#14,1#12G]	[P36]	[1 1/4"C,3#3, 1#6G]
[P15]	[3/4"C,2#10,1#10G]	[P37]	[1 1/4"C,3#3, 3#14,1#6G]
[P16]	[3/4"C,3#10,1#10G]	[P38]	[1 1/4"C,3#2, 1#6G]
[P161]	[1"C,3#10,7#14,1#10G]	[P39]	[1 1/2"C,3#1, 1#6G]
[P17]	[3/4"C,3#10,2#14,1#10G]	[P391]	[1 1/2"C,4#1, 1#6G]
[P18]	[3/4"C,3#10,3#14,1#10G]	[P40]	[2"C,3#1, 3#14,1#6G]
[P19]	[3/4"C,3#10,4#14,1#10G]	[P41]	[2"C,3#1/0, 1#4G]
[P20]	[1"C,3#10,5#14,1#10G]	[P42]	[2"C,3#2/0, 1#4G]
[P201]	[1"C,4#10,1#10G]	[P43]	[2 1/2"C,3#3/0, 1#3G]
[P21]	[1"C,2#8,1#10G]	[P44]	[2 1/2"C,3#4/0, 1#3G]
[P22]	[1"C,3#8,1#10G]	[P51]	[2 1/2"C,4#1/0, 1#3G]
[P227]	[1"C,4#10,7#14,1#10G]	[P52]	[2 1/2"C,4#2/0, 1#4G]
[P23]	[1"C,3#8,2#14,1#10G]	[P53]	[2 1/2"C,4#3/0, 1#3G]
		[P54]	[2 1/2"C,4#4/0, 1#3G]

ANALOG CIRCUIT CALLOUTS

[A1]	[3/4"C,1 TYPE 3]
[A2]	[3/4"C,2 TYPE 3]
[A3]	[1"C,3 TYPE 3]
[A4]	[1 1/4"C,4 TYPE 3]
[A5]	[1 1/4"C,5 TYPE 3]
[A6]	[1 1/4"C,6 TYPE 3]
[A7]	[1 1/2"C,7 TYPE 3]
[A8]	[1 1/2"C,8 TYPE 3]
[A9]	[1 1/2"C,9 TYPE 3]
[A10]	[2"C,10 TYPE 3]
[A11]	[2"C,11 TYPE 3]
[A12]	[2"C,12 TYPE 3]
[A13]	[2"C,13 TYPE 3]
[A14]	[2"C,14 TYPE 3]
[A15]	[3/4"C,1 TYPE 4]
[A16]	[3/4"C,2 TYPE 4]
[A17]	[1"C,3 TYPE 4]
[A18]	[1 1/4"C,4 TYPE 4]
[A19]	[1 1/4"C,5 TYPE 4]
[A20]	[1 1/4"C,6 TYPE 4]
[A21]	[1 1/2"C,7 TYPE 4]
[A22]	[1 1/2"C,8 TYPE 4]
[A23]	[2"C,9 TYPE 4]
[A24]	[3/4"C,1-4 pr. TYPE 5]
[A25]	[1"C,2-4 pr. TYPE 5]
[A26]	[1"C,3-4 pr. TYPE 5]
[A27]	[1 1/4"C,4-4 pr. TYPE 5]
[A31]	
[A32]	

CONTROL CIRCUIT CALLOUTS

[C1]	[3/4"C,MSC]
[C2]	[3/4"C,2#14,1#14G]
[C3]	[3/4"C,3#14,1#14G]
[C4]	[3/4"C,4#14,1#14G]
[C5]	[3/4"C,5#14,1#14G]
[C6]	[3/4"C,6#14,1#14G]
[C7]	[3/4"C,7#14,1#14G]
[C8]	[3/4"C,8#14,1#14G]
[C9]	[3/4"C,9#14,1#14G]
[C10]	[3/4"C,10#14,1#14G]
[C11]	[3/4"C,11#14,1#14G]
[C12]	[3/4"C,12#14,1#14G]
[C13]	[3/4"C,13#14,1#14G]
[C14]	[1"C,14#14,1#14G]
[C15]	[1"C,15#14,1#14G]
[C16]	[1"C,16#14,1#14G]
[C17]	[1"C,17#14,1#14G]
[C18]	[1"C,18#14,1#14G]
[C19]	[1"C,19#14,1#14G]
[C20]	[1"C,20#14,1#14G]
[C21]	[1"C,21#14,1#14G]
[C22]	[1"C,22#14,1#14G]
[C23]	[1"C,23#14,1#14G]
[C24]	[1 1/4"C,24#14,1#14G]
[C25]	[1 1/4"C,25#14,1#14G]
[A31]	[1"C, 1 TYPE 6]
[A32]	[1 1/4"C, 2 TYPE 6]

MULTICONDUCTOR POWER CABLE CIRCUIT CALLOUTS

[PC1]	[3/4"C,1 (3C#12,1#12G) TYPE 2]
[PC2]	[3/4"C,1 (3C#10,1#10G) TYPE 2]
[PC3]	[3/4"C,1 (3C#8,1#10G) TYPE 2]
[PC4]	[3/4"C,2 (3C#12,1#12G) TYPE 2]
[PC5]	[1"C,2 (3C#10,1#10G) TYPE 2]
[PC1A]	[3/4"C,1 (2C#12,1#12G) TYPE 2]
[PC2A]	[3/4"C,1 (2C#10,1#10G) TYPE 2]

AFD DRIVE CABLES

[AFD12]	[1"C,1 TYPE 8 (12 AWG) +4#14, 2#12,1#12G]
[AFD10]	[1 1/4"C,1 TYPE 8 (10 AWG) +4#14, 2#12,1#12G]
[AFD8]	[1 1/4"C,1 TYPE 8 (8 AWG) +4#14, 2#12,1#12G]
[AFD6]	[1 1/2"C,1 TYPE 8 (6 AWG) +4#14, 2#12,1#12G]
[AFD4]	[2"C,1 TYPE 8 (4 AWG) +4#14, 2#12,1#12G]
[AFD2]	[2"C,1 TYPE 8 (2 AWG) +4#14, 2#12,1#12G]
[AFD30]	[3"C,1 TYPE 8 (4/0), +4#14, 2#12,1#12G]
[AFD40]	[4"C,1 TYPE 8 (500KCMIL), +4#14, 2#12,1#12G]

EMPTY CONDUIT

[EC-1]	[3/4"C,WITH PULL STRING]
[EC-2]	[1"C,WITH PULL STRING]
[EC-3]	[1 1/4"C,WITH PULL STRING]
[EC-4]	[1 1/2"C,WITH PULL STRING]
[EC-5]	[2"C,WITH PULL STRING]
[EC-6]	[3"C,WITH PULL STRING]
[EC-7]	[4"C,WITH PULL STRING]
[EC-8]	[5"C,WITH PULL STRING]

MULTICONDUCTOR CONTROL CABLE CIRCUIT CALLOUTS

[CC3]	[3/4"C,1-3C TYPE 1]
[CC5]	[3/4"C,1-5C TYPE 1]
[CC7]	[3/4"C,1-7C TYPE 1]
[CC9]	[1"C,1-9C TYPE 1]
[CC12]	[1"C,1-12C TYPE 1]
[CC19]	[1 1/2"C, 1-19C TYPE 1]
[CC25]	[1 1/2"C,1-25C TYPE 1]
[CC37]	[2"C,1-37C TYPE 1]
[CCC1]	[1-7C #12 TYPE 1]

NETWORK CABLES

[N1]	[3/4"C,1-CAT 6 (TYPE 30)]
[N2]	[1"C, 2-CAT 6 (TYPE 30)]
[N3]	[1"C, 3-CAT 6 (TYPE 30)]
[F01]	[3"C WITH INNERDUCT 1-24 STRAND TYPE OS2]
[F02]	[3/4"C, 1-6 STRAND TYPE OS2]
[F03]	[3"C, 2-1" INNERDUCT SPARE, 1-24 STRAND TYPE OS2]
[F04]	[1-1/2"C, 1-6" STRAND TYPE OS2]

NOTES:
1. FOR CABLE TYPES, SEE SPECIFICATIONS.
2. POWER CIRCUIT CALLOUTS ARE BASED ON THE AREA OF THW COPPER CONDUCTORS. CONTROL CIRCUIT CALLOUTS ARE BASED ON THE AREAS OF SCHEDULE 40 PVC CONDUIT AND TYPES XHHW & XHHW-2 INSULATION.
3. SIZING OF CONDUCTORS #1 AWG AND SMALLER BASED ON AMPACITIES AT 60 DEGREES C, SIZING OF CONDUCTORS #1/0 AWG AND LARGER BASED ON AMPACITIES AT 75 DEGREES C.
4. WHERE CIRCUITS ARE UNDERGROUND, DIRECT BURIED OR CONCRETE ENCASED, MINIMUM CONDUIT SIZE SHALL BE 1".
5. FOR METRIC CONDUIT SIZES USE THE FOLLOWING CONVERSION:
   1/2" = 16 mm 1 1/4" = 35 mm
   3/4" = 21 mm 1 1/2" = 41 mm
   1" = 27 mm 2" = 53 mm
6. MUFO = MULTIMODE FIBER OPTIC
   SMFO = SINGLEMODE FIBER OPTIC CABLE
7. MSC = MANUFACTURER SUPPLIED CABLE.

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

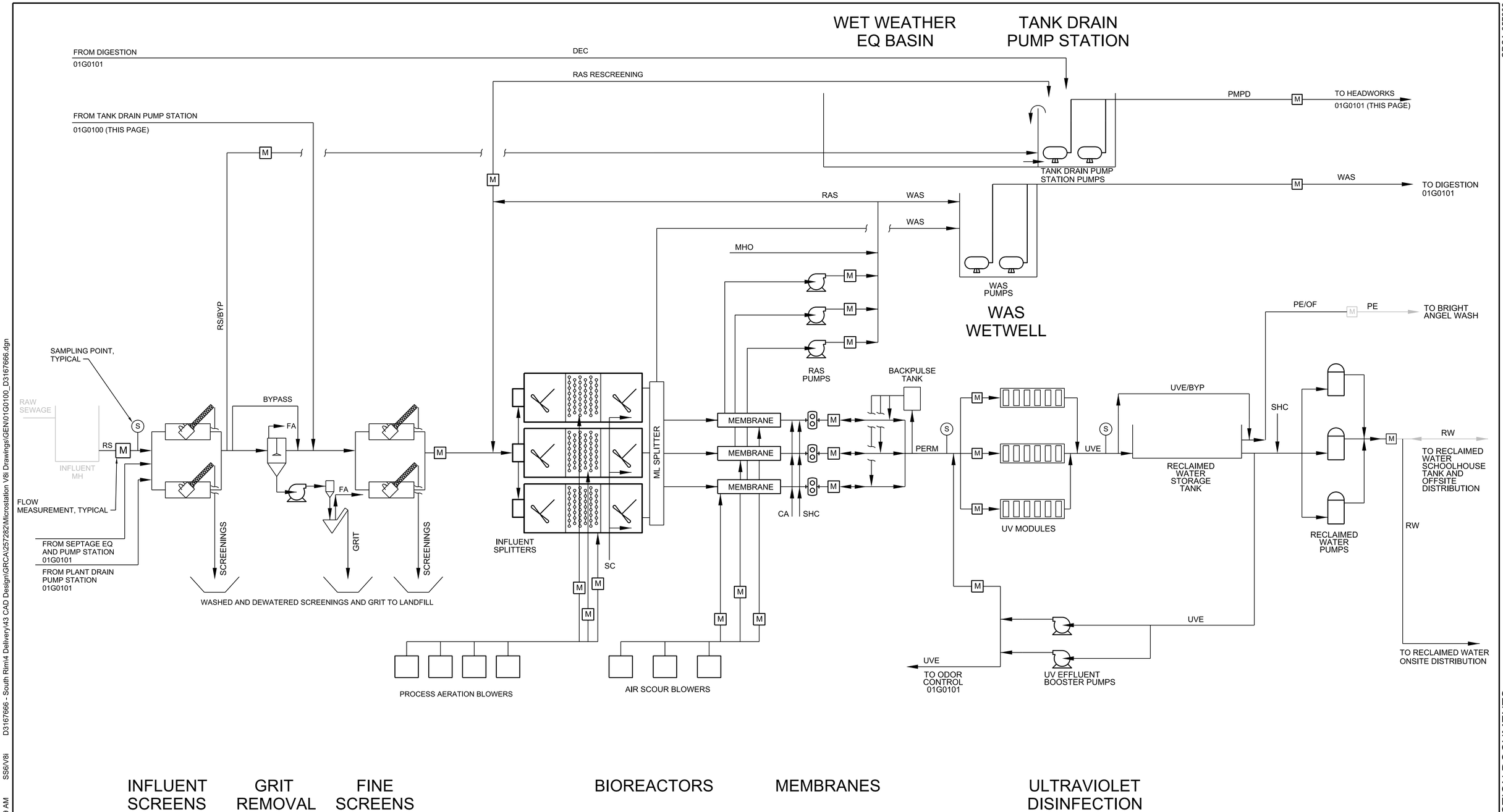
Engineered Professional Engineer (Electrical) CERTIFICATE NO. 81240 DAVID BURGER Date Signed 6-19-2025 ARIZONA, U.S.A.
JUNE 19, 2025

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO
DESIGNED:	D BURGER
CADD:	R COWAN
TECH. REVIEW:	K WEBSTER
DATE:	06/2025
SUB SHEET NO.	01E0002
TITLE OF SHEET	GENERAL ELECTRICAL LEGEND
	GRAND CANYON, SOUTH RIM
DRAWING NO.	113 175376
PMIS/PKG NO.	257282
SHEET	35 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 3:27:01 PM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01E0002_D3167666.dgn



FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer (Civil) CERTIFICATE NO. 80742 CORY LANCASTER Date Signed 8/5/25 ARIZONA, U.S.A. Cory Lancaster	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: C LANCASTER CADD: N HUBER TECH. REVIEW: D BRUNKOW DATE: 06/2025	SUB SHEET NO. 01G0100	TITLE OF SHEET GENERAL LIQUID PROCESS FLOW DIAGRAM GRAND CANYON, SOUTH RIM	NO SCALE DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 36 OF 401

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GRCA-257282

PLOT DATE: 6/17/2025 PLOT TIME: 11:26:49 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0100_D3167666.dgn

AEROBIC DIGESTION

DEC

DECANTER, TYPICAL

TO TANK DRAIN PUMP STATION 01G0100

DS

FROM WAS PUMPS 01G0100

WAS

M

M

TO HEADWORKS 01G0100

RS

DIGESTION BLOWERS

DRYING BEDS

DS

SEPTAGE RECEIVING

FA

VAULT WASTE

ROLL-OFF CONTAINER TO LANDFILL

RS

FA

SEPTAGE EQ & PUMP STATION

FROM GRIT REMOVAL FA

01G0100

FROM COMPOSTING FA

FROM UV EFFLUENT UVE

01G0100

PD

ODOR CONTROL

PD

M

PMPD

TO INFLUENT SCREENS 01G0100

PD

FROM PROCESS FACILITY DRAINS

PLANT DRAIN PUMP STATION

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

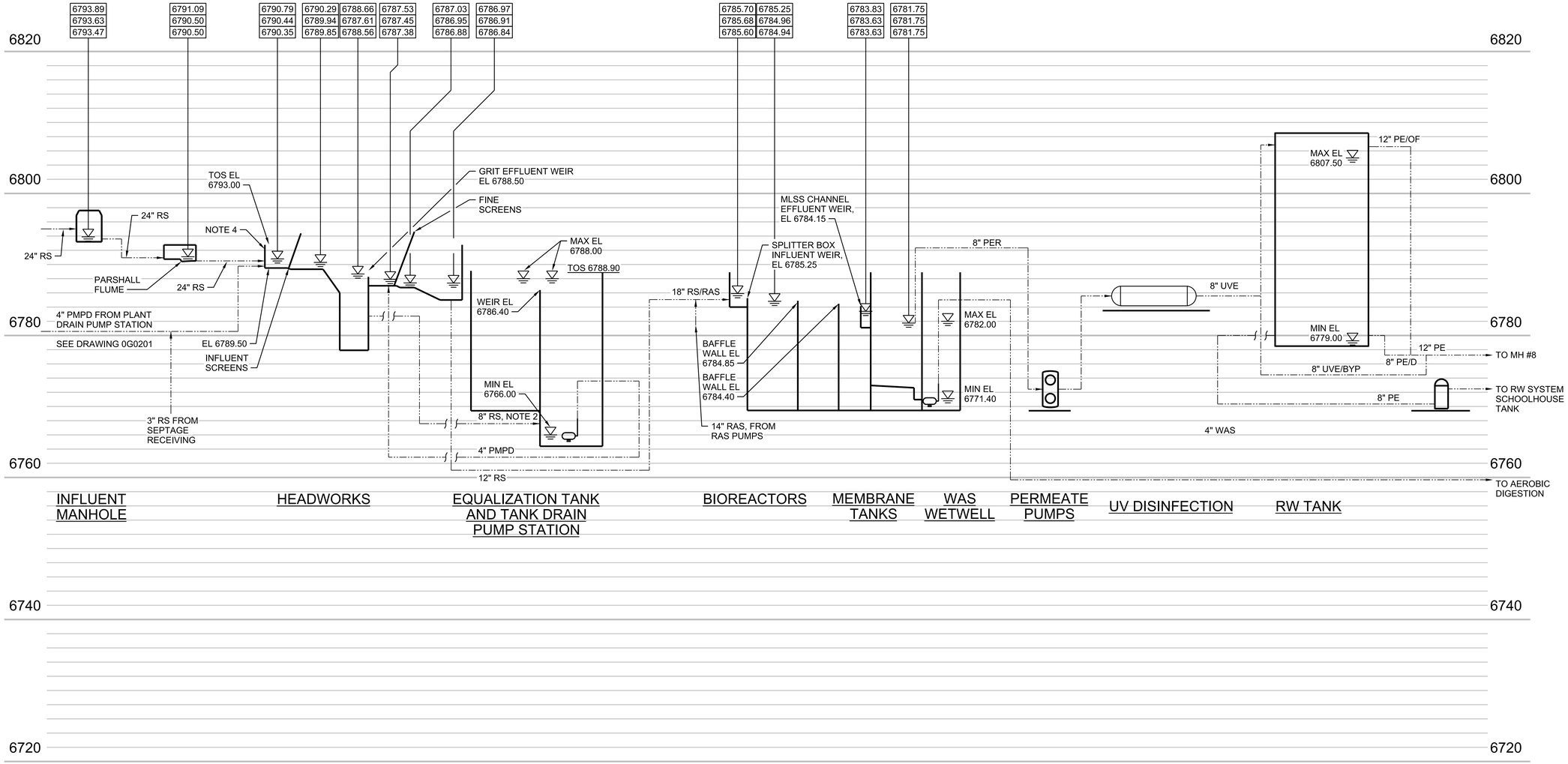
Registered Professional Engineer Seal
CERTIFICATE NO. 80742
CORY LANCASTER
Date Signed 6/17/25
ARIZONA, U.S.A.

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: C LANCASTER	SUB SHEET NO.	TITLE OF SHEET: GENERAL RESIDUALS PROCESS FLOW DIAGRAM	DRAWING NO. 113 175376
	CADD: N HUBER			PMIS/PKG NO. 257282
	TECH. REVIEW: D BRUNKOW	01G0110	GRAND CANYON, SOUTH RIM	SHEET 37 OF 401
	DATE: 06/2025			

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 6/17/2025 PLOT TIME: 11:27:27 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0110_D3167666.dgn



FOR CONTINUATION SEE DRAWING 01G0201

LEGEND

▽	WATER SURFACE ELEVATION (WSE)
6793.89	WATER SURFACE ELEVATION AT 2070 PEAK HOUR PLANT INFLUENT FLOW (NOTGE 1, 2).
6793.63	WATER SURFACE ELEVATION AT 2045 AVERAGE ANNUAL PLANT INFLUENT FLOW (NOTE 1, 3).
6793.47	WATER SURFACE ELEVATION AT STARTUP MINIMUM HOUR, MINIMUM MONTH INFLUENT FLOW (NOTE 1, 4).

NOTES

1. ALL CONDITIONS:
   a. ONE SCREEN, FINE SCREEN OFFLINE.
   b. RECLAINED WATER USE = 0.2 MGD ASSOCIATED WITH SCREEN SPRAYS AND FLUIDIZING
      WATER AT HEADWORKS
2. 2070 PEAK HOUR PLANT INFLUENT FLOW (2.0 MGD):
   a. FLOW EXCEEDING 1.2 MGD FLOWS TO EQUALIZATION TANK.
   b. RAS FLOW RATE = 3.9 MGD (6X 2070 MAXIMUM MONTH FLOW)
   c. RAS RESCREENING FLOW = 0 MGD
   d. 3 BIOREACTORS, 3 MEMBRANE TANKS ONLINE
   e. TOTAL FLOW THROUGH BIOREACTORS = 5.10 MGD
3. 2045 AVERAGE ANNUAL PLANT INFLUENT FLOW (0.45 MGD):
   a. RAS FLOW RATE = 2.0 MGD
   b. RAS RESCREENING FLOW = 0.15 MGD
   c. 2 BIOREACTORS, 2 MEMBRANE TANKS ONLINE
   d. TOTAL FLOW THROUGH BIOREACTORS = 2.77 MGD
4. STARTUP MINIMUM HOUR, MINIMUM MONTHLY INFLUENT FLOW (0.05 MGD):
   a. RAS FLOW = 0.6 MGD
   b. RAS RESCREENING FLOW = 0.15 MGD
   c. 1 BIOREACTOR, 1 MEMBRANE TANK ONLINE
   d. TOTAL FLOW THROUGH BIOREACTORS = 1.00 MGD

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer (Civil) CERTIFICATE NO. 80742 CORY D. LANCASTER Date Signed 6/17/25 ARIZONA, U.S.A.

