



**DAVIS
BOWEN &
FRIEDEL, INC.**

3028/24

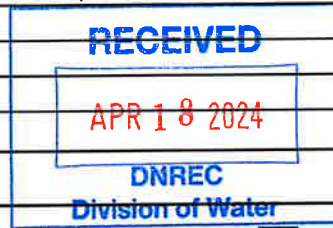
ARCHITECTS • ENGINEERS • SURVEYORS

601 East Main Street, Suite 100; Salisbury, MD 21804 | 410.543.9091

Letter of Transmittal

TO: Delaware DNREC
 Division of Water
 Commercial and Government Services Section
 89 Kings Highway
 Dover, Delaware 19901

DATE: April 17, 2024
JOB NO. 1897B031.B01
ATTENTION: Kevin Bronson
RE: Countryside Hamlet Sanitary Sewer



WE ARE SENDING YOU: Attached Under separate cover via _____ the following items:

Shop drawings Prints Plans Samples Specifications

Copy of letter Change order Permit application and backup material

COPIES	DATE	NO.	DESCRIPTION
1	undated		Application for Construction of Wastewater Collection and Conveyance Systems
1	undated		Project Narrative
1	03/2024		Countryside Hamlet Sanitary Sewer Construction Plans and Specifications - sealed
1	04/16/24		Pump Design spreadsheet
1	undated		Pump Selection Cutsheet
1	12/05/23		Pump Station Buoyance Calculations
1	04/09/24		County Project Zoning and Capacity letter
1	04/17/24		Permit Review Fee Check #5364, \$825
1	04/17/24		Public Notice Fee Check #5365, \$300

THESE ARE TRANSMITTED as checked below:

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> For approval | <input type="checkbox"/> Approved as submitted | <input type="checkbox"/> Resubmit _____ copies for approval |
| <input type="checkbox"/> For your use | <input type="checkbox"/> Approved as noted | <input type="checkbox"/> Submit _____ copies for distribution |
| <input type="checkbox"/> As requested | <input type="checkbox"/> Make corrections noted | <input type="checkbox"/> Return _____ corrected prints |
| <input type="checkbox"/> For review and comment | <input type="checkbox"/> _____ | |
| <input type="checkbox"/> FOR BIDS DUE _____ | | <input type="checkbox"/> PRINTS RETURNED AFTER LOAN TO US |

REMARKS _____
 Mr. Bronson: _____

Please find attached the full permit application for the Countryside Hamlet Sanitary Sewer project.

Should you have any questions, comments, concerns, or would like to discuss this further please give me a call at your convenience.

Thank you,

COPY TO: _____ SIGNED: _____
 _____ PRINT: _____ Jason P. Loar, P.E.
 _____ TITLE: _____ Principal/Sr. Engineer



Department of Natural Resources
and Environmental Control
89 Kings Hwy
Dover, DE 19901
dnrec.delaware.gov

Phone: (302) 739-9946
Fax: (302) 739-8369

Division of Water
Commercial and Government Services Section

INSTRUCTIONS FOR COMPLETING THE PERMIT APPLICATION FOR THE CONSTRUCTION OF WASTEWATER COLLECTION AND CONVEYANCE SYSTEMS

The following items must accompany the application. **Please note that incomplete application packages will be returned in their entirety and not reviewed until such time as all required information is received.**

- 1. A narrative summary of the intended purpose and design of the proposed facilities.
- 2. One (1) set of final construction plans and specifications, if applicable, signed and sealed by a Delaware-registered Professional Engineer, or a Delaware-registered Professional Land Surveyor for gravity systems only. One (1) electronic copy of final Plans.
- 3. One (1) electronic copy of final Plans.
- 4. The final plans must be drawn to scale showing slopes, inverts, pipe types and sizes, existing and proposed ground surfaces, tops of manholes, water lines, stormwater and stream crossings, encasements shown in plan and profile, and other information if pertinent or requested.
- 5. For pump/lift stations and force mains, include all calculations and pump/performance curves.
- 6. A check made payable to the State of Delaware for eight hundred twenty-five dollars (\$825.00), the non-refundable permit review fee. This fee covers the initial review and one follow-up review of any corrections or changes made to address the Division's comments. An additional eight hundred twenty-five dollars (\$825.00) non-refundable review fee must be submitted for resubmission of the plans if changes are made to the project which trigger a complete review of the permit application.
- 7. Your permit will have a public notice requirement if your system includes force mains or pump/lift stations. Include a check made payable to the State of Delaware for three hundred dollars (\$300.00) for the reimbursement of legal notices if the system has a force main connection or a pump/lift station.
- Please submit the completed application package, as outlined above, to DE DNREC, Division of Water, Commercial and Government Services Section, 89 Kings Highway, Dover, DE 19901. Please note, a new application, including the review fee, must be submitted if the Division's comments are not addressed or if requested supplemental information is not provided within one (1) year of the comment or request date.
- The following items must be submitted prior to permit issuance:
- 8. Verification from the appropriate county or municipal planning authority that the project has the proper zoning approval.
- 9. A letter from the owner/operator of the wastewater facilities to which the proposed collection and conveyance facilities connect. The letter must include confirmation that the owner/operator has approved the project, that the owner/operator will take responsibility for treating and disposing of the wastewater to be conveyed and that the downstream facilities have the capacity to manage the additional flows without causing or contributing to violations of Delaware's Environmental Protection Act (7 Del. C., Chapter 60) and the regulations promulgated thereafter. This includes, but is not limited to, unauthorized discharges such as overflows at manholes and violations of the treatment system's operating permit (for example, the National Pollutant Discharge Elimination System (NPDES) permit).

- Visit us on the web at: <https://dnrec.alpha.delaware.gov/water/surface-water/>

**APPLICATION FOR THE CONSTRUCTION OF
WASTEWATER COLLECTION AND CONVEYANCE SYSTEMS**

Application must be complete, typewritten or clearly printed

Date Application Submitted 04-17-2024

PROJECT INFORMATION			
Project Name and Location/ Address Countryside Hamlet Sanitary Sewer Pump Station - 34899 Delaware Ave, Frankford, Delaware 19945 Collection System - Countryside Hamlet Mobile Home Park, Lazy Lagoon Road, Frankford, Delaware 19945			
Tax Parcel Number(s) 433-11.00-19.00, 533-4.00-20.00-XXXX (multiple parcels within the mobile home park)			
County <input type="checkbox"/> Kent <input type="checkbox"/> New Castle <input checked="" type="checkbox"/> Sussex		Watershed (www.dnrec.delaware.gov/swc/wa/Pages/WatershedAssessment.aspx) <input type="checkbox"/> Chesapeake Bay <input type="checkbox"/> DE Bay/Estuary <input checked="" type="checkbox"/> Inland Bays/Atl Ocean <input type="checkbox"/> Piedmont	
Sewer District or Interceptor Dagsboro/Frankford Sewer District		Wastewater Treatment/Disposal Facility Name Piney Neck Regional Wastewater Facility	
Anticipated Construction Start Date 09/01/2024		Treatment/Disposal Facility Owner and Operating Permit Number Sussex County and 359224-03	
Please note, construction permits expire three (3) years from the date of permit issuance.			
Are you requesting plan review and comment or <u>WPCC Construction Permit issuance?</u> (circle one)			
Design Flow (gallons/day) Average 46,000		Peak 92,000	Peak Factor 2
Basis of Design 250 GPD			
Description New gravity sewer system within the mobile home park serving 47 lots along with a stub for future connection of 137 EDUs all flowing to a new duplex County pump station with an estimated 2,560 LF of 3-inch force main discharging to an existing manhole on Delaware Avenue.			
OWNER/DEVELOPER			
Company Name Sussex County Engineering			
Mailing Address 2 The Circle, P.O. Box 589			
City Georgetown		State DE	Zip 19947
Contact Name Michael Harmer, County Engineer			
E-Mail Address mike.harmer@sussexcountyde.gov			
Telephone (302) 855-7370		Cell	Fax (302) 855-7799

ENGINEER

Company Name
Davis, Bowen & Friedel, Inc.

