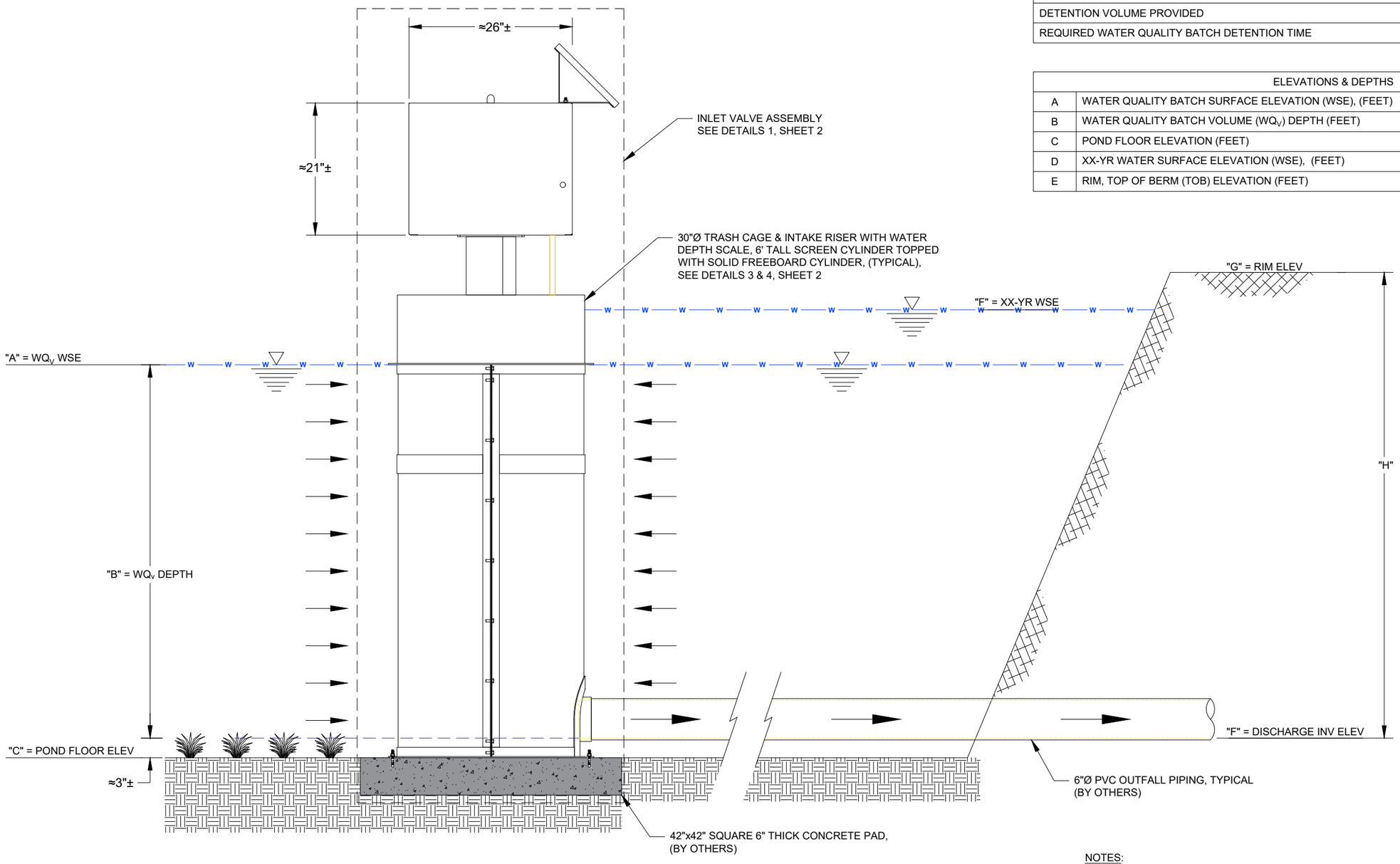
smartPOND™ INLET VALVE CONFIGURATION IN DETENTION SYSTEM

DISCHARGE RATE AND DETENTION SETTING	
ALLOWABLE DISCHARGE RATE ($Q_{ALLOWABLE}$)	X.XX-FT^3/S (XX.X-GPM)
REQUIRED DETENTION VOLUME	X.XX-FT^3
DETENTION VOLUME PROVIDED	X.XX-FT^3/S
REQUIRED WATER QUALITY BATCH DETENTION TIME	12-HOURS

ELEVATIONS & DEPTHS		
A	WATER QUALITY BATCH SURFACE ELEVATION (WSE), (FEET)	XXX.XX'
B	WATER QUALITY BATCH VOLUME (WQ_V) DEPTH (FEET)	X.XX'
C	POND FLOOR ELEVATION (FEET)	XXX.XX'
D	XX-YR WATER SURFACE ELEVATION (WSE), (FEET)	XXX.XX'
E	RIM, TOP OF BERM (TOB) ELEVATION (FEET)	XXX.XX'



NOTES:
1. ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.
2. HIGH FLOOD BYPASS FEATURES OF DETENTION SYSTEM NOT SHOWN ON THIS DETAIL.