Cory Lancaster

A/E FIRM	JACOBS GOVERNMENT SERVICES COMPANY
	GREENWOOD VILLAGE, CO
DESIGNED:	R WHITE
CADD:	N HUBER
TECH. REVIEW:	D BRUNKOW
DATE:	06/2025
SUB SHEET NO.	01G0200

TITLE OF SHEET
GENERAL HYDRAULIC PROFILE
GRAND CANYON, SOUTH RIM

NO SCALE

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 38 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

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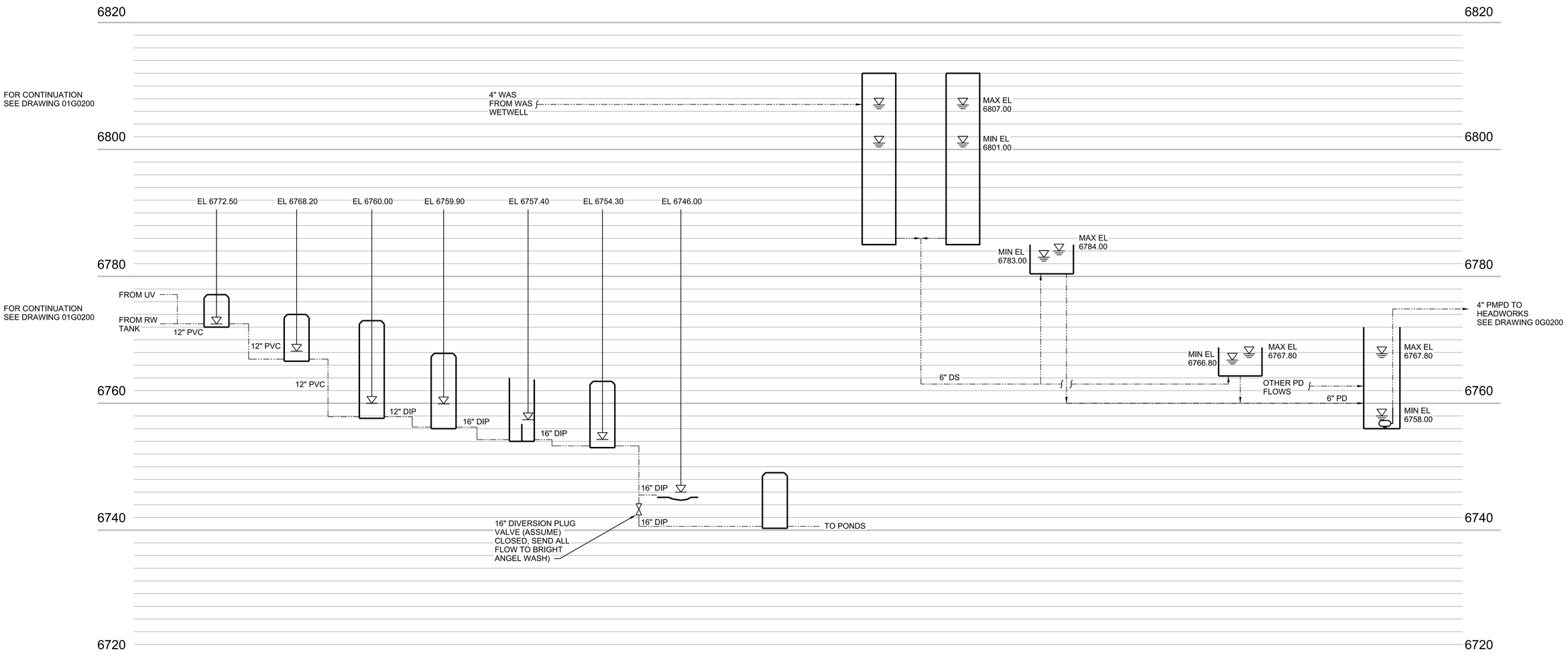
GENERAL SHEET NOTES

1. WSEs IN AEROBIC DIGESTERS, DRYING BEDS, AND PLANT DRAIN PUMP STATION UNRELATED TO PLANT INFLUENT FLOW CONDITIONS.
2. WSE's IN EFFLUENT CONVEYANCE ARE AT 1.2 MGD FROM UV, ZERO FLOW FROM RW TANK.
3. FIELD VERIFY ELEVATIONS OF EXISTING INFRASTRUCTURE AND BRIGHT ANGEL WASH.



LEGEND

WATER SURFACE ELEVATION (WSE)

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: R WHITE CADD: N HUBER TECH. REVIEW: D BRUNKOW DATE: 06/2025	SUB SHEET NO. 01G0201	TITLE OF SHEET: GENERAL HYDRAULIC PROFILE GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 39 OF 401

Registered Professional Engineer (Civil) CERTIFICATE NO. 80742 CORY D. LANCASTER Date Signed 6/17/25 ARIZONA, U.S.A.

Cory Lancaster

PLOT DATE: 6/17/2025 PLOT TIME: 1:38:55 PM SS6/V8i D:\3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0201_D3167666.dgn

GRCA-257282

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AREA CLASSIFICATION AND MATERIALS SELECTION TABLE

FACILITY NUMBER	FACILITY	ROOM / AREA	AREA CORROSIVENESS DESIGNATION	NFPA 820 (2020) CLASSIFICATION	NFPA 820 (2020) REFERENCE	NFPA 820 (2020) REQUIRED VENTILATION	NFPA 820 (2020) FIRE PROTECTION MEASURES	NEMA 250 ENCLOSURE TYPE	ELECTRICAL CONDUIT MATERIALS	ELECTRICAL OUTLET AND DEVICE BOXES, MOUNTING PLATES, AND FITTINGS	ELECTRICAL CONDUIT/CABLE TRAY SUPPORTS	FRAMING CHANNEL	DUCTWORK	DUCTWORK SUPPORTS & FASTENERS	PIPE SUPPORTS	MOUNTING HARDWARE FOR ALL TRADES (I.E. FASTENERS, ETC. DOES NOT INCLUDE PIPE BOLTING MATERIALS)	ANCHOR BOLTS AND POST-INSTALLED ANCHORS FOR ALL TRADES	REMARKS
10	ADMINISTRATION BUILDING	INTERIOR	INDOOR DRY	UNCLASSIFIED	NA	NR	NA	NEMA 1 PAINTED CARBON STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	AL	HDG	HDG	HDG	HDG	HDG	
12	MAINTENANCE	INTERIOR	INDOOR DRY	UNCLASSIFIED	NA	NR	NA	NEMA 1 PAINTED CARBON STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	AL	HDG	HDG	HDG	HDG	HDG	
18	VAULT WASTE / SEPTAGE RECEIVING	INTERIOR, TANK	SUBMERGED CORROSIVE	CLASS 1, DIV 1	TABLE 4.2.2, ROW 14, A	NR	H	NOTE 7	316 STAINLESS STEEL	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		EXTERIOR	OUTDOOR WET CORROSIVE	CLASS 1, DIV 2	TABLE 4.2.2, FIGURE A.4.2(B)	NR	-	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	CLASSIFIED AREA EXTENDS THREE FOOT ENVELOPE AROUND HATCHES, FIVE FOOT ENVELOPE AROUND VENTS
		AREAS BEYOND 5 FT	OUTDOOR WET	UNCLASSIFIED	NA	NR	-	NEMA 4X, 316 STAINLESS STEEL	316 STAINLESS STEEL	316 SST, AL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
20	HEADWORKS	BASINS/CHANNELS	SUBMERGED CORROSIVE	CLASS 1, DIV 1	TABLE 5.2.2 ROW 2A	NR	H	NOTE 7	316 STAINLESS STEEL	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		ELECTRICAL ROOM	INDOOR DRY	UNCLASSIFIED	NA	NR	NA	NEMA 1 AND NEMA 12 PAINTED CARBON STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	AL	HDG	HDG	HDG	HDG	HDG	
		PROCESS ROOM	INDOOR WET CORROSIVE	CLASS 1, DIV 2 BY VENTILATION	TABLE 5.2.2 ROW 2B	12 ACH	H, FE, CGD	SEE REMARKS	316 STAINLESS STEEL	SEE REMARKS	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	ENCLOSURES HOUSING ARC-PRODUCING DEVICES PROIVDE NEMA 7 RATED. FOR ENCLOSURES THAT ARE NOT REQUIRED TO BE EXPLOSION PROOF, PROVIDE NEMA 4X 316 STAINLESS STEEL OR CAST ALUMINUM.
		EXTERIOR	OUTDOOR WET CORROSIVE	CLASS 1, DIV 2	TABLE 5.2.2, FIGURE A.4.2(B)	NR	-	NOTE 7	316 SST, AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	CLASSIFIED AREA EXTENDS THREE FOOT ENVELOPE AROUND HATCHES, FIVE FOOT ENVELOPE AROUND VENTS
22	ODOR CONTROL	AREAS WITHIN 3 FT OF LEAKAGE SOURCES	OUTDOOR WET	CLASS 1, DIV 2	TABLE 4.2.2, ROW 18D	-	FE	NOTE 7	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	AREAS WITHIN 3 FT OF LEAKAGE SOURCES (FA DUCT, FANS, DAMPERS, FLEXIBLE CONNECTIONS, ETC.)
		AREAS BEYOND 3 FT	OUTDOOR WET	UNCLASSIFIED	TABLE 4.2.2, ROW 18E	-	FE	NEMA 4X, 316 SST, PAINTED CARBON STEEL	AL	316 SST, AL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	AREAS BEYOND 3 FT OF LEAKAGE SOURCES (FA DUCT, FANS, DUCTWORK, DAMPERS, FLEXIBLE CONNECTIONS, ETC.)
25	PROCESS TANKS	BIOREACTOR BASINS	SUBMERGED CORROSIVE	CLASS 1, DIV 2	TABLE 5.2.2 ROW 9C	NR	-	NOTE 7	316 STAINLESS STEEL	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	CLASSIFIED AREA EXTENDS FROM MINIMUM OPERATING WATER SURFACE TO THE TOP OF THE TANK WALL, ENVELOPE EXTENDS 18 INCHES ABOVE THE TOP OF THE TANK AND EXTENDING 18 INCHES BEYOND THE EXTERIOR WALL; ENVELOPE 18 INCHES ABOVE GRADE EXTENDING 10 FEET HORIZONTALLY FROM THE EXTERIOR TANK WALL.
		EQUALIZATION TANK AND TANK DRAIN WET WELL	SUBMERGED CORROSIVE	CLASS 1, DIV 2	TABLE 5.2.2 ROW 4C	NR	FE, H	NOTE 7	316 STAINLESS STEEL	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	CLASSIFIED AREA EXTENDS FROM MINIMUM OPERATING WATER SURFACE TO THE TOP OF THE TANK WALL, ENVELOPE EXTENDS 18 INCHES ABOVE THE TOP OF THE TANK AND EXTENDING 18 INCHES BEYOND THE EXTERIOR WALL; ENVELOPE 18 INCHES ABOVE GRADE EXTENDING 10 FEET HORIZONTALLY FROM THE EXTERIOR TANK WALL.
		MEMBRANE TANK	SUBMERGED CORROSIVE	CLASS 1, DIV 2	TABLE 5.2.2 ROW 9C	NR	-	NOTE 7	316 STAINLESS STEEL	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	CLASSIFIED AREA EXTENDS FROM MINIMUM OPERATING WATER SURFACE TO THE TOP OF THE TANK WALL, ENVELOPE EXTENDS 18 INCHES ABOVE THE TOP OF THE TANK AND EXTENDING 18 INCHES BEYOND THE EXTERIOR WALL; ENVELOPE 18 INCHES ABOVE GRADE EXTENDING 10 FEET HORIZONTALLY FROM THE EXTERIOR TANK WALL.
		18 INCHES ABOVE BASIN/TANK WALLS	OUTDOOR WET CORROSIVE	UNCLASSIFIED	TABLE 5.2.2 ROW 4C AND 9C	NR	-	NEMA 4X, 316 STAINLESS STEEL	316 SST, AL	316 SST, AL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	

PLOT DATE: 6/17/2025 PLOT TIME: 11:27:35 AM SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0250_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Professional Engineer Certificate 29048 DARREN EDWARDS Date Signed ARIZONA, U.S.A.

JUNE 19, 2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: D EDWARDS
CADD: G BROWN
TECH. REVIEW: D BRUNKOW
DATE: 06/2025

SUB SHEET NO. 01G0250

TITLE OF SHEET
GENERAL
AREA CLASSIFICATION AND MATERIALS SELECTION TABLE
GRAND CANYON, SOUTH RIM

NO SCALE

DRAWING NO. 113
175376
PMIS/PKG NO. 257282
SHEET 40 OF 401

AREA CLASSIFICATION AND MATERIALS SELECTION TABLE

FACILITY NUMBER	FACILITY	ROOM / AREA	AREA CORROSIVENESS DESIGNATION	NFPA 820 (2020) CLASSIFICATION	NFPA 820 (2020) REFERENCE	NFPA 820 (2020) REQUIRED VENTILATION	NFPA 820 (2020) FIRE PROTECTION MEASURES	NEMA 250 ENCLOSURE TYPE	ELECTRICAL CONDUIT MATERIALS	ELECTRICAL OUTLET AND DEVICE BOXES, MOUNTING PLATES, AND FITTINGS	ELECTRICAL CONDUIT/CABLE TRAY SUPPORTS	FRAMING CHANNEL	DUCTWORK	DUCTWORK SUPPORTS & FASTENERS	PIPE SUPPORTS	MOUNTING HARDWARE FOR ALL TRADES (I.E. FASTENERS, ETC. DOES NOT INCLUDE PIPE BOLTING MATERIALS)	ANCHOR BOLTS AND POST-INSTALLED ANCHORS FOR ALL TRADES	REMARKS
32	PROCESS BUILDING	PUMP ROOMS	INDOOR WET	UNCLASSIFIED	TABLE 6.2.2(A), ROW 9B	6 ACH	H, FE	NEMA 4X 316 STAINLESS STEEL	AL, GALVANIZED STEEL	AL, GALVANIZED STEEL	316 STAINLESS STEEL	AL	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		CHEMICAL STORAGE ROOM	INDOOR WET CORROSIVE	UNCLASSIFIED	NA	NR	NA	NEMA 4X 316 STAINLESS STEEL	AL, GALVANIZED STEEL	AL, GALVANIZED STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		UV ROOM	INDOOR WET	UNCLASSIFIED	TABLE 5.2.2, ROW 26	NR	H	NEMA 4X PAINTED CARBON STEEL	AL, GALVANIZED STEEL	AL, GALVANIZED STEEL	316 STAINLESS STEEL	AL	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		BLOWER ROOM	INDOOR WET	UNCLASSIFIED	TABLE 6.2.2(A), ROW 23	NR	FDS, FE	NEMA 4X PAINTED CARBON STEEL	AL, GALVANIZED STEEL	AL, GALVANIZED STEEL	316 STAINLESS STEEL	AL	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		ELECTRICAL ROOM	INDOOR DRY	UNCLASSIFIED	NA	NR	NA	NEMA 1 AND NEMA 12 PAINTED CARBON STEEL	GALVANIZED STEEL	GALVANIZED STEEL	GALVANIZED STEEL	AL	HDG	HDG	HDG	HDG	HDG	
70	RECLAIMED WATER TANK	SUBMERGED INTERIOR	SUBMERGED CORROSIVE	UNCLASSIFIED	NA	NR	NA	NA	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		EXTERIOR	OUTDOOR WET	UNCLASSIFIED	NA	NR	NA	NEMA 4X PAINTED CARBON STEEL	AL, GALVANIZED STEEL	AL	316 STAINLESS STEEL	AL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
80	DIGESTER FACILITY	BASIN INTERIOR	SUBMERGED CORROSIVE	NA	TABLE 5.2.2, ROW 11	NR	NR	NA	316 STAINLESS STEEL	NA	316 STAINLESS STEEL	316 STAINLESS STEEL	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		DIGESTER FEED ROOM	INDOOR WET	UNCLASSIFIED	TABLE 6.2.2(A), ROW 23	NA	FDS, FE	NEMA 4X PAINTED CARBON STEEL	AL, GALVANIZED STEEL	AL	316 STAINLESS STEEL	AL	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		BLOWER ROOM	INDOOR WET	UNCLASSIFIED	TABLE 6.2.2(A), ROW 23	NA	FDS, FE	NEMA 4X PAINTED CARBON STEEL	AL, GALVANIZED STEEL	AL	316 STAINLESS STEEL	AL	AL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
85	DRYING BEDS	DRYING BEDS	SUBMERGED CORROSIVE	UNCLASSIFIED	-	NR	-	NA	316 STAINLESS STEEL	316 STAINLESS STEEL, AL	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
86	PLANT DRAIN PUMP STATION	WETWELL	SUBMERGED CORROSIVE	CLASS 1, DIV 1	TABLE 4.2.2, ROW 14A	NR	NA	NOTE 7	316 STAINLESS STEEL	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	
		EXTERIOR, SEE NOTES	OUTDOOR WET	CLASS 1, DIV 2	TABLE 4.2.2, ROW 14B	NA	NA	NOTE 7	316 STAINLESS STEEL	316 STAINLESS STEEL, AL	316 STAINLESS STEEL	AL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	5 FT BEYOND VENT PLUS ENVELOPE 18 INCHES EXTENDING 3 FT AROUND OPENINGS (HATCHES OR DOORS)
		EXTERIOR, SEE NOTES	OUTDOOR WET	UNCLASSIFIED	TABLE 4.2.2, ROW 14B	NA	NA	NEMA 4X, 316 STAINLESS STEEL	316 STAINLESS STEEL, AL	316 STAINLESS STEEL, AL	316 STAINLESS STEEL	AL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	BEYOND LIMITS INDICATED FOR OUTSIDE CLASS 1, DIV 2 AREA ABOVE.
87	COMPOST FACILITY	COMPOST BINS	OUTDOOR WET	UNCLASSIFIED	-	NR	-	NEMA 4X, 316 STAINLESS STEEL	316 STAINLESS STEEL, AL	316 STAINLESS STEEL, AL	316 STAINLESS STEEL	AL	-	-	316 STAINLESS STEEL	316 STAINLESS STEEL	316 STAINLESS STEEL	

NOTES:

1. MATERIALS SHOWN ARE TYPICAL UNLESS OTHERWISE INDICATED ON SPECIFIC DRAWINGS OR SPECIFICATIONS.
2. SUBMERGED - AREA BELOW TOP OF WALL, UNDERSIDE OF TANK COVER OR TANK SLAB, UNLESS NOTED OTHERWISE.
3. SEE GENERAL ARCHITECTURAL DRAWINGS FOR IBC CODE CLASSIFICATIONS AND LIFE SAFETY DATA.
4. VENTILATION LISTED IS SUPPLY AIR INCLUDING OUTSIDE AIR AND TRANSFER AIR. IT DOES NOT INCLUDE EXHAUSTED AIR.
5. VENTILATION IS CONTINUOUS UNLESS OTHERWISE NOTED.
6. CONDITIONED AREA VENTILATION IS MAXIMUM SUPPLY AIR DELIVERED TO THE SPACE THROUGH SUPPLY AIR OUTLETS.
7. DO NOT LOCATE ENCLOSURES IN HAZARDOUS AREA.

ABBREVIATIONS:

ACH: AIR CHANGES PER HOUR
AL: ALUMINUM
CGD: COMBUSTIBLE GAS DETECTION
FAS: FIRE ALARM SYSTEM
FBE: FUSION BONDED EPOXY
FE: PORTABLE FIRE EXTINGUISHER
FRP: FIBERGLASS REINFORCED PLASTIC
H: HYDRANT PROTECTION
HDG: HOT DIPPED GALVANIZED (STEEL)
NA: NOT APPLICABLE
NR: NOT REQUIRED
PVC: POLYVINYL CHLORIDE
RGS: RIGID GALVANIZED STEEL (HOT DIPPED METHOD ONLY)
SST: STAINLESS STEEL

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer, State of Arizona, DARREN EDWARDS, 69545, Date Signed
JUNE 19, 2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: D EDWARDS
CADD: G BROWN
TECH. REVIEW: D BRUNKOW
DATE: 06/2025

SUB SHEET NO. 01G0251

TITLE OF SHEET
GENERAL
AREA CLASSIFICATION AND MATERIALS SELECTION TABLE
GRAND CANYON, SOUTH RIM

NO SCALE
DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 41 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 11:26:50 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i D

