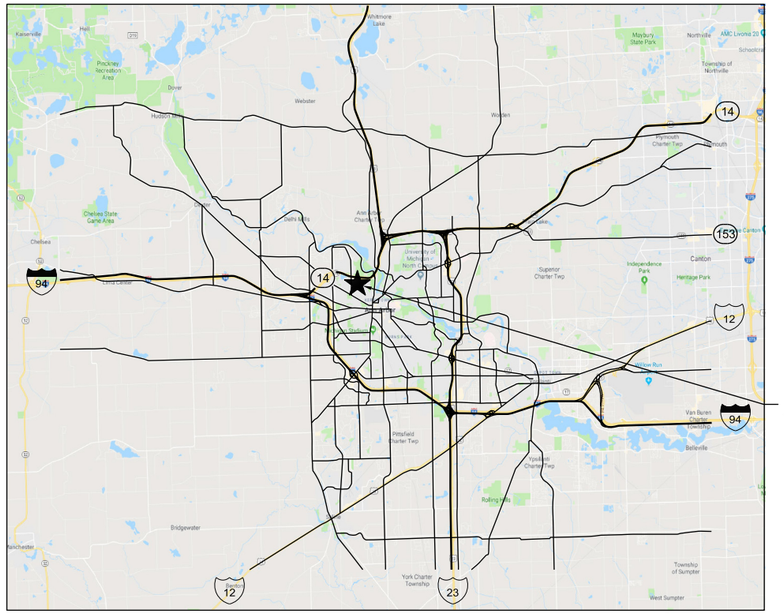
CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM
ITB NO. 4568



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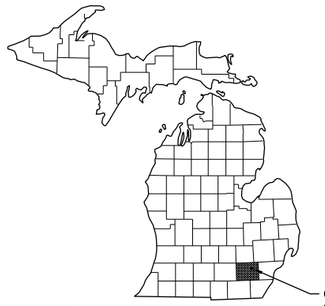
VICINITY MAP
NTS



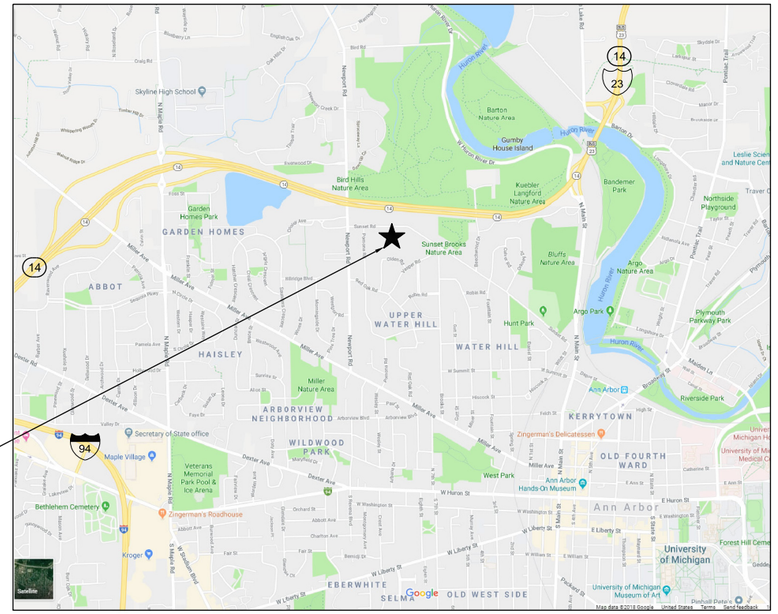
CITY OF ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

N

MICHIGAN

PROJECT LOCATION

PROJECT LOCATION
919 SUNSET RD,
ANN ARBOR, MI 48103



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LOCATION MAP
NTS

SIGNATURE AND ENGINEER SEAL

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Anthony G. Myers
01-29-2019

INDEX TO DRAWINGS

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VOLUME II OF II - DRAWINGS

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		CJ DAHL	CJ DAHL	AG MYERS	AG MYERS	AG MYERS	

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

GENERAL

TITLE SHEET, VICINITY AND LOCATION MAPS, DRAWING INDEX, AND SIGNATURE AND ENGINEER SEAL

BID DOCUMENTS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	001-G-001
SHEET	1 of 45

ABBREVIATIONS

A	AMMETER, AMPERES, AWNINGS
AB	ANCHOR BOLT, ABOVE
ABDN	ABANDON
AC	ACOUSTICAL, ACOUSTICAL CEILING
AC	ALTERNATING CURRENT
AC	ASPHALTIC CONCRETE
ACFL	ACCESS FLOORING
ACI	AMERICAN CONCRETE INSTITUTE
ACM	ASBESTOS CONTAINING MATERIALS
ACMU	ACOUSTICAL CONCRETE MASONRY UNIT, ACOUSTICAL CMU
ACP	ACOUSTICAL PANELS
ACST	ACOUSTICAL
ACT	ACOUSTICAL TILE
AD	AREA DRAIN
ADDL	ADDITIONAL
ADJ	ADJACENT
ADW	DRY WEATHER AVERAGE
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AG	ACOUSTICAL, ACOUSTICAL GLASS
AGGR	AGGREGATE
AHR	ANCHOR
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AJ	ADJUSTABLE
AL	ALUMINUM
ALKY	ALKALINITY
ALTN/ALT	ALTERNATE
AM	AUTO-MANUAL
AMRD	ACOUSTICAL METAL ROOF DECKING
ANDZ	ANODIZE
APPROX	APPROXIMATE
APVD	APPROVED
ARCH	ARCHITECTURAL
AR	ANALOG RELAY
AS	AS SELECTED
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
AWW	WET WEATHER AVERAGE
@	AT
B	BELL
BAL	BALANCE
BETW	BETWEEN
BF	BLIND FLANGE, BOTTOM FACE
BFV	BUTTERFLY VALVE
BL	BASELINE
BFP	BACKFLOW PREVENTER
BLD	BLIND
BLDG	BUILDING
BLK	BLOCK
BLL	BOTTOM LOWER LAYER
BM	BEAM, BENCHMARK
BO	BOTTOM OF
B.O.B.	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BRG	BEARING
BRK	BRICK
BRKR	BREAKER
BSP	BLACK STEEL PIPE
BUL	BOTTOM UPPER LAYER
BV	BALL VALVE, BLOCK VENT
BVC	BEGINNING OF VERTICAL CURVE
C	CONDUIT, CASEMENT
°C	DEGREE CELSIUS
C TO C	CENTER TO CENTER
CAB	CABINET
CB	CATCH BASIN, CIRCUIT BREAKER
CC	CENTER OF CIRCLE
CC	CONTROL CABLE
CCP	CENTRAL CONTROL PANEL
CCS	CENTRAL CONTROL SYSTEM
CDF	CONTROLLED DENSITY FILL
CE	CONSTRUCTION ENTRANCE
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CHEM	CHEMICAL
CHKD	CHECKERED
CI	CAST IRON
CIP	CAST IRON PIPE, CAST IN PLACE
CIP	CULVERT INLET PROTECTION
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CKT	CIRCUIT
CL	CENTERLINE
CLDI	CEMENT LINED DUCTILE IRON
CLSF	CONTROLLED LOW STRENGTH FILL
CLG	CEILING
CLR	CLEAR, CLEARANCE
CLSM	CONTROLLED LOW STRENGTH MATERIAL
CMP	CENTRAL MONITORING PANEL
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CNTR	COUNTER
CO	CLEANOUT, CARBON MONOXIDE
COL	COLUMN, COLOR
CONC	CONCRETE
COND	CONDENSATE
CONDTN	CONDITIONED
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUED, CONTINUOUS, CONTINUATION
CONTR	CONTRACTOR
COORD	COORDINATE
COP	COPPER
CP	CENTER PIVOT
CP-X	CONTROL PANEL NO. X
CPLG	COUPLING
CPRSR	COMPRESSOR
CPT	CONTROL POWER TRANSFORMER, CARPET
CPVC	CHLORINATED PVC
CR	CONTROL RELAY
CRS	COLD ROLLED STEEL
CRS	CONSTRUCTION ROAD STABILIZATION
CT	CERAMIC TILE
CT	CURRENT TRANSFORMER
CTC	COMPUTER TERMINAL CABINET
CTR	CENTER
CTRD	CENTERED
CTSK	COUNTERSUNK
CU	CUBIC
CU FT	CUBIC FOOT
CU IN	CUBIC INCH
CUH	COPPER TUBING, HARD DRAWN
CV	CHECK VALVE
CWR	CABINET DOOR MOUNTED WASTE RECEPTACLE
CY, CU YD	CUBIC YARD
CWS	CLEAN WATER SERVICES
D	DEEP, DRAIN
d	PENNY NAIL SIZE
DA	DUAL ACTION
DAS	DATA ACQUISITION SYSTEM
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DC	DIRECT CURRENT
DEG	DEGREE
DET	DETAIL
DF	DOUGLAS FIR, DRINKING FOUNTAIN
DDI	DROP INLET
DH	DOUBLE HUNG
DI	DUCTILE IRON
DIA	DIAMETER
DIAG	DIAGONAL
DIP	DUCTILE IRON PIPE
DIR	DIRECTION
DISCH	DISCHARGE
DL	DEAD LOAD
DN	DOWN
DO	DISSOLVED OXYGEN
DOL	DIRECT-ON-LINE
DP, DPNL	DISTRIBUTION PANEL
DR	DOOR
DS	DOWNSPOUT
DWG	DRAWING
DWL	DOWEL
△	DELTA
E	EAST, EMPTY
EA	EACH, EXHAUST AIR
EB, EBCT	EMPTY BED CONTACT TIME
ECC	ECCENTRIC
EE	EMERGENCY EYEWASH
EDF	EGG-SHAPED DIGESTER FACILITY
EF	EACH FACE, EXHAUST FAN
EFF	EFFICIENCY, EFFICIENT
EFL	EFFLUENT
EIFS	EXTERIOR INSULATION AND FINISH SYSTEM
EL	ELEVATION
ELB	ELBOW
ELC	ELECTRICAL LOAD CENTER
ELEC	ELECTRIC, ELECTRICAL
ENGR	ENGINEER
EOP	EDGE OF PAVEMENT
ESC	EROSION AND SEDIMENT CONTROL
EP	EXPLOSION PROOF, EDGE OF PAVING
EQL	EQUAL
EQL SP	EQUALLY SPACED
EQPT	EQUIPMENT
ESC	EROSION AND SEDIMENT CONTROL
ETM	ELAPSED TIME METER
EVC	END OF VERTICAL CURVE
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXH	EXHAUST
EXP	EXPANSION, EXPOSED
EXP AB	EXPANSION ANCHOR BOLT
EXP JT	EXPANSION JOINT
EXST, EXIST	EXISTING
EXT	EXTERIOR
° F	DEGREE FAHRENHEIT
FB	FLAT BAR
F, FU	FUSE
F, FX	FIXED
FAP	FIRE ALARM PANEL
FC	FLEXIBLE CONDUIT
FCA	FLANGED COUPLING ADAPTER
FCL2	FREE CHLORINE RESIDUAL
FCO	FLOOR CLEANOUT
FCTY	FACTORY
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDN	FOUNDATION
FDR	FEEDER
FEXT	FIRE EXTINGUISHER
FF	FINISHED FLOOR
FG	FINISH GRADE, FLOAT GLASS
FH	FLAT HEAD
FHY	FIRE HYDRANT
FIG	FIGURE
FL	FLOW LINE, FLOOR
FLG	FLANGE
FLEX	FLEXIBLE
FLH	FLAT HEAD
FLTR	FILTER
FLUOR	FLUORESCENT
FNSH	FINISH
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FP	FIELD PANEL
FPM	FEET PER MINUTE
FR	FORWARD REVERSE
FRP	FIBERGLASS REINFORCED PLASTIC
FSHS	FOLDING SHOWER SEAT
FT	FOOT OR FEET
FTG	FOOTING
FU	FIXTURE UNIT
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FWD	FORWARD
G, GND	GROUND
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GB	GYPSUM BOARD
GC	GROOVED COUPLING
GCMU	GLAZED CONCRETE MASONRY UNITS
GFA	GROOVED FLANGE ADAPTER
GFI	GROUND FAULT INTERRUPTER
GFR	GROUND FAULT RELAY
GH	GREENHOUSE
GL	GLASS
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GPS	GLOBAL POSITION SYSTEM
GRTG	GRATING
GSB	GYPSUM SOFFIT BOARD
GSP	GALVANIZED STEEL PIPE
GV	GATE VALVE
GVL	GRAVEL
GWB	GYPSUM WALLBOARD
GYP	GYPSUM
H	HIGH, HORN OR HOWLER
H2S	HYDROGEN SULFIDE
H.A.S.	HEADED ANCHOR STUD
HC	HOLLOW CORE WOOD
HCL	HYDROCHLORIC ACID
HDNR	HARDENER
HDNS	HARDNESS
HDR	HEADER
HDW	HARDWARE
HGL	HYDRAULIC GRADE LINE
HK	HOOK
HGT	HEIGHT
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HK	HOOK
HM	HOLLOW METAL
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HORIZ	HORIZONTAL
HP	HORSEPOWER
HPT	HIGH POINT
HPU	HYDRAULIC POWER UNIT
HR	HOSE RACK, HANDRAIL
HV	HOSE VALVE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HWL	HIGH WATER LEVEL
IC	INTERRUPTING CAPACITY
ID	INDUCED DRAFT, INSIDE DIAMETER
IE	INVERT ELEVATION
I.F.	INSIDE FACE
IG	INSULATING, INSULATING GLASS
IN	INCH
INCAND	INCANDESCENT
INFL	INFLUENT
INJS	INJECTIONS
INST	INSTANTANEOUS
INSTM	INSTRUMENT, INSTRUMENTATION
INSUL	INSULATION
INVT	INVERT
IP	INLET PROTECTION, INSTRUMENTATION PANEL
IRRIG	IRRIGATION
ITG	INSULATED TEMPERED GLASS
ITX	ISOLATION TRANSFORMER
IU	INTAKE UNIT
IW	IRRIGATION WELL
J	JALOUSIE
JA	JAL-AWNING
JB	JUNCTION BOX
JAN	JANITOR
JCT	JUNCTION
JT	JOINT
K	KEY GROUP, KEY INTERLOCK
KIP	THOUSAND POUNDS
KIT	KITCHEN
K-PL	KICKPLATE
kPa	KILOPASCAL
KSK	KITCHEN SINK
KV	KILOVOLTS
KVA	KILOVOLT AMPERES
KVAR	KILOVOLT AMPERES REACTIVE
KW	KILOWATT
L	ANGLE, LENGTH
LA	LIGHTNING ARRESTER
LAB	LABORATORY
LAM	LAMINATE
LAT	LATITUDE
LB	POUND
LC	LIGHTING CONTACTOR
LD	COMBINATION LOUVER/DAMPER
LDG	LOADING DOCK
LEL	LOWER EXPLOSIVE LIMIT
LF	LINEAR FEET
LG	LONG
LH	LEFT HAND
LL	LIVE LOAD
LHR	LEFT HAND REVERSE
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LONG	LONGITUDINAL
LOS	LOCK-OUT STOP PUSHBUTTON
LP	LIGHT POLE, LIGHTING PANEL, LOCAL PANEL
LPT	LOW POINT
LR	LATCHING RELAY
LR	LOCAL-REMOTE
LR	LONG RADIUS
LS	LABORATORY SINK
LT	LEFT
LTG, LTS	LIGHTS OR LIGHTING
LTX	LIGHTING TRANSFORMER
LWL	LOW WATER LEVEL
MA	MANUAL-AUTO
MADC	MILLIAMPERES DIRECT CURRENT
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MC	MASONRY CLEARANCE
MC	MODULATE-CLOSE
MCC	MOTOR CONTROL CENTER
MCJ	MASONRY CONTROL JOINT
MDO	MEDIUM DENSITY OVERLAY
MECH	MECHANICAL
MFD	MANUFACTURED
MFR	MANUFACTURER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE, MOUNTING HEIGHT
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MLO	MAIN LUGS ONLY
MMDW	DRY WEATHER MAXIMUM MONTH
MMP	MECHANICAL MOUNTING PANEL
MMWW	WET WEATHER MAXIMUM MONTH
MO	MANUAL OPERABLE, MASONRY OPENING
MP	METAL PANEL
MPa	MEGAPASCAL
MPU	MULTIPURPOSE UNIT
MS	MANUFACTURER'S STANDARD
MSC	MANUFACTURER SUPPLIED CABLE
MSR	GROUPED MOTOR CONTROL
MT	MOUNT
MTD	MOUNTED
MTG	MOUNTING
MTS	MANUAL TRANSFER SWITCH
MTS	MILL TYPE STEEL PIPE
MU	MULCHING
MV	MERCURY VAPOR
MWS	MAXIMUM WATER SURFACE
N	NORTH, NEUTRAL
NA	NOT APPLICABLE
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NEUT	NEUTRAL
NG	NATURAL GAS
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NIC	NOT IN CONTRACT
N.O.	NORMALLY OPEN
NO., #	NUMBER
NOM	NOMINAL
NP	NON-PROTECTED
NPT	NATIONAL PIPE THREADS
NS	NON-SHRINK
NTS	NOT TO SCALE
O2	OXYGEN
O TO O	OUT TO OUT
OA	OVERALL, ODOROUS AIR
OC	ON CENTER
OC	OPEN-CLOSE (O)
OCA	OPEN-CLOSE-AUTO
OCR	OPEN-CLOSE-REMOTE
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
O.F.	OUTSIDE FACE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OL	OVERLOAD RELAY
OO	ON-OFF
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
OP	OPAQUE PANEL, OUTLET PROTECTION
OPER	OPERATOR
OPNG	OPENING
OPP	OPPOSITE
OSA	OUTSIDE AIR
OSC	OPEN-STOP-CLOSE
OSD	OPEN SITE DRAIN
OWSJ	OPEN WEB STEEL JOIST
OZ	OUNCE
P	PROJECTED, PILASTER, PIPE
PAVT	PAVER TILE
PB	PUSHBUTTON SWITCH
PC	POINT OF CURVE, PHOTOCELL, PRECAST CONCRETE PANEL
PCCP	PRESTRESSED CONCRETE CYLINDER PIPE
PCV	PRESSURE CONTROL VALVE
PE	PLAIN END
PED	PEDESTAL, PEDESTRIAN
PEP	POLYETHYLENE PIPE
PEN.	PENETRATION
PFC	POUNDS PER CUBIC FOOT
PH	PENTHOUSE
pH	HYDROGEN ION CONCENTRATION
PH	PHASE
PI	POINT OF INTERSECTION
PIT	PILOT TUBE TEST STATION
PJF	PREMOULDED JOINT FILLER
PL	PLATE (STEEL)
PL	PROPERTY LINE
PLAM	PLASTIC LAMINATE
PLAS	PLASTER, PLASTIC
PLC	PROGRAMMABLE LOGIC CONTROLLER
PLYWD	PLYWOOD
PNL	PANEL
PP	POWER POLE
P-P	PUSH-PULL
PPL	POLYPROPYLENE LINED
PR	PAIR
PRC	POINT OF REVERSE CURVE
PRCST	PRECAST
PREFAB	PREFABRICATION
PRES	PRESSURE
PRI	PRIMARY
PRM	PERMANENT REFERENCED MARKER
PROJ	PROJECTION
PROP	PROPERTY
PS	PLASTIC SHEET, POLYCARBONATE SHEET
PS	PAINT SYSTEM
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH, GAUGE
PT	POINT OF TANGENCY
PT	POTENTIAL TRANSFORMER
PT	PRESSURE TREATED
PTD	PAPER TOWEL DISPENSER
PTN	PARTITION
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVT	POINT OF VERTICAL TANGENCY
QAA	AVERAGE FLOW
QMM	MAXIMUM 30 DAY FLOW
QPI	PEAK INSTANTANEOUS FLOW
QPP	PEAK PUMPING FLOW
QT	QUARRY TILE
R	RISER
R OR RAD	RADIUS
RA	RETURN AIR
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RCPT	RECEPTACLE
RD	ROAD, ROOF DRAIN
RDCR	REDUCER
RDW	REDWOOD
RECIR	RECIRCULATION
REF	REFER OR REFERENCE
REFR	REFRIGERATE, REFRIGERANT
REINF	REINFORCED, REINFORCING, REINFORCE
REQD	REQUIRED
RESIL	RESILIENT
RFS	ROLL-UP FIRE SHUTTER
RH	RIGHT HAND
RH	RODHOLE
RHR	RIGHT HAND REVERSE
RL	RAIN LEADER
RLD	RAIN LOAD
RLS	RUBBER LINED STEEL
RM	ROOM
RO	ROUGH OPENING
ROL	RAISE-OFF-LOWER
RPM	REVOLUTIONS PER MINUTE
RR	RIPRAP

GENERAL SHEET NOTES

1. THIS IS A STANDARD LEGEND SHEET. THEREFORE, NOT ALL OF THE INFORMATION SHOWN MAY BE USED ON THIS PROJECT.
2. CONTACT ENGINEER FOR ABBREVIATIONS USED BUT NOT SHOWN ON THIS DRAWING.

NO.	DATE	DSGN
DR	CJ DAHL	
CHK	AG MYERS	
APVD	AG MYERS	
BY	APVD	

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

GENERAL
ABBREVIATIONS

NO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

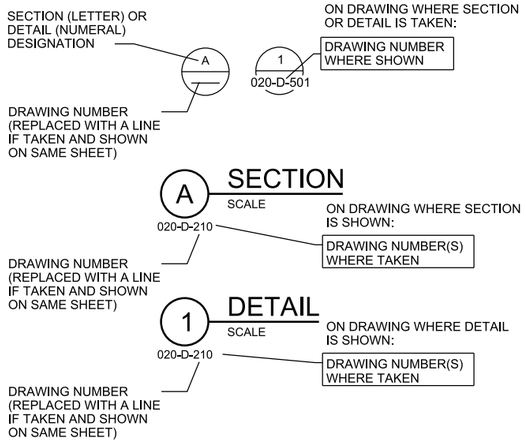
DATE	JANUARY 2019
PROJ	709084
DWG	001-G-002
SHEET	2 of 45

BID DOCUMENTS

ABBREVIATIONS (CONTINUED)

RRUB	RADIAL RUBBER
RS	RIGID STEEL
RST	REINFORCING STEEL
RT	RIGHT
RTN	RETURN
RTO	REGENERATIVE THERMAL OXIDIZER
RUB	RUBBER
RUBC	RUBBER CUSHIONED FLOORING
RUBS	RUBBER ESD CONTROL FLOORING
R/W	RIGHT OF WAY
S	I-BEAM
S	SLOPE, SOUTH, SWITCH
SA	SUPPLY AIR, SAMPLE
SATC	SUSPENDED ACOUSTICAL TILE CEILING
SB	SEDIMENT BASIN
SC	SHOWER CURTAIN, SOLID CORE WOOD
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SCC	SOLID CORE
SCFM	STANDARD CUBIC FEED PER MINUTE
SCHED	SCHEDULE
SCU	SPEED CONTROL UNIT
SDP	SUB-DISTRIBUTION PANEL
SDWK	SIDEWALK
SEC	SECONDARY
SECT	SECTION
SED	SEDIMENTATION
SEW	SEWAGE
SG	LAMINATED SAFETY GLASS, SAFETY
SGWB	SUSPENDED GYPSUM WALL BOARD
SH	SHEET
SHA	SURFACE HARDENING AGENT
SHS	SOLIDS HANDLING SYSTEM
SIM	SIMILAR
SK	SINK
SL	SNOW LOAD
SLR	SEALER
SMLS	SEAMLESS EPOXY
SOI	SPRAY- ON INSULATION
SOLN	SOLUTION
SP	SPACE OR SPACES, SPANDREL PANEL, STORMPROOF
SPEC, SPECS	SPECIFICATIONS
SPD	SUMP PUMP DISCHARGE
SPG	SPACING
SPLY	SUPPLY
SQ	SQUARE
SQ FT	SQUARE FOOT, FEET
SQ IN	SQUARE INCH
SR	SHORT RADIUS
SS	START-STOP
SST	STAINLESS STEEL
SSC	SUPERVISORY SET POINT CONTROL
ST	STORM DRAIN
ST	STRAIGHT
STA	STATUS, STATION
STD	STANDARD
STIF	STIFFENER
STIRR	STIRRUP
STL	STEEL
STRL	STRUCTURAL
STRUCT	STRUCTURE
SUBFL	SUBFLOOR
SUSP	SUSPENDED
SV	SOLENOID VALVE
SVIN	SHEET VINYL
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
SYMM	SYMMETRICAL
T	THERMOSTAT, TREAD
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TA	TRANSFER AIR
TAN	TANGENT
TB	TERMINAL BOARD
TBG	TUBING
TC	TIME TO CLOSE
TC	TURBIDITY CURTAIN
TCAD	TIME CLOSE AFTER DE-ENERGIZATION
TCAE	TIME CLOSE AFTER ENERGIZATION
TDH	TOTAL DYNAMIC HEAD
TDR	TIME DELAY RELAY
TECH	TECHNICAL
TEL	TELEPHONE
TEMP	TEMPORARY, TEMPERATURE
TF	TOP FACE
TFG	TEMPERED FLOAT GLASS
TG	TEMPERED
TH	TOP-HINGED
THD	THREAD
THK	THICKNESS
THRU	THROUGH
TJB	TERMINAL JUNCTION BOX
TL	TEFLON LINED PIPE
T.O.	TIME TO OPEN, TOP OF
TOAE	TIME OPEN AFTER ENERGIZATION
TOC	TOP OF CONCRETE
TOC	TOP OF CURB
TOD	TIME ON DELAY, TOP OF DUCT TOTAL OXYGEN DEMAND
TOF	TOP OF FOOTING
TOG	TOP OF GROUT, TOP OF GRATE
T.O.P.	TOP OF PARAPET
TOS	TOP OF SLAB
TOW	TOP OF WALL
TP	TURNING POINT
TR	TRANSOM, TRUSS
TRANS	TRANSFORMER, TRANSITION
TRANSV	TRANSVERSE
TRD	TREAD
TS	TEMPORARY SEEDING, TUBE STEEL
TSHT	THRESHOLD
TSS	TOTAL SUSPENSION SOLIDS
TST	TOP OF STEEL
TTC	TELEPHONE TERMINAL CABINET
TTD	TOILET TISSUE DISPENSER
TU-X	TREATMENT UNIT NO. X
TURB	TURBIDITY
TWP	TRANSLUCENT WALL PANEL
TX	TRANSFORMER
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
USB	UNIT SUBSTATION
UVR	UNDER VOLTAGE RELAY
V	VENT, VALVE
V	VOLTMETER, VOLTS
VB	VAPOR BARRIER (RETARDER)
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VCT	VINYL COMPOSITION TILE
VEL	VELOCITY
VERT	VERTICAL
VHC	VOLATILE HYDROCARBONS
VIB	VIBRATION
VIF	VERIFY IN FIELD
VIN	VINYL
VINT, VT	VINYL TILE
VP	VERTICAL PIVOTED
VPS	VENEER PLASTER SYSTEM
VPC	POINT OF VERTICAL CURVATURE
VPI	POINT OF VERTICAL INTERSECTION
VPT	POINT OF VERTICAL TANGENT
VS	VERTICAL SLIDE
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WEST
W/	WITH
WC	WATER COLUMN
WEASTRIP	WEATHERSTRIP
WG	WIRE, WIRE GLASS
WH	WATTHOUR METER
WHD	WATTHOUR DEMAND METER
WP	WATERPROOF, WEATHERPROOF, WORKPOINT
WR	WASTE RECEPTACLE
WRB	WATER RESISTANT GWB
WS	WATER SURFACE, WATERSTOP, WELDED STEEL
WWF	WELDED WIRE FABRIC
WWPH	WET WEATHER PEAK HOUR

SECTION / DETAIL DESIGNATIONS



DESIGN DETAIL DESIGNATION

NOTES:

1. ALL DESIGN DETAILS ARE TYPICAL AND MUST BE USED IF DESIGN DETAIL DESIGNATION IS NOT SHOWN
2. THE TERM STANDARD DETAIL, OR A FORM OF IT, IS SYNOMONOUS WITH DESIGN DETAIL. THE DESIGN DETAILS REPRESENT THE CHARACTER AND NATURE OF THE WORK REQUIRED THROUGHOUT THE PROJECT. ALL ASSOCIATED WORK SHALL BE IN ACCORDANCE WITH THE DESIGN DETAILS SHOWN WHETHER THE DETAILS ARE SPECIFICALLY REFERENCED OR NOT.

NOTE DESIGNATIONS

GENERAL NOTES

1. GENERAL NOTES APPLY TO ALL DRAWINGS WITHIN A PROJECT.
2. ALL NOTES ARE INDICATED WITH NUMBERS, NOT LETTERS.

GENERAL (DISCIPLINE) NOTE

1. GENERAL DISCIPLINE NOTES APPLY TO ALL DRAWINGS WITHIN THAT DISCIPLINE.

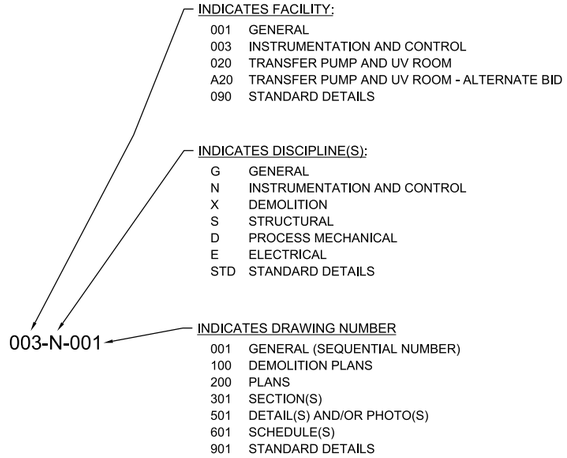
GENERAL SHEET NOTE

1. GENERAL SHEET NOTES APPLY ONLY TO THE SHEET ON WHICH THEY APPEAR.

SHEET KEYNOTES

1. SHEET KEYNOTES APPLY TO SPECIFIC DRAWING ELEMENTS ON THE SHEET THEY ARE LOCATED.
2. A HEXAGON WILL BE USED TO DENOTE SHEET KEYNOTES.

DRAWING NUMBER DESIGNATIONS



GENERAL NOTES

1. BASE BID LAYOUT DRAWINGS BASED ON UV EQUIPMENT BY TROJAN UV TECHNOLOGIES, INC. CONTRACTOR RESPONSIBLE FOR CONFIRMING ACTUAL FIELD DIMENSIONS AND ADJUSTING EQUIPMENT LOCATIONS AND DIMENSIONS AS NEEDED. CONTRACTOR SHALL SUBMIT MODIFIED LAYOUT DRAWINGS FOR APPROVAL BY ENGINEER PRIOR TO COMMENCING WORK
2. ALTERNATE BID LAYOUT DRAWINGS BASED ON UV EQUIPMENT BY CALGON CARBON CORPORATION, INC. CONTRACTOR RESPONSIBLE FOR CONFIRMING ACTUAL FIELD DIMENSIONS AND ADJUSTING EQUIPMENT LOCATIONS AND DIMENSIONS AS NEEDED. CONTRACTOR SHALL SUBMIT MODIFIED LAYOUT DRAWINGS FOR APPROVAL BY ENGINEER PRIOR TO COMMENCING WORK. NOT ALL CHANGES ARE SHOWN FROM BASE BID LAYOUT DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR MODIFYING PROCESS PIPING, VALVES, INSTRUMENTATION, CONDUITS/WIRING, AND GRATING LAYOUT AS NEEDED TO ACCOMMODATE THE ALTERNATE BID EQUIPMENT. COORDINATE WITH UV SUPPLIER FOR UV SYSTEM DIMENSIONS, ELECTRICAL/CONTROL WIRING AND CLEARANCE REQUIREMENTS.

GENERAL SHEET NOTES

1. THIS IS A STANDARD LEGEND SHEET. THEREFORE, NOT ALL OF THE INFORMATION SHOWN MAY BE USED ON THIS PROJECT.
2. CONTACT ENGINEER FOR ABBREVIATIONS USED BUT NOT SHOWN ON THIS DRAWING.

NO.	DATE	REVISION	BY	APVD
DSGN	CJ DAHL	DR	CJ DAHL	AG MYERS
		CHK	AG MYERS	APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

GENERAL
ABBREVIATIONS (CONTINUED) AND DESIGNATIONS

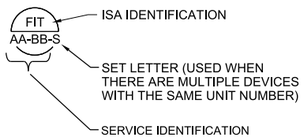
NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	001-G-003
SHEET	3 of 45

BID DOCUMENTS

INSTRUMENT IDENTIFICATION

EXAMPLE SYMBOLS



DIGITAL SYSTEM INTERFACES

- ▲ ANALOG INPUT
- ▼ ANALOG OUTPUT
- △ DISCRETE INPUT
- ▽ DISCRETE OUTPUT

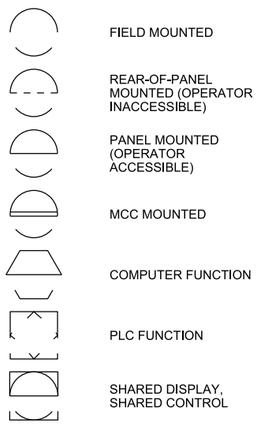
INSTRUMENT IDENTIFICATION LETTERS TABLE

LETTER	FIRST-LETTER		SUCCEEDING-LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	READOUT OR PASSIVE FUNCTION	READOUT OR PASSIVE FUNCTION
A	ANALYSIS (+)		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE (*)	USER'S CHOICE (*)	USER'S CHOICE (*)
C	USER'S CHOICE (*)			CONTROL	
D	DENSITY (S.G.)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT, SENSOR		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE (*)		GLASS, GAUGE VIEWING DEVICE	GATE	
H	HAND (MANUAL)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTION	MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE		USER'S CHOICE (*)	USER'S CHOICE (*)	USER'S CHOICE (*)
O	USER'S CHOICE (*)		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD OR PRINT		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTI VARIABLE		MULTI FUNCTION	MULTI FUNCTION	MULTI FUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED (*)	X AXIS	UNCLASSIFIED (*)	UNCLASSIFIED (*)	UNCLASSIFIED (*)
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION	Z AXIS		DRIVE, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

TABLE BASED ON THE INSTRUMENTATION, SYSTEMS, AND AUTOMATION SOCIETY (ISA) STANDARD.

(+) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.
(*) WHEN USED, DEFINE THE MEANING HERE FOR THE PROJECT.

GENERAL INSTRUMENT OR FUNCTIONAL SYMBOLS



TRANSDUCERS

A	ANALOG	I	CURRENT
D	DIGITAL	P	PNEUMATIC
E	VOLTAGE	PF	PULSE FREQUENCY
F	FREQUENCY	PD	PULSE DURATION
H	HYDRAULIC	R	RESISTANCE

EXAMPLE

CURRENT TO PNEUMATIC TRANSDUCER (BACK OF PANEL, IN A FLOW LOOP)

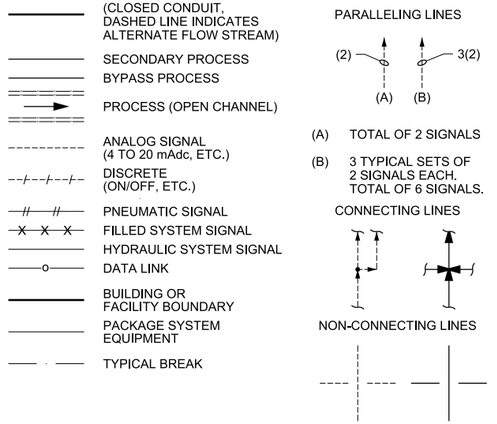
SPECIAL CASES

ON AND OFF EVENT LIGHTS

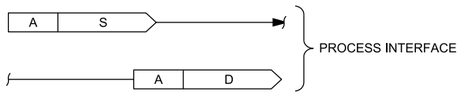
ON-OFF HAND SWITCH, MAINTAINED CONTACT SWITCH (CONTROLLED DEVICE WILL RESTART ON RETURN OF POWER AFTER POWER FAILURE).

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

LINE LEGEND



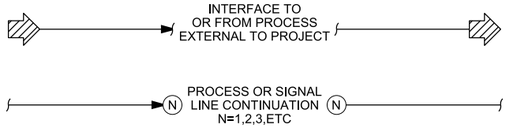
INTERFACE SYMBOLS



A INTERFACE LETTER

D DESTINATION DRAWING NO.

S SOURCE DRAWING NO.