PROJECT:
PROJECT NAME
CITY, STATE

MODEL:
INLET VALVE
FOR
BATCH DETENTION

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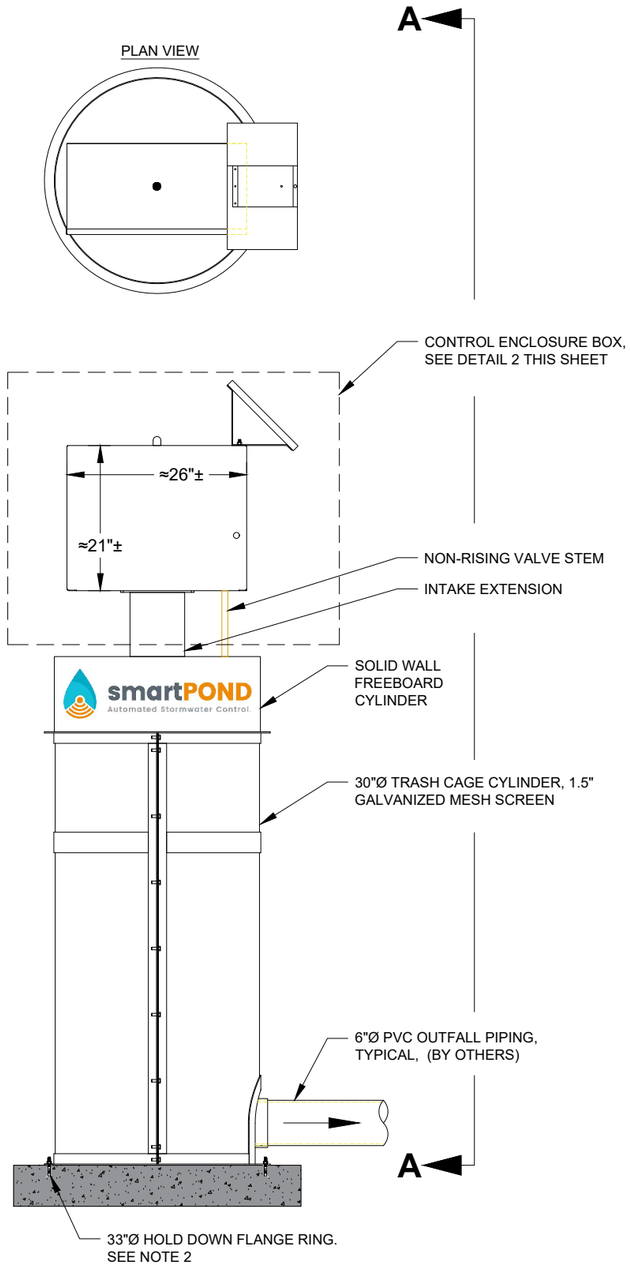
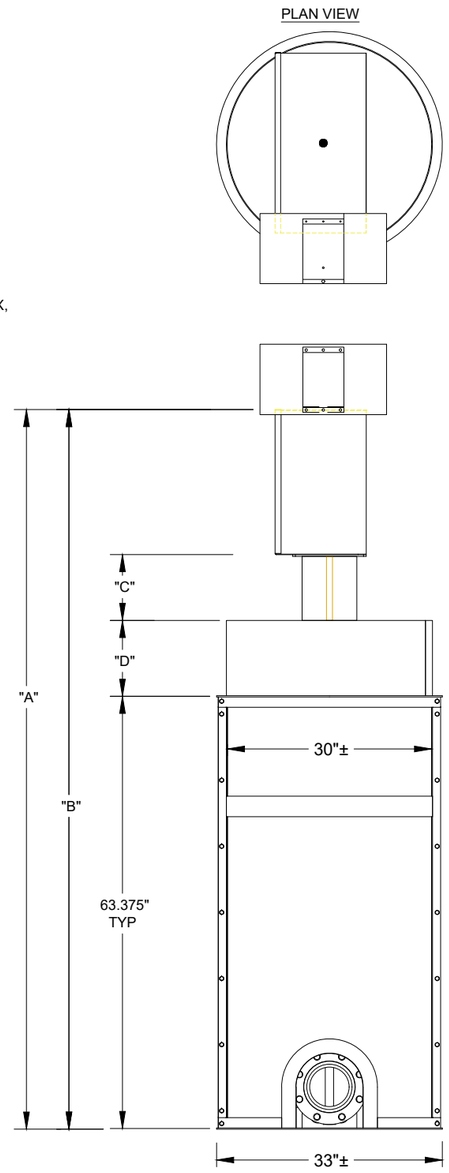
REVISION NO. 0
DATE 10/23/2023
SHEET NO. 1

