Miscellaneous

(3) Wall Mounted Stop Plates and Frames. The frame for each unit will bolt over the notch provided between various tanks. The stop plate will fit into each frame for isolation of the corresponding tank.

(1) Manually-cleaned bar screen rack. This polypropylene bar screen rack will be mounted within the concrete influent channel as shown on the plans. This bar screen rack will have a typical bar spacing to catch most large objects but allow the influent to flow through the rack. A rake will be included that can be used to clean debris from the bar screen.

Start-Up & Operator Training

When the provided equipment has been completely installed, Aero-Mod shall provide equipment start-up (one trip only) for two (2) days on-site at the jobsite. Start-up services shall only be supplied if all pending invoices are paid in full.

Process training for the new plant shall be conducted in Manhattan, KS. As part of this scope of supply, two (2) of the plant's operators shall attend Aero-Mod's operator training school within 60 days (before or after) mechanical start-up of the plant. If any additional trips are requested for additional assistance to the operator or to train new operators, additional days and/or trips shall be charged at a $500/day rate plus travel expenses.

Contractor Supplied Parts & Fittings

PROJECT: **HERITAGE SPRINGS - GREENVILLE, IN.**

DATE: February 1, 2006

This list approximates PVC pipe and fittings to be supplied by the General Contractor necessary for installation of the Aero-Mod equipment. **This list is an approximation** and is intended as a reference for planning purposes only. Aero-Mod, Inc. is in no way responsible for errors or omissions of necessary items. **It is the responsibility of the General Contractor** to verify the accuracy of this list with the Contract Plans, Specifications and Approved Submittals prior to ordering. Also note that items other than those listed on these sheets may be necessary for General Contractor supply. Reference all plan drawings for items to be supplied by the General Contractor.

NOTE: Unless otherwise noted, the plumbing fittings are to be PVC SCH 40 pressure rated. Due to their size and shape, DWV fittings are not suitable. Spears plastic fitting part numbers are provided for reference.

Conduit fittings are CARLON Electric PVC numbers

PARTS LISTING PER TANK

QTY.	PARTS #	DESCRIPTION
		SELECTOR TANK
2	#406-040	PVC 90 DEG. ELL, 4"
2	#429-040	PVC COUPLING, 4"
2	#437-532	PVC REDUCER BUSHING, 6" x 4"
50		PVC SCH 40 PIPE, 1-1/2"
65		PVC SCH 40 PIPE, 4"
5		PVC SCH 40 PIPE, 6"
1	#401-060	PVC SCH 40 TEE, 6"
1	#447-015	PVC SLIP CAP, 1-1/2"
2	#447-040	PVC SLIP CAP, 4"
		1ST STAGE AERATION TANK
2	#417-060	PVC 45 DEG. ELL, 6"
1	#417-080	PVC 45 DEG. ELL, 8"
1	#406-080	PVC 90 DEG. ELL, 8"
5		PVC SCH 40 PIPE, 1"
15		PVC SCH 40 PIPE, 1-1/2"
15		PVC SCH 40 PIPE, 6"

10		PVC SCH 40 PIPE, 8"
1	#401-626F	PVC SCH 40 TEE, 10" x 6"
15		PVC SCH 40, 160 PSI PIPE, 10"
1	#447-020	PVC SLIP CAP, 2"
1	#983J	PVC TYPE-T CONDUIT TEE, 2"

		2ND STAGE AERATION TANK
1		10" EPDM FLANGE GASKET
4		8" EPDM FLANGE GASKET
1	#417-080	PVC 45 DEG. ELL, 8"
1	#406-100	PVC 90 DEG. ELL, 10"
1	#406-040	PVC 90 DEG. ELL, 4"
8	#406-060	PVC 90 DEG. ELL, 6"
6	#406-080	PVC 90 DEG. ELL, 8"
2	#853-080	PVC BLIND FLANGE
3	#UB9AJ	PVC CONDUIT 90 DEG SWEEP, 2"
1	#E987N	PVC CONDUIT JUNCTION BOX, 4"x4"
7	#429-020	PVC COUPLING, 2"
1	#429-040	PVC COUPLING, 4"
2	#429-060	PVC COUPLING, 6"
1	#854P-100	PVC FLANGE x SLIP, 10"
2	#854P-060	PVC FLANGE x SLIP, 6"
9	#854P-080	PVC FLANGE x SLIP, 8"
1	#437-532	PVC REDUCER BUSHING, 6" x 4"
55		PVC SCH 40 PIPE, 1-1/2"
85		PVC SCH 40 PIPE, 2"
45		PVC SCH 40 PIPE, 4"
65		PVC SCH 40 PIPE, 6"
45		PVC SCH 40 PIPE, 8"
2	#401-626F	PVC SCH 40 TEE, 10" x 6"
15		PVC SCH 40, 160 PSI PIPE, 10"
1	#447-015	PVC SLIP CAP, 1-1/2"
3	#447-020	PVC SLIP CAP, 2"
1	#447-040	PVC SLIP CAP, 4"
2	#986J	PVC TYPE-LB CONDUIT LB, 2"
5	#983J	PVC TYPE-T CONDUIT TEE, 2"

		CLARIFIER TANK A
15		PVC SCH 40 PIPE, 8"
1	#401-080	PVC SCH 40 TEE, 8"

		CLARIFIER TANK B
1	#406-080	PVC 90 DEG. ELL, 8"

20		PVC SCH 40 PIPE, 8"
1	#401-080	PVC SCH 40 TEE, 8"

		SURGE TANK
15		PVC SCH 40 PIPE, 8"
1	#401-080	PVC SCH 40 TEE, 8"
1	#447-080	PVC SLIP CAP, 8"

		DIGESTER TANK
2	#417-040	PVC 45 DEG. ELL, 4"
6	#406-060	PVC 90 DEG. ELL, 6"
1	#429-040	PVC COUPLING, 4"
2	#854P-060	PVC FLANGE x SLIP, 6"
1	#437-532	PVC REDUCER BUSHING, 6" x 4"
20		PVC SCH 40 PIPE, 1-1/2"
5		PVC SCH 40 PIPE, 2"
30		PVC SCH 40 PIPE, 4"
30		PVC SCH 40 PIPE, 6"
1	#401-532	PVC SCH 40 TEE, 6" x 4"
1	#447-020	PVC SLIP CAP, 2"
1	#447-040	PVC SLIP CAP, 4"

BILL OF MATERIAL

Heritage Springs
Greenville, IN

Caterpillar Olympian 150 kW Generator Set

One new Caterpillar Olympian Model D150P1 Emergency Generator with a Perkins diesel fueled engine, directly connected to a single bearing synchronous generator with PMG excitation system to sustain a short circuit @ 300% for 10 seconds, 60 Hz., 3 phase, 1800 RPM, 150 kW standby, 120 kW prime power, 120/208 volts, and including the following attachments and accessories:

Air cleaner, single stage dry type
Breather, crankcase
Cooler, lube oil
Lube oil filters
Lubricating oil
Exhaust, manifold dry type
Paint, Caterpillar Yellow
Jacket water pump
Flexible fuel lines
Governor, electronic type allowing isochronous frequency regulation and a steady state operation of $\pm$ 0.25% from no load to full load
Formed steel base
Vibration isolators mounted between the formed steel base and the engine generator set
Radiator, engine mounted, with duct adapter and of sufficient capacity to maintain a safe operating temperature in an ambient of 122°F.
Anti-freeze
Exhaust silencer
Flexible exhaust fitting
Safety shutoff system for high coolant temperature, low oil pressure, engine overspeed and overcrank.
Electric starting system, 12 volt DC
Battery charging alternator, 12 volts, 45 amps
Automatic Engine Start/Stop control mounted in the generator control panel. It shall provide for cycle crank operation and includes alarm lights for low oil pressure, combination high coolant temperature and low coolant level, overspeed and overcrank; a three position selector switch providing positions for auto-start, manual start, and off
Battery 12 volt with acid, rack, and cables
Trickle charger, 120 VAC input, 12 VDC output, UL listed, 10 ampere per NFPA 110
Jacket water heater thermostatically controlled, 1.5 kW, 120 VAC single phase.
Local alarm horn with mute
Voltage adjustment potentiometer
Low coolant temperature alarm
Low coolant shutdown circuit
Low fuel level alarm
Generator mounted control panel, EMCP 3.2 in NEMA 1 enclosure and includes voltmeter, ammeter, frequency meter, power factor, kW hours and kVAr hours with separate LCD display for each, 0.5% accuracy; Engine and AC metering shortcut keys; cool down timer factory set for five minutes; emergency stop switch with LED indicator; LCD indicator for engine speed, battery DC volts, lube oil pressure, coolant temperature, operating hours and system diagnostic codes; auxiliary relay, illumination lights, automatic starting controls quoted above
PMG excitation system for isolating the voltage regulator power circuit from voltage distortions created when the generator supplies a non-linear load.

Generator mounted molded case circuit breaker, mounted in a NEMA 1 enclosure
Generator voltage regulator will be generator mounted.
Weatherproof CAWB with two hinged doors on each side and one at the, bolted to the integral base fuel tank with the critical exhaust silencer and trickle charger mounted inside the enclosure. The enclosure is constructed of 14 gauge steel and each individual piece of the enclosure is powder coat painted Caterpillar yellow. Panel viewing window is included.
Integral base fuel tank, double wall construction, UL approved, 24-hour fuel capacity at full load and conduit stub-up area to facilitate cabling to the generator circuit breaker (Fuel is not included)
Automatic transfer switches, Caterpillar rated 400 amps, at 120/208 volts, 3 phase, 3 pole, 4 wire, 60 hertz in NEMA 1 enclosure and includes the following accessories:
- -time delay engine starting, adjustable 0-6 seconds
- -adjustable time delay on retransfer to normal 0-30 minutes with 5 minute cooldown timer
- -differential relay protection
- -test switch to provide for operation of emergency plant and transfer switch
- -auxiliary contact, engine starting, close when normal fails
- -auxiliary contact open when normal fails
- -pilot light for indicating switch in normal position
- -pilot light for indicating switch in emergency position
- -auxiliary contact on main shaft closed on normal, two provided
- -auxiliary contact on main shaft closed on emergency, two provided
- -frequency relay
- -exerciser - load / no load type
- -test maintain switch

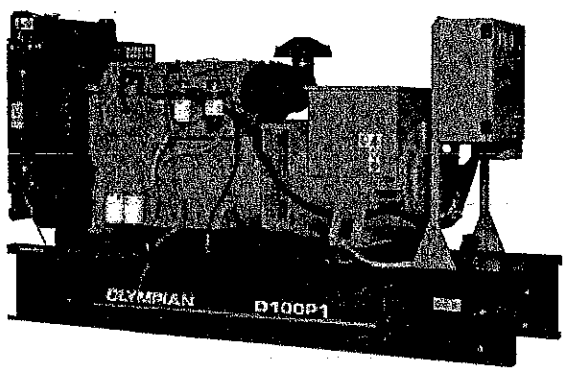
Startup and personnel training
O & M Manuals - 1 set
Submittal Data – 6 sets or as needed

WARRANTY: Two years beginning with the date of start-up of the equipment if used in a standby application.

DIESEL GENERATOR SETS

OLYMPIAN™

Exclusively from your Caterpillar® dealer



STANDBY 90-150 kW
PRIME 82.4-114 kW

60 Hz

Model	Standby kW (kVA)	Prime kW (kVA)
D90P1**	90 (112.5)	82.4 (103)
D100P1**	100 (125)	90 (112.5)
D100P4*	100 (125)	90 (112.5)
D125P1**	125 (156.3)	114 (142.5)
D125P2***	125 (156.3)	114 (142.5)
D150P1**	150 (188)	N/A

* Tier II EPA Approved, Emissions Certified

** 50 Hz option is available. Consult factory for more details.

*** Meets regulations under the transition provisions in paragraph 102 of the EPA regulations with the following statement:

THIS ENGINE IS CERTIFIED TO THE CURRENT MODEL YEAR REQUIREMENTS UNDER THE PROVISION OF 40CFFR89.102

FEATURES

GENERATOR SET
- Complete system designed and built at ISO 9001 certified facilities
- Factory tested to design specifications at full load conditions

ENGINE
- Governor, electronic (D125P1, D125P2, D150P1)
- Governor, mechanical (D90P1, D100P1, D100P4)
- Electrical system, 12 VDC
- Cartridge type filters
- Battery(ies), rack and cables
- Coolant and lube drains piped to edge of base

GENERATOR
- Insulation system, class H
- Drip proof generator air intake (NEMA 2, IP23)
- Electrical design in accordance with BS5000 Part 99, EN61000-6, IEC60034-1, NEMA MG-1.33

CONTROL SYSTEM
- 2001 Autostart control panel
- Vibration isolated NEMA 1 enclosure with lockable hinged door
- DC and AC wiring harnesses

MOUNTING ARRANGEMENT
- Heavy-duty fabricated steel base with lifting points
- Anti-vibration pads to ensure vibration isolation
- Complete OSHA guarding
- Flexible fuel lines to base with NPT connections
- Stub-up pipe ready for connection to silencer pipework

COOLING SYSTEM
- Radiator and cooling fan complete with protective guards
- Standard ambient temperatures up to 122° F (50° C)

CIRCUIT BREAKER
- UL/CSA listed
- 3-pole with solid neutral
- NEMA 1 steel enclosure, vibration isolated
- Electrical stub-up area directly below circuit breaker

AUTOMATIC VOLTAGE REGULATOR
- Voltage within ± 0.5% at steady state from no load to full load
- Provides fast recovery from transient load changes

EQUIPMENT FINISH
- All electroplated hardware
- Anticorrosive paint protection
- High gloss polyurethane paint for durability and scuff resistance

QUALITY STANDARDS
- BS4999, BS5000, BS5514, EN61000-6, IEC60034, NEMA MG-1.33, NFPA 110 (with optional equipment)

DOCUMENTATION
- Operation and maintenance manuals provided
- Wiring diagrams included

WARRANTY
- All equipment carries full manufacturer's warranty.