Mailing Address
601 E. Main Street, Suite 100

City Salisbury	State MD	Zip 21804
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Contact Name
Jason P. Loar

E-Mail Address
jpl@dbfinc.com

Telephone (410) 543-9091	Cell (410) 603-89894	Fax (410) 543-4172
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GRAVITY SEWER INFORMATION

Ownership <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	Type of Sewer System <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Other?	If Other, list below
--	---	----------------------

Type of Pipe SDR-35	Length (ft) 1960	Diameter (in) 8"	Joint Specification Push	Min. Slope (ft/ft) .0028	Min. Velocity (ft/sec) 2.0
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Minimum Pipe Cover (ft) 3.5'	Number of Manholes 10	Drop manholes provided? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Maximum Distance Between Manholes (ft) 342
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Minimum ten foot (10') horizontal & eighteen inch (18") vertical separation from water lines maintained? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If not, explain provisions to prevent cross-contamination:
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Explain any special challenges (for example, stream, highway and/or railroad crossings, directional drilling, elevated sewers, etc.)
Stream crossing via jack and bore. One DelDOT road crossing using open cut.

Comments

PUMP/LIFT STATION INFORMATION				
Ownership <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private	Type of Wastewater <input checked="" type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Industrial <input type="checkbox"/> Other?		If Other, list below	
Pump Station Flows (gallons/day) Design 92,000	Average 46,000	Peak 92,000	Peak Factor 2.0	
Basis of Design 250 gpd/EDU x 184 EDUs		Pump Type Submersible		
Will peak flows be accommodated if largest unit fails? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Pump calc's and pump curves attached? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Cycle Time (minutes) 7.5	Wet Well Detention Time (minutes) 9	
Check valves provided on discharge line? <input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Gate valves provided on discharge line? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
If not, explain alternate procedure: N/A				
Ventilation provided in wet well? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Dry Well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Is an alarm system included? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Alternate source of power? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
What other provisions for emergency operations? Emergency Bypass Connection provided				
Height of Influent Above Pump (suction head) (ft) 2.75	Height of Effluent Above Pump (discharge head) (ft) 9		Friction Loss (ft) 33.32	
Pump Design Point 64 gpm @ 59.5'	Pump Operating Point 65 gpm @ 66'	Static Head (ft) 14.43	Total Head (ft) 59.53	Required Motor Horsepower (hp) 4
FORCE MAIN INFORMATION				
Type of Pipe HDPE		Length (ft) 2,479	Diameter (in) 3	
Hazen-Williams "C" Design Factor 150	Type of Joints Fused	Velocity Under Design Conditions (ft/sec) 3.23	Minimum Pipe Cover (ft) 4	
Air relief valves specified? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Clean-outs provided? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Maximum distance between clean-outs (ft) N/A		
Minimum ten foot (10') horizontal & eighteen inch (18") vertical separation from water lines maintained? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If not, explain provisions to prevent cross-contamination:		
Comments				

**COUNTRYSIDE HAMLET SANITARY SEWER
SUSSEX COUNTY ENGINEERING
SUSSEX COUNTY, DELAWARE
DFB NO. 1897B031**

*Ring W. Lardner, P.E.
W. Zachary Crouch, P.E.
Michael E. Wheedleton, AIA, LEED GA
Jason P. Loar, P.E.
Jamie L. Sechler, P.E.*

PROJECT NARRATIVE

The Countryside Hamlet Sanitary Sewer Project shall consist of the construction of a new 64 GPM sewage pump station, approximately 1,500 LF of 3-inch force main on Delaware Avenue, and 1,960 LF of 8-inch gravity sewer which includes a 60 LF jack-and-bore under Vines Creek. The pump station is to be located at 34899 Delaware Avenue, Frankford, Delaware 19945. The new pump station is to serve the existing Countryside Hamlet Mobile Home Park and possible future development on Tax Map 433-11.00-19.00.

The pump station and associated forcemain are sized to accommodate 184 Equivalent Dwelling Units (EDU's), this total includes anticipated future EDU's on Tax Map 433-11.00-19.00. Sewage from this station will be pumped via a new 3-inch HDPE DR11 force main extending north on Delaware Avenue to an existing sanitary sewer manhole on Delaware Avenue as shown on the attached drawings. The force main will discharge into an existing 8-inch diameter gravity sewer system on Delaware Avenue.

The pump station will include two pumps, an emergency standby generator, and a pump station bypass connection.

SYSTEM CURVE - HAZEN WILLIAMS
 WHERE $4.73 Q^{1.85} / C^{1.85} L^{4.87} = \text{friction head}$
 WHERE $V^2/2G = \text{velocity head}$
 WHERE $M V^2/2G = \text{minor loss head}$

JOB NO. 1897B031

FILE NAME: P:\Users\County11578022\Geogis\Water and Wastewater\Hessens\Hamlet\Design\Pump Set

ENTER STATIC HEAD: 14.43	FOR LENGTH 2: 3" Sch 80 PVC	FOR LENGTH 3: 3" HDPE IPS DR11	FOR LENGTH 3: 6" Sch 80 PVC
FOR LENGTH 1: N/A	ENTER C: 150	ENTER C: 150	ENTER C: 150
ENTER C: 150	ENTER DIA. INCHES: 2.864	ENTER DIA. INCHES: 2.83	ENTER DIA. INCHES: 5.709
ENTER DIA. INCHES: 1000	ENTER LENGTH: 105	ENTER LENGTH: 2360	ENTER LENGTH: 14
ENTER LENGTH: 0	ENTER MINOR COEF: 73.19	ENTER MINOR COEF: 1.8	ENTER MINOR COEF: 0
ENTER MINOR COEF: 0			

FOR LENGTH 5:	ENTER Q-1: 0
ENTER C: 150	ENTER Q-2: 25.38
ENTER DIA. INCHES: 1000	ENTER Q-3: 38.05
ENTER LENGTH: 0	ENTER Q-4: 63.39
ENTER MINOR COEF: 0	ENTER Q-5: 88.72

