INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno Pigott
Commissioner

August 18, 2020

VIA CERTIFIED MAIL

7019 0700 0000 3589 7217

Mr. Jonathan Valenta, CPM, CFM, CISEC
Assistant Director of Water Quality
Department of Public Works
City of Fishers
10210 Eller Road
Fishers, Indiana 46038

Dear Mr. Valenta:

Re: 327 IAC 3 Construction
Permit Application
Sanitary Sewer
Improvements to Hague Road
and Allisonville Road Lift Stations
Permit Approval No. 23615
Fishers, Indiana
Hamilton County

The application, plans and specifications, and supporting documents for the above-referenced project have been reviewed and processed in accordance with rules adopted under 327 IAC 3. Enclosed is the Construction Permit (Approval No. 23615), which applies to the construction of the above-referenced proposed sanitary sewer system improvements project to be located in the City of Fishers. Construction will occur at the existing Hague Road Lift Station located at the southwest corner of the intersection Hague Road and 106th Street and the Allisonville Road Lift Station located at the northwest corner of the intersection of 106th Street and Allisonville Road.

Please review the enclosed permit carefully and become familiar with its terms and conditions. In addition, it is imperative that the applicant, consulting architect/engineer (A/E), inspector, and contractor are aware of these terms, conditions, and reporting and testing requirements.

It should be noted that any person affected or aggrieved by the agency's decision in authorizing the construction of the above-referenced facility may, within fifteen (15) days from date of mailing, appeal this permit by filing a request with the Office of Environmental Adjudication for an adjudicatory hearing in accordance with IC 4-21.5-3-7 and IC 13-15-6. The procedure for appeal is outlined in more detail in Part III of the attached construction permit.

Plans and specifications were prepared by Clark Dietz, Inc., certified by Mr. John D. Dufek, P.E., and submitted for review on July 6, 2020, with additional information submitted on July 31, August 4, and August 6, 2020.

Any questions concerning this permit may be addressed to Mr. Mike Miles, P.E., of our staff, at 317/232-6548.

Sincerely,

Dale T. Schnaith

Dale T. Schnaith, Chief
Facility Construction and
Engineering Support Section
Office of Water Quality

Project No. M-24335
Enclosures
cc: Hamilton County Health Department
Clark Dietz, Inc.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
AUTHORIZATION FOR CONSTRUCTION OF SANITARY SEWER SYSTEM UNDER 327 IAC 3

DECISION OF APPROVAL

City of Fishers, in accordance with the provisions of IC 13-15 and 327 IAC 3 is hereby issued a permit to construct the sanitary sewer system improvements project to be located in the City of Fishers. Construction will occur at the existing Hague Road Lift Station located at the southwest corner of the intersection Hague Road and 106th Street and the Allisonville Road Lift Station located at the northwest corner of the intersection of 106th Street and Allisonville Road. The permittee is required to comply with requirements set forth in Parts I, II and III hereof. The permit is effective pursuant to IC 4-21.5-3-4(d). If a petition for review and a petition for stay of effectiveness are filed pursuant to IC 13-15-6, an Environmental Law Judge may be appointed for an adjudicatory hearing. The force and effect of any contested permit provision may be stayed at that time.

NOTICE OF EXPIRATION DATE

Authorization to initiate construction of this sanitary sewer system improvements project shall expire at midnight one year from the date of issuance of this construction permit. In order to receive authorization to initiate construction beyond this date, the permittee shall submit such information and forms as required by the Indiana Department of Environmental Management. It is requested that this information be submitted sixty (60) days prior to the expiration date to initiate construction. This permit shall be valid for a period of five (5) years from the date below for full construction completion.

Signed this 18th day of August, 2020, for the Indiana Department of Environmental Management.

Dale T. Schnaith, Chief
Facility Construction and
Engineering Support Section
Office of Water Quality

SANITARY SEWER SYSTEM DESCRIPTION

The proposed project shall consist of the construction of improvements to the existing Hague Road and Allisonville Road Sanitary Sewer Lift Stations at the referenced project locations. Bypass pumping during construction will be provided. The peak design flow at the Hague Road Lift Station is 4,180,000 GPD. The peak design flow at the Allisonville Road Lift Station is 1,550,000 GPD.

The improvements at the Hague Road Lift Station shall consist of:

- The installation of three (3) new variable speed submersible pumps. Each pump will have a maximum capacity of 3,100 GPM at 50 feet of total dynamic head (TDH). The maximum capacity of two (2) pumps operating together is 4,160 GPM at 69 feet of TDH.
- The installation of variable frequency pump drives, new electrical control equipment and new piping, etc.
- Combining the two (2) existing wet wells into a single wet well with an overflow chamber.

The improvements at the Allisonville Road Lift Station shall consist of:

- The installation of three (3) new variable speed submersible pumps. Each pump will have a maximum capacity of 4,650 GPM at 97 feet of TDH. The maximum capacity of two (2) pumps operating together is 5,600 GPM at 128 feet of TDH.
- The installation of variable frequency pump drives, new electrical control equipment and new piping, etc.
- Combining the two (2) existing wet wells into a single wet well with an overflow chamber.

Inspection during construction of the lift station improvements will be provided by Clark Dietz, Inc. Maintenance after completion of construction will be provided by the City of Fishers. Wastewater treatment will be provided by the City of Fishers Wastewater Treatment Plant.

CONDITIONS AND LIMITATIONS TO THE AUTHORIZATION FOR CONSTRUCTION OF SANITARY SEWERS

During the period beginning on the effective date of this permit and extending until the expiration date, the permittee is authorized to construct the above described sanitary sewer system improvements project. Such construction shall conform to all provisions of State Rule 327 IAC 3 and the following specific provisions:

PART I

SPECIFIC CONDITIONS AND LIMITATIONS TO THE CONSTRUCTION PERMIT

Unless specific authorization is otherwise provided under the permit, the permittee shall comply with the following conditions:

1. All local permits shall be obtained before construction is begun on this project.

2. If pollution or nuisance conditions are created, immediate corrective action will be taken by the permittee.

3. The separation of sanitary sewers from water mains and drinking water wells must comply with 327 IAC 3-6-9.

4. An audio-visual alarm shall be installed at the rehabilitated lift stations.

Failure to submit test results within the allotted time period or failure to meet guidelines as set forth in the above conditions could be subject to enforcement proceedings as provided by 327 IAC 3-5-3.

PART II

GENERAL CONDITIONS

1. No significant or material changes in the scope of the plans or construction of this project shall be made unless the following provisions are met:

    a. Request for permit modification is made 60 days in advance of the proposed significant or material changes in the scope of the plans or construction;

    b. Submit a detailed statement of such proposed changes;

    c. Submit revised plans and specifications including a revised design summary; and

    d. Obtain a revised construction permit from this agency.

2. This permit may be modified, suspended, or revoked for cause including, but not limited to the following:

    a. Violation of any term or conditions of this permit:

    b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.

3. Nothing herein shall be construed as guaranteeing that the proposed sanitary sewer system shall meet standards, limitations or requirements of this or any other agency of state or federal government, as this agency has no direct control over the actual construction and/or operation of the proposed project.

PART III

NOTICE OF RIGHT TO ADMINISTRATIVE REVIEW

Anyone wishing to challenge this construction permit must do so by filing a Petition for Administrative Review with the Office of Environmental Adjudication (OEA), and serving a copy of the petition upon IDEM. The requirements for filing a Petition for Administrative Review are found in IC 4-21.5-3-7, IC 13-15-6-1 and 315 IAC 1-3-2. A summary of the requirements of these laws is provided below.

A Petition for Administrative Review must be filed with the Office of Environmental Adjudication (OEA) within fifteen (15) days of the issuance of this notice (eighteen (18) days if notice was received by U.S. Mail), and a copy must be served upon IDEM. Addresses are:

Director
Office of Environmental Adjudication
Indiana Government Center North
Room 103
100 North Senate Avenue
Indianapolis, Indiana 46204

Commissioner
Indiana Department of Environmental Management
Indiana Government Center North
Room 1301
100 North Senate Avenue
Indianapolis, Indiana 46204

The petition must contain the following information:

1. The name, address and telephone number of each petitioner.
2. A description of each petitioner's interest in the permit.
3. A statement of facts demonstrating that each petitioner is:
   a. a person to whom the order is directed;
   b. aggrieved or adversely affected by the permit; or
   c. entitled to administrative review under any law.
4. The reasons for the request for administrative review.
5. The particular legal issues proposed for review.
6. The alleged environmental concerns or technical deficiencies of the permit.
7. The permit terms and conditions that the petitioner believes would be appropriate and would comply with the law.
8. The identity of any persons represented by the petitioner.
9. The identity of the person against whom administrative review is sought.
10. A copy of the permit that is the basis of the petition.
11. A statement identifying petitioner's attorney or other representative, if any.

Failure to meet the requirements of the law with respect to a Petition for Administrative Review may result in a waiver of the Petitioner's right to seek administrative review of the permit. Examples are:

1. Failure to file a Petition by the applicable deadline;
2. Failure to serve a copy of the Petition upon IDEM when it is filed; or
3. Failure to include the information required by law.

If Petitioner seeks to have a permit stayed during the administrative review, he or she may need to file a Petition for a Stay of Effectiveness. The specific requirements for such a Petition can be found in 315 IAC 1-3-2 and 315 IAC 1-3-2.1.

Pursuant to IC 4-21.5-3-17, OEA will provide all parties with notice of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action. Those who are entitled to notice under IC 4-21.5-3-5(b) and would like to obtain notices of any pre-hearing conferences, preliminary hearings, hearings, stays, or orders disposing of the review of this action without intervening in the proceeding must submit a written request to OEA at the address above.

More information on the review process is available at the website for the Office of Environmental Adjudication at http://www.in.gov/oea.

PROJECT NO.
M-24335

INTRA-OFFICE MEMO

FROM: 327 IAC Construction Permit Coordinator
Engineering Plan Review Section
Office of Water Quality

TO: MM

SUBJECT: Project: Improvements to Hague Rd & Allisonville Rd Lift Stations
Location: Fishers, Hamilton County
Units: Lift Station and Sanitary Sewers
Design Flow: 0 GDP (Avg), 0 GPD (Peak)
Received On: 07/6/2020
Connection To: See plans
Wastewater Treatment By: Fishers WWTP, IN0055484, 8.0 MGD
Maintenance Provided By: City of Fishers

Capacity Certification/Allocation----	☑	New one needed if more than one year old
Sanitary Sewer Design Summary--	☑	Should match the capacity letter
Signed Application ----------	☑	Signed by applicant for SRF projects (Applicant's Engineer can sign in most cases)
Plans and Specifications ----------	☑	Each page must be signed or sealed by an Indiana P.E. or L.S. (if no lift station work is being done) Plan view, Profile view, Details, Specifications (ASTM, SDR, Bedding, Separation, etc.)
Potentially Affected Person List ----	☑	Names and addresses on signed and dated form, mailing list and mailing labels (with 65-42FC code)
Certification Letter of P.E. or L.S.---	☑	The supervising P.E. or L.S.

M-24335

APPLICATION FOR SANITARY SEWER CONSTRUCTION PERMIT PER 327 IAC 3

State Form 53159 (R7 / 2-20)

Indiana Department of Environmental Management
Office of Water Quality
Facility Construction and Engineering Support Section, Mail Code 65-42FC
100 North Senate Avenue, Room N1255
Indianapolis, IN 46204-2251

APPLICANT	APPLICANT'S ENGINEER OR LAND SURVEYOR
Name ☒ Mr. or ☐ Ms. Jonathan Valenta, CPM, CFM, CISEC	Name ☒ Mr. or ☐ Ms. John D. Dufek, P.E.
Name of Organization City of Fishers, Indiana	Name of Company Clark Dietz, Inc.
Address *(number and street, city, state, and ZIP)* 10210 Eller Road Fishers, IN 46038	Address *(number and street, city, state, and ZIP)* 8900 Keystone Crossing, Suite 475 Indianapolis, IN 46240
Telephone Number (317) 595-3139	Telephone Number (317) 808-3141
E-Mail Address valentaj@fishers.in.us	E-Mail Address john.dufek@clarkdietz.com

NAME AND LOCATION OF PROPOSED FACILITY	PROJECT DESCRIPTION
Name Improvements to Hague Road and Allisonville Road Lift Stations	Describe the scope and/or purpose of this project The project will improve reliability at the two existing lift stations by replacing most of the equipment, including pumps, VFDs, controls and backup generators. It will also simplify operations by standardizing and converting the lift stations into triplex stations with one wet well. The current configuration includes two wet wells and either 4 or 5 pumps. The second wet well at each lift station will be converted into additional temporary volume above the normal high water operating levels. This will only be needed if there is a prolonged loss of utility and backup power or major mechanical failures.
Location or Project Boundaries At two separate locations along 106th Street: 1) The SW corner of the intersection with Hague Road and 2) The NW corner of the intersection with Allisonville Road	
City or Town City of Fishers	
County Hamilton	

SOURCE OF FUNDING

☐ IFA's Wastewater State Revolving Fund Loan Program	☒ Local Funds
☐ OCRA's Community Development Block Grant	☐ Private Funds
☐ USDA's Rural Development Loan and Grant Assistance	☐ Other:

CERTIFICATION AND SIGNATURE

I swear or affirm, under penalty of perjury as specified by IC 35-44.1-2-1 and other penalties specified by IC 13-30-10 and IC 13-15-7-1(3), that the statements and representations in this application are true, accurate, and complete.

Printed Name of Person Signing
Jonathan Valenta

Title
Assistant Director of Water Quality, Department of Public Works

Signature of Applicant	Date Signed (*month / day / year*)
	6 / 22 / 2020

(Please refer to IC 13-30-10 for penalties of submission of false information.)

Rec'd 7-6-2020

COLLECTION SYSTEM DESIGN SUMMARY

Design Flow – Refer to 327 IAC 3-6-11 for Design Flow Rate Requirements

Description of Units Served	Design Flow Per Unit	Number of Units	Unit Design Flow
Example: Single family homes	*310 gpd/unit*	*30*	*9,300 gpd*
SEE SEPARATE ATTACHMENT	(gpd/unit)		gpd
	(gpd/unit)		gpd
	(gpd/unit)		gpd
	(gpd/unit)		gpd
	(gpd/unit)		gpd
		Average Design Flow	**gpd**
Peaking factor		**Peak Design flow**	**gpd**

Gravity Sewer Pipe

☐ Applicable ☒ Not Applicable

Length	Diameter	Material	ASTM or AWWA Standard	SDR or DR	Pressure Class (psi)	Installation Method
Example: 1,525 ft	*8-inch*	*PVC*	*ASTM D3034*	*SDR-35*	*N/A*	*Open Cut*
ft	in					
ft	in					
ft	in					
ft	in					
ft	in					

Force Main Pipe and Low Pressure Sewer

☐ Applicable ☒ Not Applicable

Length	Diameter	Material	ASTM or AWWA Standard	SDR or DR	Pressure Class (psi)	Installation Method
Example: 1,525 ft	*8-inch*	*PVC*	*ASTM D2241*	*SDR-21*	*200 psi*	*Open Cut*
ft	in					
ft	in					
ft	in					
ft	in					
ft	in					

Connection Location(s)

Example: The proposed sanitary sewer shall connect to an existing 8-inch sewer located approximately 10 ft north and 10 ft west of the intersection of Main Street and Park Avenue and to an existing lift station located approximately 20 ft southeast of the intersection of Oak Lane and Maple Drive.

The proposed shall connect to located

Inspection / Maintenance

Inspection during construction will be provided by	Clark Dietz, Inc.
Maintenance after completion will be provided by	City of Fishers

Wastewater Treatment

Wastewater treatment will be provided by	City of Fishers

IN0055484 8.00 mgd

Lift Station

☒ Applicable ☐ Not Applicable

1.	Location: HAGUE ROAD LS -- SW corner of 106th Street and Hague Road, Fishers, IN ALLISONVILLE ROAD LS -- NW corner of 106th Street and Allisonville Road, Fishers, IN
2.	Type of pump (example: submersible, dry pit): Submersible
3.	Number of pumps: 3 (identical models at each lift station)
4.	Constant or variable speed: Variable
5.	Design pump rate (gpm) and TDH (ft): [At Full Speed] HAGUE ROAD LS -- 3,100 gpm at 50' TDH (single operation for ADF) and 2,080 gpm at 69' TDH (duplex operation for peak flow, 4,160 gpm total at 69' TDH) ALLISONVILLE ROAD LS -- 4,650 gpm at 97' TDH (single operation for ADF) and 2,800 gpm at 128' TDH (duplex operation for peak flow, 5,600 gpm total at 128' TDH)
6.	Operating volume of the wet well (gal): HAGUE ROAD LS -- 4,970 gallons ALLISONVILLE ROAD LS -- 10,620 gallons
7.	Average detention time in the wet well (min): HAGUE ROAD LS -- 7 minutes at full speed, 10 minutes at minimum speed (FUTURE ADF) 10 minutes at full speed, 12 minutes at minimum speed (CURRENT ADF) ALLISONVILLE ROAD LS -- 11 minutes at full speed, 16 minutes at minimum speed (FUTURE ADF) 18 minutes at full speed, 20 minutes at minimum speed (CURRENT ADF)
8.	Type of standby power/pump provisions: Standby deisel generator with automatic transfer switch
9.	Type of alarm: SCADA
10.	Additional information: The first design pump rate is for ADF (only one pump is required). The second design pump rate is for each individual pump with two pumps running together for peak flow.

