SCADA Data/Instrumentaton Gap Analysis and Standard DW Storage Facilities

DI		1=Basic Data 2=Advanced Data	Instrument Required	Comments
DI				
	Control Panel AC Power Failure	1	Relay	
	Control Panel PLC Battery Voltage Low	1	Switch	
	Control Panel PLC Battery Charger Status	1	Switch	
	Control Panel Cabinet Door Open	1	Switch	
	PLC State (PROGRAM-REMOTE-RUN)	1	PLC	
	PLC Communication Fail	1	PLC	
	PLC Fault Information	2	PLC	
	Control Panel Battery Voltage	2	PLC	May require voltage divider circuit or current to voltage circuit
	Control Cabinet temperature	2	RTD	For outdoor locations
	irity) Typical for All SCADA Sites	•		
DI	Intrusion, Vault Entry (Not all sites)	1	Security	SCADA will interface to Security System Project Signals
	Intrusion, Building and Site Entry	1	Security	SCADA will interface to Security System Project Signals
	Intrusion, Storage Facility/ Tank Stairs or Hatch Entry	1	Security	SCADA will interface to Security System Project Signals
	Authorized Entry Switch (Intrusion Disarm)	1	Security	SCADA will interface to Security System Project Signals
Storage Facility				
AI	Storage Facility Level	1	LT	
	Distribution System Pressure	1	PT	
	Storage Facility In/Out Flow	1	FM	
	Storage Facility Bypass Flow	1	FM	
	Storage Facility Overflow/Drain Flow (Calculated by PLC)	1	PLC	
AI	Storage Facility Underfloor Drain Flow	1	FM	
	Chlorine Residual at Storage Facility Outlet	1	CI Analyzer	
	Chlorine Residual inside Storage Facility (w/recirc. NaOCI)	1	CI Analyzer	
AI	Chlorine Residual inside Storage Facility (w/o recirc. NaOCI)	2	Cl Analyzer	
AI	pH	2	pH Analyzer	
			Temp	
AI	Temperature	2	Transmitter	
DI	Storage Facility Overflow Alarm Switch	1	Switch	
DI	Bypass Valve Open Limit Switch	1	Limit Switch	
DI	Bypass Valve Close Limit Switch	1	Limit Switch	
			Valve	
DO	Bypass Control Valve Open Command	1	Controller	
50			Valve	
DO	Bypass Control Valve Close Command	1	Controller	
DO	Bypass PRV Enable Command	1	PRV Controller	
DO	Bypass PRV Disable Command	1	PRV Controller	
	Altitude Valve Closed Status Switch	1	Switch	
	Altitude Valve Closed Status Switch	1	Float Switch	
	ve Signals (Typical for each additional valve, but not at every site)		1 Iour Ownort	
	Valve Open Limit Switch	1	Switch	
	Valve Close Limit Switch	1	Switch	
		1	Valve	
DO	Valve Open Command	1	Controller Valve	
DO	Valve Close Command	1	Controller	
AO	Valve Position Setpoint	1	Valve Controller	
	Valve Position	1	Position Transmitter	
	Local-Off-Remote in Remote	1	Switch	
	Valve Vault Flood Alarm	1	Float Switch	
	PLC = Programmable Logic Controller			
	PLC = Programmable Logic Controller PT = Pressure Transmitter			
	LT = Level Transmitter			
	FM = Flow Meter			

SCADA Data/Instrumentation Gap Analysis and Standard Remote Controlled Valves

		Data		
			The second states	
0'	O' we all blaves	Requirement		0
Signal Type	Signal Name	1=Basic Data	Instrument	Comments
		2=Advanced	Required	
Control Panel Si		Data		
	Control Panel AC Power Failure		Dula	
DI		1	Relay Switch	
DI	Control Panel PLC Battery Voltage Low		Switch	
	Control Panel PLC Battery Charger Status	1	••	
DI	Control Panel Cabinet Door Open	1	Switch	
Internal	PLC State (PROGRAM-REMOTE-RUN)	1	PLC	
Internal	PLC Communication Fail	1	PLC	
Internal	PLC Fault Information	2	PLC	
				May require voltage divider circuit or current to voltage
AI	Control Panel Battery Voltage	2	PLC	circuit
	ity) Typical for All SCADA Sites	-		
DI	Intrusion, Vault Entry (Not all sites)	1		SCADA will interface to Security System Project Signals
DI	Authorized Entry Switch (Intrusion Disarm)	1	Security	SCADA will interface to Security System Project Signals
Pressure and Fl				
AI	Upstream Pressure	1	PT	
AI	Downstream Pressure (1 for each valve)	1	PT	
Internal	Downstream Pressure High Alarm (Calculated by PLC)	1	PLC	
AI	Flow to Zone (1 for each valve)	1	FM	
Remote Controlle	ed Flow Valve			
DI	Valve L-O-R Switch in Remote	1	Switch	
DI	Valve L-O-R Switch in Local	1	Switch	
DI	Valve Open Limit Switch	1	Switch	
DI	Valve Close Limit Switch	1	Switch	
			Valve	
DO	Valve Open Command	1	Controller	
			Valve	
DO	Valve Close Command	1	Controller	
			Position	
AI	Valve Position	1	Indicator	
		1	Valve	
AO	Valve Position Command	1	Controller	
Internal	Valve Failure to Open/Close Alarm	1	PLC	
DI	Valle Flood Alarm	1	Float Switch	
		1	i idal Switch	
	PLC = Programmable Logic Controller	1		
	PT = Pressure Transducer			
	FM = Flow Meter			