SELF CONTAINED VALVE & EQUIPMENT TAG NUMBERS

D-AA-BB

D	ARV	AIR RELEASE VALVE
	AVRV	AIR AND VACUUM RELEASE VALVE
	E	EJECTOR
	G	GATE
	M	MECHANICAL EQUIPMENT
	P	PUMP
	T	TANK
AA-BB		SERVICE IDENTIFICATION

ABBREVIATIONS & LETTER SYMBOLS

AC	ALTERNATING CURRENT
AM	AUTO-MANUAL
CAM	COMPUTER-AUTO-MANUAL
CCS	CENTRAL CONTROL SYSTEM
CL_2 etc.	CHLORINE (TYPICAL; USE STANDARD CHEMICAL ELEMENT ABBREVIATIONS)
CM	COMPUTER-MANUAL
COD	CHEMICAL OXYGEN DEMAND
CP-X	CONTROL PANEL NO. X
DC	DIRECT CURRENT
DCS	DISTRIBUTED CONTROL SYSTEM
DCU	DISTRIBUTED CONTROL UNIT
DO	DISSOLVED OXYGEN
FCL_2	FREE CHLORINE RESIDUAL
FOS	FAST-OFF-SLOW
FOSA	FAST-OFF-SLOW-AUTO
FOSR	FAST-OFF-SLOW-REMOTE
FP-W-X	FIELD PANEL NO. WX (W=UNIT PROCESS NUMBER X=PANEL NUMBER)
FR	FORWARD-REVERSE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
ISR	INTRINSICALLY SAFE RELAY
LEL	LOWER EXPLOSIVE LIMIT
LOS	LOCKOUT STOP
LR	LOCAL-REMOTE
MA	MANUAL-AUTO
MC	MODULATE-CLOSE
MCC-X	MOTOR CONTROL CENTER NO. X
MSC	MANUFACTURER SUPPLIED CABLE
OC	OPEN-CLOSE(D)
OCA	OPEN-CLOSE-AUTO
OCR	OPEN-CLOSE-REMOTE
OO	ON-OFF
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
ORP	OXIDATION REDUCTION POTENTIAL
OSC	OPEN-STOP-CLOSE
pH	HYDROGEN ION CONCENTRATION
PLC	PROGRAMMABLE LOGIC CONTROLLER
RIO	REMOTE I/O UNIT
RM-X	REMOTE MULTIPLEXING MODULE NO. X
RTU-X	REMOTE TELEMETRY UNIT NO. X
SA	SAMPLE LINE
SF	SLOWER-FASTER
SS	START-STOP
SSC	SUPERVISORY SET POINT CONTROL
TCL_2	TOTAL CHLORINE RESIDUAL
TOC	TOTAL ORGANIC CARBON
TOD	TOTAL OXYGEN DEMAND
TURB	TURBIDITY
VHC	VOLATILE HYDROCARBONS
VIB	VIBRATION
Δ	DIFFERENCE
Σ	SUM
×	MULTIPLY
÷	DIVIDE
F(X)	CHARACTERIZED
X^n	RAISED TO THE Nth POWER
$\sqrt{\ }$	SQUARE ROOT
AVG	AVERAGE
1:1	REPEAT OR BOOST
>	SELECT HIGHEST SIGNAL
<	SELECT LOWEST SIGNAL
}	BIAS
%	GAIN OR ATTENUATE

GENERAL NOTES

1. COMPONENTS AND PANELS SHOWN WITH A SINGLE ASTERISK (✳) ARE TO BE PROVIDED AS PART OF A PACKAGE SYSTEM.
2. THIS IS A STANDARD LEGEND. THEREFORE, NOT ALL OF THIS INFORMATION MAY BE USED ON THE PROJECT.

NO.	DATE	REVISION	CHK	APVD
DSGN	IT HAMMONS	CJ DAHL	IT HAMMONS	AG MYERS
		DR		BY

JACOBS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

GENERAL
INSTRUMENTATION AND CONTROL LEGEND 1

BID DOCUMENTS

NO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	001-G-004
SHEET	4 of 45

VALVE SYMBOLS

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

GATE SYMBOLS

- SLUICE
- FABRICATED SLIDE
- STOP LOG
- BUTTERFLY
- FLAP
- SHEAR

ACTUATOR SYMBOLS

- PNEUMATIC DIAPHRAGM SPRING-OPPOSED, SINGLE OR DOUBLE ACTING
- VALVE POSITIONER
- MANUAL
- PNEUMATIC CYLINDER SINGLE OR DOUBLE ACTING ACTUATED BY ONE INPUT
- H HYDRAULIC
- M ELECTRIC MOTOR
- DIAPHRAGM, DIFFERENTIAL PRESSURE
- S SOLENOID
- E/H 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
- PROPELLER OR TURBINE METER
- LS LEVEL (FLOAT)
- WEIR
- THERMAL FLOWMETER
- FI ROTAMETER
- ORFICE PLATE
- LEVEL (BUBBLER TUBE)
- DE DENSITY METER
- FLOW TUBE
- XX GENERIC
- PITOT-STATIC
- LE LEVEL
- VORTEX METER
- ULTRASONIC FLOWMETER
- M ELECTROMAGNETIC FLOWMETER

MISCELLANEOUS SYMBOLS

- V VENT TO ATMOSPHERE
- AIR GAP
- T DRIP TRAP
- PIG INSERT POINT
- PIG CATCH POINT
- A SELF CONTAINED AIR SUPPLY
- AP AIR PURGE SET
- F FLUSHING CONNECTION
- S SEAL WATER SET
- WP WATER PURGE SET
- FLEXIBLE CONNECTION
- AERATOR
- DIAPHRAGM SEAL
- ANNULAR DIAPHRAGM SEAL
- SS COMPOSITE SAMPLER
- FLAME TRAP
- CALIBRATION COLUMN
- S INLINE SILENCER
- BLIND FLANGE
- PIPE CAP
- STRAINER
- BASKET STRAINER
- FILTER
- PULSATION DAMPENER
- EXPANSION CHAMBER
- ECCENTRIC REDUCER
- CONCENTRIC REDUCER
- FFLCPLLLX — PANEL CONTINUED ON SAME OR OTHER DRAWING; PANEL OUTLINE; PANEL NAME
- 120V — 120 VOLT, 60 HZ POWER
- 480V — 480 VOLT, 60 HZ POWER
- XX AIR SET XX = SUPPLY PRESSURE IN PSIG.
- PLUG
- RECEPTACLE
- RUPTURE DISK (VACUUM)
- RUPTURE DISK (PRESSURE)
- TV TV MONITOR
- TV TV CAMERA
- A, B → AND → C LOGIC ELEMENT: IF A AND NOT B THEN C
- A, B → OR → C LOGIC ELEMENT: IF A OR B THEN C
- RADIO ANTENNA
- I OR I INTERLOCK, SEE CONTROL DIAGRAMS
- VOICE COMMUNICATION POINT
- SKIMMING MECHANISM
- SCREW CONVEYOR
- MIXER
- ELECTRIC MOTOR

PUMP AND COMPRESSOR SYMBOLS

- XX CENTRIFUGAL PUMP (DRY PIT)
- XX CENTRIFUGAL WET PIT PUMP OR TURBINE PUMP
- XX RECIPROCATING OR METERING PUMP (POSITIVE DISPLACEMENT)
- XX DIAPHRAGM PUMP
- XX GEAR PUMP OR BLOWER (POSITIVE DISPLACEMENT)
- XX PROGESSING CAVITY PUMP
- XX COMPRESSOR (CENTRIFUGAL)
- XX COMPRESSOR (PISTON)
- XX BLOWER OR FAN (CENTRIFUGAL)
- EJECTOR
- XX PISTON PUMP
- XX SUBMERSIBLE SUMP PUMP
- ROTARY PUMP
- VACUUM PUMP
- SCREW PUMP
- PERISTALTIC PUMP

XX: AS ADJUSTABLE SPEED
CS-1 CONSTANT SPEED (SINGLE SPEED)
CS-2 CONSTANT SPEED (TWO SPEED)

FLOW STREAM IDENTIFICATION

BWR	BACKWASH RECLAIM
BWS	BACKWASH SUPPLY
BWW	BACKWASH WASTE
CS	CHLORINE SOLUTION
D	DRAIN (SANITARY)
DR	DRAIN (PROCESS)
F	FLUORIDE
FD	FLOOR DRAIN
FE	FILTER EFFLUENT
FI	FILTER INFLUENT
FTW	FILTER TO WASTE
FW	FINISHED WATER
G	NATURAL GAS
LS	LIME SLURRY
NPW	NON-POTABLE WATER
OD	OVERFLOW/DRAIN
OF	OVERFLOW (PROCESS)
RW	RAW WATER
S	SANITARY SEWER (GRAVITY)
SA	SAMPLE
SHC	SODIUM HYPOCHLORITE
SHS	SODIUM HYPOCHLORITE SOLUTION
SW	SETTLED WATER
UVE	UV EFFLUENT
UVI	UV INFLUENT
V	VENT (PROCESS)
VTR	VENT THROUGH ROOF
W1	NO. 1 (POTABLE WATER)
W2	NO. 2 (NON-POTABLE WATER)

GENERAL SHEET NOTES

1. THIS IS A STANDARD LEGEND SHEET. THEREFORE, NOT ALL OF THE INFORMATION SHOWN MAY BE USED ON THIS PROJECT.
2. CONTACT ENGINEER FOR ABBREVIATIONS USED BUT NOT SHOWN ON THIS DRAWING.

NO.	DATE	DSGN	REVISION	BY	CHK	APVD
D	IT HAMMONS	CJ DAHL	IT HAMMONS	AG MYERS		

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

GENERAL
INSTRUMENTATION AND CONTROL
LEGEND 2

NO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	001-G-005
SHEET	5 of 45

BID DOCUMENTS

$PWPATH
$PWURL
FILENAME: 001-G-0005_709084.dgn PLOT DATE: 1/29/2019 PLOT TIME: 11:35:04 AM

DESIGN CRITERIA

1. APPLICABLE CODE: 2015 INTERNATIONAL BUILDING CODE (IBC), AS AMENDED BY THE STATE OF MICHIGAN AND ALL OTHER APPLICABLE LOCAL AGENCIES.
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:
   A. SELF WEIGHT
5. LIVE LOADS:

GRATING PLATFORM	250 PSF
CORRIDORS, EXITS, STAIRS	100 PSF

6. SEISMIC LOADS:

MAPPED SPECTRAL RESPONSE ACCELERATIONS	
S_S	= 0.093g
S_1	= 0.047g
DESIGN SPECTRAL RESPONSE ACCELERATIONS	
S_{DS}	= 0.099g
S_{D1}	= 0.076g
SITE CLASS	= D
SEISMIC USE GROUP	= III
SEISMIC DESIGN CATEGORY	= B
IMPORTANCE FACTOR, Ie	= 1.50

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. DO NOT CUT OR MODIFY STRUCTURAL MEMBERS FOR PIPES, DUCTS, ETC, UNLESS SPECIFICALLY DETAILED OR APPROVED IN WRITING BY THE ENGINEER.
5. 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.
6. 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 ENGINEER 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 OTHER MATERIAL TESTING RELATED TO SPECIAL INSPECTION DURING CONSTRUCTION WILL BE OWNER 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 (OWNER FURNISHED) IS REQUIRED IN ACCORDANCE WITH IBC SECTIONS 110 AND 1704 AS INDICATED IN THE STATEMENT OF SPECIAL INSPECTIONS.

CONCRETE REINFORCING

1. REINFORCING STEEL:
   TYPICAL: ASTM A615, GRADE 60
   WELDED: WELDING NOT PERMITED
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. CONCRETE COVER FOR REINFORCING, UNLESS SHOWN OTHERWISE, SHALL BE 2".
4. 90 DEGREE BENDS, UNLESS OTHERWISE SHOWN, SHALL BE ACI 318 STANDARD HOOKS.
5. 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".
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.

CAST IN PLACE CONCRETE

1. 28-DAY COMPRESSIVE STRENGTHS (TO MEET STRUCTURAL STRENGTH REQUIREMENTS):
   TYPICAL: 4500 PSI
2. DESIGN STRENGTHS ARE SAME AS 28-DAY COMPRESSIVE STRENGTHS.
3. COORDINATE PLACEMENT OF OPENINGS, PIPE PENETRATIONS, CURBS, DOWELS, SLEEVES, CONDUITS, BOLTS AND INSERTS PRIOR TO PLACEMENT OF CONCRETE.
4. NO ALUMINUM CONDUIT OR PRODUCTS CONTAINING ALUMINUM OR ANY OTHER MATERIAL INJURIOUS TO THE CONCRETE SHALL BE EMBEDDED IN THE CONCRETE.

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. 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.	
HOLLOW STRUCTURAL SECTIONS (HSS)	A500, GRADE B
STEEL PIPE	A53, GRADE B
STAINLESS STEEL SHAPES	A276

2. STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH THE AISC MANUAL OF STEEL CONSTRUCTION, CURRENT EDITION, AND CURRENT OSHA STANDARDS.
3. FASTENERS SHALL BE HIGH STRENGTH BOLTS CONFORMING TO THE FOLLOWING ASTM STANDARDS EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE:

UNLESS SHOWN OTHERWISE	A325-N
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

4. ITEMS TO BE EMBEDDED IN CONCRETE SHALL BE CLEAN AND FREE OF OIL, DIRT AND PAINT.
5. 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 ENGINEER.

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 ENGINEER.
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 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 ENGINEER. ADDITIONALLY, ACCEPTANCE INDICATED ON THE ENGINEER'S 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
40 05 15	PIPING SUPPORT SYSTEMS
OTHER	ANY EQUIPMENT OR COMPONENT IN WHICH A TECHNICAL SPECIFICATION REQUIRES SUBMITTAL OF EQUIPMENT OR ANCHORAGE SYSTEM CALCULATIONS

NO.	DATE	DSGN	DR	CHK	BY	REVISION
	DR LANGE		CJ DAHL	DR LANGE	APVD	APVD
						AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

GENERAL
STRUCTURAL NOTES

NO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

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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

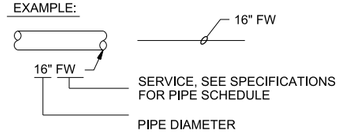
DOUBLE LINE	SINGLE LINE	
		REDUCING BUSHING
		UNION
		CAP
		ANCHOR
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		LATERAL

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	
KNIFE GATE	OR
BUTTERFLY	OR
GLOBE	OR
BALL	OR
SEATING PORT	
ECCENTRIC PLUG	OR
PLUG OR COCK	OR
NEEDLE	OR
DIAPHRAGM	OR
PINCH	OR
SWING CHECK	OR
BALL CHECK	OR

HOSE VALVE (HV- X) OR (V-X)
X = NO. IN SPECS

SAMPLE

MUD

PRESSURE RELIEF

AIR AND/OR VACUUM RELEASE

REGULATED SIDE
PRESSURE CONTROL (INTERNAL PILOT)

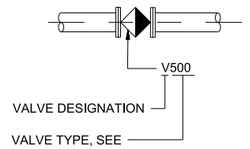
REGULATED SIDE
PRESSURE CONTROL (EXTERNAL PILOT)

MULTI-PORT VALVE,
ARROWS INDICATE FLOW PATTERN.
SEATING PORTS ARE IMPLIED BY
INDICATED FLOW PATTERN.

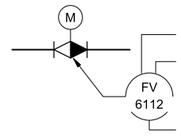
TELESCOPING SCUM VALVE

VALVE DESIGNATIONS

MANUAL VALVES AND CHECK VALVES

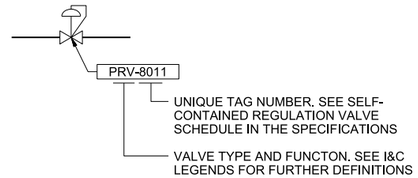


CONTROL VALVES



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

SELF-CONTAINED REGULATING VALVES



MECHANICAL LEGEND AND NOTES

GENERIC PIPING NOTES

1. 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.
2. LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. CONTRACTOR SHALL DESIGN SUPPORTS.
3. ALL JOINTS SHALL BE WATERTIGHT. WALL PIPES SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.
4. 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.
5. 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.
6. NUMBER AND LOCATION OF UNIONS SHOWN ON DRAWINGS IS ONLY APPROXIMATE. PROVIDE ALL UNIONS NECESSARY TO FACILITATE CONVENIENT REMOVAL OF VALVES AND MECHANICAL EQUIPMENT.
7. 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.

GENERAL SHEET NOTES

1. THIS IS A STANDARD LEGEND SHEET. THEREFORE, NOT ALL OF THE INFORMATION SHOWN MAY BE USED ON THIS PROJECT.
2. FLOW STREAM IDENTIFICATIONS AND DEFINITIONS ARE SHOWN ON THE INSTRUMENTATION LEGEND.

NO.	DATE	DSGN
DR	CJ DAHL	TJ ELLIOTT
CHK	TJ ELLIOTT	APVD
BY	AG MYERS	APVD

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

GENERAL
PROCESS MECHANICAL LEGEND

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

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ELECTRICAL LEGEND

SYMBOL	DESCRIPTION
	CONNECTION POINT TO EQUIPMENT SPECIFIED. FURNISHED AND INSTALLED UNDER OTHER SECTIONS. RACEWAY, CONDUCTOR TERMINATION, AND CONNECTION IN THIS SECTION. COORDINATE FINAL CONNECTION WITH EQUIPMENT SUPPLIER.
[1"C, 2#12, 1#12G]	INDICATES RACEWAYS AND CIRCUIT CONDUCTOR OR CIRCUIT NUMBER. FIRST NUMBER IS RACEWAY SIZE. THE FOLOWING NUMBERS ARE THE CONDUCTOR QUANTITIES AND SIZES.
	BRANCH CIRCUIT PANEL BOARD
MCC-A	MAJOR ELECTRICAL COMPONENT OR DEVICE - NAME OR IDENTIFYING SYMBOL AS SHOWN.
TTC	TELEPHONE TERMINAL CABINET
TJB	TERMINAL JUNCTION BOX
INDICATES SWITCH LIGHTING CONTACTOR OR PHOTOCELL. / DOT INDICATES FIXTURE WITH SELF CONTAINED EMERGENCY POWER PACK, POWER PACK TO ENERGERIZE FIXTURE ON POWER FAILURE. / a / 2 / -1 / INDICATES FIXTURE TYPE, SEE LUMINAIRE SCHEDULE / INDICATES CIRCUIT NUMBER ON PANEL SCHEDULE.	
5	MOTOR-SQUIRREL CAGE INDUCTION, HORSEPOWER INDICATED
5LP1-3	HOME RUN - DESTINATION SHOWN
OR G	EXPOSED CONDUIT AND CONDUCTORS*
OR G	CONCEALED CONDUIT AND CONDUCTORS*
	NOTE: * ALL UNMARKED CONDUIT RUNS CONSIST OF TWO NO. 12 CONDUCTORS IN CONDUIT. RUNS MARKED WITH CROSSHATCHES INDICATE NUMBER OF NO. 12 CONDUCTORS. CROSSHATCH WITH SUBSCRIPT "G" INDICATES GREEN GROUND WIRE. SIZE CONDUIT ACCORDING TO SPECIFICATIONS AND APPLICABLE CODE.
	CONDUIT DOWN
	CONDUIT UP
	CONDUIT, STUBBED AND CAPPED AS SHOWN
CE	CONCRETE ENCASED CONDUIT
DB	DIRECT BURIED CONDUIT
G	DIRECT BURIED GROUND CABLE
S^{a}_{1} OR S_{a1}	2 - DOUBLE POLE 3 - THREE WAY 4 - FOUR WAY WP - WEATHERPROOF a - CONTROLS FIXTURE TO BE SWITCHED MC - MOMENTARY CONTACT SPRING RETURN TO CENTER CRE - CORROSION RESISTANT M - MOTOR RATED TOGGLE SWITCH WITHOUT OVERLOAD
	GROUND ROD
	GROUND ROD IN ACCESSIBLE WELL
OH	OVERHEAD ELECTRIC
EOH	EXISTING OVERHEAD ELECTRIC
E	EXISTING UNDERGROUND UTILITY ELECTRIC
EB	UNDERGROUND UTILITY ELECTRIC
TE	TEMPORARY ELECTRIC

SYMBOL	DESCRIPTION
CS	CONTROL STATION-SEE CONTROL DIAGRAMS FOR TYPE
	DUPLEX CONVENIENCE RECEPTACLE WP-WEATHERPROOF
	MULT-OUTLET ASSEMBLY
	CLOCK HANGER CONVENIENCE RECEPTACLE
	RECEPTACLE, SPECIAL PURPOSE
	TELEPHONE AND DATA RECEPTACLE (OUTLET BOX ONLY) WITH 2-EMPTY 3/4" CONDUIT TO TELECOMM CABLE TRAY, UNLESS SHOWN OTHERWISE. COORDINATE FINAL LOCATION WITH OWNER.
J	JUNCTION BOX OR CONDUIT FITTING
2	CONTACTOR, MAGNETIC, NEMA SIZE INDICATED.
30 L	LIGHTING CONTACTOR, CURRENT RATING INDICATED. FOR NUMBER OF POLES, SEE CONTROL DIAGRAM.
2	STARTER MAGNETIC NEMA SIZE INDICATED, SEE ONE-LINE DIAGRAM OR PLAN.
OR 2	MAGNETIC TYPE COMBINATION MOTOR - NEMA SIZE AS INDICATED.
	NONFUSED DISCONNECT SWITCH, 30A, 3 POLE
60	NONFUSED DISCONNECT SWITCH, CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
60/40 F	FUSED DISCONNECT SWITCH, CURRENT RATINGE INDICATED (60/40, 60 = SWITCH RATING: 40= FUSE RATING) 3 POLE UNLESS INDICATED OTHERWISE.
T	DRY TYPE TRANSFORMER - SIZE, VOLTAGE AND PHASE INDICATED
CR	CONTROL RELAY
TD	TIME DELAY RELAY
F	FIRE ALARM STATION, MANUAL
F	DUCT-MOUNTED SMOKE DETECTOR
FS	FLOW SWITCH
TS	TAMPER SWITCH
H	HEAT DETECTOR
S	SMOKE DETECTOR
GC	GATE CONTROLS
SS	SUPERVISORY SWITCH
F	FIRE ALARM STROBE
F	FIRE ALARM TRUMPET HORN/STROBE COMBINATION
	OCCUPANCY SENSOR
M	MONITOR
KP	KEYPAD
IC	INTERIOR INTERCOM STATION
I	EXTERIOR INTERCOM STATION

SYMBOL	DESCRIPTION
	NORMALLY OPEN CONTACT
	NORMALLY CLOSED CONTACT
	OVERLOAD RELAY HEATER
1	MAGNETIC STARTER WITH NEMA SIZE INDICATED
/M	CIRCUIT BREAKER, MAGNETIC TRIP ONLY, 3 POLE UNLESS INDICATED OTHERWISE.
400	CIRCUIT BREAKER, THERMAL MAGNETIC TRIP SHOWN, 3 POLE UNLESS INDICATED OTHERWISE.
100	SWITCH - CURRENT RATING INDICATED, 3 POLE UNLESS INDICATED OTHERWISE.
225	FUSE - RATING INDICATED
	DRAWOUT CIRCUIT BREAKER, LOW VOLTAGE
52	DRAWOUT CIRCUIT BREAKER, MEDIUM VOLTAGE
	DRAWOUT FUSED SWITCH, MEDIUM VOLTAGE
	SURGE ARRESTER
	CAPACITOR - KVAR INDICATED
V / VS 0-600V	METER WITH SWITCH - SCALE RANGE SHOWN
	GROUND
120V OR 120/240V 15 KVA 1 PH	TRANSFORMER, SECONDARY VOLTAGES, PHASE AND RATING INDICATED AS APPLICABLE
208Y/120 30 KVA 3 PH	SHIELDED ISOLATION TRANSFORMER, SECONDARY VOLTAGES, PHASE AND RATING INDICATED
GFR	GROUND FAULT RELAY WITH C.T.
	PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
	PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
	PUSH BUTTON SWITCH, MAINTAINED CONTACTS WITH MECHANICAL INTERLOCK
	TIME DELAY RELAY CONTACT-NORMALLY CLOSED, TIME OPEN
	TIME DELAY RELAY CONTACT - NORMALLY OPEN, TIME CLOSE
	REMOTE DEVICE
O H A 1 2	SELECTOR SWITCH - MAINTAINED CONTACT - CHART IDENTIFIES OPERATION:

	POSITION		
CKT.	HAND	OFF	AUTO
1	X	O	O
2	O	O	X

X - CLOSED CONTACT
O - OPEN CONTACT

200/5 (3)	CURRENT TRANSFORMER, NUMBER AND RATIO INDICATED
A	INDICATING LIGHT, PUSH-TO-TEST, LETTER INDICATES COLOR
A	INDICATING LIGHT - LETTER INDICATES COLOR A - AMBER G - GREEN B - BLUE R - RED C - CLEAR W - WHITE

ABBREVIATIONS

ABBREVIATIONS	DESCRIPTION
A	AMMETER, AMPERE, AMBER
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AS	AMMETER SWITCH, AMPERE SENSOR
ASU	AIR SUPPLY UNIT
AT	AMPERE TRIP
ATC	AUTOMATIC THROWOVER CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
B	BELL, BLUE
BC	BARE COPPER
C	CONDUIT, CONTACTOR
CB	CIRCUIT BREAKER
CC	CONTROL CABLE
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CRS	COATED RIGID STEEL CONDUIT
CT	CURRENT TRANSFORMER
DB	DIRECT BURIED
DC	DIRECT CURRENT
DIV	DIVISION
E	EMPTY
EF	EXHAUST FAN
EHD	ELECTRIC HAND DRYER
EO	ELECTRIC OPERATOR
EMH	ELECTRIC MANHOLE
EMVMH	ELECTRIC MEDIUM VOLTAGE MANHOLE
ETM	ELAPSED TIME METER
EWS	EYEWASH SHOWER
EXST	EXISTING
FDR	FEEDER
F, FU	FUSE
FLR	FLOOR
FLUOR	FLUORESCENT
FO	FIBER OPTIC
FOPP	FIBER OPTIC PATCH PANEL
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
FHH	FIBER HANDHOLE
G,GND	GREEN, GROUND
GALV	GALVANIZED
GEIWPT	GENERAL ELECTRIC INFRASTRUCTURE WATER AND PROCESS TECHNOLOGIES
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFPE	EQUIPMENT GROUND FAULT PROTECTION
GFR	GROUND FAULT RELAY
GW	GROUND FAULT INTERUPTER, WEATHER PROOF
H	HIGH SPEED, HORN, HOWLER
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HOA	HAND OFF AUTOMATIC SELECTOR SWITCH
HPS	HIGH PRESSURE SODIUM
HT	HEAT TRACE
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IC	INTERRUPTING CAPACITY
I & C	INSTRUMENTATION AND CONTROL
INCAND	INCANDESCENT
INST	INSTANTANEOUS
J, J-BOX	JUNCTION BOX
K	KEY INTERLOCK
KAIC	KILO AMPERE INTERRUPT CAPACITY
KP	KEY PAD
L	LIGHTING CONTACTOR, LOW SPEED
LOS	LOCKOUT STOP PUSH BUTTON
LS	LIMIT SWITCH
LT FLEX	LIQUID TIGHT FLEX CONDUIT
LR	LATCHING RELAY
M	MAGNETIC CONTACTOR COIL
MCC	MOTOR CONTROL CENTER
MDC	MOTORIZED DAMPER CONTROL
MERC	MERCURY VAPOR
MH	MANHOLE
MMP	MECHANICAL MOUNTING PANEL
MO	MOTOR OPERATER
MS	MOTOR STARTER
MSC	CABLE SUPPLIED WITH EQUIPMENT
MT	MOUNT
MTD	MOUNTED
N	NEUTRAL
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NP	NAMEPLATE
OHE	OVERHEAD ELECTRIC
OL	OVERLOAD RELAY
PB	PULL BOX, PUSH BUTTON SWITCH
PC	PHOTOCELL
PDM	POWER DATA MONITOR
PNL	PANEL
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE CONDUIT
REX	EXIT RELEASE
R	RED
RCPT	RECEPTACLE
RM	REMOTE MULTIPLEXER
RS	RIGID STEEL CONDUIT
RT	REMOTE TELEMETRY
RVNR	REDUCED VOLTAGE NON-REVERSING
RVR	REDUCED VOLTAGE REVERSING
SA	SURGE ARRESTOR
SC	SPEED CONTROL
SH	SPACE HEATER
S/N	SOLID NEUTRAL
SPD	SPEED
SST	STAINLESS STEEL
ST	SHUNT TRIP
SV	SOLENOID VALVE
SW	SWITCH
TEL	TELEPHONE
T	THERMOSTAT
TB	TERMINAL BOARD
TC	TIME CLOCK, TIME CLOSE
TD	TEMPERATURE DETECTOR RELAY
TDR	TIME DELAY RELAY
TJB	TERMINAL JUNCTION BOX
TM	TIMING RELAY
TO	TIME OPEN
TR	TIMER-REPEAT CYCLE
TS	AUTO TRANSFORMER TEMPERATURE SWITCH
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TYP	TYPICAL
UH	UNIT HEATER
UVR	UNDER VOLTAGE RELAY
V	VOLTMETER, VOLT
VFD	VARIABLE FREQUENCY DRIVE
VS	VOLTMETER SWITCH
W	WATT
WHD	WATTHOUR DEMAND METER
WP	WEATHERPROOF
XFMR	TRANSFORMER

GENERAL SHEET NOTES

1. THIS IS A STANDARD LEGEND SHEET. THEREFORE, NOT ALL OF THE INFORMATION SHOWN MAY BE USED ON THIS PROJECT.
2. FOR ADDITIONAL ABBREVIATIONS OF OTHER DIVISIONS, SEE HVAC, MECHANICAL, AND STRUCTURAL/ARCHITECTURAL LEGENDS.

NO.	DATE	REVISION	CHK	DR
DSGN	IT HAMMONS	CJ DAHL	IT HAMMONS	APVD
			BY	APVD
			AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

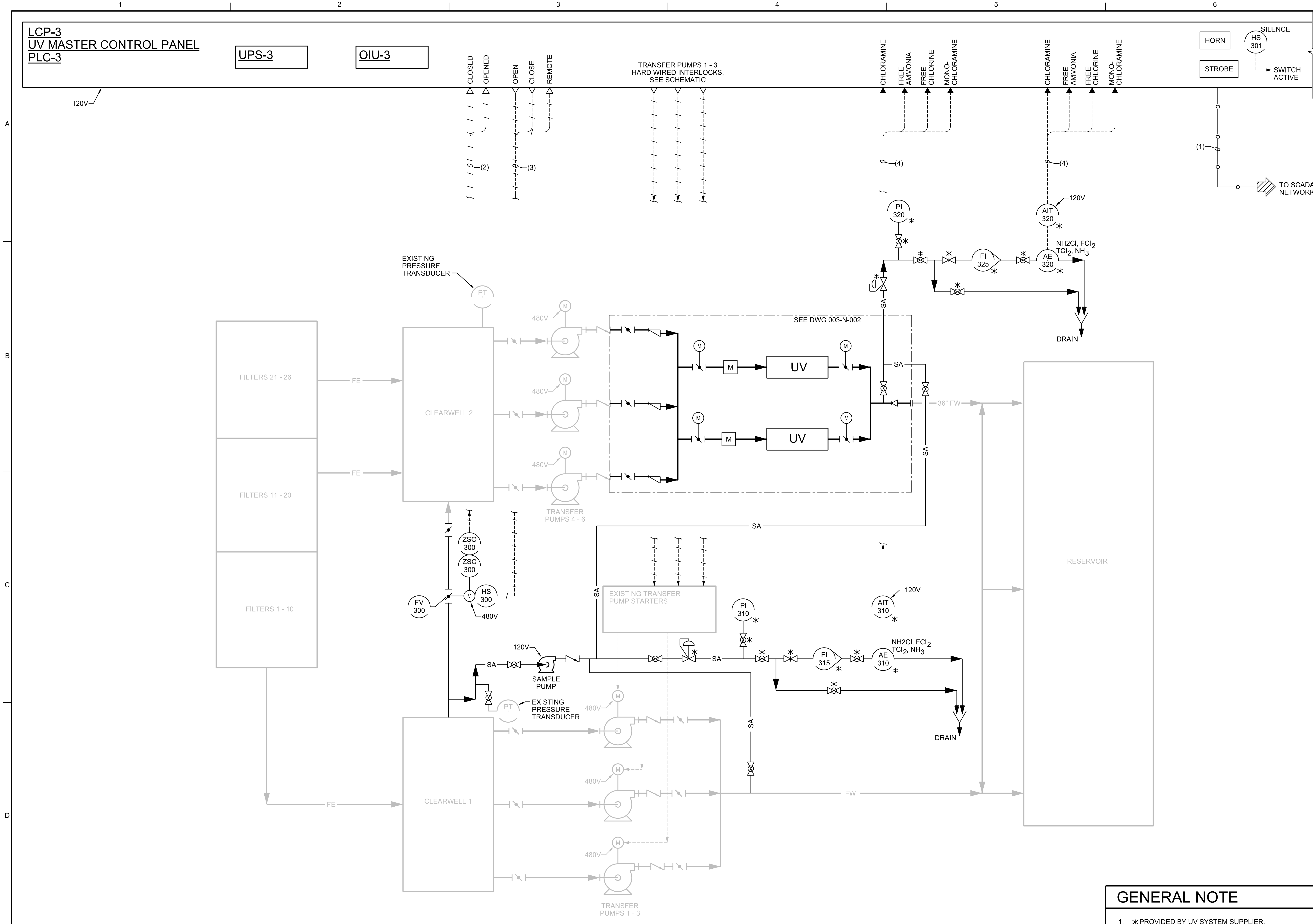
JACOBS

GENERAL
ELECTRICAL LEGEND

NO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	001-G-008
SHEET	8 of 45

BID DOCUMENTS



LCP-3
UV MASTER CONTROL PANEL
PLC-3
UPS-3
OIU-3
120V
CLOSED
OPENED
OPEN
CLOSE
REMOTE
TRANSFER PUMPS 1 - 3
HARD WIRED INTERLOCKS,
SEE SCHEMATIC
CHLORAMINE
FREE AMMONIA
FREE CHLORINE
MONO-CHLORAMINE
HORN
STROBE
HS 301
SILENCE
SWITCH ACTIVE
(1)
(2)
(3)
(4)
TO SCADA NETWORK
PI 320
AIT 320
FI 325
AE 320
NH2Cl, FCl2
TCl2, NH3
DRAIN
EXISTING PRESSURE TRANSDUCER
PT
480V
M
SEE DWG 003-N-002
UV
SA
36" FW
FILTERS 21 - 26
FILTERS 11 - 20
FILTERS 1 - 10
FE
CLEARWELL 2
CLEARWELL 1
TRANSFER PUMPS 4 - 6
TRANSFER PUMPS 1 - 3
RESERVOIR
ZSO 300
ZSC 300
FV 300
HS 300
EXISTING TRANSFER PUMP STARTERS
PI 310
AIT 310
FI 315
AE 310
SAMPLE PUMP
FW

GENERAL NOTE

1. ∗ PROVIDED BY UV SYSTEM SUPPLIER.

NO.	DATE	REVISION	BY	APVD

DSGN: I HAMMONS, T ELLIOTT
DR: MA REICHERT
CHK: AG MYERS
APVD: AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

INSTRUMENTATON AND CONTROLS
UV DISINFECTION SYSTEM
OVERALL P&ID

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	003-N-001
SHEET	9 of 45

BID DOCUMENTS

$PWPATH
$PWURL

LCP-3
UV MASTER CONTROL PANEL
PLC-3

UPS-3

OIU-3

NOTE:
1. UV SYSTEM SIGNALS, MINIMUM:
- ALARMS: MINOR, MAJOR, CRITICAL
- SYSTEM READY
- SYSTEM RUNNING
- SYSTEM WARNING
- SYSTEM SHUTDOWN
- SYSTEM OFFLINE
- REMOTE
- START/STOP
- REACTOR FLOW RATE /TOTAL FLOW
- INFLUENT VALVE OPEN STATUS
- UV DOSE OR INACTIVATION ACHIEVED
- OFF SPEC VOLUME
- UV DOSE SAFETY FACTOR
- UV DOSAGE TARGET OR INACTIVATION TARGET SETPOINT
- EFFLUENT VALVE OPEN STATUS
- UV TRANSMITTANCE
- LAMP RUN HOURS

120V

% UVT
TURBIDITY
TOC
% UVT
TURBIDITY
TOC
WET FLOOR ALARM HI-HI
OPENED
CLOSED
OPEN
CLOSE
REMOTE
FLOW TOTAL
OPENED
CLOSED
OPEN
CLOSE
REMOTE
WET FLOOR ALARM
POSITION
POSITION COMMAND
WET FLOOR ALARM
COMMON ALARM

HORN
STROBE
SILENCE
HS 301
SWITCH ACTIVE

2(2)
2(3)
(2)
(2)
ETHERNET, NOTE 1
2(2)
2(3)
(2)
(2)
(1)

TO SCADA NETWORK

HARD WIRED COMMON ALARM TO SCADA (EXST PLC-C2)

AIT 360
120V
UVT-2
UVT-1
VENDOR CABLE

LCP-1
UV CONTROL POWER PANEL*
PLC-1
OIU-1
E-STOP HS 101
480V
FLOW
WIPER STATUS
SENSORS
REACTOR TEMP HIGH
COVER OPEN
LAMP POWER
LOW WATER LEVEL

TOTALIZER PULSE
(5)
(5)

ZSO 100
ZSC 100
LR/ OSC
HS 100
480V
FV 100
FQI 105
FIT 105
120V
PI 110
TSH 115
LSL 115
PI 120
ZSO 125
ZSC 125
LR/ OSC
HS 125
480V
FCV 125
ZT 125
ZC 125

24" UVI
24" UVE
12" BWS
TO BACKWASH SUPPLY PUMP
3" DR
FE 105
1/2" DR
1/2" DR, TO EXST SUMP
UVR-1
UV REACTOR NO. 1*
WET FLOOR DETECTOR

16" UVI
20" UVI
FROM TRANSFER PUMP 4
16" UVI
20" UVI
FROM TRANSFER PUMP 5
16" UVI
20" UVI
FROM TRANSFER PUMP 6
20" UVI
3/4" SA
24" UVI

WET FLOOR DETECTOR (HI-HI)

ZSO 200
ZSC 200
LR/ OSC
HS 200
480V
FV 200

ETHERNET, NOTE 1

LCP-2
UV CONTROL POWER PANEL*
PLC-2
OIU-2
480V
SIMILAR TO ABOVE

ZSO 225
ZSC 225
LR/ OSC
HS 225
480V
FCV 225
ZT 225
ZC 225

24" UVE
24" UVE
36" FW
TO RESERVOIR
6" UVE DR
UVR-2
UV REACTOR NO. 2*
WET FLOOR DETECTOR

PI 340
FI 345
1/2" SA
AE 340
PI 350
FI 355
1/2" SA
AE 350
DRAIN

PD
PLANT DRAIN
BUILDING SUMP

GENERAL NOTE

1. *PROVIDED BY UV SYSTEM SUPPLIER.

NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
	I HAMMONS	TJ ELLIOTT	MA REICHERT	AG MYERS	APVD	AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

INSTRUMENTATION AND CONTROL
UV DISINFECTION SYSTEM
P&ID

BID DOCUMENTS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	003-N-002
SHEET	10 of 45

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PLOT DATE: 1/29/2019
PLOT TIME: 11:34:17 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN, FIELD VERIFY EXISTING CONDITIONS.
3. SEE SPECIFICATION SECTION 01 31 13 FOR SEQUENCE OF CONSTRUCTION AND DEMOLITION. CONTRACTOR RESPONSIBLE FOR PROVIDING TEMPORARY PIPE OR STAIR SUPPORTS TO COMPLETE WORK.
4. EXISTING PIPE AND VALVE PAINT MAY CONTAIN LEAD; PIPE JOINTS GASKETS CONTAIN ACM; REFER TO SPECIFICATION SECTION 02 41 00, DEMOLITION AND 02 42 00, LEAD PAINT ABATEMENT FOR SPECIFIC REQUIREMENTS.
5. FOR REMOVAL OF CONCRETE , EMBEDMENTS AND CONCRETE ANCHORS, REFER TO DETAIL 0330-143.

EXST 36" FW RCP DISCHARGE TO RESERVOIR
EXST 4" V.P. BELT DRAIN
REUSE EXST 36" MJ CI WALL PIPE
EXST 24" FW, NOT IN USE
EXST 24" MJ CI WALL PIPE
EXST 1 1/2" GI
EXST 4" CI BELT DRAIN TO SUMP
DEMOLISH EXST SADDLE TAP, TIE-RODS, AND BF, TYP
EXST SA AND PRESSURE TRANSMITTER
EXST 4" CLEARWELL DRAIN W/ GATE VALVE
DEMOLISH EXST 36"
DEMOLISH EXST 36"x36"x16" RDCR TEE
EXST 1 1/2" CHECK VALVE
EXST 2'-0" DIA x 3'-0" DEEP SUMP
DEMOLISH EXST 30"x20" RDCR
DEMOLISH ALL LIGHT FIXTURES, TYP OF 16
EXST HATCH ABOVE, TYP
DEMOLISH EXST PLATFORM, STAIRS, SUPPORT COLUMNS, HANDRAIL, AND CONCRETE BASES
DEMOLISH EXST SADDLE TAP, TIE-RODS, AND BF, TYP
EXST TRANSFER PUMP 6
EXST TRANSFER PUMP 5
EXST TRANSFER PUMP 4
EXST CLEARWELL 2
DEMOLISH EXST FILLER FLANGE
DEMOLISH EXST 30"x30"x16" RDCR TEE
DEMOLISH EXST 16" PLUG VALVE, TYP
DEMOLISH EXST 16" PIPE SPOOL, TYP
DEMOLISH EXST 20"
DEMOLISH EXST 20"x20"x16" RDCR TEE
DEMOLISH EXST 20"x12" RDCR
DEMOLISH EXST 12" WASH WATER
DEMOLISH EXST GRATING, SUPPORT COLUMNS, HANDRAIL, AND CONCRETE BASES, TYP
DEMOLISH EXST 3" FD
EXST COLUMN, TYP
EXST 36" FW, NOT IN USE
EXST 36" x 20" RDCR ELBOW
EXST 20" MJ CI WALL PIPE, TYP
DEMOLISH EXST 6" FILTRATE
EXST 16" PLUG VALVE, TYP
EXST FLOOR DRAIN, TYP
EXST 3" FD
EXST 16" FW, TYP
EXST 16" FLANGED ADAPTER, TYP
EXST DRESSER FLANGED ADAPTER, TYP
EXST 16" CHECK VALVE, TYP
DEMOLISH EXST ELECTRICAL PANELS
EXST 24" AIR DUCT
EXST 6" FILTRATE
EXST 12" BWS PUMP SUCTION, VERTICAL PIPE TO REMAIN FOR REUSE, CONTRACTOR TO REUSE ELBOW IF POSSIBLE
DO NOT DISTURB EXST STAIRS
DEMOLISH EXST LIGHT SWITCHES AND ASSOCIATED CONDUIT AND WIRE
16'-3 1/2"
12'-3"
16'-5 1/2"
5'-2"
5'-6 1/2", TYP
3'-0"
2'-0" TYP
5'-4 5/8"
1'-2 5/8"
6'-6"
6'-5"
7'-3"
5'-4"
7'-6"

PLAN - EL 966.50
3/8"=1'-0"

KEY PLAN
FILTER BUILDING

NO.	DATE	REVISION	DR	CHK	BY	APVD
DSGN	TJ ELLIOTT		CJ DAHL	AG MYERS	AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

DEMOLITION
TRANSFER PUMP AND UV ROOM
PLAN - EL 966.50

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-X-110
SHEET	11 of 45

BID DOCUMENTS

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN, FIELD VERIFY EXISTING CONDITIONS.
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4. EXISTING PIPE AND VALVE PAINT MAY CONTAIN LEAD; PIPE JOINTS GASKETS CONTAIN ACM; REFER TO SPECIFICATION SECTION 02 41 00, DEMOLITION AND 02 42 00, LEAD PAINT ABATEMENT FOR SPECIFIC REQUIREMENTS.
5. FOR REMOVAL OF CONCRETE , EMBEDMENTS AND CONCRETE ANCHORS, REFER TO DETAIL 0330-143.

SHEET KEYNOTES

1. CLEAN OUT EXISTING FLOOR DRAIN PRIOR TO IMPLEMENTING DEMOLITION WORK IN THIS AREA.
2. RELOCATED EXISTING LEVEL TRANSMITTER, REFER TO PROCESS MECHANICAL PLANS.
3. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE AND VALVE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2, AND MATCH EXISTING PIPE AND VALVE SIZE.
4. REMOVE PIPE ENTIRELY AS IT ENTERS CLEARWELL 1.

CLEARWELL 2 (BELOW)

TRANSFER PUMP MOTOR ROOM (TRANSFER PUMPS AND UV ROOM BELOW)

PUMP ROOM

3 EXST BURIED 30" CLEARWELL INTERCONNECT PIPE, TO REMAIN

3 DEMOLISH CLEARWELL INTERCONNECT PIPE EXST 30" VALVE

EXST 12" FW ABOVE EXST 30" CLEARWELL INTERCONNECT PIPETO REMAIN

8 020-X-121

6'-7"±

3 DEMOLISH EXST 30" CLEARWELL INTERCONNECT PIPE, SUPPORTS, AND LINK SEAL

EXST FLOOR DRAIN 1

7 020-X-121

9 020-X-121

EXST PE/PIT 2

3'-0"±

TRANSFER PUMP ROOM (OPEN TO BELOW)

TRANSFER PUMP 3

TRANSFER PUMP 2

TRANSFER PUMP 1

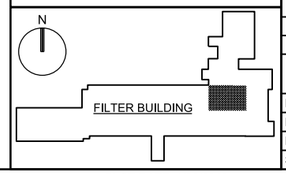
CLEARWELL 1 (BELOW)

N

PLAN - EL 967.50 AND EL 981.50

3/8"=1'-0"

KEY PLAN



NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
		TJ ELLIOTT	CJ DAHL	AG MYERS	AG MYERS	APVD	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

DEMOLITION

SUB-BASEMENT AND BASEMENT PLAN - EL 967.50 AND EL 981.50

BID DOCUMENTS

3/8"=1'-0"	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	
DATE	JANUARY 2019
PROJ	709084
DWG	020-X-121
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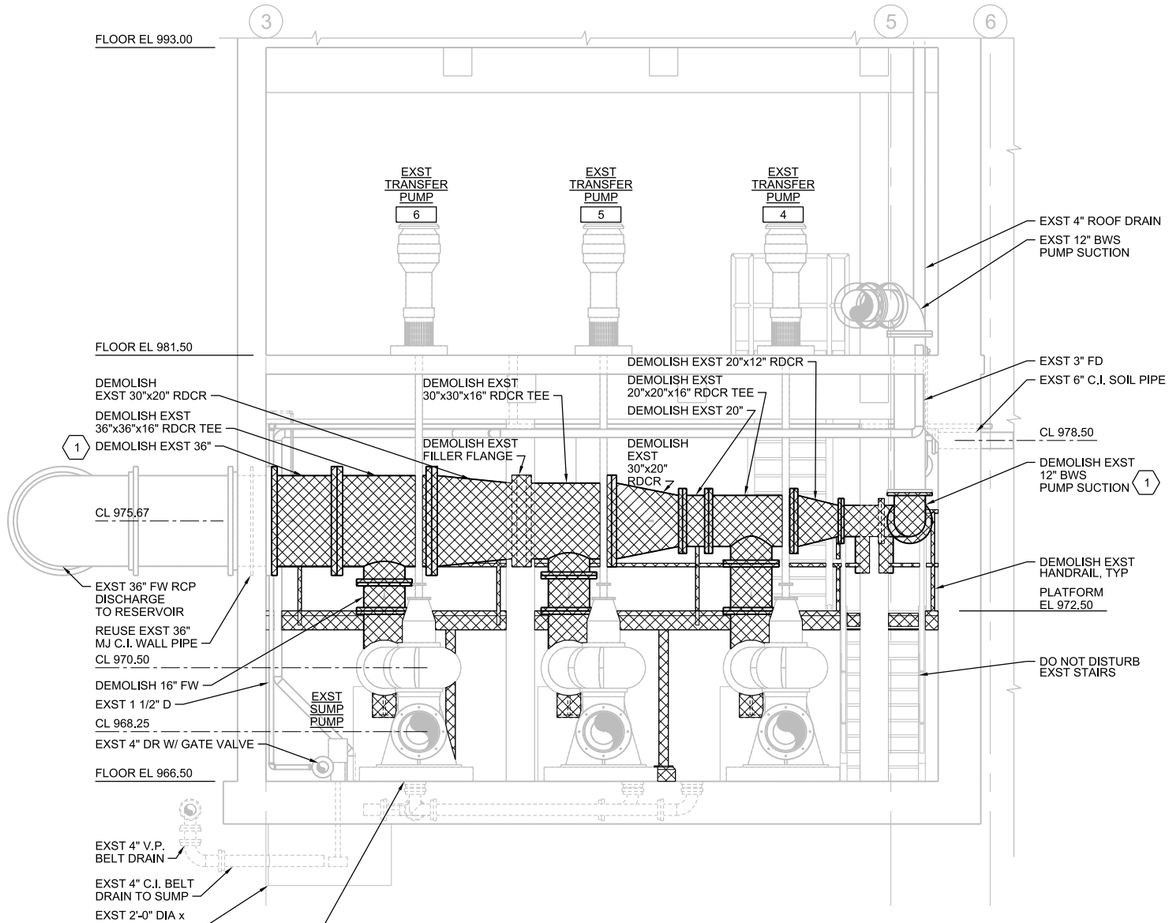
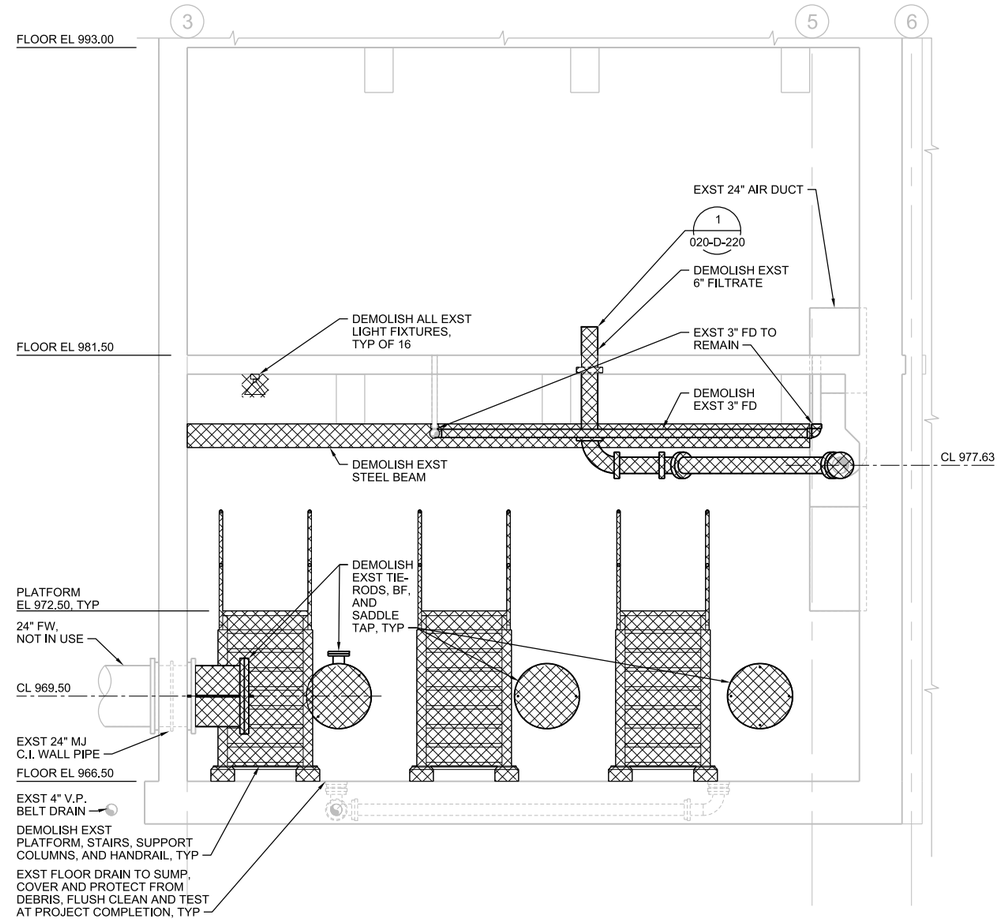


A SECTION
3/8"=1'-0"
020-X-110



B SECTION
3/8"=1'-0"
020-X-110

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
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4. EXISTING PIPE AND VALVE PAINT MAY CONTAIN LEAD; PIPE JOINTS GASKETS CONTAIN ACM; REFER TO SPECIFICATION SECTION 02 41 00, DEMOLITION AND 02 42 00, LEAD PAINT ABATEMENT FOR SPECIFIC REQUIREMENTS.
5. FOR REMOVAL OF CONCRETE , EMBEDMENTS AND CONCRETE ANCHORS, REFER TO DETAIL 0330-143.

SHEET KEYNOTE

1. DEMOLISH TO EXISTING FLANGE.

NO.	DATE	DSGN
		TJ ELLIOTT
		DR
		CJ DAHL
		CHK
		AG MYERS
		APVD

REVISION

BY	APVD
	AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

DEMOLITION

TRANSFER PUMP AND UV ROOM SECTIONS

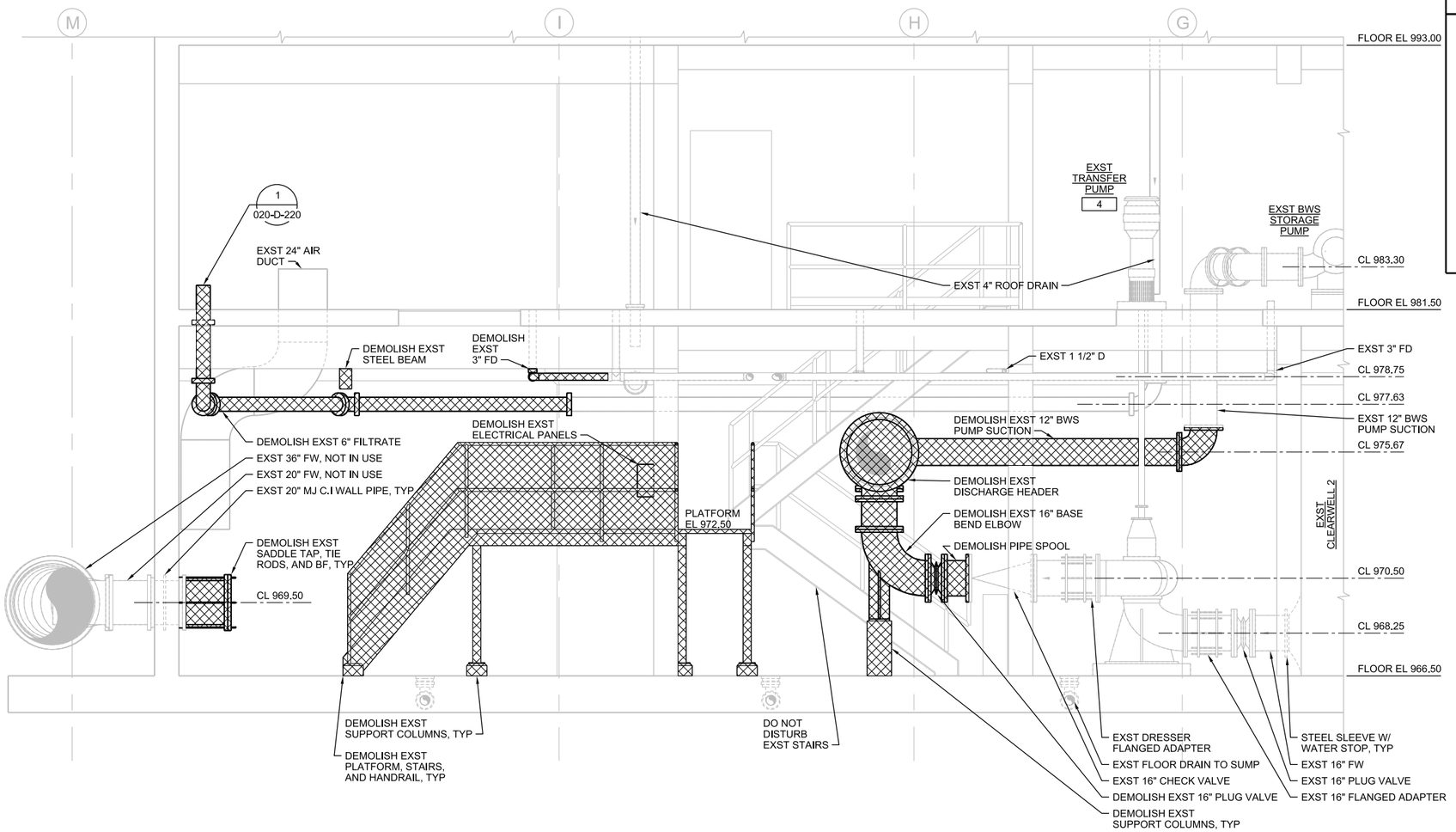
3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-X-301
SHEET	13 of 45

BID DOCUMENTS

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.
3. SEE SPECIFICATION SECTION 01 31 13 FOR SEQUENCE OF CONSTRUCTION AND DEMOLITION. CONTRACTOR RESPONSIBLE FOR PROVIDING TEMPORARY PIPE OR STAIR SUPPORTS TO COMPLETE WORK.
4. EXISTING PIPE AND VALVE PAINT MAY CONTAIN LEAD; PIPE JOINTS GASKETS CONTAIN ACM; REFER TO SPECIFICATION SECTION 02 41 00, DEMOLITION AND 02 42 00, LEAD PAINT ABATEMENT FOR SPECIFIC REQUIREMENTS.
5. FOR REMOVAL OF CONCRETE , EMBEDMENTS AND CONCRETE ANCHORS, REFER TO DETAIL 0330-143.



C SECTION
3/8"=1'-0"
020-X-110

NO.	DATE	DSGN
		TJ ELLIOTT

REVISION

BY	CHK	DR
APVD	AG MYERS	CJ DAHL
APVD	AG MYERS	
BY	APVD	
AG MYERS		

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

DEMOLITION
TRANSFER PUMP AND UV ROOM SECTION

3/8"=1'-0"	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	
DATE	JANUARY 2019
PROJ	709084
DWG	020-X-302
SHEET	14 of 45

BID DOCUMENTS

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NTS
020-X-110

2 PHOTO
NTS
020-X-110

3 PHOTO
NTS
020-X-110

4 PHOTO
NTS
020-X-110

5 PHOTO
NTS
020-X-110

6 PHOTO
NTS
020-X-110

GENERAL SHEET NOTES

1. SEE SPECIFICATION SECTION 01 31 13 FOR SEQUENCE OF CONSTRUCTION AND DEMOLITION.
2. REFER TO DEMOLITION PLAN AND SECTION DRAWINGS FOR ADDITIONAL NOTES AND INFORMATION.

NO.	DATE	REVISION	BY	APVD
DSGN	TJ ELLIOTT	DR	CJ DAHL	CHK	AG MYERS	APVD	AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

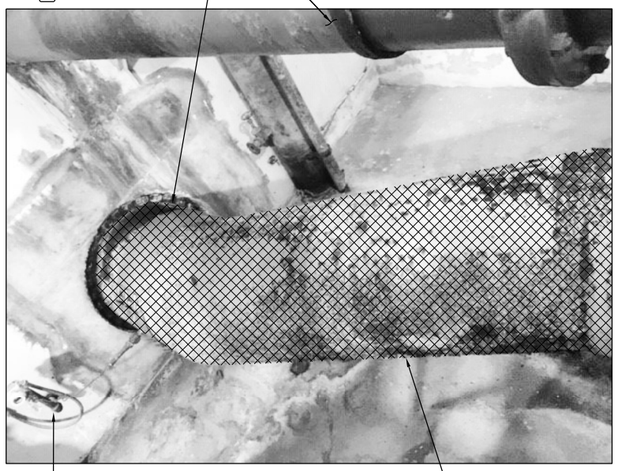
DEMOLITION

TRANSFER PUMP AND UV ROOM PHOTOS

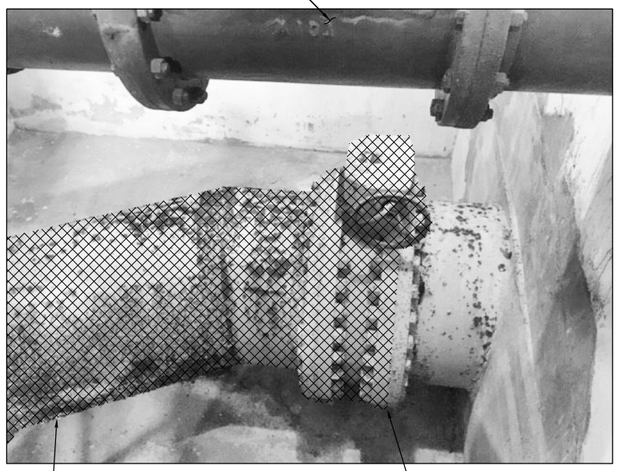
NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-X-501
SHEET	15 of 45

BID DOCUMENTS



7 PHOTO
NTS
020-X-121



8 PHOTO
NTS
020-X-121

9 PHOTO
NTS
020-X-121

GENERAL SHEET NOTES

1. SEE SPECIFICATION SECTION 01 31 13 FOR SEQUENCE OF CONSTRUCTION AND DEMOLITION.
2. REFER TO DEMOLITION PLAN AND SECTION DRAWINGS FOR ADDITIONAL NOTES AND INFORMATION.

SHEET KEYNOTES

1. RELOCATE EXISTING PRESSURE/LEVEL TRANSMITTER, REFER TO PROCESS MECHANICAL PLANS.
2. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE AND VALVE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2, AND MATCH EXISTING PIPE AND VALVE SIZE.

NO.	DATE	REVISION	DR	CHK	BY
DSGN	TJ ELLIOTT	CJ DAHL	AG MYERS	APVD	AG MYERS

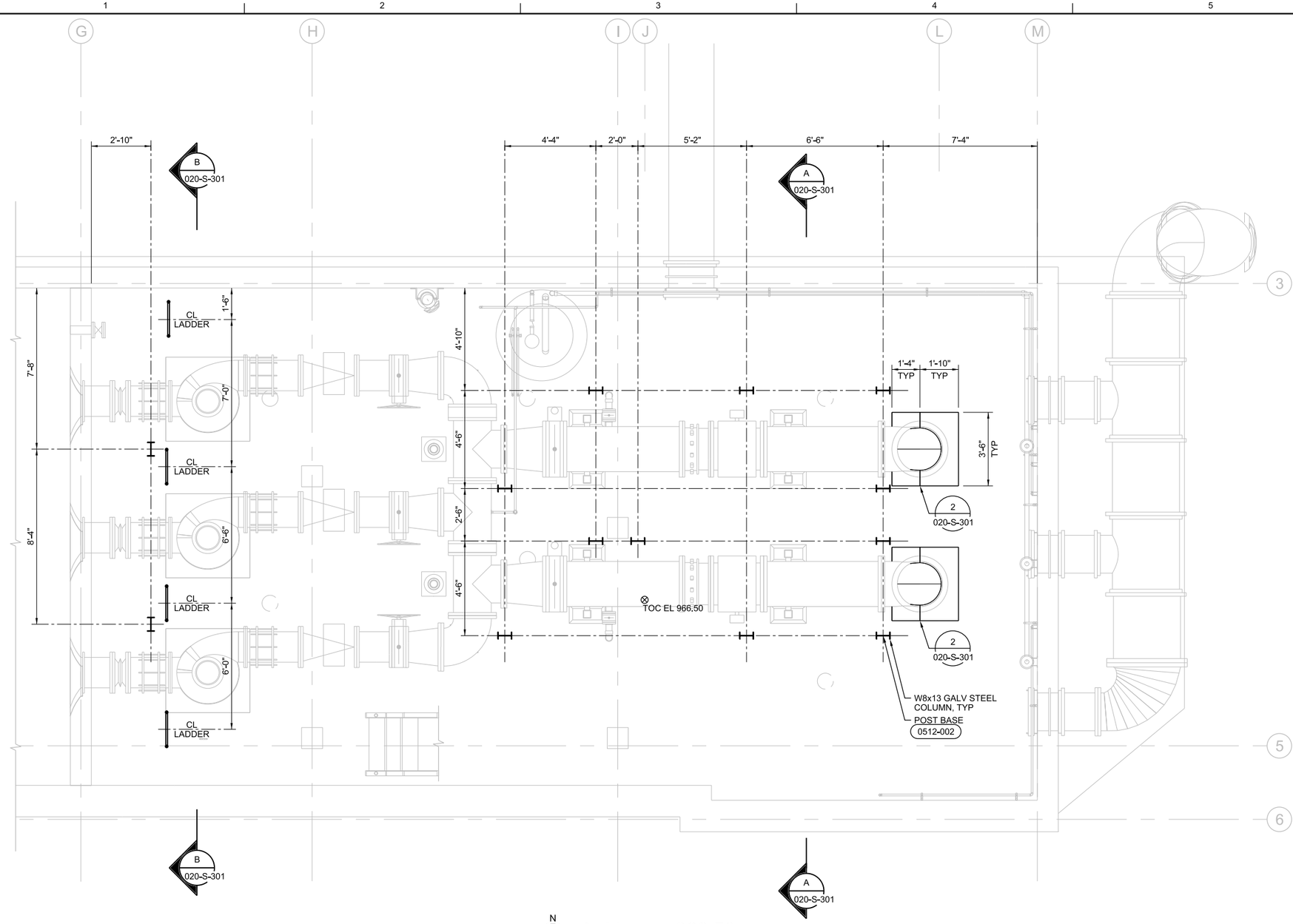
CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

DEMOLITION
SUB-BASEMENT AND BASEMENT PHOTOS

BID DOCUMENTS

NOT TO SCALE	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	
DATE	JANUARY 2019
PROJ	709084
DWG	020-X-502
SHEET	16 of 45

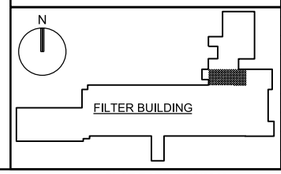


N

PLAN - EL 966.50

3/8"=1'-0"

KEY PLAN



NO.	DATE	DR	CHK	APVD	BY	REVISION
DSGN	DR LANGE	PA KARABAN	C ANSON	APVD	AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

STRUCTURAL

TRANSFER PUMP AND UV ROOM
PLAN - EL 966.50

	3/8"=1'-0"
	VERIFY SCALE
	BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
DATE	JANUARY 2019
PROJ	709084
DWG	020-S-210
SHEET	17 of 45

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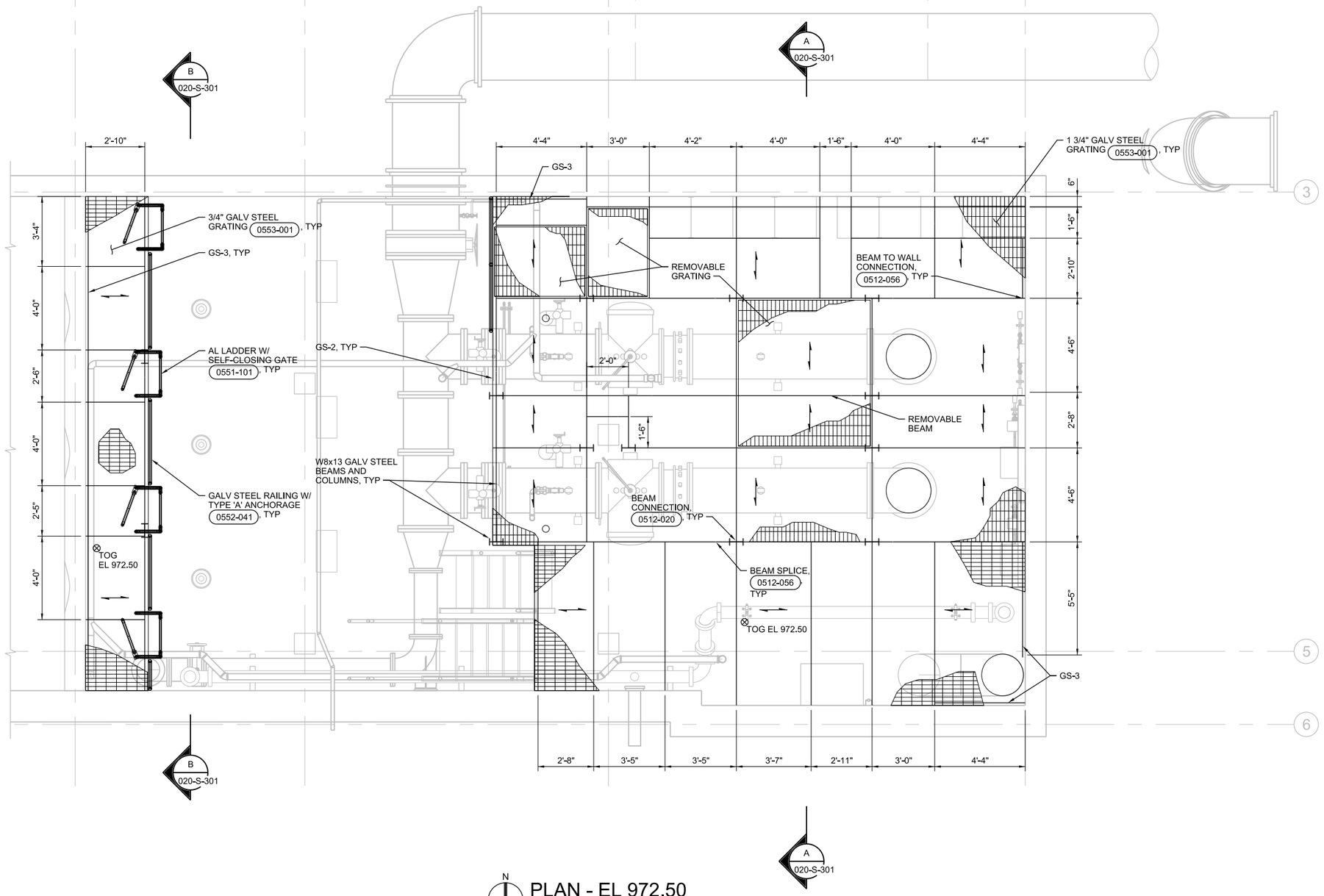


NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		DR LANGE	PA KARABAN	C ANSON	APVD	AG MYERS	

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

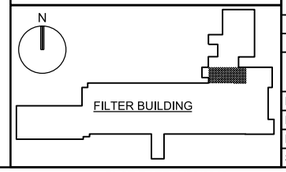
JACOBS

STRUCTURAL

TRANSFER PUMP AND UV ROOM PLAN - EL 972.50

BID DOCUMENTS

KEY PLAN



3/8"=1'-0"	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	
DATE	JANUARY 2019
PROJ	709084
DWG	020-S-211
SHEET	18 of 45

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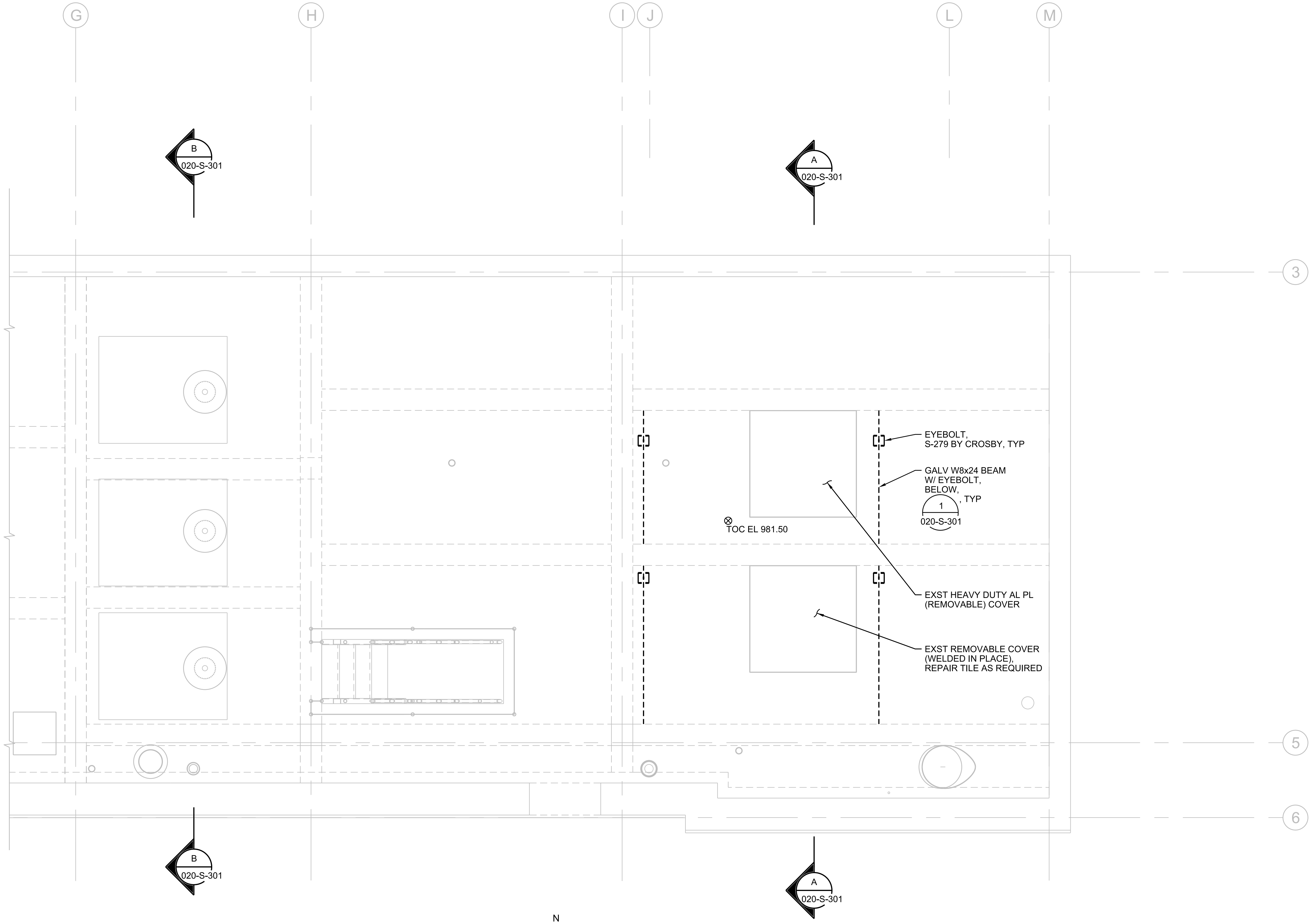
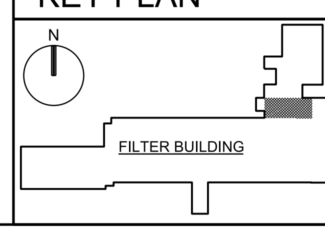
PLOT DATE: 1/29/2019
PLOT TIME: 11:37:25 AM