DETAIL 1 - INLET VALVE ASSEMBLY

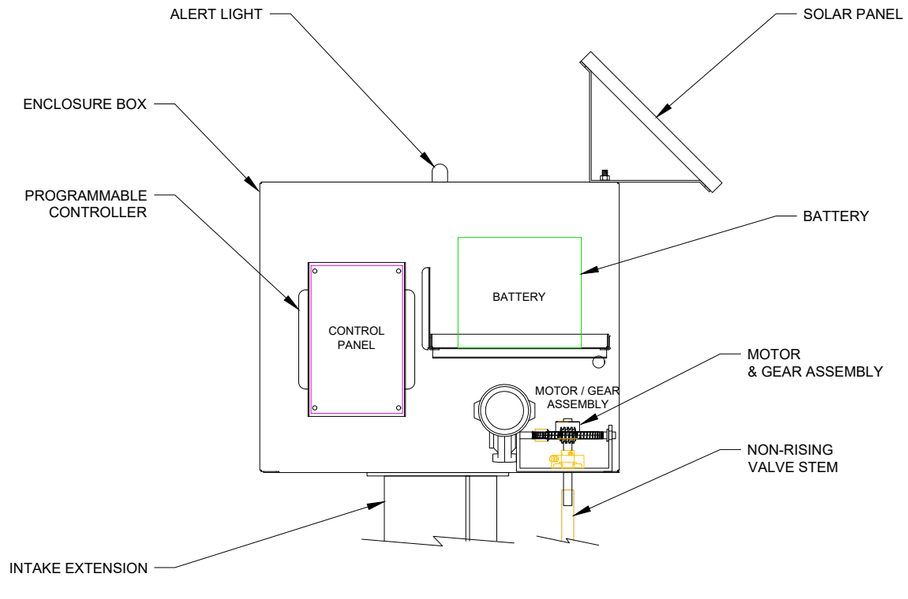
DESIGN NOTE: SEE DETAIL 1., SHEET 3 FOR VALVE ASSEMBLY
INTERNALS: 8" SQUARE INTAKE RISER & BUTTERFLY VALVE



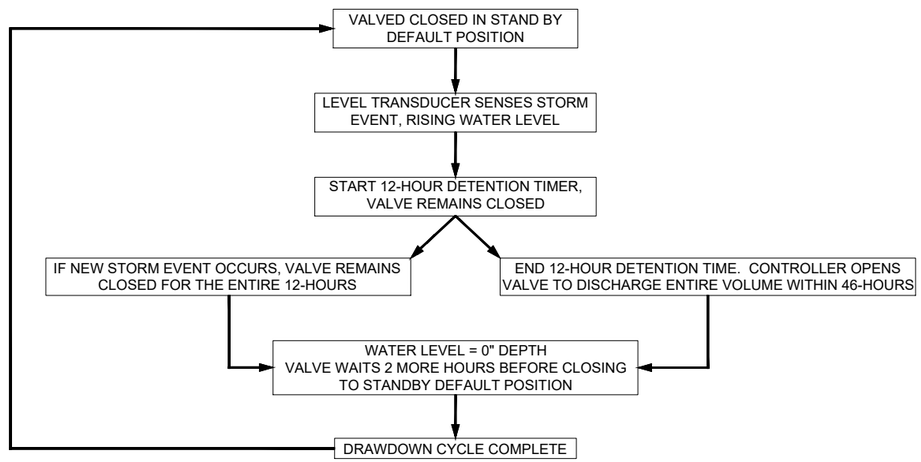
ELEVATION A-A VIEW



DETAIL 2 - CONTROL ENCLOSURE BOX



DETAIL 3 - PROGRAMMABLE LOGIC FLOW CHART, INLET VALVE OPERATION FOR WATER QUALITY BATCH DETENTION



VALVE ASSEMBLY NOTES:
1. DESIGN HEIGHT OF TRASH CAGE AND INTAKE RISER TO MATCH REQUIRED DETENTION DEPTHS.
2. USE 4X, ½"Ø X 3.5" SS WEDGE ANCHOR BOLTS TO CONNECT OUTFALL ASSEMBLY TO CONCRETE PAD, 2.5" MINIMUM EMBEDMENT.