SCADA Data/Instrumentation Gap Analysis and Standard Pressure Regulating Valves

Signal Type	Signal Name	Data Requirement 1=Basic Data 2=Advanced Data	Type of Field Instrument Required	Comments
Control Panel				
DI	Control Panel AC Power Failure	1	Relay	
DI	Control Panel PLC Battery Voltage Low	1	Switch	
DI	Control Panel PLC Battery Charger Status	1	Switch	
DI	Control Panel Cabinet Door Open	1	Switch	
Internal	PLC State (PROGRAM-REMOTE-RUN)	1	PLC	
Internal	PLC Communication Fail	1	PLC	
Internal	PLC Fault Information	2	PLC	
AI	Control Panel Battery Voltage	2	PLC	May require voltage divider circuit or current to voltage circuit
Intrusion (Sec	urity) Typical for All SCADA Sites			
DI	Intrusion, Vault Entry (Not all sites)	1	Security	SCADA will interface to Security System Project Signals
DI	Authorized Entry Switch (Intrusion Disarm)	1	Security	SCADA will interface to Security System Project Signals
Pressure Regi	ulating Valves			· · · · · · ·
AI	Upstream Pressure	1	PT	
AI	Downstream Pressure (1 for each valve)	1	PT	
AI	Flow to Zone (1 for each valve)	1	FM	Can be calculated by valve position with Cla-Val attachment
Internal	Downstream Pressure High Alarm	1	PLC	Calculated by PLC from pressure signal
Internal	Setpoint (Downloaded from SCADA)	2	PLC	
AO	Pressure Control SP (if analog output control)	2	PRV Controller	
DO	Pressure Control SP (Raise/lower if pulse control)	2	PRV Controller	
DO	PRV Enable Command	1	PRV Controller	
AI	Valve Position	1	Position Transmitter	
DI	Valve Closed Limit	1	Limit Switch	
DI	Valve Open Limit	1	Limit Switch	
DI	Vault Flood Alarm	1		Install a sump pump with the vault flood float switch at locations where water seepage could require frequent pumping to maintain a dry vault.
	PLC = Programmable Logic Controller PT = Pressure Transducer FM = Flow Meter			

SCADA Data/Instrumentation Gap Analysis and Standard Pressure or Flow Monitor Sites

Signal Type	Signal Name	Data Requirement 1=Basic Data 2=Advanced Data	Type of Field Instrument Required	Comments
	Panel Signals	-	-	
	Control Panel AC Power Failure	1	Relay	
DI	Control Panel PLC Battery Voltage Low	1	Switch	
DI	Control Panel PLC Battery Charger Status	1	Switch	
DI	Control Panel Cabinet Door Open	1	Switch	
Internal	PLC State (PROGRAM-REMOTE-RUN)	1	PLC	
Internal	PLC Communication Fail	1	PLC	
Internal	PLC Fault Information	2	PLC	
	Control Panel Battery Voltage	2	PLC	May require voltage divider circuit or current to voltage circuit
	n (Security) Typical for All SCADA Sites		•	
DI	Intrusion, Vault Entry (Not all sites)	2	Security	SCADA will interface to Security System Project Signals
	Authorized Entry Switch (Intrusion Disarm) e or Flow Monitoring	2	Security	SCADA will interface to Security System Project Signals
Al	Line Pressure	1	PT	
		1	FM	l
AI	Flow to Zone	1		Dessible SCADA interface to AMD system sould be
AI	Flow to Wholesale Customers	1	FM	Possible SCADA interface to AMR system could be implemented