POWER ACTUATED VALVE SCHEDULE

P&ID	TAG NUMBER	FLOW STREAM	VALVE NOMINAL SIZE (INCHES)	VALVE TYPE NO. (NOTE 2)	VALVE TYPE	OPERATING DESIGN PRESSURE (PSIG)	MAXIMUM OPERATING FLOW	MAXIMUM OPERATING PRESSURE (PSIG)	CYCLE TIME (SEC)	ACTUATOR TYPE (NOTE 3)	FAIL POSITION	REMOTE HAND STATION	CONTROL FEATURES (NOTE 4)	ACTUATOR POWER SUPPLY
09N1801	FV-1802*	RW	SUPPLIED BY VENDOR											
09N1801	FV-1803*	RW	SUPPLIED BY VENDOR											
09N1801	SV-1804*	RW	SUPPLIED BY VENDOR											
09N2001	FV-2121	RS	24	V150	KNIFE	1	1400 GPM	150	90	O/C	LAST	NO	C, D, E, H, J, K, L, M	480V/3PH/60HZ
09N2001	SV-2111A*	RW	SUPPLIED BY VENDOR											
09N2001	SV-2111B*	RW	SUPPLIED BY VENDOR											
09N2001	SV-2111C*	RW	SUPPLIED BY VENDOR											
09N2001	FV-2221	RS	24	V150	KNIFE	1	1400 GPM	150	90	O/C	LAST	NO	C, D, E, H, J K, L, M	480V/3PH/60HZ
09N2001	SV-2211A*	RW	SUPPLIED BY VENDOR											
09N2001	SV-2211B*	RW	SUPPLIED BY VENDOR											
09N2001	SV-2211C*	RW	SUPPLIED BY VENDOR											
09N2002	FV-2122	RS	18	V150	KNIFE	1	1400 GPM	150	90	O/C	LAST	NO	C, D, E, H, J, K, L, M	480V/3PH/60HZ
09N2002	FV-2222	RS	18	V150	KNIFE	1	1400 GPM	150	90	O/C	LAST	NO	C, D, E, H, J, K, L, M	480V/3PH/60HZ
09N2002	FV-2123	RS	14	V150	KNIFE	1	1000 GPM	150	60	O/C	LAST	NO	C, D, E, H, J, K, L, M	480V/3PH/60HZ
09N2002	FV-2223	RS	14	V150	KNIFE	1	1000 GPM	150	60	O/C	LAST	NO	C, D, E, H, J, K, L, M	480V/3PH/60HZ
09N2004	SV-2112A*	RW	SUPPLIED BY VENDOR											
09N2004	SV-2112B*	RW	SUPPLIED BY VENDOR											
09N2004	SV-2112C*	RW	SUPPLIED BY VENDOR											
09N2004	SV-2212A*	RW	SUPPLIED BY VENDOR											
09N2004	SV-2212B*	RW	SUPPLIED BY VENDOR											
09N2004	SV-2212C*	RW	SUPPLIED BY VENDOR											
09N2201	FV-2203*	UVE	SUPPLIED BY VENDOR											
09N2501	FCV-2521	RS	14	V406	PLUG	5	1000 GPM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N2501	FCV-2523	RAS	4	V405	PLUG	5	100 GPM	175	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N2502	FCV-2522	RS	14	V406	PLUG	5	1000 GPM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N2502	FCV-2621	PA	6	V514	BUTTERFLY	15	580 SCFM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N2502	FCV-2721	PA	6	V514	BUTTERFLY	15	580 SCFM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N2502	FCV-2821	PA	6	V514	BUTTERFLY	15	580 SCFM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N2503	FV-3321*	PA	SUPPLIED BY VENDOR											
09N2503	FV-3421*	PA	SUPPLIED BY VENDOR											
09N2503	FV-3521*	PA	SUPPLIED BY VENDOR											
09N3201	FV-3322*	RAS	SUPPLIED BY VENDOR											
09N3201	FV-3422*	RAS	SUPPLIED BY VENDOR											
09N3201	FV-3522*	RAS	SUPPLIED BY VENDOR											
09N3202	SV-3228A*	CA	SUPPLIED BY VENDOR											
09N3202	SV-3228B*	CA	SUPPLIED BY VENDOR											
09N3202	SV-3228C*	CA	SUPPLIED BY VENDOR											
09N3202	SV-3228D*	SHC	SUPPLIED BY VENDOR											
09N3202	SV-3228E*	SHC	SUPPLIED BY VENDOR											
09N3202	SV-3228F*	SHC	SUPPLIED BY VENDOR											
09N3202	FV-3324*	PER/BP	SUPPLIED BY VENDOR											
09N3202	FV-3424*	PER/BP	SUPPLIED BY VENDOR											
09N3202	FV-3524*	PER/BP	SUPPLIED BY VENDOR											
09N3202	FV-3323*	PER/BP	SUPPLIED BY VENDOR											
09N3202	FV-3423*	PER/BP	SUPPLIED BY VENDOR											
09N3202	FV-3523*	PER/BP	SUPPLIED BY VENDOR											
09N3202	FV-3534*	PER/BP	SUPPLIED BY VENDOR											
09N3204	FCV-3227	UVE	1.5	V306	BALL	25	25 GPM	150	60	O/C	LAST	NO	C, D, E, F, J, K, L, M	480V/3PH/60HZ
09N3204	FCV-3326	UVI	8	V500	BUTTERFLY	25	420 GPM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N3204	FCV-3426	UVI	8	V500	BUTTERFLY	25	420 GPM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N3204	FCV-3526	UVI	8	V500	BUTTERFLY	25	420 GPM	150	60	M	LAST	NO	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
9N3211	SV-3611*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3613*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3614*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3615*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3616*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3617*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3618*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3613*	IA	SUPPLIED BY VENDOR											
09N3211	SV-3613*	IA	SUPPLIED BY VENDOR											
09N8001	FCV-8121	PA	4	V514	BUTTERFLY	15	550 SCFM	150	60	M	LAST	YES	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N8001	FCV-8122	PA	8	V514	BUTTERFLY	15	1100 SCFM	150	60	M	LAST	YES	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N8001	FCV-8221	PA	4	V514	BUTTERFLY	15	550 SCFM	150	60	M	LAST	YES	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N8001	FCV-8222	PA	8	V514	BUTTERFLY	15	1100 SCFM	150	60	M	LAST	YES	C, D, E, F, I, J, K, L, N	480V/3PH/60HZ
09N8002	FV-8124	DEC	4	V405	PLUG	15	250 GPM	150	60	O/C	LAST	NO	C, D, E, F, J, K, L, M	480V/3PH/60HZ
09N8002	FV-8224	DEC	4	V405	PLUG	15	250 GPM	150	60	O/C	LAST	NO	C, D, E, F, J, K, L, M	480V/3PH/60HZ
09N8002	FV-8223	DS	12	V405	PLUG	15	7000 GPM	175	60	O/C	LAST	NO	C, D, E, F, J, K, L, M	480V/3PH/60HZ
09N8002	FV-8123	DS	12	V405	PLUG	15	7000 GPM	175	60	O/C	LAST	NO	C, D, E, F, J, K, L, M	480V/3PH/60HZ
09N8002	FV-8023	DS	6	V405	PLUG	15	2600 GPM	175	60	O/C	LAST	NO	C, D, E, F, J, K, L, M	480V/3PH/60HZ

NOTES:
1. REFER TO P&IDs FOR ASSIGNED TAG NUMBERS.
2. REFER TO SPECIFICATION SECTION 40 27 02 FOR VALVE TYPE NUMBERS.
3. ACTUATOR TYPES: O/C = OPEN-CLOSE, M= MODULATING
4. CONTROL FEATURES:

A = ACTUATOR SHALL FAIL OPEN UPON LOSS OF POWER OR SIGNAL
B = ACTUATOR SHALL FAIL CLOSED UPON LOSS OF POWER OR SIGNAL
C = ACTUATOR SHALL REMAIN IN LAST POSITION UPON LOSS OF POWER OR SIGNAL
D = LOCAL OPEN-CLOSE MOMENTARY PUSHBUTTON CONTINUOUSLY PRESSED TO INITIATE/MAINTAIN VALVE TRAVEL.
VALVE TRAVEL STOPS WHEN PUSHBUTTON NOT PRESSED. WHEN VALVE TRAVEL REACHES END LIMIT THEN PUSHBOTTON RELEASES.
E = REMOTE OPEN-CLOSE MAINTAINED BY DRY CONTACTS. WHEN REMOTE CONTACT IS OPEN THEN VALVE TRAVEL STOPS. WHEN VALVE TRAVEL REACHES END LIMIT THEN CONTACT OPENS.
F = MOTOR AND CONTROL ENCLOSURE NEMA 250, TYPE 4, WITH 120-VOLT SPACE HEATER
G = MOTOR AND CONTROL ENCLOSURE NEMA 250, TYPE 6 (IP 68) WITH 120-VOLT SPACE HEATER
H = MOTOR AND CONTROL ENCLOSURE, SUITABLE FOR INSTALLATION WITHIN CLASS 1, DIVISION 2 HAZARDOUS LOCATION, WITH 120-VOLT SPACE HEATER
I = VALVE POSITION OUTPUT CONVERTER THAT GENERATES ISOLATED 4mA TO 20mA DC SIGNAL IN PROPORTION TO VALVE POSITION FOR DRIVING LOADS UP TO 500 OHMS AT 24 VDC
J = 120-VOLT SECONDARY CONTROL POWER TRANSFORMER
K = EXTERNALLY OPERABLE POWER DISCONNECT SWITCH
L = LOCAL-OFF-REMOTE MAINTAINED DRY CONTACT
M = OPEN/CLOSED LIMIT SWITCHES
N = ANALOG 4mA TO 20mA DC INPUT SIGNAL POSITION COMMAND

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

JUNE 19, 2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: D EDWARDS
CADD: G BROWN
TECH. REVIEW: D BRUNKOW
DATE: 06/2025

SUB SHEET NO. 01G0260

TITLE OF SHEET
GENERAL
POWER ACTUATED
VALVE SCHEDULE

GRAND CANYON, SOUTH RIM

NO SCALE
DRAWING NO. 113
175376
PMIS/PKG NO. 257282
SHEET 42 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 6/17/2025 PLOT TIME: 11:26:51 AM S\S6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0260_D3167666.dgn

SELF REGULATED VALVE SCHEDULE

P&ID	TAG NUMBER	NOMINAL SIZE (INCHES)	VALVE TYPE	VALVE SPEC	FLOWSTREAM ID	SERVICE	LOCATION	MAXIMUM FLOW (GPM)	UPSTREAM PRESSURE (PSI)	DOWNSTREAM PRESSURE (PSI)
09N1801	PRV-1801	1.5	PRESSURE REDUCING	V710	RW	SEPTAGE	RECLAIMED WATER FOR SEPTAGE RECEIVER	40	110	60
09N2001	PRV-2063	1.5	PRESSURE REDUCING	V710	RW	INFLUENT SCREENS	RECLAIMED WATER FOR INFLUENT SCREENS	52	110	75
09N2001	PRV-2064	1.5	PRESSURE REDUCING	V710	RW	INFLUENT SCREENS	RECLAIMED WATER FOR INFLUENT SCREENS	52	110	75
09N2002	PRV-2012	1.25	PRESSURE REDUCING	V710	RW	GRIT BASIN	RECLAIMED WATER FOR GRIT BASIN	20	110	50
09N2003	PRV-2013	0.75	PRESSURE REDUCING	V710	RW	GRIT WASHING	RECLAIMED WATER FOR CLASSIFIER	25	110	50
09N2004	PRV-2065	1.5	PRESSURE REDUCING	V710	RW	FINE SCREENS	RECLAIMED WATER FOR FINE SCREEN 1	31	110	85
09N2004	PRV-2066	1.5	PRESSURE REDUCING	V710	RW	FINE SCREENS	REFLAIMED WATER FOR FINE SCREEN 2	31	110	85
09N2201	PRV-2211		PRESSURE REDUCING		UVE	PROVIDED BY VENDOR				
09N2501	AVRV-2561	2	AIR RELEASE	V750	PMPD	TANK DRAIN PUMP STATION	TANK DRAIN PUMP 1 DISCHARGE	150	25	ATMOSPHERE
09N2501	AVRV-2562	2	AIR RELEASE	V750	PMPD	TANK DRAIN PUMP STATION	TANK DRAIN PUMP 2 DISCHARGE	150	25	ATMOSPHERE
09N2501	ARV-2563	2	COMBO AIR-VAC	V752	PMPD	TANK DRAIN PUMP STATION	TANK DRAIN PUMPS COMMON DISCHARGE	150	25	ATMOSPHERE
09N3201	ARV-3365	2	AIR RELEASE	V752	WAS	MEMBRANE SYSTEM	WAS PUMP 1 DISCHARGE	150	25	ATMOSPHERE
09N3201	ARV-3367	2	AIR RELEASE	V752	WAS	MEMBRANE SYSTEM	WAS PUMP 2 DISCHARGE	150	25	ATMOSPHERE
09N3203	PSV-3361		BACK PRESSURE SUSTAINING		PA	PROVIDED BY VENDOR				
09N3203	PSV-3461		BACK PRESSURE SUSTAINING		PA	PROVIDED BY VENDOR				
09N3203	PSV-3561		BACK PRESSURE SUSTAINING		PA	PROVIDED BY VENDOR				
09N3204	ARV-3269	1	AIR RELEASE	V744	PERM	UV DISINFECTION	UV COMMON HEADER	840	25	ATMOSPHERE
09N3205	PSV-3215A		BACK PRESSURE SUSTAINING		SHC	PROVIDED BY VENDOR				
09N3205	PSV-3216A		BACK PRESSURE SUSTAINING		SHC	PROVIDED BY VENDOR				
09N3205	PCV-3216		PRESSURE CONTROL		SHC	PROVIDED BY VENDOR				
09N3206	PSV-3217A		BACK PRESSURE SUSTAINING		SHC	PROVIDED BY VENDOR				
09N3206	PSV-3218A		BACK PRESSURE SUSTAINING		SHC	PROVIDED BY VENDOR				
09N3207	PSV-3219A		BACK PRESSURE SUSTAINING		CA	PROVIDED BY VENDOR				
09N3207	PSV-3220A		BACK PRESSURE SUSTAINING		CA	PROVIDED BY VENDOR				
09N3207	PCV-3219		PRESSURE CONTROL		CA	PROVIDED BY VENDOR				
09N3208	PSV-3221A		BACK PRESSURE SUSTAINING		SC	PROVIDED BY VENDOR				
09N3208	PSV-3222A		BACK PRESSURE SUSTAINING		SC	PROVIDED BY VENDOR				
09N3208	PSV-3223A		BACK PRESSURE SUSTAINING		SC	PROVIDED BY VENDOR				
09N3208	PSV-3224A		BACK PRESSURE SUSTAINING		SC	PROVIDED BY VENDOR				
09N3209	PSV-3225A		BACK PRESSURE SUSTAINING		MHO	PROVIDED BY VENDOR				
09N3209	PSV-3226A		BACK PRESSURE SUSTAINING		MHO	PROVIDED BY VENDOR				
09N3211	PSV-3262A		BACK PRESSURE SUSTAINING		N/A	PROVIDED BY VENDOR				
09N3211	PCV-3264C		PRESSURE CONTROL		RW	PROVIDED BY VENDOR				

SELF REGULATED VALVE SCHEDULE

P&ID	TAG NUMBER	NOMINAL SIZE (INCHES)	VALVE TYPE	VALVE SPEC	FLOWSTREAM ID	SERVICE	LOCATION	MAXIMUM FLOW (GPM)	UPSTREAM PRESSURE (PSI)	DOWNSTREAM PRESSURE (PSI)
09N3212	AVRV3320	1	COMBO AIR-VAC	V746	RW	RECLAIMED WATER	RECLAIMED WATER PUMP DISCHARGE	250	140	ATMOSPHERE
09N3212	AVRV3420	1	COMBO AIR-VAC	V746	RW	RECLAIMED WATER	RECLAIMED WATER PUMP DISCHARGE	250	140	ATMOSPHERE
09N3212	AVRV3520	1	COMBO AIR-VAC	V746	RW	RECLAIMED WATER	RECLAIMED WATER PUMP DISCHARGE	250	140	ATMOSPHERE
09N3212	PSV3260A	1/2	BACK PRESSURE SUSTAINING	V720	SHC	SODIUM HYPOCHLORITE	RECLAIMED WATER PUMP SUCTION HEADER	10	25	25
09N3212	PRV3260B	4	PRESSURE REDUCING	V714	RW	RECLAIMED WATER	RECLAIMED WATER TO FACIITY 10 ADMIN AND FACILITY 12 MAINTENANCE HOSE BIBS AND TOILETS	100	140	60
09N8601	AVRV-8661	2	AIR RELEASE	V750	PMPD	PLANT DRAIN PUMP STATION	PLANT DRAIN PUMP 1 DISCHARGE	150	25	ATMOSPHERE
09N8601	AVRV-8662	2	AIR RELEASE	V750	PMPD	PLANT DRAIN PUMP STATION	PLANT DRAIN PUMP 2 DISCHARGE	150	25	ATMOSPHERE
09N8601	ARV-8663	2	COMBO AIR-VAC	V752	PMPD	PLANT DRAIN PUMP STATION	PLANT DRAIN PUMPS COMMON DISCHARGE	150	25	ATMOSPHERE

NOTES:
1. VENDOR PROVIDED VALVE TYPES ARE TO BE SELECTED BY THE VENDOR.
2. INDICATE "ATMOSPHERE" WHERE PRESSURE SETTING OPEN TO ATMOSPHERE
3. UPSTREAM PRESSURE IS THE SET POINT FOR PRESSURE SUSTAINING AND PRESSURE RELIEF VALVES. DOWNSTREAM PRESSURE IS THE SET POINT FOR PRESSURE REDUCING VALVES.

GRCA-257282

PLOT DATE: 6/17/2025 PLOT TIME: 11:27:27 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0261_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Professional Engineer
CERTIFICATE NO.
60048
DARREN EDWARDS
Date Signed
ARIZONA, U.S.A.
JUNE 19, 2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: D EDWARDS
CADD: G BROWN
TECH. REVIEW: D BRUNKOW
DATE: 06/2025

SUB SHEET NO. 01G0261

TITLE OF SHEET
GENERAL
SELF REGULATED
VALVE SCHEDULE
GRAND CANYON, SOUTH RIM

NO SCALE
DRAWING NO. 113
175376
PMIS/PKG NO. 257282
SHEET 43 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

PIPING SCHEDULE

FLOWSTREAM	SERVICE	NOMINAL SIZE (INCHES) (NOTE 2)	INSTALLATION (NOTE 3)	MATERIAL (NOTE 4)	SPECIFICATION SECTION	JOINT TYPE (NOTE 5)	LINING (NOTE 6)	COATING (NOTE 6)	OPERATING PRESSURE (PSIG)	TEST PRESSURE (PSIG)	PRESSURE TEST TYPE (NOTE 7)	HEAT TRACE SPECIFICATION SECTION (NOTE 8)	INSULATION SPECIFICATION SECTION (NOTE 9)	PIPE COLOR (NOTE 10)	LABEL COLOR (NOTE 10)	REMARKS
AW/AV	ACID WASTE / ACID VENT	ALL	EXP	PP	22 10 01.06	W	NONE	NONE			G			BLACK	BLACK ON YELLOW	
			BUR													
BA	BUNKER AIR	ALL	EXP	HDPE	40 27 00.21	FL, W	NONE	NONE	0.25	N/A	NO TEST			BLACK	WHITE ON GREEN	PROVIDE HDPE PLAIN END JOINING COUPLINGS WHERE SHOWN.
CA	CITRIC ACID	ALL	EXP	FEP TUBING IN SCH 40 PVC CONTAINMENT PIPE	40 27 00.19 40 27 00.10	CC, FL, W	NONE	NO. 25 FOR PVC	75	100	H			YELLOW WITH RED BAND	BLACK ON ORANGE	FEP TUBING INSIDE RIGID SCH 40 PVC SECONDARY CONTAINMENT PIPING WITH LONG RADIUS 5D BENDS. PVDF VALVES AND FITTINGS.
CD	CONDENSATE DRAIN	ALL	EXP	PVC	40 27 00.10	GLU	NONE	NO. 25 FOR PVC		5	H		22 07 00	WHITE	WHITE ON GREEN	
			BUR					NONE								
DEC	DECANT	ALL	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	20	30	H			N/A	WHITE ON GREEN	
			EMB													USE HDPE FOR PIPE ENCASED IN CONCRETE UNDER STRUCTURES. TRANSITION FROM SST TO HDPE ABOVE THE SLAB.
			EXP	SST	40 27 00.08											
			EMB													USE SST FOR WALL PIPES.
			SUB													
DS	DIGESTED SLUDGE	ALL	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	20	30	H			BROWN	BLACK ON WHITE	
			EMB													USE HDPE FOR PIPE ENCASED IN CONCRETE UNDER STRUCTURES. TRANSITION FROM SST TO HDPE ABOVE THE SLAB.
			EXP	SST	40 27 00.08											
			EMB													USE SST FOR WALL PIPES.
			SUB													
FA	FOUL AIR	ALL	BURIED	HDPE	40 27 00.21	FL, W	NONE	NONE	SEE SPEC	SEE SPEC	P			WHITE	BLACK ON WHITE	
			EXP (INDOORS)	SST	23.31.13	FL, W	NONE	NONE								
			EXP (OUTDOORS)	FRP	23 31 16.16	FL, W	NONE	NO. 25								
FP, FS	FIRE PROTECTION, FIRE SPRINKLERS	ALL	EXP (INDOORS)	STL	33 41 01.03	PO	NONE	NONE	140	190	H			RED	WHITE ON RED	
GS	GRIT SLURRY	>= 4	EMB	GLDI	40 27 00.01	GR, FL	GLASS	NO. 7	15	30	H	40 05 33	40 42 13	GRAY	BLACK ON WHITE	PROVIDE FLANGES WHERE REQUIRED TO CONNECT TO EQUIPMENT. OTHERWISE PROVIDE GROOVED PIPE JOINTS AND FITTINGS.
			EXP					NO. 4								
			SUB					NO. 2								
HW	HOT WATER 132F (POTABLE)	ALL	EXP	CPVC	40 27 00.11	GLU	NONE	NO. 25	60	80	H		22 07 00	RED	BLACK ON WHITE	
			BUR					NONE								
IA	INSTRUMENT AIR	ALL	EXP	SST	40 27 00.08	FL, THD, W	NONE	NO. 9 (UNDER INSULATION)	100	150	P	40 05 33	40 42 13	N/A	WHITE ON BLUE	
IRR	IRRIGATION WATER	<4	ALL	PVC	40 27 00.10	FL, GLU	NONE	NONE	60	90	H	NONE	NONE	PURPLE	WHITE ON PURPLE	RECLAIMED WATER AT LOWER OPERATING PRESSURE. PIPE COLOR PURPLE SELECTED BY APPROVED SUBMITTAL.
MHO	MAGNESIUM HYDROXIDE	ALL	EXP	FEP TUBING IN SCH 40 PVC CONTAINMENT PIPE	40 27 00.19 40 27 00.10	CC, FL, W	NONE	NO. 25 FOR PVC	75	100	H			FLUORESCENT ORANGE	BLACK ON ORANGE	FEP TUBING INSIDE RIGID SCH 40 PVC SECONDARY CONTAINMENT PIPING WITH LONG RADIUS 5D BENDS. PP VALVES AND FITTINGS.
NPW (W2)	NON-POTABLE WATER OR BACKFLOW-PREVENTED POTABLE WATER	NOT USED	NOT USED	NOT USED										NOT USED	NOT USED	NOT USED
PA	PROCESS AIR	ALL	EXP	SST	40 27 00.08	FL, THD, W	NONE	NO. 9 (UNDER INSULATION)	10	15	P		40 42 13	N/A	BLACK ON WHITE	
			SUB					NONE								
PD	PROCESS DRAIN	<4	BUR	PVC	40 27 00.10	GLU	NONE	NONE			G	40 05 33	40 42 13	WHITE	WHITE ON GREEN	
			EXP	SST	40 27 00.08	FL, THD, W										
			SUB	PVC	40 27 00.10	FL, GLU										
		>= 4	BUR	ELDI	40 27 00.01	RMJ	EPOXY	POLY								SEE NOTE 11
			EMB			FL, RMJ		NO. 7								
			EXP			FL		NO. 4								
			SUB			FL		NO. 2								
			BUR	PVC (PERFORATED)	40 27 00.14	GLU	NONE	NONE								PROVIDE AT DRYING BEDS WHERE CALLED FOR ON DRAWINGS.
PE	PLANT EFFLUENT	<4	EXP	SST	40 27 00.08	FL, THD, W	NONE	NONE			H			WHITE	WHITE ON GREEN	
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE								
			EMB	CLDI	40 27 00.01	FL, RMJ	CEMENT	NO. 7								
			EXP			FL	CEMENT	NO. 4								
PER OR PERM	PERMEATE	ALL	BUR	PVC	40 27 00.10	FL, GLU	NONE	NONE	30	45	H	40 05 33	40 42 13	WHITE	WHITE ON GREEN	AT CHEMICAL INJECTION POINTS, PROCESS PIPE SHALL BE SYSTEM NO. 25 COATED PVC, LENGTH AS REQD OR SHOWN.
			EMB	PVC	40 27 00.10	FL, GLU										
			EXP	SST	40 27 00.08	FL, W		NO. 9 (UNDER INSULATION)								
			SUB	SST	40 27 00.08	FL, W		NONE								
PMPD	PUMPED DRAIN	<4	EXP	SST	40 27 00.08	FL, W	NONE	NONE	25	40	H	40 05 33	40 42 13	WHITE	WHITE ON GREEN	
		>= 4	BUR	CLDI	40 27 00.01	RMJ	CEMENT	POLY								SEE NOTE 11
			EMB			FL, RMJ		NO. 7								
			EXP			FL		NO. 4								
			SUB			FL		NO. 2								