Additional Required Pressure
 0 psi

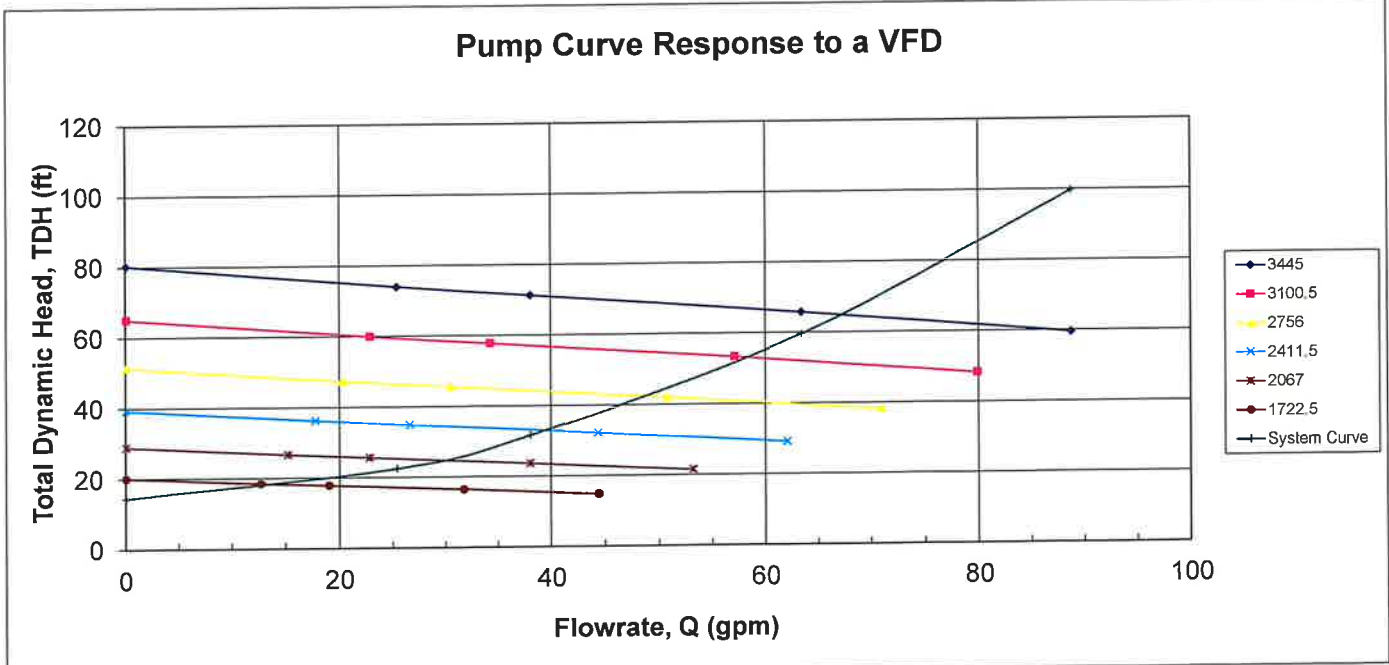
DATA OUTPUT TABLE (feet)							
Q (gpm)	H(stat)	H(f)	H(m)	H(v)	H(tdh)	H(tdh) psi	Velocity (fps)
0	14.430	0.000	0.000	0.000	14.430	6.247	0
25.38	14.430	6.129	1.863	0.026	22.447	9.718	1.29
38.05	14.430	12.963	4.187	0.058	31.639	13.696	1.94
63.39	14.430	33.327	11.620	0.162	59.540	25.775	3.23
88.72	14.430	62.072	22.762	0.318	99.583	43.109	4.53

AFFINITY LAWS FOR CENTRIFUGAL PUMPS WITH IMPELLER SIZE CONSTANT
 WHERE $Q1/Q2 = N1/N2$
 WHERE $H1/H2 = (N1/N2)^2$
 WHERE $BHP1/BHP2 = (N1/N2)^3$

DATA INPUT TABLE	
ENTER KNOWN SPEED N1:	3445
ENTER 5 KNOWN POINTS ON THE CURVE FOR N1:	
Q (GPM)	H (FT)
0	80.32
25.38	73.99
38.05	71.34
63.39	65.8
88.72	59.61

DATA OUTPUT TABLE									
N2 (rpm) = 3100.5		N3 = 2756		N4 = 2412		N5 = 2067		N6 = 1722.5	
Q (GPM)	H (FT)	Q (GPM)	H (FT)	Q (GPM)	H (FT)	Q (GPM)	H (FT)	Q (GPM)	H (FT)
0	65	0	51	0	39	0	29	0	20
23	60	20	47	18	36	15	27	13	18
34	58	30	46	27	35	23	26	19	18
57	53	51	42	44	32	38	24	32	16
80	48	71	38	62	29	53	21	44	15

ENTER DESIRED SPEEDS:	
ENTER N2 :	3100.5
ENTER N3 :	2756
ENTER N4 :	2411.5
ENTER N5 :	2067
ENTER N6 :	1722.5



NP 3085 SH 3~ Adaptive 256

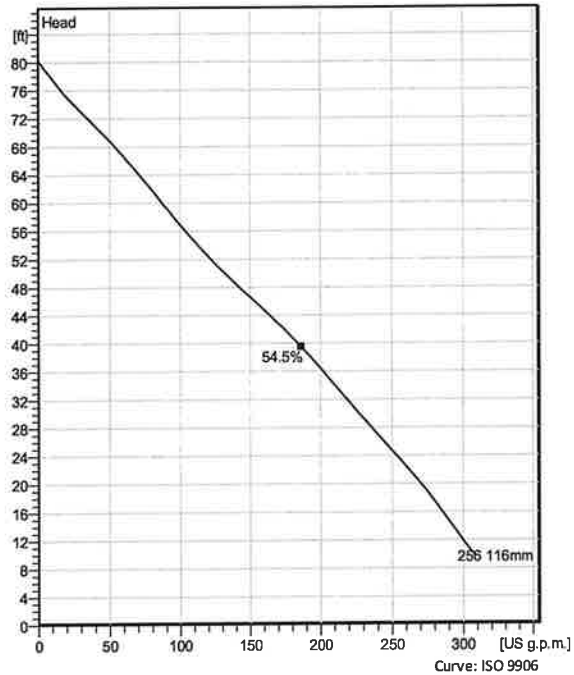
Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Modular based design with high adaptation grade.