SCADA Data/Instrumentation Gap Analysis and Standard Water Pump Stations

DI Pump 1 Motor Overload Alarm 1 Relay PLC input. DI Pump 1 Discharge Valve Closed 1 Limit Switch Existing discharge valve closed switch will be interfaced to PLC. An additional relay may be required to add a dry contact for PLC input. DI Pump 1 Discharge Valve Closed 1 Limit Switch Contact for PLC input. DI Pump 1 Discharge Valve Opened 1 Limit Switch If there is an existing discharge valve opened limit s it will be installed if it is not existin additional relay may be required to add a dry contact opened limit switch will be installed if it is not existin additional relay may be required to add a dry contact for PLC. An new discharge valve opened limit switch DI Pump 1 Discharge Valve Opened 1 Limit Switch PLC input. Internal Previous Run Hours 1 PLC PLC PLC Internal Previous Run Hours 1 PLC PLC PLC Internal Pump 1 Called (Calculated in PLC) 1 PLC PLC Internal Pump 1 Called (Calculated in PLC) 1 PLC POwer Monitor with KWH, total KWH, AC Voltage, A Ethernet Pump 1 Electrical Power Information 2 Power Monitor Current, Power Factor, and other variables.		Water Pump Stations							
Dit Control Panel PC Battey Voltage tow 1 Relay Dit Control Panel PLC Battey Voltage tow 1 Switch Dit Control Panel PLC Battey Charger Status 1 Switch Dit Control Panel PLC Battey Charger Status 1 Switch Internal PLC State (PROGRAM-REMOTE-LUN) 1 PLC Internal PLC Conformance. Internal PLC State (PROGRAM-REMOTE-LUN) 1 PLC Internal PLC State (PROGRAM-REMOTE-LUN) Internal RC Fault Information 2 PLC Internal PLC State (PROGRAM-REMOTE-LUN) Internal RC Fault Information 2 PLC Internal PLC State (PROGRAM-REMOTE-LUN) Intrusion Security Statem Project Sig 1 Security SCADA will interface to Security System Project Sig Dit Autorization Pressure (Intersion Disarm) 1 Security SCADA will interface to Security System Project Sig Page Station Common Signals 1 PT All Station State PROGRAM Project Sig Page Station Common Signals 1 PT All Station State Project Signals Pung Station Electrical Information 1 PT All State	Туре	-	Requirement 1=Basic Data 2=Advanced	Instrument	Comments				
Di Control Panel PLC Battery Voltage Low 1 Switch Di Control Panel PLC Battery Voltage Charger Statute 1 Switch Di Control Panel PLC Battery Voltage 1 Switch Internal PLC Communication Fail 1 PLC Internal PLC Communication Fail 1 Scouthy Control Panel Battery Voltage 2 PLC direct the interface to Security System Project Sig Di Intrusion, Generating System Project Sig The intrusion Statute to Socurity System Project Sig Di Intrusion Statute (1 for each zone) 1 PM A Station Discharge Pressure (1 for each zone) 1 PT A Station Discharge Pressure (1 for each zone) 1 PT A Station Discharge Pressure (1 for each zone) 1 PT A Station Discharge Pressure (1 for each zone) 1 PE A Station Disc					I				
Di Control Panel FLC Santery Charger Status 1 Switch Di Control Panel Calino Dor Open 1 Switch Internal PLC State (PROCRAM-REMOTERUN) 1 PLC Internal PLC Sommunication Fail 1 PLC Internal PLC Sommunication Fail 1 PLC Internal PLC Sommunication Fail 2 PLC Internal PLC Sommunication Fail 1 PLC Internal PLC Sommunication Fail 2 PLC Internal PLC Sommunication Fail 2 PLC Internal PLC Sommunication Fail 2 PLC Intruston, Building and Stee Entry 1 Security Social Social PLC Sommy Project Sig Di Intruston, Building and Stee Entry 1 PT All Station Discharge Pressure 1 for each zone) 1 PT All Station Discharge Pressure 1 for each zone) 1 PT All Station Discharge Pressure Switch 1 Pressure Switch Di AC Presure 1 Station Resource 1 for each zone) 1 Pressure Mail Action Act				,					
Dit Control Panel Cabinet Door Open 1 Switch Internal PLC Communication Fail 1 PLC Internal PLC Communication Fail 1 Internal PLC Communication Fail 1 PLC Internal PLC Communication Fail 1 Internal PLC Call Information 2 PLC incurs Internal PLC ScaDa will interface to Security System Project Sig Internal PLC ScaDa will interface to Security System Project Sig Interface to Security System Project Sig Interface to Security System Project Sig Dit Authorized Entry Switch (finusion Dearm) 1 Security ScaDa will interface to Security System Project Sig Dit Authorized Entry Switch (finusion Dearm) 1 PT Interface All Station Dischage Prose rot station 1 PT Interface Prover Monitor Signal All Station Dischage Prose rot station 1 PT Interface Prover Monitor Signal Interface Dit of Ethernet Pump Station Electrical KWH Usage Total 2 Power Monitor with KWH Lot KWH AC Voltage, A Dit of Ethernet Pump Station Electrical Information 2 Power Monitor with KWH Lot KWH AC Voltage, A									