Low Pressure Sewer Grinder Pump Station	☐ Applicable ☒ Not Applicable
1.	Number of stations: simplex duplex triplex
2.	Number of residential connections per simplex station (two maximum):
3.	Design pump rate (gpm) at maximum TDH (ft):
4.	Type of alarm:
5.	Privately or utility owned and maintained:
6.	Additional information:

Vacuum Pump Station	☐ Applicable ☒ Not Applicable
1.	Location:
2.	Total volume of vacuum tank (gal):
3.	Operating volume of the vacuum tank (gal):
4.	Number and size (HP) of vacuum pumps:
5.	Number and type of sewage pumps:
6.	Constant or variable speed:
7.	Design pump rate (gpm) and TDH (ft):
8.	Type of standby power/pump provisions:
9.	Type of alarm:
10.	Additional information:

Certification Seal, Signature, and Date	
Printed Name of Engineer or Land Surveyor John D. Dufek, P.E.	
Signature	Date Signed (*month / day / year*) 6 / 22 / 2020

JOHN D. DUFEK
REGISTERED
PE19400005
STATE OF
INDIANA
PROFESSIONAL ENGINEER

A factor of four (4) is prescribed by 327 IAC 3-6-11. However, an alternative peaking factor may be justified by other means (327 IAC 3-6-32) or as provided by Ten State Standards 11.243: **Peaking Factor = (18 + √P) / (4 + √P)**, where P = population in thousands.

Provide pump and system curves and design calculations for TDH. If connecting to an existing force main, provide upstream lift station pump curves and describe how the proposed flow will affect the lift station performance during simultaneous operation.

For small diameter low-pressure sanitary sewer systems, provide a spreadsheet that includes the maximum expected simultaneous operation of the proposed grinder pumps, maximum expected flow (gpm) and fluid velocity (ft/sec), static head and accumulated friction loss, and expected accumulated total dynamic head (TDH).

The average detention time in the wet well (cycle time between pump on/off settings) should be between 5 and 30 minutes. The cycle time may be calculated from the following equation: **Cycle Time = (V / (D - Q)) + (V / Q)**, where D = discharge flow rate out of the wet well (design pump rate) in gpm, Q = inflow rate into wet well (average design flow) in gpm, and V = operating volume of wet well (between pump on/off settings) in gallons.

CAPACITY CERTIFICATION

This form must be filled-out in its entirety with no alterations.

Name of Applicant: City of Fishers, Indiana
Name of Applicant Representative: Jonathan Valenta
Name of Project: Improvements to Hague Road and Allisonville Road Lift Stations

CERTIFICATION

I, Jonathan Valenta (*Name of individual*), representing the City of Fishers, Indiana (*Name of* municipality *or utility*), in my capacity as Assistant Director of Water Quality, DPW (Title) have the authority to act on behalf of the City of Fishers, Indiana (*Name of* municipality *or utility*) certify that I have reviewed and understand the requirements of 327 IAC 3 and that the sanitary collection system proposed, with the submission of this application, plans and specifications, meets all requirements of 327 IAC 3. I certify that the daily flow generated in the area that will be collected by the project system will not cause overflowing or bypassing in the collection system other than NPDES authorized discharge points and that there is sufficient capacity in the receiving water pollution treatment/control facility to treat the additional daily flow and remain in compliance with applicable NPDES permit effluent limitations. I certify that the proposed average flow will not result in hydraulic or organic overload. I certify that the proposed collection system does not include new combined sewers or a combined sewer extension to existing combined sewers. I certify that the ability for this collection system to comply with 327 IAC 3 is not contingent on water pollution/control facility construction that has not been completed and put into operation. I certify that the project meets all local rules or laws, regulations and ordinances. The information submitted is true, accurate, and complete, to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Average Design Flow (*gallons per day*)	HAGUE ROAD LS -- 1,510,000 ALLISONVILLE ROAD LS -- 470,000
Peak Design Flow (*gallons per day*)	HAGUE ROAD LS -- 4,180,000 ALLISONVILLE ROAD LS -- 1,550,000
Owner of Receiving Collection System	City of Fishers
Name of Wastewater Treatment Plant	Cheeney Creek WWTP
Mailing Address of Certifying Representative *(number and street, city, state, and ZIP code)* 10210 Eller Road Fishers, IN 46038	E-mail Address of Certifying Representative valentaj@fishers.in.us
I am certifying for the ☒ Collection System	☒ Treatment Facility
Signature	Date Signed (*month / day / year*) 6 / 22 / 2020

(Please refer to IC 13-30-10 for penalties of submission of false information.)

CERTIFICATION OF REGISTERED PROFESSIONAL ENGINEER OR LAND SURVEYOR

This form must be filled-out in its entirety with no alterations.

Name of Applicant: City of Fishers, Indiana
Name of Applicant Representative: Rick Farnham, P.E.
Name of Project: Improvements to Hague Road and Allisonville Road Lift Stations

CERTIFICATION

I, John D. Dufek, P.E. (*Name of Individual*), representing the project applicant, in my capacity as a registered professional Engineer (*Engineer or Land Surveyor*), PE19400095 (*Indiana registration number*)

certify the following under penalty of law: The design of this project has been performed under my direction or supervision to assure conformance with 327 IAC 3 and the plans and specifications require the construction of said project to be performed in conformance with 327 IAC 3-6. The peak daily flow rates, in accordance with 327 IAC 3-6-11 generated from within the specific area that will be collected by the proposed collection system that is the subject of the application, plans, and specifications (when functioning as designed and properly installed), will not cause overflowing or bypassing in the same specific area serviced by the proposed collection system other than from NPDES authorized discharge points. The proposed collection system does not include new combined sewers (serving new areas) or a combined sewer extension to existing combined sewers. The sewer at the point of connection is physically in existence and operational. Based upon information provided by the owner of the Wastewater System, the ability for this collection system to comply with 327 IAC 3 is not contingent on downstream water pollution/control facility construction that has not been completed and put into operation. The design of the proposed project meets applicable local rules or laws, regulations and ordinances. The information submitted is true, accurate, and complete, to the best of my knowledge and belief. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Average Design Flow (*gallons per day*)	HAGUE ROAD LS -- 1,510,000 ALLISONVILLE ROAD LS -- 470,000
Peak Design Flow (*gallons per day*)	HAGUE ROAD LS -- 4,180,000 ALLISONVILLE ROAD LS -- 1,550,000
Owner of Receiving Collection System	City of Fishers
Name of Wastewater Treatment Plant	Cheeney Creek WWTP
Signature	Date Signed (*month / day / year*) 6 / 22 / 2020

(Please refer to IC 13-30-10 for penalties of submission of false information.)

IDENTIFICATION OF POTENTIALLY AFFECTED PERSONS

Please list any and all persons whom you have reason to believe have a substantial or proprietary interest in this matter, or could otherwise be considered to be potentially affected under law. Failure to notify a person who is later determined to be potentially affected could result in voiding IDEM's decision on procedural grounds. To ensure conformance with Administrative Orders and Procedures Act (AOPA) and to avoid reversal of a decision, please list all such parties. The letter on the opposite side of this form will further explain the requirements under the AOPA. Attach additional names and addresses on a separate sheet of paper, as needed.

Name Mayor Scott Fadness	
Address (*number and street*) 1 Municipal Drive	
City Fishers	
State IN	ZIP Code 46038

Name Hamilton County Commissioners	
Address (*number and street*) One Hamilton County Square	
City Noblesville	
State IN	ZIP Code 46060

Name Duke Energy Indiana Inc	
Address (*number and street*) 550 Tyron St. S DEC41B	
City Charlotte	
State NC	ZIP Code 28202

Name Indianapolis Airport Authority	
Address (*number and street*) 7800 Col H Weir Cook Memorial Dr	
City Indianapolis	
State IN	ZIP Code 46241

Name	
Address (*number and street*)	
City	
State	ZIP Code

Name	
Address (*number and street*)	
City	
State	ZIP Code

CERTIFICATION

I certify that to the best of my knowledge I have listed all potentially affected parties, as defined by IC 4-21.5-3-5.

Proposed Facility Name Improvements to Hague Road and Allisonville Road Lift Stations	City Fishers
Printed Name of Person Signing John D. Dufek, P.E.	County Hamilton
Signature	Date Signed (*month / day / year*) 11 / 22 / 2020

IMPROVEMENTS TO HAGUE ROAD AND ALLISONVILLE ROAD LIFT STATIONS COLLECTION SYSTEM DESIGN SUMMARY ATTACHMENT

The following tables summarize the current and anticipated future wastewater flows to each of the existing stations. Table 1 displays the flows for each individual lift station service area, which is the average daily flow and peak hourly rate being generated in the collection system.

Table 1
Hague Road and Allisonville Road Lift Stations
Total Existing and Future Anticipated Flows (Rounded) per Service Area

Flow Parameter	Flow Rate
HAGUE ROAD LIFT STATION SERVICE AREA	
Current Average Daily Flow (Dry Weather)	880,000 gpd [611 gpm, 1.36 cfs]
Additional Development/Redevelopment [Approx. 1,372 EDUs]	425,320 gpd [295 gpm, 0.66 cfs]
Diverted Flow from Redeveloped Downtown [Approx. 660 EDUs]	204,600 gpd [142 gpm, 0.31 cfs]
Estimated Average Daily Flow (ADF) Total from Hague Service Area	*1,510,000 gpd [1,050 gpm, 2.3 cfs]*
Peak Hourly Rate [Peaking Factor of 2.768 (1) x ADF]	*4,180,000 gpd [2,900 gpm, 6.5 cfs]*
ALLISONVILLE ROAD LIFT STATION SERVICE AREA	
Current Average Daily Flow (Dry Weather)	150,000 gpd [104 gpm, 0.23 cfs]
Additional Development/Redevelopment [Approx. 362 EDUs]	112,220 gpd [78 gpm, 0.17 cfs]
Airport Redevelopment [Approx. 670 EDUs]	207,700 gpd [144 gpm, 0.32 cfs]
Estimated Average Daily Flow (ADF) Total from Allisonville Service Area	*470,000 gpd [330 gpm, 0.7 cfs]*
Peak Hourly Rate [Peaking Factor of 3.297 (2) x ADF]	*1,550,000 gpd [1,080 gpm, 2.4 cfs]*

(1) Based on assumed future service area population of 15,355.
(2) Based on assumed future service area population of 4,385.

The force main from the Hague Road Lift Station discharges directly to the Allisonville Road Lift Station, so the average daily flow from Hague Road must be added to flows from the Allisonville Road service area to calculate pumping requirements for Allisonville. Note that Hague Road's full speed pumping rate is not added since the overall rate pumped will equal what is coming into the station. Table 2 shows the future total daily flow that will be experienced by each lift station and the corresponding full flow pump capacity from a single pump.

Table 2
Hague Road and Allisonville Road Lift Stations
Average Pumping Rates

Flow Parameter	*HAGUE ROAD LIFT STATION*	*ALLISONVILLE ROAD LIFT STATION*
Average Daily Flow from within Service Area	1,510,000 gpd [1,050 gpm, 2.3 cfs]	470,000 gpd [330 gpm, 0.7 cfs]
Flow from Hague Added to Allisonville	N/A	1,510,000 gpd [1,050 gpm, 2.3 cfs]
Total Average Daily Flow to Lift Station	*1,510,000 gpd [1,050 gpm, 2.3 cfs]*	*1,980,000 gpd [1,380 gpm, 3.0 cfs]*
Full Speed Pumping Capability for ADF (Single Pump)	*4,464,000 gpd [3,100 gpm, 6.9 cfs]*	*6,696,000 gpd [4,650 gpm, 10.4 cfs]*

As with the average daily dry weather flow, the peak flow from Hague Road must be added to the Allisonville Road Lift Station to determine required pumping capacity. We have also added an additional wet weather component to add to the peak hourly rate. Previous studies utilizing flow meter data from the collection system indicate a typical wet weather peak over dry weather AFD equal to 1.65 for the Hague Road and Allisonville Road service areas. We used a factor of 2.0 (or 100% of ADF) to be conservative.

Table 3
Hague Road and Allisonville Road Lift Stations
Peak Pumping Rates

Flow Parameter	*HAGUE ROAD LIFT STATION*	*ALLISONVILLE ROAD LIFT STATION*
Peak Daily Flow from within Service Area	4,180,000 gpd [2,900 gpm, 6.5 cfs]	1,550,000 gpd [1,080 gpm, 2.4 cfs]
Flow from Hague Added to Allisonville	N/A	4,180,000 gpd [2,900 gpm, 6.5 cfs]
Add Wet Weather Flow (100% of ADF)	1,510,000 gpd [1,050 gpm, 2.3 cfs]	470,000 gpd [330 gpm, 0.7 cfs]
Wet Weather Flow from Hague Added to Allisonville	N/A	1,510,000 gpd [1,050 gpm, 2.3 cfs]
Total Peak Wet Weather Flow to Lift Station	5,690,000 gpd [3,950 gpm, 8.8 cfs]	*7,720,000 gpd [5,360 gpm, 11.9 cfs]*
Full Speed Pumping Capability for Peak Flow (2 Pumps)	***5,990,000 gpd [4,160 gpm, 9.3 cfs]***	***8,064,000 gpd [5,600 gpm, 12.5 cfs]***

ClarkDietz
Engineering Quality of Life™

June 30, 2020

Indiana Department of Environmental Management
Office of Water Quality
Facility Construction and Engineering Support Section, Mail Code 65-42
100 North Senate Avenue, Room N1255
Indianapolis, IN 46204-2251
ATTN: Don Worley

Re: City of Fishers, Indiana
Application for Sanitary Sewer Construction Permit
Improvements to Hague Road and Allisonville Road Lift Stations

Dear Mr. Worley:

On behalf of the City of Fishers we are hereby applying for a Sanitary Sewer Construction Permit per 327 IAC 3 for improvements to the existing Hague Road and Allisonville Road wastewater lift stations, two of the City's four major pump stations. This submittal includes:

- Application Form 53159 (R7 2/20)
  - Signed Application
  - Signed and Sealed Collection System Design Summary
  - Signed Capacity Certification
  - Signed Certification of Registered Professional Engineer
  - Signed Identification of Potentially Affected Persons List
  - Mailing Labels of Potentially Affected Persons
- Signed and Sealed Construction Plans
- Signed and Sealed Technical Construction Specifications

This project is for replacement of existing equipment and modifications to the structure to improve reliability, reduce maintenance, and to simplify operations. Nearly all the major mechanical, electrical and controls equipment is being replaced due to reaching the end of its useful life or to remedy chronic maintenance or operational issues. Further, since December 2018, flows that had been sent to Hague Road lift station (which pumps directly to the Allisonville Road lift station) were redirected to the Cheeney Creek Wastewater Treatment Plant. This has reduced flow to these two lift stations to approximately 30% of what it was. Upcoming development and redirection of other existing flows to these stations is projected to restore approximately half of the redirected flow. The proposed improvements are designed to handle the new lower flow rates as well as projected future peak flows.

The Hague Road lift station currently has two adjacent wet wells connected by a 3' diameter circular opening in the wall several feet above the floor and the influent interceptor. The opening was intended to allow the two wet wells to equalize and act as one, with each well having two submersible pumps, but the configuration poses significant maintenance and operational issues, including settling solids in the wet wells and influent sewer. Allisonville Road similarly has two wet wells with three pumps in one and two in the other. The opening connecting the two is at the floor so there are not the same settling issues, but operation is complicated. Pumps are of various manufacture, size and capacity which can make it difficult to compensate for pumps taken out of service.

This project will simplify both stations by utilizing only the wet well where the influent sewers are located, turning them both into triplex stations with each station having three of the same models of pump and VFD. New controls at each will be like two other larger stations in the system for familiarity. The other wet wells in each of the stations will

be abandoned and partially filled with sloped concrete to serve as additional wet well volume above the normal operating levels in case of a loss of both utility and backup power and/or major equipment failure.

The following tables summarize the current and anticipated future wastewater flows to each of the existing stations. Table 1 displays the flows for each individual lift station service area, which is the average daily flow and peak hourly rate being generated in the collection system.