Technical specification



Curves according to: Water, pure Water, pure [100%], 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Configuration

Motor number N3085.070 15-09-2AL-W 4hp	Installation type P - Semi permanent, Wet
Impeller diameter 116 mm	Discharge diameter 3 inch

Configuration

Pump information

Impeller diameter
116 mm

Discharge diameter
3 inch

Inlet diameter
80 mm

Maximum operating speed
3445 rpm

Number of blades
2

Max. fluid temperature
40 °C

Material

Impeller
Hard-Iron™

Stator housing material
Grey cast iron

Project Xylect-20994788
Block

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Created on 8/14/2023 **Last update**

8/14/2023

NP 3085 SH 3~ Adaptive 256

Technical specification



Motor - General

Motor number N3085.070 15-09-2AL-W 4hp	Phases 3~	Rated speed 3445 rpm	Rated power 4 hp
ATEX approved FM	Number of poles 2	Rated current 9.9 A	Stator variant 12
Frequency 60 Hz	Rated voltage 230 V	Insulation class H	Type of Duty S1
Version code 070			

Motor - Technical

Power factor - 1/1 Load 0.92	Motor efficiency - 1/1 Load 82.2 %	Total moment of inertia 0.152 lb ft ²	Starts per hour max. 30
Power factor - 3/4 Load 0.90	Motor efficiency - 3/4 Load 84.0 %	Starting current, direct starting 62 A	
Power factor - 1/2 Load 0.84	Motor efficiency - 1/2 Load 83.8 %	Starting current, star-delta 20.7 A	

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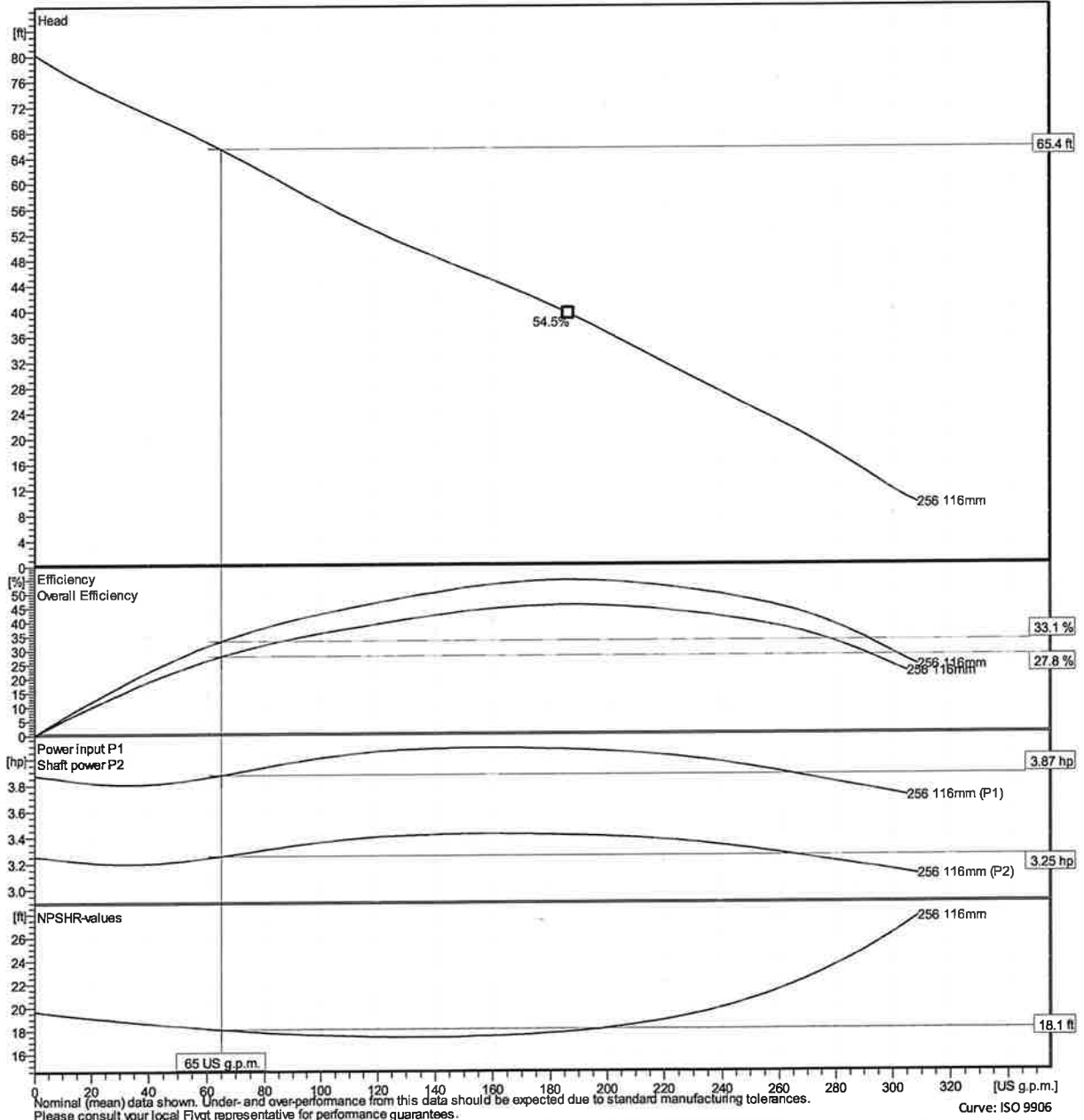
Performance curve



Duty point

Flow: 65 US g.p.m. Head: 65.4 ft

Curves according to: Water, pure Water, pure [100%], 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Curve: ISO 9906

Xylect-20994788

Thomas Rainier

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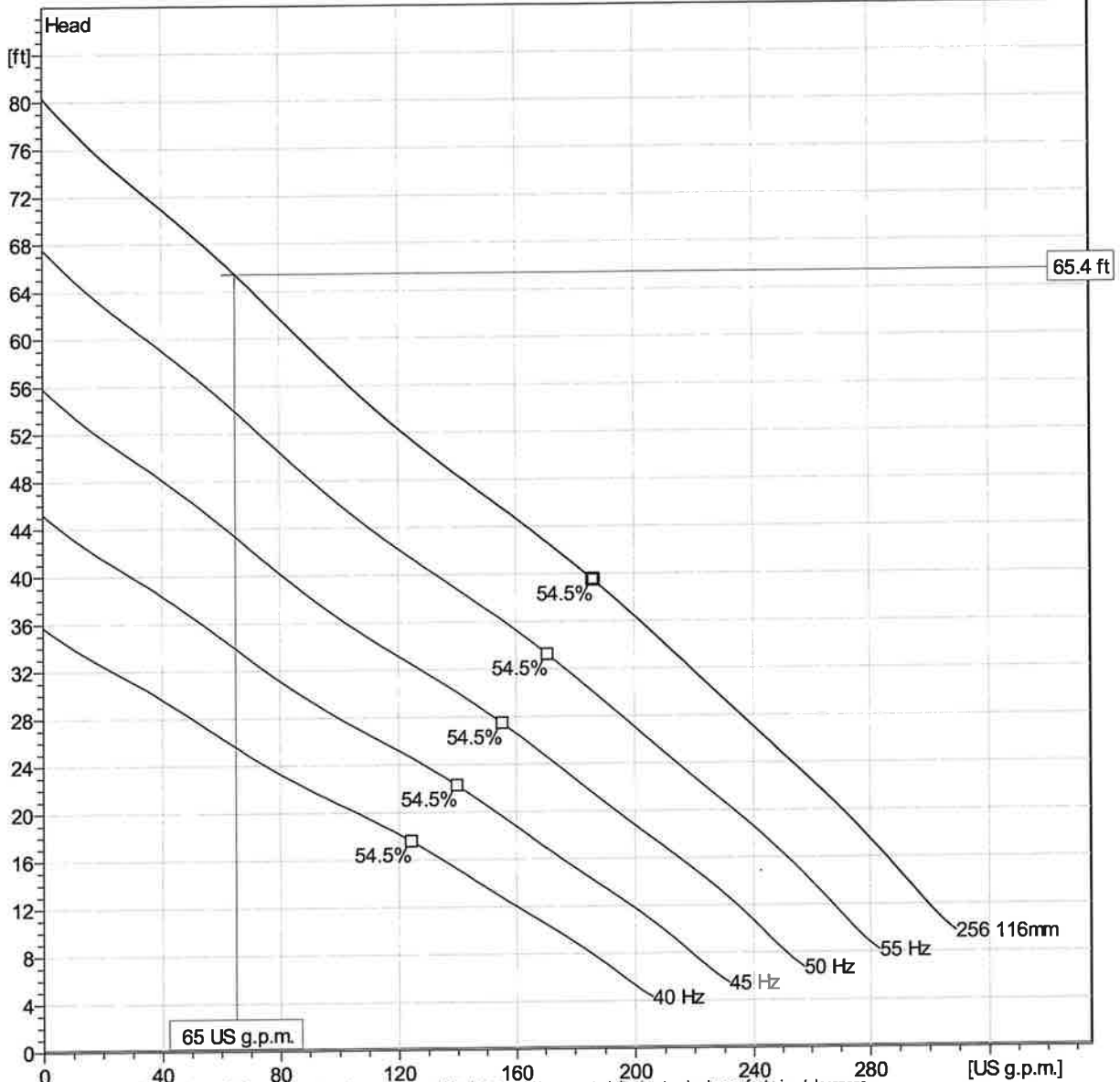
8/14/2023