Internal PLC State (PROGRAM-REMOTERUN) 1 PLC Internal PLC communication Pail 1 PLC Internal PLC communication Pail 2 PLC All Control Panel Battery Voltage 2 PLC chrout Intrusion Geourny Typical for All SCADA Sites 2 PLC chrout Dil Intrusion, Vault Enry (Net all steel) 1 Security SCADA will interface to Security System Project Sig Dil Intrusion Scurpt Psulch (Intrusion Dearm) 1 Security SCADA will interface to Security System Project Sig Dil Allo Station Discharge Pressaure 1 PT All Station Discharge Pressaure 1 for each zone) 1 All Station Discharge Pressaure 1 for each zone) 1 PT All Station Discharge Pressaure 1 for each zone) 1 Join All Station Electrical KWH Usage Total 2 Power Metry Trusied Station AC power failure Di AC Power to Station 2 Power Metry Trusied Station Electrical KWH Jusage Total 2 Di Batteri Low Station Fleatrical KWH Usage Total 2 Power Metry Trusied Station Electrical KWH, AC Voltage, A Di Test Atam Purp Station Electrical KW									
Interner PLC communication Fail 1 PLC Interner PLC built Information 2 PLC May require voltage divider circuit or current to volta intrusion Intrusion Security Typicat for All SCADA Street 9 PLC SCADA will interface to Security System Project Sig Dil Intrusion, Building and Stre Entry 1 Security SCADA will interface to Security System Project Sig Dil Intrusion, Building and Stre Entry 1 Security SCADA will interface to Security System Project Sig Dil Autorization (Intrusion Dearm) 1 Security ScaDa will interface to Security System Project Sig Dil All Station Dischage Pressure (1 for each zone) 1 PT PT All Station Dischage Pressure (1 for each zone) 1 PT Dil AC Power to Station 1 PT Dil AC Power to Station 1 Pt Difference Difference <td></td> <td></td> <td></td> <td></td> <td></td>									
Internal PLC PLC Al Control Panel Battery Voltage 2 PLC circuit Intrusion Country Typical for All SCADA Stee 9 Control Panel Battery Voltage divider circuit or current to voltage Di Intrusion, Vauit Entry (Not all sites) 1 Security SCADA will interface to Security System Project Sig Di Intrusion, Vauit Entry (Not all sites) 1 Security SCADA will interface to Security System Project Sig Di All Station Suction Pressure (1 for each zone) 1 PT All Station Discharge Pressure (1 for each zone) 1 PT All Station Discharge Pressure (1 for each zone) 1 PT All Station Discharge Pressure (1 for each zone) 1 PT All Station Discharge Pressure (1 for each zone) 1 PT All Or Di All Control Electrical KWH Usage Total 2 Power Meter Di Station Electrical KWH Usage Total 2 Power Monitor with KWH, total KWH, AC Voltage, A Di Station Electrical Information 2 Power Monitor With KWH, total KWH, AC Voltage, A Di Station Pressure (1 formation 2 Power Monit									
All Control Panel Battery Voltage 2 PLC May reprive voltage divider circuit or ourrent to volta direction (security) Typical for All SCADA sites DI Intrusion, Suite Entry Voltal Bites) 1 Security SCADA will interface to Security System Project Sig DI Authorized Entry Switch (intrusion Disarm) 1 Security SCADA will interface to Security System Project Sig Pump Station Common Signals 1 PTM Security SCADA will interface to Security System Project Sig All Station Dischage Pressure (1 for each zone) 1 PTM Provem Nation Common Signals DI AL Power to Station 1 Relay to Station Electrical KWH author (1 for each zone) 1 PTM All Station Dischage Pressure View to Station 1 Relay to Station AC power failure Discharge Pressure Winth or an anticipate to Station AC power Monitor is not installed. Prower Monitor is not installed. DI or Pump Station Electrical KWH Usage Total 2 Switch Power Monitor is not installed. Di Fload Alarm 1 PLC Interface Security Switch Power Monitor is not installed. Di Fload Alarm 1 PLC Switch PLC Switch <tr< td=""><td></td><td></td><td></td><td></td><td></td></tr<>									
All Control Panel Battery Voltage 2 PLC Circuit Intrusion, Vauli Entry (Not all stee) 1 Security SCADA will interface to Security System Project Sig Di Intrusion, Vauli Entry (Not all site) 1 Security SCADA will interface to Security System Project Sig Di Authorized Entry Switch (Intrusion Disarm) 1 Security SCADA will interface to Security System Project Sig All Station Dischage Pressure (1 for each zone) 1 PT Intrusion Security System Project Sig All Station Dischage Pressure (1 for each zone) 1 PT Interface Prover Monitor is not installed. D or Enternet 1 Relay Phase Fail Relay to detect station AC power failure D or Enternet 1 Relay Phase Fail Relay to detect station AC power failure D or Enternet Pump Station Electrical KWH Usage Total 2 Power Monitor with KWH, total KWH, AC Voltage, A D or Enternet Pump Station Electrical Information 2 Switch Power Monitor is not installed. D infored Aiarm Station Pressure Switch <td< td=""><td>Internal</td><td>PLC Fault Information</td><td>2</td><td>PLC</td><td></td></td<>	Internal	PLC Fault Information	2	PLC					