INLET VALVE ASSEMBLY HEIGHTS		
A	OVERALL HEIGHT OF INLET VALVE ASSEMBLY (FEET)	XX.XX'
B	OVERALL HEIGHT OF INTAKE (FEET)	XX.XX'
C	INTAKE FREEBOARD EXTENSION HEIGHT (FEET)	X.XX'
D	HEIGHT OF SOLID FREEBOARD CYLINDER (FEET)	X.XX'

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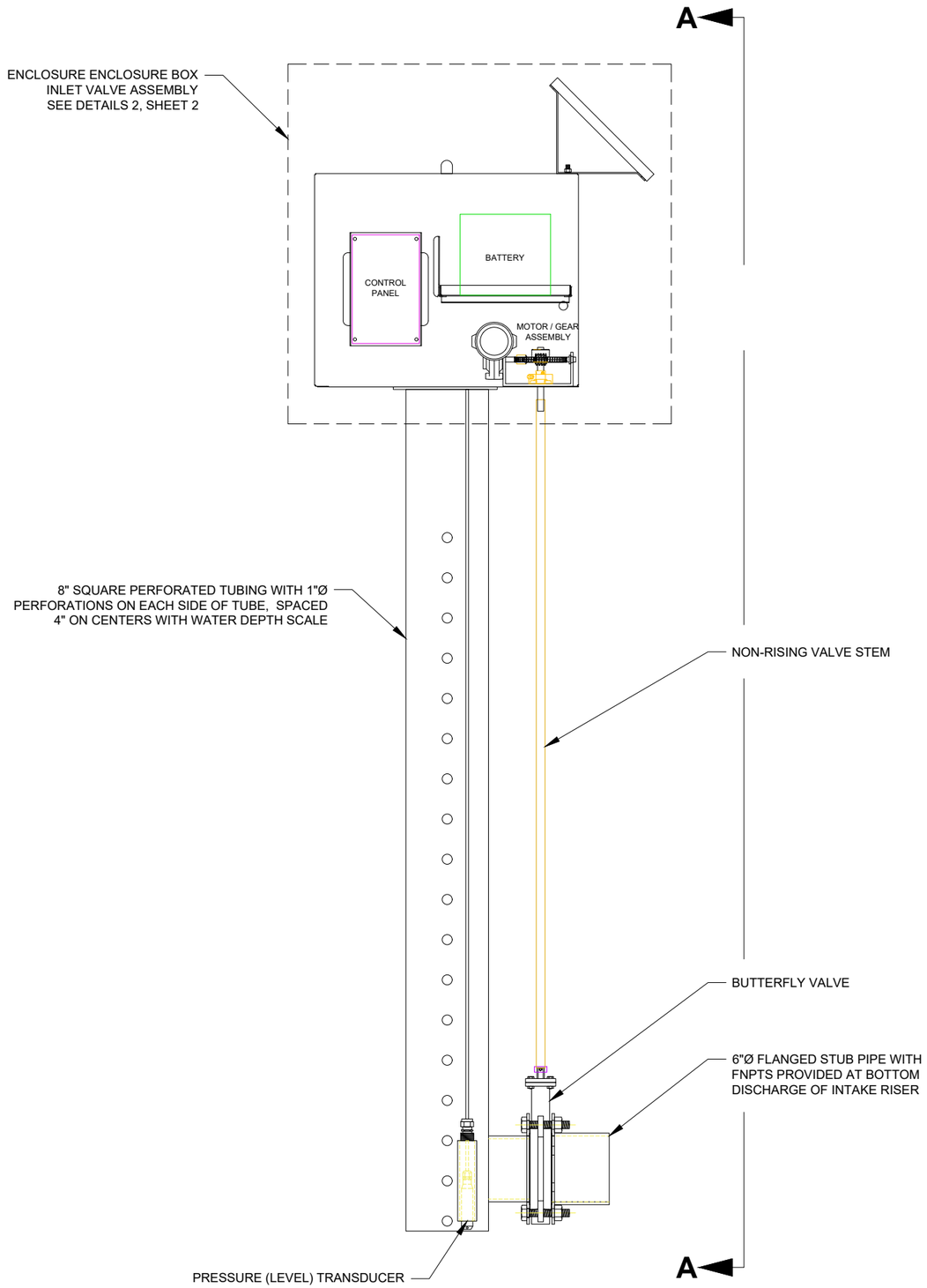
smartPOND™ VAULT VALVE