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

JUNE 19, 2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: D EDWARDS
CADD: G BROWN
TECH. REVIEW: D BRUNKOW
DATE: 06/2025

SUB SHEET NO. 01G0300

TITLE OF SHEET
GENERAL
PIPING SCHEDULE

GRAND CANYON, SOUTH RIM

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 44 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 6/17/2025 PLOT TIME: 11:26:53 AM SS6/V8I D31676666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i DrawingsGEN\01G0300_D3167666.dgn

PIPING SCHEDULE

FLOWSTREAM	SERVICE	NOMINAL SIZE (INCHES) (NOTE 2)	INSTALLATION (NOTE 3)	MATERIAL (NOTE 4)	SPECIFICATION SECTION	JOINT TYPE (NOTE 5)	LINING (NOTE 6)	COATING (NOTE 6)	OPERATING PRESSURE (PSIG)	TEST PRESSURE (PSIG)	PRESSURE TEST TYPE (NOTE 7)	HEAT TRACE SPECIFICATION SECTION (NOTE 8)	INSULATION SPECIFICATION SECTION (NOTE 9)	PIPE COLOR (NOTE 10)	LABEL COLOR (NOTE 10)	REMARKS
RAS	RETURN ACTIVATED SLUDGE	<4	EXP	SST	40 27 00.08	FL, THD, W	NONE	NO. 9 (UNDER INSULATION)	10	15	H	40 05 33	40 42 13	TAN	WHITE ON GREEN	
		>=4	BUR	CLDI	40 27 00.01	RMJ	NONE	POLY								SEE NOTE 11
			SUB			FL	CEMENT	NO. 2								
			EMB			FL	CEMENT	NO. 7								
			EXP			FL	CEMENT	NO. 4								
ROR	REVERSE OSMOSIS RETURN	ALL	EXP (INDOORS)	PP	22 10 01.09	W	NONE	NONE	60	80	H			WHITE	WHITE ON GREEN	HIGH PURITY POLYPROPYLENE
ROS	REVERSE OSMOSIS SUPPLY															
RL	REFRIGERANT - LIQUID	ALL	EXP	COP-ACR	23 23 00	W	NONE	NONE			P	NONE	22 07 00	SAFETY YELLOW	BLACK ON ORANGE	REFER TO SECTION 23 23 00, REFRIGERANT PIPING, FOR TESTING REQUIREMENTS.
RG	REFRIGERANT - GAS															
RS	RAW SEWAGE	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	50	75	H	NONE	NONE	N/A	BLACK ON WHITE	SEPATAGE EQUALIZATION PUMP DISCHARGE PIPING
			EXP	SST	40 27 00.08	FL, W	NONE	NO. 9 (UNDER INSULATION)				NONE	NONE			
			SUB			FL, W	NONE	NONE				NONE	NONE			
		>= 4	BUR	ELDI	40 27 00.01	RMJ	EPOXY	POLY			G			BROWN	BLACK ON WHITE	SEE NOTE 11
			EMB			FL, RMJ		NO. 7								
			EXP			FL		NO. 4								
			SUB			FL		NO. 2								
RW	RECLAIMED WATER	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	110	150	H	NONE	NONE	PURPLE	WHITE ON PURPLE	RECLAIMED WATER AT NORMAL OPERATING PRESSURE. PIPE COLOR PURPLE SELECTED BY APPROVED SUBMITTAL. AT CHEMICAL INJECTION POINTS, PROCESS PIPE SPOOL PIECE SHALL BE FLANGED END, SYSTEM NO. 25 COATED PURPLE PVC, LENGTH MINIMUM 5 FEET AND MAXIMUM 10 FEET.
			EXP (INDOORS)	SST	40 27 00.08	FL, THD, W	NONE	NO. 10				NONE	NONE			
			EXP (OUTDOORS)			FL, W		NO. 9 (UNDER INSULATION)				40 05 33	40 42 13			
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE				NONE	NONE	PURPLE	WHITE ON PURPLE	
			EMB	CLDI	40 27 00.01	FL, RMJ		NO. 7				NONE	NONE			
			EXP (INDOORS)			FL		NO. 4				NONE	NONE			
			EXP (OUTDOORS)			FL		NO. 4				40 05 33	40 42 13			
			SUB			FL		NO. 2				NONE	NONE			
RWH	RECLAIMED WATER HIGH	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	140	190	H	NONE	NONE	PURPLE	WHITE ON PURPLE	RECLAIMED WATER AT HIGHER OPERATING PRESSURE. PIPE COLOR PURPLE SELECTED BY APPROVED SUBMITTAL. AT CHEMICAL INJECTION POINTS, PROCESS PIPE SPOOL PIECE SHALL BE FLANGED END, SYSTEM NO. 25 COATED PURPLE PVC, LENGTH MINIMUM 5 FEET AND MAXIMUM 10 FEET.
			EXP (INDOORS)	SST	40 27 00.08	FL, THD, W	NONE	NO. 10				NONE	NONE			
			EXP (OUTDOORS)					NO. 9 (UNDER INSULATION)				40 05 33	40 42 13			
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE				NONE	NONE	PURPLE	WHITE ON PURPLE	
			EMB	CLDI	40 27 00.01	FL, RMJ		NO. 7				NONE	NONE			
			EXP (INDOORS)			FL		NO. 4				NONE	NONE			
			EXP (OUTDOORS)			FL		NO. 4				40 05 33	40 42 13			
			SUB			FL		NO. 2				NONE	NONE			
RWL	RECLAIMED WATER LOW	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	60	150	H	NONE	NONE	PURPLE	WHITE ON PURPLE	RECLAIMED WATER AT LOWER OPERATING PRESSURE. PIPE COLOR PURPLE SELECTED BY APPROVED SUBMITTAL. AT CHEMICAL INJECTION POINTS, PROCESS PIPE SPOOL PIECE SHALL BE FLANGED END, SYSTEM NO. 25 COATED PURPLE PVC, LENGTH MINIMUM 5 FEET AND MAXIMUM 10 FEET.
			EXP (INDOORS)	SST	40 27 00.08	FL, THD, W	NONE	NO. 10				NONE	NONE			
			EXP (OUTDOORS)					NO. 9 (UNDER INSULATION)				40 05 33	40 42 13			
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE				NONE	NONE	PURPLE	WHITE ON PURPLE	
			EMB	CLDI	40 27 00.01	FL, RMJ		NO. 7				NONE	NONE			
			EXP (INDOORS)			FL		NO. 4				NONE	NONE			
			EXP (OUTDOORS)			FL		NO. 4				40 05 33	40 42 13			
			SUB			FL		NO. 2				NONE	NONE			
SA	SAMPLE	ALL	ALL	SST	40 27 00.08	FL, THD, W	NONE	NONE	75	100	H			WHITE	WHITE ON GREEN	LIQUID SAMPLE
SC	SUPPLEMENTAL CARBON	ALL	EXP	SST	40 27 00.08	FL, THD, W	NONE	NO. 9 (UNDER INSULATION)	75	100	H	40 05 33	40 42 13	N/A	BLACK ON ORANGE	
			SUB				NONE	NONE	75	100	H					
SD	STORM DRAIN	ALL	BUR	PVC	33 41 01.03	PO	NONE	NONE			G			N/A	N/A	
SHC	SODIUM HYPOCHLORITE	ALL	EXP	FEP TUBING IN SCH 40 PVC CONTAINMENT PIPE	40 27 00.19 40 27 00.10	CC, FL, W	NONE	NO. 25 FOR PVC	25	50	H			SAFETY YELLOW	BLACK ON ORANGE	FEP TUBING INSIDE RIGID SCH 40 PVC SECONDARY CONTAINMENT PIPING WITH LONG RADIUS 5D BENDS. PVDF VALVES AND FITTINGS.
SPD	SUMP PUMP DISCHARGE	ALL	BUR	PVC	40 27 00.10	GLU	NONE	NONE	75	100	H			BROWN	BLACK ON WHITE	
			EMB					NO. 25								
			EXP (INDOORS)					NO. 25								
SS	SANITARY SEWER	ALL	BUR	PVC DWV	22 10 01.02	GLU	NONE	NONE			G			WHITE	BLACK ON WHITE	
			EMB					NO. 25								
			EXP (INDOORS)					NO. 25								
TW	TEPID WATER	ALL	EXP (INDOORS)	CPVC	40 27 00.11	GLU	NONE	NONE	75	100	H		22 07 00	WHITE	WHITE ON BLUE	
TWR	TEPID WATER RETURN															
UVE	UV EFFLUENT	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	100	150	H	NONE	NONE	WHITE	WHITE ON GREEN	UNCHLORINATED WATER, DOWNSTREAM OF UV DISINFECTION, UPSTREAM OF RECLAIMED WATER
			EXP (INDOORS)	SST	40 27 00.08	FL, THD, W		NO. 10				NONE	NONE			
			EXP (OUTDOORS)			FL, W		NO. 9 (UNDER INSULATION)				40 05 33	40 42 13			
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE				NONE	NONE			
			EMB	CLDI	40 27 00.01	FL, RMJ		NO. 7				NONE	NONE			
			EXP (INDOORS)			FL		NO. 4				NONE	NONE			
			EXP (OUTDOORS)			FL		NO. 4				40 05 33	40 42 13			
			SUB			FL		NO. 2				NONE	NONE			

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

JUNE 19, 2025

A/E FIRM
JACOBS GOVERNMENT SERVICES COMPANY
GREENWOOD VILLAGE, CO

DESIGNED: D EDWARDS
CADD: G BROWN
TECH. REVIEW: D BRUNKOW
DATE: 06/2025

SUB SHEET NO. 01G0301

TITLE OF SHEET
GENERAL PIPING SCHEDULE
GRAND CANYON, SOUTH RIM

DRAWING NO. 113 175376
PMIS/PKG NO. 257282
SHEET 45 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/17/2025 PLOT TIME: 11:27:37 AM SS6iV8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0301_D3167666.dgn

PLOT DATE: 6/17/2025 PLOT TIME: 11:27:29 AM SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0302_D3167666.dgn

GRCA-257282

PIPING SCHEDULE

FLOWSTREAM	SERVICE	NOMINAL SIZE (INCHES) (NOTE 2)	INSTALLATION (NOTE 3)	MATERIAL (NOTE 4)	SPECIFICATION SECTION	JOINT TYPE (NOTE 5)	LINING (NOTE 6)	COATING (NOTE 6)	OPERATING PRESSURE (PSIG)	TEST PRESSURE (PSIG)	PRESSURE TEST TYPE (NOTE 7)	HEAT TRACE SPECIFICATION SECTION (NOTE 8)	INSULATION SPECIFICATION SECTION (NOTE 9)	PIPE COLOR (NOTE 10)	LABEL COLOR (NOTE 10)	REMARKS
UVI	UV INFLUENT	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	100	150	H	NONE	NONE	WHITE	WHITE ON GREEN	UV RECIRCULATION LOOP, UNCHLORINATED WATER
			EXP (INDOORS)	SST	40 27 00.08	FL, THD, W		NO. 10				NONE	NONE			
			EXP (OUTDOORS)			FL, W		NO. 9 (UNDER INSULATION)				40 05 33	40 42 13			
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE				NONE	NONE			
			EMB	CLDI	40 27 00.01	FL, RMJ		NO. 7				NONE	NONE			
			EXP (INDOORS)			FL		NO. 4				NONE	NONE			
			EXP (OUTDOORS)			FL		NO. 4				40 05 33	40 42 13			
			SUB			FL		NO. 2				NONE	NONE			
VAC	LABORATORY VACUUM	ALL	EXP	SST	40 27 00.08	THD	NONE	NONE	13.5	14.2	P			N/A	WHITE ON BLUE	
V/VTR	VENT OR VENT THROUGH ROOF (SANITARY)	ALL	EXP	PVC	22 10 01.02	GLU	NONE	NO. 25	N/A	N/A	G			WHITE	BLACK ON YELLOW	
W1 (PW)	POTABLE WATER	<4	BUR	HDPE	40 27 00.21	FL, W	NONE	NONE	60	80	H			SAFETY BLUE	WHITE ON BLUE	
			EXP (INDOORS)	CPVC	40 27 00.11	FL, GLU	NONE	NO. 25					22 07 00			
			EXP (OUTDOORS)	SST	40 27 00.08	FL, THD, W	NONE	NO. 9 (UNDER INSULATION)				40 05 33	22 07 00			
		>= 4	BUR	PVC (AWWA C900)	40 27 00.23	RMJ	NONE	NONE								
W2 (NPW)	NON-POTABLE WATER OR BACKFLOW-PREVENTED POTABLE WATER	NOT USED														
WAS	WASTE ACTIVATED SLUDGE	<4	EXP	SST	40 27 00.08	FL, THD, W	NONE	NONE	25	40	H			TAN	WHITE ON GREEN	
		>= 4	BUR	CLDI	40 27 00.01	RMJ	CEMENT	POLY								SEE NOTE 11
			EMB			FL, RMJ		NO. 7								
			EXP			FL		NO. 4								
			SUB			FL		NO. 2								
XX/BYP	BYPASS	XX= PRIMARY SERVICE (NOTE 1)														
XX / DR	DRAIN	XX= PRIMARY SERVICE (NOTE 1)														
XX / OF	OVERFLOW	XX= PRIMARY SERVICE (NOTE 1)														
XX / V	VENT	XX= PRIMARY SERVICE (NOTE 1)														

NOTES:

1. WHERE PIPING CARRIES TWO OR MORE SERVICE DESIGNATIONS, THE PIPING MATERIAL SHALL CONFORM TO THE MATERIAL OF THE FIRST SERVICE LISTED

2. SIZES MEASURED IN INCHES
   "ALL" REFERS TO ALL SIZES
   ">" GREATER THAN
   "<" LESS THAN
   "<=" LESS THAN OR EQUAL TO
   ">=" GREATER THAN OR EQUAL TO

3. ALL: INCLUDES ALL INSTALLATIONS LISTED BELOW
   BUR: BURIED
   EMB: EMBEDDED OR ENCASED (IN CLSM OR CONCRETE)
   EXP: EXPOSED (INDOORS OR OUTDOORS)
   SUB: SUBMERGED

4. CEDI: CERAMIC EPOXY LINED DUCTILE IRON
   CLDI: CEMENT LINED DUCTILE IRON
   COP: COPPER
   COP-ACR: COPPER - AIR CONDITIONING REFRIGERATION
   CPVC: CHLORINATED POLYVINYL CHLORIDE
   CSP: CARBON STEEL PIPE
   DIP: DUCTILE IRON PIPE
   ELDI: EPOXY LINED DUCTILE IRON
   FEP: FLUORINATED ETHYLENE PROPYLENE
   FRP: FIBERGLASS REINFORCED PLASTIC
   GLDI: GLASS LINED DUCTILE IRON
   HDPE: HIGH DENSITY POLYETHYLENE
   PP: POLYPROPYLENE
   PVC: POLYVINYL CHLORIDE
   PVC-DWV: POLYVINYL CHLORIDE - DRAIN WASTE VENT
   STL: STEEL (CARBON STEEL PIPE)
   SST: STAINLESS STEEL

5. ALL JOINT IN ALL PIPING SYSTEM SHALL BE FULLY RESTRAINED
   CC: COMPRESSION COLLAR COUPLINGS ON BARBLOCK TUBING FITTING
   FL: FLANGED
   GLU: GLUED SOLVENT SOCKET WELDED
   GR: GROOVED
   RMJ OR PRJ: RESTRAINED MECHANICAL JOINT OR PROPRIETARY RESTRAINED JOINT
   PO: PUSH ON
   THD: THREADED
   W: WELDED, SOLDERED, BRAZED, ELECTRO FUSION WELDED

6. COATINGS AND LININGS SYSTEM NUMBER AS SPECIFIED IN SECTION 09 90 00, PAINTING AND COATING, AND AS SPECIFIED IN ARTICLE, PIPE CORROSION PROTECTION. POLY: FOR BURIED DUCTILE IRON PIPE, USE A ZINC COATING, ASPHALT AND POLYETHYLENE BAGGING

7. SEE SECTION 40 80 01, PROCESS PIPING LEAKAGE TESTING FOR TEST PROCEDURES AND, TEST PRESSURE WHERE "SEE SPEC" IS INDICATED.
   H: HYDROSTATIC TEST FOR PRESSURE PIPING
   G: HYDROSTATIC TEST FOR GRAVITY PIPING
   P: PNEUMATIC TEST FOR PRESSURE PIPING

8. SEE SECTION 40 05 33, PIPE HEAT TRACING, FOR OUTDOOR EXPOSED PLUMBING OR PROCESS PIPING. OUTDOOR EXPOSED PIPING THAT REQUIRES HEAT TRACING IS INDICATED ON THE DRAWINGS.

9. SEE SECTION 22 07 00, PLUMBING PIPING INSULATION, FOR INDOOR OR OUTDOOR EXPOSED PLUMBING AND REFRIGERANT PIPING. SEE SECTION 40 42 13, PROCESS PIPING INSULATION, FOR INDOOR OR OUTDOOR EXPOSED PROCESS PIPING.

10. PIPE COLORS AND LABEL COLORS SHALL BE IN ACCORDANCE WITH SECTION 09 90 00, PAINTING AND COATING, AND 10 14 00, SIGNAGE. COLOR SELECTIONS, MATERIALS, AND PRODUCTS SHALL BE APPROVED BY SUBMITTAL PRIOR TO FINAL ACCEPTANCE OF PIPING SUBMITTALS.

11. BOND ALL JOINTS ON BURIED DUCTILE IRON PIPING PER SECTION 26 42 021, PPIPE BONDING AND DETAILS 2642-840 AND 2642-910.

NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

Registered Professional Engineer, Certificate No. 69048, DARREN EDWARDS, Date Signed, ARIZONA, U.S.A.
JUNE 19, 2025

A/E FIRM	DESIGNED: D EDWARDS	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO. 113 / 175376
JACOBS GOVERNMENT SERVICES COMPANY	CADD: G BROWN	01G0302	GENERAL PIPING SCHEDULE	PMIS/PKG NO. 257282
GREENWOOD VILLAGE, CO	TECH. REVIEW: D BRUNKOW			SHEET
	DATE: 06/2025		GRAND CANYON, SOUTH RIM	46 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

INFLUENT FLOW, MGD		
	2045 DESIGN CRITERIA	2070 DESIGN CRITERIA
MINIMUM MONTH	0.35	0.38
AVERAGE ANNUAL	0.42	0.51
MAXIMUM MONTH	0.52	0.65
PEAK DAY	0.83	1.0
PEAK HOUR	1.8	2.0
INFLUENT LOADS, POUNDS PER DAY		
	2045 DESIGN CRITERIA	2070 DESIGN CRITERIA
MINIMUM MONTH		
BOD	740	830
TSS	740	830
TKN (AS N)	200	220
NH4 (AS N)	140	160
ANNUAL AVERAGE		
BOD	960	1190
TSS	960	1190
TKN (AS N)	260	320
NH4 (AS N)	190	230
MAX MONTH		
BOD	1210	1540
TSS	1210	1540
TKN (AS N)	330	410
NH4 (AS N)	230	300
SEPTAGE FLOW, GPD		
2045 CONDITIONS	2045 DESIGN CRITERIA	2070 DESIGN CRITERIA
MINIMUM MONTH	220	360
ANNUAL AVERAGE	560	920
MAX MONTH	880	1240
SEPTAGE LOADS, POUNDS PER DAY		
	2045 DESIGN CRITERIA	2070 DESIGN CRITERIA
MINIMUM MONTH		
BOD	80	130
TSS	80	130
TKN (AS N)	21	34
NH4 (AS N)	15	24
ANNUAL AVERAGE		
BOD	200	320
TSS	200	320
TKN (AS N)	53	86
NH4 (AS N)	38	62
MAX MONTH		
BOD	310	440
TSS	310	440
TKN (AS N)	83	118
NH4 (AS N)	59	84
INFLUENT SCREENING		
TYPE		IN CHANNEL DRUM BAR SCREEN WITH INTEGRAL WASH PRESS
NUMBER		1 DUTY, 1 STANDBY
CAPACITY, MGD		2.0
BAR SPACING, MM		6
WASHED SCREENINGS LOAD AT 2045 AA, CF/DAY		1.7
GRIT REMOVAL		
GRIT CHAMBER		
TYPE		STACKED-TRAY, VORTEX
NUMBER OF CHAMBERS		1, WITH BYPASS
NUMBER OF TRAYS		10
DIAMETER OF TRAYS, FT		4
PEAK FLOW CUTPOINT, MICRON		106 AT 2.0 MGD
GRIT PUMP		
TYPE		SELF PRIMING CENTRIFUGAL
NUMBER		1, WITH SHELF SPARE
CAPACITY, GPM		150
GRIT WASHER AND DEWATERING		
TYPE		VORTEX WITH INCLINED CONVEYOR
NUMBER		1
WASHED GRIT LOAD AT 2045 AA, CF/DAY		2.1
FINE SCREENING		
TYPE		IN CHANNEL DRUM PERFORATED PLATE SCREEN WITH INTEGRAL WASH PRESS
NUMBER		1 DUTY, 1 STANDBY
CAPACITY, MGD		1.2
PERFORATION OPENING, MM		1
WASHED SCREENINGS LOAD AT 2045 AA, CF/DAY		2.9
FLOW EQUALIZATION		
OPEN CONCRETE EQUALIZATION TANK		
NUMBER		1
VOLUME, GALLONS		200,000
SIDEWATER DEPTH, FEET		17
PEAK FLOW THRESHOLD, MG		1.18
RETURN FLOW		BY GRAVITY TO PLANT DRAIN PS