Intrusion (Security) Typical for All SCADA Sites DI Intrusion, Vauli Entry (Not all sites) 1 Security SCADA will interface to Security System Project Sig DI Intrusion, Building and Site Entry 1 Security SCADA will interface to Security System Project Sig Pump Station Common Signals ScADA will interface to Security System Project Sig Pump Station Dischage Pressure 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All or Power Monitor Nump Pressure Monitor is not installed. Prover Monitor with KWH, AC Votage, A Iternal Suction Pressure Low Alarm (Calculated by PLC) 1 PLC Prover Monitor Current, Power Factor, and other variables. DI Station Pressure Low Alarm (Calculated by PLC) 1 PLC PLC PL Intr									
Di Intrusion, Vauit Entry (Not all stee) 1 Security SCADA will interface to Security System Project Sig Di Authorzed Entry Switch (Intrusion Disarm) 1 Security SCADA will interface to Security System Project Sig All Station Sucion Pressure 1 PT Intrusion Common Signation All Station Dischage Pressure (1 for each zone) 1 PT Interface to Security System Project Sig All Station Dischage Pressure (1 for each zone) 1 PT Interface to Security System Project Sig D or Station Dischage Forwarie 1 PT Interface to Security System Project Sig D or Ethernet Power Monitor is no Prover Monitor is no Optional Electrical MWH pulse output interface D or Ethernet Pump Station Electrical KWH Usage Total 2 Station Low Station Pressore Station 2 Power Monitor is no Power Monitor is no D or Station Low Station Pressore Statich 2 Station Pressore Station 1 Flags Station Power Monitor is no D interface Instantion Statian Provem Station Pressore Statin Stating Marm Calculated by PLC) 1			2	PLC	circuit				
DI Intrusion, Building and Site Entry 1 Security SCADA will interface to Security. System Project Sig Pump Station Common Signals			4						
D1 Authorized Entry Switch (Intrusion Disarm) 1 Security SCADA will Interface to Security System Project Sig All Station Suction Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT All Station Dischage Pressure (1 for each zone) 1 PT D1 AC Power to Station 1 PT D1 AC power Station Electrical MWH Usage Total 2 Power Monitor with KWH, Hotal KWH, AC Voltage, A D1 Station Low Suction Pressure Switch 2 Switch 2 D1 Flood Alarm 1 PLC 1 Internal Station Electrical Information 2 Switch 2 D1 Flood Alarm 1 Heat Sensor 2 Switch D1 Flood Alarm 1 Heat Sensor 2 2 2 2			-	,					
Pump Station Common Signals Image: Common Signals All Station Dischage Flow Rate (1 for each zone) 1 PT All Station Dischage Flow Rate (1 for each zone) 1 PT All Station Dischage Flow Rate (1 for each zone) 1 PT All Station Dischage Prevents Station 1 PT DI AC Power to Station 1 PT DI AC Power to Station Electrical KWH Usage Total 2 Interface DI or Ethernet Pump Station Electrical Information 2 Switch DI Station Dressure Davids Station Pressure Switch 2 Switch Pume Station Electrical Information 2 Switch 2 Switch Pic C DI Filter Alarm Calculated by PLC) 1 PLC Ploce Alarm DI Filter Alarm Calculated by PLC) 1 PLC Ploce Alarm DI Filter Alarm Remay I Running 1 PLC Ploce Alarm DI Pump 1 Statio Command 1 PLC Ploce Alarm Ploce Alarm DI Pump 1 Statio Command 1 PLC Ploce Alarm Ploce Alarm Ploce Alarm									
AI Station Suctor Pressure 1 PT AI Station Discharge Pressure (1 for each zone) 1 PT AI Station Discharge Pressure (1 for each zone) 1 PT DI AC Power to Station 1 PT DI Food Station Construction (MT) Power Monitor with KWH, Hotal KWH, AC Voltage, A Presser Food Nam 2 Switch Power Monitor With KWH, Hotal KWH, AC Voltage, A Internal Station Low Suction Pressure Walth (Calculated by PLC) 1 PLC Internal Station Pressure Main (Calculated by PLC) 1 PLC DI Flood Alarm 1 Heal Sensor DI Pump 1 Stant Command 1 PLC DO Pump 1 Stant Command 1 PLC DD Pump 1 Stant Command 1 PLC </td <td></td> <td></td> <td>1</td> <td>Security</td> <td>SCADA will interface to Security System Project Signals</td>			1	Security	SCADA will interface to Security System Project Signals				