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Duty Analysis



Curves according to: Water, pure [100%]; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy kWh/US MG	NPSHre ft
	US g.p.m.	ft	hp	US g.p.m.	ft	hp			
1	65	65.4	3.25	65	65.4	3.25	33.1 %	741	18.1

Project Block
Xylect-20994788

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Created on 8/14/2023

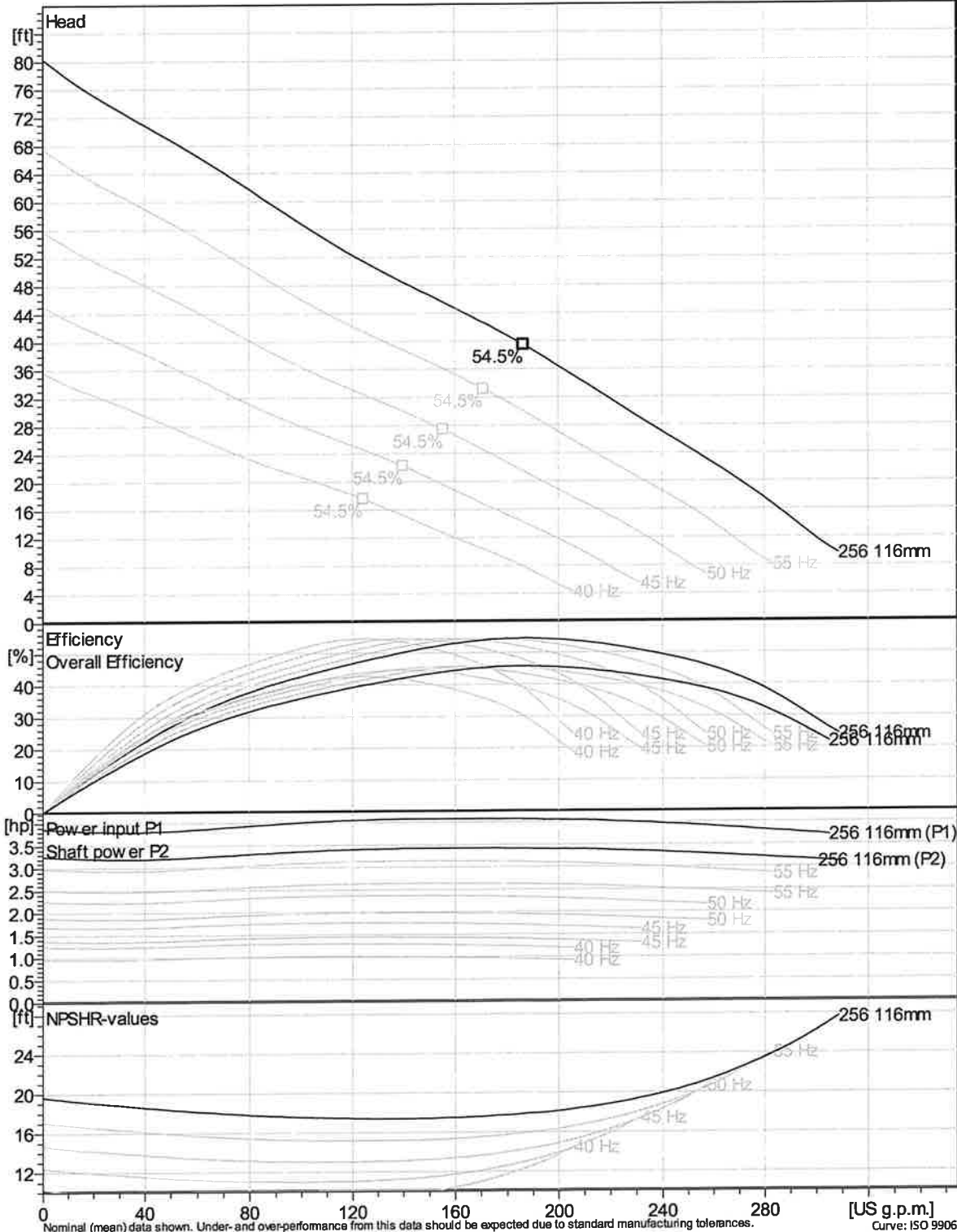
Last update 8/14/2023

NP 3085 SH 3~ Adaptive 256

VFD Curve



Curves according to: Water, pure, 39.2 °F, 62.42 lb/ft³, 1.6891E-5 ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees. Curve: ISO 9906