OPTIONAL EQUIPMENT*

ENCLOSURE
- B Series weather protective enclosure (includes internal silencer system)
- Single point lift
- Panel viewing window
- External emergency stop pushbutton
- Sound attenuated enclosure (includes internal silencer system)
- Super sound attenuated enclosure (includes internal silencer system) (D90P1, D100P1)

SILENCER SYSTEM — OPEN UNIT
- Level 1 silencer 10 dBA
- Level 2 silencer 25 dBA
- Level 3 silencer 35 dBA
- Mounting kit
- Through-wall installation kits

ENGINE
- Electronic governor (fully adjustable)
- Battery heater
- Lube oil drain pump
- High lube oil temperature shutdown
- Lube oil sump heater

CIRCUIT BREAKER
- Auxiliary voltfree contacts
- Shunt trip (100+ amp breakers)

GENERATOR
- Anti-condensation heater
- Permanent magnet generator
- AREP excitation system
- Generator upgrade 1 size - except D150P1

CONTROL SYSTEM
- No control system
- 4001 Series Autostart control panel
- 4001E Series Autostart control panel

MOUNTING ACCESSORIES
- Seismic Zone 4 vibration isolators

FUEL SYSTEM
- Metal fuel tank
- UL listed closed top-piked skid-mounted fuel tank base (12/24 hour capacity) with fuel alarm (low level/leak detected)
- Critical high fuel alarm
- Critical low fuel level shutdown

REMOTE ANNUNCIATORS
- 8- and 16-channel remote annunciator panel (supplied loose)
- Remote annunciator upgrade normal/run control switch
- Remote annunciator upgrade lockdown emergency stop button

COOLING SYSTEM
- Coolant heater
- Low coolant temperature alarm
- Low coolant level shutdown
- Radiator transition flange

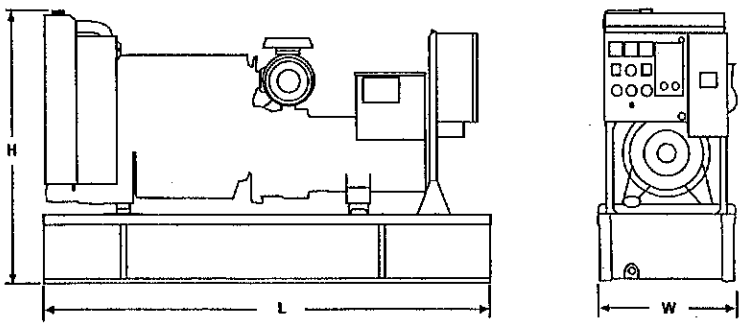
MISCELLANEOUS ACCESSORIES
- Toolkit
- Additional operator's manual pack
- Special enclosure color
- UL listing
- CSA certification
- French or Spanish language labels

EXTENDED SERVICE CONTRACTS
- Extended Service Coverage available

TESTING
- Factory witness test (restricted to 6 hours — full load, 1.0 pf)

*Some options may not be available on all models. Not all options are listed.

GENERATOR SET DIMENSIONS AND WEIGHTS



Model	Length in (mm)	Width in (mm)	Height in (mm)	Weight lbs (kg)**
D90P1	97.7 (2481)	29.4 (746)	56.4 (1433)	2778 (1260)
D100P1	97.7 (2481)	29.4 (746)	56.4 (1433)	2778 (1260)
D100P4	92.4 (2347)	43.3 (1100)	52.0 (1321)	3157 (1432)
D125P1	105 (2675)	35.4 (900)	57.5 (1460)	3263 (1480)
D125P2	105 (2675)	35.4 (900)	57.5 (1460)	3131 (1420)
D150P1	105 (2675)	35.4 (900)	57.5 (1460)	3304 (1535)

NOTE: General configuration not to be used for installation. See specific dimensional drawings for detail.

**Includes oil and coolant
∞ Estimated weight

STANDBY 90 - 150 kW
PRIME 82.4 - 114 kW
60 Hz

OLYMPIAN™

SPECIFICATIONS

GENERATOR

Voltage Regulation ..... ±0.5% at steady state from no load to full load
Frequency ..±0.8% (models with mechanical governor) ±0.25% (models with electronic governor) for constant load, no load to full load
Waveform Distortion .....THD < 4%, at no load
Radio Interference .....Compliance with EN61000-6
Telephone Interference .....TIF <50, THF <2%
Overspeed Limit.....2250 rpm
Insulation ..... Class H
Temperature Rise ..... Within Class H limits
Available Voltages 277/480, 266/460, 120/240, 127/220, 120/208, 347/600
Deration..... Consult factory for available outputs
Ratings ..... At 86° F (30° C), 500 ft. (152.4 m), 60% humidity, 0.8 pf

ENGINE

D90P1, D100P1, D125P1, D125P2 D150P1 — 1006
Manufacturer ..... Perkins
Type..... 4-Cycle
Cylinder Configuration..... In-line 6
Displacement — cu in (L) 365 (5.99)
Bore — in (mm) 3.94 (100.0)
Stroke — in (mm) 5.00 (127.0)
Compression Ratio
D90P1, D100P1 ..... 16.0:1
D125P1, D125P2, D150P1 ..... 17.0:1
Governor
Type ..... Mechanical/Electronic
Class A1/G2
Piston Speed — ft/sec (m/sec)..... 25.0 (7.62)
Engine speed — rpm..... 1800
Air Cleaner Type ..... Dry, replaceable paper element type with restriction indicator
Regenerative Power — kW 16.2

D100P4 — 1104
Manufacturer ..... Perkins
Type..... 4-Cycle
Cylinder Configuration..... In-line 4
Displacement — cu in (L) 268.5 (4.4)
Bore — in (mm) 4.13 (105)
Stroke — in (mm) 5.00 (127)
Compression Ratio 19.3:1
Governor
Type ..... Electronic
Class..... A1
Piston Speed — ft/sec (m/sec)..... 25.0 (7.62)
Engine speed — rpm..... 1800
Air Cleaner Type ..... Dry, replaceable paper element type with restriction indicator
Regenerative Power — kW 16.2

D90P1 — 1006TG1A
Max Power at Rated rpm — hp (kW)
Standby 149.8 (111.7)
Prime 136.2 (101.6)
BMEP — psi (kPa)
Standby..... 182 (1259)
Prime 164 (1133)
Aspiration..... Turbocharged

D100P1 — 1006TG2A
Max Power at Rated rpm — hp (kW)
Standby..... 166 (124)
Prime 151 (112)
BMEP — psi (kPa)
Standby..... 202 (1393)
Prime..... 182 (1253)
Aspiration..... Turbocharged

D100P4 — 1104C-TAG2
Max Power at Rated rpm — hp (kW)
Standby.....157.5 (117.5)
Prime 143.2 (106.9)
BMEP — psi (kPa)
Standby 258 (1780)
Prime.....235 (1618)
Aspiration.....Turbocharged

D125P1 — 1006TAG
Max Power at Rated rpm — hp (kW)
Standby 212.1 (158.5)
Prime..... 193.8 (144.2)
BMEP — psi (kPa)
Standby..... 266 (1836)
Prime..... 234 (1610)
Aspiration ..... Turbocharged, AA Charge Cooled

D125P2 — 1006-6TA
Max Power at Rated rpm — hp (kW)
Standby 212.1 (158.5)
Prime..... 193.8 (144.2)
BMEP — psi (kPa)
Standby..... 266 (1836)
Prime..... 233 (1610)
Aspiration ..... Turbocharged, AA Charge Cooled

D150P1 — 1006TAG1
Max Power at Rated rpm — hp (kW)
Standby 244 (182)
Prime ..... N/A
BMEP — psi (kPa)
Standby 294 (2026)
Prime ..... N/A
Aspiration ..... Turbocharged, AA Charge Cooled

CONTROL PANEL

NEMA 1 steel enclosure with lockable hinged door
Vibration isolated mounted Autostart control panel
Single location customer connector point
Electrical stub-up area directly below control panel

RATING DEFINITIONS

Standby — Applicable for supplying continuous electrical power (at variable load) in the event of a utility power failure. No overload is permitted on these ratings. The generator is peak rated (as defined in ISO8528-3).

Prime — Applicable for supplying continuous electrical power (at variable load) in lieu of commercially purchased power. There is no limitation to the annual hours of operation and the generator set can supply 10 percent overload power for 1 hour in 12 hours.

Consult your Olympian representative for more information.

Market: N. America
LEHX9506-11 (08-05)

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

D150P1 (3-Phase)

Materials and specifications are subject to change without notice.

Generator Set Technical Data — 1800 rpm/60 Hz		Standby
Power Rating	kW (kVA)	150 (188)
Lubricating System		
Type: Full Pressure		
Oil Filter: Spin-On, Full Flow		
Oil Cooler: Watercooled		
Oil Type Required: API CG4		
Total Oil Capacity	U.S. gal (L)	5.0 (19)
Oil Pan	U.S. gal (L)	4.23 (16)
Fuel System		
Generator Set Fuel Consumption		
100% Load	G/hr (L/hr)	11.60 (43.90)
75% Load	G/hr (L/hr)	9.00 (34.07)
50% Load	G/hr (L/hr)	6.40 (24.21)
Engine Electrical System		
Voltage/Ground: 12/Negative		
Battery Charging Generator Ampere Rating	Amps	45
Cooling System		
Water Pump Type: Centrifugal		
Radiator System Capacity Incl. Engine	U.S. gal (L)	9.8 (30.7)
Maximum Coolant Static Head	Ft H_2O (m H_2O)	32.2 (9.8)
Coolant Flow Rate	U.S. gal/hr (L/hr)	2725 (10 320)
Minimum Temperature to Engine	°F (°C)	169 (76)
Temperature Rise Across Engine	°F (°C)	14.4 (8.0)
Heat Rejected to Coolant at Rated Power	Btu/min (kW)	4363 (83)
Total Heat Radiated to Room at Rated Power	Btu/min (kW)	2551 (36.2)
Radiator Fan Load	Hp (kW)	10 (7.5)
Air Requirements		
Combustion Air Flow	Cfm (m³/min)	394 (11.2)
Maximum Air Cleaner Restriction	In H_2O (kPa)	20 (3.0)
Radiator Cooling Air (zero restriction)	Cfm (m³/min)	11,000 (312)
Generator Cooling Air	Cfm (m³/min)	933 (26.4)
Allowable Air Flow Restriction (After radiator)	In H_2O (kPa)	0.48 (0.120)
Cooling Airflow (@ rated speed)		
Rate with restriction	Cfm (m³/min)	8900 (252)
Exhaust System		
Maximum Allowable Backpressure	In Hg (kPa)	1.8 (6.0)
Exhaust Flow at Rated kW	Cfm (m³/min)	1102 (31.2)
Exhaust Temperature at Rated kW — Dry Exhaust	°F (°C)	1229 (665)
Generator Set Noise Rating* (Without Attenuation) at 3 ft (1 m)	dB(A)	97

Generator Technical Data		277/480V	266/460V	127/220V	120/240V 120/208V	347/600V
Motor Starting Capability: (kVA) (30% Voltage Dip)	Self Excited	420	391	363	330	N/A
	PM Excited**	548	511	476	433	548
	AREP Excited	548	511	476	433	548
Full Load Efficiencies:	Standby	92.9	92.9	92.8	92.5	92.9
Reactances (per unit):	X_d	2.91	3.16	3.46	3.67	2.91
	X'_d	0.10	0.11	0.12	0.13	0.10
Reactances	X''_d	0.058	0.064	0.070	0.076	0.058
shown are:	X_q	1.74	1.90	2.08	2.20	1.74
applicable to the	X''_q	0.069	0.075	0.082	0.087	0.069
standby rating.	X_2	0.063	0.069	0.075	0.080	0.063
	X_0	0.005	0.005	0.006	0.007	0.005
Time Constants:		t'_d 100 ms	t''_d 10 ms	t'_{do} 2966 ms		t_a 15 ms

* dB(A) levels are for guidance only

STRAND ASSOCIATES®

Strand Associates, Inc.®
Waterfront Plaza
325 West Main Street, Suite 710
Louisville, KY 40202
(P) 502-583-7020
(F) 502-583-7026

January 30, 2013

Mr. Randal Johnes, Town Manager
Town of Greenville
P.O. Box 188
Greenville, IN 47124

Re: Heritage Springs WWTP Review

Dear Mr. Johnes:

Enclosed are two copies of the final Heritage Springs Wastewater Treatment Plant Review report. Thank you for the opportunity to prepare this report.