PLAN - EL 981.50

3/8"=1'-0"

KEY PLAN



JACOBS

STRUCTURAL
TRANSFER PUMP AND UV ROOM
PLAN - EL 981.50

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

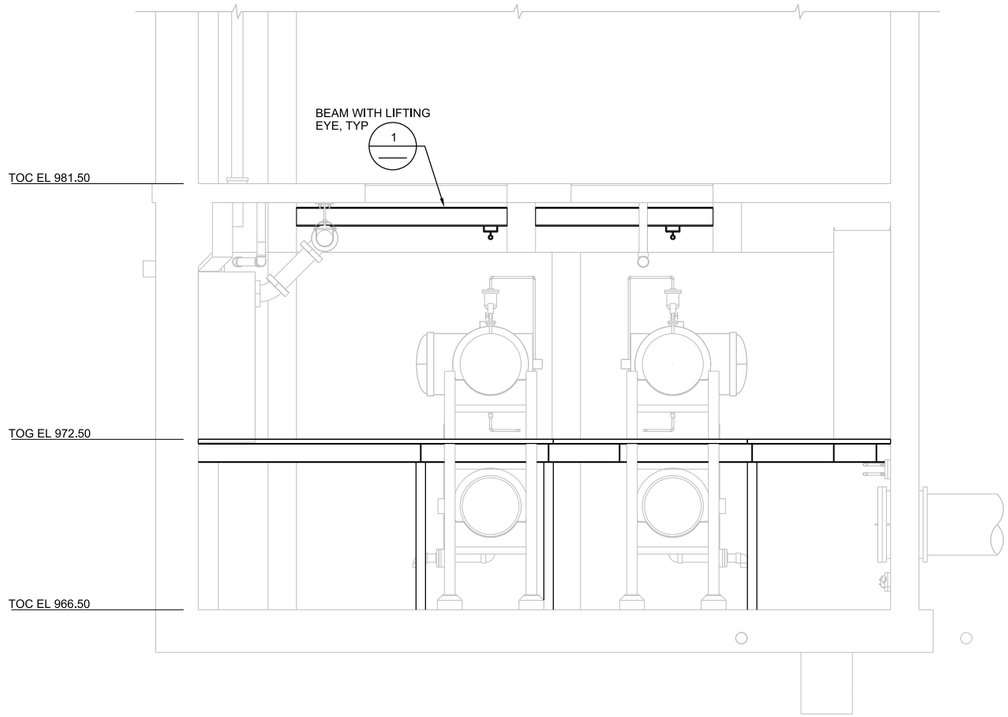
NO.	DATE	REVISION	BY	APVD

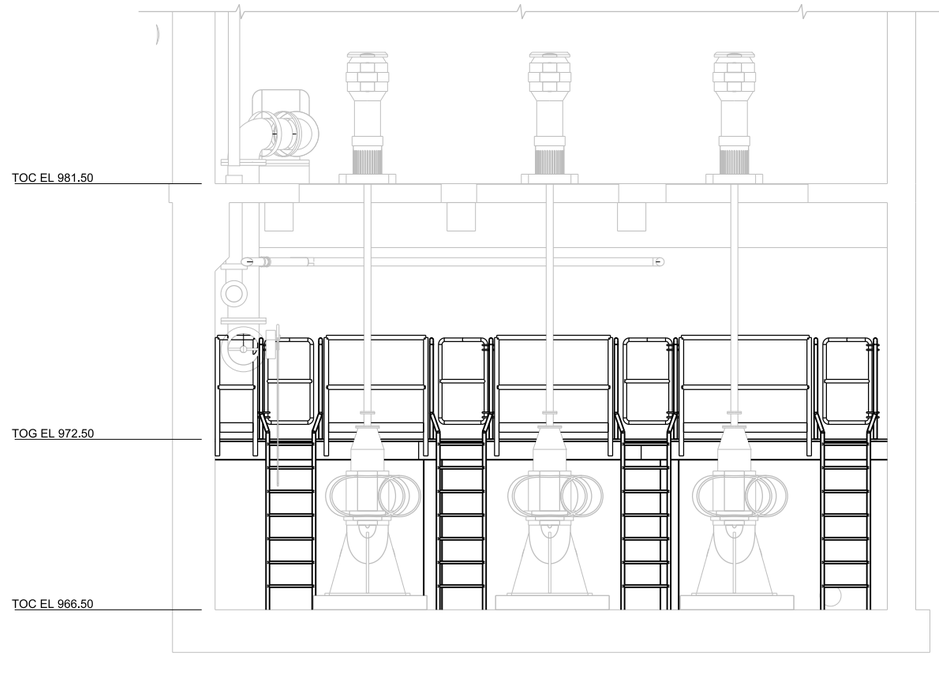
DSGN	DR	CHK	APVD
DR LANGE	PA KARABAN	C ANSON	AG MYERS

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-S-220
SHEET	19 of 45

BID DOCUMENTS



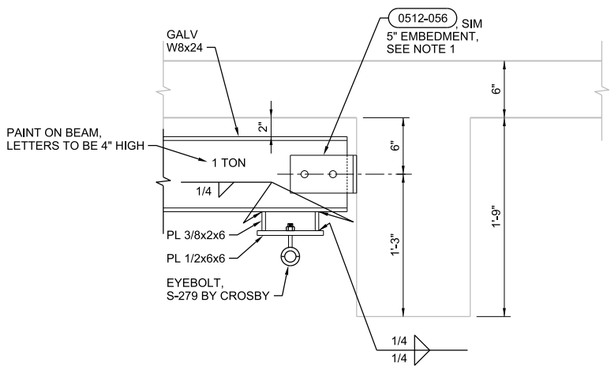


A SECTION
3/8"=1'-0"

020-S-210, 020-S-211
020-S-220

B SECTION
3/8"=1'-0"

020-S-210, 020-S-211
020-S-220

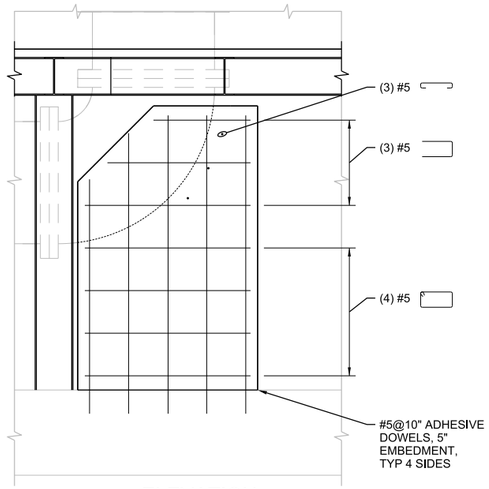


NOTES:

1. LOCATE BEAM REINFORCEMENT PRIOR TO DRILLING. DO NOT DRILL THROUGH BEAM REINFORCEMENT.
2. EYEBOLT SHALL BE LOCATED DIRECTLY OVER EQUIPMENT LIFTING POINT.
3. COORDINATE LOCATION OF BEAMS AND EYEBOLTS WITH OWNER.

1 DETAIL
1 1/2"=1'-0"

020-S-220



ELEVATION

2 DETAIL
3/4"=1'-0"

020-S-210

NO.	DATE	DR	CHK	APVD	BY	REVISION
DSGN	DR LANGE	PA KARABAN	C ANSON	APVD	AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

STRUCTURAL

TRANSFER PUMP AND UV ROOM SECTIONS AND DETAILS

BID DOCUMENTS

SCALE AS NOTED
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-S-3001
SHEET	20 of 45

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FILENAME: 020-S-3001_709084.dgn
PLOT DATE: 1/30/2019
PLOT TIME: 2:37:07 PM

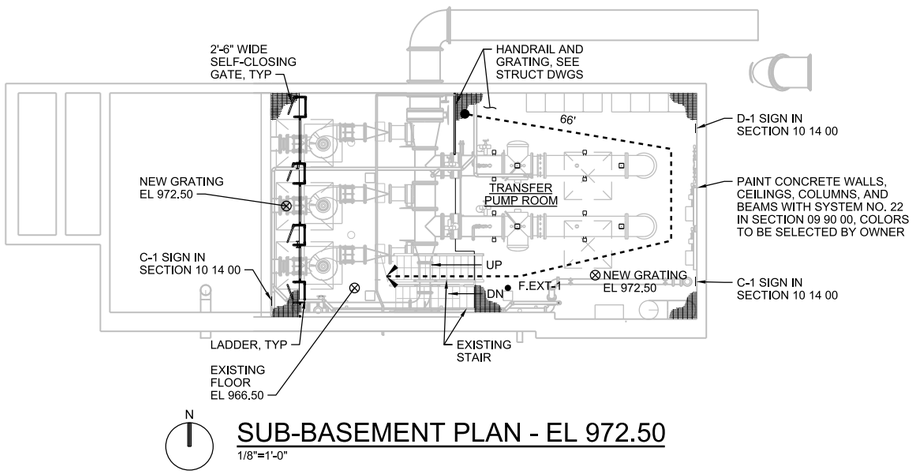
BUILDING CODE DATA

BUILDING NAME:	EXISTING FILTER BUILDING
BUILDING CODE:	2015 MICHIGAN BUILDING CODE (MBC) AND 2015 MICHIGAN REHABILITATION CODE
CLASSIFICATION OF WORK:	LEVEL 2 ALTERATION, NEW WORK INCLUDES ADDING NEW UV EQUIPMENT, PIPING AND EQUIPMENT PLATFORMS AND DOES NOT INCLUDE ANY WALLS OR DOORS
OCCUPANCY TYPE:	F-2
CONSTRUCTION CLASS:	1B FOR EXISTING STRUCTURE
PROJECT WORK AREA:	1,075 SF
FIRE PROTECTION SYSTEMS:	FIRE EXTINGUISHER ADDED TO SUB-BASEMENT. NO FIRE SUPPRESSION INCLUDED IN PROJECT. EXISTING SPRINKLER SYSTEM IN BOILER ROOM ONLY.

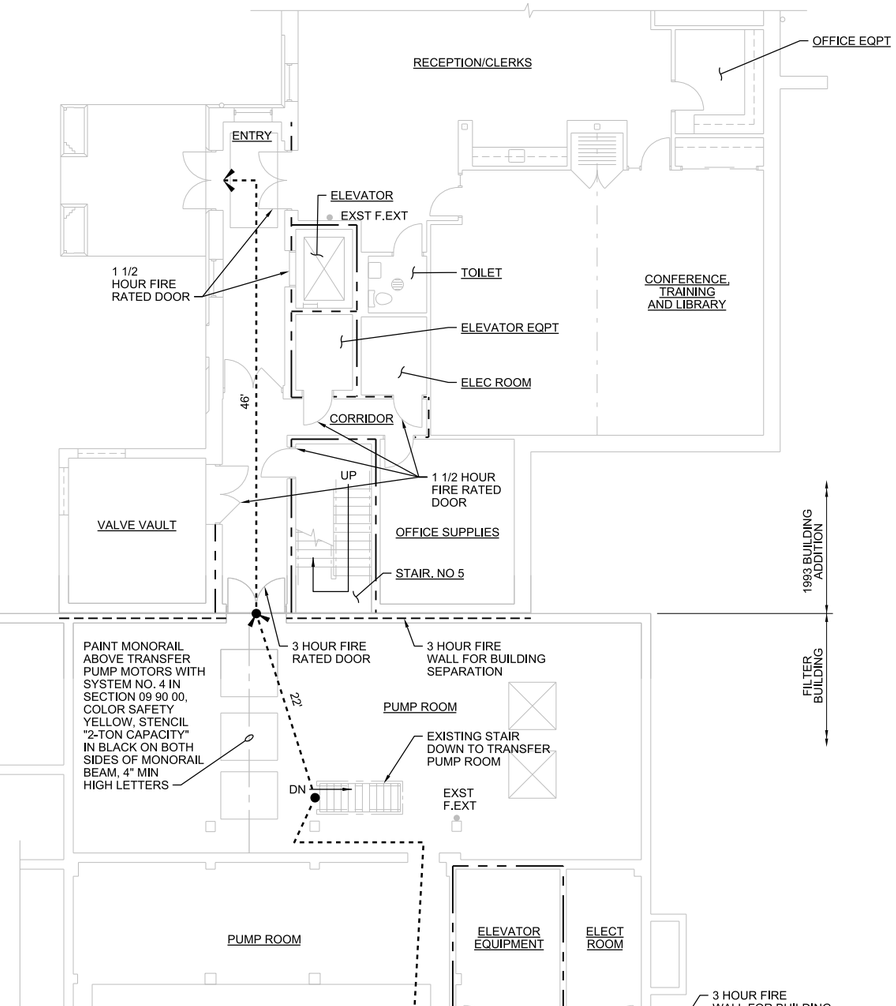
EGRESS:
THE 2015 MICHIGAN BUILDING CODE REQUIRES A 75-FOOT MAXIMUM COMMON PATH TRAVEL DISTANCE WHEN ONLY ONE EXIT IS PROVIDED. THE COMMON PATH TRAVEL DISTANCES FROM THE CORNER OF THE NEW UV REACTOR PLATFORM TO THE TOP OF THE STAIRS IS 66 FEET, WHICH IS UNDER THE 75-FOOT MAXIMUM DISTANCE WITH ONE EXIT ROUTE. AT THE TOP OF THE STAIRS FROM THE TRANSFER PUMP ROOM EGRESS, THERE ARE 2 EXITS IN THE EXISTING BUILDING. ONE EXIT IS TO THE NORTH THROUGH A CORRIDOR AND ENTRY TO THE OUTSIDE, AND THE OTHER EXIT IS TO THE SOUTH THROUGH ANOTHER PUMP ROOM THAT HAS SEVERAL EXIT ROUTES TO STAIRS UP TO THE GROUND FLOOR AND THEN OUTSIDE.

STAIRS AND LADDERS:
THE EXISTING STAIRS GOING DOWN TO THE EXISTING TRANSFER PUMP ROOM WILL NOT HAVE TO BE BROUGHT UP TO CURRENT CODE BECAUSE IT IS EXISTING AND NOT BEING MODIFIED. SELF-CLOSING GATES ARE REQUIRED ON THE NEW LADDERS GOING DOWN TO THE EXISTING TRANSFER PUMPS.

FIRE PROTECTION:
THE WORK ON THIS PROJECT WOULD BE CLASSIFIED AS LEVEL 2 ALTERATION WITH NO CHANGE IN OCCUPANCY ACCORDING TO THE 2015 MICHIGAN REHABILITATION CODE. THE CURRENT BUILDING CODE REQUIRED THE BASEMENT AND SUB-BASEMENT TO HAVE A SPRINKLER SYSTEM, BECAUSE IT IS A WINDOWLESS STORY. HOWEVER, THE WORK AREA IS UNDER 1,500 SQUARE FEET AND IS EXEMPTED FROM THIS REQUIREMENT PER MBC 903.2.11.1. FIRE AND SMOKE ALARMS ARE NOT PROVIDED AND ARE NOT REQUIRED DO TO THE LIMITED OCCUPANCY LOADS OF THE BASEMENT AND SUB-BASEMENT PER MBC 907.2.4.

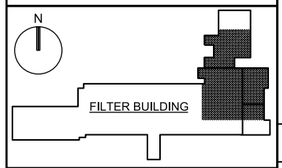


SUB-BASEMENT PLAN - EL 972.50
1/8"=1'-0"

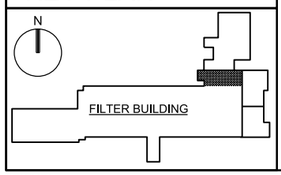


PARTIAL BASEMENT PLAN - EL 981.50
1/8"=1'-0"

BASEMENT KEY PLAN



SUB-BASEMENT KEY PLAN



LEGEND

- 1 HOUR RATED WALL
- 2 HOUR RATED WALL
- 3 HOUR RATED WALL
- X' — TRAVEL DISTANCE (X = TOTAL DISTANCE TO EXIT IN FEET)
- F.EXT — FIRE EXTINGUISHER, SEE PLANS

NO.	DATE	REVISION	BY	APVD
DSGN	RG SIEBERS	DR DL MICHALEK	CHK B TRAUTWEIN	APVD AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ARCHITECTURAL

TRANSFER PUMP AND UV ROOM PLANS

1/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-A-201
SHEET	21 of 45

BID DOCUMENTS

$PWPATH
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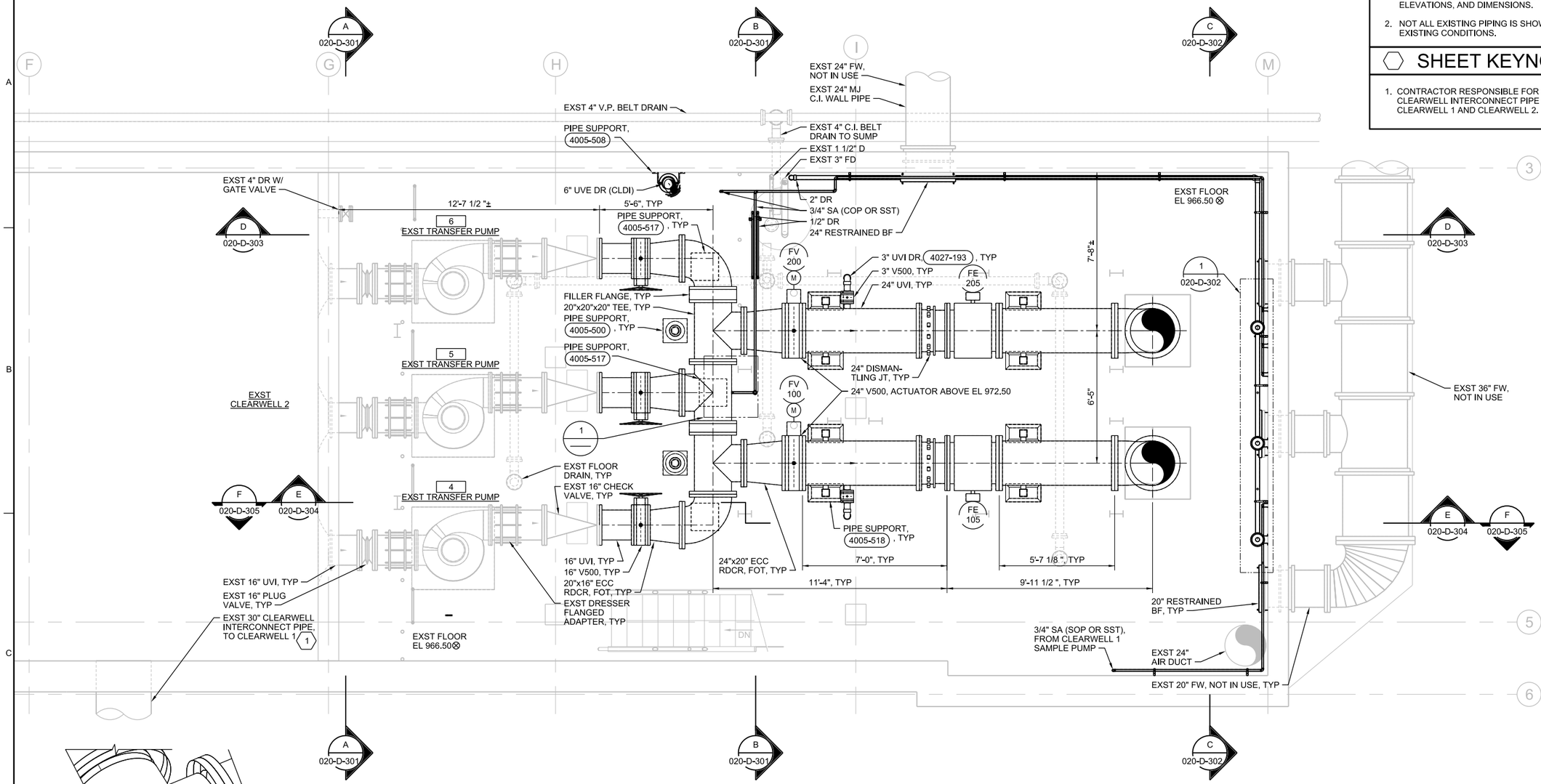
FILENAME: 020-A-2010_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:35:17 AM

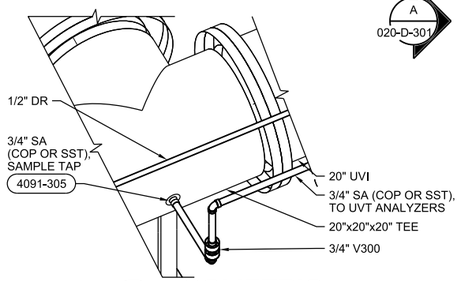
GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTE

1. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2.

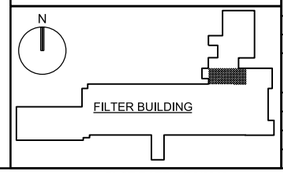




1 ISOMETRIC
NTS

N
PLAN - EL 966.50
3/8"=1'-0"

KEY PLAN



NO.	DATE	DSGN	REVISION	BY	APVD
		TJ ELLIOTT	CJ DAHL	CHK	LM MOHR
		DR		APVD	AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
PLAN - EL 966.50 AND ISOMETRIC

BID DOCUMENTS

SCALE AS NOTED	
VERIFY SCALE	
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"	
DATE	JANUARY 2019
PROJ	709084
DWG	020-D-210
SHEET	22 of 45

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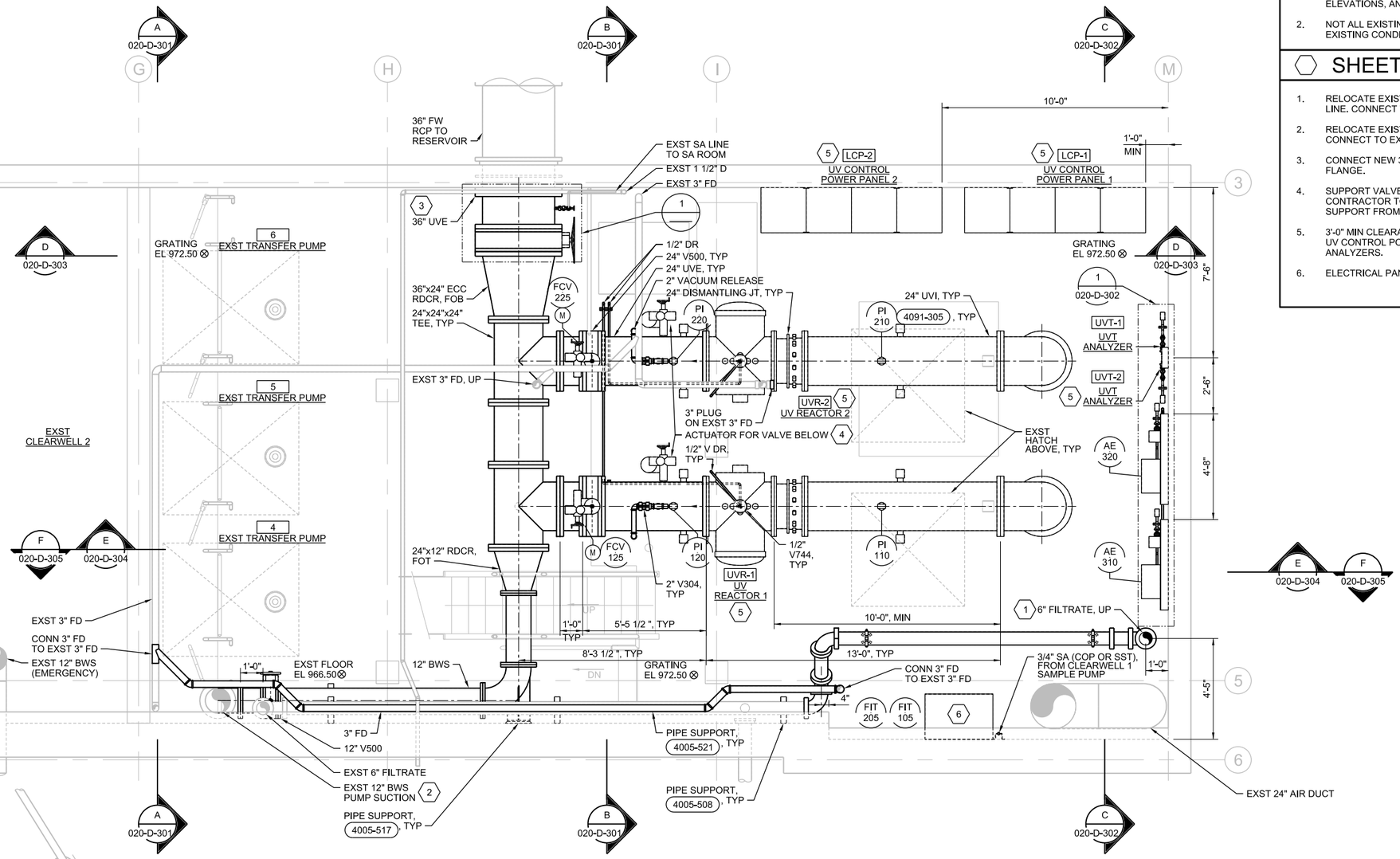
FILENAME: 020-D-2010_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:36:59 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

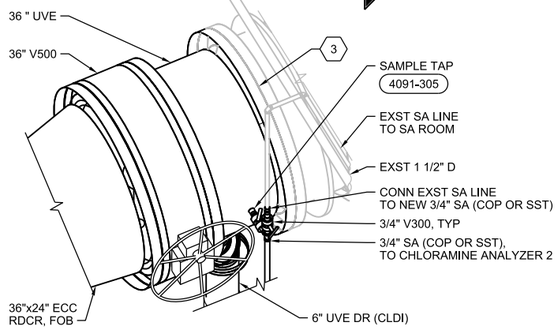
1. RELOCATE EXISTING 6" GROOVED END FILTRATE LINE. CONNECT TO EXISTING VICTAULIC JOINTS.
2. RELOCATE EXISTING 12" CLDI FILTRATE PIPE. CONNECT TO EXISTING FLANGES.
3. CONNECT NEW 36" UVE TO EXISTING WALL PIPE FLANGE.
4. SUPPORT VALVE ACTUATOR FROM PIPE SUPPORT. CONTRACTOR TO ADD ADDITIONAL LATERAL SUPPORT FROM GRATING OR PIPE.
5. 3'-0" MIN CLEARANCE IN FRONT OF UV REACTORS, UV CONTROL POWER PANELS, AND UVT ANALYZERS.
6. ELECTRICAL PANEL, SEE ELECTRICAL DRAWINGS.



N

PLAN - EL 972.50

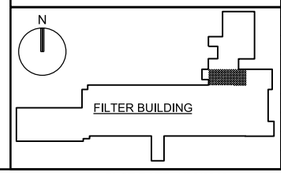
3/8"=1'-0"



1 ISOMETRIC

NTS

KEY PLAN



NO.	DATE	DSGN	REVISION	CHK	APVD	BY	APVD
		TJ ELLIOTT	DR	CJ DAHL	LM MOHR		AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
PLAN - EL 972.50 AND ISOMETRIC

SCALE AS NOTED
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-211
SHEET	23 of 45

BID DOCUMENTS

$PWPATH

$PWURL

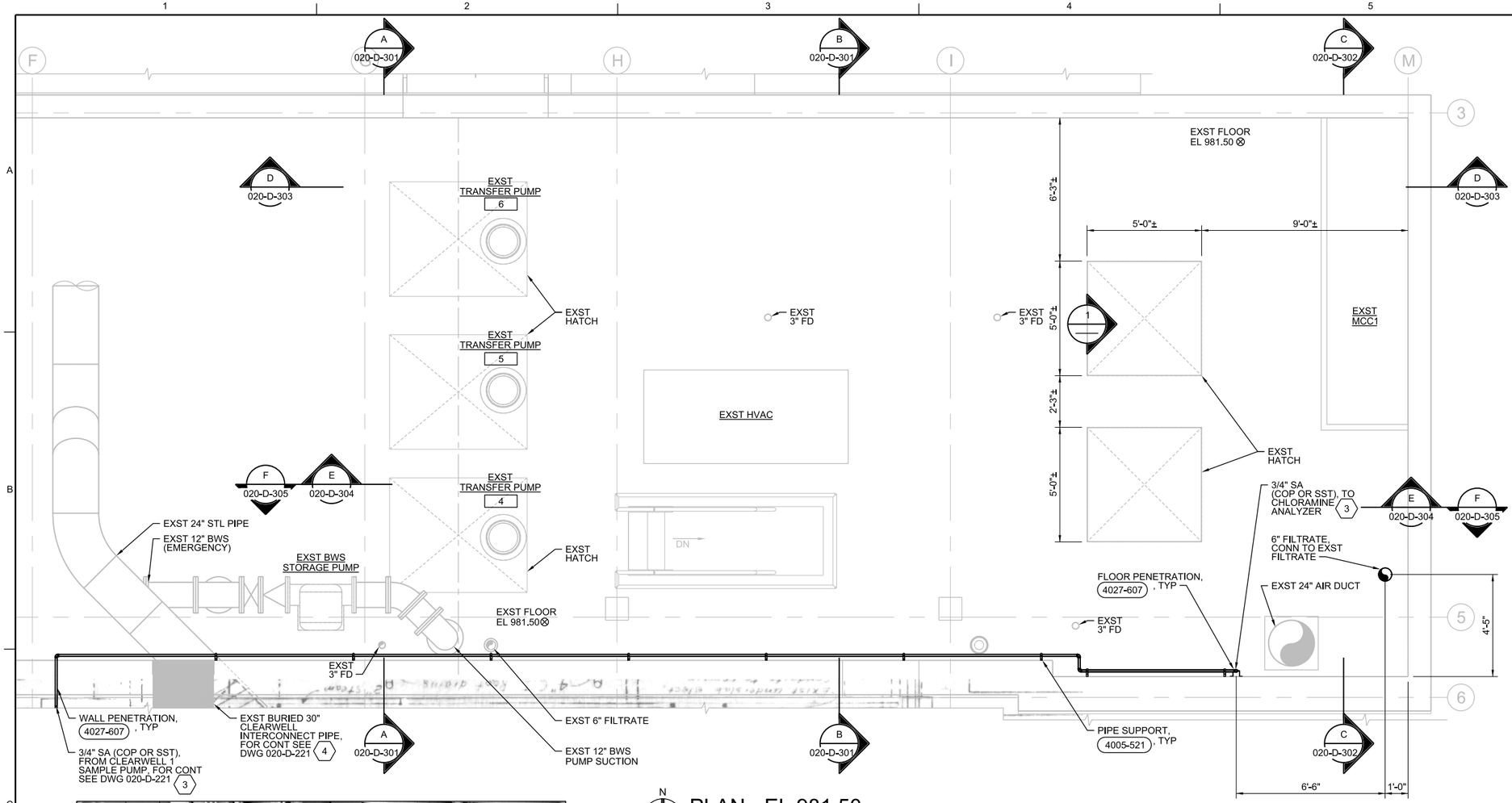
FILENAME: 020-D-2011_709084.dgn PLOT DATE: 1/29/2019 PLOT TIME: 11:34:59 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

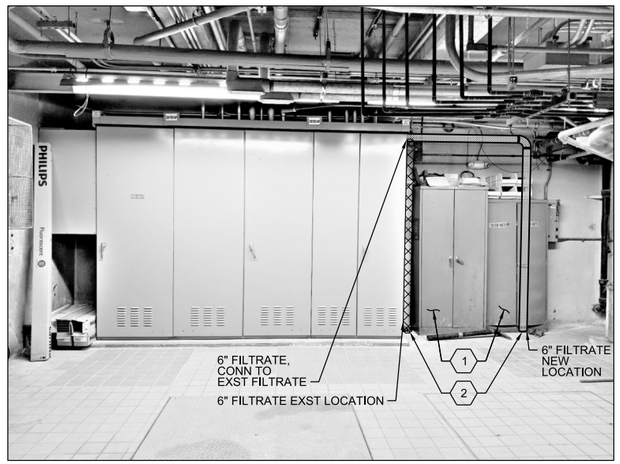
1. CONTRACTOR TO COORDINATE WITH OWNER TO RELOCATE EXISTING STORAGE CABINETS, AS NECESSARY.
2. 6" FILTRATE TO BE RELOCATED. CONTRACTOR TO REUSE EXISTING PIPING IF POSSIBLE.
3. CONTRACTOR TO INSPECT SAMPLE PIPE ROUTE TO AVOID CONFLICTS WITH EXISTING ITEMS. INSTALL ONE 3/4" V300 AND V744 AT HIGH POINT.
4. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2.



N

PLAN - EL 981.50

3/8"=1'-0"

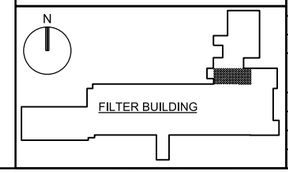


1 PHOTO

NTS

020-X-301, 020-X-302
020-D-302, 020-D-305
A20-D-302

KEY PLAN



NO.	DATE	DSGN	REVISION	DR	CHK	APVD	BY	APVD
		TJ ELLIOTT		CJ DAHL	LM MOHR		AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP MOTOR ROOM
PLAN - EL 981.50 AND PHOTO

BID DOCUMENTS

	3/8"=1'-0"
	VERIFY SCALE
	BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
DATE	JANUARY 2019
PROJ	709084
DWG	020-D-220
SHEET	24 of 45

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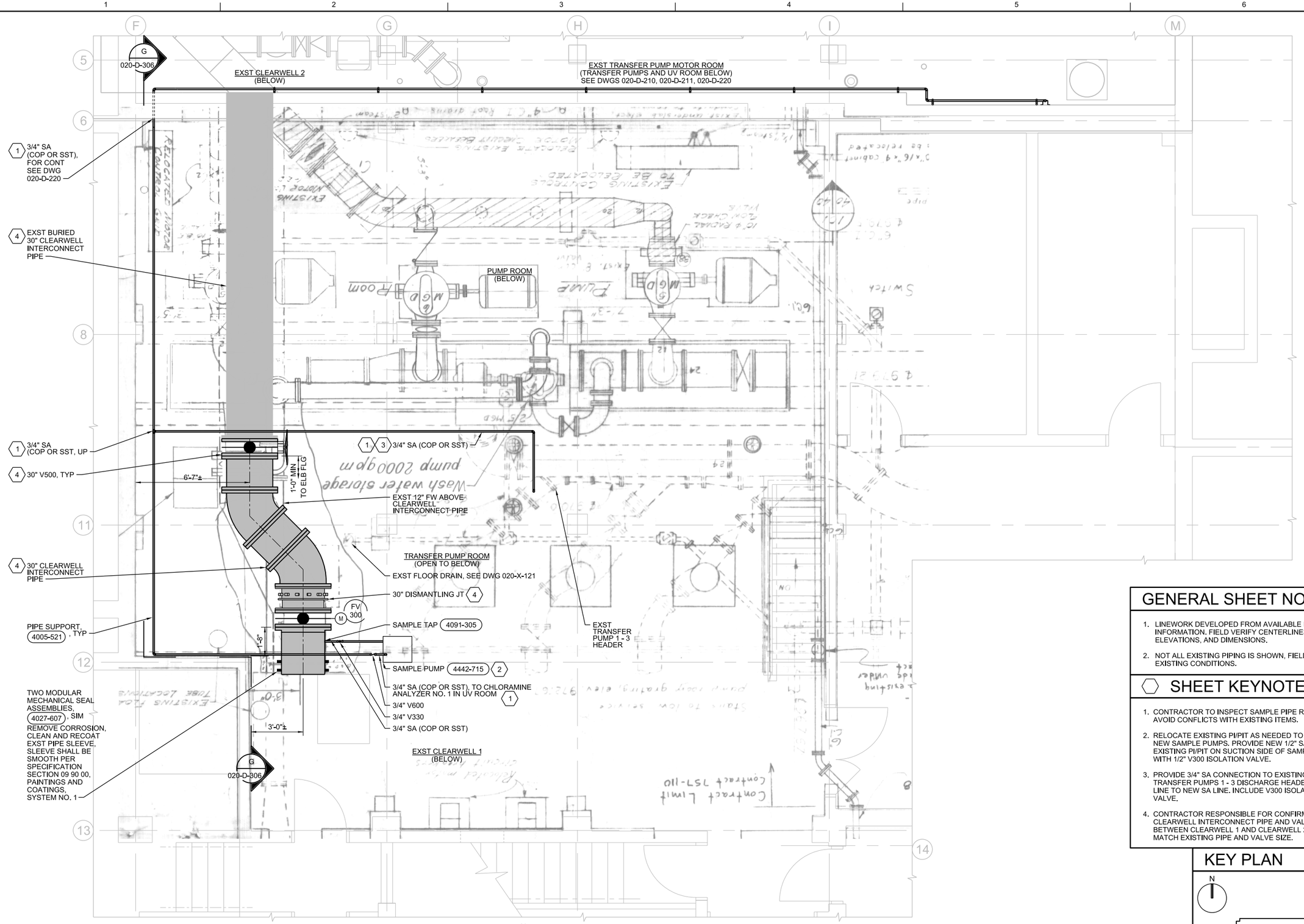
PLOT DATE: 1/29/2019

PLOT TIME: 11:35:39 AM



N

PLAN - EL 967.50 AND EL 981.50

3/8"=1'-0"

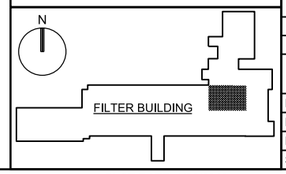
GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN, FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

1. CONTRACTOR TO INSPECT SAMPLE PIPE ROUTE TO AVOID CONFLICTS WITH EXISTING ITEMS.
2. RELOCATE EXISTING PI/PIT AS NEEDED TO INSTALL NEW SAMPLE PUMPS. PROVIDE NEW 1/2" SA LINE TO EXISTING PI/PIT ON SUCTION SIDE OF SAMPLE PUMP WITH 1/2" V300 ISOLATION VALVE.
3. PROVIDE 3/4" SA CONNECTION TO EXISTING TRANSFER PUMPS 1 - 3 DISCHARGE HEADER SAMPLE LINE TO NEW SA LINE. INCLUDE V300 ISOLATION VALVE.
4. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE AND VALVE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2, AND MATCH EXISTING PIPE AND VALVE SIZE.