VAULT WASTE RECEIVING	
INCLINED ROTATING SCREEN WITH WASHING/COMPACTING	
NUMBER	1
CAPACITY, GPM	450
SCREEN OPENING, MM	6
VAULT WASTE EQUALIZATION TANK	
NUMBER	1
VOLUME, GALLONS	4,000
VAULT WASTE PUMP	
TYPE	SUBMERSIBLE GRINDER PUMP
NUMBER	1, WITH SHELF SPARE
CAPACITY, GPM	50
SECONDARY/TERTIARY TREATMENT	
TREATMENT BIOREACTORS	
NUMBER	3
VOLUME, EACH BIOREACTOR, GALLONS	87,000
SIDEWATER DEPTH, FEET	15
ZONES	3
ANOXIC VOLUME, PER BIOREACTOR, GALLONS	13,050
AEROBIC VOLUME, PER BIOREACTOR, GALLONS	52,200
POST ANOXIC VOLUME, PER BIOREACTOR, GALLONS	21,750
BAFFLE WALLS	
TYPE	CONCRETE, FLOW-OVER ONLY
NUMBER PER BASIN	2
ANOXIC MIXERS	
NUMBER PER BIOREACTOR	2 DUTY, 1 SHELF SPARE
TYPE	SUBMERSIBLE
SIZE, HP	1.5
FINE BUBBLE AERATION	
DIFFUSER TYPE	DISC DIFFUSERS
DIFFUSER GRIDS PER BIOREACTOR	2
NUMBER OF DIFFUSERS PER GRID, GRID 1	120
NUMBER OF DIFFUSERS PER GRID, GRID 2	70
PROCESS AERATION	
NUMBER OF BLOWERS	3 DUTY, 1 STANDBY
BLOWER TYPE	POSITIVE DISPLACEMENT
BLOWER SIZE, SCFM	610
BLOWER SIZE, HP	50
SUBMERGED ULTRAFILTRATION MEMBRANE SYSTEM	
NUMBER OF MEMBRANE TANKS	3
TYPE OF MEMBRANE	HOLLOW FIBER
NUMBER OF CASSETTES PER TANK	1
MEMBRANE SURFACE AREA PER MODULE, SQUARE FEET	430
NUMBER OF MODULES PER CASSETTE	44
MEMBRANE AIR SCOUR BLOWERS	
NUMBER	2 DUTY, 1 STANDBY
BLOWER TYPE	POSITIVE DISPLACEMENT
BLOWER SIZE, SCFM	70-300
BLOWER SIZE, HP	15
RAS PUMPS	
NUMBER	3 DUTY, 1 SHELF SPARE
TYPE	CENTRIFUGAL
RAS PUMP CAPACITY, GPM	900
RAS PUMP CAPACITY, HP	3
RAS PUMP TDH, FT	15
PERMEATE PUMPS	
NUMBER	3 DUTY, 1 SHELF SPARE
TYPE	ROTARY LOBE
PERMEATE PUMP CAPACITY, GPM	635
PERMEATE PUMP CAPACITY, HP	20
PERMEATE PUMP TDH, FT	45
BACKPULSE SYSTEM	
TYPE	OFFLINE BACKPULSE TANK
TANK SIZE	775 GALLONS
WASTING TYPE	SURFACE WASTING W/ACTUATED WEIR TO SUMP
WAS PUMPS	
NUMBER	1 DUTY, 1 STANDBY
TYPE	CENTRIFUGAL SUBMERSIBLE
WAS PUMP CAPACITY, GPM	150
WAS PUMP CAPACITY, HP	7.5

PLOT DATE: 6/18/2025 PLOT TIME: 8:29:04 AM SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8I Drawings\GEN\01G0400_D3167666.dgn

100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

Registered Professional Engineer Civil
CERTIFICATE NO.
80742
CORY
LANCASTER
Date Signed 6/18/2025
ARIZONA, U.S.A.

Cory Lancaster

NO SCALE

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: R CAMPBELL CADD: G BROWN TECH. REVIEW: D BRUNKOW DATE: 06/2025	SUB SHEET NO. 01G0400	TITLE OF SHEET GENERAL DESIGN CRITERIA GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 47 OF 401	

DISINFECTION	
ULTRAVIOLET DISINFECTION	
TYPE	IN-VESSEL REACTOR
NUMBER	2 DUTY, 1 STANDBY
UV LAMP TYPE	LOW PRESSURE HIGH OUTPUT AMALGAM
LAMPS PER REACTOR	32
UV TRANSMITTANCE, MINIMUM, %	65
UV DOSE, MINIMUM, MJ/CM^2	80
UV EFFLUENT PUMPS	
SERVICE	UVE DISINFECTED & UNCHLORINATED WATER TO UV RECIRC LOOP AND ODOR CONTROL BIOFILTER
TYPE	VERTICAL MULTISTAGE INLINE CENTRIFUGAL
QUANTITY	1 DUTY, 1 STANDBY
FLOW RATE, GPM	25
RATED HEAD, FEET	50
RATED HEAD, PSI	20
MOTOR SIZE, HP (EACH)	1-1/2
MOTOR RATED SPEED, RPM (EACH)	1750
AEROBIC DIGESTION	
AEROBIC DIGESTERS	
TYPE	COVERED WITH DECANT THICKENING
OPERATION	NORMALLY IN SERIES W/ ON/OFF AERATION
NUMBER	2
VOLUME, EACH, GALLONS	227,000
MINIMUM/MAXIMUM DEPTH	20/23.5
MIXER/AERATORS	
TYPE	HYPERBOLOID MIXER/AERATOR
NUMBER PER DIGESTER	2
AERATION TYPE	SPARGER RING, MEDIUM BUBBLE DIFFUSERS
HP PER MIXER/AERATOR	30
DECANTERS	
TYPE	FLOATING WITH SUBSURFACE WEIR AND HOSE OR ARTICULATING ARM
MAX FLOW RATE, GPM	250
MAX TRAVEL, FEET	6
DIGESTER BLOWERS	
NUMBER	3 DUTY, 1 STANDBY
BLOWER TYPE	POSITIVE DISPLACEMENT
BLOWER SIZE, SCFM	600
BLOWER SIZE, HP	75
DEWATERING	
DRYING BEDS	
TYPE	UNCOVERED, SAND AND GRAVEL WITH UNDERDRAIN
NUMBER	10 (9 ONLINE/DEWATERING, 1 OFFLINE/STORAGE)
LENGTH, EACH, FEET	100
WIDTH, EACH, FEET	30
SURFACE AREA, EACH, SQUARE FEET	3,000
SOLIDS LOADING RATE (POUNDS PER SQ FT PER YEAR)	
CURRENT AVERAGE ANNUAL	9.1
2045 AVERAGE ANNUAL	12.3
2070 AVERAGE ANNUAL	15.7
FREEBOARD DURING FILLING, INCHES	12
SLUDGE LAYER DEPTH DURING FILLING, INCHES	12
SLUDGE LAYER DEPTH AFTER DRYING, INCHES	~1
SAND DEPTH, INCHES	12
GRAVEL DEPTH, INCHES	18
UNDERDRAIN	4" PERFORATED PIPE, 3 PER BED
RECLAIMED WATER SYSTEM	
RECLAIMED WATER STORAGE TANK	
TYPE	WELDED STEEL, EPOXY LINING, ACRYLIC/URETHANE COATING
NOMINAL STORAGE VOLUME, GALLONS	110,000
RECLAIMED WATER PUMPS	
TYPE	VERTICAL MULTISTAGE INLINE CENTRIFUGAL
QUANTITY (DUTY + STANDBY)	3 (2 + 1)
FLOW RATE, GPM (EACH)	250
RATED HEAD, FEET	315
RATED HEAD, PSI	140
MOTOR SIZE, HP (EACH)	30
MOTOR RATED SPEED, RPM (EACH)	3600

CHEMICAL SYSTEMS	
MEMBRANE CLEANING SYSTEM - SODIUM HYPOCHLORITE	
TYPE	LIQUID SODIUM HYPOCHLORITE SOLUTION
STRENGTH, %	10-15%
CONCENTRATION AT MEMBRANES, MG/L	200-1000
STORAGE TYPE AND VOLUME	TWO 275 GALLON TOTES
METERING PUMP TYPE	PERISTALTIC
NUMBER OF METERING PUMPS	1 DUTY, 1 STANDBY
MEMBRANE CLEANING SYSTEM - CITRIC ACID	
TYPE	LIQUID CITRIC ACID SOLUTION
STRENGTH, %	50%
CONCENTRATION AT MEMBRANES, MG/L	2,000
STORAGE TYPE AND VOLUME	TWO 275 GALLON TOTES
METERING PUMP TYPE	PERISTALTIC
NUMBER OF METERING PUMPS	1 DUTY, 1 STANDBY
ALKALINITY DOSING SYSTEM - MAGNESIUM HYDROXIDE	
TYPE	LIQUID MAGNESIUM HYDROXIDE SOLUTION
STRENGTH, %	62
DOSE, MG/L AS $CaCO_3$	50
TOTE MIXER HP	1
STORAGE TYPE AND VOLUME	TWO 275 GALLON TOTES
METERING PUMP TYPE	PERISTALTIC
NUMBER OF METERING PUMPS	1 DUTY, 1 STANDBY
SUPPLEMENTAL CARBON SYSTEM	
TYPE	LIQUID ORGANIC CHEMICAL
STRENGTH, G/L COD	1,100
DOSE, MG/L AS COD	20-50
STORAGE TYPE AND VOLUME	TWO 275 GALLON TOTES
METERING PUMP TYPE	PERISTALTIC
NUMBER OF METERING PUMPS	3 DUTY, 1 STANDBY
RECLAIMED WATER CHLORINATION SYSTEM	
TYPE	LIQUID SODIUM HYPOCHLORITE SOLUTION
STRENGTH, %	10-15%
DOSE, MG/L	2 to 10
STORAGE TYPE AND VOLUME	TWO 275 GALLON TOTES
METERING PUMP TYPE	PERISTALTIC
NUMBER OF METERING PUMPS	1 DUTY, 1 STANDBY
ODOR CONTROL	
BIOFILTER	
NUMBER	1
CAPACITY	1,000 CFM
MEDIA TYPE	ENGINEERED MEDIA
MINIMUM EMPTY BED CONTACT TIME	45 SECONDS
MEDIA DEPTH	9.5 FEET
VESSEL DIAMETER	10 FEET
IRRIGATION WATER SUPPLY	UVE (PRE-CHLORINATION)
IRRIGATION WATER INSTANTANEOUS RATE	20-25 GAL PER MIN
IRRIGATION QUANTITY	300 GAL PER DAY
FANS	
TYPE	CENTRIFUGAL
NUMBER	1 DUTY, 1 STANDBY
FAN CAPACITY	1,000 CFM @ 8 IN W.C.
MOTOR SIZE	3 HP
DRIVE TYPE	VARIABLE SPEED
COMPOSTING FACILITY	
BATCH COMPOSTING	
TYPE	AERATED STATIC PILE
PILE CONTAINMENT TYPE	COVERED BUNKER
NUMBER OF PILES	2 ACTIVE, 1 CURING, 1 STORAGE
AERATION TYPE	FORCED AIR
MAXIMUM RATIO OF DEWATERED BIOSOLIDS/BULKING AGENT:COMPOSTING TOILET WASTE	2:1
BUNKER CAPACITY	11.25 CY
FANS	
TYPE	CENTRIFUGAL
NUMBER	4 DUTY
FAN CAPACITY	300 CFM @ 8 IN W.C.
MOTOR SIZE	1 HP
PLANT DRAIN PUMP STATION	
PLANT DRAIN PUMPS	
NUMBER	1 DUTY, 1 STANDBY
TYPE	CENTRIFUGAL SUBMERSIBLE
CAPACITY, GPM	150
CAPACITY, HP	7.5
TANK DRAIN PUMP STATION	
PLANT DRAIN PUMPS	
NUMBER	1 DUTY, 1 STANDBY
TYPE	CENTRIFUGAL SUBMERSIBLE
CAPACITY, GPM	150
CAPACITY, HP	7.5

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 6/18/2025 PLOT TIME: 8:28:51 AM SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\GEN\01G0401_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

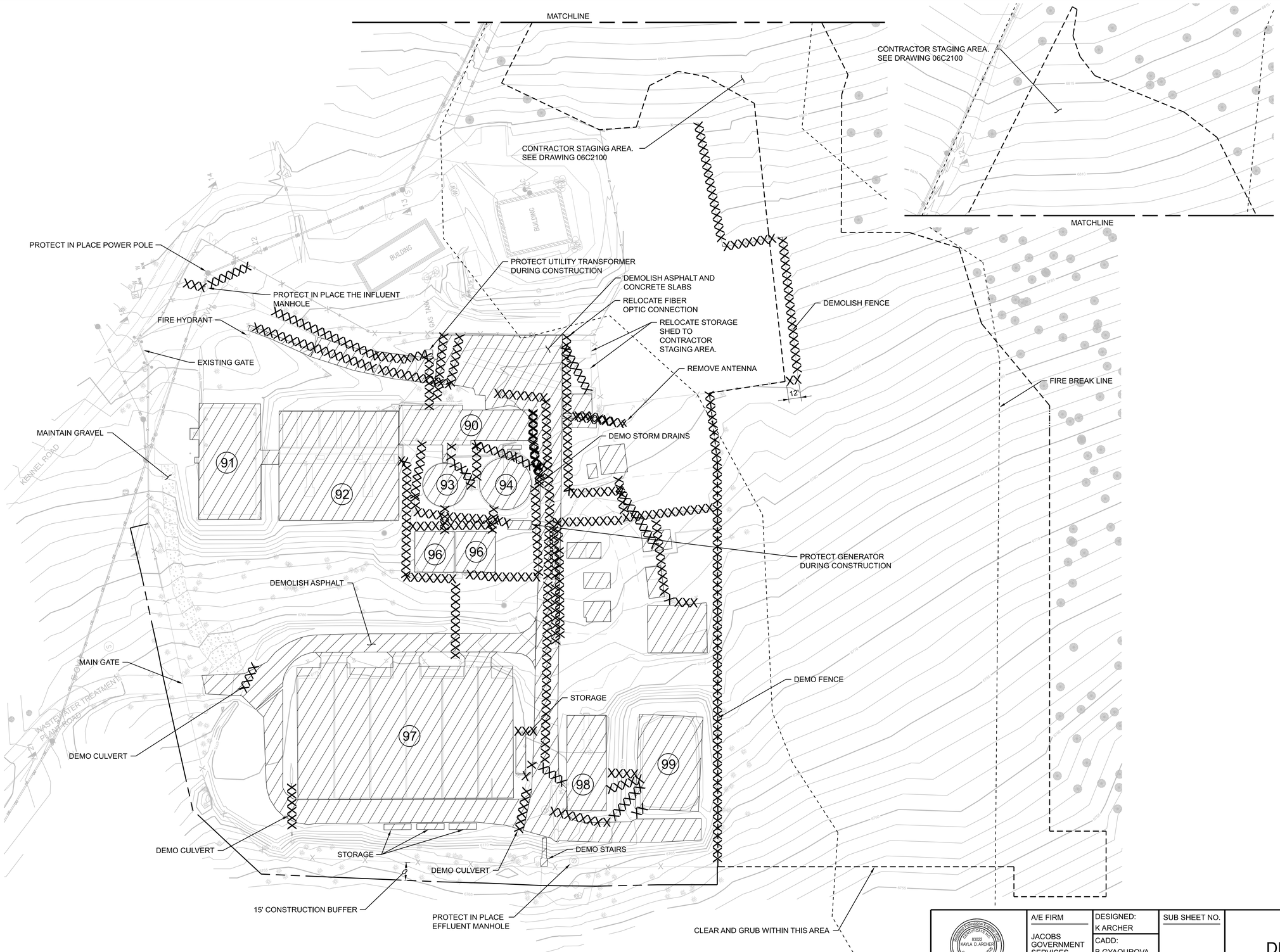
0" 1"

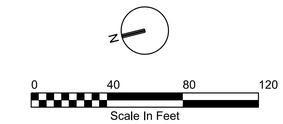
NO SCALE

Registered Professional Engineer (Civil) CERTIFICATE NO. 80742 CORY D. LANCASTER U.S. Signed 6/18/25 ARIZONA U.S.A.

Cory Lancaster

A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	R CAMPBELL CADD: G BROWN TECH. REVIEW: D BRUNKOW DATE: 06/2025	01G0401	PROCESS DESIGN CRITERIA GRAND CANYON, SOUTH RIM	113 175376 PMIS/PKG NO. 257282 SHEET 48 OF 401





GENERAL SHEET NOTES

A. EXISTING FACILITIES TO BE DEMOLISHED PER 02 41 00, DEMOLITION. SEE DRAWINGS 06X1101 THROUGH 06X1124.

B. FOR CONSTRUCTION PHASING SEE DRAWING 06X1001 THROUGH 06X1002.

C. FOR UTILITY DEMOLITION, SEE DRAWING 06X1003.

D. FOR TREE PROTECTION DETAILS SEE DRAWING 06L5001.

EXISTING FACILITIES LEGEND

90	CONTROL BUILDING
91	PRETREATMENT, BLOWER, AND DIGESTER BUILDING
92	AERATION TANKS
93	CLARIFIER NO. 1
94	CLARIFIER NO. 2
96	FLOW EQUALIZATION TANKS
97	SLUDGE DRYING BEDS 1-6
98	RECLAMATION PLANT
99	BACKWASH HOLDING POND

LEGEND:

DEMOLITION

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

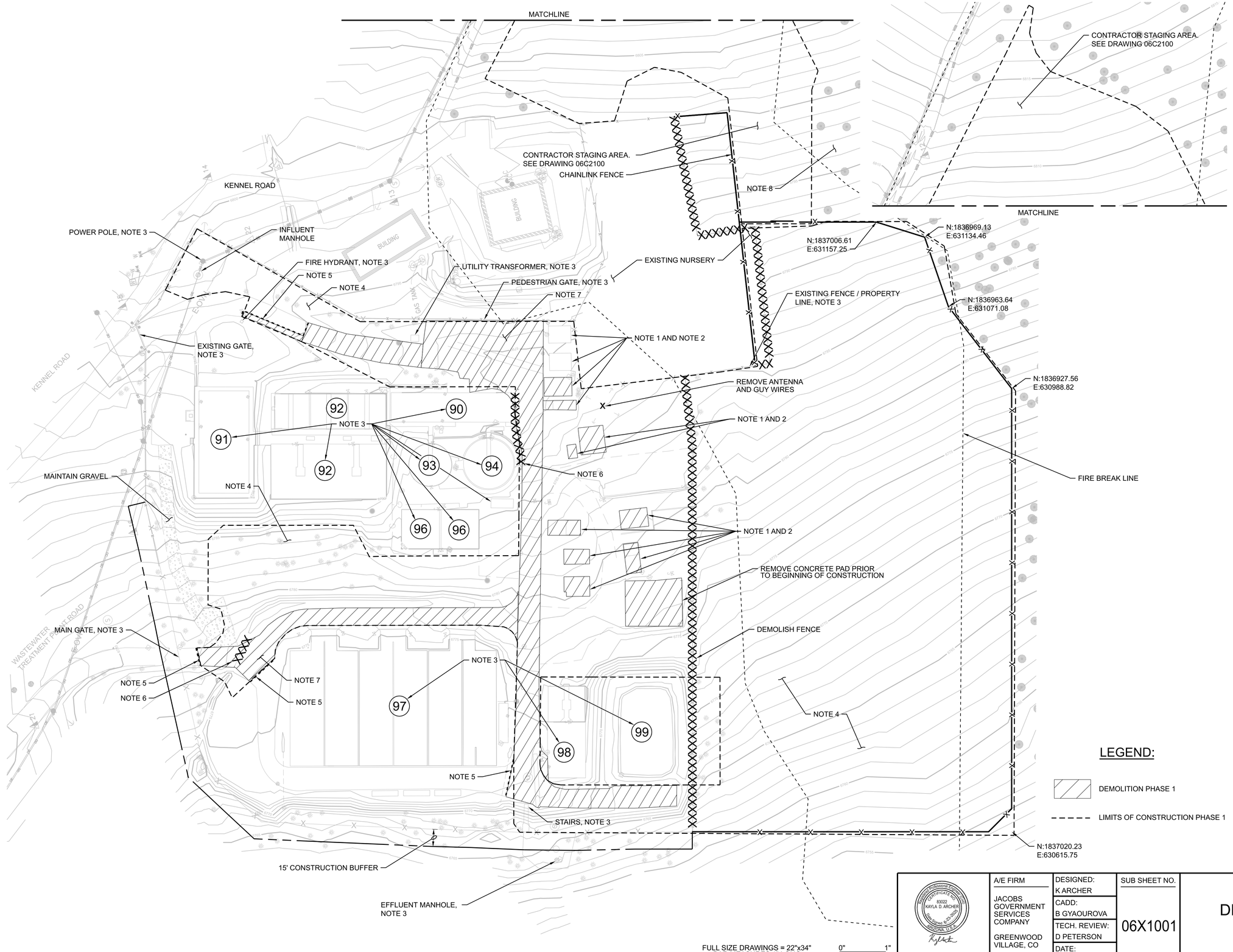
0" 1"

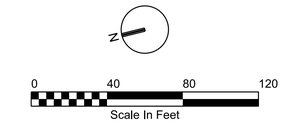
A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1000	TITLE OF SHEET CIVIL DEMOLITION PLAN OVERALL GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 49 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:18 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1000_D3167666.dgn





GENERAL SHEET NOTES

A. SEE SHEET 06C2100 FOR CONTRACTOR STAGING AREA.

B. MAINTAIN ACCESS FOR STAFF DURING CONSTRUCTION.

C. FOR TREE PROTECTION DETAILS, SEE 06C5001.

SHEET NOTES

1. ALL STORAGE SHEDS, RELATED FOUNDATIONS, AND CONNECTING UTILITIES TO BE REMOVED PRIOR TO BEGINNING OF CONSTRUCTION. SEE 02 41 00, DEMOLITION.
2. CONTENTS OR FUNCTION OF SHED MAY NEED TO BE PROVIDED TEMPORARILY THROUGHOUT THE CONSTRUCTION FOR PARK OPERATIONS.
3. PROTECT IN PLACE.
4. CLEAR AND GRUB, SEE SPEC 31 10 00, SITE CLEARING.
5. SAWCUT PAVEMENT.
6. DEMOLISH STORM DRAINS.
7. DEMOLISH ASPHALT AND REMOVE BASE COURSE.
8. REFER TO LANDSCAPING PLAN FOR TREE PROTECTION IN CONTRACTOR STAGING AREA.