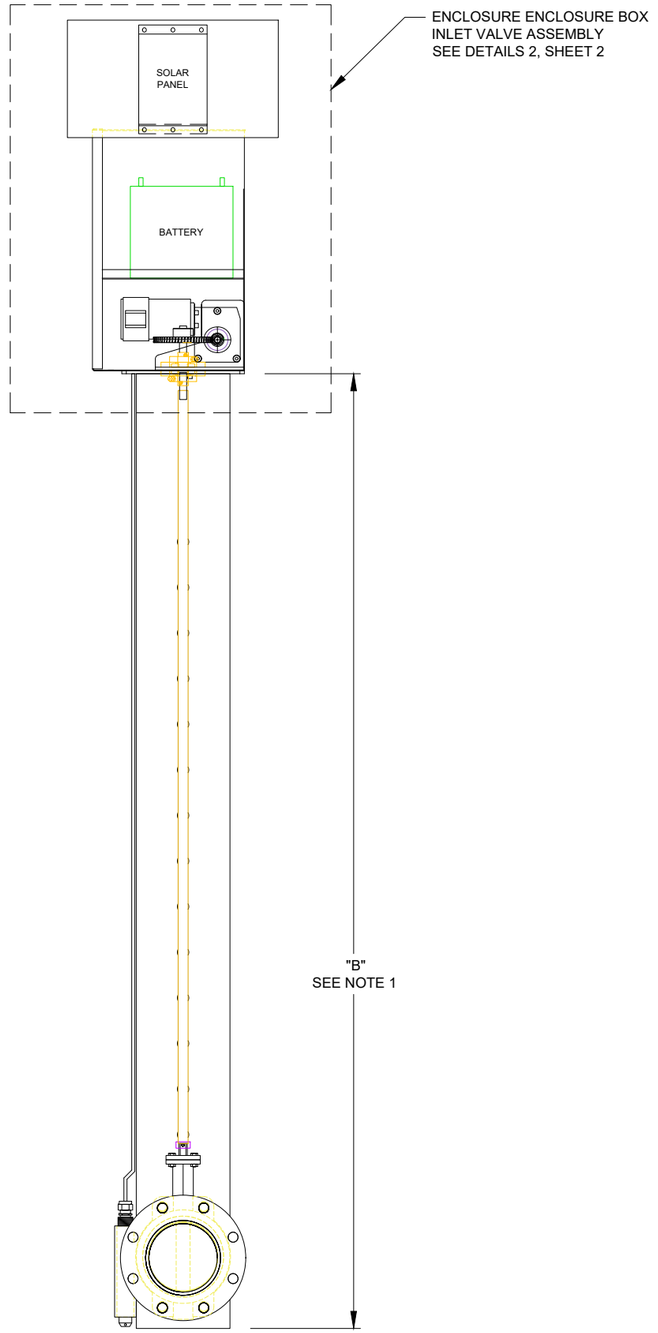
INLET VALVE DETAILS

REVISION NO. 0
DATE 10/23/2023
SHEET NO. 2

DETAIL 1 - INTAKE RISER & BUTTERFLY VALVE



ELEVATION A-A VIEW



INTAKE RISER NOTE:
1. SEE VALUE "B" IN INLET VALVE ASSEMBLY HEIGHTS TABLE AT THE BOTTOM OF ELEVATION A-A VIEW, SHEET 2.

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INLET VALVE DETAILS

REVISION NO.
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DATE
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SHEET NO.
3

smartPOND INLET VALVE SPECIFICATIONS

CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS), WITH PROGRAM CONTROLLED INLET VALVE

1. **CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS) DEVICE**: THE CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS), SHOWN ON THE PLANS AS THE INLET ASSEMBLY SHALL BE A smartPOND™ INLET VALVE PROVIDED BY:

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   WWW.CONVERGENTWATER.COM

   THE smartPOND™ INLET VALVE SHALL SHALL PROVIDE FOR ACTIVE MANAGEMENT OF DETAINED STORMWATER VOLUME AND / OR ITS ALLOWABLE DISCHARGE RATE. THE smartPOND™ INLET VALVE SHALL BE PROGRAMMABLE TO DETAIN A SPECIFIED VOLUME OF STORMWATER FOR A SPECIFIED REQUIRED PERIOD OF TIME AND / OR PROGRAMMED TO CONTROL THE OUTFLOW RATE TO MATCH THE MAXIMUM ALLOWABLE DISCHARGE RATE OR BOTH OF THIS OPERATIONS SIMULTANEOUSLY. THE smartPOND™ INLET VALVE MAXIMIZES THE DETENTION TO PROMOTE THE SETTLEMENT OF SOLIDS BEFORE AUTOMATICALLY DEWATERING THE DETENTION POND COMPLETELY. FOR STORMWATER RETENTION SYSTEMS, THE SYSTEM SHALL BE PROGRAMMED TO MANAGE THE REQUIRED RETENTION VOLUME WHILE MAINTAINING A SPECIFIED AMOUNT OF CAPACITY FOR FLOOD STORAGE OR OTHER USE.

   THE FOLLOWING SPECIFICATIONS DESCRIBE THE COMPONENTS, GENERAL FUNCTIONS, AND APPLICATIONS OF A CONTINUOUSLY MONITORED AUTOMATED STORMWATER SYSTEM (C-MASS), USING THE PROGRAMMED smartPOND™ INLET VALVE.