If you or the Town should have any questions, please feel free to call.

Sincerely,

STRAND ASSOCIATES, INC.®

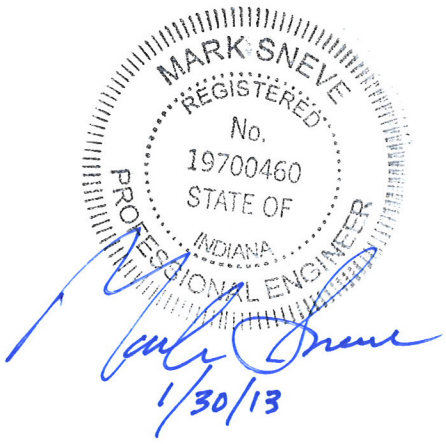
Mark A. Sneve, P.E., BCEE
Senior Associate

Enclosure: Report

c/enc: Jorge Lanz–Jacobi, Toombs & Lanz, Inc.

Report for
Town of Greenville, Indiana

Heritage Springs Wastewater Treatment Plant Review



Prepared by:

STRAND ASSOCIATES, INC.®
325 W. Main Street, Suite 710
Louisville, KY 40202
www.strand.com

January 2013

STRAND ASSOCIATES®

TABLE OF CONTENTS

The Town of Greenville (Town) hired Strand Associates, Inc.® to conduct a review of the Heritage Springs Wastewater Treatment Plant (WWTP) in advance of the Town pursuing a purchase of the assets from the current owner. The scope of services included:

1. Reviewing background information provided by the client and current WWTP owner. Examples of background information include construction drawings, construction specifications, National Pollutant Discharge Elimination System (NPDES) permit and permit application, Indiana Department of Environmental Management (IDEM) construction permit application and Construction Permit, and any other permits or contracts (i.e., sludge hauling or disposal permits).

2. Conducting a half-day site visit to review the condition of the plant.

3. Confirming unit process sizing and rated capacity.

4. Reviewing latest 12 months of operational data [Monthly Review of Operations (MRO) and Discharge Monitoring Reports (DMRs)]. Data to be provided by client or current plant owner.

5. Preparing a brief report on the condition and capacity of the existing facility, which is to include any obvious recommendations based on the site visit and data review.

BACKGROUND

The Heritage Springs WWTP was constructed by Thieneman Environmental, LLC beginning in 2006. The facility was designed by Paul Primavera & Associates and constructed by Thieneman Environmental with the assistance of a mechanical contractor. The facility is located at 1011 Freedom Court, Greenville, Indiana. Access to the WWTP is provided by a gravel road off Arthur Coffman Road. The facility construction was permitted by the IDEM based on a construction permit application dated August 17, 2005. IDEM also issued a NPDES permit that authorized a discharge of effluent treated to a specified degree to Jersey Park Creek. The facility operates under NPDES Permit No. IN0062553 that was reissued on July 29, 2011.

A site visit was conducted by Mark Sneve on January 16, 2013. Mr. Sneve was accompanied by Don Thieneman for part of the site visit.

The following files were obtained and reviewed as part of this effort:

1. NPDES Discharge Permit IN0062553 issued July 29, 2011.

2. DMRs as available on-site and via the IDEM Virtual File Cabinet.

3. MRO information from 2012 as provided by Thieneman Environmental, LLC.

4. AeroMod WWTP shop drawings for the WWTP, dated January 2006.

5. IDEM Facilities Construction and NPDES Permit Application Information, dated August 2005.

6. Application for a Certificate of Territorial Authority to the Utility Regulatory Commission, filed June 2004.

7. Specification for the Heritage Springs WWTP by Paul Primavera & Associates, not dated.

8. Construction Drawings for the Heritage Springs WWTP by Paul Primavera & Associates, dated 2004 and 2005.

9. Wasteload Allocation Report from IDEM, dated April 2011.

10. Sanitary Sewer Feasibility Study, Step 1 Interim Report prepared by Jacobi, Toombs & Lanz, Inc., dated June 2011.

11. Inspection correspondence from 2012 obtained from IDEM Virtual File Cabinet.

PHYSICAL CONDITION

The physical condition of the WWTP was visually assessed during the January 16, 2013 site visit. Photos taken during the site visit are included in Appendix A.

Overall the facility was found to be in good condition. The WWTP is surrounded by a security fence topped by three strands of barbed wire. The treatment tanks are constructed of 12-inch-thick cast-in-place concrete walls. Walkways are constructed using aluminum grating and aluminum handrails. The influent magnetic flow meter is installed in a concrete vault. The ultraviolet (UV) chamber is constructed of concrete. A fiberglass manhole with access hatch contains the effluent Parshall flume. An outfall cascade is constructed of cast-in-place reinforced concrete. The plant building is constructed of reinforced concrete walls with a truss-type roof supporting a shingled roof. The emergency generator is a stand-alone package unit located outside the building.

The outfall sewer and influent pump stations were not reviewed. According to the construction plans, the influent pump station consists of a precast concrete wetwell and valve vault. Submersible pumps lift the wastewater into the WWTP. The outfall sewer is identified as a 10-inch polyvinyl chloride (PVC) sewer with nine precast manholes and a precast outfall headwall.

There was no evidence of any tank or channel overflows. The equipment and facilities appear to have been maintained. Review of maintenance records was not performed and was not included in the scope.

OPERATING CONDITION

The operating condition of the WWTP was visually assessed during the January 16, 2013 site visit. Photos taken during the site visit are included in Appendix A.

The WWTP was found to be operating in batch treatment mode with two reactor tanks under aeration and one sludge storage tank under aeration. The largest aeration tank was out of service. One blower

was in service at about two-thirds speed and cycled on and off based on a timer. The ultraviolet disinfection system was not in service because the NPDES permit does not require disinfection in the winter months. The UV light banks were being stored in the building for the winter. During the site visit, the function of the influent bar screen was observed. The screen was adequate. There was no batch discharge from the facility during the site visit, so the hydraulics of the Parshall flume and the function of the cascade aerator could not be observed. The emergency generator was not in service during the site visit.

All facilities observed during the site visit appeared to be in good operating order.

Some time just before the site visit, the operations staff had discharged a batch of effluent from the aeration tanks and also had a contractor remove solids from the solids holding tank.

There were no unusual or objectionable odors at the facility.

During the site visit, checklists were filled out to compare the installation against typical criteria as found in the Ten State Standards published by Great Lakes–Upper Mississippi River Board, a widely accepted guidance document for the design of municipal WWTPs. Refer to Appendix B for the completed checklists. Based on the checklists, the following concerns are identified in Table 1.

Concern	Significance
No backflow preventer (BFP) to protect the public water supply.	Recommend installation of BFP.
Lack of hand railing on outfall cascade.	Recommend installation of handrail.
Lack of on-site first aid supplies.	Provide on-site first aid supplies.
Coarse bubble diffusers.	Future upgrade to fine bubble diffuser will improve operations and efficiency.
Influent concentrations are above design concentrations. Design Biochemical Oxygen Demand (BOD) is 240 mg/L, actual has been 316 mg/L. Design NH3-N is 25 mg/L, actual has been 41 mg/L.	As WWTP approaches design conditions the plant may run out of oxygen transfer capacity. Not an immediate concern.
Inability to take one aeration tank out of service.	Consider flexibility to operate with one of two aeration tanks if using full plant capacity causes concern.
Improve outfall cascade to create pools at each step.	Improve oxygen transfer to address occasional low effluent dissolved oxygen (DO).

Table 1 Design Checklist Concerns

PERMIT REVIEW

The NPDES discharge permit was reviewed and found to be quite standard. Effluent limits are typical of this type of plant and the receiving stream. The NPDES permit discusses the procedure to transfer the permittee on Page 11 of 26. Should the Town take ownership of the treatment facility, we recommend the Town become very familiar with the NPDES permit.

IDEM has provided a Wasteload Allocation (WLA) for increasing plant capacities up to 0.4 mgd. The WLA indicates that effluent limits would remain essentially the same as today. The site footprint may not allow the WWTP to be expanded beyond 0.2 mgd. Also, IDEM setback requirements (327 IAC 3-2-6) apply to new treatment plants and require 500 feet from the nearest dwelling to the nearest treatment tank or equipment. IDEM should be consulted to make sure it does not intend to apply this requirement to expansions of existing WWTPs. If IDEM does, additional buffer land or written approval from future property owners (less than 500 feet away) may be required.

No sludge disposal permit was provided for the existing facility. Sludge is reportedly removed from the site and disposed of by a contract hauler (B&H according to Mr. Thieneman). Should the Town take ownership, additional permitting may be required. Permits for the disposal of sludge may be required according to Page 18 of 26 of the NPDES permit.

UNIT PROCESS SIZING

The dimensions of the tanks on the site were compared to the dimensions on the drawings. The facility appeared to be constructed according to drawings. The sizing of each unit process was checked in the facility checklist review. No concerns were identified over the unit process sizing. The extended aeration activated sludge aeration tanks were sized based on a 15 pounds of BOD per 1,000 cubic feet (15 lb BOD/1000 CF) loading rate as recommended by Ten State Standards.

DMR REVIEW

DMRs were obtained for the past 12 months of operation at the Heritage Springs WWTP. The results presented in the DMRs are published in Table 2. The significance of the results will be discussed in the Compliance Review section.

TABLE 2

HERITAGE SPRINGS DMR DATA

	EFFLUENT						AVERAGE					WEEKLY AVERAGE				
	DO Min Summer (mg/L)	DO Min Winter (mg/L)	pH Min (std. units)	pH Max (std. units)	Flow Average (mgd)	Flow Monthly Total (mil gal)	BOD (mg/L)	TSS (mg/L)	NH3-N Summer (mg/L)	NH3-N Winter (mg/L)	E-Coli Summer (CFU)	BOD (mg/L)	TSS (mg/L)	NH3-N Summer (mg/L)	NH3-N Winter (mg/L)	E-Coli Daily Max Summer (CFU)
Permit	> 6	> 5	> 6	< 9			< 20	< 24	< 1.5	< 3.0	< 125	< 30	< 36	< 2.3	< 4.5	< 235
Jan-12		9.2	7.0	7.8	0.0049	0.151	7.8	17.2		0.25		10	23		0.41	
Feb-12		7.3	7.4	8.1	0.0044	0.127	5.2	5.6		0.45		7	9		1.16	
Mar-12		6.5	6.9	7.9	0.0055	0.172	15.4	29.3		1.25		19	38		4.74	
Apr-12		7.8	7.0	7.8	0.0045	0.134	7.3	7.0		0.31	5	12	9		0.69	10
May-12	7.0		7.0	8.1	0.0045	0.140	6.4	13.4	<0.2		3	7	19	<0.2		8
Jun-12	6.0		6.2	7.9	0.0048	0.144	8.9	10.8	10.25		22	19	23	27.9		344
Jul-12	6.8		7.1	7.9	0.0085	0.264	6.3	9.4	7.18		20	19	29	31.6		219
Aug-12	6.0		7.3	7.8	0.0059	0.184	3.6	3.4	<0.2		3	5	5	<0.2		15
Sep-12	7.0		7.0	7.7	0.0053	0.158	9.0	15.6	0.93		16	13	27	1.7		106
Oct-12	5.2		7.3	8.0	0.0060	0.186	8.2	14.4	1.39		14	11	22	3.1		813
Nov-12	5.2		7.5	7.9	0.0053	0.160	4.7	7.5		0.20		6	13		0.20	
Dec-12		7.5	7.4	8.0	0.0064	0.178	8.0	8.6		0.99		15	21		2.06	

Notes: November and December 2012 data were taken from MRO information, not DMR information.