Al Station Dischage Flow Rate (11 for each zone) 1 FM Al Station Dischage Pressure (11 or each zone) 1 PT Al Bypass (Zone Transfer) Valve Flowrate 1 PT DI AC Power to Station 1 Relay Phase Fail Relay to detect station AC power failure; DI or 1 Relay Phase Fail Relay to detect station AC power failure; DI or 1 Relay Phase Fail Relay to detect station AC power failure; DI or 1 Relay Phase Fail Relay to detect station AC power failure; DI or Station Electrical KWH Usage Total 2 Power Monitor with KWH, Intal KWH, AC Voltage, A II station Low Suction Pressure Switch 2 Switch Power Monitor with KWH, Intal KWH, AC Voltage, A Internal Station Pressure Low Atarn (Calculated by PLC) 1 PLC PLC Internal Station Pressure Switch 2 Switch Switch Switch DI Fired Atarm 1 Heat Sensor Pump 1 Faunitig Switch PLC Switch PLC Switch PLC Switch PLC Switch PLC Switch			4	DT					
AI Station Discharge Pressure (if for each zone) 1 PT AI Bypass (Zone Transfer) Valve Flowrate 1 PT DI AC Power to Station 1 Relay Phase Fail Relay to detect station AC power failure DI or Ethernet Pump Station Electrical KWH Usage Total 2 Dovided by Power Company if Power Monitor is not installed. AI or 2 Power Monitor with KWH, total KWH, AC Voltage, A Ethernet Pump Station Electrical Information 2 Power Monitor with KWH, total KWH, AC Voltage, A Internal Discharge Pressure (Low Alarm (Calculated by PLC) 1 PLC DI Fload Alarm 1 Pload DI Fload Alarm 1 PLC DI Fload Alarm 1 PLC DI Fload Switch 2 Switch DI Pump 1 Stapa Command 1 PLC DI Pump 1 Stapa Command 1 PLC DI Pump 1 Lo-R in DFF 1 Switch DI Pump 1 Lo-R in CFF 1 Switch DI Pump 1 Lo-									
Al Bypass (Zone Transfer) Valve Flowrate 1 PT DI AC Power to Station 1 Relay Phase Fail Relay to detect station AC power failure DI or 1 Relay Phase Fail Relay to detect station AC power failure DI or 1 Relay Phase Fail Relay to detect station AC power failure Di or 2 Power Monitor is not installed. Power Monitor with KWH, total KWH, AC Voltage, A All or 2 Switch 1 Plase Fail Relay to detect station AC power Monitor is not installed. Di Station Low Suction Pressure Valam (Calculated by PLC) 1 PLC 1 Internal Suction Pressure Valam (Calculated by PLC) 1 PLC 1 Di Flood Alarm 1 Heals Sensor 1 Di Pump 1 Stant Command 1 PLC 1 Di Pump 1 Stant Command 1 PLC 1 Di Pump 1 Hohito Command 1 PLC 1 Di Pump 1 Hohito Command 1 PLC 1 Di Pump 1 Hohito Command 1 PLC 1									
DI AC Power to Station 1 Relay Phase Fail Relay to detect station AC power failure Di or Prover Meter To Station Electrical KWH Usage Total 2 Power Meter To Station Electrical KWH pulse output interface Ethernet Pump Station Electrical Information 2 Power Meter Monitor Station Installed. Power Monitor With KWH, total KWH, AC Voltage, A Di Station Low Suction Pressure Switch 2 Switch Power Monitor With KWH, total KWH, AC Voltage, A Internal Suction Pressure Low Alarm (Calculated by PLC) 1 FLC PLC Di Fired Alarm 1 Float Switch 1 Float Switch Di Fired Alarm 1 Float Switch 1 Float Switch Di Pump 1 Running 1 Relay 1 PLC Di Pump 1 Station Command 1 PLC 1 Internal Pump 1 Lo-R in OFF 1 Switch Di Pump 1 Lo-R in OFF 1 Switch 1 Terms Switch Switch 1 Existing bearing temperature high switches will be interfaced to PLC. An additional relay may be required to add a dry contact for PLC input. Di Pump 1 Lo-R in OFF 1 Switch 1 Terms Switch 1 Float Switch 1									
Di or Power Meter Interface Power Meter Interface Power Monitor with KWH, total KWH, AC Voltage, A Al or Ethernet Power Monitor Power Monitor Interface installed. Al or Power Monitor Power Monitor Current, Power Factor, and other variables. DI Station Low Suction Pressure Bigh Alarm (Calculated by PLC) 1 PLC Internal Station Fressure Ligh Alarm (Calculated by PLC) 1 PLC Internal Station Fressure Ligh Alarm (Calculated by PLC) 1 PLC DI Flood Alarm 1 Heat Sensor Pump Signal S					Dhana Fail Dalay ta data at station AQ navyan failyna				
Di or Power Metry provided by Power Company if Power Monitor is not installed. Al or 2 Interface installed. Al or 2 Interface installed. Ethemet Pump Station Electrical Information 2 Power Monitor is not installed. DI Station Low Suction Pressure Switch 2 Switch Internal Suction Pressure Low Alarm (Calculated by PLC) 1 PLC DI Flored Alarm 1 Flored Switch 2 DI Flored Alarm 1 Flored Switch 2 DI Pired Alarm 1 Relay 2 DI Pump 1 Running 1 Relay 2 DO Pump 1 Stato Command 1 PLC 2 DI Pump 1 Stato Command 1 PLC 2 DI Pump 1 Stato Command 1 PLC 2 DI Pump 1 Hord in REMOTE 1 Switch 2 DI Pump 1 Hord in REMOTE 1 Switch 2 DI	DI	AC Power to Station	1	Relay					