Table 1
Hague Road and Allisonville Road Lift Stations
Total Existing and Future Anticipated Flows (Rounded) per Service Area

Flow Parameter	Flow Rate
HAGUE ROAD LIFT STATION SERVICE AREA	
Current Average Daily Flow (Dry Weather)	880,000 gpd [611 gpm, 1.36 cfs]
Additional Development/Redevelopment [Approx. 1,372 EDUs]	425,320 gpd [295 gpm, 0.66 cfs]
Diverted Flow from Redeveloped Downtown [Approx. 660 EDUs]	204,600 gpd [142 gpm, 0.31 cfs]
Estimated Average Daily Flow (ADF) Total from Hague Service Area	***1,510,000 gpd [1,050 gpm, 2.3 cfs]***
Peak Hourly Rate [Peaking Factor of 2.768 (1) x ADF]	***4,180,000 gpd [2,900 gpm, 6.5 cfs]***
ALLISONVILLE ROAD LIFT STATION SERVICE AREA	
Current Average Daily Flow (Dry Weather)	150,000 gpd [104 gpm, 0.23 cfs]
Additional Development/Redevelopment [Approx. 362 EDUs]	112,220 gpd [78 gpm, 0.17 cfs]
Airport Redevelopment [Approx. 670 EDUs]	207,700 gpd [144 gpm, 0.32 cfs]
Estimated Average Daily Flow (ADF) Total from Allisonville Service Area	***470,000 gpd [330 gpm, 0.7 cfs]***
Peak Hourly Rate [Peaking Factor of 3.297 (2) x ADF]	***1,550,000 gpd [1,080 gpm, 2.4 cfs]***

(1) Based on assumed future service area population of 15,355.
(2) Based on assumed future service area population of 4,385.

The force main from the Hague Road Lift Station discharges directly to the Allisonville Road Lift Station, so the average daily flow from Hague Road must be added to flows from the Allisonville Road service area to calculate pumping requirements for Allisonville. Note that Hague Road's full speed pumping rate is not added since the overall rate pumped will equal what is coming into the station. Table 2 shows the future total daily flow that will be experienced by each lift station and the corresponding full flow pump capacity from a single pump.

Table 2
Hague Road and Allisonville Road Lift Stations
Average Pumping Rates

Flow Parameter	*HAGUE ROAD LIFT STATION*	*ALLISONVILLE ROAD LIFT STATION*
Average Daily Flow from within Service Area	1,510,000 gpd [1,050 gpm, 2.3 cfs]	470,000 gpd [330 gpm, 0.7 cfs]
Flow from Hague Added to Allisonville	N/A	1,510,000 gpd [1,050 gpm, 2.3 cfs]
Total Average Daily Flow to Lift Station	*1,510,000 gpd [1,050 gpm, 2.3 cfs]*	*1,980,000 gpd [1,380 gpm, 3.0 cfs]*
Full Speed Pumping Capability for ADF (Single Pump)	***4,464,000 gpd [3,100 gpm, 6.9 cfs]***	***6,696,000 gpd [4,650 gpm, 10.4 cfs]***

As with the average daily dry weather flow, the peak flow from Hague Road must be added to the Allisonville Road Lift Station to determine required pumping capacity. We have also added an additional wet weather component to add to the peak hourly rate. Previous studies utilizing flow meter data from the collection system indicate a typical wet weather peak over dry weather AFD equal to 1.65 for the Hague Road and Allisonville Road service areas. We used a factor of 2.0 (or 100% of ADF) to be conservative.

Table 3
Hague Road and Allisonville Road Lift Stations
Peak Pumping Rates

Flow Parameter	*HAGUE ROAD LIFT STATION*	*ALLISONVILLE ROAD LIFT STATION*
Peak Daily Flow from within Service Area	4,180,000 gpd [2,900 gpm, 6.5 cfs]	1,550,000 gpd + [1,080 gpm, 2.4 cfs]
Flow from Hague Added to Allisonville	N/A	4,180,000 gpd + [2,900 gpm, 6.5 cfs]
Add Wet Weather Flow (100% of ADF) from Table 1	1,510,000 gpd [1,050 gpm, 2.3 cfs]	470,000 gpd + [330 gpm, 0.7 cfs]
Wet Weather Flow from Hague Added to Allisonville	N/A	1,510,000 gpd + [1,050 gpm, 2.3 cfs]
Total Peak Wet Weather Flow to Lift Station	5,690,000 gpd [3,950 gpm, 8.8 cfs]	*7,720,000 gpd* = 's *[5,360 gpm, 11.9 cfs]*
Full Speed Pumping Capability for Peak Flow (2 Pumps)	***5,990,000 gpd [4,160 gpm, 9.3 cfs]***	***8,064,000 gpd [5,600 gpm, 12.5 cfs]***

Flows shown in the above tables are included in the system & pump curve graphs provided with this permit application. System curves for the existing ductile iron force mains, installed in 1993, were derived from pressure and flow tests conducted by Clark Dietz during the preliminary design for this project. The best match to the pressure and flow tests is by assuming a relatively rough force main interior (C=95 for Hague and C=100 for Allisonville). This correlates well with the observed operating points of the currently installed pumps and is reasonable for older pipe. For these reasons we have not designed around a typical "C" factor of 120 as we would for a new force main. Note that the curves for C=120 are shown on the graphs and that the selected pumps will operate efficiently at those points as well.

Please contact me at (317) 808-3141 or at john.dufek@clarkdietz.com if you have any questions or requests for additional backup information.

Sincerely,
Clark Dietz, Inc.

John D. Dufek, P.E.
Project Engineer
E-mail: john.dufek@clarkdietz.com
cc: Jonathan Valenta, Assistant Director of Water Quality, Department of Public Works

ClarkDietz

Engineering Quality of Life™

August 4, 2020

Indiana Department of Environmental Management
Office of Water Quality
Facility Construction and Engineering Section, Mail Code 65-42
100 North Senate Avenue, Room N1255
Indianapolis, IN 46204-2251
ATTN: Mike Miles, P.E.

Re: City of Fishers, Indiana
Application for Sanitary Sewer Construction Permit
Improvements to Hague Road and Allisonville Road Lift Stations
RESPONSE TO DEFICIENCY NOTICE FOR CONSTRUCTION PERMIT APPLICATION, PROJECT NO. M-24335

RECEIVED AUG 06 2020 IDEM/OWQ

Dear Mr. Miles:

On behalf of the City of Fishers we are hereby responding to Construction Permit Application Technical Review comments received via email on July 21, 2020 for Project No. M-24335 (see attached copy of the review comments). This response submittal includes:

- Full-sized signed and sealed Construction Plans
- Modified page 6 of Specification 43 21 13, Submersible Pumping Equipment
- Email correspondence dated July 21st, July 31st, and August 3rd regarding review comments

Following are the Technical Review comments with responses:

1. RESPONSE: Full-sized (22"x34") are included with this submittal.

2. RESPONSE: Specification 43 21 13, Paragraph 2.1.H.9 has been modified to require explosion proof motors (as was intended) and is included with this submittal for reference.

3. RESPONSE: As noted in the attached email correspondence, there are currently several 4" openings in the top slab at each lift station where the pump cables pass through from outside of the control building and into the wet well. The cables are hidden behind a large SS cabinet that is vented to allow dissipation of gasses between the wet well openings and the sealed junction box mounted on the outside of the control building wall. At completion there will be at least six of these holes per lift station. Each of the existing wet wells will also end up with one motorized odor canister that pulls air in through the slab top openings and from the wet well, then through the canister before discharging into the open air. The stations have never had a "typical" vent and the City is not aware of any operational or maintenance issues as a result. We believe there is sufficient venting (existing and planned) for handling displaced air during wet well filling as required in 327 IAC 3-6-27 (c), plus also to allow air in during pumping.

4. RESPONSE: As noted in the attached email correspondence, each of the 4 valve vaults currently have a drain located at a low point in the floor of the valve vault that drains into the wet well. There is a shut off valve for each that is accessible using a valve wrench from the surface of the wet well outside the control building. This project is replacing one of the older drains at Hague Road to match the other PVC drains. We are also adding grout on the floor to better direct water to the drain lines. Per your response in the August 31st email these drain lines are sufficient to comply with 327 IAC 3-6-29 (5).

Please contact me at (317) 808-3141 or at john.dufek@clarkdietz.com if you have any questions or requests for additional backup information.

Sincerely,

Clark Dietz, Inc.

John D. Dufek, P.E.
Project Engineer
E-mail: john.dufek@clarkdietz.com
cc: Jonathan Valenta, Asst. Director of Water Quality, City of Fishers DPW

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
We Protect Hoosiers and Our Environment.
100 N. Senate Avenue • Indianapolis, IN 46204
(800) 451-6027 • (317) 232-8603 • www.idem.IN.gov

Eric J. Holcomb
Governor

Bruno Pigott
Commissioner

July 21, 2020

VIA ELECTRONIC MAIL

Mr. Jonathan Valenta, CPM, CFM, CISEC
Assistant Director of Water Quality,
Department of Public Works
City of Fishers
10210 Eller Road
Fishers, Indiana 46038

Dear Mr. Valenta:

Re: Deficiency Notice for
Construction Permit Application
Sanitary Sewer
Improvements to Hague Road &
Allisonville Road Lift Stations
Fishers, Indiana
Hamilton County
Project No. M-24335

This will acknowledge the receipt of plans and specifications on July 6, 2020 in connection with your application for a Construction Permit pursuant to 327 IAC 3 for the above-referenced project.

Your application has been found to be deficient. The following administrative and technical items are required to complete your application for a Construction Permit. Please be advised that if all deficiency items are not corrected or resolved within sixty (60) days of the date of this letter, your application can be denied on the basis of incompleteness. The responses to the deficiency items should be mailed to the following address:

Indiana Department of Environmental Management
Office of Water Quality
Facility Construction and Engineering Support Section
100 North Senate Avenue, Room N1255
Indianapolis, Indiana 46204-2251

I. ADMINISTRATIVE EVALUATION

Upon review of your application, no administrative deficiencies were noted.

If you have any questions concerning the administrative accuracy of this application, please contact Missy Nunnery at 317/232-5579 or by email at mnunnery@idem.in.gov.

II. TECHNICAL REVIEW

This Office offers the following technical comments:

1. The submitted plan sheets are 11x17-inches. Please submit larger plan sheets.

2. Page No. "43 21 13-6" in the submersible pumping equipment section in the project specifications book contains a sentence No. H 9 that states " Motors shall be standard, non-explosion proof." Lift station wet wells can contain explosive and flammable gases. Please adjust the pump off elevation setting to submerge the pump motors or specify explosion proof pump motors in order to comply with 327 IAC 3-6-24.

3. 327 IAC 3-6-27 (c) states "A wet well that is covered shall be vented to allow for the displacement of air due to filling of the wet well." The plan sheets do not show a wet well vent in the rehabilitated lift stations. Please install wet well vents in the rehabilitated lift stations.

4. The plan sheets do not show valve vault drainage lines as required by 327 IAC 3-6-29 (5). Please install valve vault drainage lines in the lift stations.

If you have any questions regarding the technical matters of your application, please contact me at 317/317/232-6548 or by email at mmiles@idem.in.gov.

Sincerely,

Mike Miles

Mike Miles, P.E.
Project Engineer
Facility Construction and
Engineering Support Section
Office of Water Quality

cc: Mr. John D. Dufek, P.E., Clark Dietz Inc.

5. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two parallel guide bars extending from the top of the station to the wet well mounted discharge connection. There shall be no need for personnel to enter the wet well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. The entire weight of the pump/motor unit shall be borne by the pump base. No portion of the pump/motor unit shall bear on the sump floor directly or on a sump floor mounted stand.

H. MOTOR

1. The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber, NEMA B type inverter duty rated according to NEMA MG-1 Part 31. The motor and pump shall be designed and assembled by the same manufacturer.
2. Stator winding systems shall be designed to operate at a peak voltage less than 1600 volts with a rise time greater than 0.1 micro-seconds at the motor terminals. The stator windings and stator leads shall be insulated with moisture resistant Class H insulation rated for 356°F. The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable.
3. Motor cooling shall be sufficient for continuous operation under full nameplate load in a dry environment. The motor shall be inverter duty rated. The motor shall be designed for continuous duty handling pumped media of 104°F and capable of up to 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum.
4. Thermal switches shall be embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel.
5. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer o-ring seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. Wire nuts or crimping type connection devices shall not be used.
6. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation of up to 104°F ambient and with a temperature rise not to exceed 176°F. A performance chart shall be provided showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
7. The power cable shall be sized according to the NEC and ICEA standards (and also meet P-MSHA approval) and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chloroprene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.
8. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.
9. Motors shall be explosion~~standard, non-explosion~~ proof rated for use in Class 1, Division 1, Group D locations per the National Electric Code.

I. BEARINGS

1. The pump shaft shall rotate on at least three grease-lubricated bearings. The upper bearing, provided for radial forces, shall be a single roller bearing. The lower bearings shall consist of at least one roller bearing for radial forces and one or two angular contact ball bearings for axial thrust.
2. The minimum L10 bearing life shall be 100,000 hours at any point along the usable portion of the pump curve at maximum product speed.

From:	MILES, MIKE
To:	John D. Dufek
Cc:	Nunnery, Malishia (Missy)
Subject:	RE: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335
Date:	Monday, August 3, 2020 11:23:35 AM
Attachments:	image002.png image003.png image004.png image005.png image006.png image007.png

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John,

If the existing wet well ventilation system at the Hague Road and the Allisonville Road Lift Stations is functioning properly and not causing any problems, I see no reason to change anything.

The existing valve vault drain lines at the Allisonville Road Lift Station are acceptable. The existing and new valve vault drain lines at the Hague Road Lift Station are also acceptable to me.

COVID-19 Resources:

- **Indiana State Dept. of Health (ISDH) COVID-19 Call Center:** Call 877-826-0011 (available 8:00 am-5:00 pm daily).
- **Anthem NurseLine:** Call 800-337-4770 or visit the Anthem NurseLine online for a FREE symptom screening. Available to anyone with an Anthem health plan (this includes State of IN employees)
- **Anthem Employee Assistance Program (EAP)**: Available to full-time state employees and their household members regardless of health plan participation. Call 800-223-7723 or visit anthemeap.com (enter State of Indiana) for crisis counseling, help finding child/elder care, legal/financial consultation and much more.

Mike Miles, P.E.
Project Engineer
IDEM OWQ Facility Construction Section
317 /232-6548
mmiles@idem.IN.gov

From: John D. Dufek <John.Dufek@clarkdietz.com>
Sent: Friday, July 31, 2020 10:50 AM
To: MILES, MIKE <MMILES@idem.IN.gov>
Cc: Nunnery, Malishia (Missy) <mnunnery@idem.IN.gov>
Subject: RE: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335

Mike,

Good morning, how are you doing? I've been looking at the attached deficiency letter for the City of Fishers and I'm hoping to clarify a couple of the items before responding.

Technical Review Comment 3: This comment refers to venting the wet wells (please see P-13 and P-23 in the attached plans for reference). There are currently several 4" holes in the top slab where the pump cables pass through from outside of the control building and into the wet well. The cables are hidden behind a large SS cabinet that is vented to allow dissipation of gasses between the wet well openings and the sealed junction box mounted on the outside of the control building wall. At completion there will be at least six of these holes per lift station. Each of the existing wet wells will also end up with one motorized odor canister that pulls air in through the slab top openings and from the wet well, then through the canister before discharging into the open air. With or without the odor canister and even with the pump cables installed we believe there is sufficient venting for handling displaced air during wet well filling as required in 327 IAC 3-6-27 (c), plus also to allow air in during pumping. The stations have never had a "typical" vent and the City is not aware of any operational or maintenance issues as a result. Is this venting sufficient? If not, we will add a 6" vent specifically for venting and accepting air during filling and pumping cycles and submit the revised drawings with our response.

Technical Review Comment 4: This comment relates to drain lines from the valve vaults (please see P-14, P-15 and P-24 in the attached plans for reference). Each of the 4 valve vaults currently have a drain located at a low point in the floor of the valve vault that drains into the wet well. There is a shut off valve for each that is accessible using a valve wrench from the surface of the wet well outside the control building. This project is replacing one of the older drains at Hague Road to match the other PVC drains. We are also adding grout on the floor to better direct water to the drain lines. Are these drain lines sufficient to comply with 327 IAC 3-6-29 (5)? The existing drain lines are not called out in the drawings and are easy to miss, but if there is something more to do please let me know so we can get it into our formal response.

Thanks,
John

John D. Dufek, PE
Clark Dietz, Inc.

317.808.3141

From: MILES, MIKE <MMILES@idem.IN.gov>
Sent: Tuesday, July 21, 2020 2:17 PM
To: valenta@fishers.in.us
Cc: John D. Dufek <John.Dufek@clarkdietz.com>; Nunnery, Malishia (Missy) <mnunnery@idem.IN.gov>
Subject: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335

Dear Mr. Valenta;

This e-mail serves to transmit the attached Deficiency Notice for the above-referenced construction permit application. The attached Deficiency Notice is the official notice, and a paper copy will not be sent via the US mail. Please review the Deficiency Notice and provide an appropriate response within the designated time.

If you have questions, please contact the sender.