   THIS smartPOND™ INLET VALVE SHALL FUNCTION AS AN ELECTRONICALLY CONTROLLED, SOLAR POWERED STORMWATER MANAGEMENT DEVICE, PROVIDING PRECISION STORMWATER VOLUME MANAGEMENT CAPABILITIES AND REAL-TIME DATA. USING SENSORS, SOLAR POWER, AN ELECTRONIC ACTUATOR, AND AN INTERNET-BASED CONTROL INTERFACE. THE smartPOND™ INLET VALVE CONNECTS TO A SPECIALIZED PERFORATED INTAKE RISER INSIDE THE STORMWATER IMPOUNDMENT AREA TO ENABLE PRECISE CONTROL OF REQUIRED DETAINED OR RETAINED STORMWATER CONTROL VOLUMES AND ALLOWABLE DISCHARGE RATES AUTOMATICALLY OR IN REAL TIME. THE smartPOND™ ASSEMBLY CAN BE CONFIGURED ABOVE GROUND OR BELOW IN SMALL MANHOLE OR INLET STRUCTURE.

   1.1 PRE-PROGRAMMED INLET VALVE CONTROL: THE INLET VALVE SHALL BE PRE-PROGRAMMED TO EXECUTE COMMANDS BASED ON STORM EVENTS, REQUIRED CONTROL VOLUMES, ALLOWABLE DISCHARGE RATES AND DETENTION TIME.

   1.1.1 BATCH DETENTION FUNCTION FOR STORMWATER QUALITY: THE smartPOND™ INLET VALVE MAY BE PROGRAMMED TO PROVIDE BATCH DETENTION TO ACHIEVE STORMWATER QUALITY EFFLUENT GOAL OF 80% OR MORE REMOVAL OF TOTAL SUSPENDED SOLID (TSS) REMOVAL BY HOLDING THE WATER QUALITY VOLUME (WQ_V) FOR SETTLEMENT TREATMENT, FOR A REQUIRED PERIOD OF TIME. HOLDING TIMES ARE TYPICALLY SET FORTH IN STORMWATER MANAGEMENT REGULATIONS AS 12, 24 OR 48-HOURS.

   1.2 REAL-TIME MONITORING (OPTIONAL): THE smartPOND™ SHALL COME WITH TELEMETRY THAT SHALL ENABLE REAL-TIME REMOTE MONITORING & VALVE OPERATION CAPACITIES THROUGH A SECURE WEB-BASED USER INTERFACE. THIS INTERFACE ENABLES COMMANDS TO BE SENT TO THE INLET VALVE TO CHANGE THE VALVES POSITION TO CONTROL DISCHARGE RATE AND POND DEPTH. THROUGH THIS SECURE WEB-BASED USER INTERFACE THE DETENTION POND'S STORAGE-STAGE AND DISCHARGE RATE CAN BE MONITORED IN REAL-TIME. THE SECURE WEB-BASED USER INTERFACE SHALL ALSO ENABLE A USER TO:

   - CONTROL THE INLET VALVE, EITHER OPEN OR CLOSE.
   - DETERMINE THE WATER SURFACE ELEVATION (WSE) OR POND DEPTH.
   - DETERMINE IF TRASH OR DEBRIS IS SURROUNDING THE TRASH CAGE AND INTAKE RISER.
   - RECEIVE MAINTENANCE ALERTS SUCH AS: LOW BATTERY, INLET VALVE FAILURE, ETC.
   - MAINTAIN SPECIFIED WATER SURFACE LEVEL.

   THIS SECURE WEB-BASED USER INTERFACE SHALL PROVIDE LIVE AND HISTORICAL DATA AND PROVIDE THE ALERTS LISTED IN SECTION 4. IT WILL ALSO ENABLE COMMANDS TO BE SENT TO THE INLET VALVE TO CHANGE THE VALVES POSITION TO CONTROL DISCHARGE RATE AND POND DEPTH.

   A COMPLETE SET OF INSTRUCTIONS FOR ACCESSING AND USING THIS SECURE WEB-BASED INTERFACE FOR LONG-TERM OPERATIONS SHALL BE PROVIDED IN THE CONSTRUCTION SUBMITTALS AND COPY OF THESE INSTRUCTION SHALL BE PLACED IN THE ENCLOSURE BOX.

