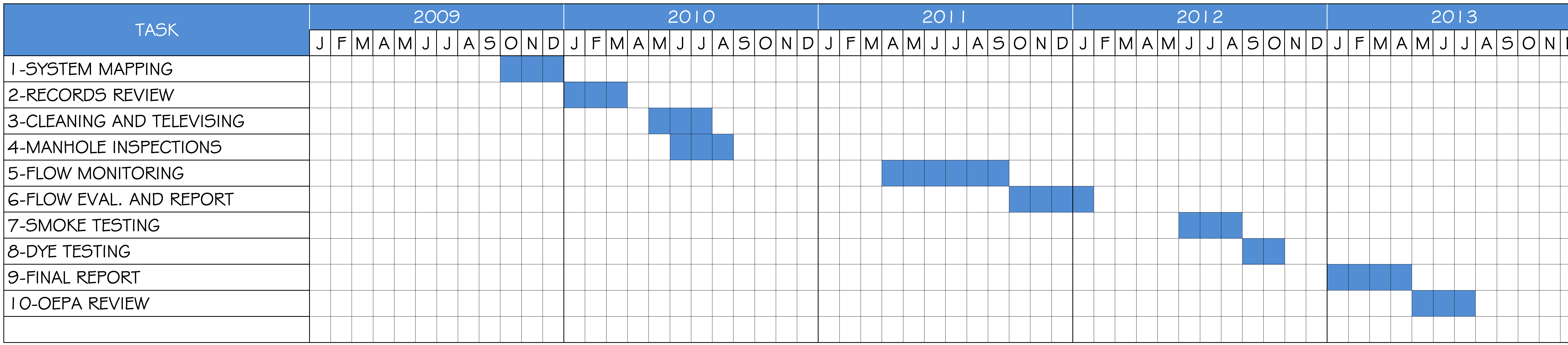
Tab 1

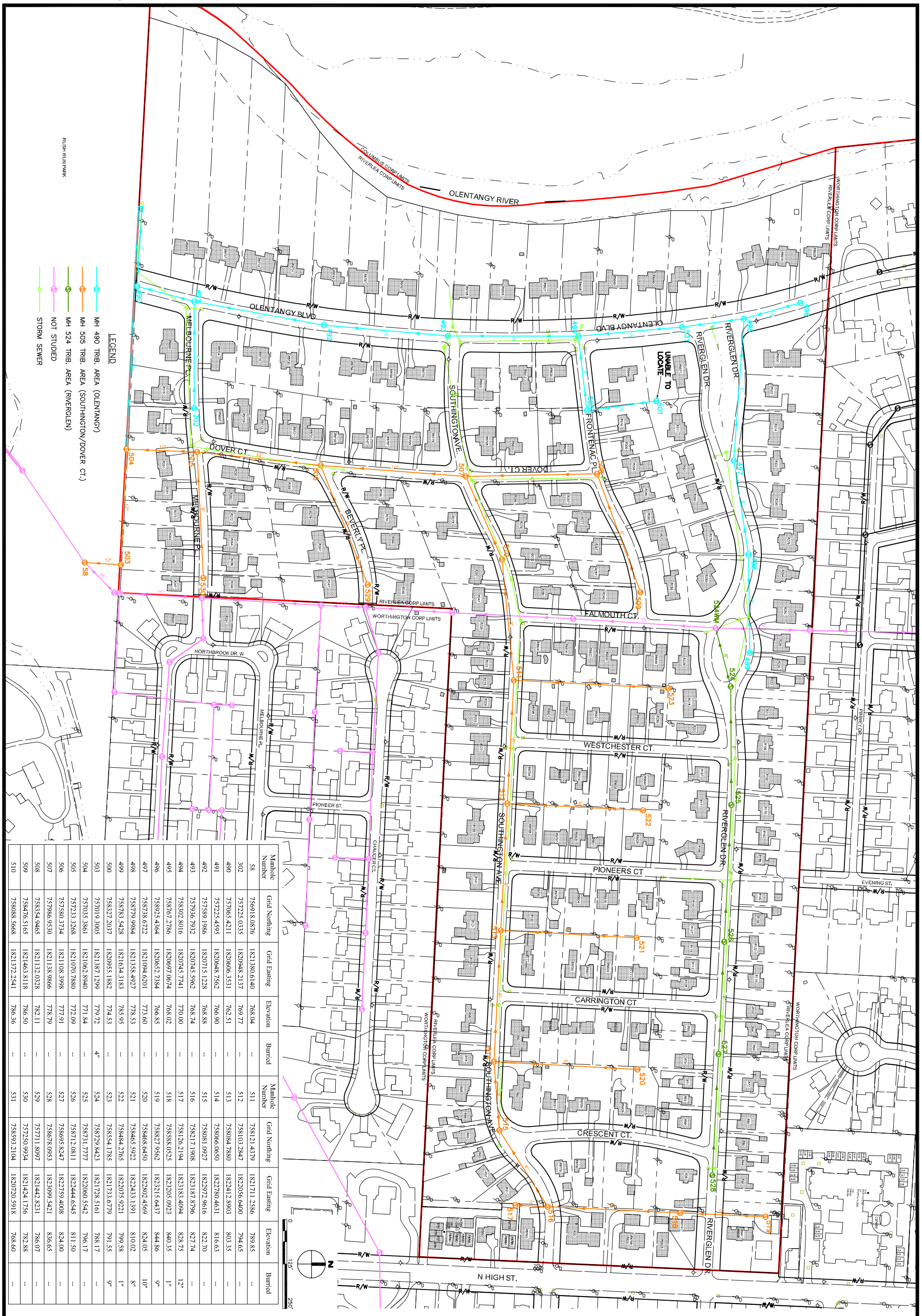
Not Used

Tab 2

VILLAGE OF RIVERLEA - 5 YEAR SSES SCHEDULE
AUGUST 2009



Tab 3



Manhole Number	Grid Northing	Grid Easting	Elevation	Buried
58	756918.0876	1821380.6140	768.04	--
302	757225.0335	1820948.2137	769.77	--
490	757065.4211	1820606.3531	762.51	--
491	757225.4595	1820648.7562	766.90	--
492	757589.1986	1820715.1228	768.88	--
493	757936.7932	1820745.5962	768.74	--
494	758302.8016	1820745.7741	770.00	--
495	758767.2786	1820697.0674	768.02	--
496	758925.4364	1820652.7384	766.85	--
497	758738.6722	1820094.6201	773.60	--
498	758779.9984	1821358.4927	778.53	--
499	758783.5428	1821634.3183	785.95	--
500	758327.2037	1820955.1882	774.53	--
503	757019.3005	1821387.1299	779.72	4"
504	757035.3861	1821062.8940	771.84	--
505	757233.3268	1821070.7880	772.09	--
506	757580.3734	1821108.3998	777.91	--
507	757986.9530	1821138.9866	778.79	--
508	758354.9465	1821132.0328	782.11	--
509	758476.5165	1821463.8118	786.50	--
510	758088.5668	1821372.2541	786.36	--

Manhole Number	Grid Northing	Grid Easting	Elevation	Buried
511	758121.4379	1821711.2586	789.85	--
512	758103.2847	1822056.6400	794.65	--
513	758084.7880	1822412.8903	803.35	--
514	758066.0650	1822780.4631	816.63	--
515	758081.0927	1822972.9616	822.70	--
516	758217.1908	1823187.8796	827.74	--
517	758126.2194	1823183.4094	828.75	12"
518	758588.0525	1823205.0923	840.35	1"
519	758827.9562	1823215.6437	844.86	9"
520	758468.6450	1822802.4569	824.05	10"
521	758465.5922	1822433.1391	810.02	8"
522	758484.2765	1822075.9221	799.58	1"
523	758554.1785	1821733.6779	791.55	9"
524	758729.8423	1821728.5161	788.17	--
525	758731.7777	1822060.5542	796.17	--
526	758712.0811	1822444.6545	811.50	--
527	758695.8247	1822759.4008	824.00	--
528	758678.0953	1823099.5421	836.65	--
529	757711.8097	1821442.8231	786.07	--
530	757250.9934	1821424.1756	782.88	--
531	758593.2104	1820720.5918	768.60	--