Highlighted cells show permit excursions.

COMPLIANCE REVIEW

The compliance history for the WWTP was assessed based on a review of the past 12 months of DMR documents. The licensed operator is required to submit monthly reports to IDEM to document the performance of the WWTP and its compliance with NPDES permit limits. The DMRs were reviewed and discussed in the previous section. Based on a review of the DMRs in Table 2, the compliance status is summarized as follows:

- Effluent DO–The plant was in compliance with the minimum effluent dissolved oxygen in 10 of 12 months. The plant was out of compliance in October and November. In October, two days had less than the required concentration of 6 mg/L out of 23 days when measurements were taken. In November, one day was less than the required concentration out of 17 days when measurements were taken. The outfall cascade's effectiveness could be improved by installing plates to create more pools for reoxygenation. Also the DO settings for the biological treatment plant could be increased.

- Effluent pH–The plant must discharge effluent with a pH between 6.0 and 9.0. The plant was in full compliance.

- Effluent BOD–The plant must meet monthly and weekly average concentration and mass discharge limitations. The plant was in full compliance.

- Effluent TSS–The facility must discharge effluent with total suspended solids (TSS) of less than 24 mg/L as a monthly average and less than 36 mg/L as a weekly average. In March 2012, the monthly average effluent TSS was 29.3 and the peak weekly effluent TSS was 38 mg/L; both were in violation of the permit. The effluent TSS is a measure of how well the plant clarifiers captured the treatment biomass before discharge. A slight compromise in effluent quality is not of significant concern since the facility is currently being operated in an alternate processing mode that involves batch discharges. Once continuous flow discharges are employed (as the plant flow picks up), the effluent TSS should be in compliance.

- Effluent NH_3-N–The WWTP is required to meet monthly and weekly average discharge concentrations that differ between winter and summer. In the winter, the monthly and weekly averages must be less than 3.0 and 4.5 mg/L, respectively. In the summer, the monthly and weekly averages must be less than 1.5 and 2.3 mg/L, respectively. The plant has had numerous violations of the monthly and weekly average NH_3-N effluent limits. Two violations of the summer monthly average and three violations of the summer weekly average occurred. In addition, one violation of the winter weekly average occurred in the past 12 months. Violations of ammonia effluent limits can occur because of inadequate treatment time, inadequate DO, inadequate alkalinity, or a lack of specific microorganisms to complete the nitrification process. Given that the WWTP is being operated in a batch mode, it is likely that either the processing time or the oxygen transfer was insufficient to support full nitrification. These concerns should not persist when the plant begins operation as a continuous flow through extended aeration activated sludge process.

- Effluent *E. coli*–The plant is required to meet monthly average standards for *E. coli* and also demonstrate compliance with a maximum daily concentration during the summer months. The plant is routinely in compliance with the monthly average criteria, but it had two isolated violations of the daily maximum criteria in 63 sampling results. *E. coli* violations are the result of inadequate disinfection. Since the WWTP uses UV light to disinfect the effluent, the likely cause of poor disinfection was either a fouled lamp sleeve or aged UV lamps. Given that the facility was in routine compliance, the cause is likely a maintenance issue that could be managed or resolved.

The WWTP should be expected to achieve an effluent that meets permit standards as the operation begins to use the plant capacity as designed. To demonstrate the typical effluent quality achieved with a very similar WWTP, Table 3 shows data from the Wymberly Sanitary Works in Floyd County. This facility was selected as a comparison because it is of the same AeroMod design and it was designed by the author of this report. Also, very similar effluent limits are imposed. Table 3 shows effluent quality can be produced to consistently achieve the required effluent quality. In the 13 months of data tabulated for Wymberly Sanitary Works, there were no effluent limit violations.

TABLE 3

WYMBERLY SANITARY WORKS COMPARABLE DMR DATA

	EFFLUENT					AVERAGE					WEEKLY AVERAGE				
	DO Min (mg/L)	pH Min (std. units)	pH Max (std. units)	Flow Average (mgd)	Flow Monthly Total (mil gal)	BOD (mg/L)	TSS (mg/L)	NH3-N Summer (mg/L)	NH3-N Winter (mg/L)	E-Coli Summer (CFU)	BOD (mg/L)	TSS (mg/L)	NH3-N Summer (mg/L)	NH3-N Winter (mg/L)	E-Coli Daily Max Summer (CFU)
Permit	> 6	> 6	< 9			< 25	< 30	< 1.3	< 1.9	< 125	< 40	< 45	< 1.9	< 2.9	< 235
Jul-11	6.3	7.5	7.8	0.090	2.777	5.7	2.0	0.09		1.0	9.7	3.0	0.10		1.0
Aug-11	6.4	7.6	7.7	0.093	2.898	4.0	2.0	0.10		1.0	6.0	3.0	0.10		21.0
Sep-11	6.5	7.5	7.7	0.096	2.875	2.9	3.4	0.09		2.0	4.0	4.3	0.12		8.0
Oct-11	6.6	7.4	7.6	0.094	2.905	3.6	3.8	0.21		3.0	4.3		0.29		44.0
Nov-11	7.3	7.1	7.6	0.128	3.835	2.5	2.5		0.21		3.2	3.0		0.50	
Dec-11	6.9	7.3	7.5	0.154	4.779	2.1	2.3		0.25		2.3	3.5		0.50	
Jan-12	8.6	7.3	7.6	0.138	4.265	2.0	2.2		0.28		2.0	2.7		0.39	
Feb-12	9.1	7.3	7.5	0.115	3.336	2.2	2.2		0.26		2.5	2.9		0.29	
Mar-12	7.7	7.1	7.5	0.128	3.964	3.0	2.3		0.23		3.8	2.7		0.44	
Apr-12	6.1	7.4	8.1	0.100	2.991	4.2	2.4		0.75	1.0	9.1	3.3		1.86	4.0
May-12	7.3	7.0	7.6	0.112	3.460	4.8	5.0	0.21		1.0	6.1	11.2	0.35		31.0
Jun-12	6.8	7.0	7.2	0.091	2.741	5.9	3.1	0.15		2.0	7.5	4.0	0.18		4.0
Jul-12	6.4	7.1	7.3	0.087	2.698	2.4	2.3	0.16		1.0	2.8	2.6	0.20		2.0

Note: Highlighted cells show permit excursions.

The IDEM Virtual File Cabinet was consulted for IDEM inspections or letters of violation. One such letter was sent in 2012. The October 18, 2012 letter from IDEM noted three concerns. First, there was a concern over the method of sample compositing. Second, IDEM noted the effluent flow meter had not been calibrated in the past year, as required by the NPDES permit. Third, IDEM pointed out the recent effluent limit violations. A reply letter was sent on November 13, 2012, by the operator (American Water–Contract Services Group). The response noted that the composite sampling concern was a nonissue since IDEM had modified the permit to allow grab sampling. The effluent flow meter was subsequently calibrated to address the second concern. The third concern was identified as a consequence of the batch treatment approach or from something dumped into the WWTP from the ongoing home construction.

RECOMMENDATIONS

The intent of this review was not to identify needs for the facility; however, several recommendations were identified as a result of the study. These recommendations are listed in Table 4.

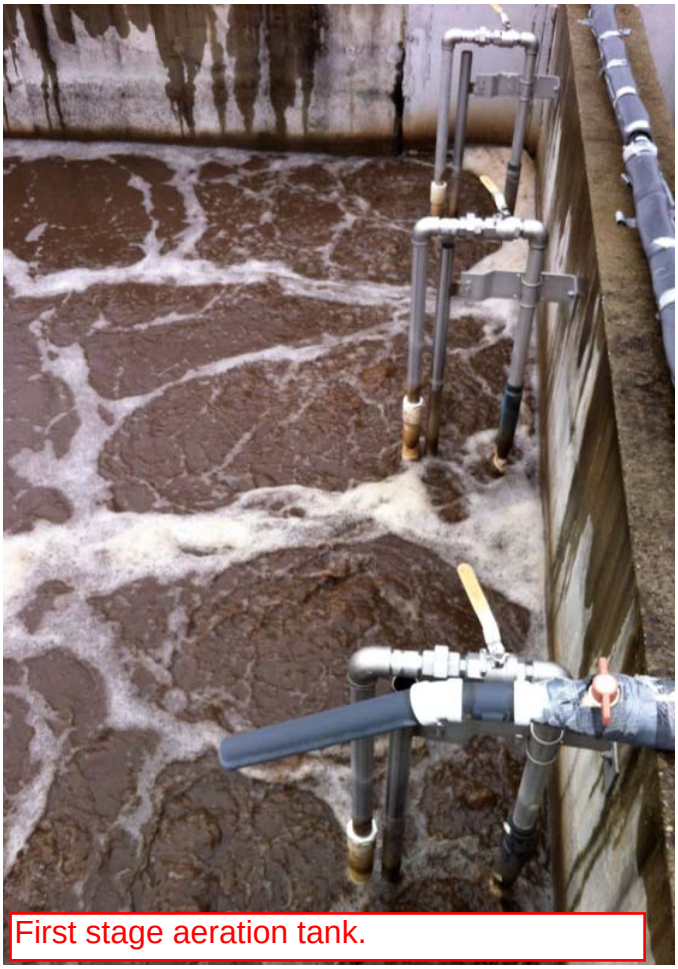
Recommendation	Benefit
Add handrail around the top and west edge of the outfall cascade.	Improve safety.
Add stairs to access plant walkways in lieu of cast-in-place manhole steps.	Improve access.
Confirm grating is on the UV structure for compliance with OSHA fall protection. Add grating or handrail if missing.	Improve safety.
Install fine bubble diffusers in lieu of coarse bubble diffusers (check blower and air filtration impacts first).	Improve oxygen transfer and overall efficiency and enhance permit compliance. Not an immediate concern.
Improve outfall cascade to transfer more oxygen at low flows.	Enhance permit compliance.
Carefully monitor influent concentrations since they are above design concentrations. Design BOD is 240 mg/L, actual has been 316 mg/L. Design NH3-N is 25 mg/L, actual has been 41 mg/L.	As WWTP approaches design flows, the plant may run out of oxygen transfer/treatment capacity. Not an immediate concern.
Consider adding ability to take either aeration tank out of service.	May allow better match of tankage to capacity needed as flows increase.
Confirm permits are in place for the proper disposal of sludge.	Confirm compliance with regulations.

Table 4 Recommendations

APPENDIX A
PHOTOS FROM SITE VISIT

Site access with perimeter fence.

First stage aeration tank.



First stage aeration tank.

Sludge storage tank.

Manhole steps to access tank walkways.

Manual bar screen and selector tank.

Manual Bar Screen Box with alarm float.

Surge Pump control panel.

Precast Influent flow meter vault.

Ultraviolet Disinfection Structure.

Ultraviolet disinfection Control Panel.

Fiberglass Parshall Flume structure.

Effluent flow meter totalizer.


Outfall Cascade.


Outfall Cascade.


Control/Blower Building.

Second stage aeration tank (out of service).

PVC air pipes that have been replaced.

Pneumatic Air Lift controller

Tank walkway.

Clarifier (out of service).

Surge tank (out of service).

First stage aeration tank.

Clarifier (recent batch discharge).

Surge tank (out of service).

Clarifier (out of service).

Plant influent pump station.

Plant influent pump station.

Plant influent pump station.

Plant influent pump station.

Control/Blower Building & fixed generator.

Control/Blower Building access doors.

Generator Disconnect.

Blower 1.

Blower 1 and Blower 2.

Generator Control Panel.

Generator Control Panel.


Power transformer.

Transformer disconnect.


Blower piping and valves.

Main Plant Control Panel.

Blower VFDs and Wiring chase.

Blower 1 gauges when operating.

Flow control stop gates.

Air compressors for pneumatic controls.


UV disinfection modules stored for winter.

Air Compressor Control Panel.

Alarm Reset Panel.

Air Compressor dryer system.

Blower Variable Frequency Drive (VFD).

Blower VFD close up.

Blower 1 run time meter.

Blower 2 run time meter.

Pipe and conduit exit from building.

Control building doors, ceiling, lights.

Yard hydrant by Aeration tank 1 wall.