COVID-19 Resources:

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Mike Miles, P.E.
Project Engineer
IDEM OWQ Facility Construction Section
317 /232-6548
mmiles@idem.IN.gov

MILES, MIKE

From: John D. Dufek <John.Dufek@clarkdietz.com>
Sent: Tuesday, August 04, 2020 8:05 AM
To: MILES, MIKE; Jonathan Valenta (valentaj@fishers.in.us)
Cc: Nunnery, Malishia (Missy); Hans J. Peterson
Subject: RE: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335
Attachments: PROJ #M-24335 REVIEW RESPONSE LETTER with ATT_Fishers Hague-Allisonvillle LS.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

**** This is an EXTERNAL email. Exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email. ****

Mike – I'm resending this with a corrected email address for Jonathan Valenta at Fishers. His email is valentaj@fishers.in.us (it looks like the "j" was missing in the initial email and I forgot to update it before replying).

John D. Dufek, PE
Clark Dietz, Inc.
317.808.3141

From: John D. Dufek
Sent: Tuesday, August 4, 2020 7:53 AM
To: MILES, MIKE <MMILES@idem.IN.gov>; valenta@fishers.in.us
Cc: Nunnery, Malishia (Missy) <mnunnery@idem.IN.gov>; Hans J. Peterson <Hans.Peterson@clarkdietz.com>
Subject: RE: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335

Mike,

Please find attached our response on behalf of the City of Fishers to the permit application Deficiency Notice for Project No. M-24335. A hard copy of this response along with full-size drawings will be mailed to you this week.

Let me know if you need anything else to issue the permit.

Thanks,
John

John D. Dufek, PE
Clark Dietz, Inc.
317.808.3141

From: MILES, MIKE <MMILES@idem.IN.gov>
Sent: Tuesday, July 21, 2020 2:17 PM
To: valenta@fishers.in.us
Cc: John D. Dufek <John.Dufek@clarkdietz.com>; Nunnery, Malishia (Missy) <mnunnery@idem.IN.gov>
Subject: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335

Dear Mr. Valenta;

This e-mail serves to transmit the attached Deficiency Notice for the above-referenced construction permit application. The attached Deficiency Notice is the official notice, and a paper copy will not be sent via the US mail. Please review the Deficiency Notice and provide an appropriate response within the designated time.

If you have questions, please contact the sender.

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- **Anthem Employee Assistance Program (EAP)**: Available to full-time state employees and their household members regardless of health plan participation. Call 800-223-7723 or visit anthemeap.com (enter State of Indiana) for crisis counseling, help finding child/elder care, legal/financial consultation and much more.

Mike Miles, P.E.
Project Engineer
IDEM OWQ Facility Construction Section
317 /232-6548
mmiles@idem.IN.gov

ClarkDietz

Engineering Quality of Life™

August 4, 2020

Indiana Department of Environmental Management
Office of Water Quality
Facility Construction and Engineering Section, Mail Code 65-42
100 North Senate Avenue, Room N1255
Indianapolis, IN 46204-2251
ATTN: Mike Miles, P.E.

Re: City of Fishers, Indiana
Application for Sanitary Sewer Construction Permit
Improvements to Hague Road and Allisonville Road Lift Stations
RESPONSE TO DEFICIENCY NOTICE FOR CONSTRUCTION PERMIT APPLICATION, PROJECT NO. M-24335

Dear Mr. Miles:

On behalf of the City of Fishers we are hereby responding to Construction Permit Application Technical Review comments received via email on July 21, 2020 for Project No. M-24335 (see attached copy of the review comments). This response submittal includes:

- Full-sized signed and sealed Construction Plans
- Modified page 6 of Specification 43 21 13, Submersible Pumping Equipment
- Email correspondence dated July 21st, July 31st, and August 3rd regarding review comments

Following are the Technical Review comments with responses:

1. RESPONSE: Full-sized (22"x34") are included with this submittal.

2. RESPONSE: Specification 43 21 13, Paragraph 2.1.H.9 has been modified to require explosion proof motors (as was intended) and is included with this submittal for reference.

3. RESPONSE: As noted in the attached email correspondence, there are currently several 4" openings in the top slab at each lift station where the pump cables pass through from outside of the control building and into the wet well. The cables are hidden behind a large SS cabinet that is vented to allow dissipation of gasses between the wet well openings and the sealed junction box mounted on the outside of the control building wall. At completion there will be at least six of these holes per lift station. Each of the existing wet wells will also end up with one motorized odor canister that pulls air in through the slab top openings and from the wet well, then through the canister before discharging into the open air. The stations have never had a "typical" vent and the City is not aware of any operational or maintenance issues as a result. We believe there is sufficient venting (existing and planned) for handling displaced air during wet well filling as required in 327 IAC 3-6-27 (c), plus also to allow air in during pumping.

4. RESPONSE: As noted in the attached email correspondence, each of the 4 valve vaults currently have a drain located at a low point in the floor of the valve vault that drains into the wet well. There is a shut off valve for each that is accessible using a valve wrench from the surface of the wet well outside the control building. This project is replacing one of the older drains at Hague Road to match the other PVC drains. We are also adding grout on the floor to better direct water to the drain lines. Per your response in the August 31st email these drain lines are sufficient to comply with 327 IAC 3-6-29 (5).

Please contact me at (317) 808-3141 or at john.dufek@clarkdietz.com if you have any questions or requests for additional backup information.

Sincerely,

Clark Dietz, Inc.

John D. Dufek, P.E.
Project Engineer
E-mail: john.dufek@clarkdietz.com
cc: Jonathan Valenta, Asst. Director of Water Quality, City of Fishers DPW

Rec'd 7/31/2020

MILES, MIKE

From:	John D. Dufek <John.Dufek@clarkdietz.com>
Sent:	Friday, July 31, 2020 10:50 AM
To:	MILES, MIKE
Cc:	Nunnery, Malishia (Missy)
Subject:	RE: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335
Attachments:	Fishers -Hague Rd Lift Station M-24335.pdf; Pages from Fishers Hague & Allisonville Rd LS Imp-20200708.pdf

Mike,

Good morning, how are you doing? I've been looking at the attached deficiency letter for the City of Fishers and I'm hoping to clarify a couple of the items before responding.

Technical Review Comment 3: This comment refers to venting the wet wells (please see P-13 and P-23 in the attached plans for reference). There are currently several 4" holes in the top slab where the pump cables pass through from outside of the control building and into the wet well. The cables are hidden behind a large SS cabinet that is vented to allow dissipation of gasses between the wet well openings and the sealed junction box mounted on the outside of the control building wall. At completion there will be at least six of these holes per lift station. Each of the existing wet wells will also end up with one motorized odor canister that pulls air in through the slab top openings and from the wet well, then through the canister before discharging into the open air. With or without the odor canister and even with the pump cables installed we believe there is sufficient venting for handling displaced air during wet well filling as required in 327 IAC 3-6-27 (c), plus also to allow air in during pumping. The stations have never had a "typical" vent and the City is not aware of any operational or maintenance issues as a result. Is this venting sufficient? If not, we will add a 6" vent specifically for venting and accepting air during filling and pumping cycles and submit the revised drawings with our response.

Technical Review Comment 4: This comment relates to drain lines from the valve vaults (please see P-14, P-15 and P-24 in the attached plans for reference). Each of the 4 valve vaults currently have a drain located at a low point in the floor of the valve vault that drains into the wet well. There is a shut off valve for each that is accessible using a valve wrench from the surface of the wet well outside the control building. This project is replacing one of the older drains at Hague Road to match the other PVC drains. We are also adding grout on the floor to better direct water to the drain lines. Are these drain lines sufficient to comply with 327 IAC 3-6-29 (5)? The existing drain lines are not called out in the drawings and are easy to miss, but if there is something more to do please let me know so we can get it into our formal response.

Thanks,
John

John D. Dufek, PE
Clark Dietz, Inc.
317.808.3141

From: MILES, MIKE <MMILES@idem.IN.gov>
Sent: Tuesday, July 21, 2020 2:17 PM
To: valenta@fishers.in.us

Cc: John D. Dufek <John.Dufek@clarkdietz.com>; Nunnery, Malishia (Missy) <mnunnery@idem.IN.gov>
Subject: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335

Dear Mr. Valenta;

This e-mail serves to transmit the attached Deficiency Notice for the above-referenced construction permit application. The attached Deficiency Notice is the official notice, and a paper copy will not be sent via the US mail. Please review the Deficiency Notice and provide an appropriate response within the designated time.

If you have questions, please contact the sender.

COVID-19 Resources:

- **Indiana State Dept. of Health (ISDH) COVID-19 Call Center:** Call 877-826-0011 (available 8:00 am-5:00 pm daily).
- **Anthem NurseLine:** Call 800-337-4770 or visit the Anthem NurseLine online for a FREE symptom screening. Available to anyone with an Anthem health plan (this includes State of IN employees)
- **Anthem Employee Assistance Program (EAP)**: Available to full-time state employees and their household members regardless of health plan participation. Call 800-223-7723 or visit anthemeap.com (enter State of Indiana) for crisis counseling, help finding child/elder care, legal/financial consultation and much more.

Mike Miles, P.E.
Project Engineer
IDEM OWQ Facility Construction Section
317 /232-6548
mmiles@idem.IN.gov

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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Eric J. Holcomb
Governor

Bruno Pigott
Commissioner

July 21, 2020

VIA ELECTRONIC MAIL

Mr. Jonathan Valenta, CPM, CFM, CISEC
Assistant Director of Water Quality,
Department of Public Works
City of Fishers
10210 Eller Road
Fishers, Indiana 46038

Dear Mr. Valenta:

Re: Deficiency Notice for
Construction Permit Application
Sanitary Sewer
Improvements to Hague Road &
Allisonville Road Lift Stations
Fishers, Indiana
Hamilton County
Project No. M-24335

This will acknowledge the receipt of plans and specifications on July 6, 2020 in connection with your application for a Construction Permit pursuant to 327 IAC 3 for the above-referenced project.

Your application has been found to be deficient. The following administrative and technical items are required to complete your application for a Construction Permit. Please be advised that if all deficiency items are not corrected or resolved within sixty (60) days of the date of this letter, your application can be denied on the basis of incompleteness. The responses to the deficiency items should be mailed to the following address:

Indiana Department of Environmental Management
Office of Water Quality
Facility Construction and Engineering Support Section
100 North Senate Avenue, Room N1255
Indianapolis, Indiana 46204-2251

I. ADMINISTRATIVE EVALUATION

Upon review of your application, no administrative deficiencies were noted.

If you have any questions concerning the administrative accuracy of this application, please contact Missy Nunnery at 317/232-5579 or by email at mnunnery@idem.in.gov.

II. TECHNICAL REVIEW

This Office offers the following technical comments:

1. The submitted plan sheets are 11x17-inches. Please submit larger plan sheets.

2. Page No. "43 21 13-6" in the submersible pumping equipment section in the project specifications book contains a sentence No. H 9 that states " Motors shall be standard, non-explosion proof." Lift station wet wells can contain explosive and flammable gases. Please adjust the pump off elevation setting to submerge the pump motors or specify explosion proof pump motors in order to comply with 327 IAC 3-6-24.

3. 327 IAC 3-6-27 (c) states "A wet well that is covered shall be vented to allow for the displacement of air due to filling of the wet well." The plan sheets do not show a wet well vent in the rehabilitated lift stations. Please install wet well vents in the rehabilitated lift stations.

4. The plan sheets do not show valve vault drainage lines as required by 327 IAC 3-6-29 (5). Please install valve vault drainage lines in the lift stations.

If you have any questions regarding the technical matters of your application, please contact me at 317/317/232-6548 or by email at mmiles@idem.in.gov.

Sincerely,

Mike Miles

Mike Miles, P.E.
Project Engineer
Facility Construction and
Engineering Support Section
Office of Water Quality

cc: Mr. John D. Dufek, P.E., Clark Dietz Inc.

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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Eric J. Holcomb
Governor

Bruno Pigott
Commissioner

July 21, 2020

VIA ELECTRONIC MAIL

Mr. Jonathan Valenta, CPM, CFM, CISEC
Assistant Director of Water Quality,
Department of Public Works
City of Fishers
10210 Eller Road
Fishers, Indiana 46038

Dear Mr. Valenta:

Re: Deficiency Notice for
Construction Permit Application
Sanitary Sewer
Improvements to Hague Road &
Allisonville Road Lift Stations
Fishers, Indiana
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2. Page No. "43 21 13-6" in the submersible pumping equipment section in the project specifications book contains a sentence No. H 9 that states " Motors shall be standard, non-explosion proof." Lift station wet wells can contain explosive and flammable gases. Please adjust the pump off elevation setting to submerge the pump motors or specify explosion proof pump motors in order to comply with 327 IAC 3-6-24.

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4. The plan sheets do not show valve vault drainage lines as required by 327 IAC 3-6-29 (5). Please install valve vault drainage lines in the lift stations.

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Sincerely,

Mike Miles

Mike Miles, P.E.
Project Engineer
Facility Construction and
Engineering Support Section
Office of Water Quality

cc: Mr. John D. Dufek, P.E., Clark Dietz Inc.

5. The pumps shall be automatically and firmly connected to the discharge connection, guided by no less than two parallel guide bars extending from the top of the station to the wet well mounted discharge connection. There shall be no need for personnel to enter the wet well. Sealing of the pumping unit to the discharge connection shall be accomplished by a machined metal to metal watertight contact. Sealing of the discharge interface with a diaphragm, O-ring or profile gasket will not be acceptable. The entire weight of the pump/motor unit shall be borne by the pump base. No portion of the pump/motor unit shall bear on the sump floor directly or on a sump floor mounted stand.

H. MOTOR

1. The pump motor shall be induction type with a squirrel cage rotor, shell type design, housed in an air filled, watertight chamber, NEMA B type inverter duty rated according to NEMA MG-1 Part 31. The motor and pump shall be designed and assembled by the same manufacturer.
2. Stator winding systems shall be designed to operate at a peak voltage less than 1600 volts with a rise time greater than 0.1 micro-seconds at the motor terminals. The stator windings and stator leads shall be insulated with moisture resistant Class H insulation rated for 356°F. The stator shall be insulated by the trickle impregnation method using Class H monomer-free polyester resin resulting in a winding fill factor of at least 95%. The stator shall be heat-shrink fitted into the cast iron stator housing. The use of multiple step dip and bake-type stator insulation process is not acceptable. The use of bolts, pins or other fastening devices requiring penetration of the stator housing is not acceptable.
3. Motor cooling shall be sufficient for continuous operation under full nameplate load in a dry environment. The motor shall be inverter duty rated. The motor shall be designed for continuous duty handling pumped media of 104°F and capable of up to 15 evenly spaced starts per hour. The rotor bars and short circuit rings shall be made of cast aluminum.
4. Thermal switches shall be embedded in the stator lead coils to monitor the temperature of each phase winding. These thermal switches shall be used in conjunction with and supplemental to external motor overload protection and shall be connected to the control panel.
5. The junction chamber containing the terminal board, shall be hermetically sealed from the motor by an elastomer o-ring seal. Connection between the cable conductors and stator leads shall be made with threaded compression type binding posts permanently affixed to a terminal board. Wire nuts or crimping type connection devices shall not be used.
6. The combined service factor (combined effect of voltage, frequency and specific gravity) shall be a minimum of 1.15. The motor shall have a voltage tolerance of plus or minus 10%. The motor shall be designed for operation of up to 104°F ambient and with a temperature rise not to exceed 176°F. A performance chart shall be provided showing curves for torque, current, power factor, input/output kW and efficiency. This chart shall also include data on starting and no-load characteristics.
7. The power cable shall be sized according to the NEC and ICEA standards (and also meet P-MSHA approval) and shall be of sufficient length to reach the junction box without the need of any splices. The outer jacket of the cable shall be oil resistant chloroprene rubber. The motor and cable shall be capable of continuous submergence underwater without loss of watertight integrity to a depth of 65 feet.
8. The motor horsepower shall be adequate so that the pump is non-overloading throughout the entire pump performance curve from shut-off through run-out.
9. Motors shall be explosion~~standard, non-explosion~~ proof rated for use in Class 1, Division 1, Group D locations per the National Electric Code.

I. BEARINGS

1. The pump shaft shall rotate on at least three grease-lubricated bearings. The upper bearing, provided for radial forces, shall be a single roller bearing. The lower bearings shall consist of at least one roller bearing for radial forces and one or two angular contact ball bearings for axial thrust.
2. The minimum L10 bearing life shall be 100,000 hours at any point along the usable portion of the pump curve at maximum product speed.

From:	MILES, MIKE
To:	John D. Dufek
Cc:	Nunnery, Malishia (Missy)
Subject:	RE: Improvements to Hague Road and Allisonville Road Lift Stations, City of Fishers, Hamilton County, Project No. M-24335
Date:	Monday, August 3, 2020 11:23:35 AM
Attachments:	image002.png image003.png image004.png image005.png image006.png image007.png

---

John,

If the existing wet well ventilation system at the Hague Road and the Allisonville Road Lift Stations is functioning properly and not causing any problems, I see no reason to change anything.

The existing valve vault drain lines at the Allisonville Road Lift Station are acceptable. The existing and new valve vault drain lines at the Hague Road Lift Station are also acceptable to me.