KEY PLAN



NO.	DATE	DSGN	DR	CHK	BY	APVD
		TJ ELLIOTT	CJ DAHL	LM MOHR	AG MYERS	APVD

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

SUB-BASEMENT AND BASEMENT
PLAN - EL 967.50 AND EL 981.50

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-221
SHEET	25 of 45

BID DOCUMENTS

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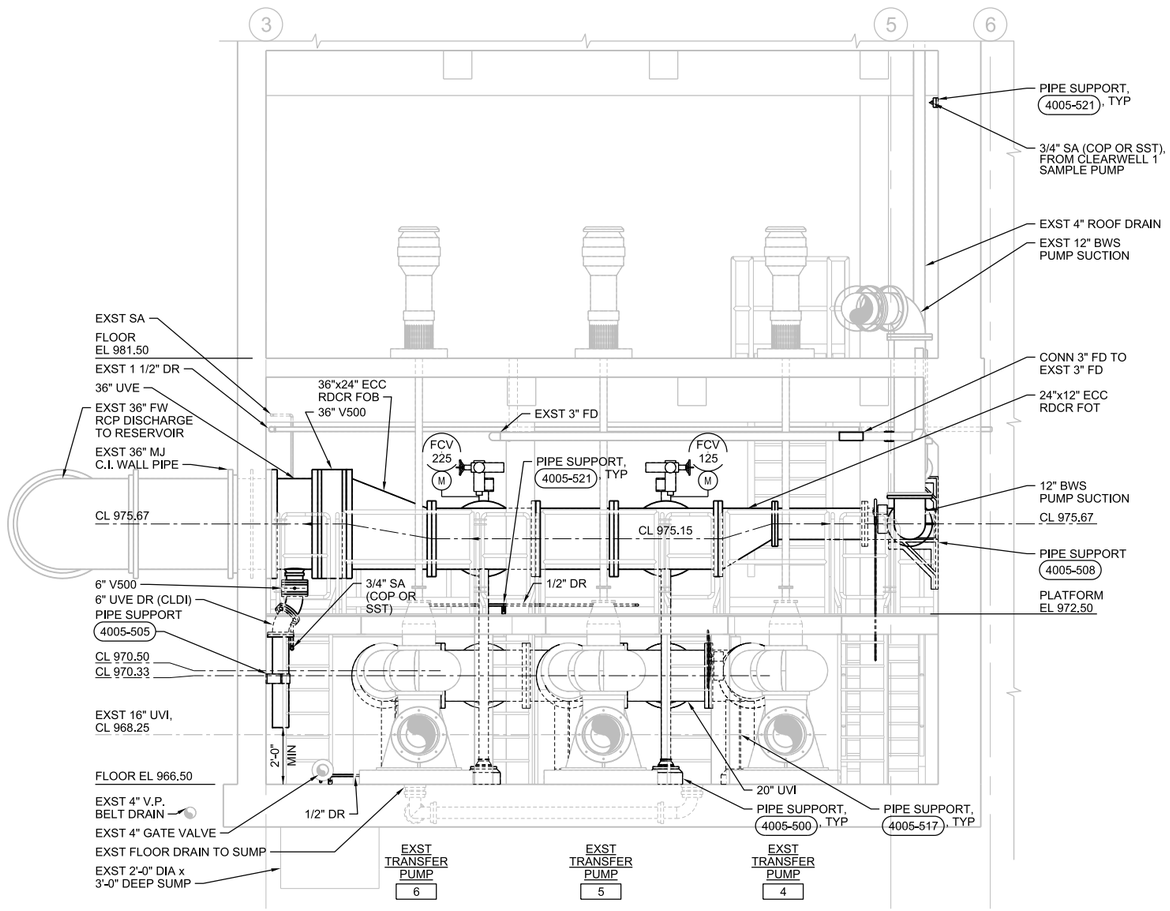
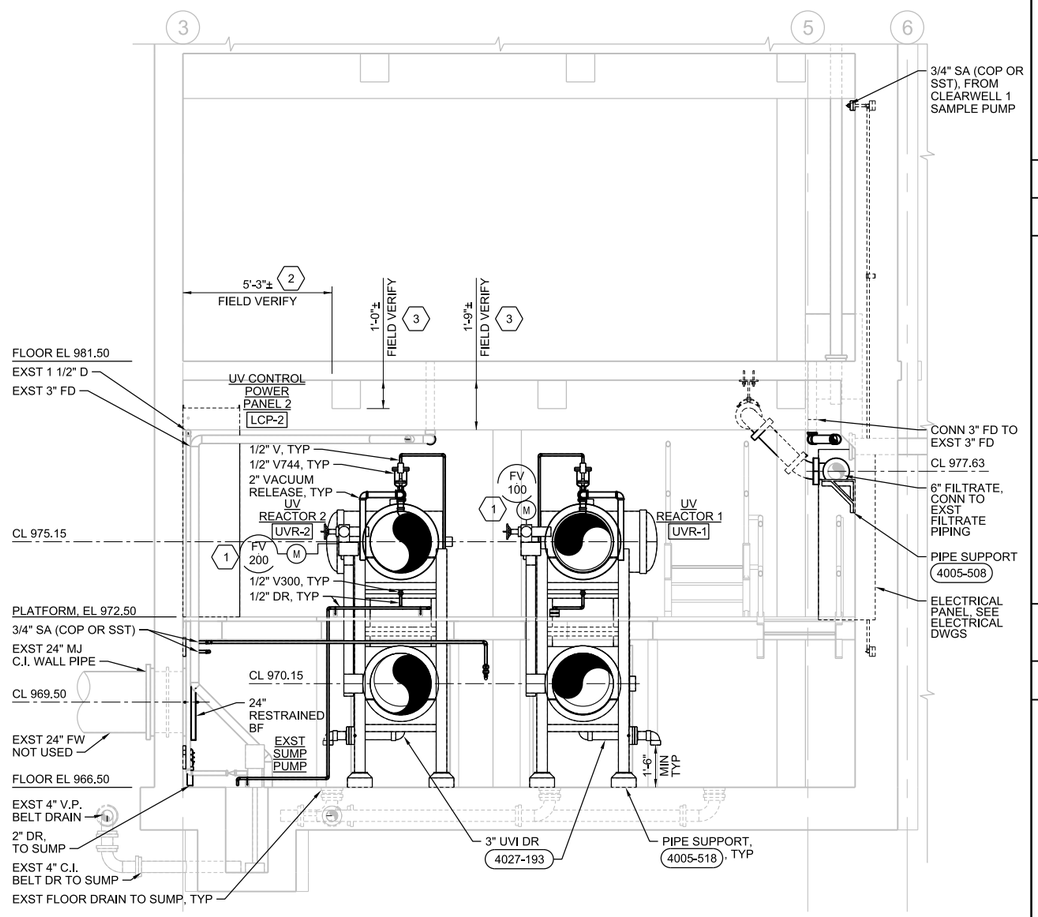
PLOT DATE: 1/29/2019
PLOT TIME: 11:34:48 AM



A SECTION
3/8"=1'-0"
020-D-210, 020-D-211, 020-D-220, A20-D-210, A20-D-211



B SECTION
3/8"=1'-0"
020-D-210, 020-D-211, 020-D-220, A20-D-210, A20-D-211

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

1. SUPPORT VALVE ACTUATOR FROM PIPE SUPPORT. CONTRACTOR TO ADD ADDITIONAL LATERAL SUPPORT FROM GRATING OR PIPE.
2. CONTRACTOR TO FIELD VERIFY DISTANCE BETWEEN WALL AND EDGE OF BEAMS.
3. CONTRACTOR TO FIELD VERIFY DEPTH OF BEAMS.

NO.	DATE	DSGN	DR	CHK	APVD	BY	REVISION
		TJ ELLIOTT	CJ DAHL	LM MOHR	APVD	AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM SECTIONS

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-3001
SHEET	26 of 45

BID DOCUMENTS

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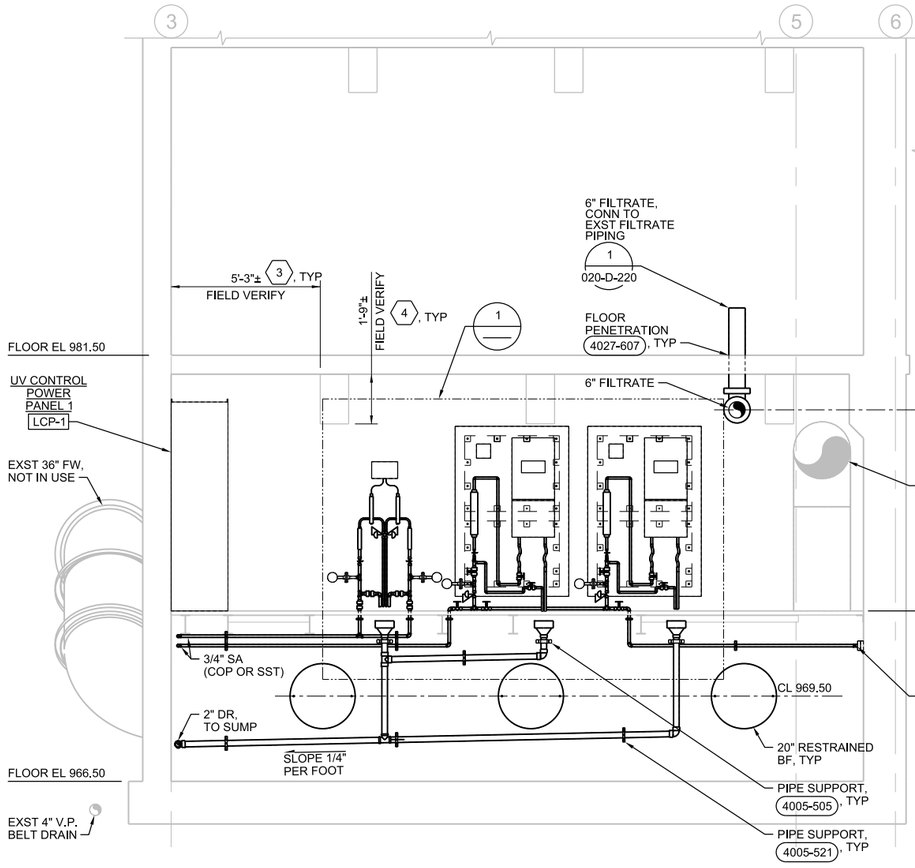
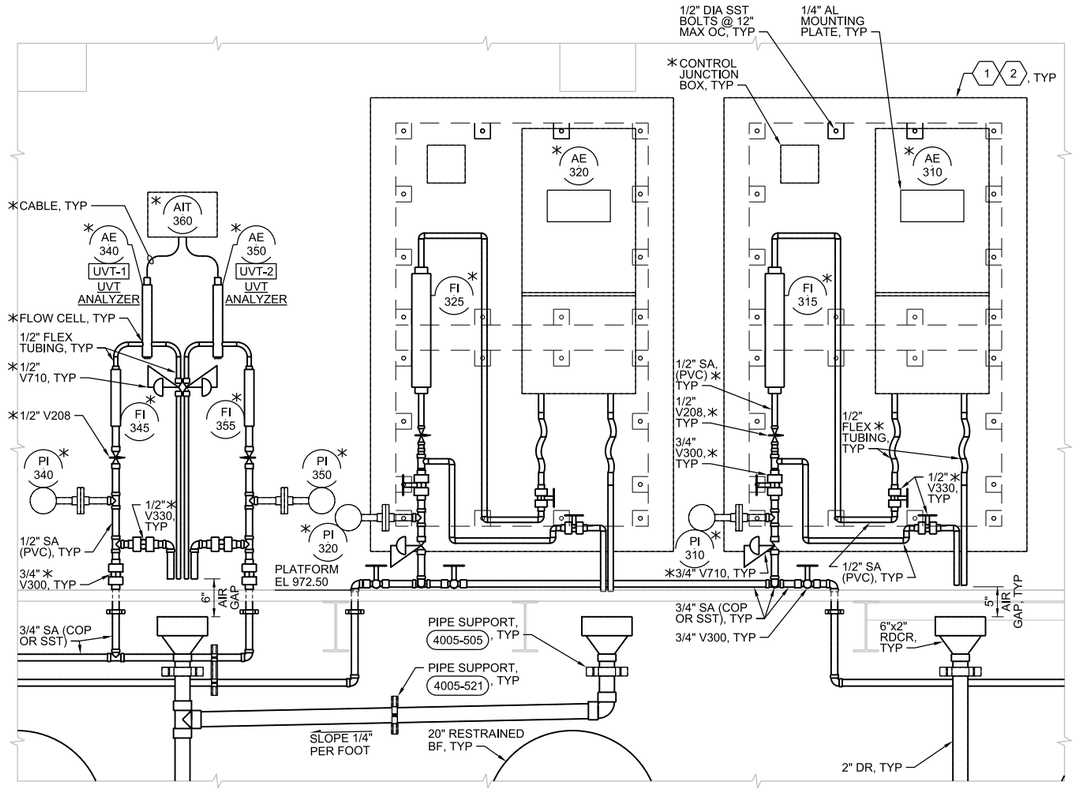
FILENAME: 020-D-3001_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:38:47 AM



C SECTION
3/8"=1'-0"
020-D-210, 020-D-211, 020-D-220



1 DETAIL
1"=1'-0"
020-D-210, 020-D-211,
020-D-304, 020-D-305, A20-D-210, A20-D-211, 020-D-303

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

1. WATER QUALITY ANALYZER SUPPLIER SHALL PROVIDE ALL NECESSARY VALVES, FLOWMETERS, AND INSTRUMENTS FOR A COMPLETE AND OPERATIONAL SYSTEM.
2. CONTRACTOR SHALL PROVIDE WALL MOUNTED WATER QUALITY ANALYZER SUPPORT PANEL USING STEEL UNISTRUT (OR EQUAL) CHANNEL SUPPORTS AND FRP BACKER BOARD. SIZE AS NEEDED TO ACCOMMODATE WATER QUALITY ANALYZER SYSTEM.
3. CONTRACTOR TO FIELD VERIFY DISTANCE BETWEEN WALL AND EDGE OF BEAMS.
4. CONTRACTOR TO FIELD VERIFY DEPTH OF BEAMS.

NO.	DATE	DSGN	DR	CHK	APVD
		TJ ELLIOTT	CJ DAHL	LM MOHR	AG MYERS

REVISION BY APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM SECTION AND DETAIL

SCALE AS NOTED
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-302
SHEET	27 of 45

BID DOCUMENTS

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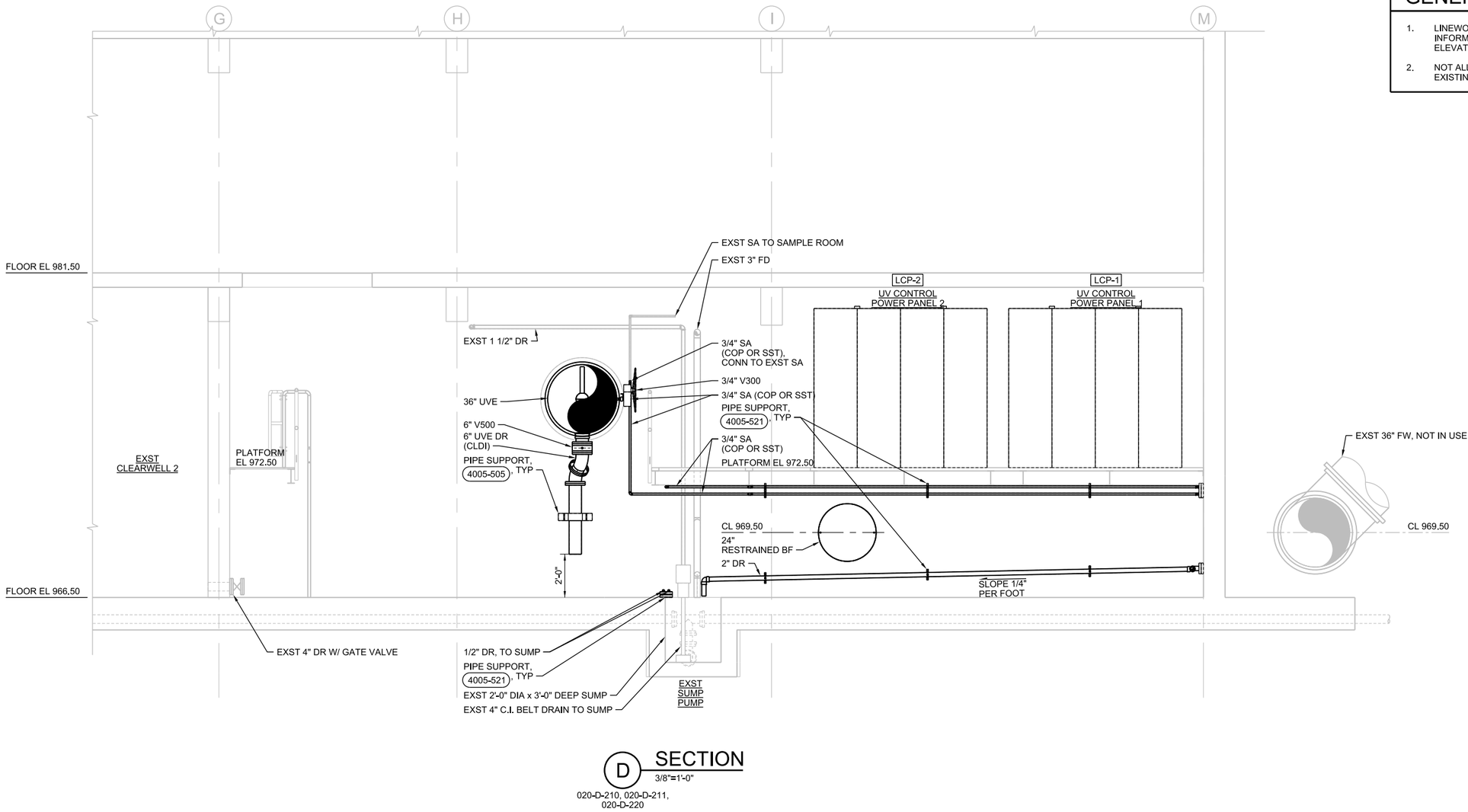
FILENAME: 020-D-3002_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:34:41 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.



D SECTION
3/8"=1'-0"
020-D-210, 020-D-211, 020-D-220

NO.	DATE	DSGN	DR	REVISION	CHK	APVD	BY	APVD
		TJ ELLIOTT	CJ DAHL		LM MOHR		AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM SECTION

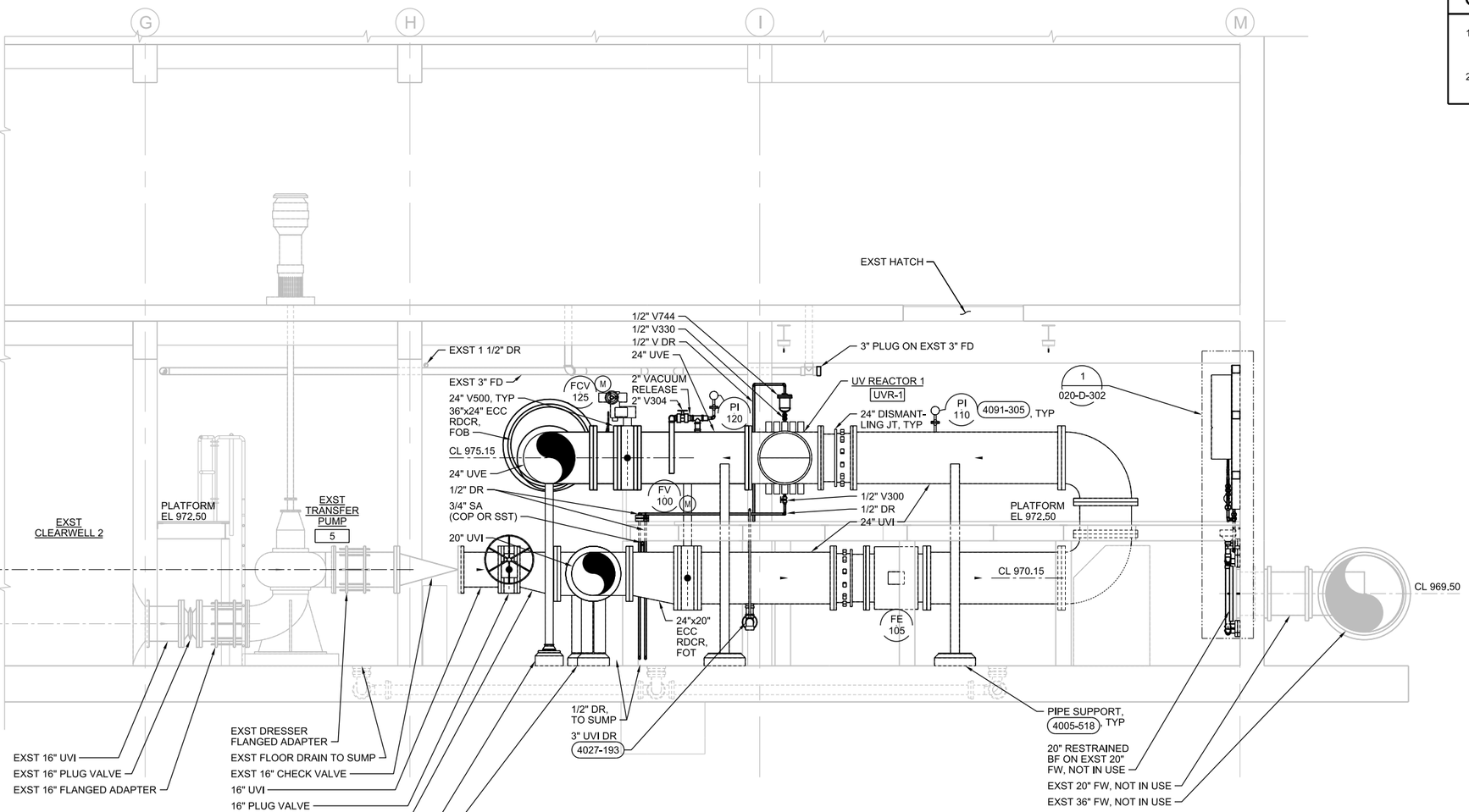
3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-303
SHEET	28 of 45

BID DOCUMENTS

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.



E SECTION
3/8"=1'-0"
020-D-210, 020-D-211, 020-D-220

NO.	DATE	DSGN
		DR
		CJ DAHL
		CHK
		LM MOHR
		APVD
		BY
		AG MYERS
		APVD

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM SECTION

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-304
SHEET	29 of 45

BID DOCUMENTS

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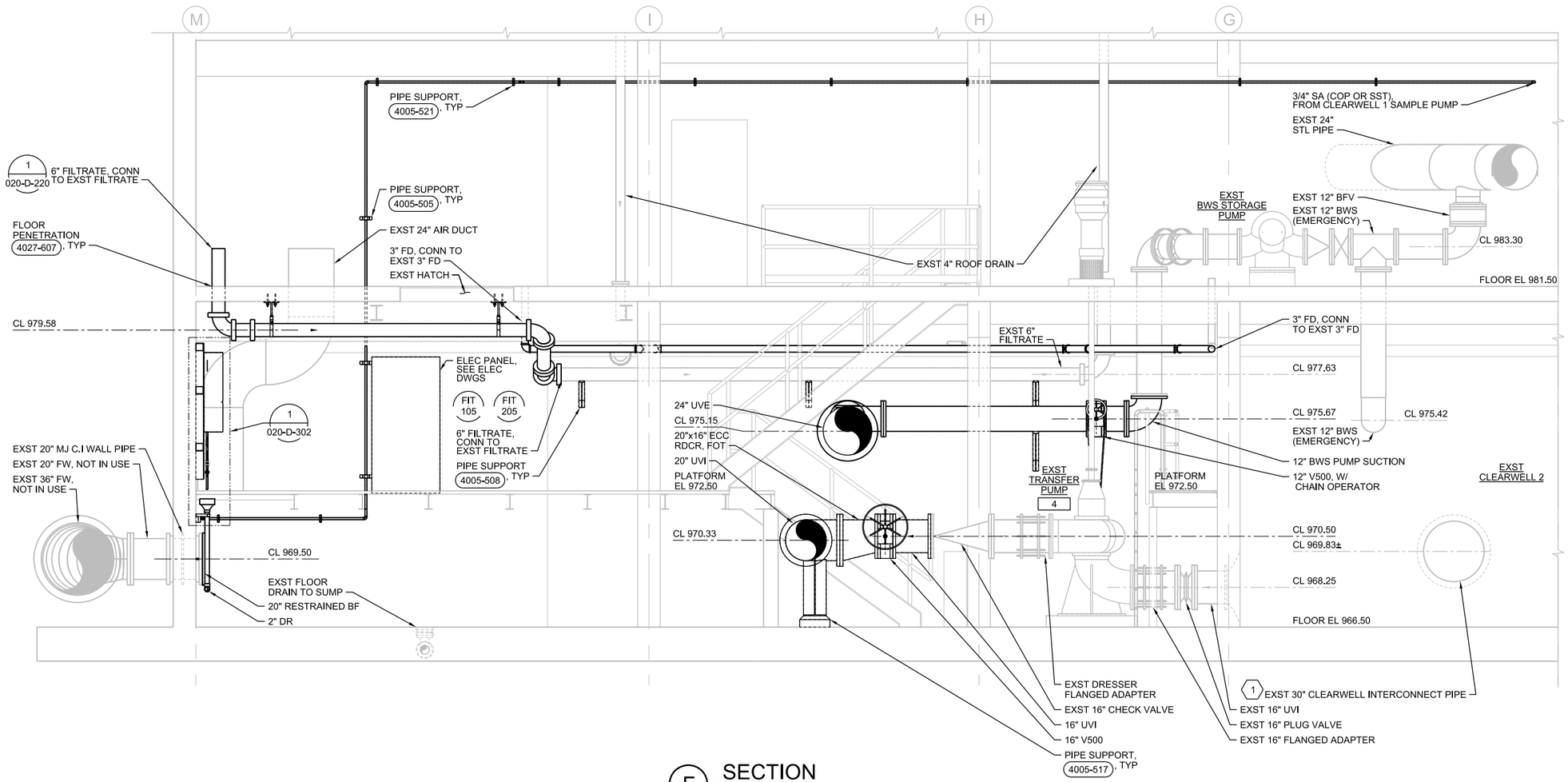
FILENAME: 020-D-3004_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:37:15 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTE

1. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2.



F SECTION
3/8"=1'-0"

020-D-210, 020-D-211, 020-D-220, A20-D-210, A20-D-211

NO.	DATE	DSGN
DR	TJ ELLIOTT	
CHK	CJ DAHL	
APVD	LM MOHR	
BY	APVD	AG MYERS

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

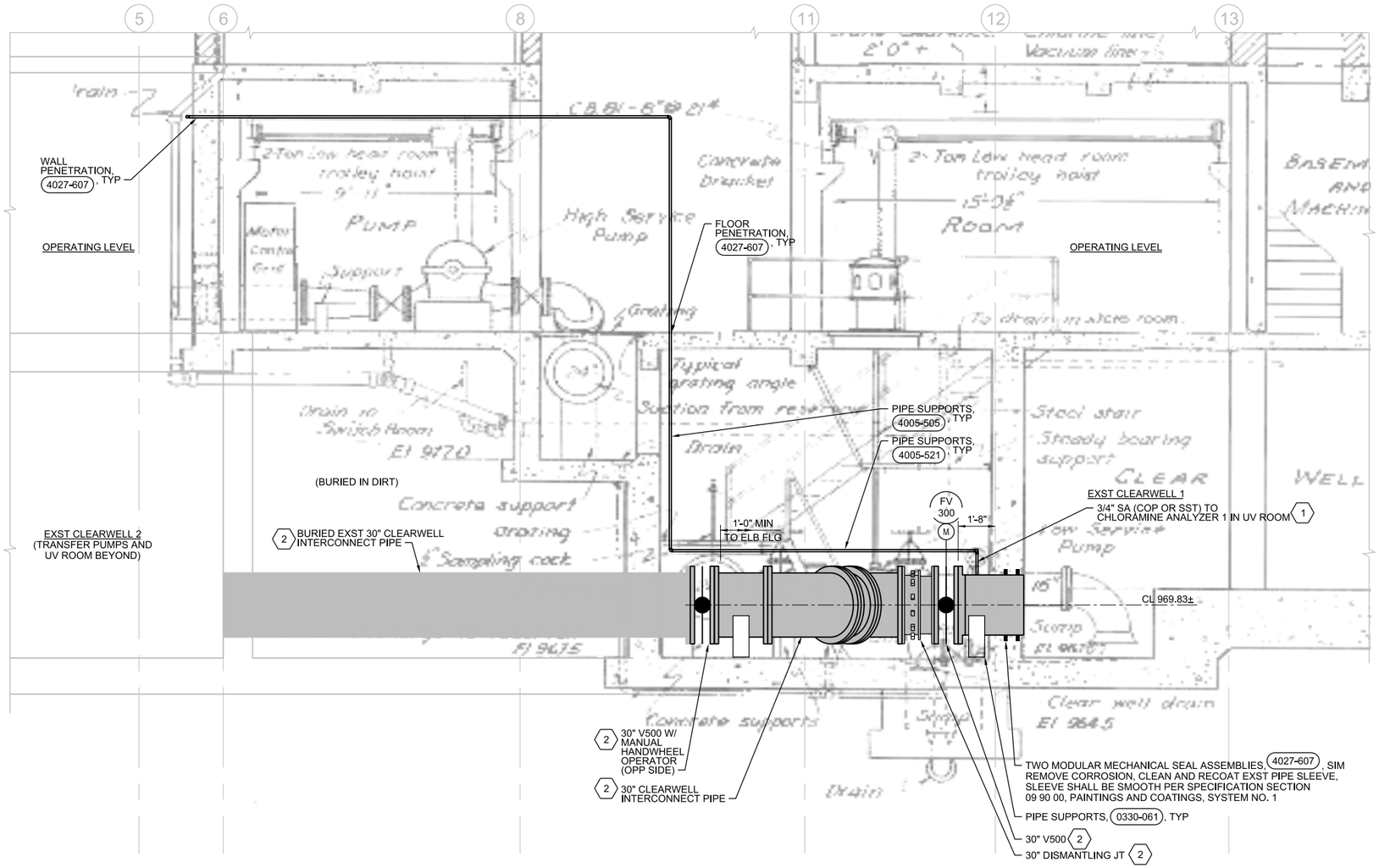
PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM SECTION

BID DOCUMENTS

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-305
SHEET	30 of 45



G SECTION
3/8"=1'-0"
020-D-221

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN, FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

1. CONTRACTOR TO INSPECT SAMPLE PIPE ROUTE TO AVOID CONFLICTS WITH EXISTING ITEMS.
2. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE AND VALVE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2, AND MATCH EXISTING PIPE AND VALVE SIZE.