NO.	DESCRIPTION	DATE
	REVISIONS	

VILLAGE OF RIVERLEA, OHIO
SANITARY SEWER
EVALUATION STUDY
JANUARY 2012

BURGESS & NIPLE
5085 REED ROAD
COLUMBUS, OHIO 43220

JOB NO:	PR50204
DATE:	JAN. 2012
DESIGNED BY:	JDF
DRAWN BY:	JDF
CHECKED BY:	LAM
APPROVED BY:	JED
SCALE:	AS SHOWN

FIGURE 3-1
SANITARY SEWER
MAP

SHEET: 1 OF 1

Riverlea Sanitary Lift Station Information

History & Upgrades:

The Riverlea Sanitary Lift Station (RSLS) was constructed along with other village infrastructure (sanitary and storm sewers systems, waterlines and streets) in 1925. It is located along the south property line of the village, approximately 200 feet west of Olentangy Blvd at 5693 Olentangy.

Little is known as to any specific changes or upgrades that occurred from the time of original construction until 2004, other than at some point in the past the original dry pit sewage pumps installed on the intermediate level were replaced by submersible sewage pumps with PVC discharge piping retrofit into the original 4" cast iron force main inside the station.

In 2004, the lift station controls and equipment were completely upgraded. This consisted of new electrical service & interior lighting (120V/240V, 1ph, 3w, 60A service with new load center panel), a complete new NEMA 4X conventional 2 pump control panel (PCP) providing HOA operation with Stop, Lead and Lag control floats and Alternator, 2 new 2" sewage pumps (230V, 1ph, 1 HP), a manually operated inline ventilation fan & 12" PVC piping for forced outside air intake ventilation of the lower levels, and new aluminum wetwell access cover plate & hatch & stairs down to the intermediate level. It is not clear if the roof was also replaced at that time, but it appears relatively new (a conventional end-gabled wood truss with plywood, shingles, and aluminum gable vents).

In 2011, a new remote monitoring system was added. This consisted of a new NEMA 4X monitoring interface panel (MIP), and a NEMA 4X Raco *AlarmAgent* RTU with cellular data service and internet based alarm notification service (by voice, email, and SMS) along with historical data logging and reporting provided by alarmagent.com. Along with this upgrade, high level alarm and overflow alarm floats were installed to provide inputs to the RTU, current monitoring relays were installed in the MIP for both pumps, and modifications were made to the 2004 Pump Control Panel to correct a control logic flaw that prevented the lag float from starting both pumps if the lead float was not working and did not start the lead pump.

Please refer to separate attachments which show the functionality provided by the *AlarmAgent* system and the modified pump controls.

Pump Equipment Overview:

In late July 2011, 2 new 2" – 1 HP, 230V, 1p submersible sewage pumps (Zoeller Model E284) were purchased. These pumps are the basic same size as the 2004 pumps (Dayton Model 4LE20), but have slightly less output capacity versus TDH. One of the new pumps was installed on 7/29/2011 to replace the existing

Pump 2, which had been exhibiting problematic operation (extended and erratic running hours). The other new Zoeller pump is stored in the lift station as a spare. New discharge check valves were also installed for both pumps. The old removed Pump 2 (Dayton Model 4LE20) was refurbished by a local pump repair house and is also being kept on site to provide 100% spare capacity in on-site storage.

Based on calculated station flow data provided by the new Raco RTU, the daily operating reports from July 29, 2011 through Dec 31, 2011 indicate that the normal daily average station flow and average daily pump performance for the current pumps are as follows:

- Average Daily Station Flow – 7,710 gallons
- Pump 1 Averages -- 65.8 gpm – 8 starts/day – 0.89 hours run/day
- Pump 2 Averages -- 49.9 gpm – 8 starts/day – 1.30 hours run/day

During this same time period, the Calculated Min and Max Day Station Flows, along with the associated P1 & P2 flows, and starts and hours run for those days, were as follows:

- Minimum Day Flow – 3,900 gallons on 08/17/2011
  - P1 – 66.5 gpm – 5 starts – 0.5 hours run
  - P2 – 52.1 gpm – 4 starts – 0.5 hours run
- Maximum Day Flow – 54,580 gallons on 12/06/2011 (24 hour rainfall total per NWS was 1.95")
  - P1 -- 65.7 gpm – 18 starts – 5.9 hours run
  - P2 -- 47.3 gpm – 16 starts – 11.0 hours run
  - P1 + P2 simultaneous run – 2.2 hours

All calculated flows listed above are based on an estimated lead pump stop-start differential control volume of 410 gallons.

Please see separately attached product and performance data for the Zoeller and Dayton submersible sewage pumps.

Future Plans for Lift Station Elimination:

The City of Worthington is in the process of completing the design and permitting for a new deeper gravity trunk sewer through Rush Run Park to replace their existing trunk sewer and siphon crossing under Rush Run. They have advised the Village that the sewer should be low enough to allow Riverlea to install a new gravity sewer from the existing SSES "Olentangy" subarea outlet location at the south end of Olentangy Boulevard (MH 490) through Rush Run Park to discharge into the new trunk sewer. The Village is hopeful that this will occur within the next 5 years, allowing the elimination of the lift station and the SSO to the Olentangy River.

Lift Station Operation, Maintenance and Emergency Repairs:

The Riverlea Street Commissioner is responsible for overseeing the operation and maintenance of the lift station.

Regular lift station cleanout/vacuuming service and periodic and emergency mechanical maintenance service for the Riverlea lift station is normally provided by Radico Inc., a Columbus area mechanical contractor who has been working for the Village for a number of years. The Village has also contracted with Waterworks Inc. for past emergency sewer repairs and they also stand ready to assist with emergency repairs of sewer and piping systems at the station.

Lift station washdown and cleanout operations are hindered by the station's inaccessibility and the lack of water service near the station. There is no access road through the private property on which the station sits, and no access road through the heavily forested Rush Run Park to the immediate south. Vacuum trucks and water trucks must therefore remain on the street, some 200+ feet to the east, requiring long hose runs from the trucks back to the station.

Control systems and electrical emergencies are typically handled by the Street Commissioner, who is skilled in basic electrical systems work and electromechanical and digital control systems troubleshooting and repair.

Based on past operating experience, the Village's current policy is to have periodic preventative influent chamber and wetwell wash-downs with vacuum cleanouts performed twice yearly, preferably in early spring and early to mid-autumn.

With the new remote monitoring, alarm notification, and daily reporting system in place since January 2011, regular inspection visits to the lift station are now typically performed by the Street Commissioner only once per month. The daily reports from the *AlarmAgent* website are normally checked daily, and the daily data is loaded into a spreadsheet to provide a comprehensive daily log of the lift station operation. If the monthly visits indicate that a specific maintenance task needs to be performed (such as bar rack cleaning), the Street Commissioner will contact the appropriate party and arrange to have the work done as soon as possible.

The Street Commissioner is the first responder for critical alarms generated by the *AlarmAgent* system (power failures, pump failures, high level alarms, and overflow alarms). Upon receiving such notifications, the Street Commissioner will visit the site as quickly as possible to asses the situation and make repairs if possible, or if not, contact the appropriate contractor to make the needed repairs. If he is unable to respond, he will request one of the two contactors noted above to visit the site as soon as possible and advise him of the situation.