COVID-19 Resources:

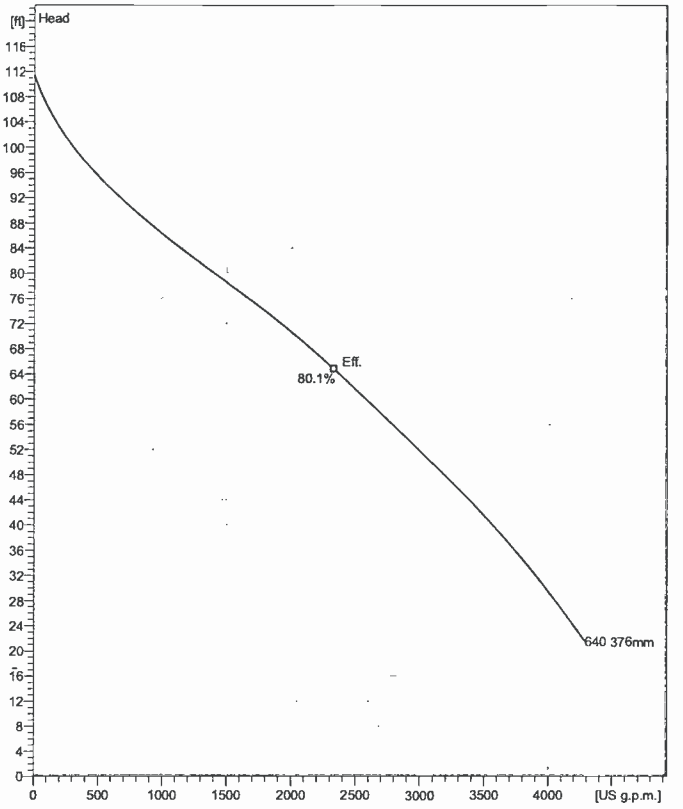
- **Indiana State Dept. of Health (ISDH) COVID-19 Call Center:** Call 877-826-0011 (available 8:00 am-5:00 pm daily).
- **Anthem NurseLine:** Call 800-337-4770 or visit the Anthem NurseLine online for a FREE symptom screening. Available to anyone with an Anthem health plan (this includes State of IN employees)
- **Anthem Employee Assistance Program (EAP)**: Available to full-time state employees and their household members regardless of health plan participation. Call 800-223-7723 or visit anthemeap.com (enter State of Indiana) for crisis counseling, help finding child/elder care, legal/financial consultation and much more.

Mike Miles, P.E.
Project Engineer
IDEM OWQ Facility Construction Section
317 /232-6548
mmiles@idem.IN.gov

xylem

NP 3202 MT 3~ 640

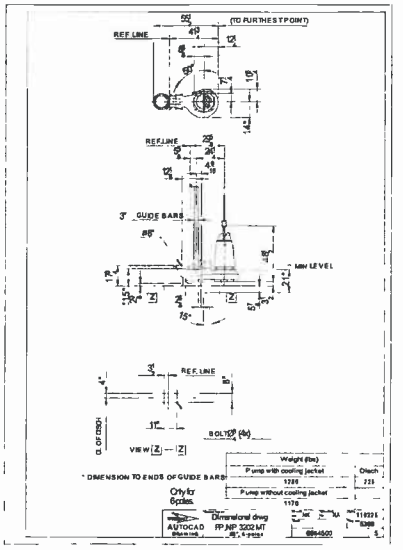
Technical specification



Water, pure *Curve ISO*

Note: Picture might not correspond to the current configuration.

Installation: P - Semi permanent, Wet



General

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

Impeller

Impeller material	Hard-Iron ™
Discharge Flange Diameter	7 7/8 inch
Suction Flange Diameter	9 13/16 inch
Impeller diameter	376 mm
Number of blades	2

Motor

Motor #	N3202.185 30-29-6AA-W 60hp Standard
Stator variant	1
Frequency	60 Hz
Rated voltage	460 V
Number of poles	6
Phases	3~
Rated power	60 hp
Rated current	72 A
Starting current	420 A
Rated speed	1170 rpm
Power factor	
1/1 Load	0.86
3/4 Load	0.83
1/2 Load	0.74
Motor efficiency	
1/1 Load	90.5 %
3/4 Load	91.0 %
1/2 Load	91.0 %

Configuration

Project	Project ID	Created by	Created on	Last update
			4/11/2019	

xylem

NP 3202 MT 3~ 640

FLYGT

Performance curve

Pump

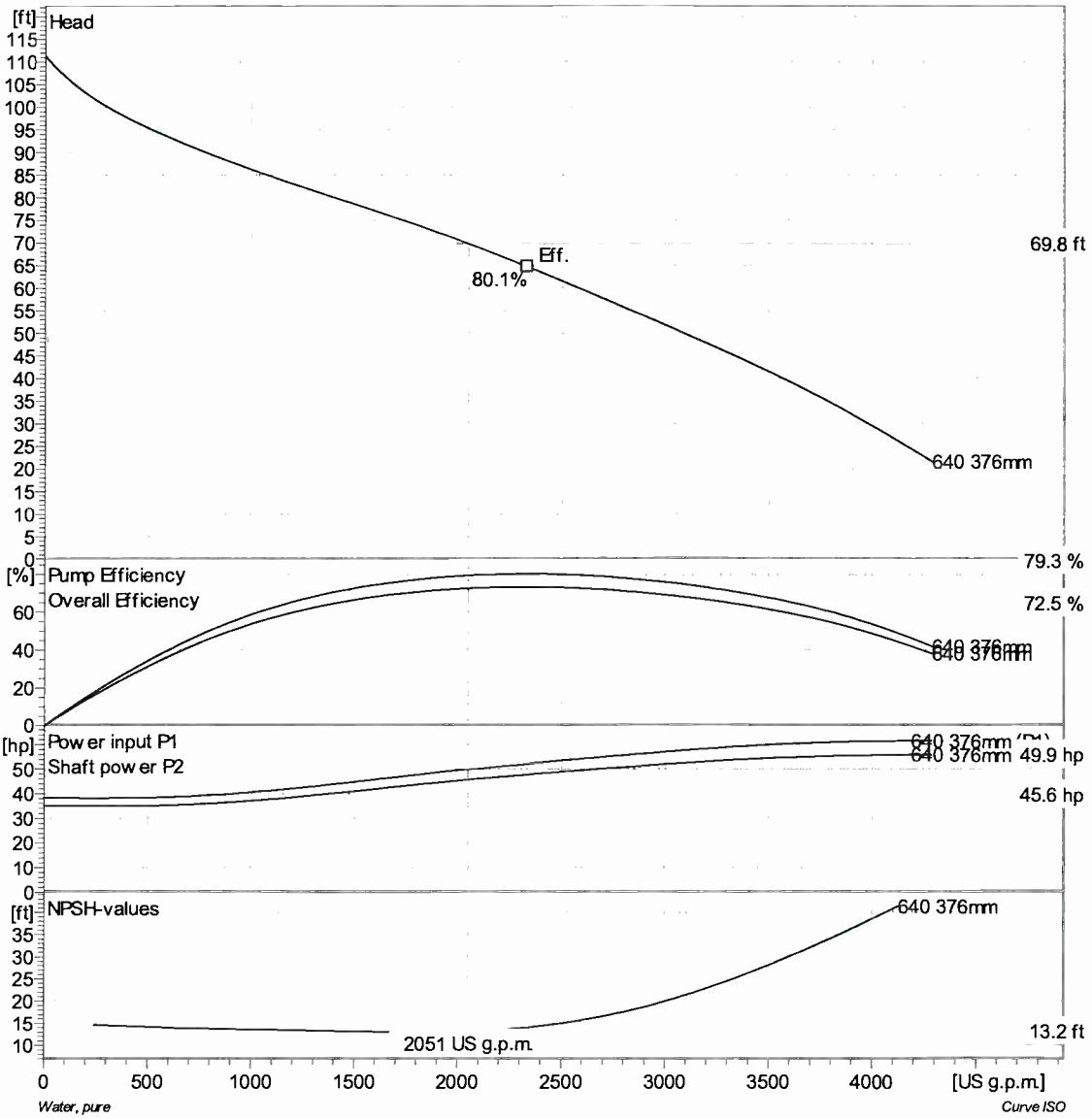
Discharge Flange Diameter	7 7/8 inch
Suction Flange Diameter	250 mm
Impeller diameter	14 13/16"
Number of blades	2

Motor

Motor #	N3202.185 30-29-6AA-W 60hp
Stator variant	1
Frequency	60 Hz
Rated voltage	460 V
Number of poles	6
Phases	3~
Rated power	60 hp
Rated current	72 A
Starting current	420 A
Rated speed	1170 rpm

Power factor	
1/1 Load	0.86
3/4 Load	0.83
1/2 Load	0.74

Motor efficiency	
1/1 Load	90.5 %
3/4 Load	91.0 %
1/2 Load	91.0 %



Duty point		Guarantee
Flow	Head	
2100 US g.p.m.	72 ft	No

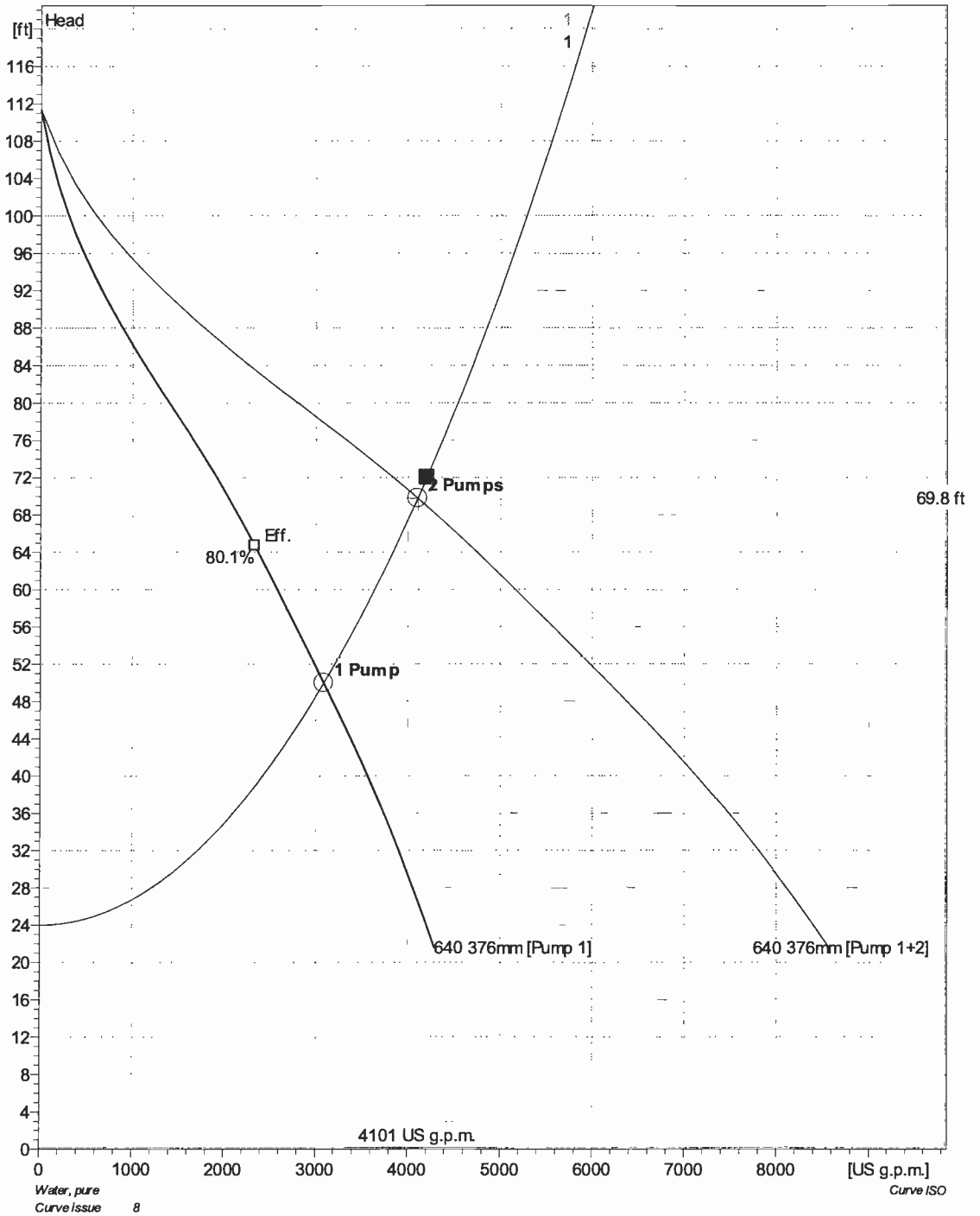
Project	Project ID	Created by	Created on	Last update
			4/11/2019	

xylem

NP 3202 MT 3~ 640

Duty Analysis

FLYGT



Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
2 / 1	2050 US g.p.m.	69.8 ft	45.6 hp	4100 US g.p.m.	69.8 ft	91.3 hp	79.3 %25	302 kWh/US MG	13.2 ft
1 / 1	3090 US g.p.m.	50 ft	52.4 hp	3090 US g.p.m.	50 ft	52.4 hp	74.5 %25	231 kWh/US MG	21.2 ft

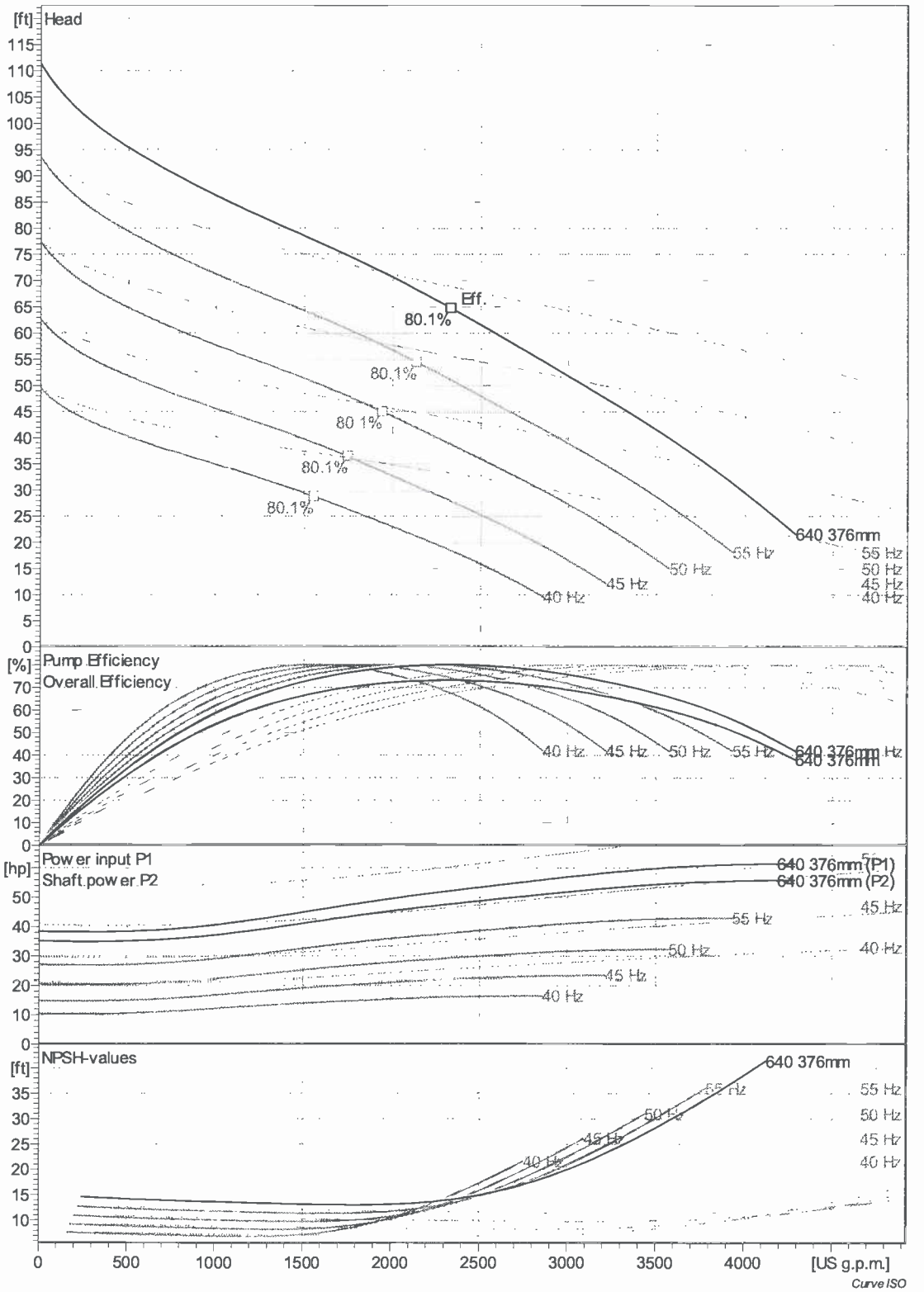
Project	Project ID	Created by	Created on	Last update
			4/11/2019	