NO.	DATE	DSGN	DR	CHK	APVD	BY
		TJ ELLIOTT	CJ DAHL	LM MOHR	APVD	AG MYERS

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

SUB-BASEMENT AND BASEMENT SECTION

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-D-306
SHEET	31 of 45

BID DOCUMENTS

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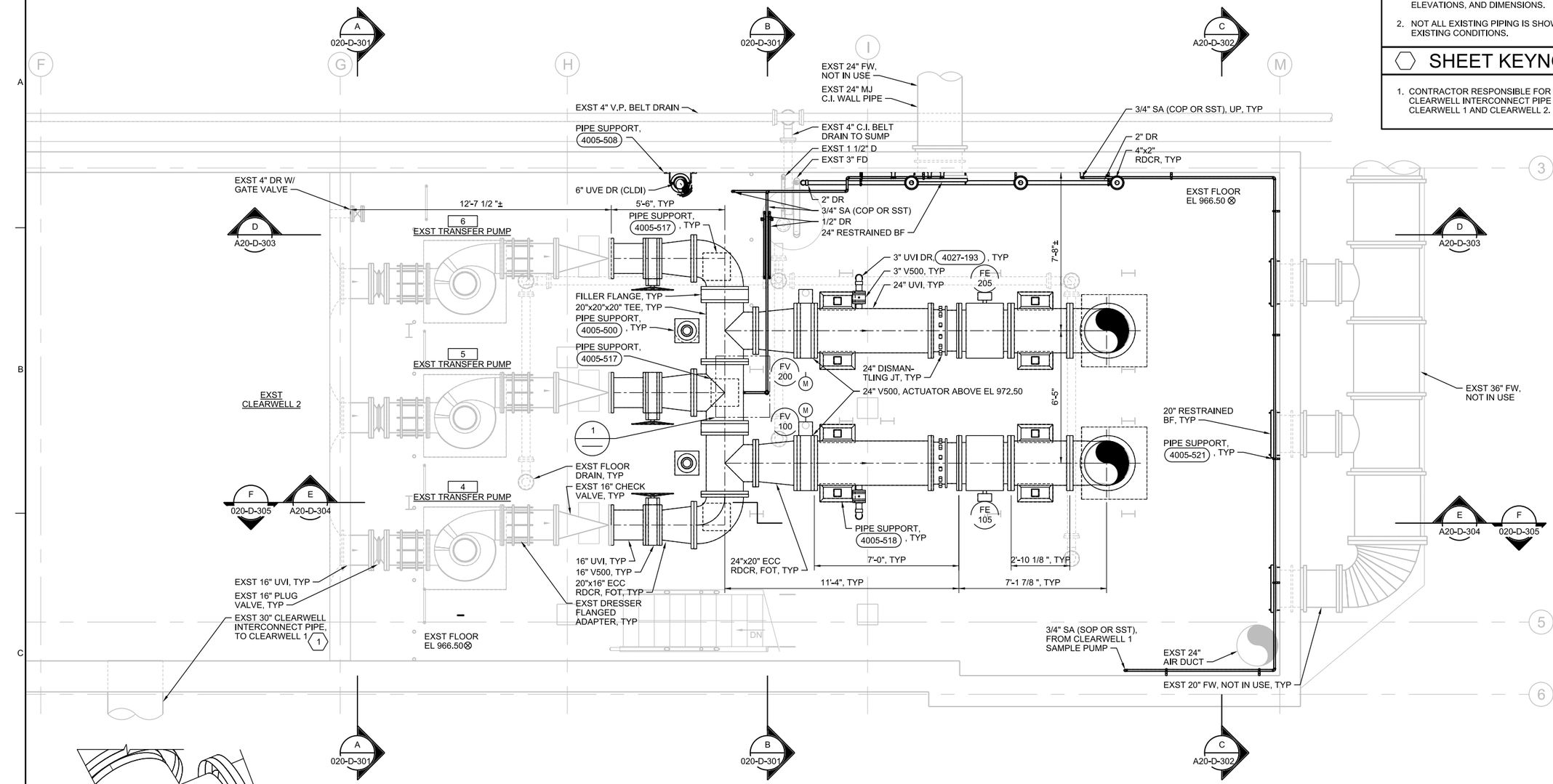
PLOT DATE: 1/29/2019
PLOT TIME: 11:35:27 AM

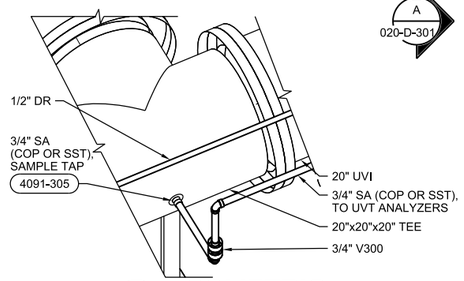
GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTE

1. CONTRACTOR RESPONSIBLE FOR CONFIRMING CLEARWELL INTERCONNECT PIPE SIZE BETWEEN CLEARWELL 1 AND CLEARWELL 2.



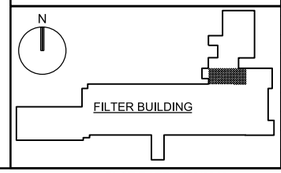


1 ISOMETRIC
NTS

N
PLAN - EL 966.50
3/8"=1'-0"

FOR ATLERNATE BID NO. 1 ONLY:
CALGON CARBON CORPORATION, INC.
SEE GENERAL ABBREVIATIONS (CONTINUED) AND DESIGNATIONS LEGEND DWG GENERAL NOTES

KEY PLAN



NO.	DATE	DSGN
		TJ ELLIOTT

REVISION | DR: CJ DAHL | CHK: LM MOHR | APVD: AG MYERS | BY | APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
ALTERNATE BID
PLAN - EL 966.50 AND ISOMETRIC

ALTERNATE BID DOCUMENT

SCALE AS NOTED
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	A20-D-210
SHEET	22A of 45

$PWPATH
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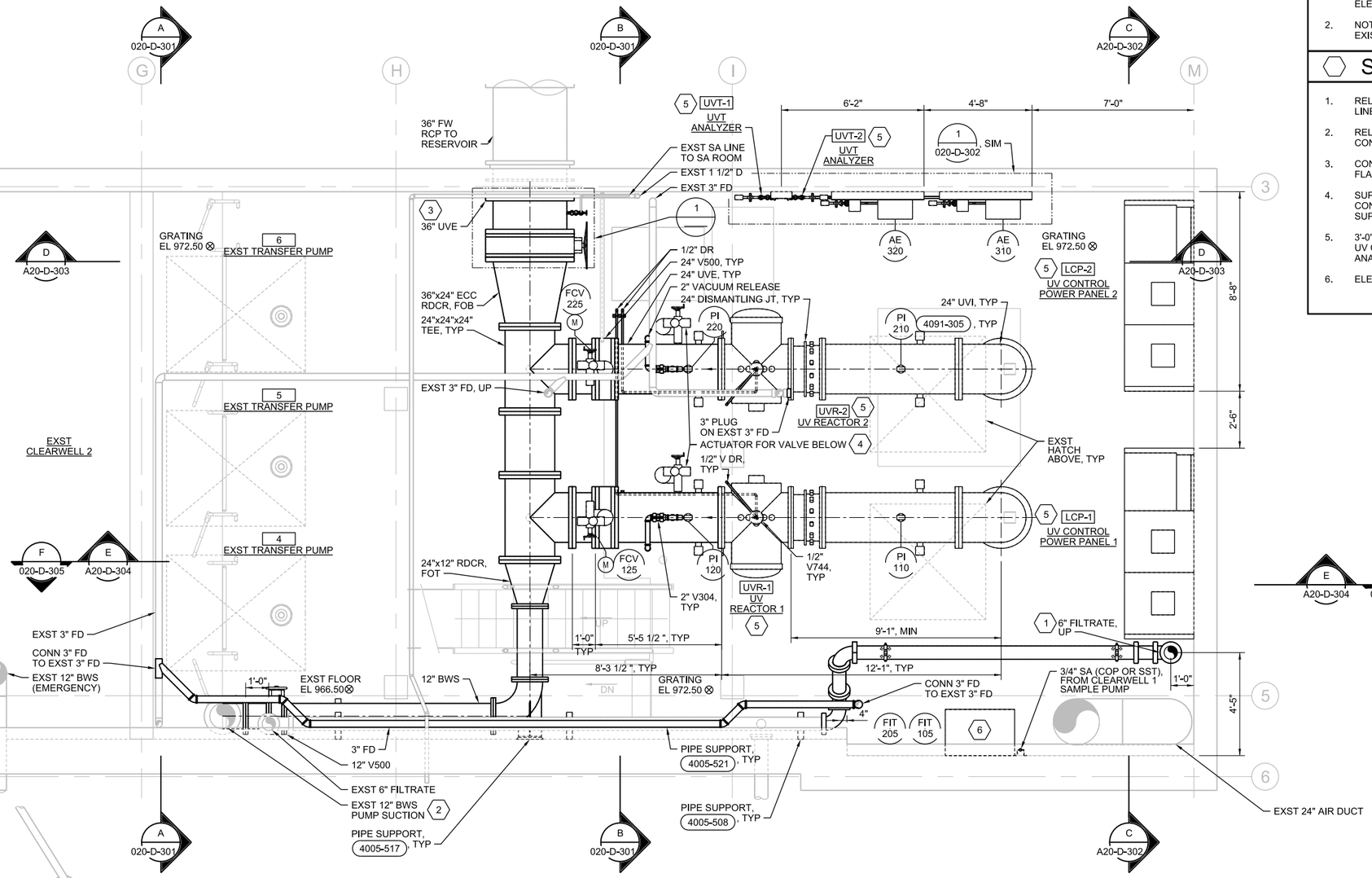
FILENAME: A20-D-2010_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:36:30 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

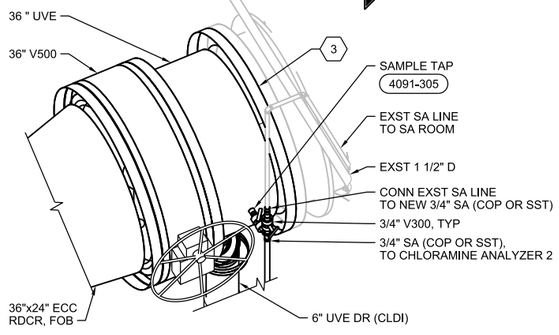
SHEET KEYNOTES

1. RELOCATE EXISTING 6" GROOVED END FILTRATE LINE. CONNECT TO EXISTING VICTAULIC JOINTS.
2. RELOCATE EXISTING 12" CLDI FILTRATE PIPE. CONNECT TO EXISTING FLANGES.
3. CONNECT NEW 36" UVE TO EXISTING WALL PIPE FLANGE.
4. SUPPORT VALVE ACTUATOR FROM PIPE SUPPORT. CONTRACTOR TO ADD ADDITIONAL LATERAL SUPPORT FROM GRATING OR PIPE.
5. 3'-0" MIN CLEARANCE IN FRONT OF UV REACTORS, UV CONTROL POWER PANELS, AND UVT ANALYZERS.
6. ELECTRICAL PANEL, SEE ELECTRICAL DRAWINGS.



PLAN - EL 972.50

3/8"=1'-0"

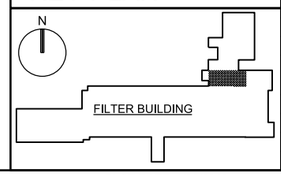


1 ISOMETRIC

NTS

FOR ATLERNATE BID NO. 1 ONLY:
CALGON CARBON CORPORATION, INC.
SEE GENERAL ABBREVIATIONS (CONTINUED) AND DESIGNATIONS LEGEND DWG GENERAL NOTES

KEY PLAN



NO.	DATE	REVISION	BY	APVD
DSGN	TJ ELLIOTT	DR CJ DAHL	CHK LM MOHR	APVD AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

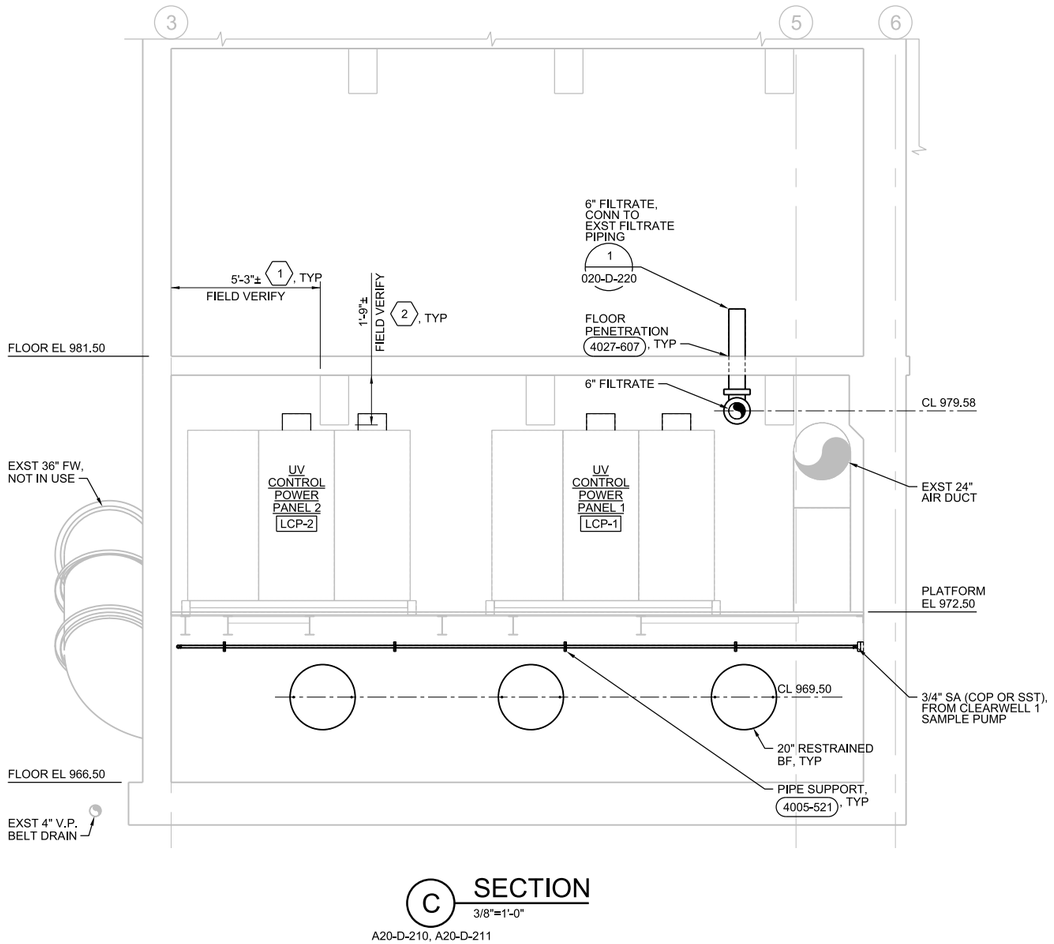
PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
ALTERNATE BID
PLAN - EL 972.50 AND ISOMETRIC

ALTERNATE BID DOCUMENT

SCALE AS NOTED
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	A20-D-211
SHEET	23A of 45



C SECTION
3/8"=1'-0"
A20-D-210, A20-D-211

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.

SHEET KEYNOTES

1. CONTRACTOR TO FIELD VERIFY DISTANCE BETWEEN WALL AND EDGE OF BEAMS.
2. CONTRACTOR TO FIELD VERIFY DEPTH OF BEAMS.

FOR ATLERNATE BID NO. 1 ONLY:
CALGON CARBON CORPORATION, INC.
SEE GENERAL ABBREVIATIONS (CONTINUED) AND DESIGNATIONS LEGEND DWG GENERAL NOTES

NO.	DATE	REVISION	BY	APVD
DSGN	TJ ELLIOTT	DR CJ DAHL	CHK LM MOHR	APVD AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
ALTERNATE BID
SECTION

ALTERNATE BID DOCUMENT

SCALE AS NOTED
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	A20-D-302
SHEET	27A of 45

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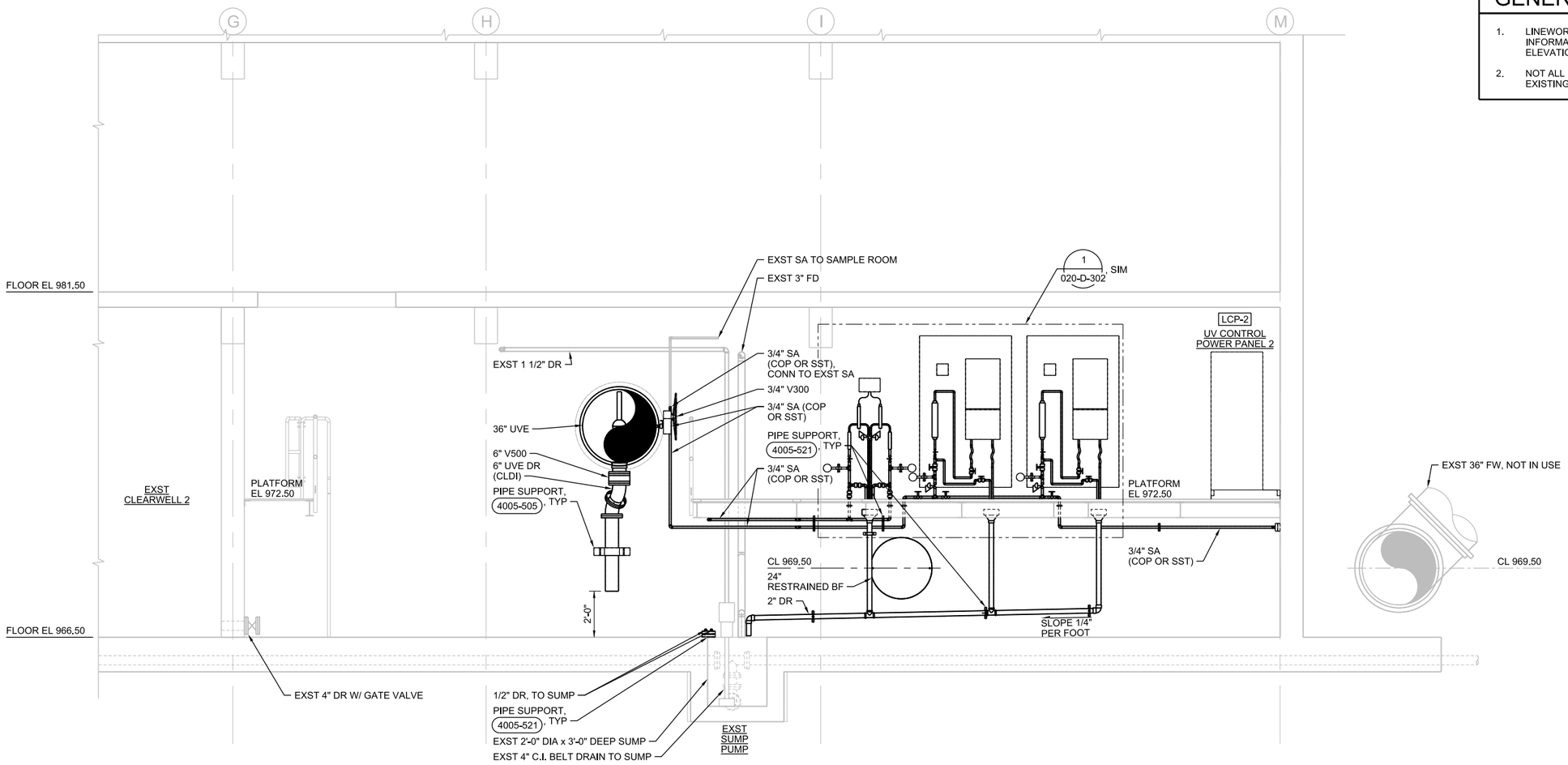
FILENAME: A20-D-3002_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:36:57 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.



D SECTION
3/8"=1'-0"
A20-D-210, A20-D-211

FOR ATLERNATE BID NO. 1 ONLY:
CALGON CARBON CORPORATION, INC.
SEE GENERAL ABBREVIATIONS (CONTINUED) AND DESIGNATIONS LEGEND DWG GENERAL NOTES

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		TJ ELLIOTT	CJ DAHL	LM MOHR		AG MYERS	

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
ALTERNATE BID
SECTION

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	A20-D-303
SHEET	28A of 45

ALTERNATE BID DOCUMENT

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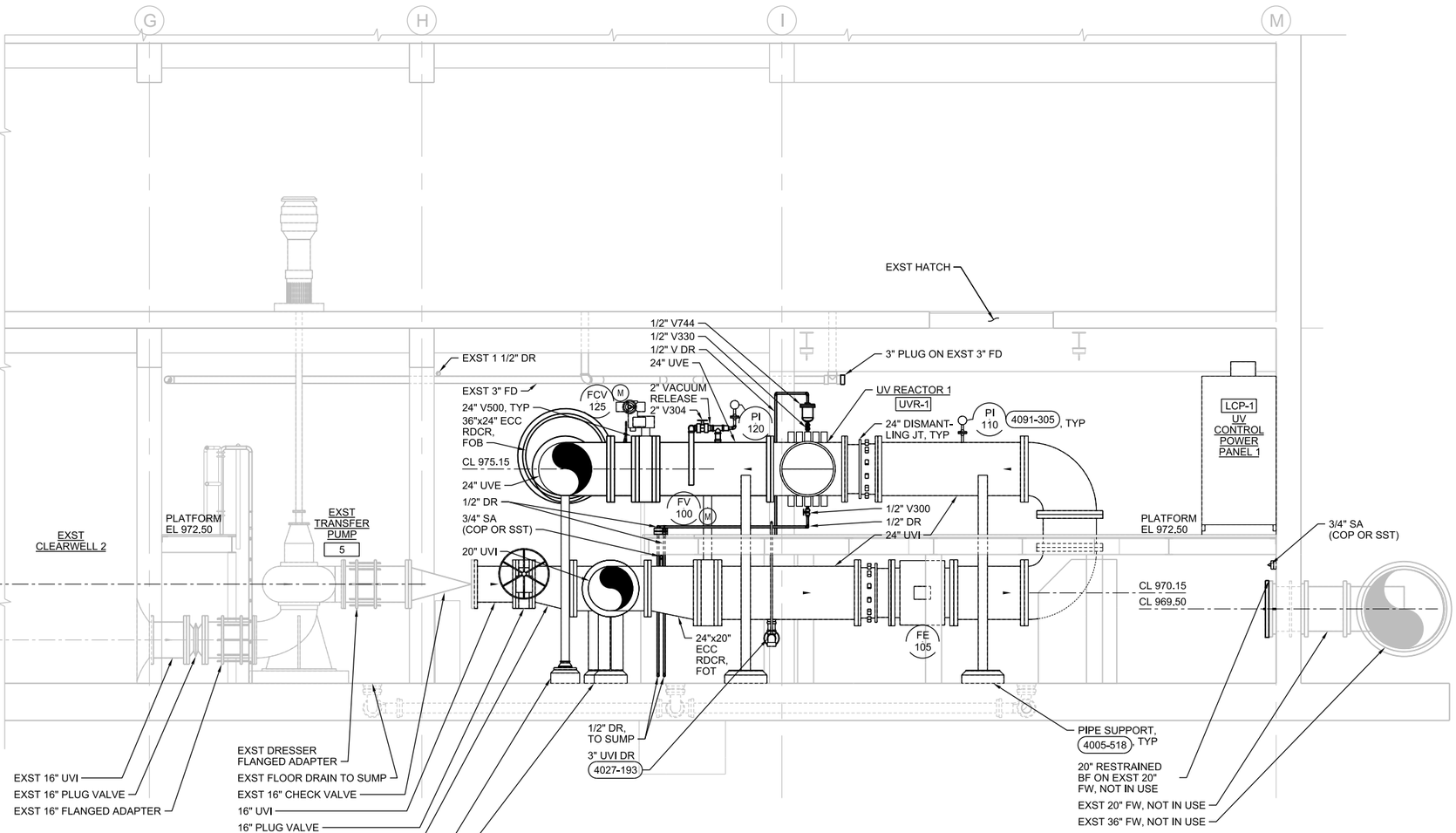
FILENAME: A20-D-3003_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:35:45 AM

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN FIELD VERIFY EXISTING CONDITIONS.



E SECTION
3/8"=1'-0"
A20-D-210, A20-D-211

FOR ATLERNATE BID NO. 1 ONLY:
CALGON CARBON CORPORATION, INC.
SEE GENERAL ABBREVIATIONS (CONTINUED) AND DESIGNATIONS LEGEND DWG GENERAL NOTES

NO.	DATE	DSGN	DR	CHK	APVD
		TJ ELLIOTT	CJ DAHL	LM MOHR	AG MYERS

REVISION BY APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

PROCESS MECHANICAL

TRANSFER PUMP AND UV ROOM
ALTERNATE BID
SECTION

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	A20-D-304
SHEET	29A of 45

ALTERNATE BID DOCUMENT

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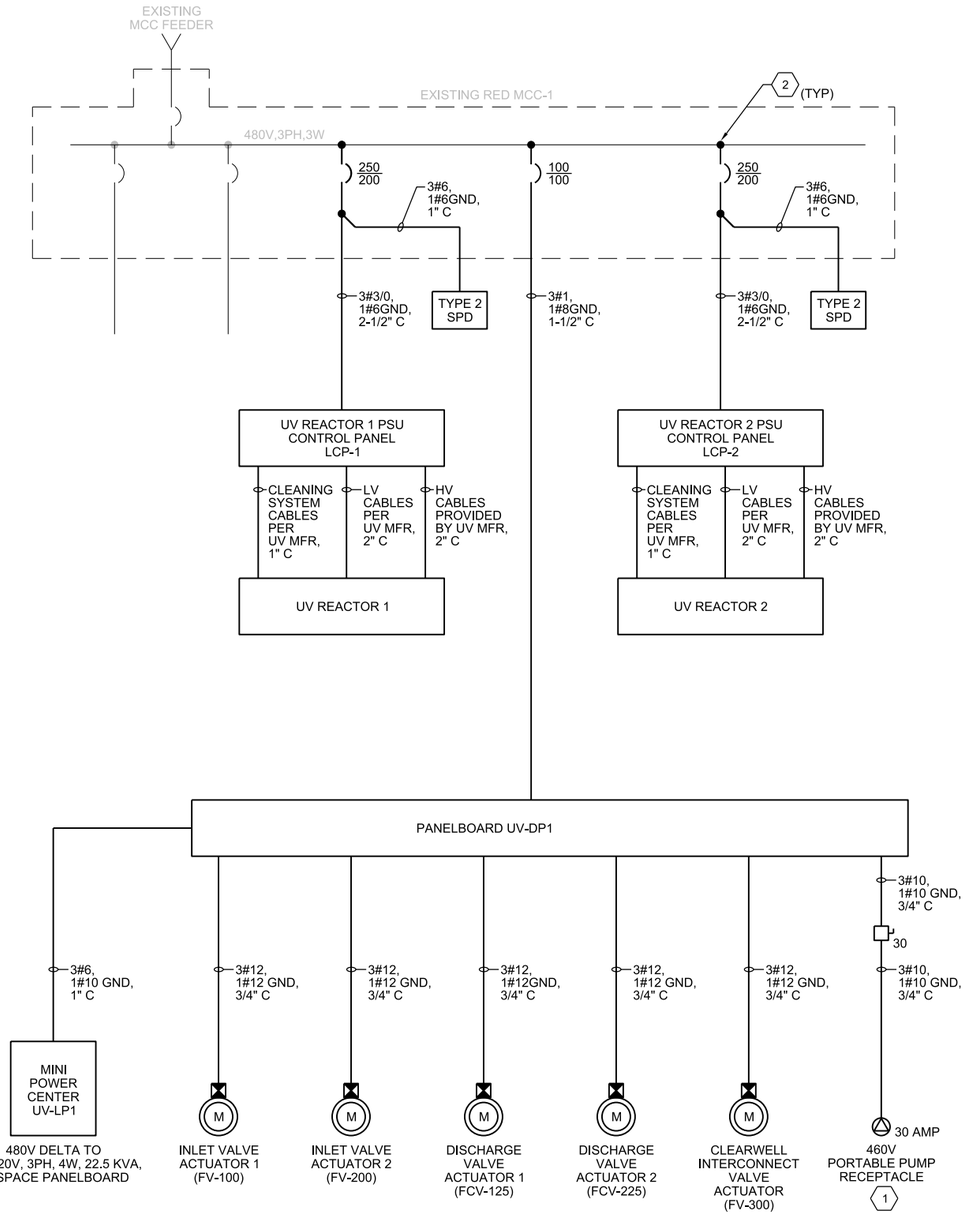
PLOT DATE: 1/29/2019
PLOT TIME: 11:36:21 AM



ONE-LINE DIAGRAM

SHEET KEYNOTES

1. PORTABLE PUMP RECEPTACLE SHALL BE A MELTRIC PB30 MODEL RATED FOR 480V WITH A 3P & G POLARITY. PROVIDE MATCHING INLET PLUG AND A METAL BOX WITH METAL ANGLE.

2. REMOVE EXISTING SPARE BREAKERS AND REPLACE WITH NEW FEEDER BREAKERS AS INDICATED. TURN OVER EXISTING SPARE BREAKERS TO THE OWNER.

ELECTRICAL DISTRIBUTION PANELBOARD UV-DP1

					KVA							
NO	TRIP	DESCRIPTION	AMPS	KVA	A	B	C	KVA	AMPS	DESCRIPTION	TRIP	NO
1	15	INLET VALVE ACTUATOR 1 (FV-100)	1.1	0.3	0.6	---	---	0.3	1.1	INLET VALVE ACTUATOR 2 (FV-200)	15	2
3			1.1	0.3	---	0.6	---	0.3	1.1			4
5	3P		1.1	0.3	---	---	0.6	0.3	1.1		3P	6
7	15	DISCHARGE VALVE ACTUATOR 1 (FCV-125)	1.1	0.3	0.6	---	---	0.3	1.1	DISCHARGE VALVE ACTUATOR 2 (FCV-225)	15	8
9			1.1	0.3	---	0.6	---	0.3	1.1			10
11	3P		1.1	0.3	---	---	0.6	0.3	1.1		3P	12
13	15	CLEARWELL INTERCONNECT VALVE (FV-300)	1.1	0.3	2.2	---	---	1.9	6.9	UV MINI POWER CENTER UV-LP1	40	14
15			1.1	0.3	---	1.1	---	0.8	2.9			16
17	3P		1.1	0.3	---	---	0.8	0.5	1.8		3P	18
19	30	PORTABLE PUMP RECEPTACLE	10.8	3.0	3.0	---	---	0.0	0.0	SPARE	15	20
21			10.8	3.0	---	3.0	---	0.0	0.0			22
23	3P		10.8	3.0	---	---	3.0	0.0	0.0		3P	24
25		SPACE	0.0	0.0	0.0	---	---	0.0	0.0	SPACE		26
27			0.0	0.0	---	0.0	---	0.0	0.0			28
29	3P		0.0	0.0	---	---	0.0	0.0	0.0		3P	30
		TOTAL KVA PER PHASE			6.4	5.3	5.0					
		TOTAL KVA CONNECTED					16.7					
		TOTAL AMPS PER PHASE TO NEUTRAL			23.1	19.1	18.1					

480V, 3 PHASE, 3 WIRE
100A BUS, 100A MAIN CB, 22KAIC
GROUND BUS

NOTE: NEMA 12 ENCLOSURE

PANELBOARD SCHEDULE

MINI POWER CENTER UV-LP1

NO	TRIP	DESCRIPTION	AMPS	KVA	A	B	C	KVA	AMPS	DESCRIPTION	TRIP	NO
1	20	UV MASTER CONTROL PANEL	12.5	1.5	1.9	---	---	0.4	3.3	UV TASK LIGHTS	20	2
3	20	UV LIGHTS	5.0	0.6	---	0.8	---	0.2	1.7	UV RECEPTACLES	20	4
5	20	UV LIGHTS	4.2	0.5	---	---	0.7	0.2	1.7	SAMPLE PUMP	20	6
7	20	SPARE	0.0	0.0	0.0	---	---	0.0	0.0	SPARE	20	8
9	20	SPARE	0.0	0.0	---	0.0	---	0.0	0.0	SPARE	20	10
11	20	SPARE	0.0	0.0	---	---	0.0	0.0	0.0	SPARE	20	12
13	20	SPARE	0.0	0.0	0.0	---	---	0.0	0.0	SPARE	20	14
15	20	SPARE	0.0	0.0	---	0.0	---	0.0	0.0	SPARE	20	16
17			0.0	0.0	---	---	0.0	0.0	0.0	SPARE	20	18
		TOTAL KVA PER PHASE			1.9	0.8	0.7					
		TOTAL KVA CONNECTED					3.4					
		TOTAL AMPS PER PHASE			15.8	6.7	5.8					

120/208V 3 PHASE 4 WIRE
70A MAIN CB (SECONDARY)
GROUND BUS, NEUTRAL BUS
PANEL AND BREAKERS RATED 18 KAIC MIN

BUILDING:
ROOM: TRANSFER PUMP ROOM
FED FROM: UV-DP1
ENCLOSURE: MINI POWER CENTER

PANELBOARD SCHEDULE

NO.	DATE	REVISION	BY	APVD

DSGN IT HAMMONS
DR JL GUYTYON
CHK RJ WOOD
APVD AG MYERS

JACOBS®

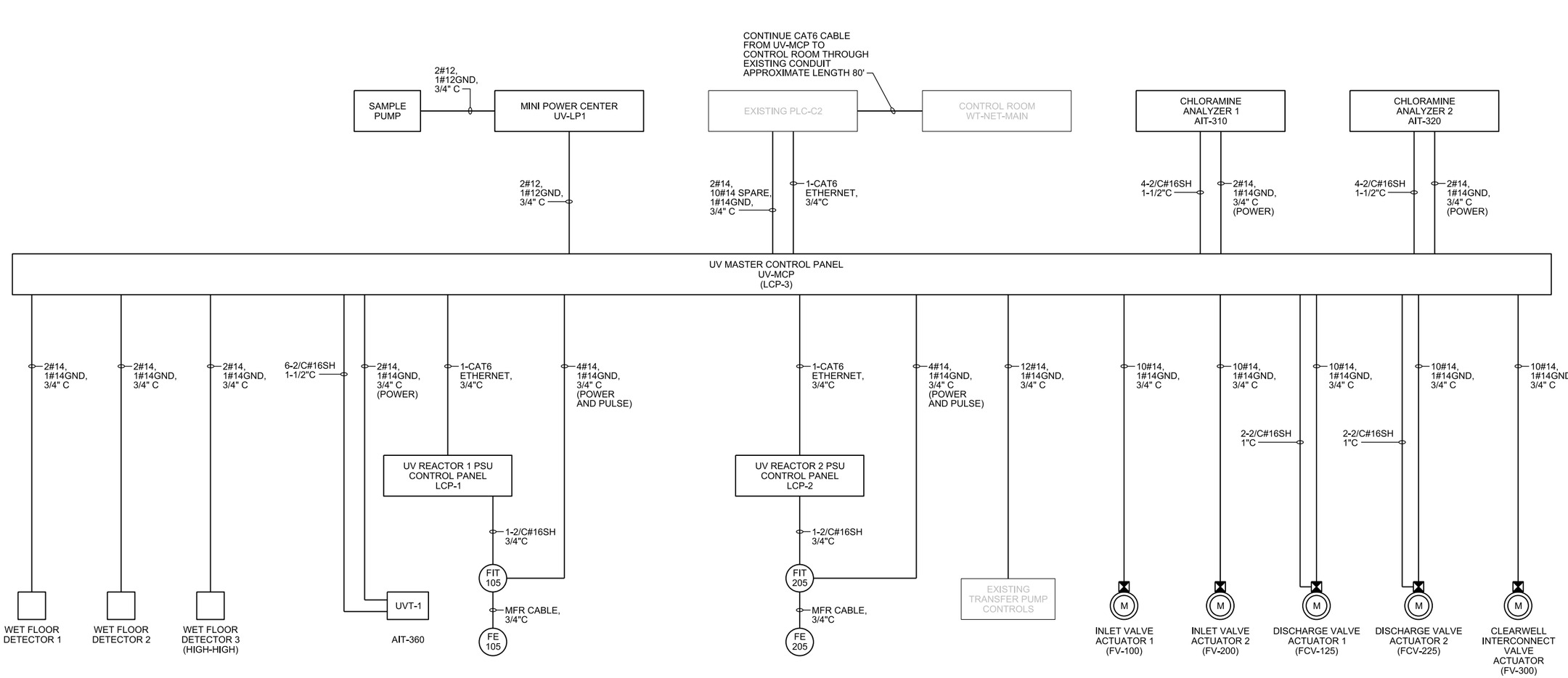
CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

ELECTRICAL
ONE-LINE DIAGRAM AND
PANELBOARD SCHEDULES

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON
ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-E-001
SHEET	32 of 45

BID DOCUMENTS



CONTROL BLOCK DIAGRAM

NO.	DATE	DSGN	DR	CHK	APVD
REVISION		IT HAMMONS	JL GUYTON	RJ WOOD	AG MYERS
BY	APVD				

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL

CONTROL BLOCK DIAGRAM

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-E-002
SHEET	33 of 45

BID DOCUMENTS

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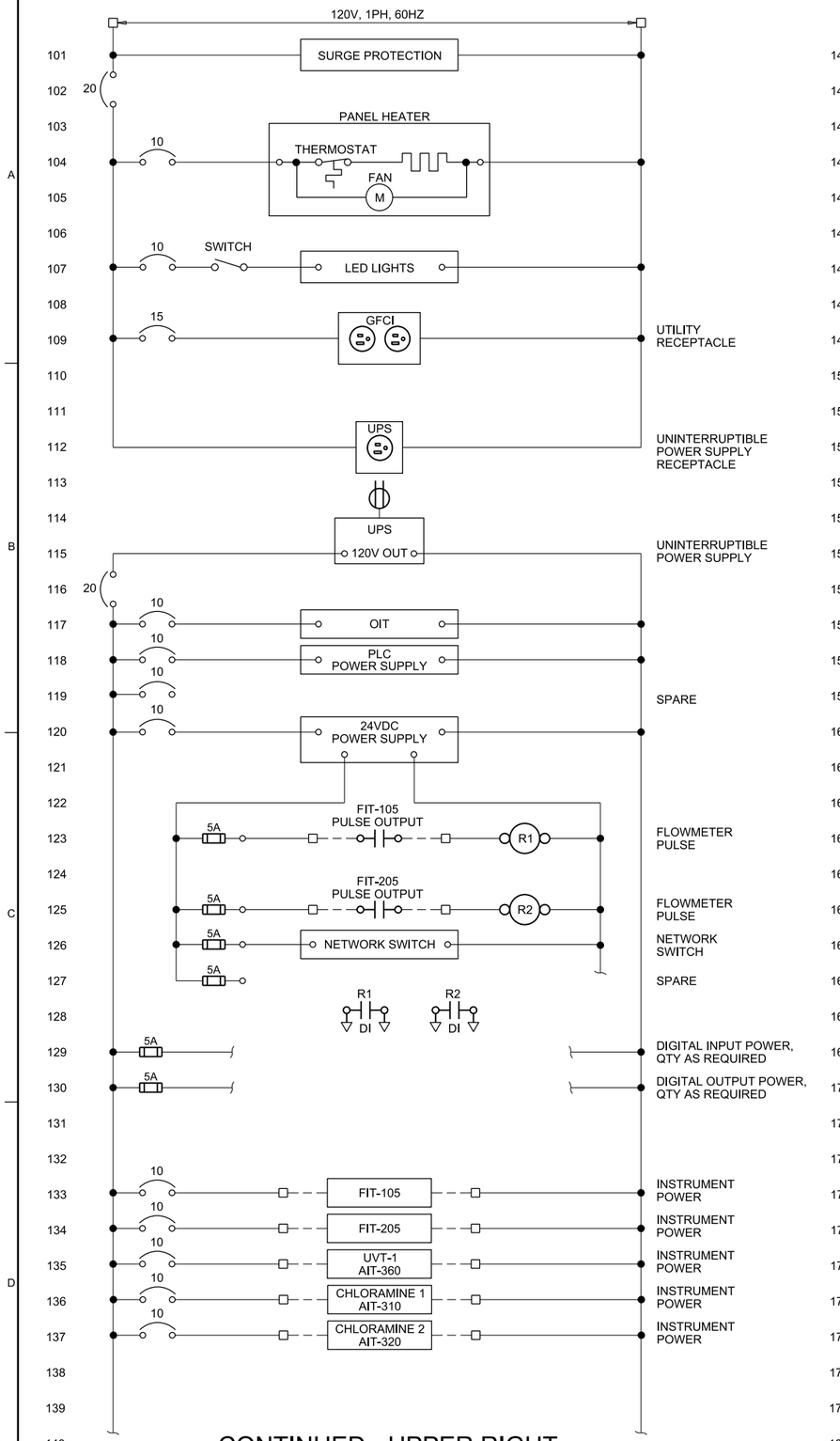
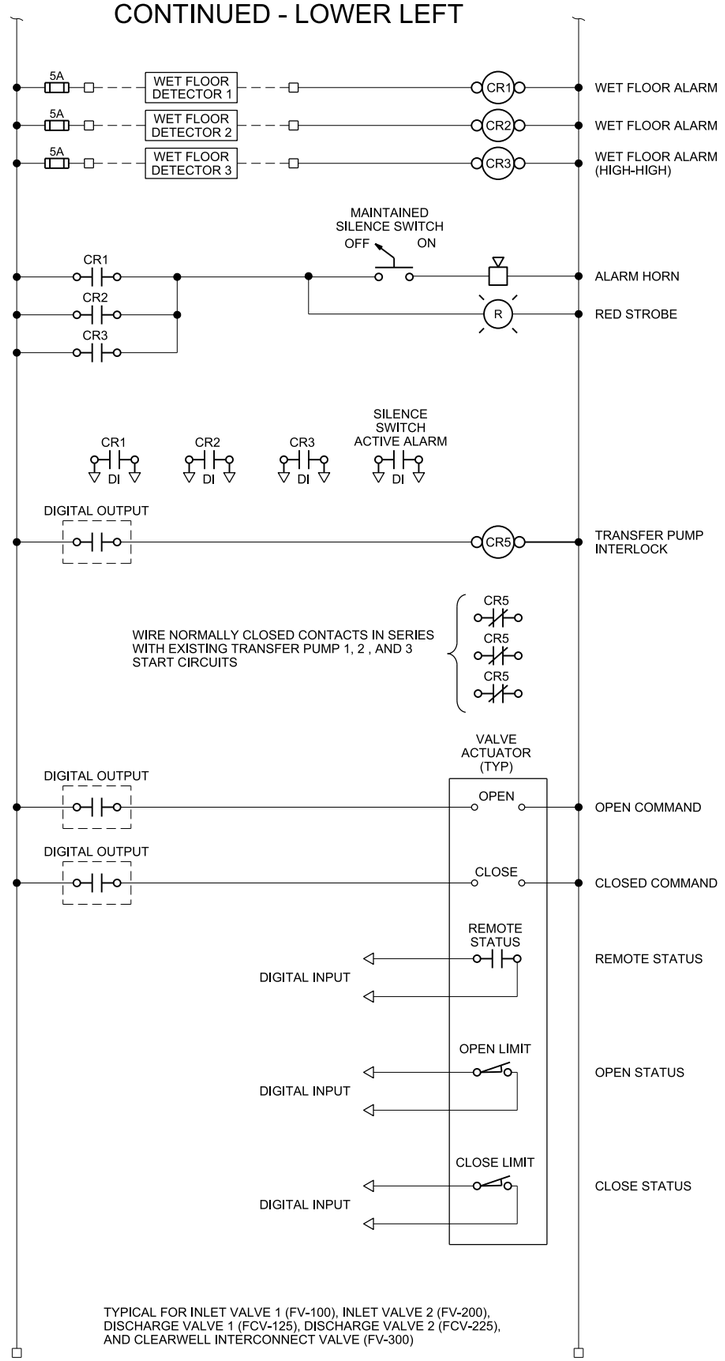
PLOT DATE: 1/29/2019
PLOT TIME: 11:35:24 AM