Lift Station Design and Layout:

The lift station is a 3 level concrete structure. The bottom level consists of an influent chamber with a bar rack (manually cleaned) at the east end, a center transition section, and a depressed wetwell section on the west end. Rough overall inside plan view dimensions of the lift station bottom level are 14'-4" long by 6' wide. Based on field measurements from the top slab at grade, the bottom of the east end influent chamber appears to be about 9.5 feet below grade and is 5' long by 6' wide. The depressed wetwell on the west end is roughly 4'-8" long by 6' wide, with the bottom about 13.0 feet below grade. The slightly sloping transition section between the influent chamber and the depressed wetwell is roughly 4'-8" long by 6' wide.

The east end influent sewer, which serves the "Olentangy" subarea as outlined in the SSES report, is 8" VCP. There is a constructed 8" VCP overflow in the west end wetwell section which empties into the existing storm sewer manhole just west of the station. This storm sewer discharges into the Olentangy River near the bend in the river across from the southeast corner of Antrim Park. Based on rough measurements made from the top level of the lift station (confined space entry restrictions prevented more accurate measurements), it appears that the invert of the 8" overflow is 3" to 6" below the invert of the 8" influent sewer. The 8" influent is about 8'-2" to 8'-5" below grade and the 8" overflow is about 8'-8" below grade. The location of the constructed overflow is intended to prevent backup of sewage into basements of the houses along Olentangy Blvd if/when the lift station fails.

The intermediate level consists of a concrete slab about 6.5 feet below finished grade over the center transition section (with steps up to the top level access hatch) to provide access for cleaning the bar rack, influent chamber, and wetwell. This level also provides access for pump and control float installation and maintenance. The original installation used dry pit style pumps installed on the intermediate level with suction lift from the wetwell and discharge into a 4" cast iron force main running east along the south property line and discharging into the SSES "Southington/Dover Court" subarea outlet manhole (MH 504) directly south of the south end of Dover Court.

The top slab level at finished grade covers only the center transition and west end wetwell sections, with overall outside plan view dimensions of 10'-8" long by 7'-4" wide. Superstructure is 8" concrete block covered by a wood truss end-gabled roof. An exterior concrete slab at grade covers the east end influent chamber.

Please see attached station photos, field notes, and sketches.

Village of Riverlea

RTU STATUS

Refresh

RTU NAME: RIVERLEA SANITARY LIFT STATION

Firmware Version: V2.6

LAST KNOWN RTU STATE	
Alarms in the Last 24 Hrs:	0
Configuration Changes Pending:	None
Last Contact with RTU:	Feb 8, 2012 10:01 AM
Last Separate Analog Reading Report Received:	Analog reporting not enabled
Last Separate Arm/Disarm Report Received:	No Scheduled ArmDisarm Report received from the RTU
Next Scheduled Contact with RTU:	0 Hrs 54 Mins
RTU's Signal Strength Indicator:	70% (7 bars on bar graph)
RTU On Line:	Yes Force RTU Off Line
RTU Armed:	Yes
Last Known RTU Location:	Latitude: 40.0774543188662 Longitude: -83.0292802810669 Save Location Edit on a Map

- Normal
- Anything currently acknowledged - problem being dealt with
- Any non-normal state that is not acknowledged
- Any non-normal state that is not acknowledged and is suspended
- RTU is Offline and the Current Channel State is unknown

CHANNEL	STATE	NORMAL Status Message		Alarm Status Message
1		Pump 1 Performance, Normal	*	Pump 1 Performance Alarm
2		Pump 2 Performance, Normal	*	Pump 2 Performance Alarm
3		Wetwell Level, Normal		Wetwell Level High Alarm
4		Wetwell Level, Normal		Overflow Alarm
5		Lead Call, Normal		Lead Call - No Pumps Running
6		Lag Call, Normal		Lag Call - No Pumps Running
7		Pump 1 Overload, Normal		Pump 1 Overload Alarm
8		Pump 2 Overload, Normal		Pump 2 Overload Alarm
9		Pump 1 Amps, Normal	**	Pump 1 Running - Low Amps
10		Pump 2 Amps, Normal	**	Pump 2 Running - Low Amps
P	AC Power	Power On		Power Failure
B	Battery	Battery OK		Battery Alarm

Next RTU | Previous RTU

* RTU monitors Pumps 1 & 2 Run Status from Motor Starter Aux Contact. Logs Daily Runtimes for Reports & # Starts for Reports

Generates "Performance Alarms" based on internal algorithm which looks at recent past performance data (runtimes, starts, calculated gpms), and alarms when deviations are noted which might indicate suction &/or discharge plugging, line breaks etc. Sensitivity level for alarm generation can be increased / decreased by system administrator.

** Separate inputs from current monitoring relays to indicate possible suction plugging, line breaks or check valve problems.

ALARMAGENT PUMP STATION REPORT

RTU NAME: RIVERLEA SANITARY LIFT STATION

	PUMP 1	PUMP 2
Cumul Run Time 1	600.4	1318.3
Hrs to Maint 1	-600.4	-1318.3
Hrs to Maint 2	-600.4	-1318.3

			GPM		# OF STARTS			RUNTIME HRS			
DATE	**TIME**	**CALCULATED STATION FLOW KGAL**	**PUMP1**	**PUMP2**	**PUMP1**	**PUMP2**	**STARTS RATIO**	**PUMP1**	**PUMP2**	**RUN RATIO**	**HRS WITH 2 PUMPS RUNNING**
Feb 1, 2012	5:01 AM	11.68	62.46	44.84	12	12	1.0	1.5	2.2	1.47	0.0
Feb 2, 2012	5:01 AM	10.66	61.66	44.04	11	11	1.0	1.4	2.0	1.43	0.0
Feb 3, 2012	5:01 AM	9.994	61.66	44.84	11	10	0.91	1.3	1.8	1.38	0.0
Feb 4, 2012	5:01 AM	9.481	62.46	43.24	10	10	1.0	1.2	1.8	1.5	0.0
Feb 5, 2012	5:01 AM	10.02	62.46	44.84	10	11	1.1	1.2	1.9	1.58	0.0
Feb 6, 2012	5:01 AM	9.456	61.66	44.84	10	10	1.0	1.2	1.7	1.42	0.0
Feb 7, 2012	5:01 AM	9.840	62.46	45.64	10	10	1.0	1.2	1.8	1.5	0.0
Feb 8, 2012	5:01 AM	8.302	65.66	45.64	9	9	1.0	1.0	1.5	1.5	0.0
Total:		79.44	62.56	44.74	83.00	83.00	1.000	10.00	14.70	1.470	0.0000