Ethernet Pump Station Electrical KWH Usage Total 2 Interface installed. At or Power Monitor With KWH, total KWH, AC Voltage, A Di Station Low Suction Pressure Switch 2 Switch Power Monitor With KWH, total KWH, AC Voltage, A Di Station Low Suction Pressure Switch 2 Switch PleC Internal Suction Pressure High Alarm (Calculated by PLC) 1 PLC DI Fload Sam 1 Fload Switch D DI Fload Sam 1 Relay D DI Pump Stant Command 1 PLC D DO Pump 1 Stant Command 1 PLC D DI Pump 1 Lo-R in DFF 1 Switch D DI Pump 1 Lo-R in DCAL 1 Switch D Existing bearing temperature high switches will be interfaced to PLC. An additional relay may be required to add a dry contact for PLC. Input. Internal Pump 1 High Bearing Temperature 1 Temp Switch Existing discharge valve closed switch will be interfaced to PLC. An additional relay may be required to add a dry contact for PLC. Input. <td>Disa</td> <td></td> <td></td> <td>Deven Mater</td> <td></td>	Disa			Deven Mater					
Al or Power Monitor With KWH, total KWH, AC Voltage, A Ethernet Pump Station Electrical Information 2 Power Monitor Current, Power Factor, and other variables. Internal Suction Pressure Low Alarm (Calculated by PLC) 1 PLC Internal Suction Pressure Ign Alarm (Calculated by PLC) 1 PLC DI First Alarm 1 Float Sutch DI First Alarm 1 Relay DO Pump 1 Stop.Command 1 PLC Internal Pump 1 Stop.Command 1 PLC DI Pump 1 Stop.Command 1 PLC Internal Pump 1 Lo-R in REMOTE 1 Switch 1 DI Pump 1 Lo-R in ICGAL 1 Switch 1 Internal Pump 1 Lo-R in LOCAL 1 Switch 1 DI Pump 1 Lo-R in LOCA In CR and motor alarms) 1 PLC Internal Pump 1 High Bearing Temperature 1 Temp Switch ad d a y contact for PLC input. DI Pump 1 High Bearing Temperature 1 Existing discharge valve closed switch will be interfaced to PLC. An additional relay may be required to add a d'y contact for PLC input. DI Pump 1 Motor Overload Alarm 1 PLC DI Pump 1 Discharge Valve Closed 1 Limit Switch DI	-	Duran Otation Electrical KW/U Users Tatal	0						
Ethemet Power Nonitor Current, Power Factor, and other variables. DI Station Low Suction Pressure Switch 2 Switch Internal Suction Pressure Switch 2 Switch Internal Dic Station Low Suction Pressure Switch 1 PLC Internal Dic Flood Alarm 1 Fload Switch DI Flood Alarm 1 Heat Sensor Pump Stata Command 1 PLC 1 DO Pump 1 Stata Command 1 PLC DO Pump 1 Stata Command 1 PLC DI Pump 1 I_O-R in REMOTE 1 Switch DI Pump 1 L-O-R in OFF 1 Switch Internal Pump 1 L-O-R in OFF 1 Existing MicC overioad relays will be interfaced to PLC. An additio		Pump Station Electrical KWH Usage Total	2	Interface					
DI Station Low Suction Pressure Switch 2 Switch Internal Suction Pressure Low Alarm (Calculated by PLC) 1 PLC Internal Discharge Pressure High Alarm (Calculated by PLC) 1 PLC DI Fired Alarm 1 Float Switch DI Fired Alarm 1 Relay DI Pump 1 Running 1 Relay DO Pump 1 Stor Command 1 PLC DO Pump 1 Stor Command 1 PLC DI Pump 1 Stor Command 1 PLC DI Pump 1 Stor Command 1 PLC DI Pump 1 LO-R in REMOTE 1 Switch Internal Pump 1 LO-R in IOFF 1 Switch Internal Pump 1 LO-R in IOCAL 1 Switch Internal Pump 1 LO-R in LOCAL 1 Switch Internal Pump 1 High Bearing Temperature 1 Fems Switch Internal Pump 1 High Bearing Temperature 1 Relay DI Pump 1 Motor Overload Alarm 1 Relay DI Pump 1 Discharge Valve Closed 1 Limit Switch DI Pump 1 Discharge Valve Closed 1 PLC input. <td< td=""><td>-</td><td></td><td></td><td></td><td>· · · · · · · · · · · · · · · · · · ·</td></td<>	-				· · · · · · · · · · · · · · · · · · ·				
Internal Suction Pressure Low Alarm (Calculated by PLC) 1 PLC Internal Discharge Pressure High Alarm (Calculated by PLC) 1 PLC DI Flood Alarm 1 Float Switch DI Fire Alarm 1 Heat Sensor Pump Signals (Typical for each Pump) 1 Relay 0 DO Pump 1 Start Command 1 PLC 0 DO Pump 1 Start Command 1 PLC 0 DO Pump 1 Start Command 1 PLC 0 DI Pump 1 LO-R in REMOTE 1 Switch 0 DI Pump 1 LO-R in OFF 1 Switch 0 DI Pump 1 LO-R in OFF 1 Switch 0 Internal Pump 1 Available (Calculated from LOR and motor alarms) 1 PLC Existing discharge valve closed swith will be interfaced to PLC. An additional relay may be required to add a dry contact for PLC input. DI Pump 1 Motor Overload Alarm 1 Relay may be required to add a dry contact for PLC input. DI Pump 1 Discharge Valve C					Current, Power Factor, and other variables.				
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DO Valve #1 Open Command 1 PLC	DI		1						
	DO	Valve #1 Open Command	1	PLC					
DO Valve #1 Close Command 1 PLC	DO		1						