2. **COMPONENTS**: THE smartPOND™ INLET VALVE SHALL BE DEPLOYED ABOVE THE TRASH CAGE WITHIN THE DETENTION POND AND IS COMPRISED OF THE FOLLOWING COMPONENTS:

   2.1 HARDWARE AND CONFIGURATION:

   THE STANDARD smartPOND™ INLET VALVE SYSTEM CONSISTS OF A LOWER AND UPPER COMPONENT: THE LOWER COMPONENT IS THE TRASH CAGE WITH ITS INTERNALS: INTAKE RISER, BUTTERFLY VALVE ASSEMBLY RISER STEM AND PRESSURE TRANSDUCER. THE SECOND, UPPER COMPONENT IS THE LOCKABLE STEEL WEATHERPROOF ENCLOSURE BOX WITH A SOLAR PANEL AND ALERT LIGHT MOUNTED ON ITS TOP. THIS ENCLOSURE CONTROL BOX HOUSES THE PROGRAMMABLE CONTROLLER INSIDE A NEMA-3R BOX, BATTERY, ELECTRIC MOTOR, ACTUATOR GEARING AND AN EXTENDABLE NON-RISING VALVE STEM BETWEEN THE ACTUATOR AND THE 6"Ø BUTTERFLY OF THE INLET VALVE.

   THE ENCLOSURE CONTROL BOX SHALL BE BOLTED TO THE TOP OF THE INLET WITH $\frac{1}{2}$"Ø " STAINLESS STEEL (SS) BOLT, NUTS AND WASHERS.

   THE ENCLOSURE BOX SHOULD BE MOUNTED ABOVE THE MAXIMUM WATER SURFACE ELEVATION (WSE), OF THE DETENTION/DRAINAGE SYSTEM ION.

   2.2 OTHER ELECTRONICS SPECIFICATIONS:

   - MOTOR - OPERATES ON 12-VOLTS AND HAS TWO WIRES CONNECTING TO THE MOTOR CONTROLLER BOARD.
   - BATTERY - THIS IS A GEL BATTERY THAT PROVIDES 12-VOLTS, 30 AMP/HOUR OF POWER TO THE INLET VALVE ASSEMBLY.
   - SOLAR PANEL - PROVIDES 15-WATT CHARGING TO THE 12-VOLT GEL BATTERY.
   - SOLAR CHARGE CONTROLLER - REGULATES THE VOLTAGE AND CURRENT DELIVERED TO THE GEL BATTERY.

   SENSORS:

   - PRESSURE TRANSDUCER - A SENSOR CAPABLE OF STAYING SUBMERSED IN WATER INDEFINITELY AND IS MOUNTED IN CENTER PIPE SPOOL OF THE LOWER PEDESTAL COMPONENT.
   - INLET VALVE POSITION SENSOR - DETERMINES THE POSITION OF THE BUTTERFLY VALVE.

   OPTIONAL SENSORS & HARDWARE:

   - CELL DATA MODEM - REQUIRED FOR REAL TIME CONTROL AND ALERTS.
   - HYDROCARBON SENSOR - THIS OPTIONAL SENSOR MAY BE FITTED TO THE smartPOND™ INLET VALVE TO PERFORM SPECIFIC FUNCTIONS BASED ON THE PRESENCE OF HYDROCARBON CONTAMINATION.
   - VOLTAGE / CURRENT CONVERTER - 120-VOLT ALTERNATING CURRENT CONVERTER TO 12-VOLT DIRECT CURRENT WHEN CONTROL IS POWER BY 120-VOLT AC VIA A POWER CONDUIT DESIGNED IN BY THE ENGINEER AND INSTALLED BY THE CONTRACTOR.

3. **ADDITIONAL COMPONENTS LIST**:

   3.1 INTAKE RISER: THIS SHALL BE A PERFORATED STEEL RISER CONNECTED TO THE 6"Ø BUTTERFLY VALVE AND OUTFALL PIPE WITHIN THE DETENTION POND AREA. THIS INTAKE RISER SHALL BE AN 8" SQUARE STEEL WITH FOUR (4X) 1"Ø HOLES AT 90-DEGREES EACH SIDE OF THE TUBE, EVERY 4 VERTICAL INCHES. THE DISCHARGE OF THIS INTAKE TUBING SHALL HAVE FEMALE NATIONAL PIPE THREADS (FNPT) TO MATCH THE 6"Ø SCHEDULE 40 PVC OUTFALL PIPE.

   3.2 TRASH CAGE: THE TRASH CAGE ATTACHES TO THE PERFORATED RISER WITH A COUPLING AND CALDER PIN PROVIDED WITH THE THE SYSTEM. THE TRASH CAGE SHALL BE COMPRISED OF STEEL BANDING AND A 1.5" X 1.5" MESH TO PREVENT FLOATABLE'S AND OTHER CONTAMINANTS FROM ENTERING AND CLOGGING THE PERFORATED RISER. THE TRASH CAGE WILL SIT 0.5" ABOVE THE BOTTOM OF THE IMPOUNDMENT TO ALLOW THE LAST 0.5" OUT OF THE IMPOUNDMENT.