Close Window Print Report

ALARM EVENTS LOG

RTU NAME: RIVERLEA SANITARY LIFT STATION

DATE	TIME	RTU	ACTIVITY	CHANNEL STATE	USER
Jan 27, 2012	5:03 AM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Pump 2 Performance, Alarm, Now Normal	William P Charles
Jan 27, 2012	5:01 AM	Riverlea Sanitary Lift Station	RTN	Pump 2 Performance, Alarm, Now Normal	
Jan 27, 2012	3:12 AM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Pump 2 Performance, Alarm, Acknowledged	William P Charles
Jan 27, 2012	3:03 AM	Riverlea Sanitary Lift Station	Pump 2 Performance Alarm not yet acknowledged. Increasing call delay multiplier to 3.		
Jan 27, 2012	1:23 AM	Riverlea Sanitary Lift Station	Pump 2 Performance Alarm not yet acknowledged. Increasing call delay multiplier to 2.		
Jan 27, 2012	12:43 AM	Riverlea Sanitary Lift Station	ALARM	Pump 2 Performance, Alarm	
Jan 26, 2012	7:45 AM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Watchdog Alarm - Acknowledged	William P Charles
Jan 26, 2012	5:59 AM	Riverlea Sanitary Lift Station	Watchdog alarm created - RTU missed a scheduled Report. not yet acknowledged. Increasing call delay		
Jan 26, 2012	3:29 AM	Riverlea Sanitary Lift Station	Watchdog alarm created - RTU missed a scheduled Report. not yet acknowledged. Increasing call delay		
Jan 26, 2012	1:49 AM	Riverlea Sanitary Lift Station	Watchdog alarm created - RTU missed a scheduled Report. not yet acknowledged. Increasing call delay		
Jan 26, 2012	1:09 AM	Riverlea Sanitary Lift Station	ALARM	Watchdog alarm created - RTU missed a scheduled Report.	
Jan 17, 2012	12:02 PM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Watchdog Alarm - Acknowledged	William P Charles
Jan 17, 2012	12:01 PM	Riverlea Sanitary Lift Station	ALARM	Watchdog alarm created - RTU missed a scheduled Report.	
Jan 17, 2012	11:47 AM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Watchdog Alarm - Acknowledged	William P Charles
Jan 17, 2012	11:46 AM	Riverlea Sanitary Lift Station	ALARM	Watchdog alarm created - RTU missed a scheduled Report.	
Jan 5, 2012	4:03 PM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Watchdog Alarm - Acknowledged	William P Charles
Jan 5, 2012	4:01 PM	Riverlea Sanitary Lift Station	ALARM	Watchdog alarm created - RTU missed a scheduled Report.	
Jan 5, 2012	3:03 PM	Riverlea Sanitary Lift Station	ACKNOWLEDGED	Watchdog Alarm - Acknowledged	William P Charles
Jan 5, 2012	3:01 PM	Riverlea Sanitary Lift Station	ALARM	Watchdog alarm created - RTU missed a scheduled Report.	

Close Window Print Report

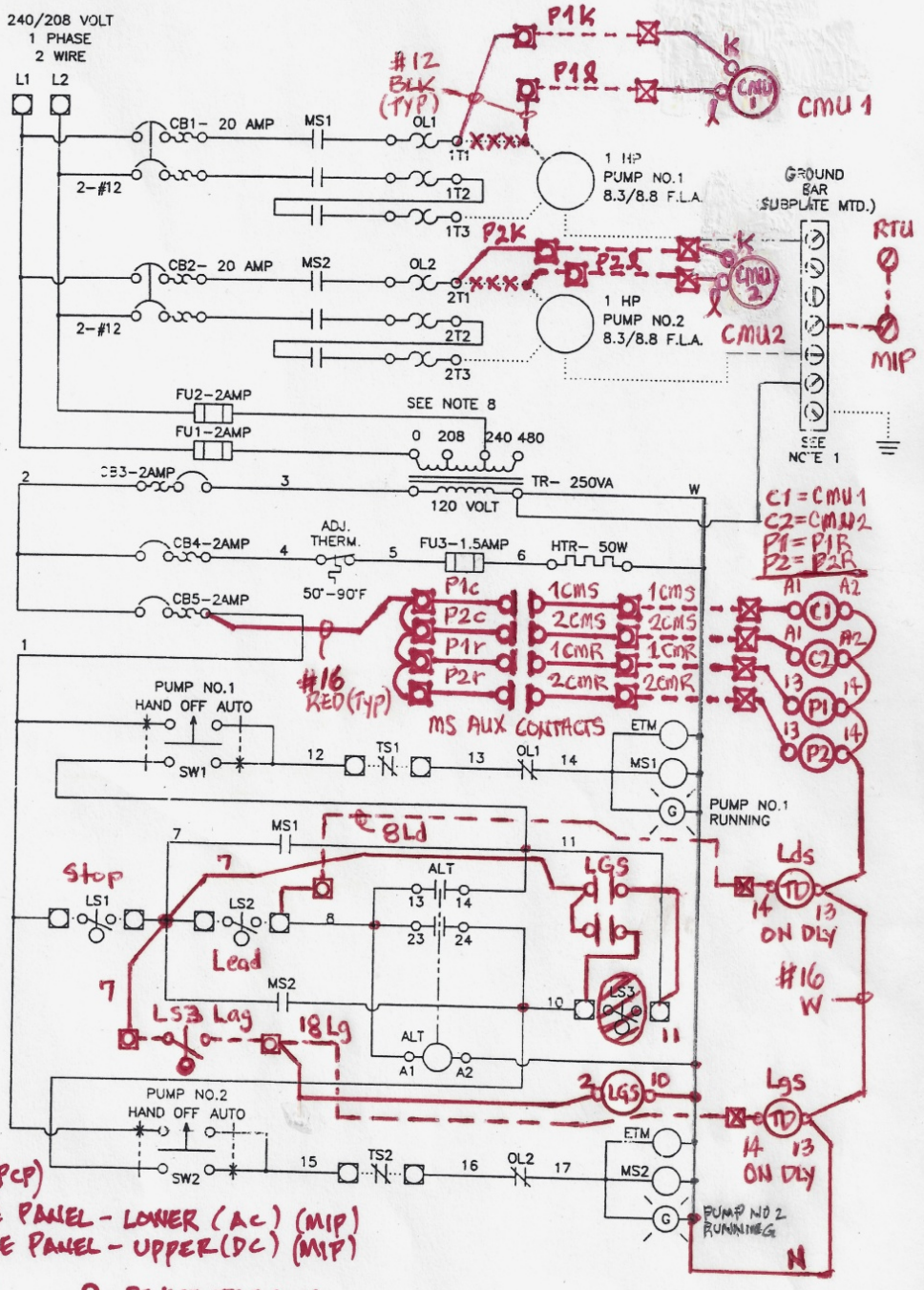
COMM-CHECK EVENTS LOG

RTU NAME: RIVERLEA SANITARY LIFT STATION

TIME REQUESTED	TIME RECEIVED	RTU'S SIGNAL STRENGTH
Feb 8, 2012 12:01:36 AM	Feb 8, 2012 12:01:46 AM	70% (7 bars on graph)
Feb 8, 2012 1:01:36 AM	Feb 8, 2012 1:01:45 AM	60% (6 bars on graph)
Feb 8, 2012 2:01:36 AM	Feb 8, 2012 2:01:45 AM	70% (7 bars on graph)
Feb 8, 2012 3:01:36 AM	Feb 8, 2012 3:01:45 AM	60% (6 bars on graph)
Feb 8, 2012 4:01:36 AM	Feb 8, 2012 4:01:43 AM	60% (6 bars on graph)
Feb 8, 2012 5:01:36 AM	Feb 8, 2012 5:01:42 AM	50% (5 bars on graph)
Feb 8, 2012 6:01:36 AM	Feb 8, 2012 6:01:48 AM	70% (7 bars on graph)
Feb 8, 2012 7:01:36 AM	Feb 8, 2012 7:01:46 AM	60% (6 bars on graph)
Feb 8, 2012 8:01:36 AM	Feb 8, 2012 8:01:46 AM	60% (6 bars on graph)
Feb 8, 2012 9:01:36 AM	Feb 8, 2012 9:01:45 AM	60% (6 bars on graph)
Feb 8, 2012 10:01:36 AM	Feb 8, 2012 10:01:45 AM	70% (7 bars on graph)

Close Window Print Report

CMU = BENDER CURRENT MONITORING RELAY IN MIP



LOCATION & TERMINAL BLOCK LEGEND

- ■ PUMP CONTROL PANEL (PCP)
- ☒ MONITORING INTERFACE PANEL - LOWER (AC) (MIP)
- ☒ MONITORING INTERFACE PANEL - UPPER (DC) (MIP)
- △ ALARM AGENT RTU
- O - DEVICE TERMINAL

WIRE #'s MATCH TB #'s

WIRE TYPE	SIZE	COLOR	WIRE TYPE	SIZE	COLOR
POWER	SEE ABOVE	BLACK	24 VDC	14 AWG	PURPLE
120V CONTROL	14 AWG	RED	12 VDC	14 AWG	BLUE
120V NEUTRAL	14 AWG	WHITE	INTERLOCK	14 AWG	YELLOW
24 VAC	14 AWG	ORANGE	SHIELDED	18 AWG	MULTI
LOW VAC	14 AWG	BROWN	GROUND	14 AWG	GREEN