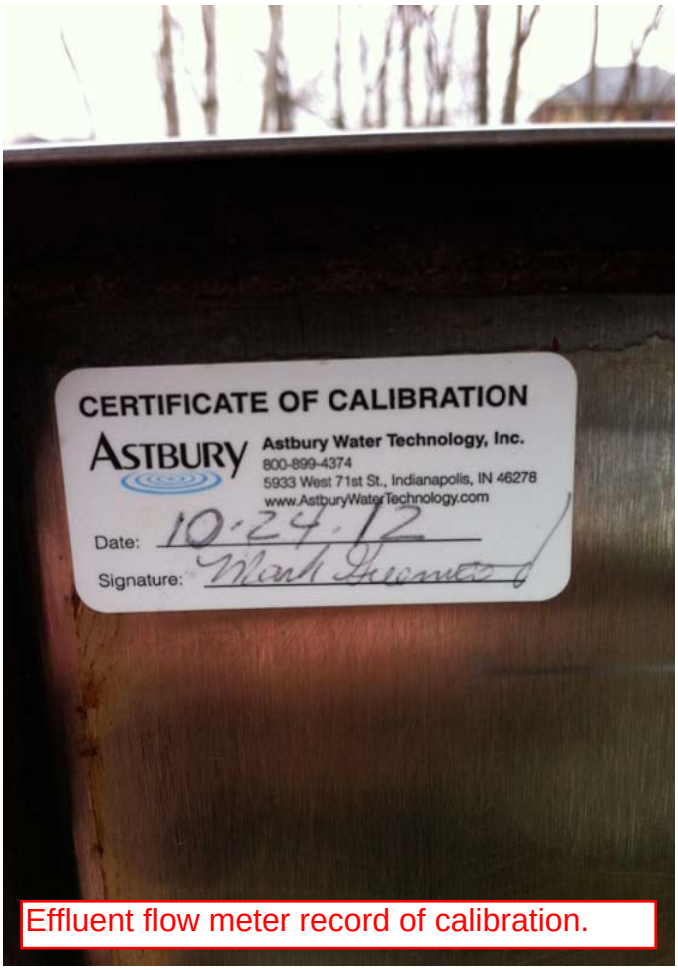
Area light on tank wall.

Sludge pump connection.

Sludge Pump Control Panel.

Aeration pneumatic control valves.

Effluent Parshall Flume and meter.



Effluent flow meter record of calibration.

APPENDIX B
FACILITY DESIGN CHECKLISTS

AAS
1/16/13

WWTP GENERAL

Name: Heritage Springs

NPDES Number IN 0062553

Yes	No	N/A		
☒	☐	☐	1.	Are all structures, electrical and mechanical equipment protected from physical damage by the 100 year flood? (51.2) FIRM 18043 C0106E ~~their Flood Map~~ 100yr Flood Jersey Co. = 714 & WWTP is at 760±
☒	☐	☐	2.	Is the treatment works operational and accessible during the 25 year flood? (51.2) Yes
☒	☐	☐	3.	Are bottom corners of the channels fileted? (53.5) EQ + Clarifiers
☐	☐	☒	4.	Are conduits designed to avoid creation of pockets or corners where solids can accumulate? (53.5)
			5.	Are flow division control facilities:
☐	☐	☒		a. Provided to insure organic and hydraulic loading control to plant process units? (53.7) Single Plant
☒	☐	☐		b. Designed for easy operator access, change, observation and maintenance? (53.7)
☒	☐	☐		c. Designed with appropriate flow measurement facilities incorporated? (53.7) Influent & Effluent
☐	☒	☐	6.	Are properly located bypass structures or piping provided so that each unit of the plant can be removed from service independently? (54.21) Except for Clarifiers - yes
☐	☐	☒	7.	Is maintenance of operation during construction addressed in the specifications? (54.22)
☒	☒	☐	8.	Are drains or sumps provided to completely dewater each unit to an appropriate place in the process? (54.3) Check Plans (only for Digester Tank)
☐	☒	☐	9.	Are hydrostatic pressure relief valves provided? (54.3) Check Plans - No
☒	☐	☐	10.	Are pipes subject to plugging provided with means of mechanical cleaning or flushing? (54.3) Easily Accessed.
☐	☐	☒	11.	Has a complete outfit of tools, accessories and spare parts been provided? (54.6)

Yes	No	N/A		
☒	☐	☐	12.	Has readily accessible storage space and workbench facilities been provided? (54.6)
☐	☐	☒	13.	Has effective site erosion control been provided during construction? (54.7)
☐	☐	☒	14.	Has final grading, seeding or sodding been included in the specifications? (54.8)
☒	☐	☐	15.	Is surface water diverted away from all process units, especially trickling filter beds, sludge beds and intermittent sand filters? (54.8)
			16.	The outfall sewer:
☒	☐	☐		a. Has been protected from the effects of floodwater or ice? (55.2) Headwall
☒	☐	☐		b. Has been provided with a manhole at the shore end? (55.2)
☒	☐	☐		c. Has been designed to be safe for navigation? (55.2) Edge of bank
☒	☐	☐		d. Does allow for a sample of the effluent to be taken after the last treatment process and before discharge to the receiving waters? (55.3) At Cascade
			17.	Which alternative source of power has been provided? (56.11)
☐	☐	☒		a. 2 separate power lines from 2 independent substations.
☐	☐	☒		b. Portable engine driven generator.
☒	☐	☐		c. In-place engine driven generator.
☐	☐	☒		d. Portable pumping equipment when only emergency pumping is required.
☒	☐	☐	18.	If plant has a history of power outages over 4 hours is auxiliary power provided for aeration? (56.12) Generator
☒	☐	☐	19.	Has an adequate supply of potable water been provided? (56.21) Check Plans
☐	☒	☐	20.	Is a backflow preventor provided to protect the potable water supply? (56.21, DOW) Check Plans Assume No since could not locate on Plans.

Yes	No	N/A		
☐	☐	☒	21.	If potable water is used for any purpose other than the following, then is a break tank provided: (56.22) 1. Lavatory 2. Water closet 3. Laboratory sink 4. Shower 5. Drinking fountain 6. Eyewash fountain or 7. Safety shower None
☐	☐	☒	22.	If a nonpotable water supply is provided, do all system outlets have a permanent sign indicating the water is not safe for drinking? (56.23)
☐	☐	☒	23.	Are all floor surfaces sloped to a point of drainage? (56.4)
☒	☐	☐	24.	Are stairways provided for access to units requiring routine inspection and maintenance; i.e., digesters, trickling filters, aeration tanks, clarifiers, tertiary filters, etc.? (56.5) MANHOLE STEPS
☐	☐	☒	25.	If spiral or winding stairs are used, is a stairway provided as the primary means of egress? (56.5)
			26.	For all stairways:
☐	☐	☒		a. Are stairway slopes between 30° and 40° from the horizontal? (56.5)
☐	☐	☒		b. Are the tread and riser a uniform dimension in each flight? (56.5)
☐	☐	☒		c. Is the minimum tread run greater than 9 inches? (56.5)
☐	☐	☒		d. Is the riser 8 or 9 inches tall? (56.5)
☐	☐	☒		e. Is the maximum continuous rise without a platform for each flight of stairs less than 12 feet? (56.5)
			27.	Are flow measurement facilities provided for the following flows? (56.61)
☒	☐	☐		a. Plant influent. MAG METER
☒	☐	☐		b. Plant effluent, if significantly different from influent; i.e., plants with flow equalization, lagoons or excess flow storage. FLUME

Yes	No	N/A		
☐	☐	☒		c. Excess flow treatment facility discharge.
☐	☒	☐		d. Return activated sludge. Air lift, Adjustable
☐	☒	☐		e. Waste activated sludge. Air Lift, Adjustable, Timers
☐	☐	☒		f. Recirculation.
☐	☐	☒		g. Recycle required for plant operational control.
☒	☐	☐	28.	If this is a mechanical plant, are indicating, totalizing and recording flow measurement devices provided? (56.62) effluent, per permit
☐	☐	☒	29.	If this is a lagoon system, is a calibrated weir flow measuring system, or elapsed time meter provided on pumps with pumping rate tests provided? (56.62)
☒	☐	☐	30.	Is the flow measuring equipment sized to function effectively over the full range of flows expected? (56.62)
☒	☐	☐	31.	Is the flow measurement equipment including entrance and discharge conduit configuration and critical control elevations designed to provide the hydraulic condition necessary for accurate measurement? (56.63)
☒	☐	☐	32.	Is the flow measuring equipment protected from freezing? (56.62)
☐	☒	☐	33.	If this is a mechanical plant with a design flow of at least 0.1 MGD, is a composite sampler provided for the influent and the effluent (required to verify 85% reduction in municipals)? (56.7)
☒	☐	☐	34.	Is the plant site enclosed with a fence designed to discourage the entrance of unauthorized persons and animals? (57.1a)
☐	☒	☐	35.	Are signs provided to discourage the entrance of unauthorized persons to the plant site? (57.1a)
☒	☒	☐	36.	Are handrails and guards provided for all tanks, trenches, pits, stairwells, and other hazardous structures with the tops of walls less than 42 inches above the surrounding ground level? (57.1b) All but CASCADE
☒	☐	☐	37.	Are gratings provided over appropriate areas where access for maintenance is required? (57.1c)
☐	☒	☐	38.	Is first aid equipment provided? (57.1d) Did not see any.
☐	☒	☐	39.	Are no smoking signs provided in hazardous areas? (57.1e)

Yes	No	N/A		
			40.	DID NOT SEE ANY - NOT SUBJECT OF REVIEW Is the following protective clothing and equipment provided? (57.1f)
☐	☐	☐		a. Self contained breathing apparatus, recommended for protection against chlorine, with a 30 minute capacity, compatible with local fire department equipment. (57.1f, 57.27, 102.56)
☐	☐	☐		b. Gas detection equipment certified for use in Class I, Group D, Division 1 locations. (57.1i)
☐	☐	☐		c. Chemical workers goggles or other suitable goggles. (57.27b)
☐	☐	☐		d. Rubber gloves, aprons with leg straps, boots. (57.27e, f, g)
☐	☐	☐		e. Safety harness and line. (57.27h)
☐	☐	☐		f. Portable blower and sufficient hose. (57.1g)
☐	☐	☐		g. Portable lighting equipment complying with NEC Requirements. (57.1h)
☐	☐	☐		h. Hard hats. (57.1f)
☐	☐	☐		i. Dust mask to protect the lungs in dry chemical areas. (57.27d)
			41.	DID NOT SEE ANY - NOT SUBJECT OF REVIEW Are warning signs for the following areas provided? (57.1j)
☐	☐	☐		a. Slippery areas.
☐	☐	☐		b. Low head clearance.
☐	☐	☐		c. Open service manholes.
☐	☐	☐		d. Hazardous chemical storage areas.
☐	☐	☐		e. Flammable fuel storage areas.
☐	☐	☐		f. Requiring the use of goggles near chemical stations, pump or other points of frequent hazard. (57.28)
☒	☐	☐	42.	Are provisions made for local lockout on motor controls? (57.1L)

Note: "Lockout" means the ability to disable a circuit for a device by padlocking the switch in the off position. "Local" indicates this is to be near the location of the device.

☐	☐	☒	43.	Are provisions made for confined space entry in accordance with OSHA? (57.1m) NOT SUBJECT OF REVIEW

Yes	No	N/A		
☐	☐	☒	44.	Have the materials utilized for storage, piping, valves, pumping, metering and splash guards been selected considering the characteristics of the hazardous chemical used? (57.21) NONE
☐	☐	☒	45.	If underground storage tanks are proposed, do they meet applicable requirements? (57.22)
☐	☐	☒	46.	Are the chemical (including liquid polymer) storage areas enclosed in dikes or curbs which will contain the stored volume until it can be transferred to alternate storage or released to the wastewater at allowable rates? (57.23)
☐	☐	☒	47.	Is a system provided to automatically shutdown pumps and to sound an alarm when a failure occurs in a pressurized chemical discharge line? (57.28)
☐	☐	☒	48.	Are splash guards provided for all pumps or feeders of hazardous or corrosive chemicals which will prevent the spray of chemicals into space occupied by personnel? (57.25)
☐	☐	☒	49.	Is all piping containing or transporting corrosive or hazardous chemicals identified with labels every 10 feet with at least two labels in each room, closet or pipechase? (57.26)
☐	☐	☒	50.	Do all connections except those adjacent to storage or feeder areas have guards which will direct leakage away from space occupied by personnel? (57.26)
			51.	Is dust collection equipment provided:
☐	☐	☒		a. To protect personnel from dust injurious to the lungs or skin? (57.29)
☐	☐	☒		b. To prevent polymer dust from settling on walkways? (57.29)
			52.	For facilities which use liquified gas chemicals:
☐	☐	☒		a. Are properly designed isolated areas provided for storage and handling of chlorine, sulfur dioxide and other hazardous gases. (57.24)
				b. Have the following gas detection items been provided? (57.24)
☐	☐	☒		1. Kits
☐	☐	☒		2. Alarms