   3.3 INLET VALVE STEM EXTENSION: THE NON-RISING STEM, AKA: "DRIVE SHAFT" OF THE smartPOND™ SYSTEM MAY BE EXTENDED TO ANY LENGTH NECESSARY FOR DEPLOYMENT CONFIGURATIONS INSTANCES. THE INLET VALVE STEM WILL CONNECT THE BUTTERFLY VALVE OF THE TO THE GEAR ACTUATOR IN THE ENCLOSURE CONTROL BOX LOCATED DIRECTLY ABOVE, AT THE TOP OF THE INLET VALVE ASSEMBLY.

4. **ALERTS**: THE smartPOND™ INLET VALVE WILL INDICATE THE FOLLOWING ALERTS BY ILLUMINATING AN EXTERIORLY VISIBLE RED LIGHT ON TOP OF THE ENCLOSURE BOX:

   - LOW BATTERY
   - LOSS OF FUNCTION
   - INLET VALVE MALFUNCTION
   - HYDROCARBON CONTAMINATION (OPTIONAL)

6. **MAINTENANCE & OPERATION SUBMITTAL**: AN OPERATION AND MAINTENANCE MANUAL SHALL BE PROVIDED, REVIEWED AND APPROVED DURING THE CONSTRUCTION SUBMITTAL PROCESS AND SHALL INCLUDE AT A MINIMUM: GREASING AND LUBRICATION ITEMS AND CYCLE FOR THE ACTUATOR, MOTOR AND VALVE; INSPECTION AND MAINTENANCE OF THE SOLAR PANEL, GEL BATTERY TRASH CAGE AND INTAKE RISER; AND PROCEDURES FOR VALVE OPERATION IN CASE OF TOTAL ELECTRONIC OR MOTOR FAILURE.

7. **SHIPPING AND HANDLING STORAGE**: THE smartPOND™ INLET VALVE IS SHIPPED IN A NEAR-FULLY ASSEMBLED CONFIGURATION AND SHOULD BE STORED LIKEWISE. THE SYSTEMS ARE TRANSPORTED AND STORED ON PALLETS AND MUST REMAIN SECURED VIA STRAPS OR STEEL BANDS TO SAID PALLET AT ALL TIMES. THE SOLAR PANEL IS NOT INSTALLED AT TIMES OF TRANSPORT OR STORAGE AND SHOULD NOT BE INSTALLED UNTIL THE UNIT IS READY TO BEGIN OPERATION. THE BATTERY MAY BE STORED INSIDE THE ELECTRONICS BOX AND IF REMOVED, SHOULD NEVER BE STORED ON A CONCRETE SURFACE.

8. **INSTALLATION**: INSTALL THE smartPOND™ INLET ASSEMBLY FIRST WITHOUT THE SOLAR PANEL. MOUNT SOLAR PANEL WITH THE CONNECTION BOLTS PROVIDED AFTER THE ASSEMBLY IS ANCHORED TO THE CONCRETE PAD USING THE ANCHOR BOLTS CALLED OUT ON THE PLANS. THERE ARE SEVERAL WAYS TO INSTALL THE smartPOND™ INLET VALVE WITH THE KEY BEING STRUCTURED SUPPORT.

9. **SAFETY INFORMATION AND WARNINGS**:

   - ALWAYS KEEP HANDS CLEAR OF THE INLET VALVE AND MOTOR WHEN UNIT IS IN OPERATION.
   - TURN THE POWER SWITCH OFF WHEN DOING ANY ELECTRICAL WORK.
   - DO NOT ENTER THE WATER WHEN THE DEVICE IS ACTIVELY DRAINING WATER.
   - ALWAYS USE PROPER PERSONAL PROTECTION EQUIPMENT (PPE), AND CONFINED SPACE PROTOCOL WHEN SERVICING A INLET VALVE BENEATH GROUND.

10. **PRODUCTS**: THE MANUFACTURER SHALL BE AN ESTABLISHED STORMWATER COMPANY THAT HAS AT LEAST FIVE (5X) INSTALLATIONS OF C-MASS DEVICES THAT HAVE BEEN IN USE AND FUNCTIONAL FOR FIVE (5X) OR MORE YEARS.

11. **QUALITY ASSURANCE AND PERFORMANCE SPECIFICATIONS**: THE QUALITY OF ALL SYSTEM COMPONENTS AND ALL OTHER APPURTENANCES AND THEIR ASSEMBLY PROCESS SHALL BE SUBJECT TO INSPECTION UPON DELIVERY OF THE SYSTEM TO THE WORK SITE. INSTALLATION IS TO BE PERFORMED ONLY BY SKILLED WORK PEOPLE WITH SATISFACTORY RECORD OF PERFORMANCE ON EARTHWORKS, PIPE, WELDING, CHAMBER, OR POND/LANDFILL CONSTRUCTION PROJECTS OF COMPARABLE SIZE AND QUALITY.

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