EXISTING FACILITIES LEGEND

90	CONTROL BUILDING
91	PRETREATMENT, BLOWER, AND DIGESTER BUILDING
92	AERATION TANKS
93	CLARIFIER NO. 1
94	CLARIFIER NO. 2
96	FLOW EQUALIZATION TANKS
97	SLUDGE DRYING BEDS 1-6
98	RECLAMATION PLANT
99	BACKWASH HOLDING POND

LEGEND:

DEMOLITION PHASE 1

LIMITS OF CONSTRUCTION PHASE 1

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

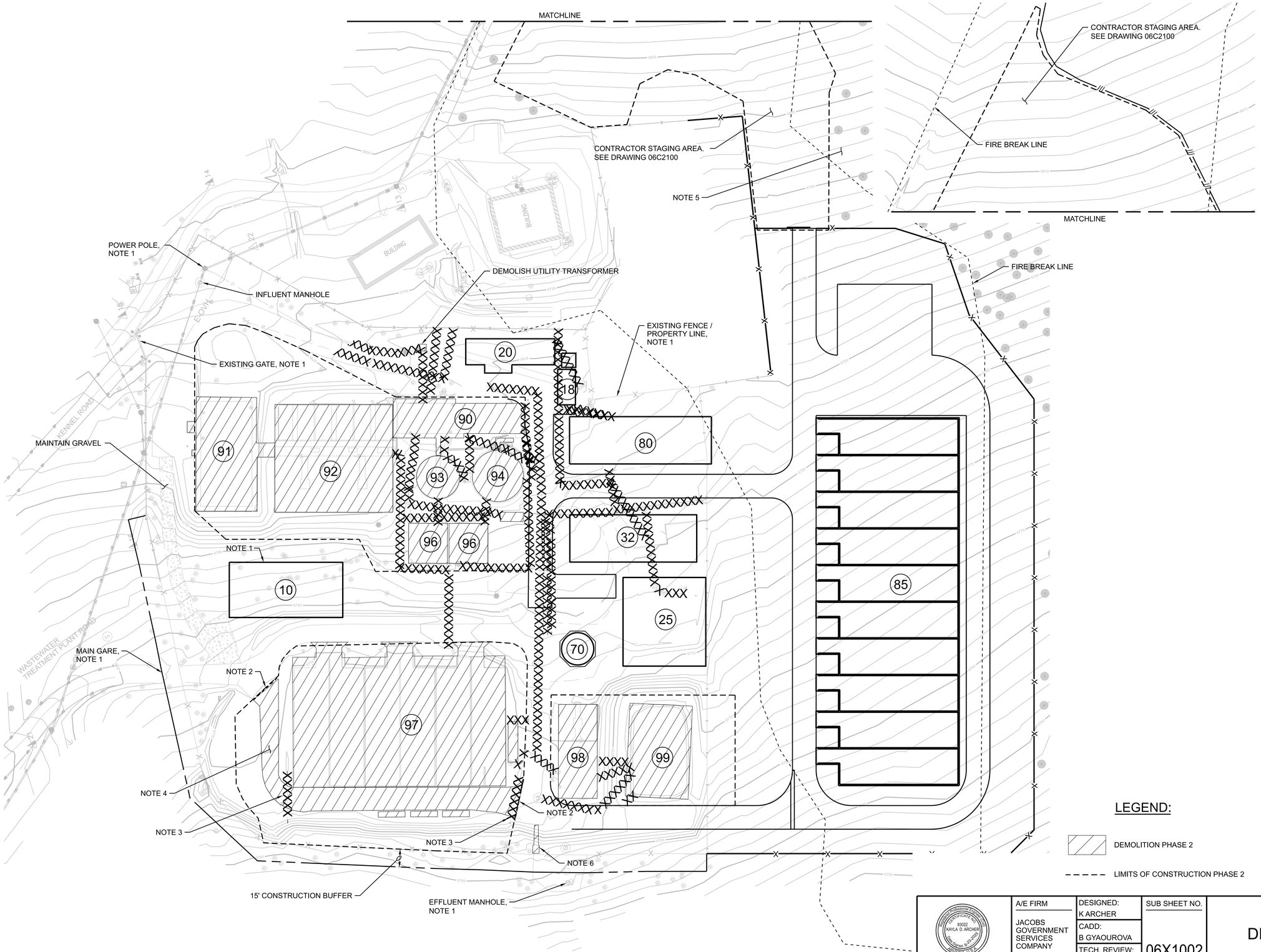
0" 1"

Registered Professional Engineer (Civil) CERTIFICATE NO. 83022 KAYLA D. ARCHER Date Signed: 6-23-2025 ARIZONA, U.S.A.	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1001	TITLE OF SHEET CIVIL DEMOLITION PLAN PHASE 1 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 / 175376 PMIS/PKG NO. 257282 SHEET 50 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:17 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1001_D3167666.dgn



0 40 80 120
Scale In Feet

GENERAL SHEET NOTES

A. SEE SHEET 06C2100 FOR CONTRACTOR STAGING AREA.

B. MAINTAIN ACCESS FOR STAFF DURING CONSTRUCTION.

C. FOR PROTECTION DETAILS, SEE 06L5001.

SHEET NOTES

1. PROTECT IN PLACE
2. SAWCUT PAVEMENT
3. DEMOLISH STORM DRAINS
4. DEMOLISH ASPHALT AND REMOVE BASE COURSE
5. REFER TO LANDSCAPING PLAN FOR TREE PROTECTION IN CONTRACTOR STAGING AREA
6. DEMOLISH AND REPLACE STAIRS, 0330-049

EXISTING FACILITIES LEGEND

- 90 CONTROL BUILDING
- 91 PRETREATMENT, BLOWER, AND DIGESTER BUILDING
- 92 AERATION TANKS
- 93 CLARIFIER NO. 1
- 94 CLARIFIER NO. 2
- 96 FLOW EQUALIZATION TANKS
- 97 SLUDGE DRYING BEDS 1-6
- 98 RECLAMATION PLANT
- 99 BACKWASH HOLDING POND

NEW FACILITIES LEGEND

- 10 ADDMINISTRATION BUILDING
- 18 RECEIVING STATION
- 20 HEADWORKS
- 25 PROCESS TANKS
- 32 PROCESS BUILDING
- 70 RECLAIMED WATER TANK
- 80 DIGESTER FACILITY
- 85 DRYING BEDS

LEGEND:

DEMOLITION PHASE 2

LIMITS OF CONSTRUCTION PHASE 2

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

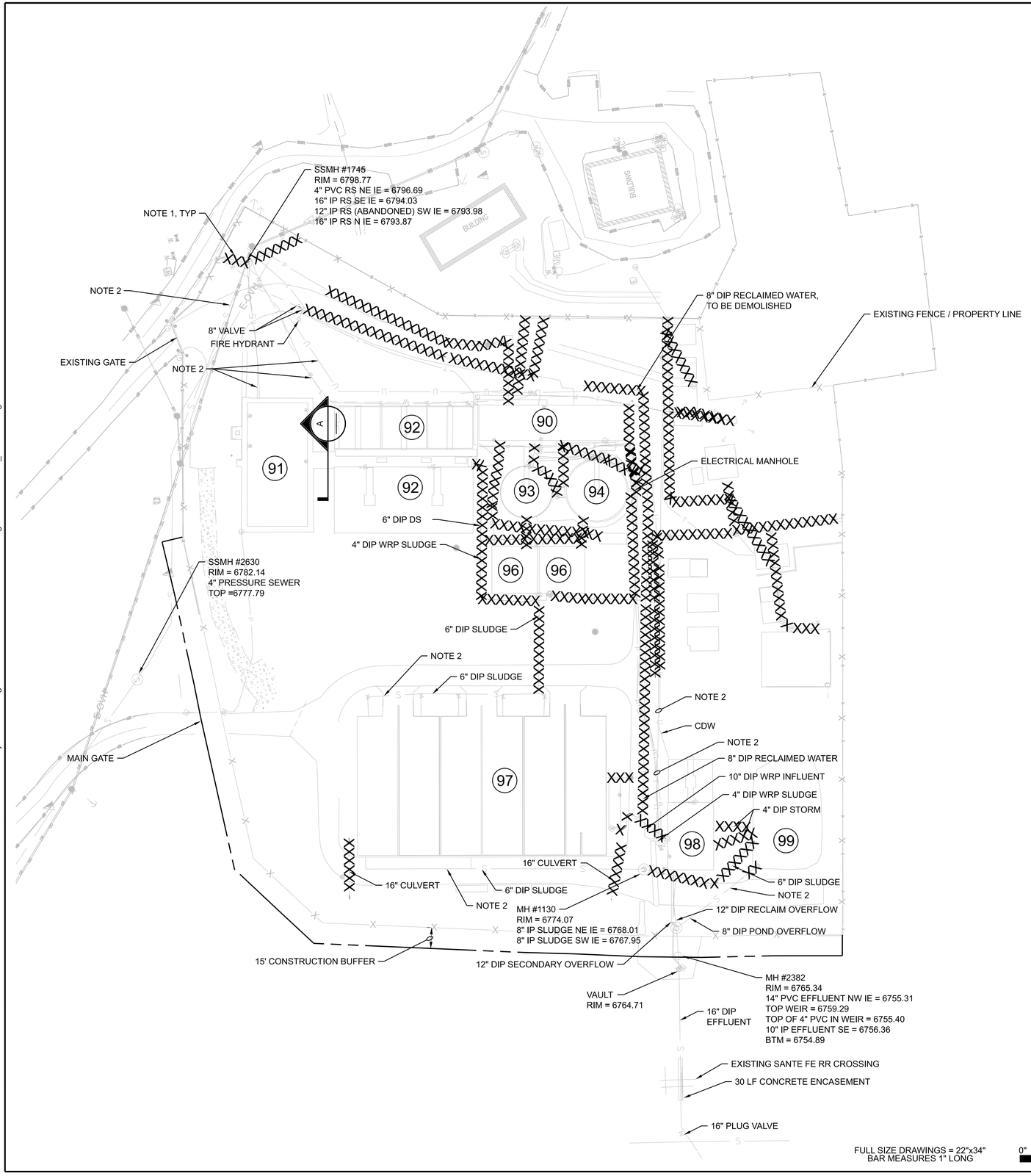
0" 1"

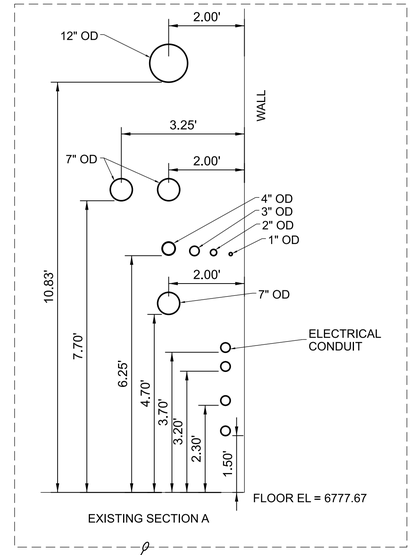
CERTIFICATE NO. 83022 KAYLA D. ARCHER Date Signed 6-23-2025 ARIZONA, U.S.A.	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1002	TITLE OF SHEET CIVIL DEMOLITION PLAN PHASE 2 GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 51 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:19 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1002_D3167666.dgn





REMOVE ALL PIPING AND EQUIPMENT FROM FACILITIES TO BE DEMOLISHED. SEE DRAWING 06X1107 AND 06X1108

1 EXISTING SECTION A
1/2"=1'-0"

GENERAL SHEET NOTES

A. EXISTING FACILITIES TO BE DEMOLISHED PER 02 41 00, DEMOLITION.

B. SEE SHEET 06C2100 FOR CONTRACTOR STAGING AREA.

C. MAINTAIN ACCESS FOR STAFF DURING CONSTRUCTION.

SHEET NOTES

1. DEMOLISH UTILITY. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.

2. ABANDON UTILITY IN PLACE. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF. SEE SHEETS 06X1101 THROUGH 06X1124 FOR DETAILED LOCATIONS.

EXISTING FACILITIES LEGEND

90	CONTROL BUILDING
91	PRETREATMENT, BLOWER, AND DIGESTER BUILDING
92	AERATION TANKS
93	CLARIFIER NO. 1
94	CLARIFIER NO. 2
96	FLOW EQUALIZATION TANKS
97	SLUDGE DRYING BEDS 1-6
98	RECLAMATION PLANT
99	BACKWASH HOLDING POND

LEGEND

XXXXXXX PIPES TO BE DEMOLISHED. SEE NOTE 1

N

0 40 80 120
Scale In Feet

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1003	TITLE OF SHEET CIVIL DEMOLITION PLAN EXISTING UTILITIES GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 52 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:18 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1003_D3167666.dgn

GENERAL SHEET NOTES

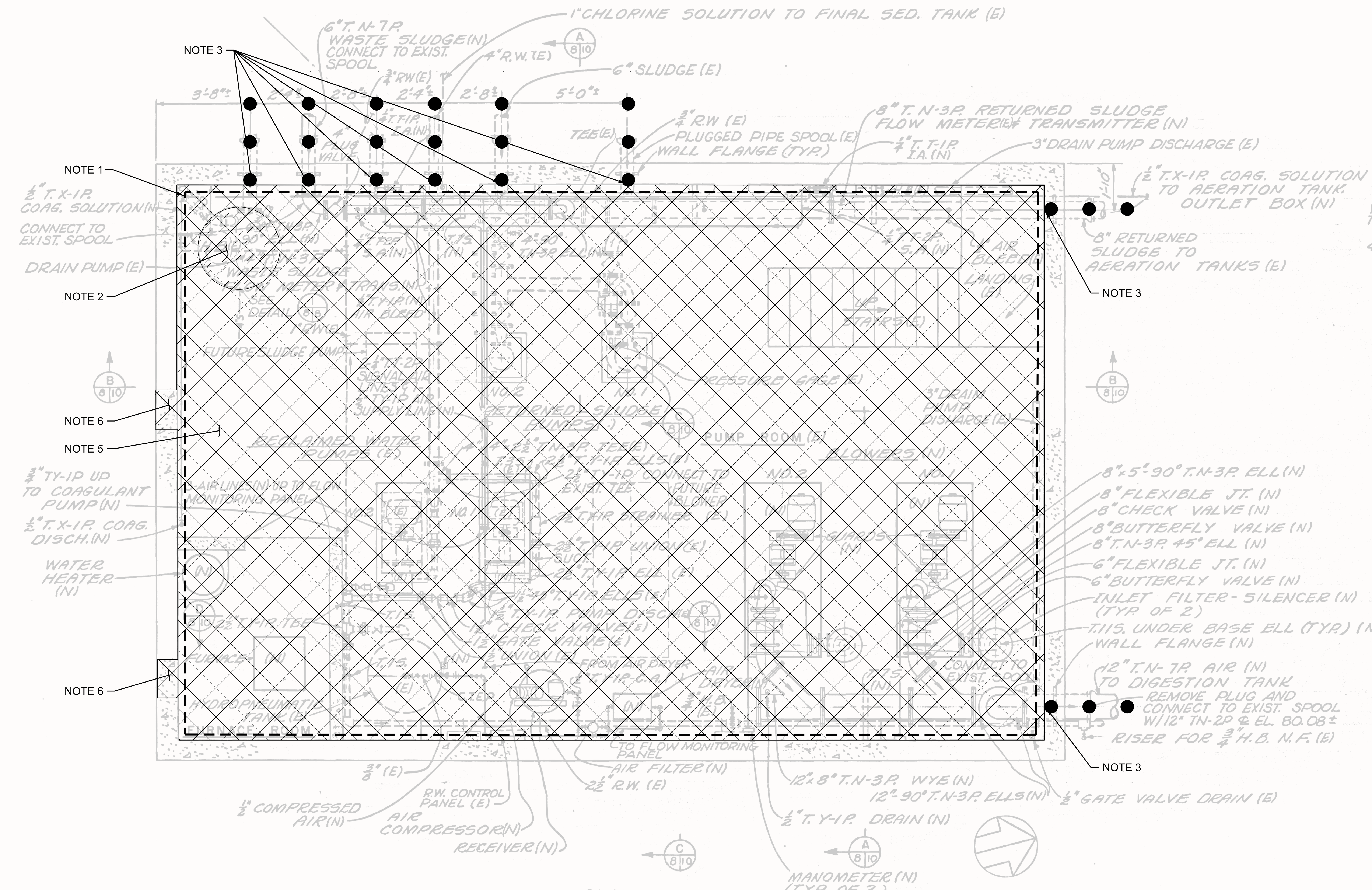
A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

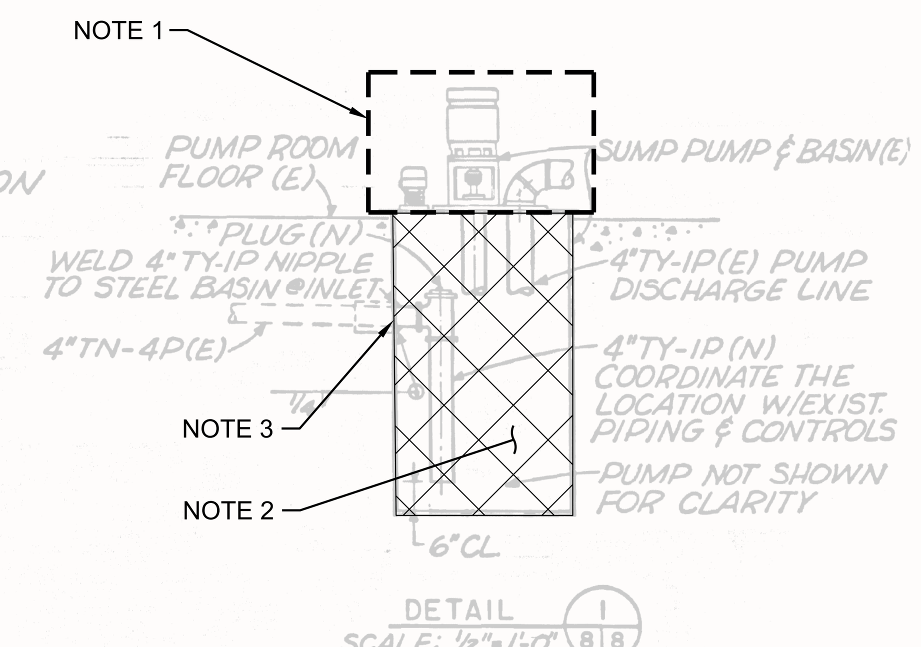
B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

C. DEMOLITION DRAWING DOES NOT REFLECT ALL PREVIOUS EXPANSIONS OF FACILITY 90 AND DEMOLITION OF THE ENTIRE BUILDING FOOTPRINT IS REQUIRED PER THE DEMOLITION SITE PLAN.

SHEET NOTES

1. REMOVE ALL EQUIPMENT FROM FACILITY.
2. CLSM BACKFILL.
3. ABANDON PIPE IN PLACE. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
4. PLUG PIPE WITH 2' OF LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
5. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.
6. DEMOLISH CONCRETE WALL TO COMPLY WITH 31 23 23.15; TRENCH BACKFILL, FOR NEW PIPE ALIGNMENT.





NOTES

1. THIS DRAWING TO BE COORDINATED, WITH EQUIPMENT MANUFACTURER'S DRAWINGS, AND WITH EXIST. EQUIPMENT AND PIPING.
2. SEE SHEETS 13 & 14 FOR PLUMBING, DRAINS, HEATING & VENTILATING PLANS & DETAILS.
3. THE EXISTING AIR COMPRESSOR SHALL BE REMOVED BUT SHALL REMAIN THE PROPERTY OF THE GOVERNMENT.
4. THE CONTROL BLDG. STRUCTURE IS EXISTING.

NO SCALE

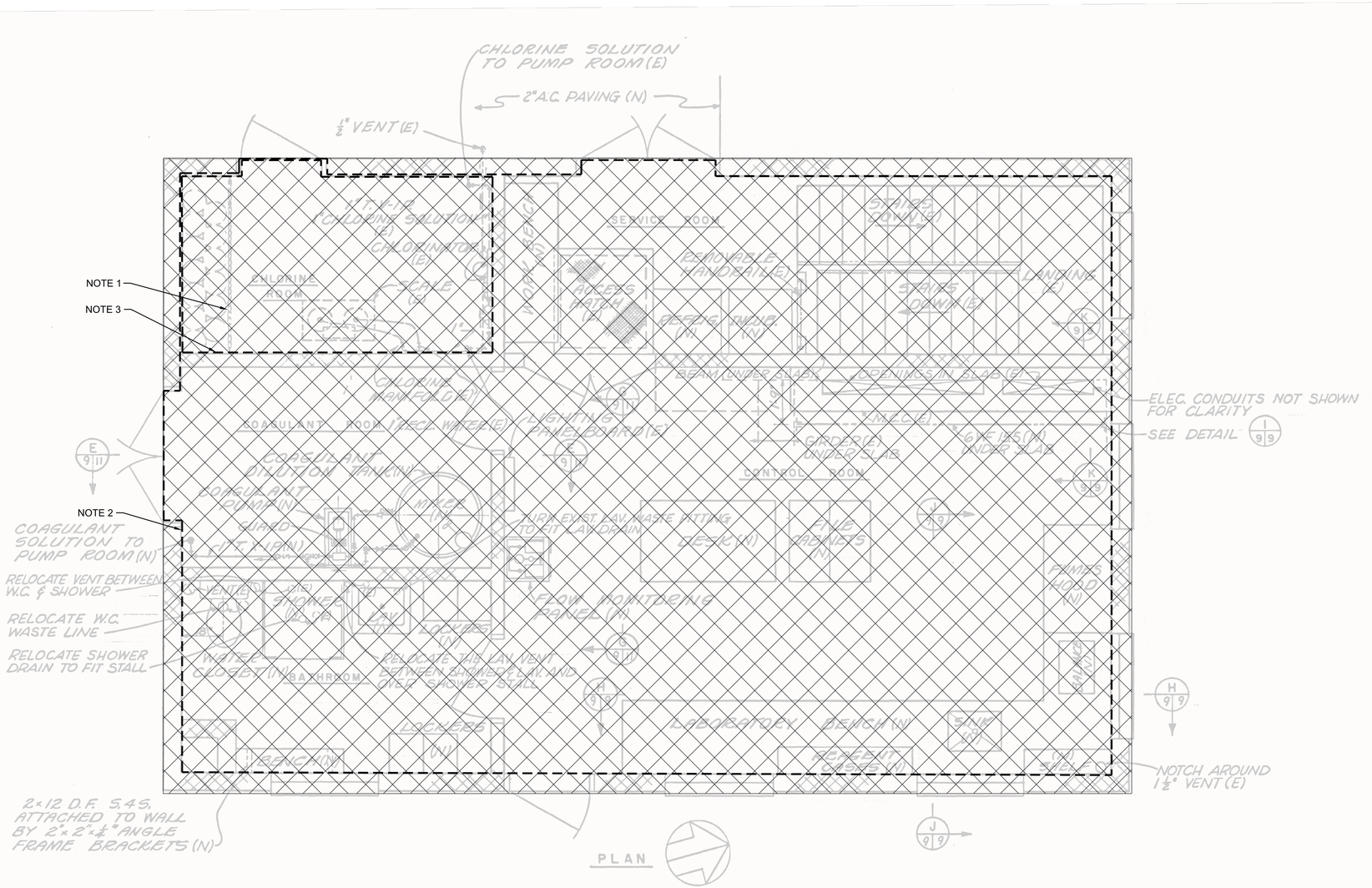
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

A/E FIRM	DESIGNED:	SUB SHEET NO.	TITLE OF SHEET	DRAWING NO.
JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	06X1101	CIVIL DEMOLITION 90 - CONTROL BUILDING LOWER FLOOR PLAN GRAND CANYON, SOUTH RIM	113 175376 PMIS/PKG NO. 257282 SHEET 53 OF 401

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:21 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1101_D3167666.dgn



NOTES

1. THIS DRAWING TO BE COORDINATED WITH EQUIPMENT MANUFACTURER'S DRAWINGS. AND WITH EXISTING EQUIPMENT AND PIPING.
2. SEE DRAWINGS 12, 13, & 14 FOR PLUMBING, DRAINS, HEATING, VENTILATING, AND BATHROOM DETAILS.
3. PROVIDE AIR GAP WHERE COAGULANT PUMP DISCHARGES INTO REDUCER ATTACHED TO SECONDARY DILUTION WATER EDUCTOR.
4. THE CONTROL BLDG. STRUCTURE IS EXISTING.
5. THE 6WF15.5 BEAM UNDER THE CONTROL ROOM SLAB SHALL BE INSTALLED IMMEDIATLY AFTER THE AWARD OF THIS CONTRACT & PRIOR TO PLACING ANY LOADS ON THE CONTROL ROOM SLAB.

GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION PORTIONS TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. ALL CHEMICALS WITHIN THE CHLORINE ROOM TO BE REMOVED FOLLOWING APPLICABLE FEDERAL AND STATE RULES AND REGULATIONS. COMPLY WITH SPECIFICATION 02 41 00; DEMOLITION, AND 02 81 00; TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS.

GRCA-257282

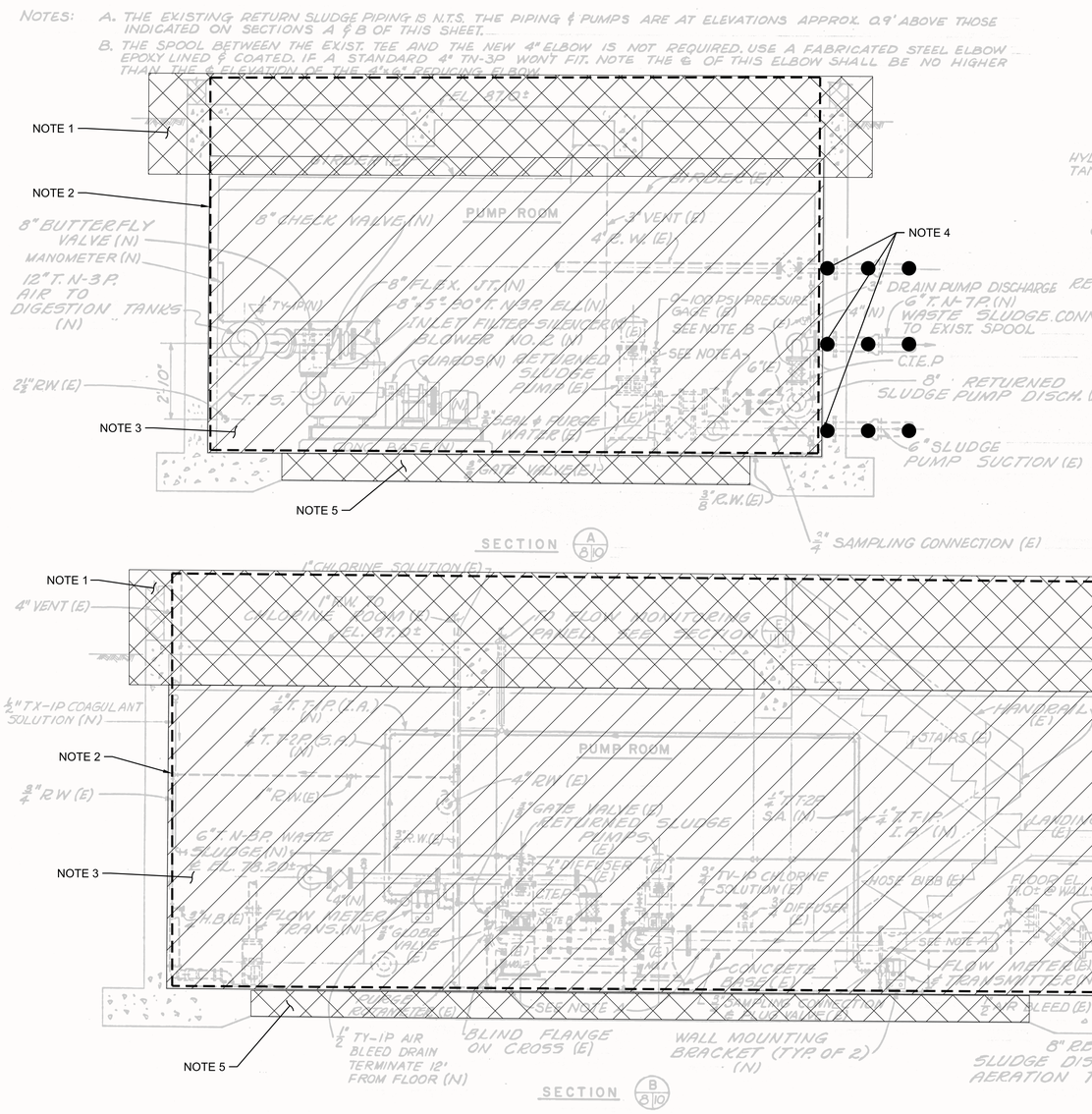
100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:20 SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1102_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

83022 KAYLA D. ARCHER REGISTERED ARCHITECT ARIZONA, U.S.A.	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1102	TITLE OF SHEET: CIVIL DEMOLITION 90 - CONTROL BUILDING GROUND FLOOR PLAN GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 54 OF 401



GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
4. ABANDON PIPE IN PLACE. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
5. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:22 SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1103_D3167666.dgn

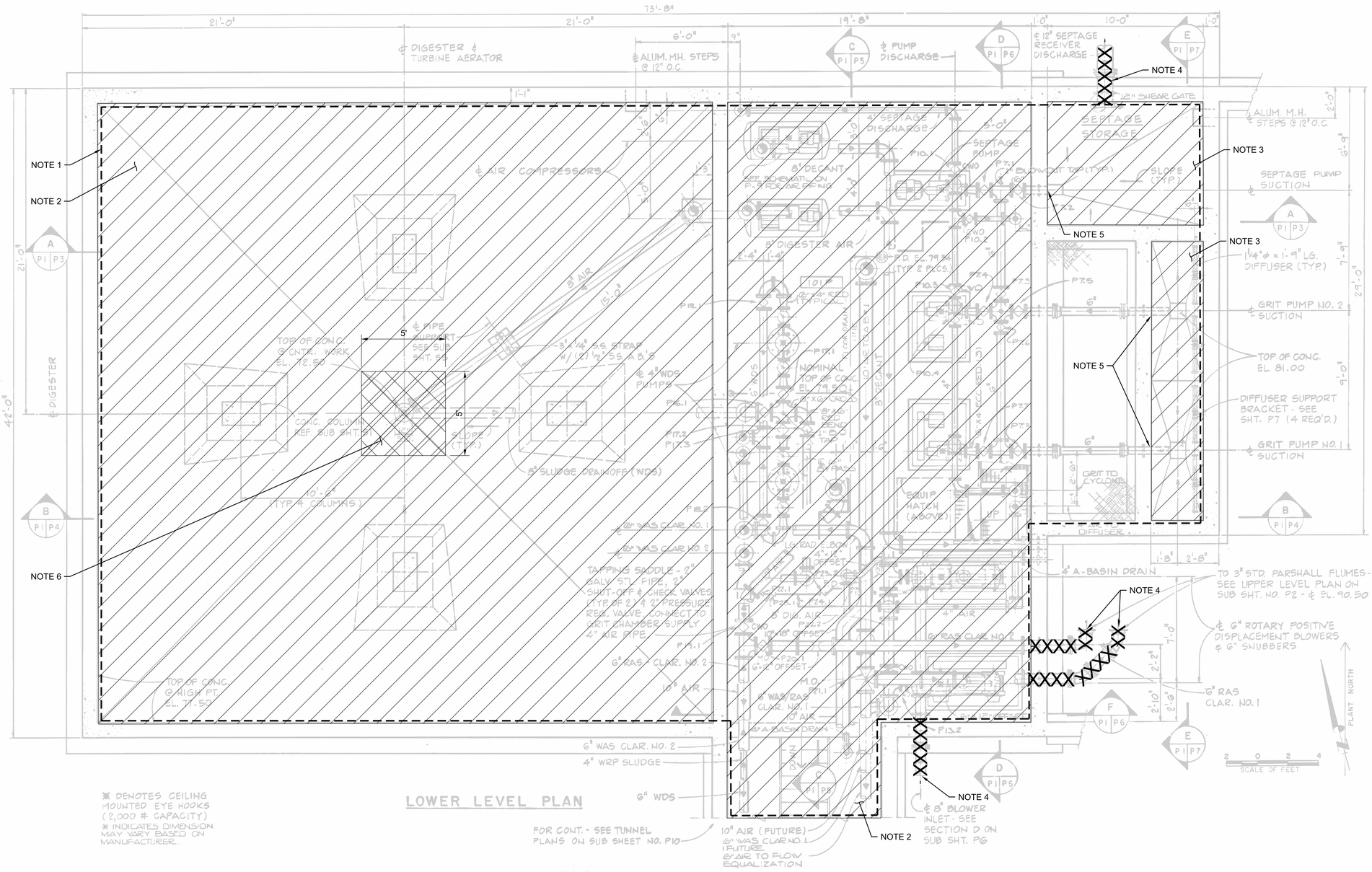
FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

Arizona Registered Engineer CERTIFICATE NO. 83022 KAYLA D. ARCHER Date Signed 6-20-2025 ARIZONA, U.S.A.

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER	SUB SHEET NO. 06X1103	TITLE OF SHEET: CIVIL DEMOLITION 90 - CONTROL BUILDING SECTIONS AND DETAILS, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376
	CADD: B GYAOUROVA			PMIS/PKG NO. 257282
	TECH. REVIEW: D PETERSON			SHEET 55 OF 401
	DATE: 06/2025			



GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

SHEET NOTES

1. REMOVE ALL EQUIPMENT FROM FACILITY.
2. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
3. CLSM BACKFILL.
4. DEMOLISH UTILITY.
5. PLUG PIPE WITH 2' OF LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
6. SAWCUT AND REMOVE CONCRETE BASE SLAB AS SHOWN.

GRCA-257282

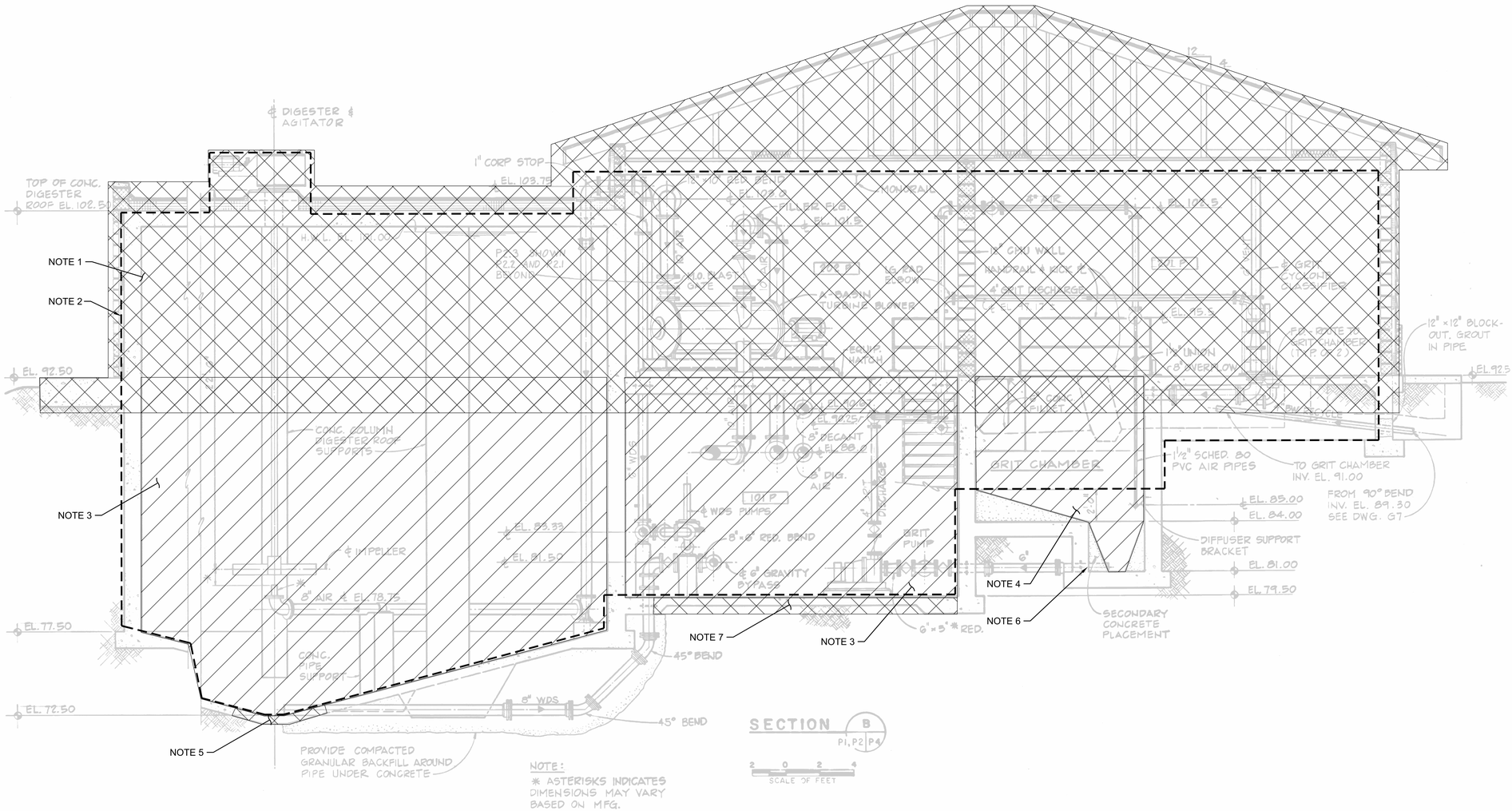
100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 83022 KAYLA D. ARCHER Date Signed 6-23-2025 ARIZONA, U.S.A.	A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1104	TITLE OF SHEET CIVIL DEMOLITION 91 - PRETREATMENT BLDG LOWER LEVEL PLAN GRAND CANYON, SOUTH RIM	NO SCALE DRAWING NO. 113 / 175376 PMIS/PKG NO. 257282 SHEET 56 OF 401

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:17 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1104_D3167666.dgn



GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
4. CLSM BACKFILL.
5. SAWCUT AND REMOVE CONCRETE BASE SLAB AS SHOWN.
6. PLUG PIPE WITH 2' OF LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
7. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

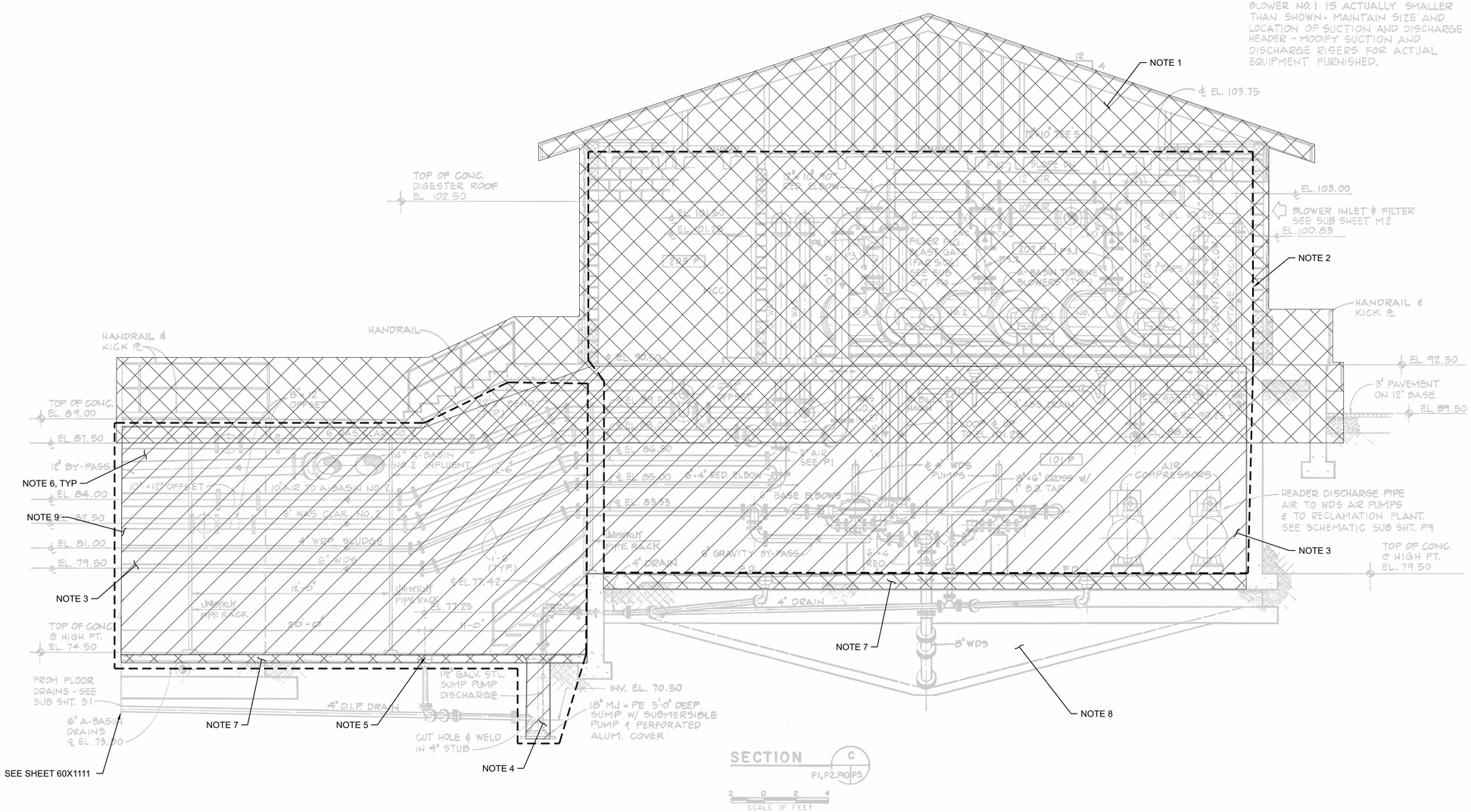
PLOT DATE: 16-JUN-2025 PLOT TIME: 19:19 SS6\V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i D

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

NO SCALE

REGISTERED ENGINEER CERTIFICATE NO. 83022 KAYLA D. ARCHER ARIZONA U.S.A. 6/27/2025	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO.: 06X1105	TITLE OF SHEET: CIVIL DEMOLITION 91 - PRETREATMENT BLDG SECTION E-W, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 57 OF 401



GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
4. CLSM BACKFILL.
5. PLUG PIPE WITH 2' IF LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
6. REMOVE ALL PIPES FROM PIPE GALLERY.
7. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.
8. SEE SHEET 06X1104 FOR DEMOLITION OF BACKGROUND FEATURES IN THIS AREA.
9. SEE SHEET 06X1107 FOR CONTINUATION OF STRUCTURE.