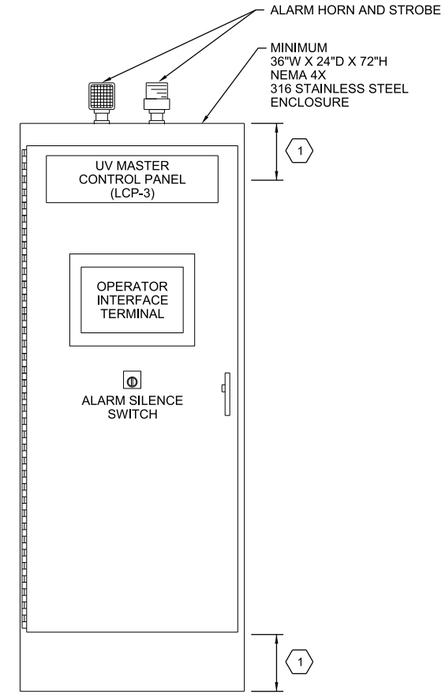
CONTINUED - UPPER RIGHT



UV MASTER CONTROL PANEL UV-MCP (LCP-3) SCHEMATIC

SHEET KEYNOTE

1. LEAVE THE TOP 9" AND THE BOTTOM 9" OF THE BACK OF THE CONTROL PANEL CLEAR TO INSTALL CONDUITS INTO THE CONTROL PANEL



A ELEVATION

NO.	DATE	DSGN
	REVISION	DR
BY	APVD	
AG MYERS	RJ WOOD	JL GUYTON
	CHK	IT HAMMONS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL

UV MASTER CONTROL PANEL UV-MCP SCHEMATIC AND ELEVATION

BID DOCUMENTS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

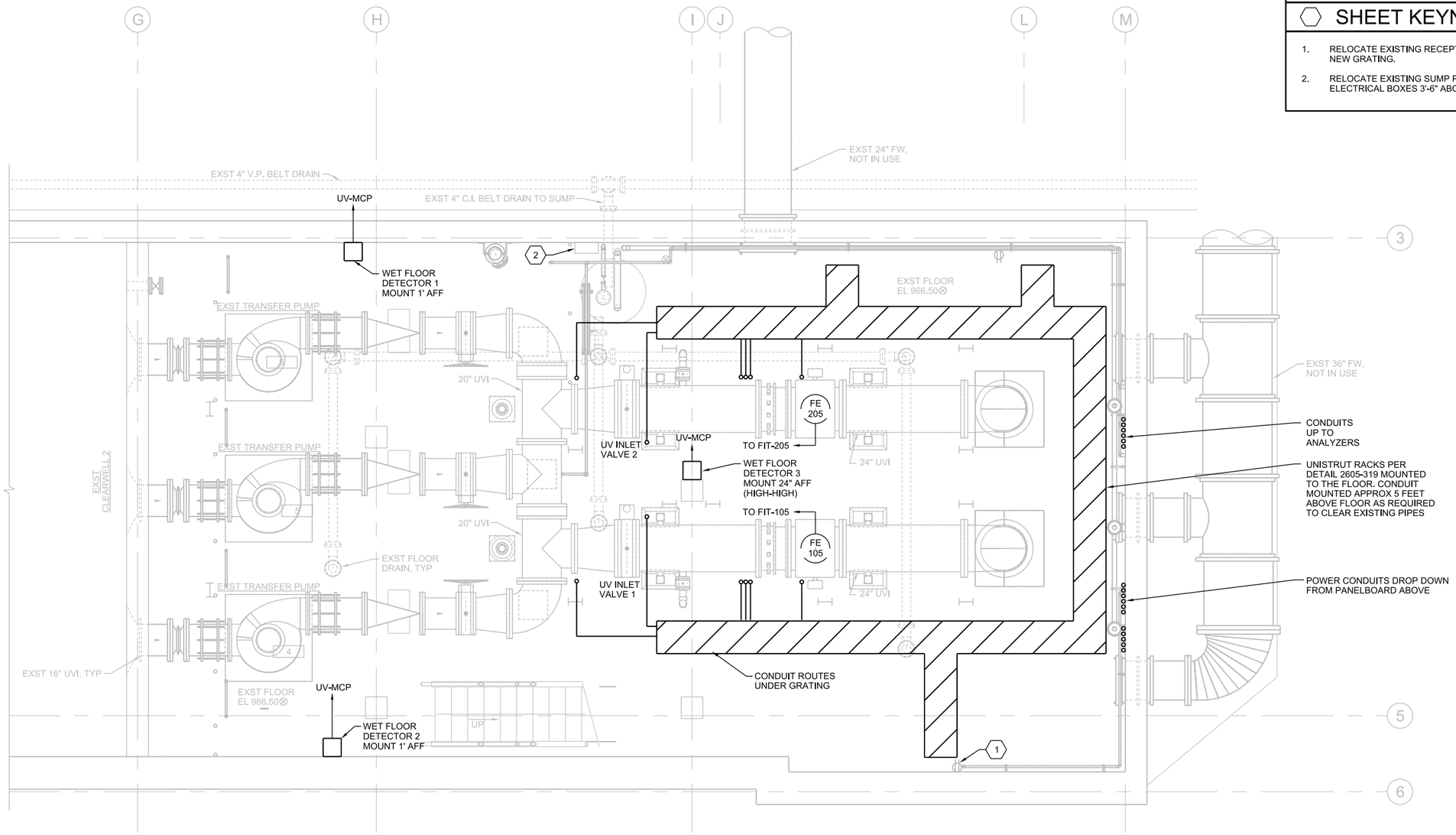
DATE	JANUARY 2019
PROJ	709084
DWG	020-E-003
SHEET	34 of 45

GENERAL SHEET NOTES

1. CONDUIT ROUTES SHALL STAY BELOW GRATING TO THE GREATEST EXTENT POSSIBLE.
2. CONDUITS SHALL NOT BE COMBINED.
3. LAYOUT BASED ON BASE BID UV EQUIPMENT BY TROJAN UV TECHNOLOGIES, INC. SEE PROCESS SHEETS FOR ALTERNATE LAYOUT.

SHEET KEYNOTES

1. RELOCATE EXISTING RECEPTACLE 3'-6" ABOVE NEW GRATING.
2. RELOCATE EXISTING SUMP PUMP CONTROLS AND ELECTRICAL BOXES 3'-6" ABOVE NEW GRATING.

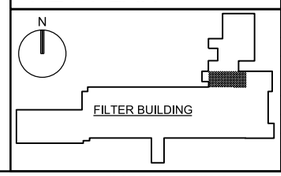


N

POWER PLAN - EL 966.50

3/8"=1'-0"

KEY PLAN



NO.	DATE	DSGN	DR	CHK	APVD
		IT HAMMONS	JL GUYTON	RJ WOOD	AG MYERS

REVISION BY APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL

TRANSFER PUMP AND UV ROOM
POWER PLAN - EL 966.50

BID DOCUMENTS

	3/8"=1'-0"
	VERIFY SCALE
	BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"
DATE	JANUARY 2019
PROJ	709084
DWG	020-E-210
SHEET	35 of 45

$PWPATH

$PWURL

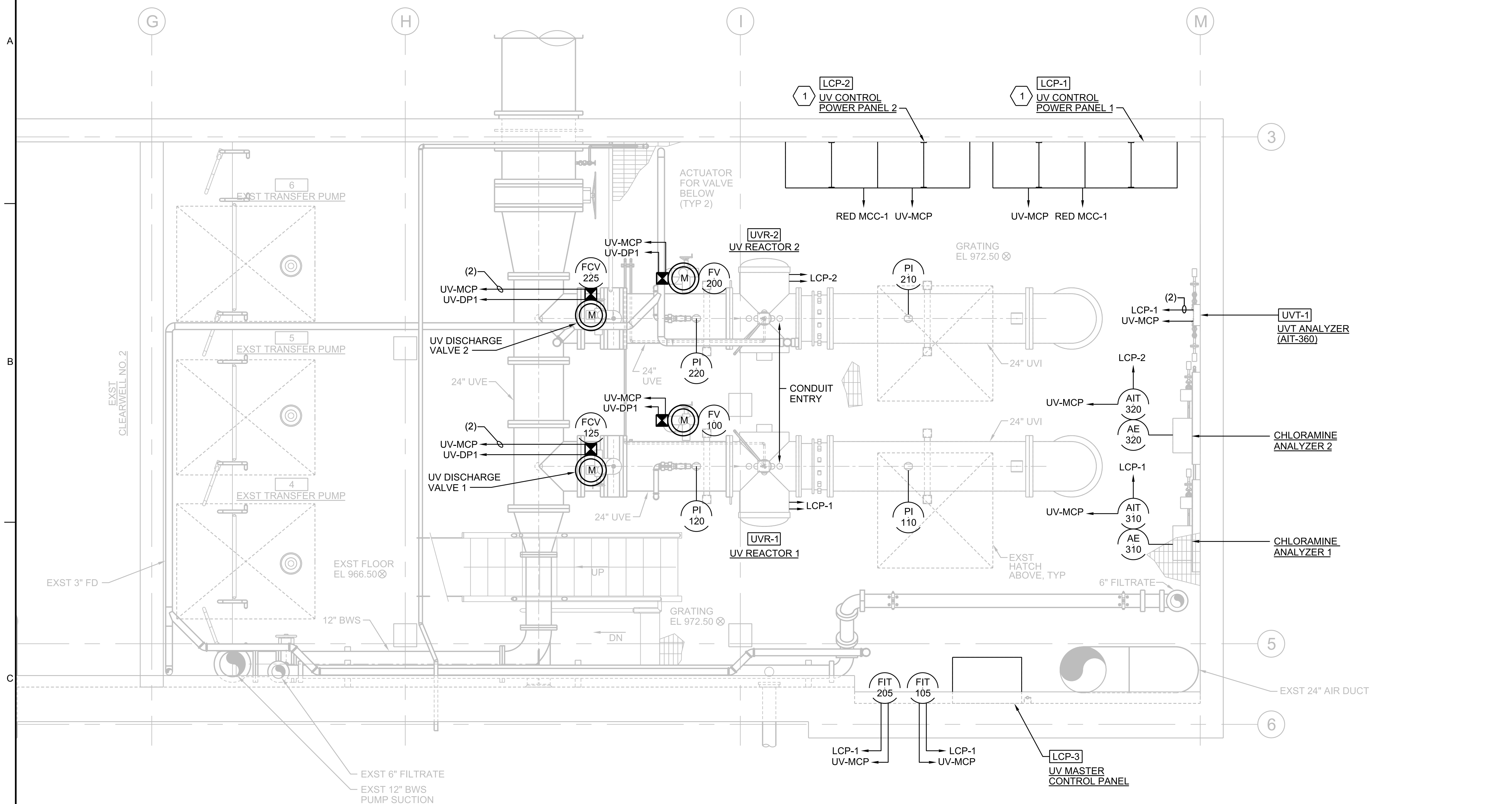
FILENAME: 020-E-2010_709084.dgn PLOT DATE: 1/29/2019 PLOT TIME: 11:34:47 AM

GENERAL SHEET NOTES

1. CONDUIT ROUTES SHALL STAY BELOW GRATING TO THE GREATEST EXTENT POSSIBLE, EXCEPT WHERE NOTED OTHERWISE.
2. LAYOUT BASED ON BASE BID UV EQUIPMENT BY TROJAN UV TECHNOLOGIES, INC. SEE PROCESS SHEETS FOR CALGON ALTERNATE LAYOUT.

SHEET KEYNOTE

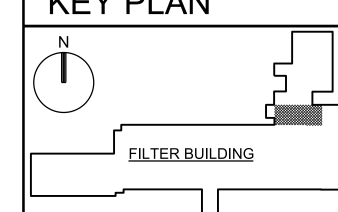
1. CONDUIT ENTRY TO UV LCP-1 AND LCP-2 SHALL BE THROUGH THE TOP.



POWER PLAN - EL 972.50

3/8"=1'-0"

KEY PLAN



NO.	
DSGN	IT HAMMONS
DR	JL GUYTON
CHK	RJ WOOD
APVD	AG MYERS

REVISION | DATE | BY | APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL
TRANSFER PUMP AND UV ROOM
POWER PLAN - EL 972.50

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-E-211
SHEET	36 of 45

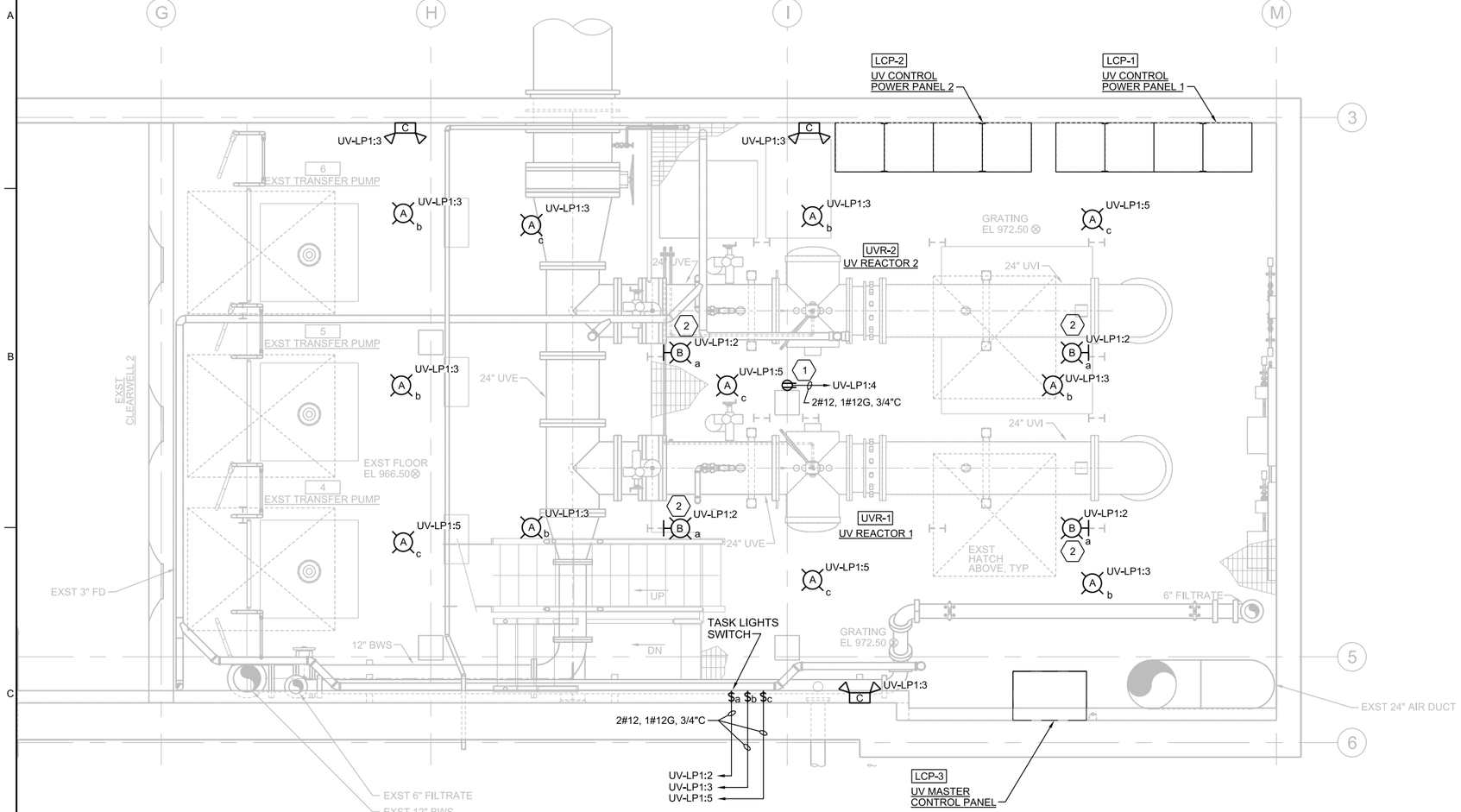
BID DOCUMENTS

GENERAL SHEET NOTES

1. CEILING MOUNT TYPE "A" FIXTURES.
2. EMERGENCY LIGHT FIXTURES SHALL BE WIRED TO UNSWITCHED PORTION OF BRANCH CIRCUIT. MOUNT 7'-0" AFF.

SHEET KEYNOTES

1. MOUNT RECEPTACLE TO COLUMN.
2. MOUNT TYPE "B" TASK LIGHT FIXTURES TO GRATING VERTICAL SUPPORTS NEAR BOTTOM OF GRATNG.



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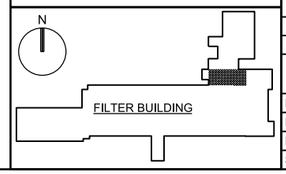
LIGHTING PLAN - EL 972.50

3/8"=1'-0"

FIXTURE TYPE	FIXTURE DESCRIPTION	LAMP	LUMENS	WATTS	VOLTAGE	MOUNTING	REMARKS
A	LED, 10L LUMEN PACKAGE, LOW-COPPER ALUMINUM POLYESTER POWDER PAINTED HOUSING, TOTALLY GASKETED AND ENCLOSED, CORROSION RESISTANT WHITE FINISH,TYPE 5 LOW ANGLE GLASS OPTICS, MAX 55C AMBIENT TEMPERATURE RATED, SINGLE FUSING, NEMA 4X, UL LISTED FOR WET LOCATIONS, UNIVERSAL MOUNT.	LED 5000K	10000	98W	120V	PENDANT/ CEILING	HOLOPHANE PETROLUX LED SERIES CATALOG NO. PLED2 10L 5K AS UN NA W L5 F1
B	TASK LIGHT - LED, 6000 LUMEN PACKAGE, 120V, FLOOD LIGHT, 5000K,WITH STAINLESS STEEL YOKE, WHITE PAINT FINISH, SINGLE FUSING, DIE CAST ALUMINUM HOUSING	LED 5000K	6000	49W	120V	ON GRATING VERTICAL SUPPORT	HOLOPHANE PREDATOR PSLED FLOOD, PSLED-PK1-MVOLT-FL-50K-3-WHSDP-F1 OR APPROVED EQUIVALENT
C	EMERGENCY FIXTURE W/GRAY THERMO-PLASTIC BODY RATED NEMA 4X, TWO 20W/12V HALOGEN HEADS ATTACHED, 90 MINUTE NI-CAD BATTERY, DAMP LOCATION LISTED TO 30°F, WITH "SEL" PACKAGE OPTION TO INCLUDE SELF-DIAGNOSTICS, AUDIBLE FAILURE ALARM, ETC.	2-20W/12V HALOGEN HEADS	-	5W	120V	WALL	LITHONIA INDX 1254 H2012/SEL OR APPROVED EQUIVALVENT

LIGHTING FIXTURE SCHEDULE

KEY PLAN



NO.	DATE	DSGN	DR	CHK	APVD
		IT HAMMONS	JL GUYTON	RJ WOOD	AG MYERS

REVISION BY APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL

TRANSFER PUMP AND UV ROOM LIGHTING PLAN - EL 972.50 AND LIGHTING FIXTURE SCHEDULE

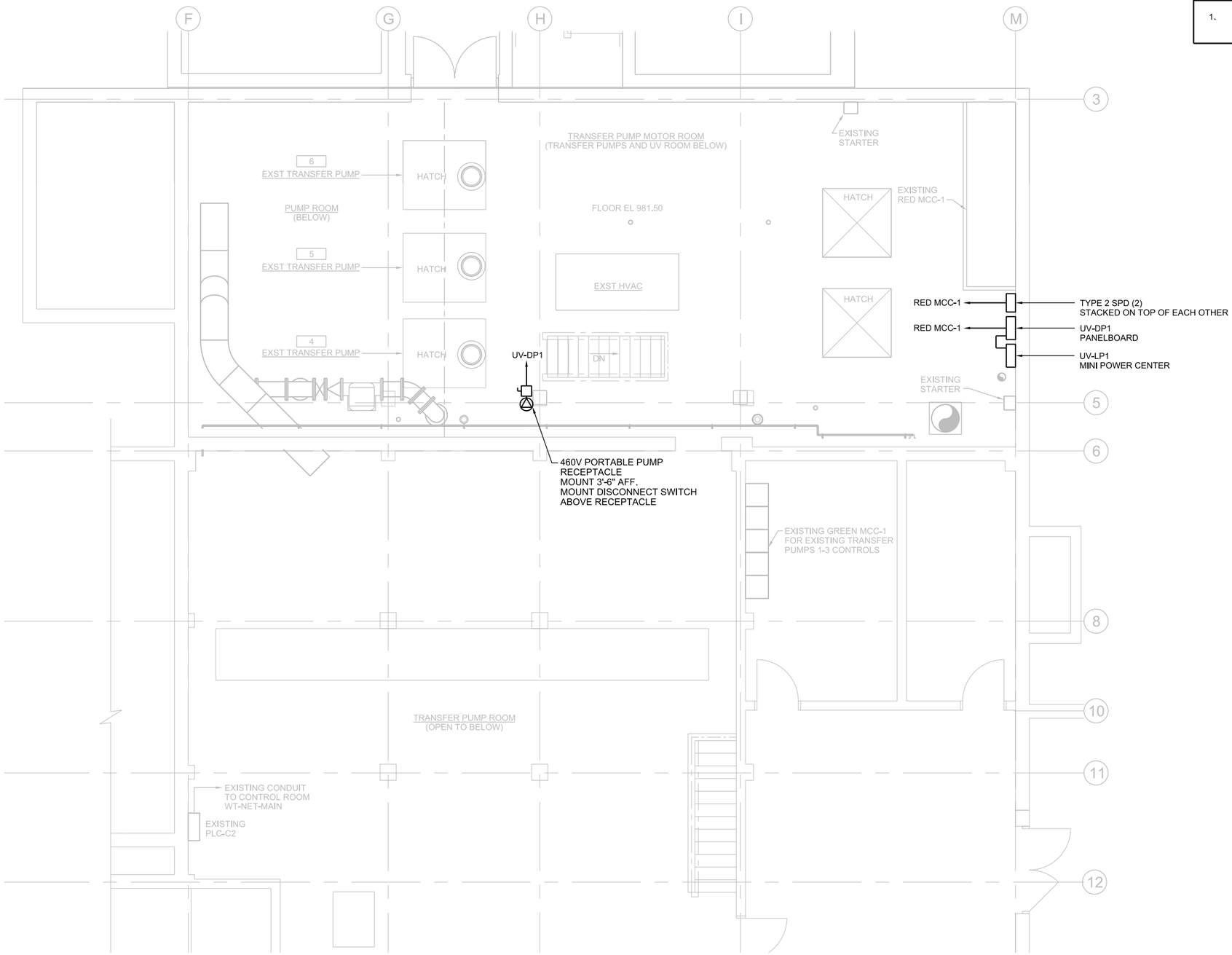
BID DOCUMENTS

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-E-212
SHEET	37 of 45

GENERAL SHEET NOTE

1. REMOVE EXISTING STORAGE CABINETS AND TURN OVER TO OWNER.

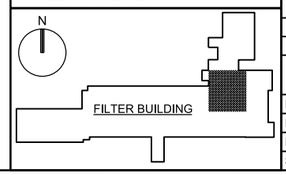


N

POWER PLAN - EL 981.50

1/4"=1'-0"

KEY PLAN



NO.	DATE	DSGN	DR	CHK	APVD
		IT HAMMONS	JL GUYTON	RJ WOOD	AG MYERS

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL

TRANSFER PUMP MOTOR ROOM
POWER PLAN - EL 981.50

1/4"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-E-220
SHEET	38 of 45

BID DOCUMENTS

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FILENAME: 020-E-2020_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:34:40 AM

CLEARWELL 2
(BELOW)

TRANSFER PUMP MOTOR ROOM
(TRANSFER PUMPS AND UV ROOM BELOW)

PUMP ROOM
(BELOW)

BURIED EXST
30" CLEARWELL
INTERCONNECT PIPE

30" CLEARWELL
INTERCONNECT PIPE

UV-DP1
UV-MCP

M — FV 300 — CLEARWELL
INTERCONNECT
VALVE ACTUATOR

TRANSFER PUMP ROOM
(OPEN TO BELOW)

UV-LP1

PT — SAMPLE
PUMP

RE-INSTALL EXISTING
PRESSURE TRANSDUCER
TO NEW PIPE

CLEARWELL 1
(BELOW)

N

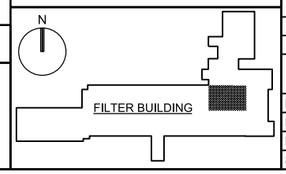
POWER PLAN - EL 967.50

3/8"=1'-0"

GENERAL SHEET NOTES

1. LINEWORK DEVELOPED FROM AVAILABLE EXISTING INFORMATION. FIELD VERIFY CENTERLINES, ELEVATIONS, AND DIMENSIONS.
2. NOT ALL EXISTING PIPING IS SHOWN, FIELD VERIFY EXISTING CONDITIONS.

KEY PLAN



NO.	DATE	REVISION	BY	APVD
DSGN	IT HAMMONS	DR	JL GUYTON	CHK	RJ WOOD	APVD	AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

ELECTRICAL
SUB-BASEMENT
POWER PLAN - EL 967.50

BID DOCUMENTS

3/8"=1'-0"
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	020-E-221
SHEET	39 of 45

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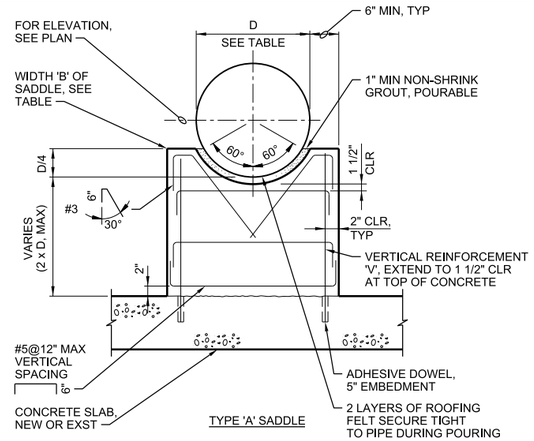
FILENAME: 020-E-2021_709084.dgn
PLOT DATE: 1/29/2019
PLOT TIME: 11:34:00 AM



TYPE 'A' SADDLE

PIPE SADDLE TABLE			
PIPE DIAMETER D	SADDLE WIDTH B	LAYERS OF REINFORCEMENT	VERTICAL REINFORCEMENT V
D ≤ 12"	9"	1 (CTRD)	#5@12"
12" < D ≤ 24"	9"	1 (CTRD)	#5@12"
24" < D ≤ 36"	10"	2 (EF)	#5@12"
36" < D ≤ 48"	12"	2 (EF)	#5@12"
48" < D ≤ 60"	16"	2 (EF)	#6@12"
60" < D ≤ 72"	18"	2 (EF)	#6@12"

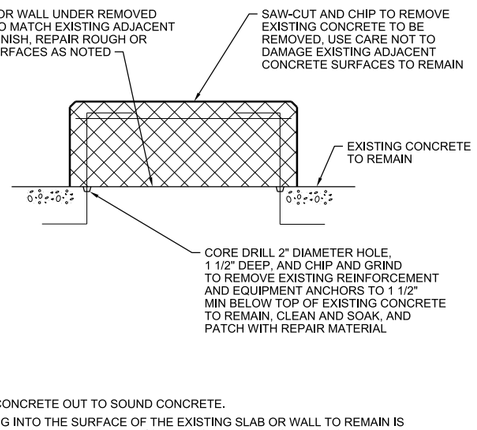
NOTE:

1. FOR 'B'=10" OR THICKER, USE 2 LAYERS OF REINFORCEMENT, TURN HORIZONTAL BARS 90° TO HOOK AROUND VERTICALS [ ], 1 1/2" COVER.

PIPE SUPPORT - CONCRETE SADDLE

NTS

0330-061



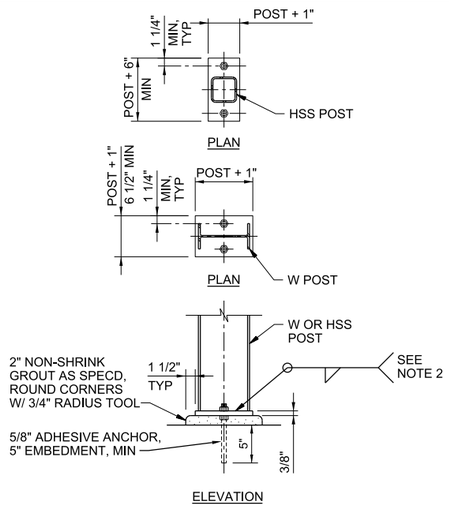
NOTES:

1. REMOVE CONCRETE OUT TO SOUND CONCRETE.
2. IF CHIPPING INTO THE SURFACE OF THE EXISTING SLAB OR WALL TO REMAIN IS REQUIRED, MAKE EDGES PERPENDICULAR TO THE SURFACE. DO NOT FEATHER EDGES.
3. FILL DEFECTIVE AREA WITH AN APPROVED PREPACKAGED REPAIR MATERIAL TO MATCH APPEARANCE OF ADJACENT CONCRETE SURFACES.
4. USE APPROVED BONDING AGENT ON SURFACES TO BE PATCHED PRIOR TO PLACING REPAIR MATERIAL.
5. DEMONSTRATE METHODS FOR REPAIR USING ACTUAL MATERIALS, METHODS, AND CURING PROCEDURES REQUIRED BY MATERIAL MANUFACTURERS. CONSULT WITH BONDING AGENT MANUFACTURER AND REPAIR MATERIAL MANUFACTURER ON TECHNIQUES.

CONCRETE DEMOLITION

NTS

0330-143



ELEVATION

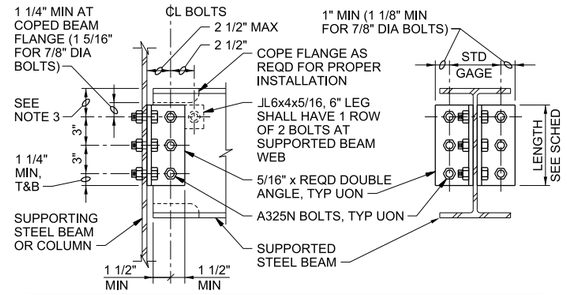
NOTES:

1. USE OF 2 - BOLT STEEL POST BASEPLATE ANCHORAGE DETAIL SHOWN SHALL BE LIMITED TO STEEL SUPPORT MEMBERS WEIGHING LESS THAN 300 LBS IN ACCORDANCE WITH OSHA STANDARDS.
2. WELD SIZE SHALL BE DETERMINED BY THE THICKEST MEMBER JOINED; MINIMUM WELD SIZE SHALL BE 3/16" FILLET FOR MATERIAL THICKNESSES UP TO AND INCLUDING 1/2", 1/4" FILLET FOR THICKNESSES OVER 1/2" TO 3/4", AND 5/16" FILLET FOR MATERIAL THICKNESSES OVER 3/4". ALL WELDS SHALL BE SINGLE-PASS WELDS.

POST BASE - STEEL

NTS

0512-002



NOMINAL BEAM DEPTH, INCHES	ROWS OF BOLTS	BOLT DIA, INCHES	DOUBLE ANGLE, LENGTH, INCHES	COMMENTS
36	10	7/8"	2'-6"	ANGLE THK = 3/8"
33	9	7/8"	2'-3"	ANGLE THK = 3/8"
30	8	7/8"	2'-0"	ANGLE THK = 3/8"
27	7	3/4"	1'-8 1/2"	-
24	6	3/4"	1'-5 1/2"	-
21	5	3/4"	1'-2 1/2"	-
16-18	4	3/4"	0'-11 1/2"	-
12-15	3	3/4"	0'-8 1/2"	-
8-10	2	3/4"	0'-5 1/2"	-
6	1	3/4"	0'-3"	JL 6"x4"x5/16"
4	1	3/4"	0'-2 1/2"	JL 6"x4"x5/16"

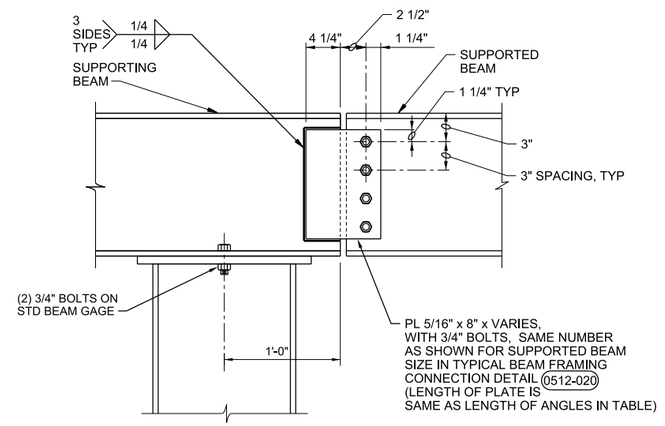
NOTES:

1. ALL BEAM FRAMING CONNECTIONS SHALL CONFORM TO THIS DETAIL UNLESS SPECIFICALLY NOTED OTHERWISE OR APPROVED IN WRITING BY THE ENGINEER.
2. PROVIDE ADDITIONAL 1 1/2" LENGTH TO DOUBLE ANGLE FOR STAGGERED BOLT CONNECTIONS WHEN REQUIRED OR USED.
3. DIMENSION SHALL BE 3" UNLESS OTHERWISE REQUIRED FOR PROPER FABRICATION.

TYPICAL BEAM CONNECTION - STEEL

NTS

0512-020



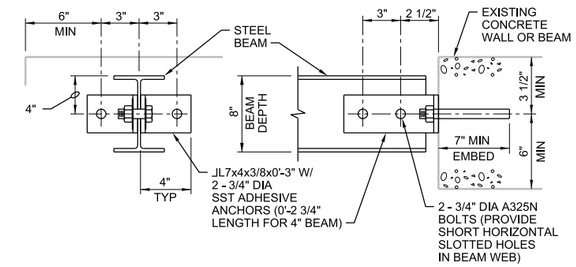
NOTE:

PROVIDE SHIM PLATES AS REQUIRED.