xylem

NP 3202 MT 3~ 640

VFD Curve

FLYGT



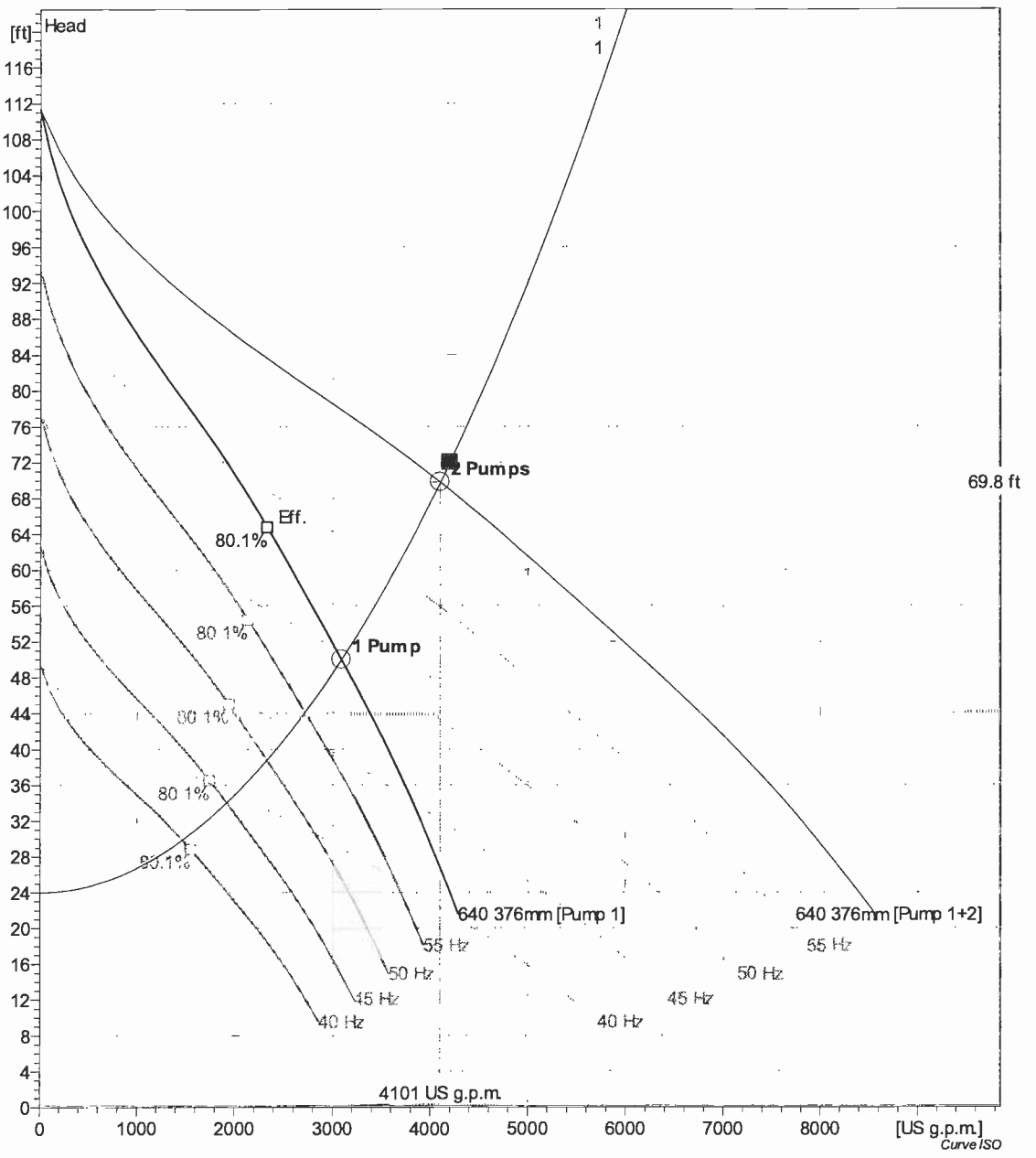
Project	Project ID	Created by	Created on	Last update
			4/11/2019	

xylem

NP 3202 MT 3~ 640

FLYGT

VFD Analysis



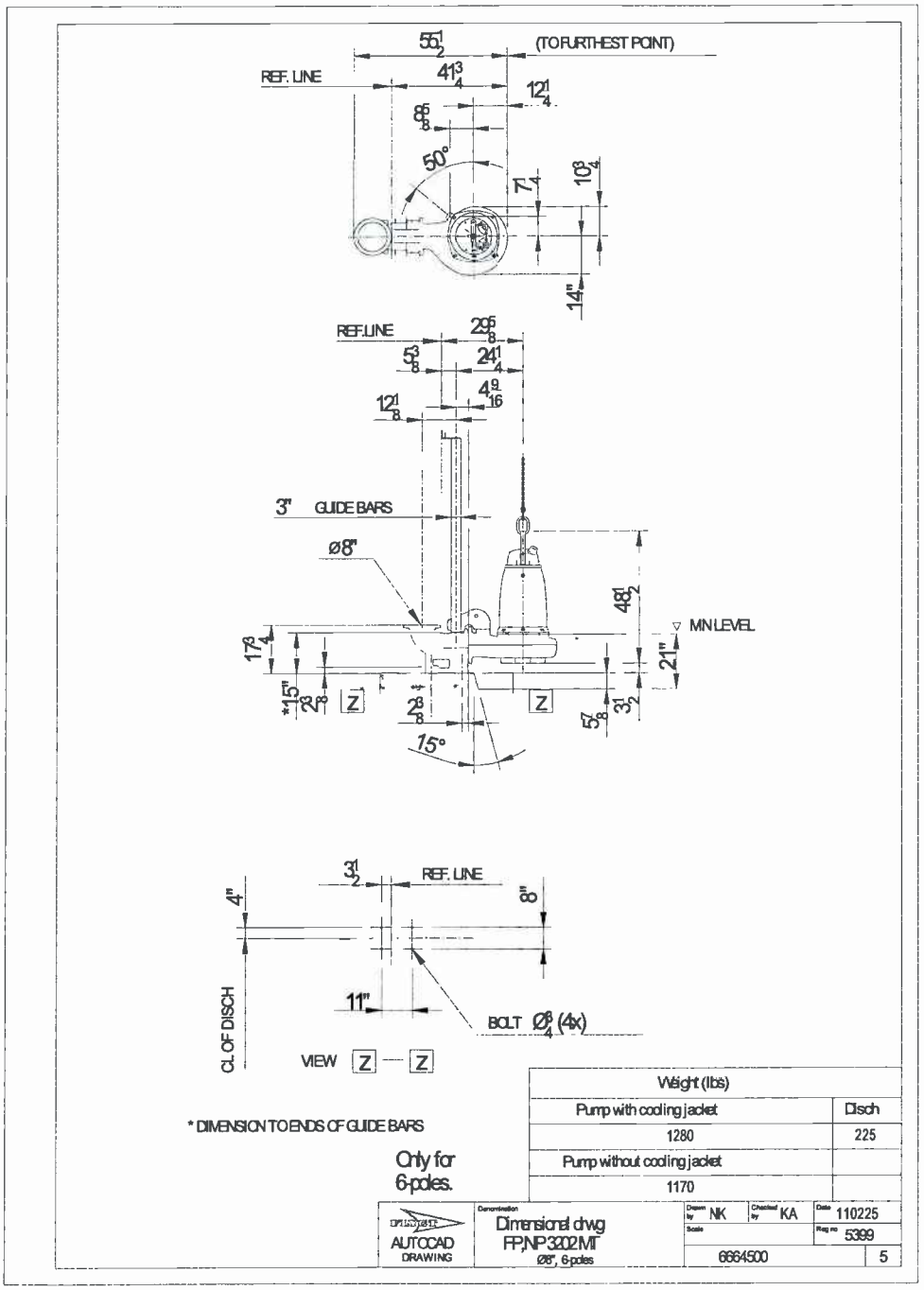
Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
2 / 1	60 Hz	2050 US g.p.m.	69.8 ft	45.6 hp	4100 US g.p.m.	69.8 ft	91.3 hp	79.3 %25	302 kWh/US MG	13.2 ft
2 / 1	55 Hz	1810 US g.p.m.	59.7 ft	34.7 hp	3620 US g.p.m.	59.7 ft	69.4 hp	78.8 %25	261 kWh/US MG	11.4 ft
2 / 1	50 Hz	1560 US g.p.m.	50.5 ft	25.6 hp	3120 US g.p.m.	50.5 ft	51.2 hp	77.9 %25	225 kWh/US MG	9.73 ft
2 / 1	45 Hz	1290 US g.p.m.	42.2 ft	18.2 hp	2590 US g.p.m.	42.2 ft	36.3 hp	76.2 %25	196 kWh/US MG	8.22 ft
2 / 1	40 Hz	1000 US g.p.m.	34.9 ft	12.2 hp	2000 US g.p.m.	34.9 ft	24.3 hp	72.6 %25	177 kWh/US MG	6.88 ft
1 / 1	60 Hz	3090 US g.p.m.	50 ft	52.4 hp	3090 US g.p.m.	50 ft	52.4 hp	74.5 %25	231 kWh/US MG	21.2 ft
1 / 1	55 Hz	2720 US g.p.m.	44.1 ft	39.8 hp	2720 US g.p.m.	44.1 ft	39.8 hp	76.2 %25	199 kWh/US MG	16.9 ft
1 / 1	50 Hz	2330 US g.p.m.	38.8 ft	29.3 hp	2330 US g.p.m.	38.8 ft	29.3 hp	78 %25	172 kWh/US MG	13.1 ft
1 / 1	45 Hz	1920 US g.p.m.	34 ft	20.7 hp	1920 US g.p.m.	34 ft	20.7 hp	79.6 %25	150 kWh/US MG	9.68 ft
1 / 1	40 Hz	1470 US g.p.m.	29.8 ft	13.8 hp	1470 US g.p.m.	29.8 ft	13.8 hp	79.9 %25	135 kWh/US MG	7.07 ft

Project	Project ID	Created by	Created on	Last update
			4/11/2019	

xylem

NP 3202 MT 3~ 640
Dimensional drawing

FLYGT



Weight (lbs)	
Pump with cooling jacket	Disch
1280	225
Pump without cooling jacket	
1170	

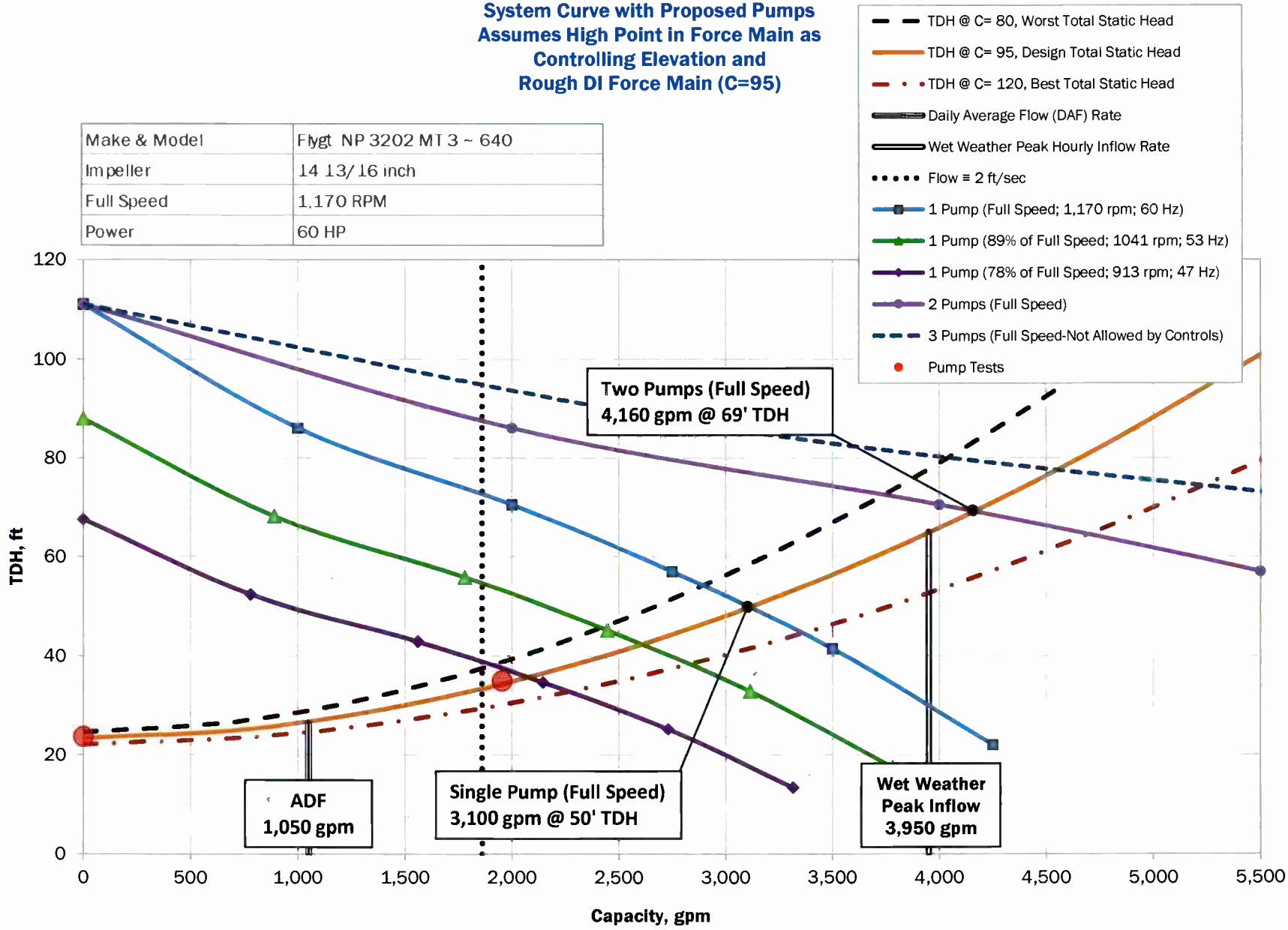
Project	Project ID	Created by	Created on	Last update
			4/11/2019	

ClarkDietz

Hague Road Lift Station Improvements
City of Fishers, IN

System Curve with Proposed Pumps Assumes High Point in Force Main as Controlling Elevation and Rough DI Force Main (C=95)

Make & Model	Flygt NP 3202 MT 3 ~ 640
Impeller	14 13/16 inch
Full Speed	1,170 RPM
Power	60 HP



Estimation of Pump Cycles - ADF with 1 Pump at Full Speed

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	3,100	gpm	At Full Speed
Wet Well Diameter (Equivalent)	$D_{wet\ well}$	20.56	ft	332 Sq Ft Avg w/Fillets -- Eq. Dia. = 20.56'
Pump ON	h_1	768.40	ft	
Pump OFF	h_2	766.40	ft	
Volume Corresponding to Pump ON	V_1	255,108	ft^3	
Volume corresponding to pump OFF	V_2	254,444	ft^3	
Pumped Wastewater volume	ΔV	664	ft^3	
Pumped Wastewater volume	ΔV	4,970	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	1,050	gpm	
Fill Time	$t_{f,avg}$	4.7	min	
Pump Run Time	$t_{r,avg}$	2.4	min	
Pump Cycle Time	$t_{c,avg}$	7	min	
Pump Starts per Hour	$N_{p,avg}$	8	-	< 10 cycles per hour

Estimation of Pump Cycles - ADF with 1 Pump at Minimum Speed

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	2,080	gpm	At 78% of Full Speed to Maintain 2 fps in FM
Wet Well Diameter (Equivalent)	$D_{wet\ well}$	20.56	ft	332 Sq Ft Avg w/Fillets -- Eq. Dia. = 20.56'
Pump ON	h_1	768.40	ft	
Pump OFF	h_2	766.40	ft	
Volume Corresponding to Pump ON	V_1	255,108	ft^3	
Volume corresponding to pump OFF	V_2	254,444	ft^3	
Pumped Wastewater volume	ΔV	664	ft^3	
Pumped Wastewater volume	ΔV	4,970	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	1,050	gpm	
Fill Time	$t_{f,avg}$	4.7	min	
Pump Run Time	$t_{r,avg}$	4.8	min	
Pump Cycle Time	$t_{c,avg}$	10	min	
Pump Starts per Hour	$N_{p,avg}$	6	-	< 10 cycles per hour

Estimation of Pump Cycles - Peak Inflow with 2 Pumps at Full Speed

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	4,160	gpm	At Full Speed
Wet Well Diameter (Equivalent)	$D_{wet\ well}$	21.08	ft	349 Sq Ft Avg w/Fillets -- Eq. Dia. = 21.08'
Pump ON	h_1	768.80	ft	
Pump OFF	h_2	766.40	ft	
Volume Corresponding to Pump ON	V_1	268,315	ft^3	
Volume corresponding to pump OFF	V_2	267,477	ft^3	
Pumped Wastewater volume	ΔV	838	ft^3	
Pumped Wastewater volume	ΔV	6,270	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	3,950	gpm	2,900 gpm peak plus 1,050 gpm wet weather
Fill Time	$t_{f,avg}$	1.6	min	
Pump Run Time	$t_{r,avg}$	29.9	min	
Pump Cycle Time	$t_{c,avg}$	31	min	
Pump Starts per Hour	$N_{p,avg}$	2	-	< 10 cycles per hour