Yes	No	N/A		
☐	☐	☒		3. Controls
☐	☐	☒		4. Safety devices
☐	☐	☒		c. Are emergency repair kits provided? (57.24)
☐	☐	☒	53.	Does the identification and hazard warning data included on shipping containers, when received, appear on all containers used to store or carry a hazardous substance? (57.3)
☐	☐	☒	54.	Are safety showers and eyewash fountains no more than 25 feet from points of hazardous chemical exposure? (57.382)
☐	☐	☒	55.	Are eyewash fountains supplied with water between 50° and 90°F suitable to provide 15 to 30 minutes of continuous irrigation of the eyes? (58.382)
☐	☐	☒	56.	Are emergency showers capable of discharging 30-50 GPM at 50° and 90°F and at pressure of 20 to 50 psi? (58.382)
☒	☒	☐	57.	Is a plant hydraulic profile provided for the minimum, design average and peak flows? (20.43d) ~~Elevation Drawings~~ Sheet W-15 has Profile, No indication of what this is used.
☐	☐	☒	58.	Does the hydraulic profile include the high and low water level of the receiving water? (20.43b) ~~Elevation Drawings~~
☐	☒	☐	59.	Are onsite sludge dewatering facilities provided? (88.1) No, Plant is Well above Creek Flood.
☒	☐	☐	60.	If no grit removal facilities are proposed, has consideration been given to the possible damaging effects on pumps, comminutors, etc. and the need for additional storage capacity in treatment units where grit is likely to accumulate? (63.1) AIR LIFTS

MAS 1/16/13

SCREENING/GRINDING

Name: Heritage Springs

NPDES Number IN0062553

1. **Screening Devices:**

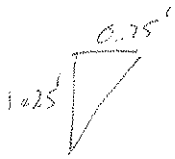
A. Coarse Screens: ***Required on all POTW's***

Type: Manual X ; Mechanical _____

Number of screens: 1

Opening width: 5/8" inches

Slope of bars: ~30 degrees



Velocity at average design flow: _____ fps

Velocity at maximum flow: _____ fps

Distance between channel invert and invert of incoming sewer: N/A inches
Forcemain not Sewer

Yes	No	N/A		
☐	☒	☐	1.	Is the opening width between the bars no less than one inch, but no greater than 1 3/4 inches for manually cleaned screens? The openings may be smaller for mechanically cleaned screens. (61.121) 5/8"
☒	☐	☐	2.	Is the slope of the manually cleaned bar screen between 30 and 45 degrees from the horizontal? (61.122)
☐	☐	☒	3.	At average design flow conditions, are the approach velocities between 1.25 and 3.0 feet per second (fps)? (61.122) N/A, Force Main
☐	☒	☐	4.	Have dual channels been provided and equipped with the necessary gates to isolate flow from any screening unit? (61.123)
☐	☐	☒	5.	Can the channels be dewatered for cleaning? (61.123)
☐	☐	☒	6.	Has the channel preceding and following the screen been shaped to eliminate stranding and settling of solids? (61.123)
☐	☐	☒	7.	Has an auxiliary manually cleaned screen been provided where a

Yes	No	N/A		
				single mechanically cleaned screen is used? (61.124)
☐	☐	☒	8.	When two or more mechanically cleaned screens are used, can the design peak instantaneous flow be handled with one unit out of service? (61.124)
☐	☐	☒	9.	Is the screen channel between 3 and 6 inches below the invert of the incoming sewer? (61.125)
☒	☐	☐	10.	Is the entrance channel designed to provide for equal and uniform distribution of flow to the screens? (61.126)
☐	☐	☒	11.	Has a flow measurement device been located in the channel preceding the bar screen? (61.127) FM on FM
☐	☐	☒	12.	If so, will the changes in backwater elevation, due to cleaning the bar screen, effect the accuracy of the flow measurement device? (61.127)
☐	☒	☐	13.	Has the screening device and screening storage area been protected from freezing? (61.128)
☒	☐	☐	14.	Has a convenient and adequate means of removing screenings been provided? (61.129) MANUAL RAKE
☐	☒	☐	15.	Is an accessible platform provided for the operator to rake screenings from the manually cleaned screen? (61.129) OK
☐	☐	☒	16.	Has a drain been provided for both the platform and the storage area? (61.129)
			17.	If the screening devices are located in an enclosed area, have the following provisions for access, ventilation, shields, safety and electrical equipment been satisfied? (61.13)
☐	☐	☒		a. Stairways for access to pits greater than 4 feet deep. Access ladders are acceptable for pits less than 4 feet deep. (61.13)
				b. If installed in building with other uses:
☐	☐	☒		1. Isolated from the rest of the building. (61.13)
☐	☐	☒		2. Separate outside entrance. (61.13)
☐	☐	☒		3. Separate and independent fresh air supply. (61.13)
☐	☐	☒		c. Fresh air is forced into enclosed screening device area or into

open pits more than 4 feet deep. (61.13)

Yes	No	N/A		
☐	☐	☒	d.	Air supplied at rate of 12 complete air changes per hour for continuous ventilation. (61.13)
☐	☐	☒	e.	Air supplied at a rate of 30 complete air changes per hour for intermittent ventilation when workers enter the area. (61.13)
☐	☐	☒	f.	The switches for operation of ventilation equipment are conveniently located and marked. (61.13)
☐	☐	☒	g.	The intermittently operated ventilation equipment is interconnected with the pit lighting system. (61.13)
☐	☐	☒	h.	The fan material is made from non-sparking material. (61.13)
☐	☐	☒	i.	Gas detectors are provided. (61.13)
☐	☐	☒	18.	Are guard railings and deck gratings provided for both manually and mechanically cleaned screens? (61.141)
☐	☐	☒	19.	Have adequate removable enclosures which protect personnel from accidental contact been provided on mechanically cleaned screens? (61.142)
☐	☐	☒	20.	Has a positive means of locking out each mechanical device for maintenance been provided? (61.142)
☐	☐	☒	21.	Do all mechanical units which are operated by a timing device also include auxiliary controls which will set the cleaning unit in operation at a preset high water elevation? (61.151)
☐	☐	☒	22.	Are warning devices provided to alert personnel when the cleaning unit fails to lower the high water? (61.151)
☐	☐	☒	23.	In screening areas where hazardous gases may accumulate, do the electrical fixtures meet the requirements of the National Electrical Code for Class 1, Group D, Division 1 locations? (61.152)

B. Fine Screens: Not Required, But May Be Installed After The Coarse Screen N/A

Type:

- ☐ Inclined static screen
- ☐ Rotary drum screen
- ☐ Rotary disk screen

Number of Screens: _____

N/A

Opening Width: _____

Hydraulic Capacity: _____ gal/ft^2. min.

% BOD_5 Removal: _____ %

% Suspended Solids Removal: _____ %

Yes	No	N/A		
☐	☐	☒	1.	Are the openings approximately 1/16 inch? (61.21)
☐	☐	☒	2.	If the design projects removals of a portion of the influent BOD5 and suspended solids, has the engineer provided test results which support the anticipated removal percentages? (61.22)
☐	☐	☒	3.	Have additional provisions been made for removal of floatable oils and grease? (61.21)
☐	☐	☒	4.	Is a minimum of two fine screens provided, each unit being capable of independent operation? (61.22)
☐	☐	☒	5.	Is each unit designed to treat the design peak instantaneous flow with one unit out of service? (61.22)
☐	☐	☒	6.	Is a course bar screening device provided upstream of the fine screen? (61.22)
☐	☐	☒	7.	Are the fine screens protected from freezing and located to facilitate maintenance? (61.22)
☐	☐	☒	8.	For those screening areas where hazardous gases may accumulate, do the electrical fixtures and controls meet the requirements of the National Electrical Code for Class I, Group D, Division 1 locations? (61.23)
☐	☐	☒	9.	Has hosing equipment been provided to facilitate cleaning? (61.24)
☐	☐	☒	10.	Are the captured solids collected and disposed of separately from the other solids? Separate grinding of screenings and return to the sewage flow is unacceptable. (61.129)
☐	☐	☒	11.	Can the units be isolated and removed for service? (61.123)

N/A

2. **Comminutors:** ~~Not Required But May Be Used In Place Of Screening Devices Where Stringy Substance Accumulation On Downstream Equipment Will Not Be A Substantial Problem. (62.2)~~

Type: _____

Design Peak Hourly Flow: _____ gph

Number of Units: _____

Yes	No	N/A		
☐	☐	☒	1.	Is the communitor located downstream of the grit removal equipment or has a 6 inch deep gravel trap been provided upstream of the communitor? (62.31
☐	☐	☒	2.	Has the communitor been sized to handle the design peak hourly flow? (62.32)
☐	☐	☒	3.	Is a screened bypass channel provided? (62.33)
☐	☐	☒	4.	Is the bypass channel designed to allow for automatic use for all communitor failures? (62.33)
☐	☐	☒	5.	Are adequate gates provided to allow for bypass of the communitor during periods of cleaning and maintenance? (62.33)
			6.	If the communitor chambers is located in an enclosed area, have the following provisions for access, ventilation, shields, safety and electrical equipment been satisfied: (61.13)
☐	☐	☒		a. Stairways for access to pits greater than 4 feet deep. Access ladders are acceptable for pits less than 4 feet deep. (61.13)
				b. If installed in building with other uses:
☐	☐	☒		1. Isolated from the rest of the building. (61.13)
☐	☐	☒		2. Separate outside entrance. (61.13)
☐	☐	☒		3. Separate and independent fresh air supply. (61.13)
☐	☐	☒		c. Fresh air is forced into enclosed screening device area or into open pits more than 4 feet deep. (61.13)
☐	☐	☒		d. Air supplied at rate of 12 complete air changes per hour for

continuous ventilation. (61.13)

Yes	No	N/A		
☐	☐	☒	e.	Air supplied at a rate of 30 complete air changes per hour for intermittent ventilation when workers enter the area. (61.13)
☐	☐	☒	f.	The switches for operation of ventilation equipment are conveniently located and marked. (61.13)
☐	☐	☒	g.	The intermittently operated ventilation equipment is interconnected with the pit lighting system. (61.13)
☐	☐	☒	h.	The fan material is made from non-sparking material. (61.13)
☐	☐	☒	i.	Gas detectors are provided. (61.13)
☐	☐	☒	7.	Are guard railings and deck gratings provided? (61.141)
☐	☐	☒	8.	Have adequate removable enclosures which protect personnel from accidental contact been provided? (61.142)
☐	☐	☒	9.	Has a positive means of locking out each mechanical device for maintenance been provided? (61.142)
☐	☐	☒	10.	Do all mechanical units which are operated by a timing device also include auxiliary controls which will set the cleaning unit in operation at a preset high water elevation? (61.151)
☐	☐	☒	11.	Are warning devices provided to alert personnel when the cleaning unit fails to lower the high water? (61.151)
☐	☐	☒	12.	In areas where hazardous gases may accumulate, do the electrical fixtures meet the requirements of the National Electrical Code for Class 1, Group D, Division 1 locations? (61.152)

3. Flow Equalization – YES

General: Use of flow equalization should be considered where significant variation in organic and hydraulic loadings can be expected. (65.1)

Type of flow equalization: off line basin - Future Clarifier
Example: in-line

Location of flow equalization basin: OFF ANOXIC ZONE, AFTER SCREENING
Equalization basin should be located down stream of pretreatment facilities such as bar screen, comminutors, and grit chambers. (65.4)

Size of flow equalization basin 12,500 gallons. The equalization basin should have sufficient capacity to effectively reduce expected flow and load variations. (65.4) ~~Check~~ Plans
10 x 12 x 14' 5000

A. Operation:

Yes	No	N/A		
☐	☒	☐	1.	Has aeration or mixing equipment been provided to maintain adequate mixing? (65.51)
☒	☐	☐	2.	Have corner fillets and hopper bottoms with draw-offs been provided to allow sludge removal? (65.51)

B. Aeration:

☐	☐	☒	1.	Has aeration equipment been provided to maintain a minimum of 1.0 mg/l of dissolved oxygen in the mixed basin contents at all times?
☐	☐	☒	2.	Is the air supply rate a minimum of 1.25 cfm/1000 gallons of storage capacity? (65.52)
☐	☐	☒	3.	Is this air supply isolated from other treatment plant aeration requirements? (65.52)

C. Controls:

☐	☒	☐	1.	Have inlets and outlets for all basin compartments been equipped with accessible external valves, stop plates, weirs, or other devices to permit flow control and removal of the unit from service? (65.53) FILLS BY OVERFLOW
☐	☒	☐	2.	Have flow level measuring and flow level indicators equipment been provided? (65.53)

D. Electrical:

☐	☐	☒	1.	Does all electrical work housed in the equalization basins meet the requirements of the National Electrical Code for Class I, Group D, Division I locations? (65.6) JUST A PUMP

E. Access:

☒	☐	☐	1.	Has suitable access been provided to facilitate cleaning and the maintenance of equipment? (65.7) ACCESS FROM WALKWAY ABOVE.