GRCA-257282

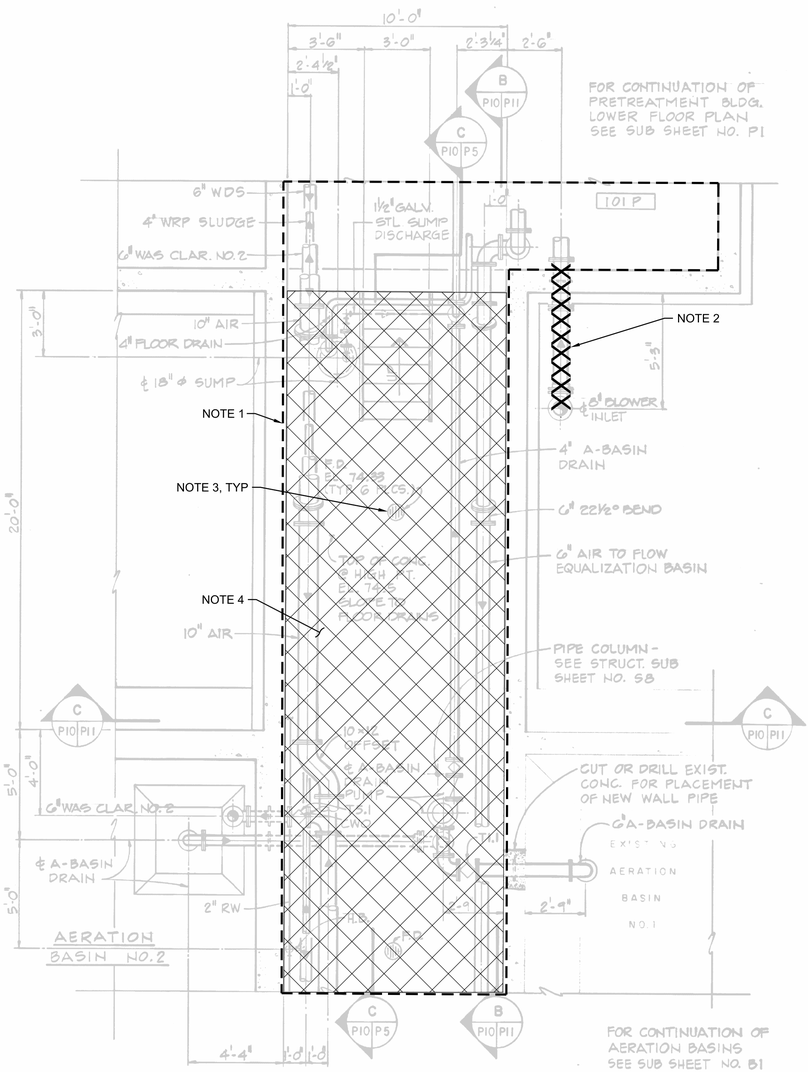
100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

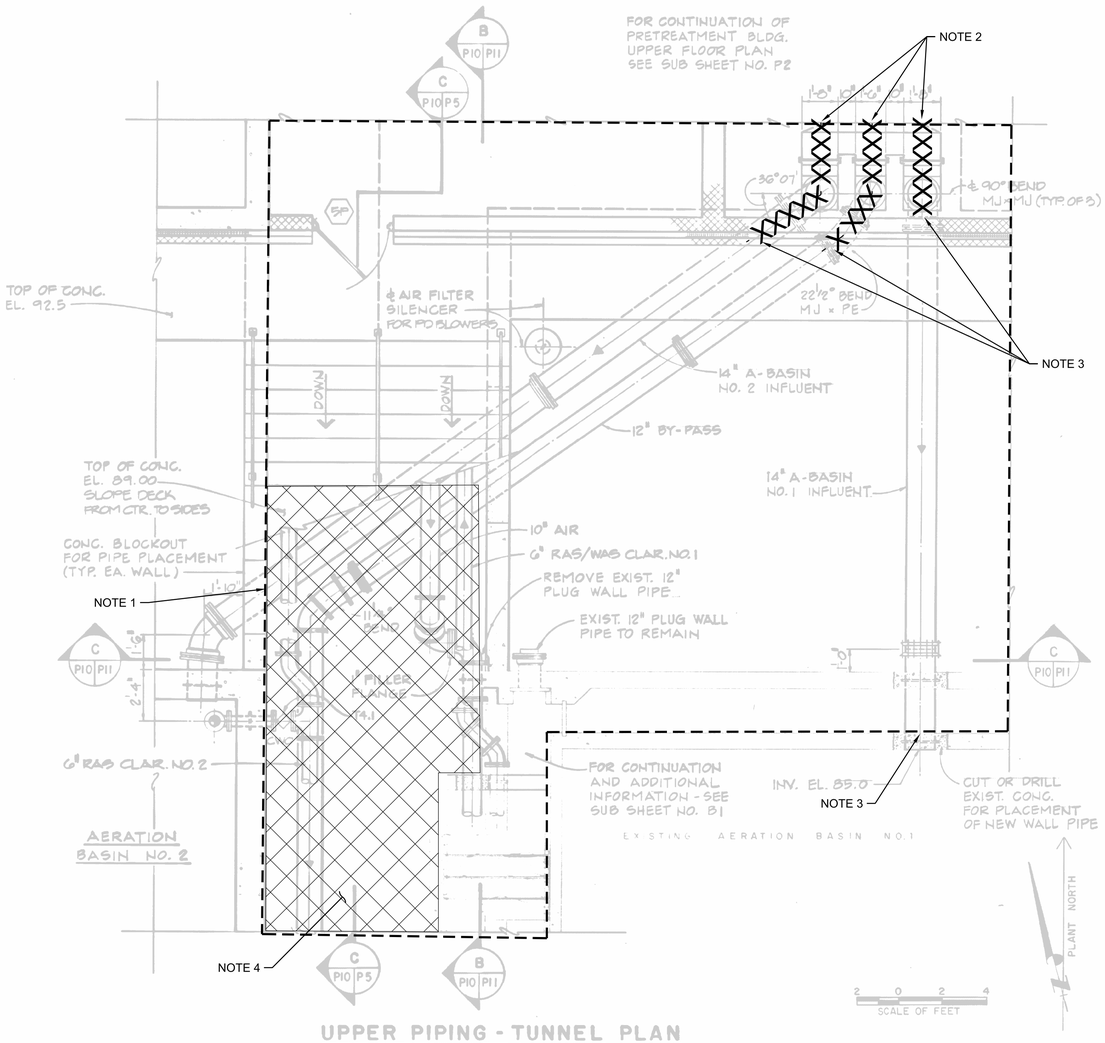
0" 1"

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1106	TITLE OF SHEET CIVIL DEMOLITION 91 - PRETREATMENT BLDG SECTION N-S GRAND CANYON, SOUTH RIM	NO SCALE DRAWING NO. 113 / 175376 PMIS/PKG NO. 257282 SHEET 58 OF 401	

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:17 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1106_D3167666.dgn



LOWER PIPING - TUNNEL PLAN



UPPER PIPING - TUNNEL PLAN

GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. REMOVE ALL EQUIPMENT FROM FACILITY.
2. DEMOLISH UTILITY. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
3. PLUG PIPE WITH 2' OF LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
4. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.

GRCA-257282

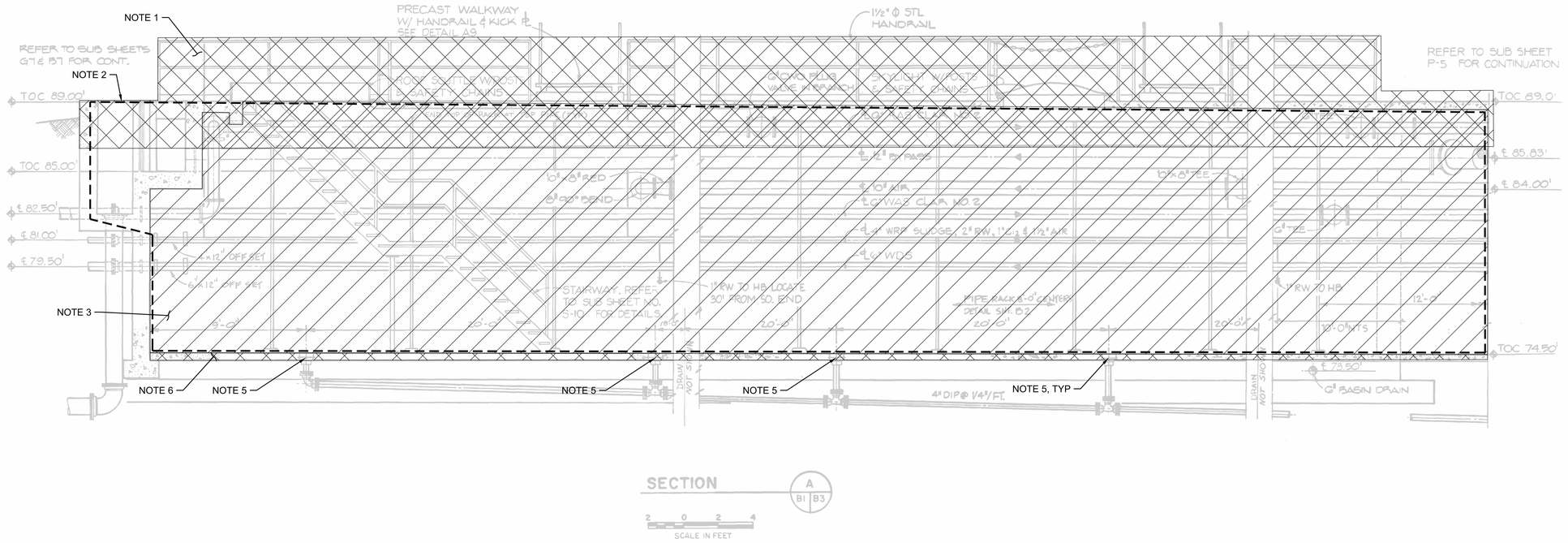
100% COMPLETE CONSTRUCTION DOCUMENTS

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

A/E FIRM JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1107	TITLE OF SHEET CIVIL DEMOLITION 91 - PRETREATMENT BLDG TUNNEL PLANS GRAND CANYON, SOUTH RIM	NO SCALE DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 59 OF 401

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:19 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1107_D3167666.dgn



GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
4. DEMOLISH UTILITY. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
5. PLUG PIPE WITH 2" OF LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
6. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

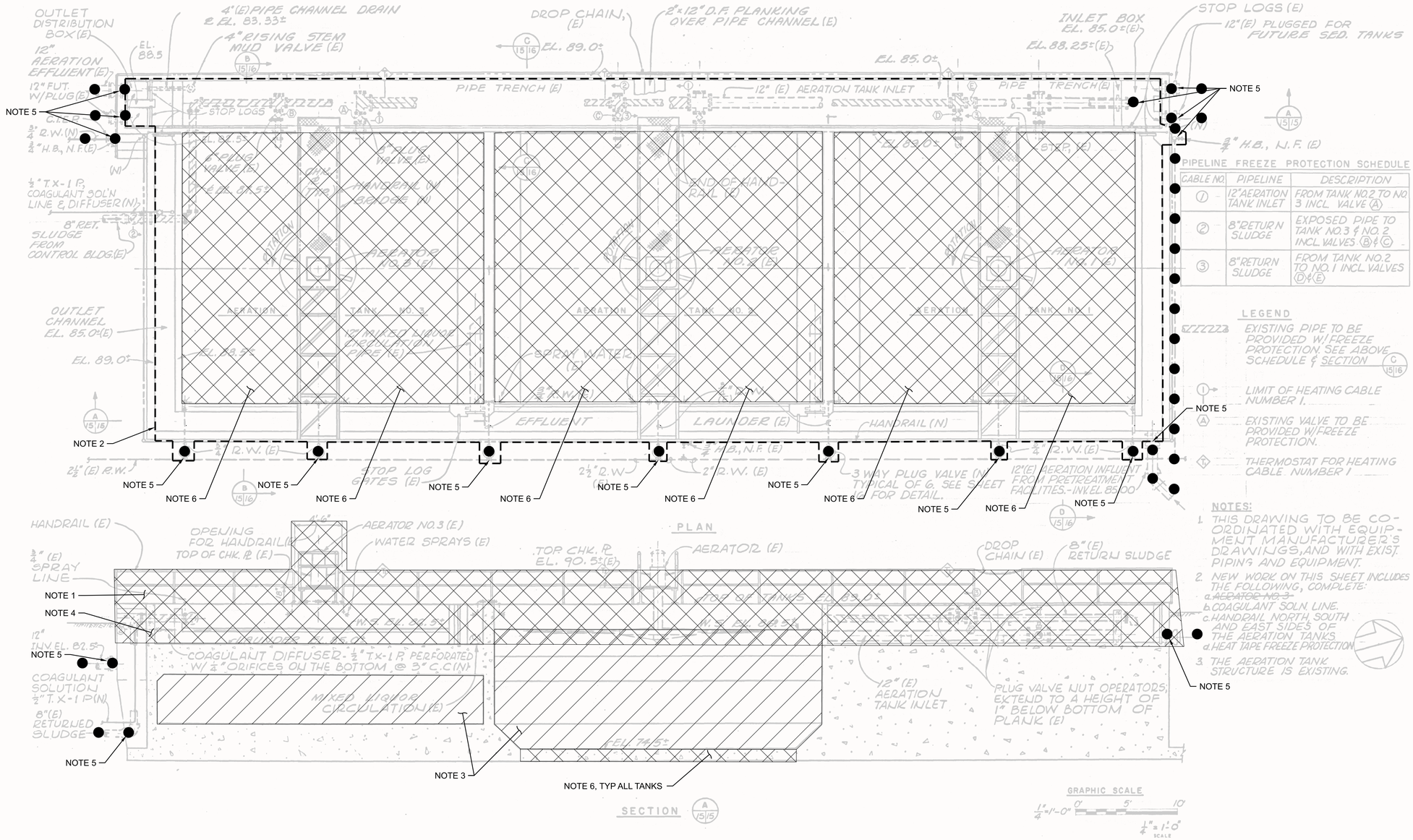
PLOT DATE: 16-JUN-2025 PLOT TIME: 19:17 SS6/V8I D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1108_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

Registered Professional Engineer CERTIFICATE NO. 83022 KAYLA D. ARCHER State of Arizona U.S.A.

A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO.: 06X1108	TITLE OF SHEET: CIVIL DEMOLITION 92B - AERATION BASINS SECTIONS N-S GRAND CANYON, SOUTH RIM	DRAWING NO.: 113 175376 PMIS/PKG NO.: 257282 SHEET: 60 OF 401	



GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
4. DEMOLISH CONCRETE.
5. ABANDON PIPE IN PLACE. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
6. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.

GRCA-257282

100% COMPLETE CONSTRUCTION DOCUMENTS

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:19 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1109_D3167666.dgn

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

NO SCALE

83022 KAYLA D. ARCHER REGISTERED PROFESSIONAL ENGINEER CERTIFICATE EXPIRES 9-30-2026 ARIZONA U.S.A.	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY; GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER; CADD: B GYAOUROVA; TECH. REVIEW: D PETERSON; DATE: 06/2025	SUB SHEET NO. 06X1109	TITLE OF SHEET: CIVIL DEMOLITION 92A - AERATION TANKS PLAN AND SECTION GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376; PMIS/PKG NO. 257282; SHEET 61 OF 401

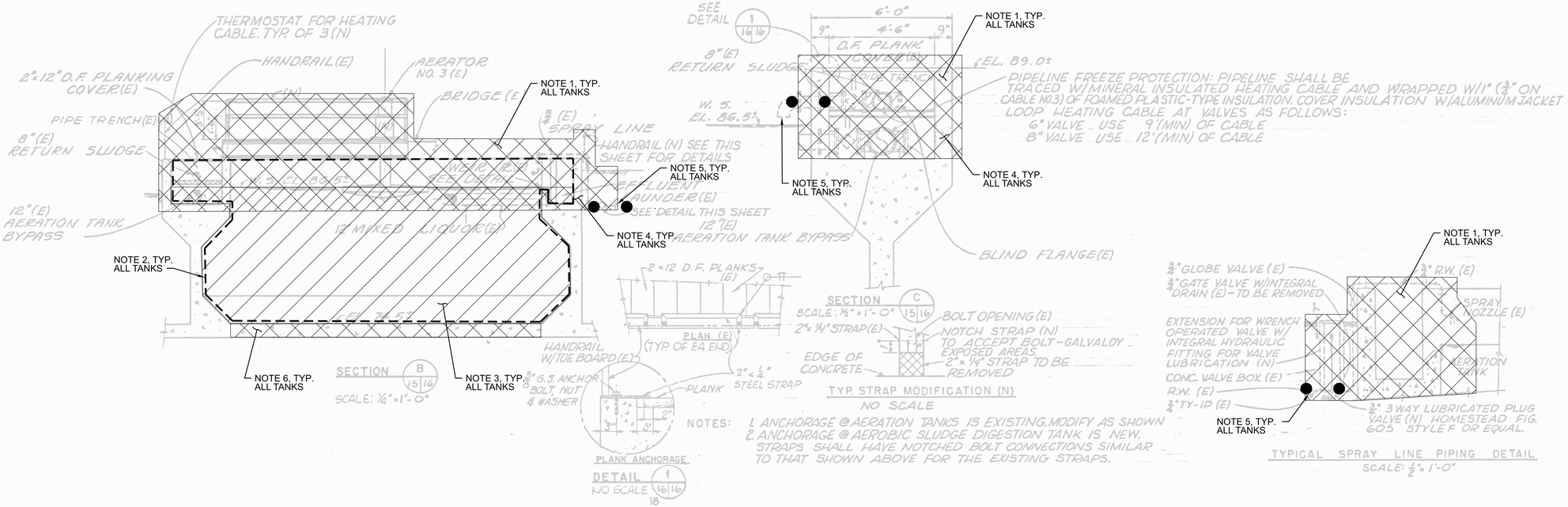
GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. STRUCTURAL DEMOLITION TO COMPLY WITH 02 41 00, DEMOLITION.
2. REMOVE ALL EQUIPMENT FROM FACILITY.
3. BACKFILL UP TO FINISHED GRADE PER SPECIFICATION 31 23 23, FILL AND BACKFILL.
4. DEMOLISH CONCRETE.
5. ABANDON PIPE IN PLACE. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
6. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.



NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG

0" 1"

	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY, GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO. 06X1110	TITLE OF SHEET: CIVIL DEMOLITION 92A - AERATION TANKS SECTIONS AND DETAILS, GRAND CANYON, SOUTH RIM	DRAWING NO. 113 175376 PMIS/PKG NO. 257282 SHEET 62 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS

GRCA-257282

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:17 SS6\V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1110_D3167666.dgn

PLOT DATE: 16-JUN-2025 PLOT TIME: 19:18 SS6/V8i D3167666 - South Rim\4 Delivery\43 CAD Design\GRCA\257282\Microstation V8i Drawings\CIVIL\06X1111_D3167666.dgn

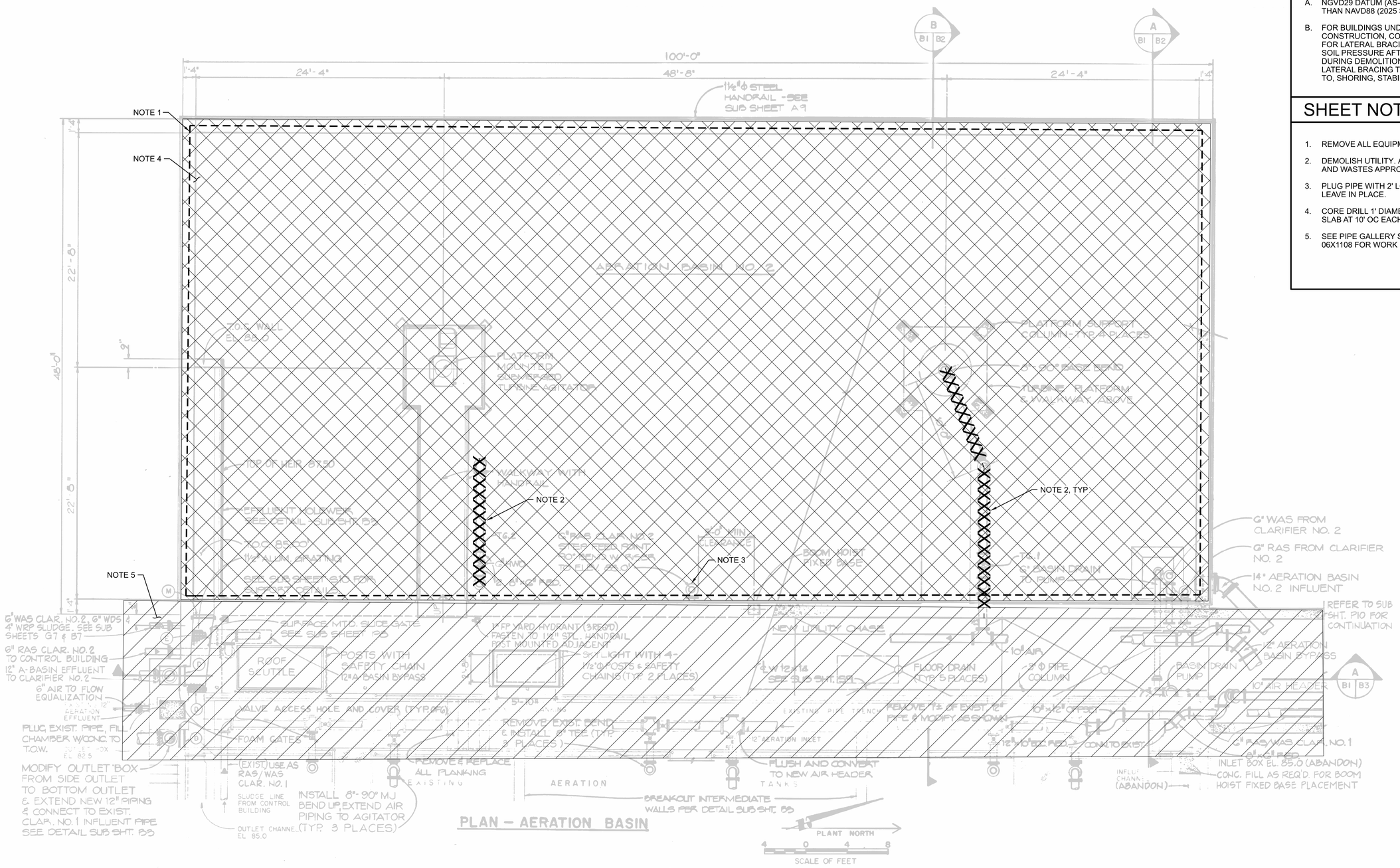
GENERAL SHEET NOTES

A. NGVD29 DATUM (AS-BUILTS) IS 3.25 FEET LOWER THAN NAVD88 (2025 SET).

B. FOR BUILDINGS UNDER DEMOLITION AND PARTIAL CONSTRUCTION, CONTRACTOR IS RESPONSIBLE FOR LATERAL BRACING OF WALLS DUE TO LATERAL SOIL PRESSURE AFTER REMOVAL OF FLOOR SLAB DURING DEMOLITION AND FILLING PROCESSES. LATERAL BRACING TO INCLUDE, BUT NOT LIMITED TO, SHORING, STABILIZERS, AND STRUTS.

SHEET NOTES

1. REMOVE ALL EQUIPMENT FROM FACILITY.
2. DEMOLISH UTILITY. ALL LINES SHOULD BE VACATED AND WASTES APPROPRIATELY DISPOSED OF.
3. PLUG PIPE WITH 2' LOW STRENGTH CONCRETE AND LEAVE IN PLACE.
4. CORE DRILL 1' DIAMETER HOLES THROUGH BASE SLAB AT 10' OC EACH DIRECTION.
5. SEE PIPE GALLERY SHEETS 06X1107 AND SHEET 06X1108 FOR WORK IN THIS AREA.



NO SCALE

FULL SIZE DRAWINGS = 22"x34"
BAR MEASURES 1" LONG
0" 1"

83022 KAYLA D. ARCHER ARIZONA U.S.A.	A/E FIRM: JACOBS GOVERNMENT SERVICES COMPANY GREENWOOD VILLAGE, CO	DESIGNED: K ARCHER CADD: B GYAOUROVA TECH. REVIEW: D PETERSON DATE: 06/2025	SUB SHEET NO.: 06X1111	TITLE OF SHEET: CIVIL DEMOLITION 92B - AERATION BASINS PLAN GRAND CANYON, SOUTH RIM	DRAWING NO.: 113 175376 PMIS/PKG NO.: 257282 SHEET: 63 OF 401

100% COMPLETE CONSTRUCTION DOCUMENTS