SCADA Data/Instrumentation Gap Analysis and Standard Water Pump Stations

Signal Type	Signal Name	Data Requirement 1=Basic Data 2=Advanced Data	Type of Field Instrument Required	Comments
			Position	
AI	Valve #1 Position (Percent Open)	1	Transmitter	Valve position will be used to determine if valve is moving
	PLC = Programmable Logic Controller			
	PT = Pressure Transducer			
	FM = Flow Meter			

SCADA Data/Instrumentation Gap Analysis and Standard Wastewater Pump Stations

	Wastewater Pump Stations						
Signal Type	Signal Name	Data Requirement 1=Basic Data 2=Advanced Data		Comments			
Control P	anel Signals						
DI	Control Panel AC Power Failure	1	Relay				
DI	Control Panel PLC Battery Voltage Low	1	Switch				
DI	Control Panel PLC Battery Charger Status	1	Switch				
	Control Panel Cabinet Door Open	1	Switch				
Internal	PLC State (PROGRAM-REMOTE-RUN)	1	PLC				
	PLC Communication Fail	1	PLC				
Internal	PLC Fault Information	2	PLC				
	Control Panel Battery Voltage	2	PLC	May require voltage divider circuit or current to voltage circuit			
	(Security) Typical for All SCADA Sites		•				
DI	Intrusion, Vault Entry (Not all sites)	1	Switch				
Pump Sta	tion Common Signals						
AI	Station Wet Well Level	1	LT				
AI	Station Effluent Flow Rate (1 for each zone)	1	FM	Derived from wet well level changes or effluent flow meter.			
DI	AC Power to Station	1	Relay	Phase Fail Relay to detect station AC power failure.			
DI or			Power Meter	Optional Electric meter KWH pulse output interface provided by Power Company if Power Monitor is not			
	Pump Station Electrical KWH Usage Total	2	Interface	installed.			
Al or				Power Monitor with KWH, total KWH, AC Voltage, AC			
Ethernet	Pump Station Electrical KW Usage Rate	2		Current, Power Factor, and other variables.			
	Dry Well Flood Alarm	1	Float Switch				
DI	Fire Alarm	1	Heat Sensor				
	High Float Alarm	1	Switch				
	nals (Typical for each Pump)						
DI	Pump Running	1	Relay				
DO	Pump Start Command	1	PLC				
DO	Pump Stop Command	1	PLC				
		1	PLC				
	Pump H-O-A in HAND	1	Switch				
	Pump H-O-A in OFF	1	Switch				
DI	Pump H-O-A in AUTO	1	Switch				
	Pump Available (Calculated from H-O-A switch and motor alarms)	1	PLC				
	Pump Over Temperature	1		Used on submersible pumps only.			
DI	Pump Seal Fail	1	Seal Switch	Used on submersible pumps only.			
				Existing MCC overload relays will be interfaced to PLC. An additional relay may be required to add a dry contact for			
	Pump Motor Overload Alarm	1	Relay	PLC input.			
	Previous Run Hours	1	PLC				
	Current Day Run Hours	1	PLC				
	Pump Called (Calculated in PLC)	1	PLC				
	nals (Typical For each Check Valve)						
	Check Valve Closed	1	Limit Switch				
DI	Check Valve Open	1	Limit Switch				
	PLC = Programmable Logic Controller						
	PT = Pressure Transducer						
	FM = Flow Meter						

SCADA Data/Instrumentation Gap Analysis and Standard Combined Sewer Overflow

	Combined Sewer Overflow							
Signal Type	Signal Name	Data Requirement 1=Basic Data 2=Advanced Data	Type of Field Instrument Required	Comments				
Control Pan								
DI	Control Panel AC Power Failure	1	Relay					
DI	Control Panel PLC Battery Voltage Low	1	Switch					
DI	Control Panel PLC Battery Charger Status	1	Switch					
DI	Control Panel Cabinet Door Open	1	Switch					
Internal	PLC State (PROGRAM-REMOTE-RUN)	1	PLC					
Internal	PLC Communication Fail	1	PLC					
Internal	PLC Fault Information	2	PLC					
AI	Control Panel Battery Voltage	2	PLC	May require voltage divider circuit or current to voltage circuit				
	ecurity) Typical for All SCADA Sites							
DI	Intrusion, Vault Entry (Not all sites)	1	Switch					
CSO Comm								
AI	CSO Level	1	LT					
AI	CSO Effluent Flow Rate	1	FM					
DI	Overflow Alarm	1	FS					
	PLC = Programmable Logic Controller PT = Pressure Transducer							
	FM = Flow Meter							