Estimation of Pump Cycles - ADF with 1 Pump at Full Speed
CURRENT AVERAGE DAILY FLOWS

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	3,100	gpm	At Full Speed
Wet Well Diameter (Equivalent)	$D_{wet\ well}$	20.56	ft	332 Sq Ft Avg w/Fillets -- Eq. Dia. = 20.56'
Pump ON	h_1	768.40	ft	
Pump OFF	h_2	766.40	ft	
Volume Corresponding to Pump ON	V_1	255,108	ft^3	
Volume corresponding to pump OFF	V_2	254,444	ft^3	
Pumped Wastewater volume	ΔV	664	ft^3	
Pumped Wastewater volume	ΔV	4,970	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	611	gpm	
Fill Time	$t_{f,avg}$	8.1	min	
Pump Run Time	$t_{r,avg}$	2.0	min	
Pump Cycle Time	$t_{c,avg}$	10	min	
Pump Starts per Hour	$N_{p,avg}$	6	-	< 10 cycles per hour

Estimation of Pump Cycles - ADF with 1 Pump at Minimum Speed
CURRENT AVERAGE DAILY FLOWS

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	2,080	gpm	At 78% of Full Speed to Maintain 2 fps in FM
Wet Well Diameter (Equivalent)	$D_{wet\ well}$	20.56	ft	332 Sq Ft Avg w/Fillets -- Eq. Dia. = 20.56'
Pump ON	h_1	768.40	ft	
Pump OFF	h_2	766.40	ft	
Volume Corresponding to Pump ON	V_1	255,108	ft^3	
Volume corresponding to pump OFF	V_2	254,444	ft^3	
Pumped Wastewater volume	ΔV	664	ft^3	
Pumped Wastewater volume	ΔV	4,970	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	611	gpm	
Fill Time	$t_{f,avg}$	8.1	min	
Pump Run Time	$t_{r,avg}$	3.4	min	
Pump Cycle Time	$t_{c,avg}$	12	min	
Pump Starts per Hour	$N_{p,avg}$	5	-	< 10 cycles per hour

NPSH Calculations

Parameter		Value		
Design flow	Q	5.7	mgd	Refer Data
Temperature of water	t	60	°F	
Temperature of water	T	289	°K	
Vapor pressure	p_v/γ	0.25	psia	
Specific gravity of water	s	1	-	
Vapor pressure head	H_v	0.58	ft	
Mole of air	M	28.97	kg/kgmole	
Universal Gas Constant	R	8,314	$kg.m^2/kgmol.s^2.K$	
Static Suction Head	H_{sh}			
High		3.40	ft	
Design		2.20	ft	
Low		1.00	ft	
Atmospheric head at Sea Level	H_a	34	ft	
Atmospheric pressure at Sea Level	p_a	14.7	psi	
Atmospheric pressure at Sea Level	p_a	101.35	kN/m^2	
Pump suction elevation	Δz	765.40	ft	Refer Data
Atmospheric pressure at pump sction	$p_{a,z}$	92.57	kN/m^2	$p_{a,z} = p_a \times e^{\left(-\frac{gM\Delta z}{RT}\right)}$
Atmospheric head at pump suction	$H_{a,z}$	31.0	ft	

$$NHSP_{a,i} = H_{a,z} + H_{sh} - h_{Ds,i} - H_v$$

Total Flow, $Q_{t,i}$		Dynamic Head Loss in Suction Pipe at C =120, $h_{Ds,i}$	Available NPSH, $NPSH_{a,i}$		
			High H_{sh}	Design H_{sh}	Low H_{sh}
mgd	gpm	ft	ft	ft	ft
0	0	0.00	33.8	32.6	31.4
1.1	790	0.00	33.8	32.6	31.4
2.3	1,580	0.00	33.8	32.6	31.4
3.4	2,370	0.00	33.8	32.6	31.4
4.6	3,160	0.00	33.8	32.6	31.4
5.7	3,950	0.00	33.8	32.6	31.4
6.8	4,740	0.00	33.8	32.6	31.4
8.0	5,530	0.00	33.8	32.6	31.4

Lift Station & Force Main Piping System

Design	Assumed	Calculated

Pump Station Type

		Case 1 Weather			
Pumping Liquid		Wastewater			
Storage Basin Volume		NA			mgal
Drainage Duration		NA			hr
Flow total	Q_t	5.7			mgd
Flow total	Q_t	3,960			gpm
Min. velocity	V_{min}	2			ft/sec
Max. velocity	V_{max}	8			ft/sec
Number of Pumps		1			-
Flow per pump	Q_{pump}	5.7			mgd
Flow per pump	Q_{pump}	3,960			gpm
Flow per pump	Q_{pump}	8.8			ft^3/sec

18" 2 fps	1,860	gpm
18" 3 fps	2,790	gpm

Suction Side

Pipe			
Location		Wet well to Pump	
Pipe Material		NA	-
Class		NA	-
Manning's Coefficient		NA	-
Pipe Length	L	NA	ft
Nominal Diameter	D	NA	in
Outside Diameter	D_o	NA	in
Thickness	t	NA	in
Inside Diameter	D_i	NA	in
Inside Diameter	D_i	NA	ft
Flow Area	A	NA	ft^2
Flow			
Case 1		5.7	mgd
Velocity			
Case 1		NA	ft/sec

Pipe Fittings	k_i	Number
Σ		0.00

Pipe Factors		
Manning's Friction Facto	K_f	
Minor Loss Factor	K_m	

Static Suction Head			
Pump Suction Elevation		765.40	ft
Wet well water level			
High Water Level		768.80	ft
Design Water Level		767.60	ft
Low Water Level		766.40	ft
Static Suction Head	H_{sh}		
High		3.40	ft
Design		2.20	ft
Low		1.00	ft

Discharge Side

Pipe					
Location		Pump to Header	Header	Force Main	
Pipe Material		Ductile Iron	Ductile Iron	Ductile Iron	-
Class		Class 52	Class 52	PC 350	-
Manning's Coefficient		0.012	0.012	0.012	-
Pipe Length	L	25	25	4570	ft
Nominal Diameter	D	12	18	18	in
Outside Diameter	D_o	13.20	19.50	19.50	in
Thickness	t	0.28	0.36	0.36	in
Inside Diameter	D_i	12.64	18.78	18.78	in
Inside Diameter	D_i	1.05	1.57	1.57	ft
Flow Area	A	0.87	1.92	1.92	ft^2
Flow					
Case 1		5.7	5.7	5.7	mgd
Velocity					
Case 1		10.1	4.6	4.6	ft/sec

Pipe Fittings	k_i	Number		
8"				
90° Elbow	0.42	1		
Expansion (8"x12")	0.12	1		
12"				
90° Elbow	0.42	1		
Swing Check Valve	2.5	1		
Plug Valve	0.7	1		
Expansion (12"x18")	0.12	1		
18"				
Tee (Flow Branch)	1.8		3	
Tee (Flow Through)	0.6		1	
Plug Valve	0.7		1	1
45° Elbow	0.19			10
90° Elbow	0.42			
Expansion (14"x18")	0.12			
Magmeter (18")	0.05			1
Exit	1			1
Σ		4.28	6.70	3.65

Pipe Factors				
Manning's Friction Facto	K_f	0.01	0.00	0.28
Minor Loss Factor	K_m	0.09	0.03	0.02

Static Discharge Head				
Pump Suction Elevation		765.40	ft	
Force Main Elevations				
High Point		795.63	ft	
Dischage		763.00	ft	
Controlling Elevation		791.00		Capacity of FM < Design Flow
Static Discharge Head	H_{sd}	25.60	ft	

Dynamic Head Losses

Design	Assumed	Calculated

Hazen Williams Coefficient			
Minimum	C_{min}		-
Maximum	C_{max}		-

$$h_{m,i} = \sum k_i \times h_{v,i}$$

$$h_{v,i} = \frac{V_i^2}{2g}$$

$$h_{f,i} = 0.002083 \times L_i \times \left(\frac{100}{C}\right)^{1.85} \times \frac{Q_{i|gpm}^{1.85}}{d_{i|in}^{4.8655}}$$

$$h_{D,i} = h_{m,i} + h_{f,i}$$

	Pipe	Flow Qi			Velocity V_i	Velocity Head $h_{v,i}$	Minor Losses $h_{m,i}$	Frictional Losses, ft h_{fi}			Total Dynamic Losses, ft h_{Di}		
		mgd	gpm	ft³/sec	ft/sec	ft	ft	C			C		
								80	95	120	80	95	120
Suction Side	Wet well to Pump	0	0	0	0	0	0	0	0	0	0	0	0
		1.1	790	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		2.3	1,580	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.4	2,370	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		4.6	3,160	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		5.7	3,950	8.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		6.8	4,740	10.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		8.0	5,530	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discharge Side	Pump to Header	0	0	0.0	0	0.0	0	0	0	0	0	0	0
		1.1	790	1.8	2.0	0.1	0.3	0.1	0.1	0.0	0.4	0.3	0.3
		2.3	1,580	3.5	4.0	0.3	1.1	0.3	0.2	0.1	1.4	1.3	1.2
		3.4	2,370	5.3	6.1	0.6	2.4	0.6	0.4	0.3	3.0	2.9	2.7
		4.6	3,160	7.0	8.1	1.0	4.4	1.0	0.7	0.5	5.4	5.1	4.8
		5.7	3,950	8.8	10.1	1.6	6.8	1.5	1.1	0.7	8.3	7.9	7.5
		6.8	4,740	10.6	12.1	2.3	9.8	2.2	1.6	1.0	12.0	11.4	10.8
		8.0	5,530	12.3	14.2	3.1	13.3	2.9	2.1	1.4	16.2	15.4	14.7
	Header	0	0	0.0	0	0.0	0	0	0	0	0	0	0
		1.1	790	1.8	0.9	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.1
		2.3	1,580	3.5	1.8	0.1	0.3	0.0	0.0	0.0	0.4	0.4	0.4
		3.4	2,370	5.3	2.7	0.1	0.8	0.1	0.1	0.0	0.9	0.8	0.8
		4.6	3,160	7.0	3.7	0.2	1.4	0.1	0.1	0.1	1.5	1.5	1.5
		5.7	3,950	8.8	4.6	0.3	2.2	0.2	0.2	0.1	2.4	2.3	2.3
		6.8	4,740	10.6	5.5	0.5	3.1	0.3	0.2	0.1	3.5	3.4	3.3
		8.0	5,530	12.3	6.4	0.6	4.3	0.4	0.3	0.2	4.7	4.6	4.5
	Force Main	0	0	0	0	0	0	0	0	0	0	0	0
		1.1	790	1.8	0.9	0.0	0.0	2.1	1.5	1.0	2.1	1.6	1.0
		2.3	1,580	3.5	1.8	0.1	0.2	7.6	5.5	3.6	7.7	5.7	3.8
		3.4	2,370	5.3	2.7	0.1	0.4	16.0	11.6	7.6	16.4	12.1	8.0
		4.6	3,160	7.0	3.7	0.2	0.8	27.2	19.8	12.9	28.0	20.6	13.6
		5.7	3,950	8.8	4.6	0.3	1.2	41.2	29.9	19.4	42.3	31.1	20.6
		6.8	4,740	10.6	5.5	0.5	1.7	57.7	42.0	27.2	59.4	43.7	28.9
		8.0	5,530	12.3	6.4	0.6	2.3	76.7	55.8	36.2	79.0	58.1	38.6

Total Dynamic Head

Design	Assumed	Calculated

Total Static Head	H_{ts}			$H_{ts} = H_{sd} - H_{sh}$
Worst		24.60	ft	
Design		23.40	ft	
Best		22.20	ft	

$$TDH_i = H_{ts} + \sum h_{D,i}$$

Total Flow, $Q_{t,i}$			Flow per pump, $Q_{pump,i}$	TDH, ft when C =		
mgd	gpm	ft^3/sec	mgd	80 Worst	95 Design	120 Best
0.0	0	0	0	25	23	22
1.1	790	1.76	1.1	27	25	24
2.3	1,580	3.52	2.3	34	31	28
3.4	2,370	5.29	3.4	45	39	34
4.6	3,160	7.05	4.6	60	51	42
5.7	3,950	8.81	5.7	78	65	53
6.8	4,740	10.57	6.8	99	82	65
8.0	5,530	12.33	8.0	125	102	80

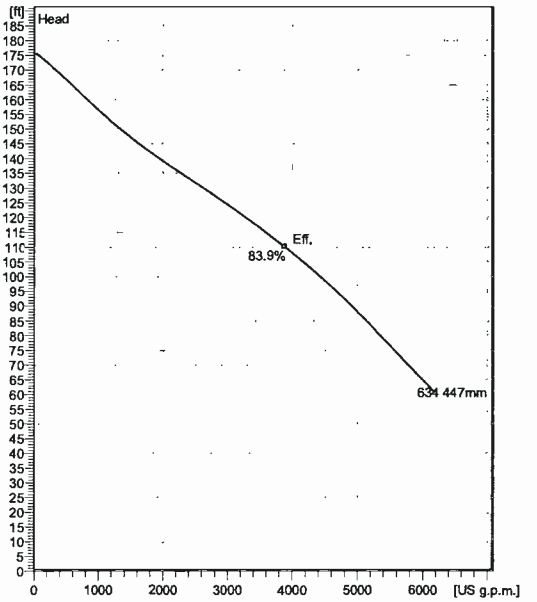
NP 3315 MT 3~ 634

Patented self cleaning semi-open channel impeller, ideal for pumping in waste water applications. Possible to be upgraded with Guide-pin® for even better clogging resistance. Modular based design with high adaptation grade.

FLYGT
a xylem brand

Technical specification

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



Configuration

Motor number
N3315.185 35-45-6AA-W 140hp

Installation type
P - Semi permanent, Wet

Impeller diameter
447 mm

Discharge diameter
9 13/16 inch

Pump information

Impeller diameter
447 mm

Discharge diameter
9 13/16 inch

Inlet diameter
250 mm

Maximum operating speed
1185 rpm

Number of blades
3

Materials

Impeller
Hard-Iron ™

Project	**Created by**		**Last update**
Block	**Created on**	5/14/2019	

NP 3315 MT 3~ 634

Technical specification

FLYGT
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Motor - General

Motor number N3315.185 35-45-6AA-W 140hp	**Phases** 3~	**Rated speed** 1185 rpm	**Rated power** 140 hp
Approval No	**Number of poles** 6	**Rated current** 177 A	**Stator variant** 1
Frequency 60 Hz	**Rated voltage** 460 V	**Insulation class** H	**Type of Duty** S1

Motor - Technical

Power factor - 1/1 Load 0.80	**Motor efficiency - 1/1 Load** 93.0 %	**Total moment of inertia** 71.8 lb ft²	**Starts per hour max.** 15
Power factor - 3/4 Load 0.74	**Motor efficiency - 3/4 Load** 93.4 %	**Starting current, direct starting** 1200 A	
Power factor - 1/2 Load 0.63	**Motor efficiency - 1/2 Load** 92.9 %	**Starting current, star-delta** 400 A	