BEAM SPLICE - STEEL

NTS

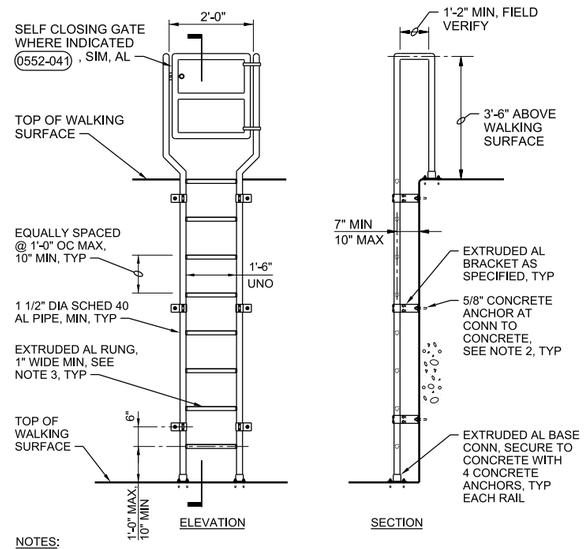
0512-029



BEAM/ WALL CONNECTION - STEEL

NTS

0512-056



ELEVATION SECTION

NOTES:

1. PROVIDE PROTECTION FOR ALUMINUM IN CONTACT WITH CONCRETE AND STEEL, SEE SPECIFICATIONS.
2. PROVIDE SST CONC ANCHORS.
3. PROVIDE CORRUGATED, KNURLED OR DIMPLED SURFACE ON TOP OF RUNG.
4. SELF-CLOSING GATE SHALL HAVE SST SPRINGS AND HARDWARE.

PRE-ENGINEERED PIPE LADDER WITH EXTENSION - ALUMINUM

NTS

0551-101

NO.	DATE	REVISION	BY	APVD
DSGN	DR LANGE	DR	PA KARABAN	CHK	C ANSON	APVD	AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

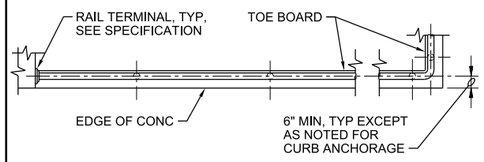
JACOBS

STANDARD DETAILS

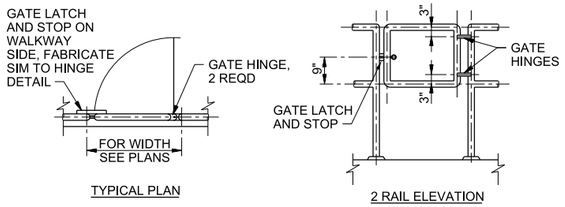
NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	090-STD-901
SHEET	40 of 45

BID DOCUMENTS

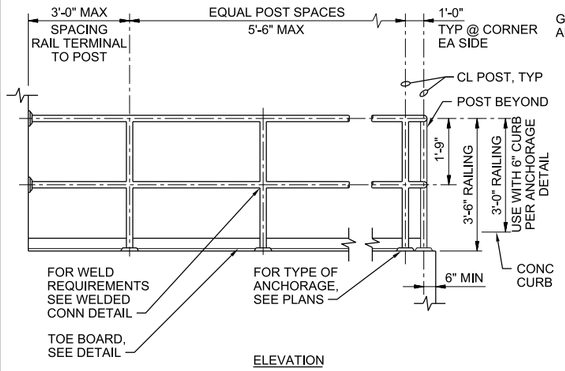


PLAN

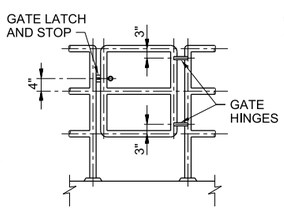


TYPICAL PLAN

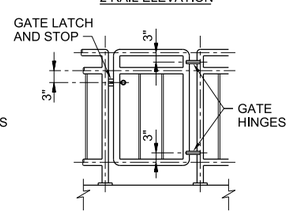
2 RAIL ELEVATION



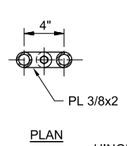
ELEVATION



3 RAIL ELEVATION



PICKET



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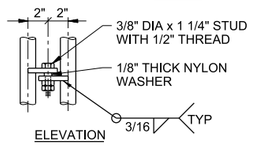
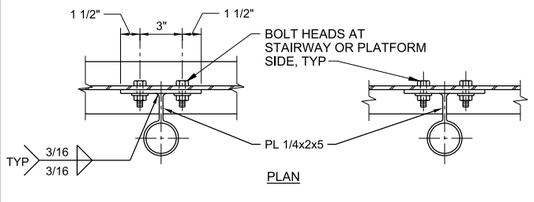


ELEVATION

HINGE

NOTES:

1. AT CONTRACTOR'S OPTION FABRICATE HINGES OR PROVIDE OTHER HINGES AS SPECIFIED. GALVANIZE AFTER ALL WELDING.



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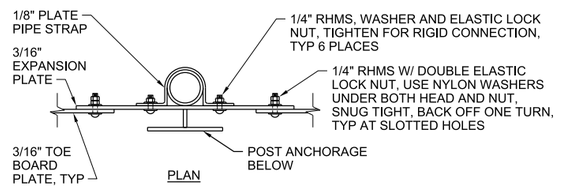
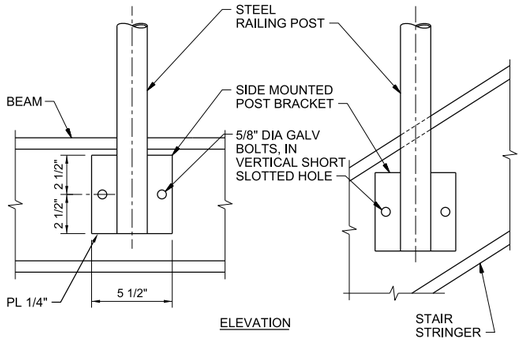
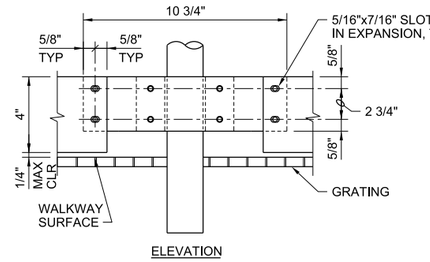


PLAN

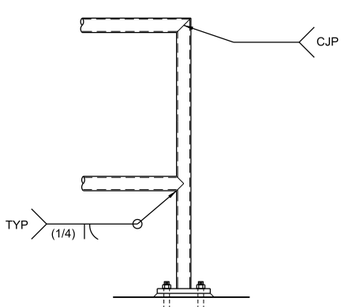


ELEVATION

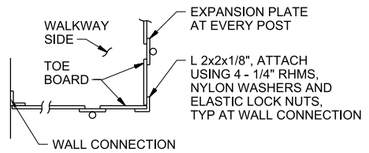
TYPE 'A'



ELEVATION



WELDING CONNECTION



TOE BOARD PLAN

(INSIDE CORNER SHOWN, OUTSIDE CORNER SIMILAR)

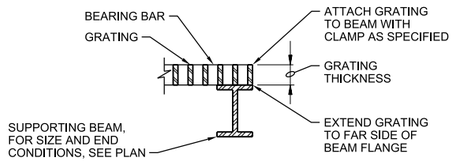
NOTES:

1. TOE BOARD TO BE MOUNTED ON WALKWAY SIDE OF RAILING.
2. RHMS = ROUND HEAD MACHINE SCREW.

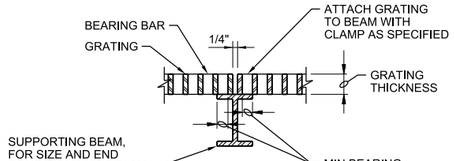
RAILING - 2 RAIL - STEEL

NTS

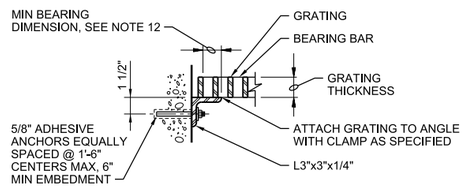
0552-041



GS-2 - ONE SIDED



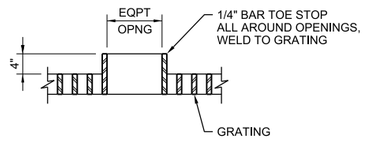
GS-2 - TWO SIDED



NOTES:

1. USE GS-3 ONLY FOR LIGHT DUTY GRATING, TYPE 'A'.
2. INSTALL ANCHORS MAXIMUM 4" FROM EACH END.
3. WHEN ANCHOR IS WITHIN 4" OF A CONCRETE EDGE, UTILIZE MANUFACTURER'S LOW-TORQUE INSTALLATION PROCEDURES.

GS-3



EQUIPMENT OPENINGS

GENERAL NOTES:

1. GRATING SPAN IS INDICATED BY ←→, SEE PLAN.
2. INDIVIDUAL GRATING SECTIONS SHALL NOT EXCEED 3'-0" IN WIDTH OR WEIGH MORE THAN 150 POUNDS.
3. SHOP DRAWINGS BASED ON FIELD DIMENSIONS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO FABRICATION.
4. BEARING BAR THICKNESS FOR GRATING TO BE 3/16" MINIMUM. SEE SPECIFICATIONS FOR SPACING OF BEARING AND CROSS BARS.
5. BAND ALL EDGES. MATCH DEPTH OF BEARING BAR.
6. THE HORIZONTAL CLEARANCE BETWEEN THE GRATING AND GRATING SUPPORTS SHALL NOT BE LESS THAN 1/4" NOR GREATER THAN 1/2" AND AS SPECIFIED.
7. MINIMUM BEARING HORIZONTAL DIMENSION = 1" FOR GRATING DEPTH 2 1/4" OR LESS. MINIMUM BEARING HORIZONTAL DIMENSION = 2" FOR GRATING DEPTH GREATER THAN 2 1/4"

STANDARD GRATING

NTS

0553-001

NO.	DATE	REVISION	BY	APVD
DSGN	DR LANGE	DR PA KARABAN	CHK C ANSON	APVD AG MYERS

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

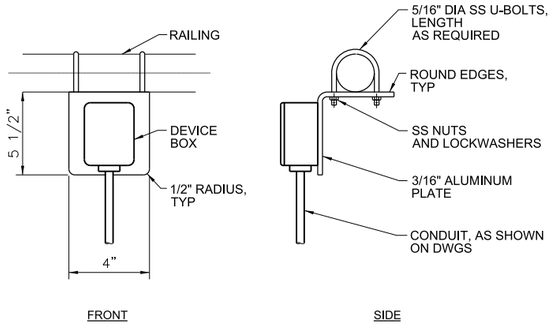
JACOBS

STANDARD DETAILS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	090-STD-902
SHEET	41 of 45

BID DOCUMENTS



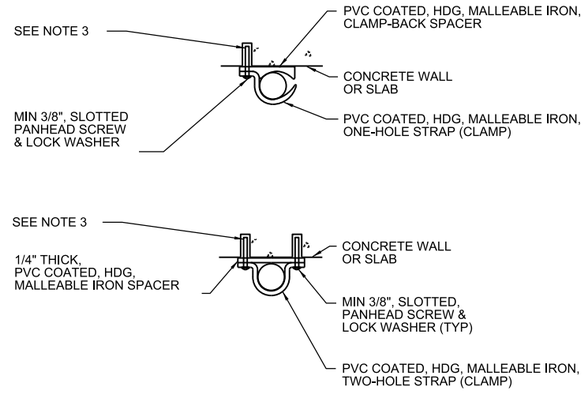
NOTES:

1. ALL HARDWARE SHALL BE STAINLESS STEEL. USE WASHER AND SPLIT LOCK WASHERS AT ALL NUTS
2. ALL EDGES AND ENDS OF U-BOLTS WHICH HAVE BEEN CUT SHALL BE FILED SMOOTH

DEVICE MOUNTING, AT RAILING

NTS

2605-004



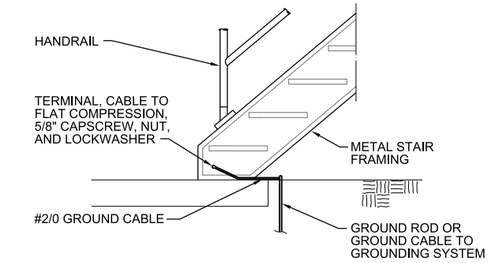
NOTES:

1. THESE DETAILS ARE TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING.
2. STRAP TO BE SPACED AT SPECIFIED INTERVALS.
3. CONCRETE ANCHOR, SIZE AND NUMBER AS REQUIRED BY CALCULATIONS.
4. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

CONDUIT MOUNTING USING STRAPS

NTS

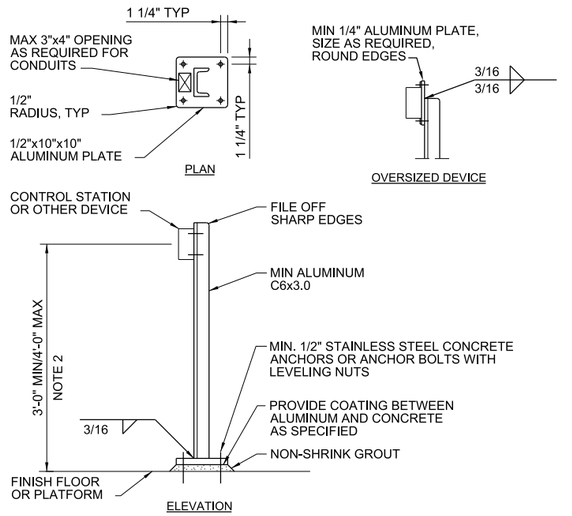
2605-017



GROUNDING GENERAL STAIRWAY

NTS

2605-207



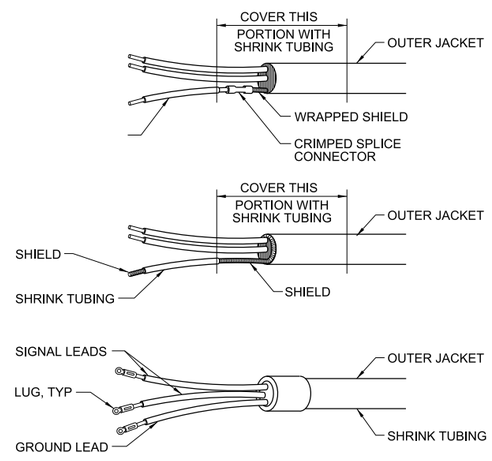
NOTES:

1. ALL MOUNTING HARDWARE SHALL BE STAINLESS STEEL. USE WASHERS AND SPLIT-LOCK WASHERS UNDER ALL NUTS AND BOLTS.
2. FOR HEIGHTS EXCEEDING 4'-0" OR WEIGHTS OF MOUNTED EQUIPMENT EXCEEDING 50 LBS, SIZE POST AND CONNECTION FOR LATERAL LOADS. EXTEND POSTS TO STRUCTURE ABOVE WHERE REQUIRED BY CALCULATION. SUBMIT FINAL DESIGN AND CALCULATIONS.

DEVICE MOUNTING, PEDESTAL

NTS

2605-011



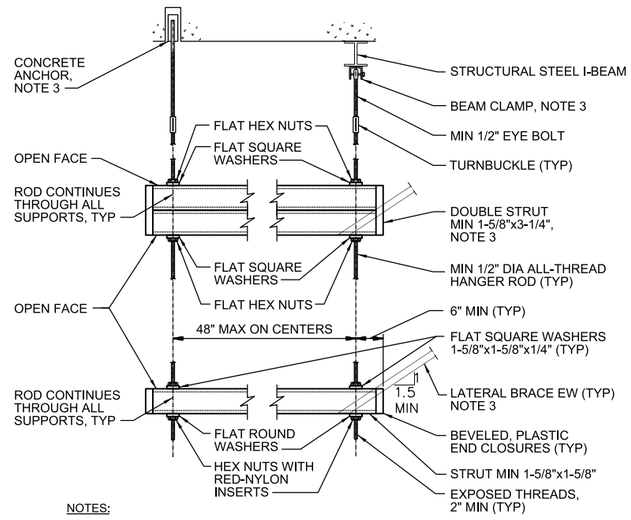
NOTES:

1. ALL SHIELDED INSTRUMENTATION CABLE SHALL BE TERMINATED IN ACCORDANCE WITH THIS DETAIL WHERE GROUNDING IS REQUIRED.

TERMINATION OF SHIELDED INSTRUMENTATION CABLE

NTS

2605-100



NOTES:

1. CONDUIT SHALL BE MOUNTED ON STRUT AS SHOWN ON 2605-302
2. INSTALL SUPPORTS AT 5'-0" MAXIMUM INTERVALS.
3. DETERMINE SPAN AND TYPE OF SUPPORTS, LOCATE SUPPORTS, AND SIZE SUPPORT RODS, CONNECTIONS AND BRACES PER MANUFACTURERS RECOMMENDATIONS AND LATERAL REQUIREMENTS.
4. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

CONDUIT SUPPORT SYSTEM

NTS

2605-301

NO.	DATE	DSGN	DR	CHK	APVD	BY
		IT HAMMONS	JL GUYTON	RJ WOOD	APVD	AG MYERS

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

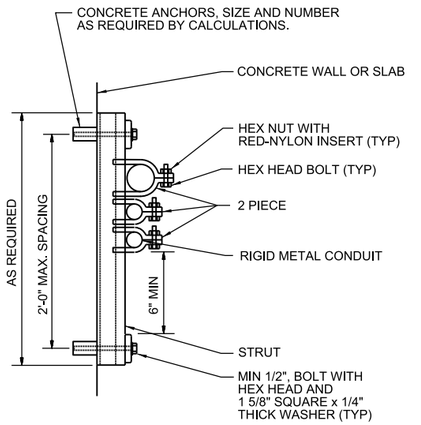
JACOBS

STANDARD DETAILS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	090-STD-9003
SHEET	42 of 45

BID DOCUMENTS



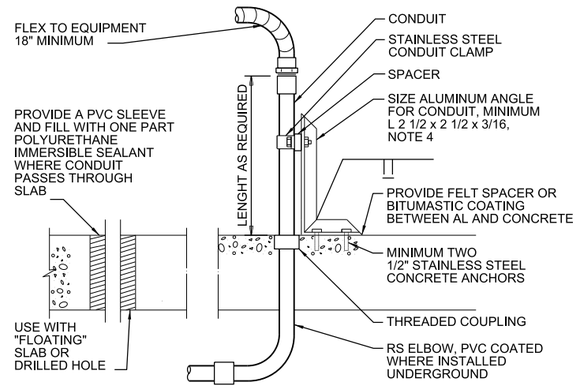
NOTES:

1. THIS DETAIL IS TYPICAL FOR BOTH VERTICAL AND HORIZONTAL MOUNTING.
2. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

MULTIPLE CONDUIT MOUNTING USING STRUT

NTS

2605-302



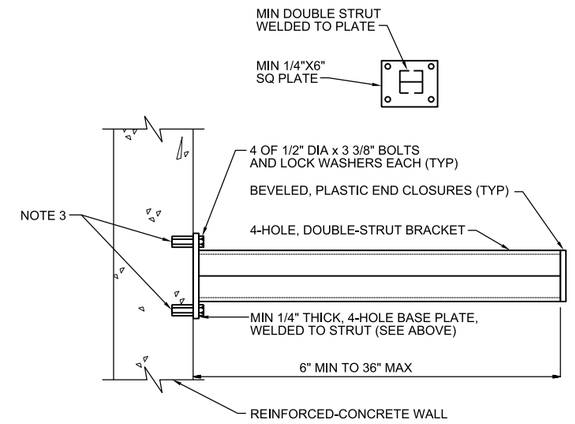
NOTES:

1. PROVIDE SUPPORT FOR ALL METAL CONDUITS WHICH EXTEND MORE THAN 18 INCHES OUT OF THE SLAB WITHIN 3 INCHES OF THE END OF THE CONDUIT.
2. PROVIDE SUPPORT FOR ALL PVC CONDUIT WITHIN 3 INCHES OF THE END OF THE CONDUIT.
3. THIS DETAIL SHALL BE USED FOR SUPPORT OF ALL CONDUITS WHICH ARE NOT OTHERWISE SUPPORTED IN A RIGID MANNER SUCH AS AGAINST AN EQUIPMENT BASE, WALL, COLUMN, ETC, AS REQUIRED ABOVE.
4. FOR ANY ANGLE GREATER THAN 2'-6" TALL, SIZE ANGLE SUPPORT AND ANCHORS FOR SEISMIC LOADS.

CONDUIT TRANSITION AND SUPPORT

NTS

2605-305



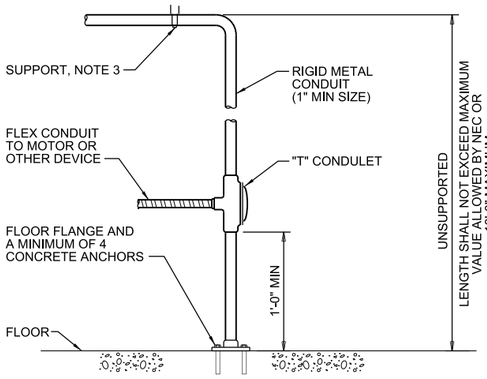
NOTES:

1. CONDUIT SHALL BE MOUNTED ON STRUT AS SHOWN ON 2605-302
2. INSTALL SUPPORTS AT 5'-0" MAXIMUM INTERVALS.
3. EXPANSION ANCHOR, LENGTH AS REQUIRED FOR RIGID ASSEMBLAGE (TYP).
4. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

CONDUIT SUPPORT SYSTEM FOR WALLS

NTS

2605-320



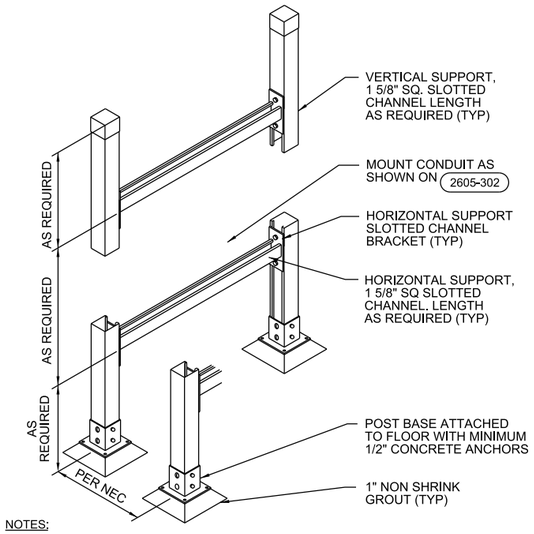
NOTES:

1. INSTALLATION OF CONDUIT TO A MOTOR OR OTHER DEVICE WHERE A FLEXIBLE CONNECTION IS REQUIRED AND NO JUNCTION BOXES OR CONTROL DEVICES ARE REQUIRED SHALL BE MADE IN ACCORDANCE WITH THIS DETAIL.
2. ALL HARDWARE SHALL BE STAINLESS STEEL.
3. SIZE TOP AND ANY INTERMEDIATE LATERAL SUPPORTS AS REQUIRED FOR STABILITY AND SEISMIC LOADS. SEE GENERAL ELECTRICAL CONSTRUCTION NOTES ON DRAWINGS.

CONDUIT TO EQUIPMENT FROM CEILING

NTS

2605-303



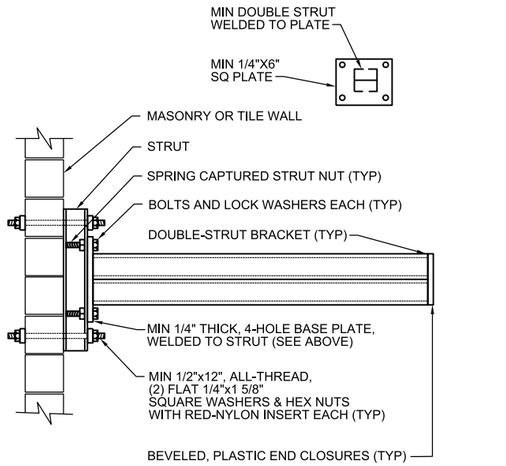
NOTES:

1. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

HORIZONTAL CONDUIT SUPPORT

NTS

2605-319



NOTES:

1. CONDUIT SHALL BE MOUNTED ON STRUT AS SHOWN ON 2605-302
2. INSTALL SUPPORTS AT 5'-0" MAXIMUM INTERVALS.
3. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

CONDUIT SUPPORT SYSTEM FOR WALLS

NTS

2605-321

NO.	DATE	DSGN	DR	CHK	APVD	BY	APVD
		IT HAMMONS	JL GUYTON	RJ WOOD		AG MYERS	

REVISION

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

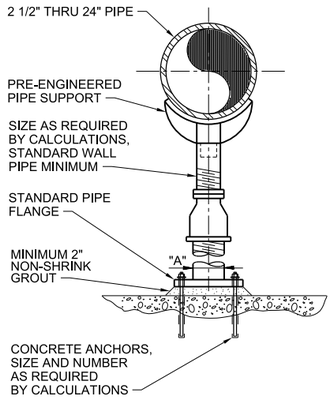
JACOBS

STANDARD DETAILS

BID DOCUMENTS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	090-STD-904
SHEET	43 of 45



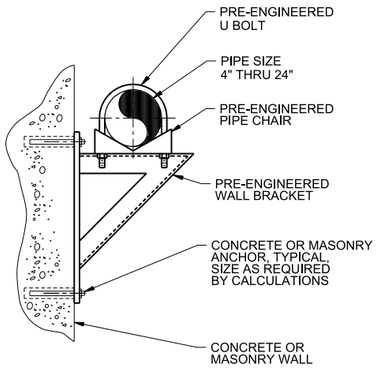
DIMENSION TABLE	
PIPE SIZE	"A" MINIMUM NOMINAL PIPE SIZE
2-1/2"	2-1/2"
3"	2-1/2"
4"	3"
6"	3"
8"	3"
10"	3"
12"	3"
14"	4"
16"	4"
20"	6"
24"	6"

NOTE:
SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

PIPE SUPPORT - SADDLE SUPPORT PEDESTAL TYPE - ADJUSTABLE

NTS

4005-500

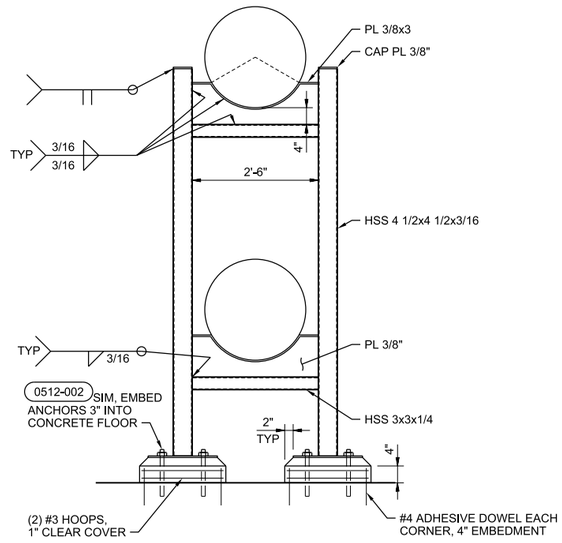


NOTES:
1. WALL BRACKET SHALL BE MEDIUM HEAVY DUTY AS REQUIRED BY CALCULATIONS.
2. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

PIPE SUPPORT - WALL MOUNTED MEDIUM

NTS

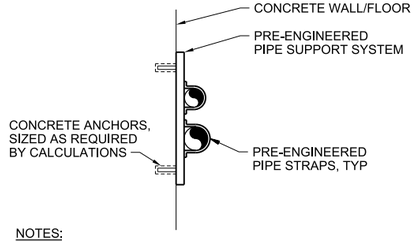
4005-508



PIPE SUPPORT

NTS

4005-518

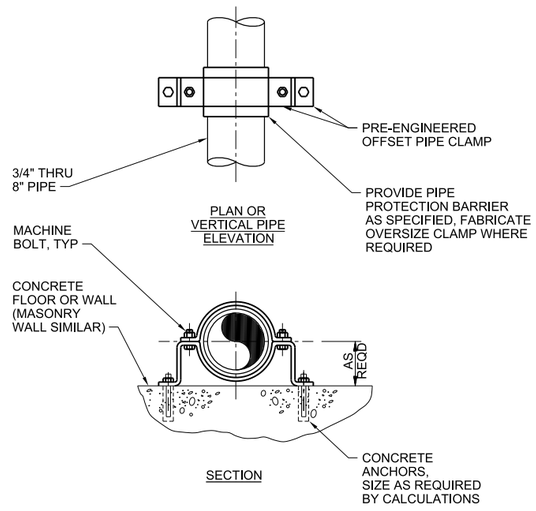


NOTES:
1. PROVIDE PIPE PROTECTION BARRIER AS SPECIFIED.
2. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORAGES AS SPECIFIED.
3. MAXIMUM OF TWO PIPES PER CHANNEL. MAX PIPE SIZE IS 6".

WALL/FLOOR PIPE STRUT SUPPORT SYSTEM

NTS

4005-521

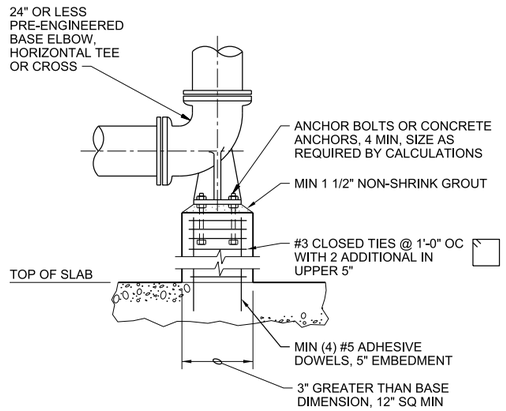


NOTES:
1. ONLY FOR VERTICAL OR FLOOR MOUNTED PIPES.
2. SUBMIT FINAL DESIGN AND CALCULATIONS FOR SUPPORT AND ANCHORAGE AS SPECIFIED.

PIPE SUPPORT - WALL MOUNTED

NTS

4005-505

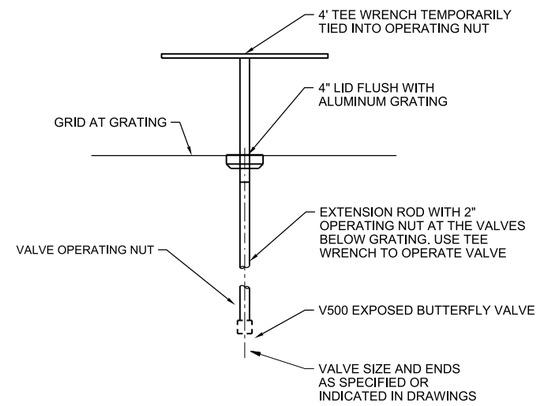


NOTES:
1. SUBMIT FINAL DESIGN DRAWINGS AND CALCULATIONS OF SUPPORTS AND ANCHORAGES AS SPECIFIED.
2. MINIMUM COMPONENT AND CONNECTION SIZES SHOWN. FURNISH LARGER SIZES AS REQUIRED BY CALCULATIONS.
3. USE SIMILAR FOR SUPPORT OF HORIZONTAL TEE OR CROSS.

BASE BEND

NTS

4005-517



BUTTERFLY VALVE OPERATING NUT

NTS

4027-192

NO.	DATE	DSGN	REVISION	CHK	BY	APVD
		TJ ELLIOTT	DR	CJ DAHL	LM MOHR	APVD
					AG MYERS	

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

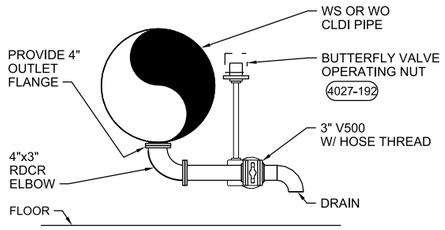
JACOBS

STANDARD DETAILS

BID DOCUMENTS

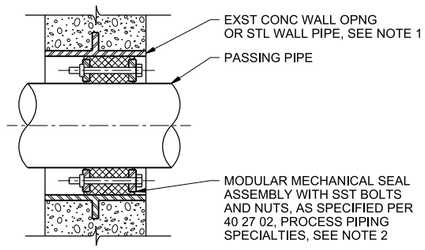
NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	090-STD-9005
SHEET	45 of 45



DRAIN
NTS

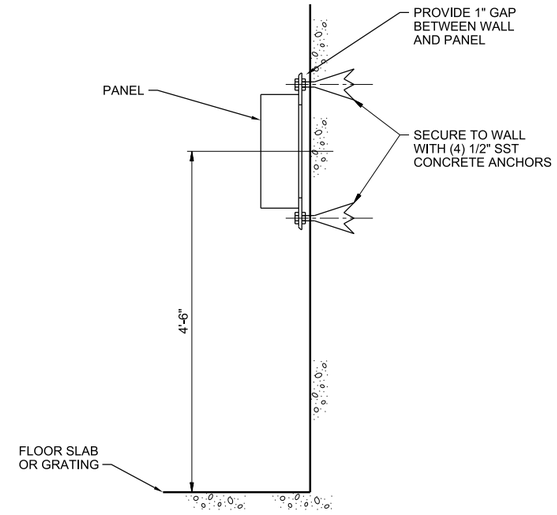
4027-193



NOTES:
1. FOR EXISTING CONCRETE WALL PENETRATION, CORE DRILL THROUGH WALL AND CLEAN CORED HOLE. COAT OPENING INTERIOR AS SPECIFIED PER 09 90 00, PAINTINGS AND COATINGS.
2. IF HYDROSTATIC PRESSURE IS PRESENT, PROVIDE TWO (2) MODULAR MECHANICAL SEALS.

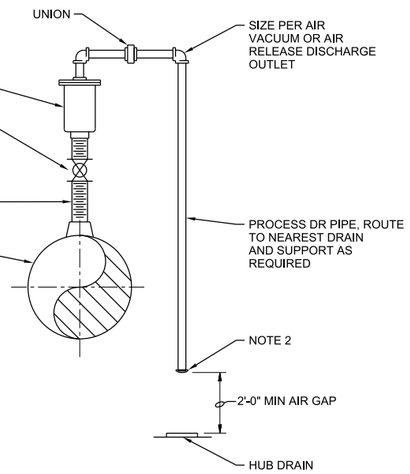
WALL/FLOOR PIPE PENETRATION SEAL
NTS

4027-607



WALL MOUNTED PANEL OR INSTRUMENT INSTALLATION
NTS

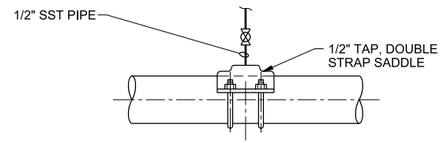
4091-388



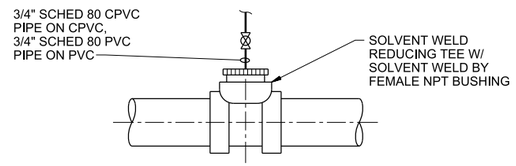
NOTES:
1. DETAIL APPLIES TO VALVES 2" OR SMALLER. PROVIDE SERVICE SADDLE IF REQUIRED BY PIPE SUPPLIER.
2. INSTALL 24 OR 30 MESH SST MUSHROOM VENT SCREEN WITH FNPT THREADS MATCHING VENT PIPE SIZE.

AIR RELEASE VALVE ASSEMBLY
NTS

4027-195



CEMENT LINE STEEL PIPE, CAST IRON PIPE AND DUCTILE IRON PIPE

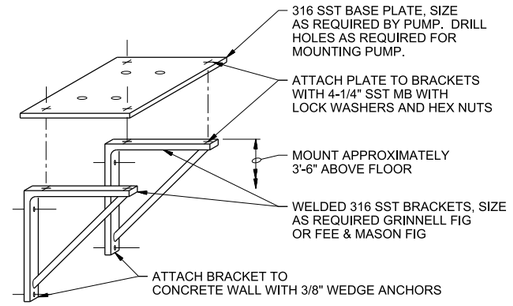


PVC AND CPVC PIPE

NOTE:
1. BALL VALVE SHOWN, PROVIDE VALVE APPROPRIATE FOR THE SERVICE.

PRESSURE CONNECTION INSTALLATION
NTS

4091-305



SMALL PUMP SUPPORT
NTS

4442-715

NO.	DATE	DSGN	DR	CHK	BY
		TJ ELLIOTT	CJ DAHL	LM MOHR	AG MYERS

REVISION

APVD APVD

CITY OF ANN ARBOR, MICHIGAN
WATER TREATMENT SERVICES UNIT
WTP UV DISINFECTION SYSTEM

JACOBS

STANDARD DETAILS

BID DOCUMENTS

NOT TO SCALE
VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1"

DATE	JANUARY 2019
PROJ	709084
DWG	090-STD-9006
SHEET	46 of 45