1/16/13 F
1/25/13

ACTIVATED SLUDGE TYPE PROCESSES

Name: Heritage Springs

NPDES Number IN0062553

1. Process Type and Loading

A. Type of process:

AT 1
17 x 15 x 14' SWD = 3570 cf
AT 2
50 x 14 x 14' SWD = 9800 cf
Σ = 13370 cf

- ☐ Conventional A.S.
- ☐ Step Aeration
- ☐ Complete Mix
- ☐ Contact Stabilization
- ☒ Extended Aeration
- ☐ Oxidation Ditch
- ☐ Single Stage Nitrification
- ☐ Other (Specify)

B. Process Loading (Aeration Tank):

1. Pounds of BOD_5 entering aeration tank/day = 200 (240 mg/L x 0.1 mgd x 8.34)
2. Organic Loading: 15 lbs. BOD_5/day/1000 cu. ft. OK
3. Total and volatile suspended solids concentrations in mixed liquor in aeration basin:
   MLSS = 4000 (Assume) mg/l; MLVSS = 65% to 79% of MLSS = 3000 mg/l

   (Note: MLSS may vary over a range from 1500 mg/l to 5000 mg/l, depending on recycle ratio)
4. F/M Ratio = 0.08 lbs. BOD_5/day/lb. MLVSS
5. lb/day NH_3-N entering aeration tank = 21 (25 mg/L x 0.1 mgd x 8.34)
6. Diurnal BOD_5 load ratio ____: ____ Assume 1.5 to 1

C. Design Considerations:

Yes	No	N/A		
☒	☐	☐	1.	Independent check of design calculations?
☒	☐	☐	2.	Does the design of the aeration tanks meet the permissible loadings shown in the table on page 90-7 of Ten States Standards? (92.31)

Yes	No	N/A		
☐	☐	☒	4.	If the dinural load ratios exceed 4:1, has flow equalization been provided? (92.31)

2. Aeration Tanks

A. Number of tanks: 2 ; IN SERIES

B. Volume of each tank: ____ cu. ft.; ____ gal. 1 3570 cF 26700 gal
2 9800 cF 73300 gal
Total Volume: ____ cu. ft.; ____ gal. 13370 cF 100,000 gal

C. Hydraulic detention time: 24 hours @ ADF 6 hrs @ Peak Flow

D. Freeboard 26 inches (normally, should have 18 inches or more) @ Average 21" @ Peak

E. Tank water depth 13.83 feet (normally, should be between 10 ft. and 30 ft.) @ Average

Yes	No	N/A		
☒	☐	☐	1.	Are liquid depths between 10 feet and 30 feet? (92.32a)
☒	☐	☐	2.	For horizontally mixed aeration tanks, is the liquid depth greater than 5.5 feet? (92.32a)
☒	☐	☐	3.	Are the tanks designed to prevent short-circuiting? (92.32b)
☐	☒	☐	4.	Has the total aeration tank volume been divided among two or more units capable of independent operation when required? (92.321) MUST OPERATE IN SERIES
☒	☐	☐	5.	Are the inlets and outlets for each aeration tank equipped with valves, gates, stop plates, weirs or other devices to permit controlling the flow of any unit and to maintain reasonably constant liquid level? (92.322a)
☐	☐	☒	6.	Can the system carry the design peak instantaneous flow with any single aeration tank unit out of service? (92.322a) No ability to take Tank out of Service
☐	☐	☒	7.	For horizontally mixed aeration tank systems, is the effluent weir adjustable by mechanical means and is it sized based on the design peak instantaneous flow plus the maximum return sludge flow? (92.322a). TANK LEVEL FLOATS OF FL LEVEL

Yes	No	N/A		
☐	☐	☒	8.	Are all channels and pipes carrying liquids with solids in suspension designed to maintain self-cleansing velocities? (92.322b)

☐ ☐ ☐ 9. Has a freeboard of not less than 18 inches been provided? (92.323)

☐ ☐ ☒ 10. If a mechanical surface aerator is used, has a freeboard at least 3 feet been provided? (92.323)

☐ ☒ ☐ 11. Is a suitable drain provided for emptying the content of each tank by gravity? Must be pumped out

3. Oxygen and Air Requirements

Oxygen requirements need to be sufficient for main aeration tank biological treatment processes, aerobic digestion in a separate sludge tank, and effluent post aeration. Other air requirements may need to be met, including air for aerated grit channels, airlift pumps, etc.

Use 1.1 lbs 0_2/lb design peak hourly BOD_5 for all activated sludge processes except extended aeration. (92.331)

Use 1.5 lbs 0_2/lb design peak hourly BOD_5 for extended aeration plants (includes oxidation ditches). (92.331)

Use 4.6 lbs 0_2/lb design peak hourly TKN for <u>all</u> activated sludge processes. (92.331)

A. Calculate lbs 0_2 required for aeration tank treatment:

Assume 35 mg/L

lbs 0_2 required/day = 1.1 or 1.5 (lbs BOD_5/day entering) _____ + 4.6 (lbs TKN/day entering) _____ = _____ lb 0_2/day 434 lb O_2/d per calcs

B. Note: the above calculation is for the aeration basin oxygen requirement only. The overall plant oxygen/air requirement may be greater (see item #5 below).

4. Diffused Air System (if applicable)

Blowers capacities should be determined on the basis of the air requirement calculated per 3.A. above (using the method outlined in Ten States Standards, Section 92.332), plus any additional capacity required for other air use demands (airlifts, aerobic digesters, aerated grit channels, post aeration, etc. as applicable). (92.332c)

Separate Calculations

Process air = 339 scfm (BOD + TKN, no denite)
Digester Mixing = 134 scfm (based on 20 scfm/1000 cf)
Channel Mixing = 45 scfm (based on 20 scfm/1000 cf)
Air Lift Pumps = 40 scfm estimate
558 scfm

If T = 100°, RH = 36% P = 6.10 psi 558 scfm = 633 icfm

Blowers are 590 icfm Close

The following formulas may be used:

Vol. of air (in CFM) = _____ Separate Calculations

(lbs of 0_2 from 3.A. above required/day) (Air temp. in °R)
899.7 [(Atmos, Press, Psia)-(Rel. Humid Fraction)(Sat. Vapor Press, psia)]g

Where g = 0_2 transfer efficiency fraction, use g = 0.20 for typical diffusers.

Use t = 80°F (T = 540°R); Rel. Humidity = 60% = 0.6; Sat. Vapor Pressure = 0.512 psia at 80°F

Then use the AOR/SOR conversion formula if applicable.

Use at least two blowers, each having this calculated capacity, or provide this air delivery rate with the largest blower out of service.

A. Calculated air rate needed ____ CFM
B. Actual air supply rate provided ____ CFM air/1000 cu. ft. tank water volume.
C. Actual air supply rate provided ____ $ft^3/\#BOD_5$

Yes	No	N/A		
☒	☐	☐	1.	Can the amount of air or oxygen be varied (either instantaneously or by on/off timer settings)? (92.332e) Timer + VFD
☒	☐	☐	2.	Can the diffusers be readily cleaned? Removed for cleaning
☒	☐	☐	3.	Are duplicate (or multiple) blowers/ compressors provided, and can the plant oxygen demand be met with the largest blower out of service? (92.332e) 2 Blowers
☐	☒	☐	4.	Do the specifications call for the aeration system performance to be tested (by the contractor) before acceptance (by the owner/engineer)?
☒	☐	☐	5.	Is at least 1500 cu. ft. of air provided per pound of BOD_5 for all activated sludge processes, except extended aeration? 2050 cu. ft. per pound BOD_5 shall be provided for the extended aeration process. (92.332b) $\frac{(200\ lb/d)}{1440\ min/d} \cdot 2050\ CF = 285\ cfm$ OK
☐	☐	☐	6.	Is the diffuser system capable of providing for 200 percent of the designed average day oxygen demand? (92.332f) UNKNOWN
☒	☐	☐	7.	Are the diffusers equally spaced through the total length of the tank? (92.332f)

Yes	No	N/A		
☐	☒	☐	8.	Can the spacing of the diffusers be adjusted without major revisions to the air header piping? (92.332f)
☒	☐	☐	9.	For plants employing less than four independent aeration tanks, does the design incorporate removable diffusers that can be serviced and/or replaced without dewatering tank? (92.332f)
☒	☐	☐	10.	Is each diffuser equipped with a control valve for throttling or complete shutoff? (92.332g)
☐	☐	☒	11.	Are air filters provided to furnish at all times an air supply sufficiently free from dust? (92.332h) COARSE BUBBLE DIFFUSERS

5. Mechanical Aerator(s), (if applicable) N/A

A. The engineer or manufacturer must provide the performance rating of the particular mechanical aerator if such figure is not contained in the specifications. The rating should be given in (or converted to) units of lbs. of 0_2 per horsepower per hour. (Typical performance is from 1.5 to 3.5 lb 0_2/hp/hr. If design information is not provided, a transfer rate of 2 lb. 0_2/hp/hr shall be used. (92.333a)

Given performance rating ____ (lb 0_2/hp/hr).

B. Aerator horsepower required

= lbs. 0_2 required/day (from 3A, above)
(lb 0_2/hp/hr) (24 hr/day) from 5A above; need to convert to field transfer rate if only standard transfer rate is given (by using AOR/SOR conversion formula).

=____ + ____ h_p

Yes	No	N/A		
☐	☐	☒	1.	Are design transfer efficiencies provided in the specifications? (92.333a)
☐	☐	☒	2.	Is the mixing requirement met, i.e. is there sufficient horsepower per unit, volume of tank liquid to keep biological solids in suspension? (92.333b.2)

Yes	No	N/A		
☐	☐	☒	3.	Are sufficient mechanical aerators provided to maintain process performance with the largest unit out of service? (92.333b.3)
☐	☐	☒	4.	Have provisions been made (location, mounting method, lifting adds, etc.) for the removal of mechanical aerators for repairs/servicing? (93.333b.5)
☐	☐	☒	5.	Are the mechanical aerators designed to be operable during extended cold weather?
☐	☐	☒	6.	Do the specifications call for the aeration system performance to be tested (by the contractor) before acceptance (by the owner/engineer)?
☐	☐	☒	7.	Can the amount of oxygen transferred be varied in proportion of load demand on the plant? (92.333b.4)
☐	☐	☒	8.	Is a dissolved oxygen level of 2 mg/l maintained in the mixed liquor at all times throughout the tank or basin? (92.333b.1)

6. Sludge Return and Sludge Wasting

Yes	No	N/A		
☒	☐	☐	1.	Have the necessary design features been provided to allow the recycling of settled sludge from the secondary clarifier and also for the wasting (removal) of sludge from the plant? MUST WASTE MIXED LIQUOR
☐	☐	☒	2.	Does the piping for pumped return sludge have a diameter of at least 4 inches? (Not to be confused with sludge withdrawal piping which must be 6" or 8"). (92.43) Airlifts are 4" ϕ
☒	☐	☐	3.	Is a pipe flow velocity of 2 ft/sec or more achieved? Velocity = ft/sec. (92.43) 2 fps in 4" ϕ Requires 78 gpm RAS Q Reported Flow is 200 gpm each => OK
☒	☐	☐	4.	Are multiple and/or variable speed pumps provided for return (recycle) of sludge from the clarifier(s) to the aerator basin(s)? (92.42) Adjustable Air Lift Pump
☒	☐	☐	5.	Can the maximum return sludge capacity be obtained with the largest pump out of service? (92.42) Largest Air Lift Pump => OK
☒	☐	☐	6.	Is a positive head provided on the pump suctions? (92.42) AIR LIFT

Yes	No	N/A		
☐	☐	☒	7.	Do the pumps and air lifts have at least 3 inches suction and discharge openings? (92.42)
☒	☐	☐	8.	Does the sludge return system provide for return sludge flow rates varying over the range identified in the table on page 90-13 of Ten States Standards (92.41)? ✓ 200gpm x6 This range is: minimum 0 %; maximum 1730% Typ 50-150% OK
			9.	To what locations are the return sludge stream and the waste sludge stream taken? (92.44) Return sludge goes to ANOXIC ZONE Waste sludge goes to DIGESTER FROM AERATION TANK NOT FINAL CLARIFIER
☒	☐	☐	10.	Is this shown in the plan drawings or details? (92.44)
☐	☒	☐	11.	Has a means of measuring the sludge return and wasting rate been provided? (92.43) Specify the Type: Adjust Air Flow to Control. Measure waste # by tank depth change OK Return _____ Waste _____
☐	☐	☒	12.	Does the waste sludge control facilities have a capacity of at least 25 percent of the design average rate of wastewater flow? (92.44)
☒	☐	☐	13.	Can the waste sludge control facilities function satisfactorily at rates of 50 percent of design average wastewater flow or a minimum of 10 gallons per minute, whichever is larger? (92.44) OK to 200 gpm
☐	☐	☒	14.	For plant designed for average wastewater flows of 1 MGD or more, do the flow measuring devices totalize and record as well as indicate flows? (92.5)
			15.	Check pump capacities, TDH, force main velocities, etc. for return sludge pumps and waste sludge transfer pumps (if applicable). Complete attached sheet for each type of pump. NA

FLOW MEASUREMENT

1/16/13

Name: Heritage Springs

NPDES Number IN0062553

Flow Measurement Type: (Effluent)

		WEIR TYPE	SIZE
☐	Sharp Crested Weir		
☒	Parshall Flume		3"
☐	Other* *See Other Section		

Minimum Anticipated Flow Rate 0.01 mgd

Maximum Anticipated Flow Rate 0.4 mgd

Yes	No	N/A		
☐	☐	☒	1.	If Other, is the installation in accordance with manufacturer's installation recommendations?
☒	☐	☐	2.	Is the primary flow device located where it will measure only the plant influent or effluent and not include any recycle streams?