AS-BUILT

Sheet:	Orig. Date:	Rev. Date:	As-Built Date:
1 OF 1	1-8-04	1-15-03	1-29-04

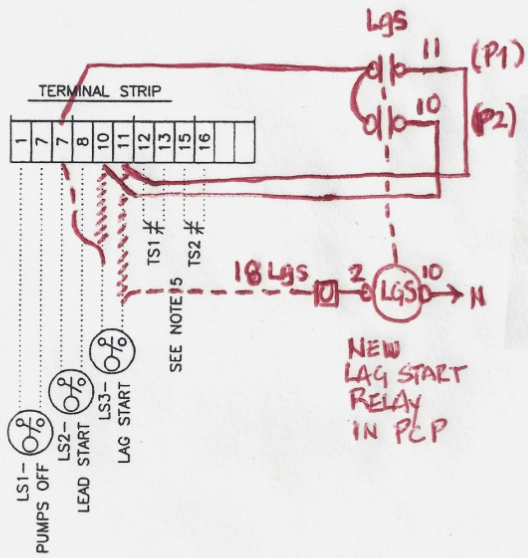
1179 U.S. Highwa

DUPLEX P

REVISIONS IN RED MADE JAN. 2011 WPC

NOTES ON 2011 MODS →

1.) PANEL GROUND TERMINAL MUST BE CONNECTED TO EARTH GROUND
2.) FACTORY WIRING IS SHOWN ———————
FIELD WIRING IS SHOWN .....
3.) INSTALLER MUST PROVIDE A MAIN DISCONNECTING DEVICE WITH SHORT CIRCUIT PROTECTION FOR THIS ELECTRICAL ASSEMBLY
4.) WARNING LABEL TO BE YELLOW BACKGROUND WITH BLACK LETTERS. "WARNING – LOCK OUT ELECTRICAL SERVICE TO THIS ENCLOSURE BEFORE OPENING DOOR OR SERVICING EQUIPMENT".
5.) THERMAL SAFETY SWITCH (TS) CONTACTS ARE NOT IN ALL MOTORS. IF MOTOR DOES NOT HAVE SWITCH, THESE TERMINALS MUST BE JUMPERED.
6.) THIS CIRCUIT DIAGRAM IS DRAWN WITH NO ELECTRICAL POWER, THAT IS, WITH ALL COMPONENTS IN DE-ENERGIZED STATE.
7.) ALL LEVEL SENSING SWITCHES ARE SHOWN WITH NO LIQUID IN TANK OR WELL.
8.) TRANSFORMER IS FACTORY WIRED FOR 240 VOLT SERVICE. IF SERVICE IS 208V, TRANSFORMER PRIMARY WIRING MUST BE RECONFIGURED.



9) Hand-marked modifications as shown were made in conjunction with installation of a new Remote Monitoring System (RMS) in 2010/2011. This included installation of additional terminal blocks and wiring in the existing Pump Control Panel (PCP) to provide inputs to a separate new Monitoring Interface Panel (MIP) and Raco Alarm Agent RTU. Also installed were two additional monitoring float switches; High Level Alarm located between above Lag Start level and Overflow Level, and Overflow Alarm, set a invert of existing overflow pipe in the Wetwell. See separate schematics for MIP and RTU wiring. See 10) and 11), for explanation of reasoning behind additional changes made to existing PCP control logic.

10) **NOTE**: As originally wired, in order for the Lag float (LS3) to start the Lag pump(s) in Auto mode, either P1 or P2 must already be running (i.e. MS1 or MS2 aux contact closed) in order for 120VAC to be present on wire 7 connection to wires 10 or 11 when the Lag float contact closes. Thus, if the Lead float fails to close or the Lead pump is not already running (i.e. the associated MS1 or MS2 aux contact is open due to an OL trip), then the Lag pump will never get started, leading to certain overflow. Solution to this problem was to re-wire the Lag float (LS3) in parallel with the Lead float (LS2), so that at least one (or both) pumps will start if the Lead float (or pump) fails. The MS1 and MS2 aux contacts should function only as latching contacts for auto mode pump control to keep pump(s) running until level drops below the Stop float actuation level (LS1). These wiring changes were made during installation of the Remote Monitoring System in January 2011 by wpc, and should increase system functionality and reliability and help avoid overflows.

11) **NOTE**: In order to remotely sense the difference between a Lead Start Call and a Lag Start Call, a new interposing relay, LGS, was also required to be added in the Pump Control Panel. This was needed to provide an independent 120VAC source (wire 18 – LGS) to the remote sensing TDR, separate from the Lag Start Call wires 10 or 11, either of which will become hot on a Lead Start Call as soon as the Lead Pump starts and the associated Lead Pump aux latching contact (MS1 or MS2) closes. This change was made in conjunction with changes noted in 10) above.

REVISIONS IN RED MADE JAN 2011 wpc

CONTROL WORKS INC.
[illegible] Ohio 45150 • (513) 831-9959
[illegible]@controlworksinc.com

Power Requirements: 2-1 HP 8.3/8.8 F.L.A. 240/208 Voltage 1 Phase 60 Hz

Drawn By:	Designed By:	Checked By:	As Built By:	Checked By:
WAGES/R.L.	R.E.L.			

[illegible] P.S. AND CONTROL PANEL (PCP)

Customer: SABATKA, DAVIS, & ASSOC., INC.