Project Xylect-20994788
Block

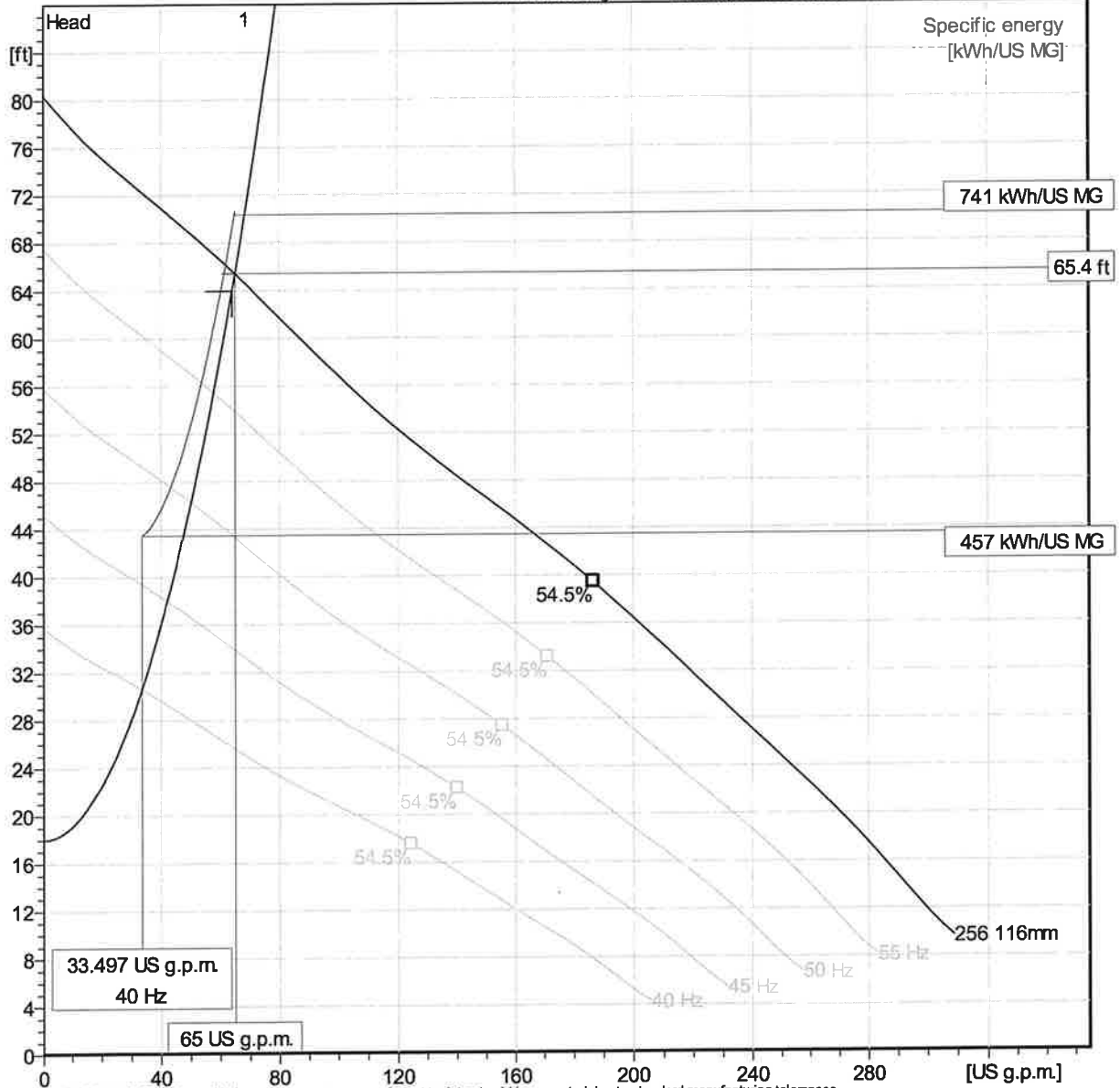
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Created on 8/14/2023 Last update 8/14/2023

NP 3085 SH 3~ Adaptive 256

VFD Analysis



Curves according to: Water, pure [100%]; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr. eff.	Specific energy	NPSH _{re}
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	
1	60 Hz	65	65.4	3.25	65	65.4	3.25	33.1 %	741	18.1
1	55 Hz	57.7	55.4	2.5	57.7	55.4	2.5	32.4 %	641	15.8
1	50 Hz	50.1	46.2	1.87	50.1	46.2	1.87	31.3 %	557	13.6
1	45 Hz	42.1	37.9	1.36	42.1	37.9	1.36	29.7 %	493	11.5

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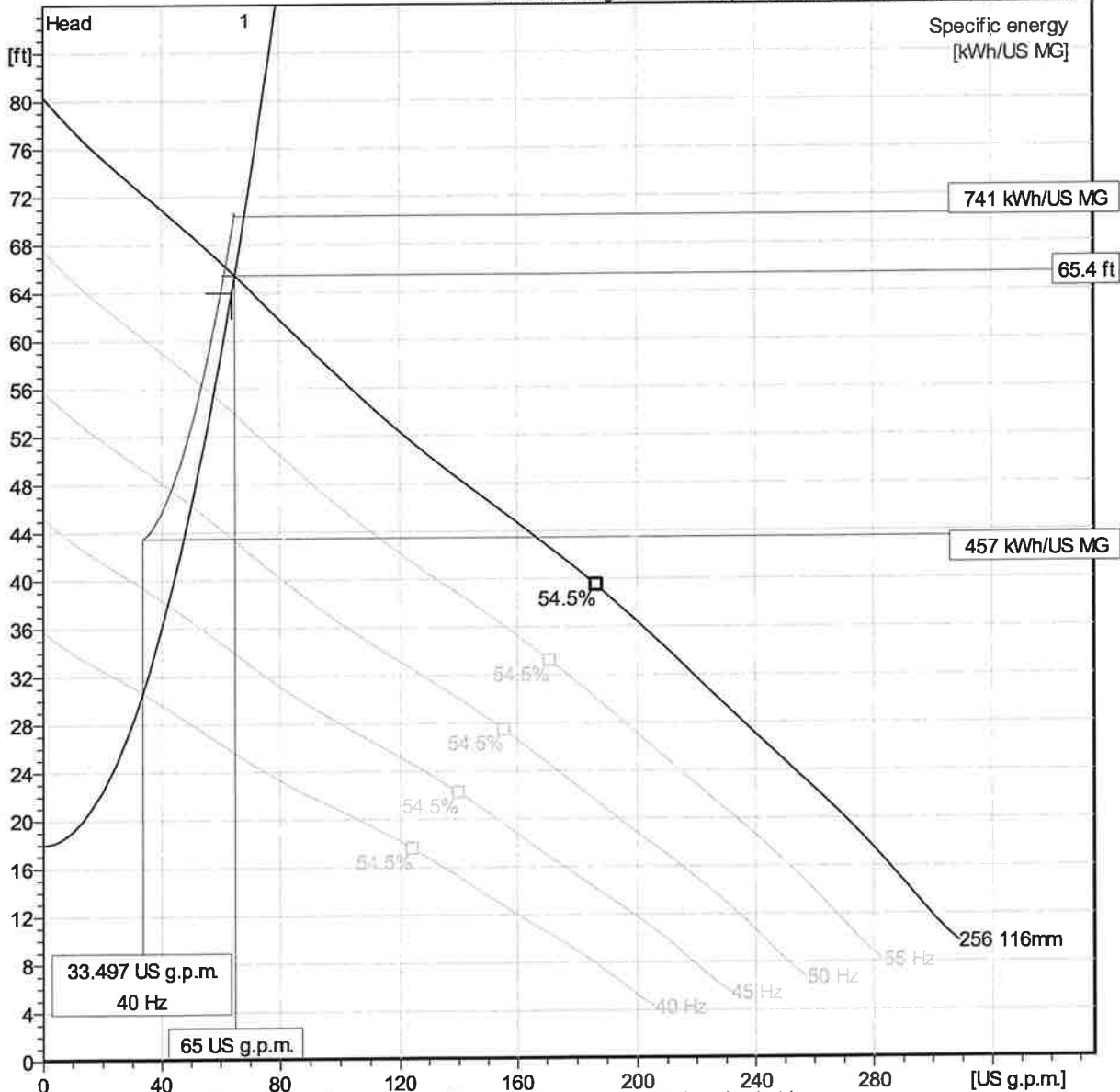
Last update 8/14/2023

NP 3085 SH 3~ Adaptive 256

VFD Analysis



Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Nominal (mean) data shown. Under- and over-performance from this data should be expected due to standard manufacturing tolerances. Please consult your local Flygt representative for performance guarantees.

Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr. eff.	Specific energy	NPSH _{re}
		US g.p.m.	ft	hp	US g.p.m.	ft	hp		kWh/US MG	
1	40 Hz	33.5	30.6	0.953	33.5	30.6	0.953	27.2 %	457	9.61

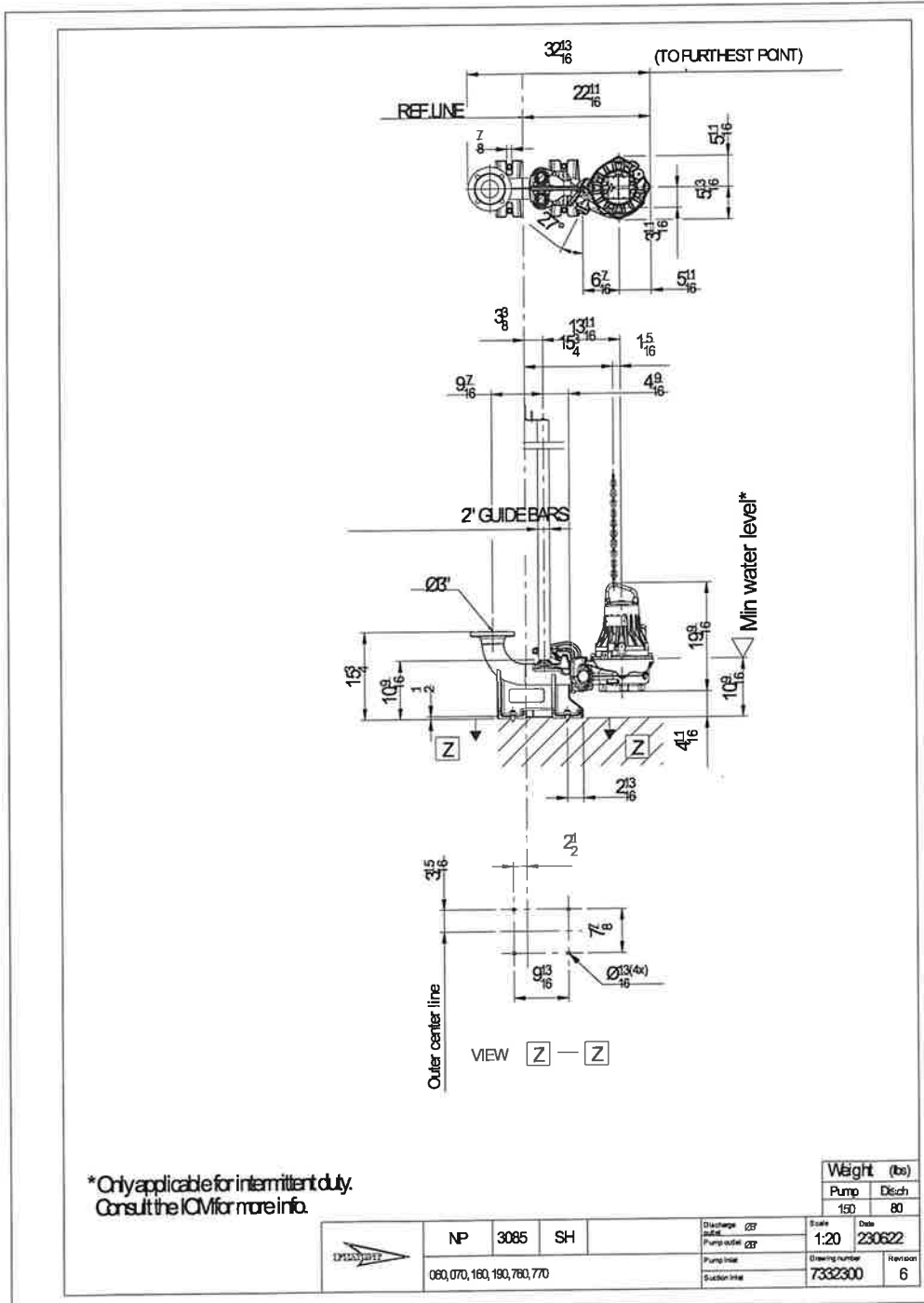
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Last update 8/14/2023

NP 3085 SH 3~ Adaptive 256

Dimensional drawing



*Only applicable for intermittent duty.
Consult the ICM for more info.

Weight (lb)	
Pump	Disch
160	80



NP	3085	SH
060, 070, 160, 190, 760, 770		

Discharge pipe	Ø3"	Scale	1:20	Date	230622
Pump outlet	Ø3"	Drawing number	7332300	Revisions	6
Pump inlet					
Suction line					

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Created on 8/14/2023 Last update

8/14/2023

Buoyancy Calculation for Circular Pump Station

Calculate Buoyant Forces (F_B):

$$W_w * \{[\pi/4 * (D_o^2 * H_w)] + (A_B * t_b)\}$$

Design Data:

H _{str} =	16.5 ft	[Height of Structure (Excludes Base)]
H _{gr} =	13.5 ft	[Height of Grade (Excludes Base)]
H _{wl} =	15.5 ft	[Height of Water above Base, Assumes Water to Top of Chamber]
W _w =	62.4 pcf	[Unit Weight of Water]
W _c =	145 pcf	[Normal Weight of Concrete]
W _s =	115 pcf	[Unit Weight of Soil]
W _{ss} =	52.6 pcf	[Unit Weight of Submerged Soil, (W _s - W _w)]
D _o =	7.0 ft	[Outside Diameter]
D _i =	5.0 ft	[Inside Diameter]

Top Slab:

L _t =	10.0 ft	[Length of Top Slab]
B _t =	10.0 ft	[Width of Top Slab]
t _t =	1.0 ft	[Thickness of Top Slab]
L _o =	4.0 ft	[Length of Opening]
B _o =	3.5 ft	[Width of Opening]

Bottom Slab:

t _b =	0.67 ft	[Base Slab Thickness]
s _s =	1.0 ft	[Shelf size (Overhang of Base)]
w _{sw} =	3.62 ft	[Width of Soil Wedge at Top (Wedge Angle 15°)]
D _B =	9.0 ft	[Diameter of Base]
A _B =	63.6 ft ²	[Area of Base]

F_B = 39,882 lbs	[Buoyant Force]
-----------------------------------	-----------------

Resisting Forces (F_R):

[1] Weight of Top Slab:

$$[(L_t * B_t) - (L_o * B_o)] * t_t * W_c$$

$$W_1 = 12,470 \text{ lbs}$$

[2] Weight of Walls:

$$\pi/4 * (D_o^2 - D_i^2) * (H_{str} - t_t) * W_c$$

$$W_2 = 42,364 \text{ lbs}$$

[3] Weight of Bottom Slab:

$$A_B * t_b * W_c$$

$$W_3 = 6,180 \text{ lbs}$$

[4] Weight of Soil:

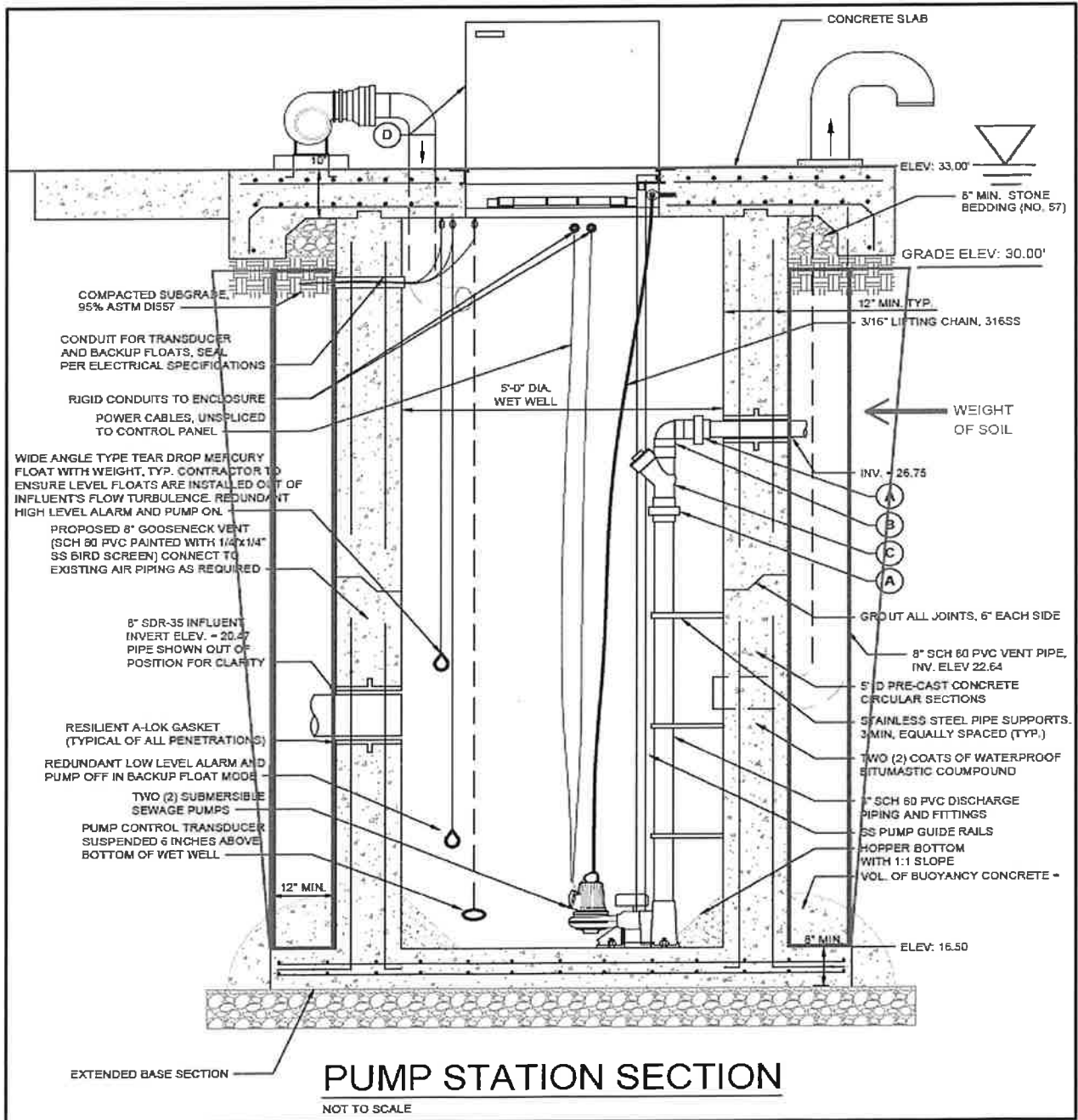
$$W_{ss} * \{ [(1/3 * H_{gr} * \{ (\pi/4 (D_B + 2w_{sw})^2) + (\pi/4 * D_B^2) + \text{sqrt}(\{ (\pi/4 (D_B + 2w_{sw})^2) * (\pi/4 D_B^2) \})] - [\pi/4 D_o^2 * H_{gr}] \}$$

$W_4 = 63,890 \text{ lbs}$

$F_R = 124,905 \text{ lbs}$ [Resisting Force]

$F_R/F_B = 3.1$ **OK!** [Factor of Safety must be greater than 1.0 to avoid floating]

NOTE: Volume of Air + Volume of Concrete have been used to calculate the Bouyant Force. Normal Weight of Concrete has been used to calculate the Resisting Force. Weight of Submerged Soil Wedge has also been considered to resist the Bouyancy.



ENGINEERING DEPARTMENT

JOHN J. ASHMAN
DIRECTOR OF UTILITY PLANNING & DESIGN REVIEW

(302) 855-7370 T
(302) 854-5391 F
jashman@sussexcountyde.gov



Sussex County

DELAWARE
sussexcountyde.gov

MIKE HARMER, P.E.
SUSSEX COUNTY ENGINEER

April 9, 2024

Department of Natural Resources & Environmental Control
Division of Water
89 Kings Highway
Dover DE 19901

REF: COUNTRYSIDE HAMLET
PROJECT ZONING & CAPACITY
FILE: OM 8.05.39

To Whom it may concern:

This letter is being provided in response to the requests on the Permit Application for the Construction of Wastewater Collection and Conveyance System for the Countryside Hamlet project. The project is an expansion of the Sussex County Unified Sanitary Sewer District, Dagsboro/Frankford Area. The request is for verification that the project has the proper zoning approval and that there is sufficient capacity at the treatment facility for the expansion. The Sussex County Utility Planning Department would like to provide this letter stating zoning conformity for the above-mentioned project. Wastewater from the project will be conveyed to the County-owned Piney Neck Regional Wastewater Facility, permit 359224-03, and capacity is available.

Sincerely,

SUSSEX COUNTY ENGINEERING DEPARTMENT

John J. Ashman
Director of Utility Planning & Design Review

Cc: Mike Harmer, P.E.



RECEIPT

April 18, 2024

40

RCVD FROM Davis, Bowen & Friedel, Inc. \$825.00
FOR Eight Hundred twenty-five dollars and 00/100 *DOLLARS*
Plan review fee WPCC 3028/24 Countryside Hamlet Sanitary S

ACCT	\$	825.00
PAYMENT	\$	825.00
	\$	-

<input checked="" type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

CHECK # 5364
CASH
OTHER BY Kevin Bronson

DNREC, Surface Water Discharges Section, 89 Kings Hwy, Dover, DE 19901

RECEIPT

April 18, 2024

41

RCVD FROM Davis, Bowen & Friedel, Inc. \$300.00
FOR Three Hundred Dollars and 00/100 *DOLLARS*
WPCC Legal Notice Reimbursement 3028/24

ACCT	\$	300.00
PAYMENT	\$	300.00
	\$	-

<input checked="" type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

CHECK # 5365
CASH
OTHER BY Kevin Bronson

DNREC, Surface Water Discharges Section, 89 Kings Hwy, Dover, DE 19901