Sharp Crested Weir: Based on NPDES Compliance Sampling Inspection Manual

Yes	No	N/A		
☐	☐	☒	1.	Does the flow to be measured have a low solids concentration, i.e., WWTP effluent?
☐	☐	☒	2.	Is the weir installed perpendicular to the axis of flow with no leakage at the sides or bottom?
☐	☐	☒	3.	Is the weir plate level and adjustable?
☐	☐	☒	4.	Is the thickness of the weir crest less than 1/10 inch?
☐	☐	☒	5.	Is the distance from the weir crest to the bottom of the approach channel at least 1 foot or 2 times the maximum weir head, whichever is greater?
☐	☐	☒	6.	Is the distance from the side of the weir to the side of the approach channel at least 1 foot or 2 times the maximum weir head, whichever is greater? This does not apply to suppressed weirs.
☐	☐	☒	7.	Can air circulate freely under and on both sides of the nappe?

Yes	No	N/A		
☐	☐	☒	8.	Is the cross sectional area of the approach channel at least 8 times the area of the nappe?
☐	☐	☒	9.	Is the approach channel straight and uniform upstream of the weir, a distance of at least 15 times the maximum weir head?
☐	☐	☒	10.	Is the measurement of head at least 4 times the maximum weir head upstream from the crest?
☐	☐	☒	11.	Is the minimum weir head at least 0.2 feet?
☐	☐	☒	12.	Is the weir length for a cippolletti, rectangular or suppressed weir at least 3 times the maximum weir head?
☐	☐	☒	13.	Are the sides of a rectangular contracted weir vertical?
☐	☐	☒	14.	Is the angle of the v-notch weir cut precisely?
☐	☐	☒	15.	Can the weir accurately measure the anticipated flow variations?
☐	☐	☒	16.	Is the maximum downstream pool level at least 0.2 ft. below the crest elevation?
☐	☐	☒	17.	Is a reference staff gauge provided?

Parshall Flume:

Based on NPDES Compliance Sampling Inspection Manual and Recommended Practice For The Use of Parshall Flumes

LAST CALIBRATED ON 10/24/12

☒	☐	☒	1.	Where the throat width is larger than 1/2 the width of the approach channel, is the straight upstream length of the approach channel 10 times the channel width?
☒	☐	☐	2.	Where the throat width is less than 1/2 the width of the approach channel, is the straight upstream length of the approach channel greater than 20 times the throat width?
☒	☐	☐	3.	Are the throat section walls vertical?
☒	☐	☐	4.	Is the measuring point upstream two-thirds (2/3) the length of the converging section sidewall?
☒	☐	☐	5.	Is the flow evenly distributed across the channel, free of turbulence or waves and shall not be located after transition sections?
☒	☐	☐	6.	Is the longitudinal and lateral axes of the converging crest floor level? APPEARS SO
☒	☐	☐	7.	Can the flume accurately measure the anticipated flow variations within free flow conditions?
☒	☐	☐	8.	Is a reference staff gauge provided for Ha and Hb? Yes No OK

Other Type of Flow Measuring Device:

Yes	No	N/A		
☐	☐	☒	1.	If a doppler or magnetic type of in pipe flow measuring device has been specified, does the manufacturer provide a means of calibrating the device? If so, see the weir or parshall flume sections.
☐	☐	☒	2.	If the manufacturer cannot offer a means of calibrating their flow meter, has some alternate means been proposed? This may be a parshall flume or some type of weir.

1/16/13

ULTRAVIOLET DISINFECTION

Name: Heritage Springs

NPDES Number IN 0062553

Peak Hourly Flow Rate (PHFR) 0.4 MGD

PHFR x 40 lamps/MGD = 16 # of lamps needed (rule of thumb)

16 # of lamps provided

Transmittance _____% Typical 65%

YES	NO	N/A			
☒	☐	☐	1.		Is the design based on the peak hourly flow rate?
☒	☐	☐	2.		Is the detention time between 5 and 15 seconds at the peak hourly flow rate? ± 5 sec at 0.4 mgd
			3.		If the transmittance is less than:
☐	☐	☒		a.	65% are additional lamps or is additional detention time provided?
☐	☐	☒		b.	20% have other disinfection methods been considered, since UV may not be viable.
☒	☐	☐	4.		Is the effluent expected to be clear and colorless?
☐	☐	☒	5.		If chemicals are proposed to be used in the treatment process (especially iron salts), is this information included in the specification?
☒	☐	☐	6.		Is the effluent expected to have less than 30 mg/l of suspended solids at all times? (Reliability Class 1 or 2)

MS
1/10/13

POST AERATION

Name: Heritage Springs

NPDES Number IN 0062553

11'-4" Drop

Yes	No	N/A		
☒	☐	☐	1.	Is the WLA effluent D.O. requirement greater that 2 mg/l? **If yes, post aeration is required.**
			2.	What type of post aeration is to be used?
☐	☐	☒		Diffused Aeration
☐	☐	☒		Mechanical Aeration
☒	☐	☐		Cascade Aeration
☐	☐	☒		Turbine Aeration
☐	☐	☒		U-Tube Aeration
☐	☐	☒		Agitator Aeration
☒	☐	☐	3.	Is the minimum vertical drop provided for the cascade OK? DOW requires 19' (overall) 11.33' is OK
☐	☒	☐	4.	Does any portion of the cascade aeration ladder extend below the 25-year flood elevation?
☐	☐	☒		If so, has the permitee provided a written request for a letter from the Agency stating that sampling for dissolved oxygen (DO) is not required during flood conditions? This letter will be placed with the discharge permit in the project file.

Aeration formulas are contained in the Process Design Manual for Upgrading Existing Wastewater Treatment Plants (blue book) in Chapter 8, Preaeration and Post aeration Practices. Additionally, a computer program is available for cascade aeration.

1/16/13

OUTFALL

Name: Heritage Springs

NPDES Number IN 0062553

Type of Outfall: ☒ Gravity ☐ Pressure

WWTP Design Flow: 0.1 MGD

WWTP Peak Flow: 0.4 MGD

Gravity Outfall:

Length: 2022 ft. Diameter: or 10" 0.83 ft.

Slope: 1.29% ~~ft./ft.~~ = 0.0129 ft/ft Material: PVC

Hydraulic Capacity: 1.61 MGD @ n = 0.013

Pressure Outfall: N/A

Length: _____ ft. Diameter: _____ ft.

Material: _____ Static head: _____ ft.

Friction head: _____ ft. Total dynamic head: _____ ft.

Pumping rate: _____ GPM and _____ MGD

Attach pump curve and calculation

Diffuser: N/A

Diameter: _____ ft. Length: _____ ft.

Number of ports: _____ Port diameter: _____ ft.

Distance between ports: _____ ft.

Yes	No	N/A		
☒	☐	☐	1.	Can outfall sewer carry the peak design flows?
☒	☐	☐	2.	Is a head wall provided? Per Plans
☐	☒	☐	3.	Is a flap gate provided? Per Plans
☒	☐	☐	4.	Is the effluent discharged at the low water level of the stream? Unknown, But IDEM has permitted already so OK
☐	☐	☒	5.	If a diffuser is proposed, is it needed to assure adequate mixing and dilution to satisfy a discharge permit parameter?

TOWN OF GREENVILLE
ORDINANCE NO. 2013-WR-009

RESOLUTION CONCERNING THE TURN OFF OF WATER SERVICE DUE TO EXCESSIVE WATER USAGE CAUSED BY A LEAK ON CUSTOMER PROPERTY SERVICE BY THE GREENVILLE MUNICIPAL WATER UTILITY OF GREENVILLE, INDIANA

WHEREAS, the Town of Greenville Water Utility Council is responsible for protecting the financial interest of The Greenville Water Utility of Greenville, Indiana and;

WHEREAS, from time to time a water line leak or leaks may occur on customers property which could cause an excessive water bill and burden on a customer and;

WHEREAS, the water line leak or leaks may cause an unfair burden on the Greenville Water Utility for collection of charges for the water service;

NOW, THEREFORE, BE IT ORDAINED BY THE WATER UTILITY COUNCIL OF THE TOWN OF GREENVILLE, INDIANA, AS FOLLOWS:

1. If any or all of the following situations exist the Greenville Water Utility Superintendent by his discretion has the authority to terminate a water customer's service until such time the water leak or leaks are corrected and inspected by the Greenville Municipal Water Utility through flow meter observance.

- It is determined that an excessive water leak exist through observance of ground water present or meter box flow meter examination or both.
- It is determined that the amount of water usage may cause a customer's account to go into default.
- Customer has not corrected the water leakage after being informed of the leak within a reasonable time.
- Customer payment by check has been returned because of non-deficient funds.
- Customer payment does not paid full amount due.
- Customer home where service is provided has been placed into a foreclosure process.
- Disconnection would be in the best interest of protecting the Greenville Municipal Water Utility collection of bad debt.

2. After signing of this Resolution its effective date shall be January 1st, 2013.

TOWN OF GREENVILLE
ORDINANCE NO. 2013-WR-009

ADOPTED BY THE WATER UTILITY COUNCIL OF GREENVILLE, INDIANA, ON THE 11th DAY OF FEBRUARY, 2013.

PRESIDENT OF THE WATER UTILITY
COUNCIL OF GREENVILLE, INDIANA

TALBOTTE RICHARDSON

JACK TRAVILLIAN,
CLERK/TREASURER

PREPARED BY: RANDAL JOHNES

TOWN OF GREENVILLE
ORDINANCE NO. 2013-WR-010

RESOLUTION TO CARRY OVER OF VACATION TIME PER REQUEST OF CRYSTAL BURKHART WATER UTILITY ASSISTANCE CLERK OF THE TOWN OF GREENVILLE, INDIANA WATER UTILITY

WHEREAS, Assistant Water Utility Clerk Crystal Burkhart by written request date 02-11-2013 to the Greenville Water Utility Superintendent and the Greenville Water Utility Council to carry over 3 days of vacation for 90 days pass the 6 month cut-off period in accordance with Water Utility Personnel Manual;

NOW, THEREFORE, BE IT ORDAINED BY THE TOWN AND WATER UTILITY COUNCIL OF THE TOWN OF GREENVILLE, INDIANA, AS FOLLOWS:

1. Per written request {attached} presented to the Greenville Water Utility Superintendent, Town of Greenville and Water Utility Council Crystal Burkhart shall be authorized to carry over 3 days of vacation time beyond the usual 6 month period as stated in the Water Utility Personnel Manual. The time period shall be extended for 90 days past the 6 month cut-off period.

ADOPTED BY THE TOWN COUNCIL OF GREENVILLE, INDIANA, ON THE 11th DAY OF FEBRUARY, 2013.

PRESIDENT OF THE TOWN AND
GREENVILLE WATER UTILITY
COUNCIL OF GREENVILLE,
INDIANA

TALBOTTE RICHARDSON

JACK TRAVILLIAN,
CLERK/TREASURER

PREPARED BY: RANDAL JOHNES

To: The GREENVILLE TOWN COUNCIL

I am making a request to the Water Superintendent and Town Council which would allow me to carry over 3 days of vacation beyond the usual 6 month period as stated in the personnel manual. If possible I would like this period to be extended for 90 days. Thanks you for your time and consideration.

Sincerely,

Crystal Burkhart

Crystal Burkhart