Job Number: CW20326

Drawing Number: 20326001

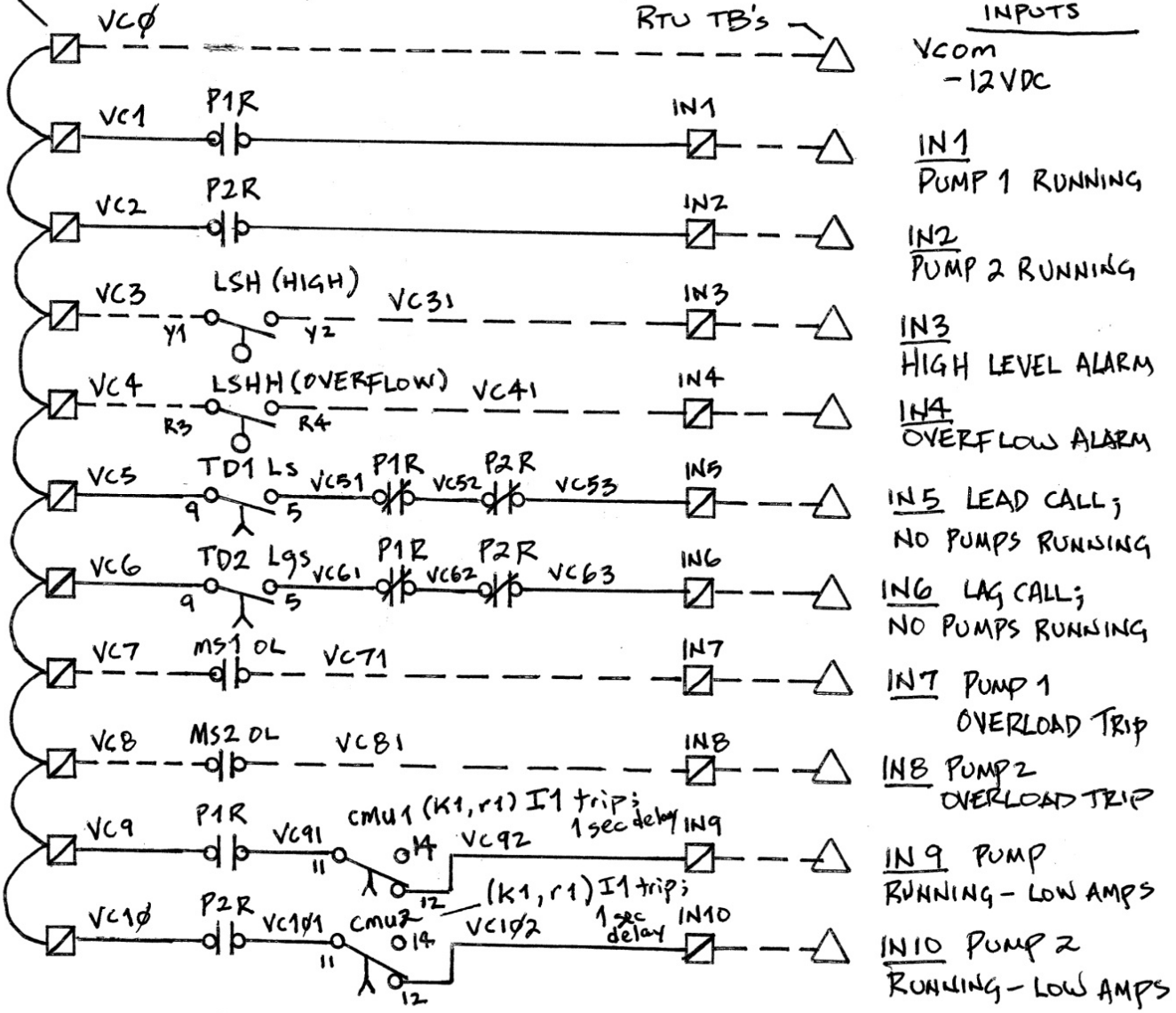
RIVERLEA SANITARY LIFT STATION

RACO ALARM AGENT - REMOTE MONITORING SYSTEM INSTALLATION

JAN/FEB 2011 NOTE: ALL VDC wiring (sourced from RTU) is BLUE.

MONITORING INTERFACE PANEL (MIP)

ALARM AGENT RTU WIRING SCHEMATICS



CMU Setpoints & Operation: [I_2 set > 7.8 A; I1 set @ >70% of I_2 (Low trip)]

Relay K1/r1 (N.O.) is set to close contacts 11-14 for input of "Low Running Amps" (potentially clogged suction inlet or broken discharge pipe) alarm after the pump starts. Start delay is 0.5 sec (ts). Under normal operation, both setpoint relays will energize on startup giving green ON LED & two yellow LEDs (AL1, AL2). Below I_2 setpt - AL2 is off; Below I_1 Low trip - AL1 is OFF.

"Quality Pumps Since 1939"

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-PUMP • FAX (502) 774-3624

SECTION: 2.30.040
FM0494
0110
Supersedes
0808

visit our web site:
www.zoeller.com

COMPARE THESE FEATURES

- Non-clogging vortex impeller.
- Durable cast construction. Cast iron switch case, motor and pump housing, base and impeller. No sheet metal parts to rust or corrode. All cast iron class 25-30 25000# tensile strength.
- Stainless steel screws, bolts, float rod, handle, guard and arm and seal assembly.
- Shaft Seal - Carbon & ceramic rotary face seal, with stainless steel wetted parts.
- UL Listed 3-wire neoprene cord and plug.
  10 ft. standard for automatic.
  15 ft. standard for nonautomatic.
- Upper sleeve bearing and lower ball bearing running in a bath of oil.
- Maximum temperature for sewage or dewatering 130°F (54°C).
- Motor - 60 Hz, 1750 RPM, oil-filled, hermetically sealed, automatic reset thermal overload protected (1 Ph and Auto 3 Ph).
- All models are available in 2" or 3" discharge.
- All models pass 2 inch spherical solids.
- Automatic units available with float operated, submersible (NEMA 6) mechanical switch. Available in both 1 and 3 Phase Units.**
- Corrosion resistant powder coated epoxy finish.
- On point 15¼", Off point 5¼".
- Major width 13 9/16". Major height 18 13/16". (Single seal pumps)

MODELS 4282-4284
DOUBLE SEAL PUMPS (nonauto only)

- Protects motor from seal leaks.
- Improved bearing lubrication.
- Helps eliminate seal and bearing damage from dry runs.
- Major width 13 $^{9}/_{16}$". Height 20 $^{11}/_{16}$".

NOTE: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

Tested to UL Standard UL778

282 - 284 Single Seal Series
4282 - 4284 Double Seal Series

(For Pump Prefix Identification see News & Views 0052)

Certified to CSA Standard C22.2 No. 108

"WASTE-MATE"
SUBMERSIBLE
SEWAGE
OR DEWATERING PUMP

SSPMA MEMBER
SUMP AND SEWAGE PUMP MFRS. ASSN.

2" OR 3" FLANGED DISCHARGE • PASSES 2" SOLIDS

AUTOMATIC THREE PHASE PUMP**

SINGLE SEAL PUMP

DOUBLE SEAL PUMP

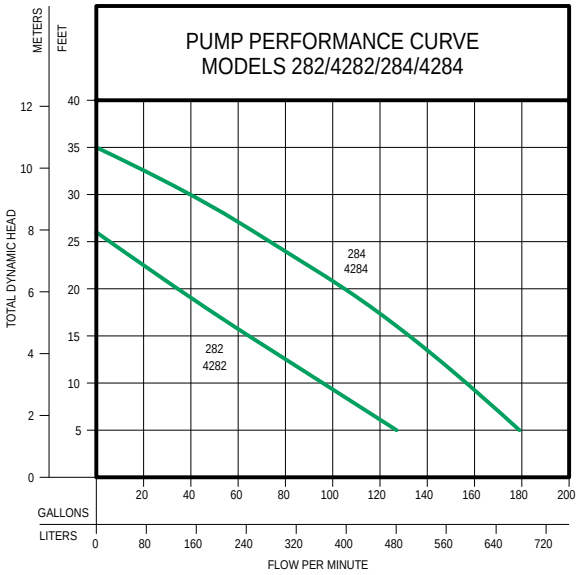
POWDER COATED TOUGH™

MODELS AVAILABLE

- Automatic or Nonautomatic with single seal
- Nonautomatic with double seals
- 2" or 3" discharge.
- Single phase or three phase motors avilable.
- See selection chart for specifications or specific models.

*NOTE: No UL Listing or CSA Certification for 200V 1Ph or Extra Duty (ED) pumps. See back page for UL & CSA Listings.

**THREE PHASE AUTOMATIC UNITS AVAILABLE IN 230V SINGLE SEAL ONLY.

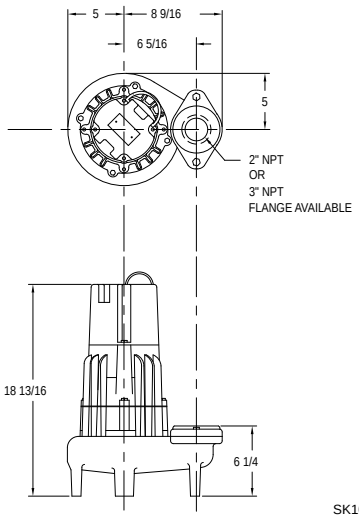


009927A

MODELS		282/4282		284/4284	
Feet	Meters	Gal.	Liters	Gal.	Liters
5	1.5	127	481	179	678
10	3.0	96	363	157	594
15	4.6	64	242	133	503
20	6.1	34	129	106	401
25	7.6	6	23	73	276
30	9.1	--	--	42	159
Shut-off Head		26 ft. (7.9m)		35 ft. (10.7m)	

009927B

Single Seal Design
Weight 81-86 lbs.

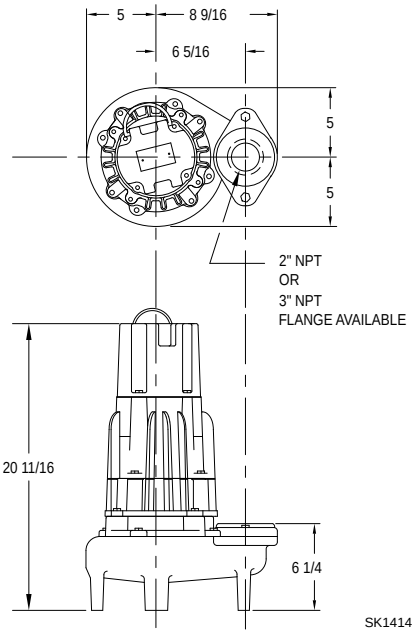


SK1023

CONSULT FACTORY FOR SPECIAL APPLICATIONS

- Three phase pumps are available in 200V, 230V, or 460V. 230V three phase is available in automatic and nonautomatic models.
- Electrical alternators, for duplex systems, are available and supplied with an alarm.
- Mechanical alternators, for duplex systems, are available with or without alarm switches.
- Combination starters are available.
- Variable level control switches are available for controlling single and three phase systems.
- Double piggyback variable level float switches are available for variable level long cycle controls.
- Long cords are available in lengths or 25 - 35 - 50 feet.
- Simplex and duplex basins are available.
- Refer to FM1922 and FM0806 for temperatures over 130°F.

Double Seal Design
Weight 88-91 lbs.



SK1414

SPECIFICATIONS								CONTROL SELECTION		Listings	
Single Seal Model	Double Seal Model	Volt-Phase		Mode	Amps	HP	Cord Lgth.	Simplex	Duplex	CSA	UL
M282	----------	115	1Ph	Automatic	10.3	1/2	10	1	-------	Y	Y
N282	N4282	115	1Ph	Nonauto	10.3	1/2	15	2 or 3	4	Y	Y
D282	----------	230	1Ph	Automatic	5.0	1/2	10	1	-------	Y	Y
E282	E4282	230	1Ph	Nonauto	5.0	1/2	15	2 or 3	4	Y	Y
* H282	----------	200	1Ph	Automatic	6.1	1/2	10	1	-------	N	N
* I282	*I4282	200	1Ph	Nonauto	6.1	1/2	15	3	4	N	N
* J282	*J4282	200	3Ph	Nonauto	3.6	1/2	15	3	4	Y	Y
* F282	*F4282	230	3Ph	Nonauto	3.0	1/2	15	3	4	Y	Y
* CF282	----------	230	3Ph	Automatic	3.0	1/2	15	1	-------	N	Y
* G282	*G4282	460	3Ph	Nonauto	1.7	1/2	15	3	4	Y	Y
D284	----------	230	1Ph	Automatic	8.9	1	10	1	-------	Y	Y
E284	E4284	230	1Ph	Nonauto	8.9	1	15	2 or 3	4	Y	Y
* H284	----------	200	1Ph	Automatic	9.3	1	10	1	-------	N	N
* I284	*I4284	200	1Ph	Nonauto	9.3	1	15	3	4	N	N
* J284	*J4284	200	3Ph	Nonauto	5.5	1	15	3	4	Y	Y
* F284	*F4284	230	3Ph	Nonauto	5.0	1	15	3	4	Y	Y
* CF284	----------	230	3Ph	Automatic	5.0	1	15	1	-------	N	Y
* G284	*G4284	460	3Ph	Nonauto	2.6	1	15	3	4	Y	Y

* No Molded Plug

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. For automatic use single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. See FM1228 for correct model of simplex control panel.
4. See FM0712 for correct model of duplex control panel.

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Sump/Sewage Basins, FM0487; Simplex Pump Control, FM1596; Alarm Systems, FM0732; and Disconnect/Rail Systems, FM0787.

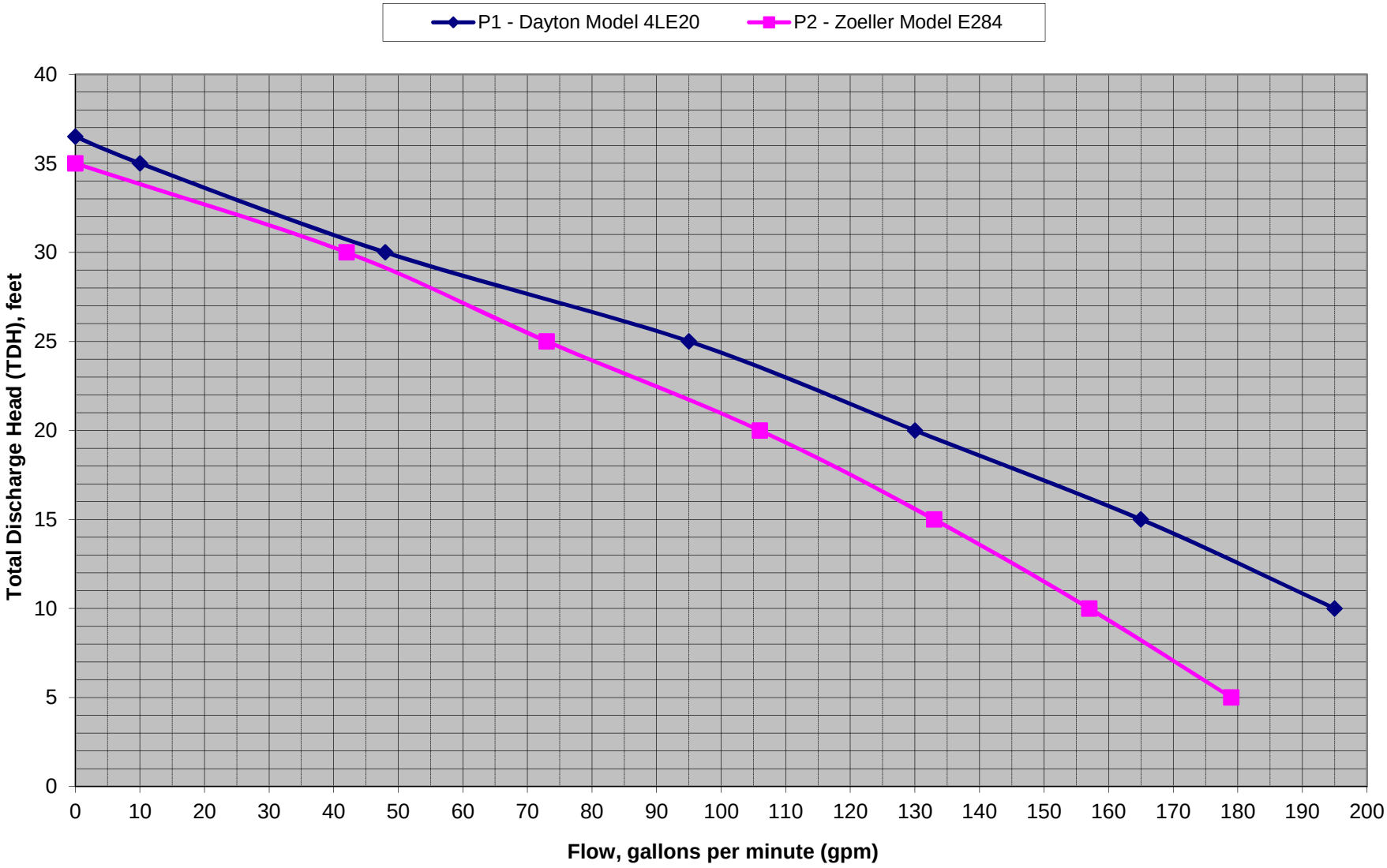
⚠ CAUTION

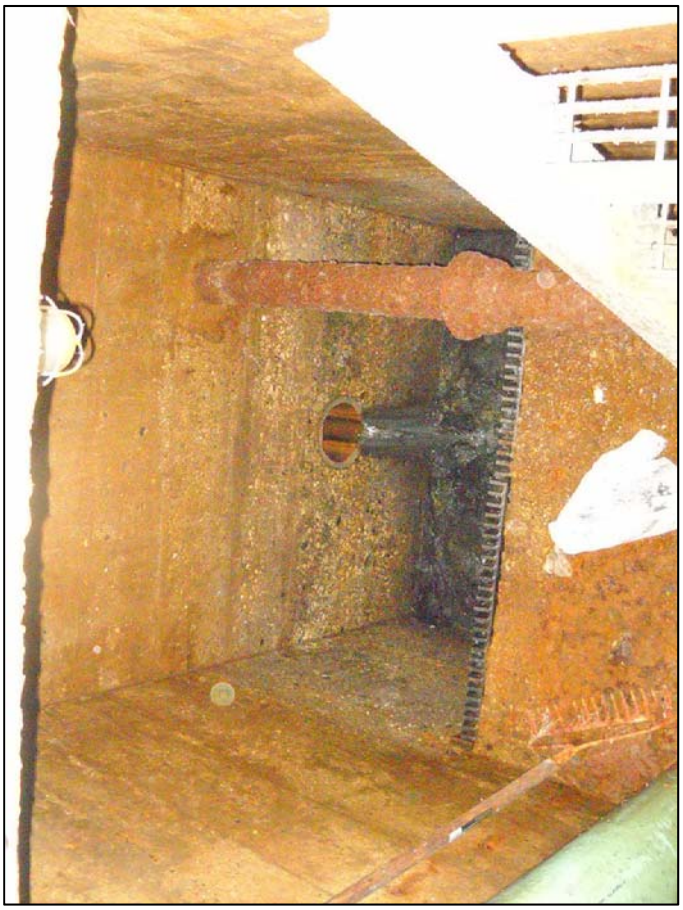
All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electric Code (NEC) and the Occupational Safety and Health Act (OSHA).

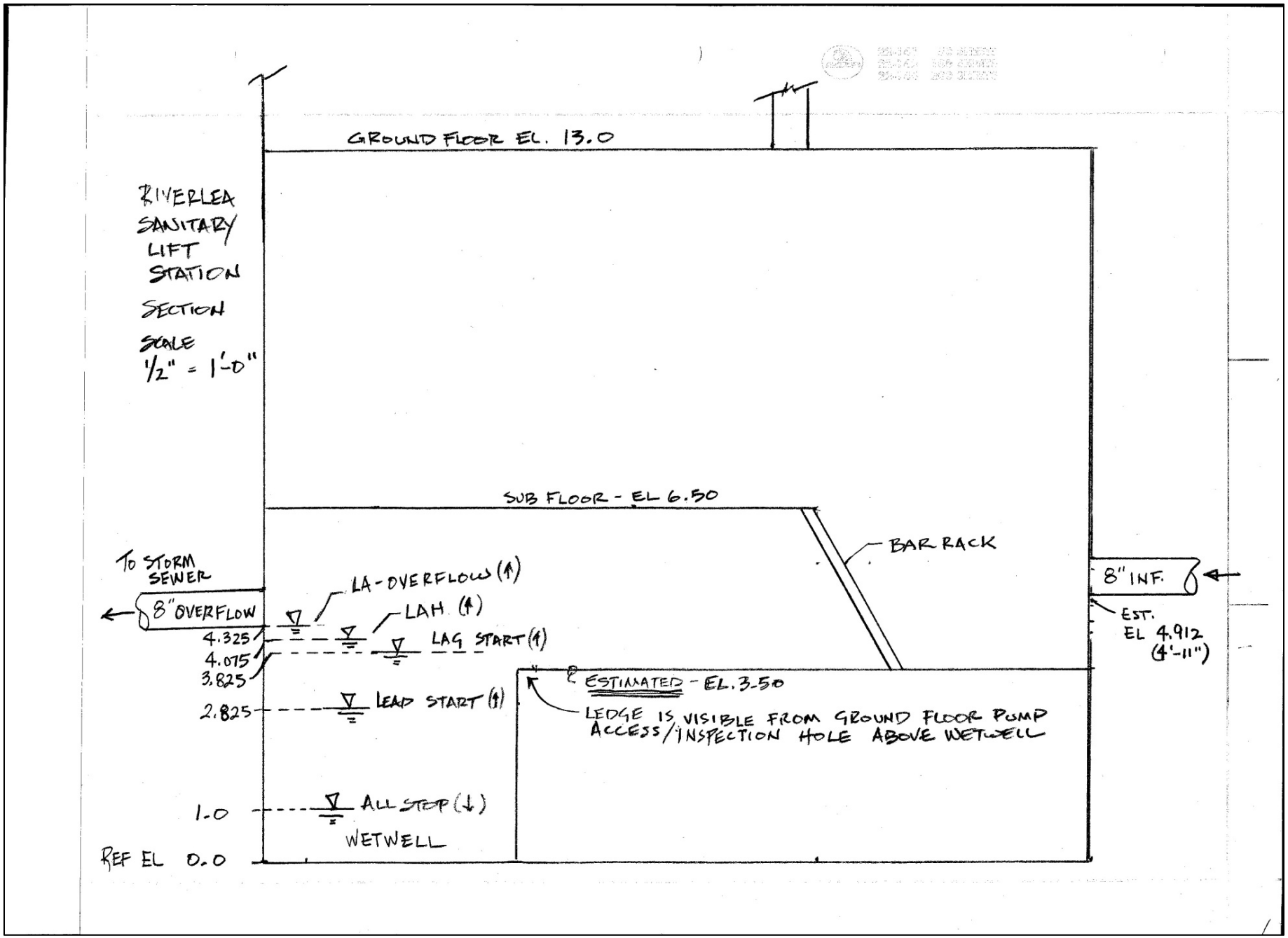
RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.

RLS Pumps Performance Curves






GROUND FLOOR EL. 13.0
RIVERLEA SANITARY LIFT STATION
SECTION
SCALE
1/2" = 1'-0"
SUB FLOOR - EL 6.50
BAR RACK
TO STORM SEWER
8" OVERFLOW
LA - OVERFLOW (↑)
LAH (↑)
LAG START (↑)
LEAD START (↑)
ALL STOP (↓)
WETWELL
4.325
4.075
3.825
2.825
1.0
REF EL 0.0
ESTIMATED - EL. 3.50
LEDGE IS VISIBLE FROM GROUND FLOOR PUMP ACCESS/INSPECTION HOLE ABOVE WETWELL
8" INF.
EST. EL 4.912 (4'-11")

RIVERLEA SANITARY LIFT STATION

CALCULATED VOLUMES

① BASE WETWELL DIMENSION / VOLUME

WIDTH = 6.0' → LENGTH TO LEDGE (@ TOP EL 3.50) = 4'-8"

EST → [(3.5 blocks x 16") = 56"] ⇒ 4.67

Use 5'-0"

AREA = 6 (5) = 30 ft²

VOLUME = 30 (7.48) = 224.4 gal/ft

say 225 gal/ft

② AREA / VOLUME ABOVE LEDGE @ ~ TOP EL 3.50

LENGTH = 9'-4" + 8" + ~ 5'-0" = 15.0'

WIDTH = 6.0'

AREA = 15(6) = 90 ft²

VOLUME = 90 (7.48) = 673.2 gal/ft

③ LEAD PUMP DOWN VOLUME (LEAD START TO ALL STOP)

EL. 2.825 − EL 1.0 ⇒ DEPTH = 1.825 ft

VOLUME = (1.825)(225) ≅ 410 gal

④ DIFFERENTIAL VOLUME − (LEAD START TO LAG START)

BASE WW VOLUME = (3.5 − 2.825)(225) = 151.9 gal

EXTENDED WW VOLUME = (3.825 − 3.50)(673.2) = 218.8 gal

370.7 gal

⑤ DIFF VOLUME − LAG START TO HLA

VOLUME = (4.075 − 3.825)(673.2) = 168.3 gal

⑥ DIFF VOLUME − HLA TO OVERFLOW

VOLUME = (4.325 − 4.075)(673.2) = 168.3 gal

336.6 gal

Tab 4

Not Used