Project	**Created by**	**Last update**
Block	**Created on** 5/14/2019	

NP 3315 MT 3~ 634

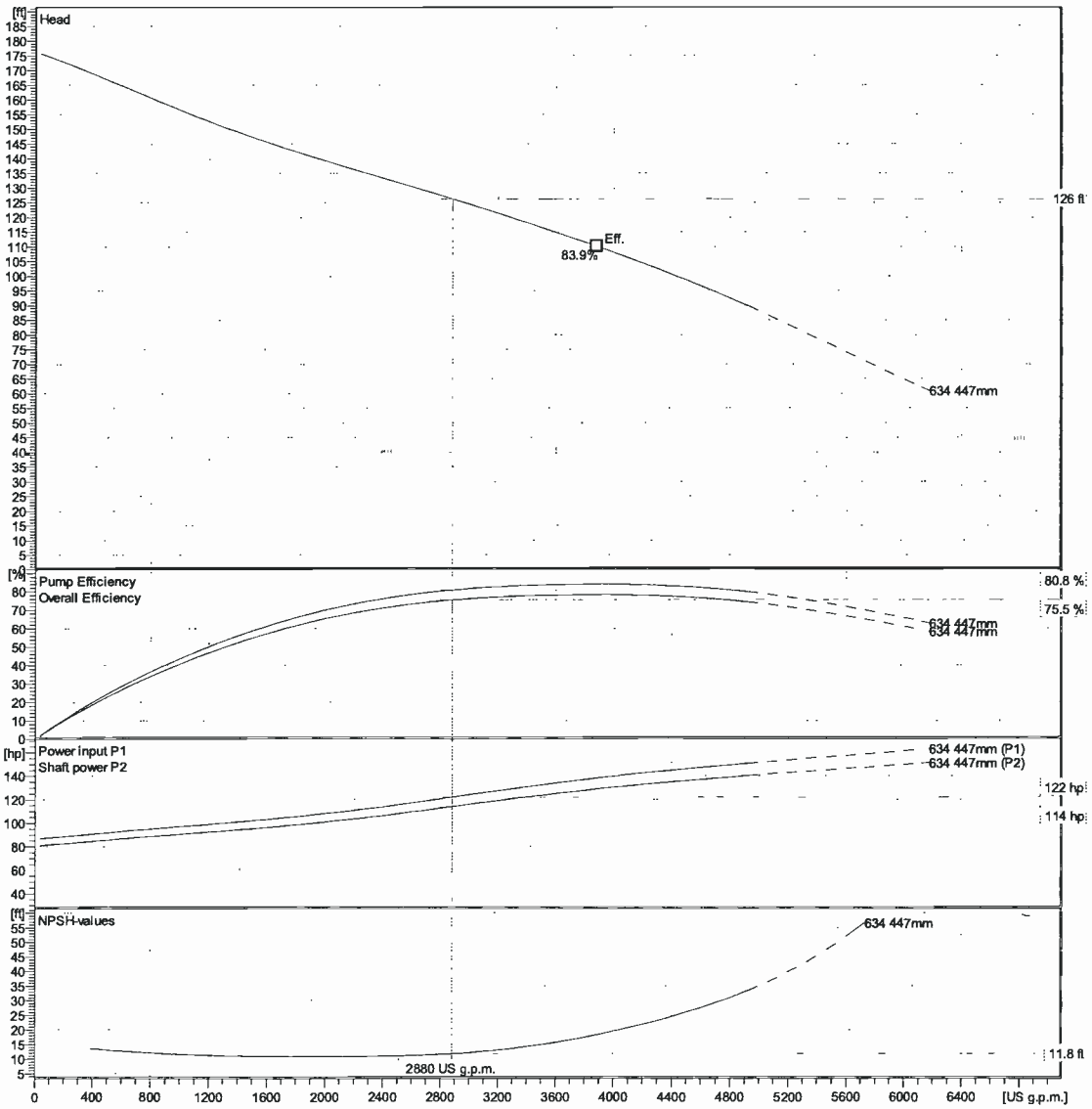
Performance curve

FLYGT
a xylem brand

Duty point

Flow	Head
2880 US g.p.m.	126 ft

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



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Block	Created on 5/14/2019	

NP 3315 MT 3~ 634

Duty Analysis

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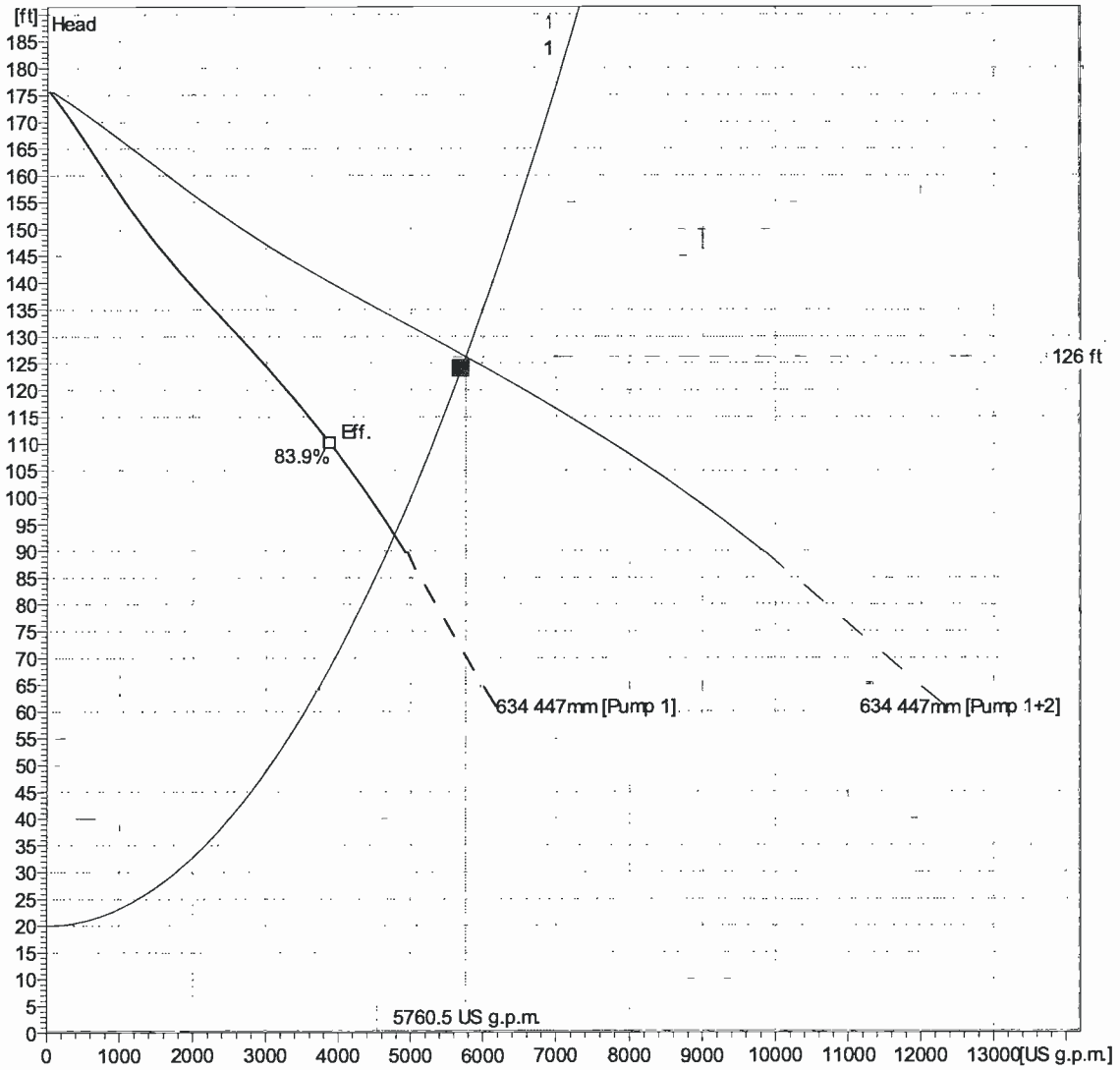
Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Operating characteristics

Pumps running /System	Individual pump Flow	Head	Shaft power	Total Flow	Head	Shaft power	Pump eff.	Specific energy	NPSHre
2 / 1	2880 US g.p.m.	126 ft	114 hp	5760 US g.p.m.	126 ft	228 hp	80.8 %	526 kWh/US MG	11.8 ft
1 / 1	4770 US g.p.m.	92.9 ft	139 hp	4770 US g.p.m.	92.9 ft	139 hp	81	388 kWh/US MG	30.4 ft

Project		Created by		Last update	
Block		Created on	5/14/2019		

NP 3315 MT 3~ 634

VFD Curve

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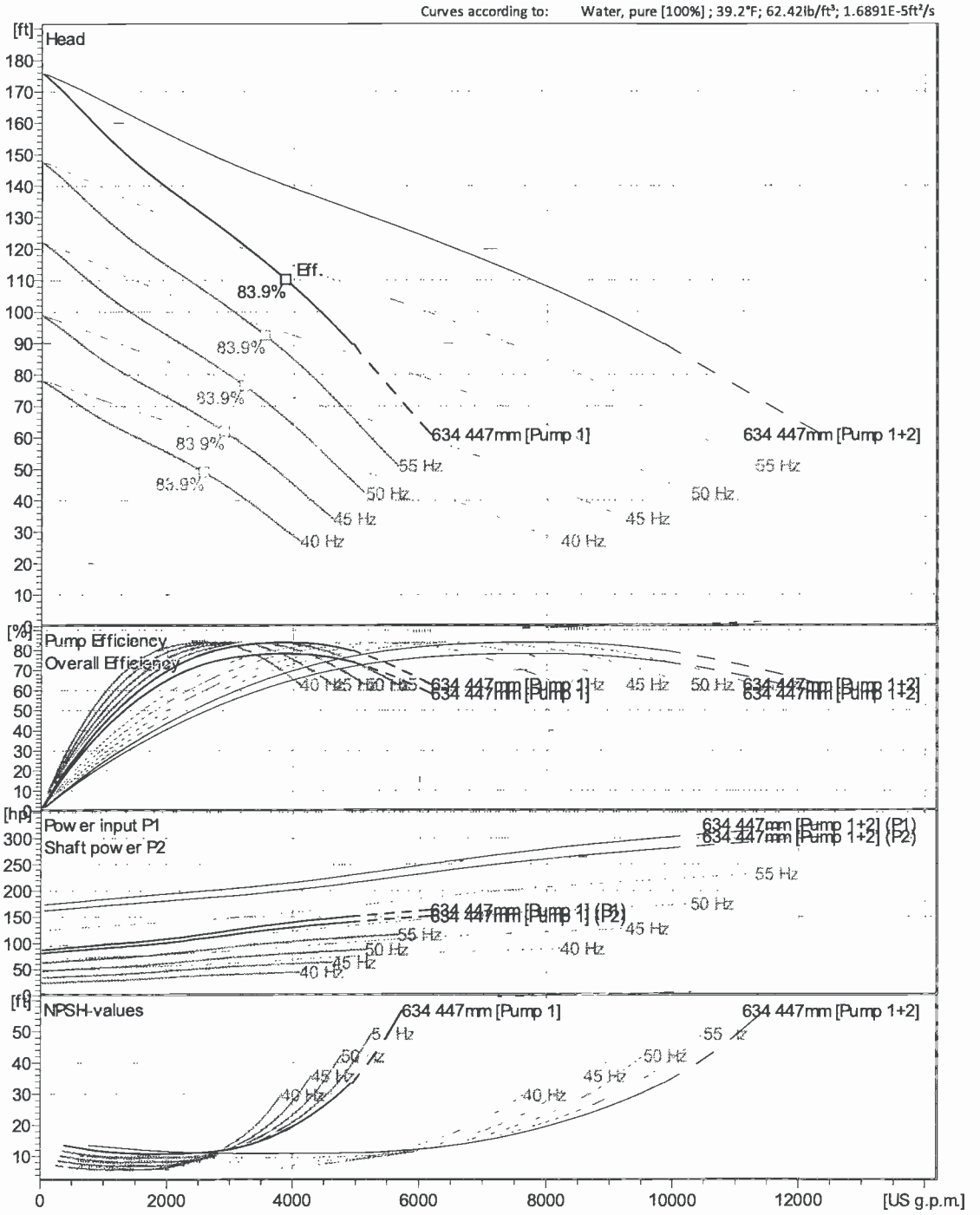
Curves according to: Water, pure [100%] ; 39.2°F; 62.42lb/ft³; 1.6891E-5ft²/s



Project	Created by	Last update
Block	Created on 5/14/2019	

NP 3315 MT 3~ 634

VFD Analysis

FLYGT
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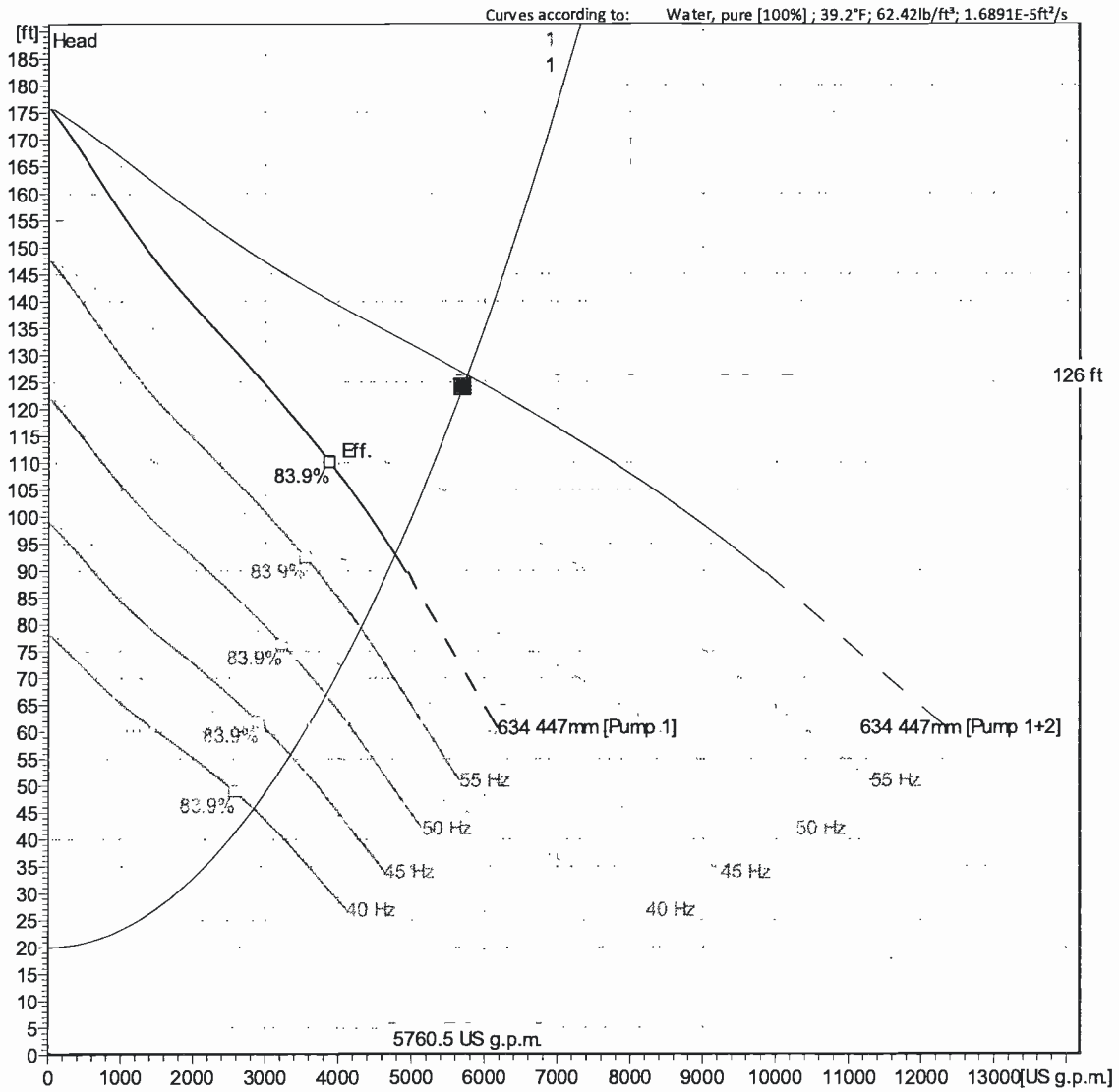

Operating Characteristics

Pumps running /System	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hyd eff.	Specific energy	NPSHre
2 / 1	60 Hz	2880 US g.p.m.	126 ft	114 hp	5760 US g.p.m.	126 ft	228 hp	80.8 %	526 kWh/US MG	11.8 ft
2 / 1	55 Hz	2600 US g.p.m.	106 ft	86.9 hp	5200 US g.p.m.	106 ft	174 hp	80.5 %	446 kWh/US MG	10.2 ft
2 / 1	50 Hz	2310 US g.p.m.	88.6 ft	64.8 hp	4630 US g.p.m.	88.6 ft	130 hp	80 %	376 kWh/US MG	8.61 ft
2 / 1	45 Hz	2020 US g.p.m.	72.4 ft	46.7 hp	4050 US g.p.m.	72.4 ft	93.4 hp	79.4 %	314 kWh/US MG	7.17 ft
2 / 1	40 Hz	1720 US g.p.m.	58 ft	32.3 hp	3440 US g.p.m.	58 ft	64.5 hp	78.3 %	263 kWh/US MG	5.84 ft
1 / 1	60 Hz	4770 US g.p.m.	92.9 ft	139 hp	4770 US g.p.m.	92.9 ft	139 hp	81 %	388 kWh/US MG	30.4 ft
1 / 1	55 Hz	4300 US g.p.m.	79.2 ft	106 hp	4300 US g.p.m.	79.2 ft	106 hp	81.5 %	327 kWh/US MG	25.3 ft
1 / 1	50 Hz	3830 US g.p.m.	66.9 ft	78.9 hp	3830 US g.p.m.	66.9 ft	78.9 hp	82.1 %	275 kWh/US MG	20.5 ft
1 / 1	45 Hz	3340 US g.p.m.	55.8 ft	56.9 hp	3340 US g.p.m.	55.8 ft	56.9 hp	82.8 %	230 kWh/US MG	16 ft
1 / 1	40 Hz	2840 US g.p.m.	45.8 ft	39.4 hp	2840 US g.p.m.	45.8 ft	39.4 hp	83.5 %	191 kWh/US MG	11.8 ft

Project		**Created by**		**Last update**	
Block		**Created on**	5/14/2019		

NP 3315 MT 3~ 634

Dimensional drawing

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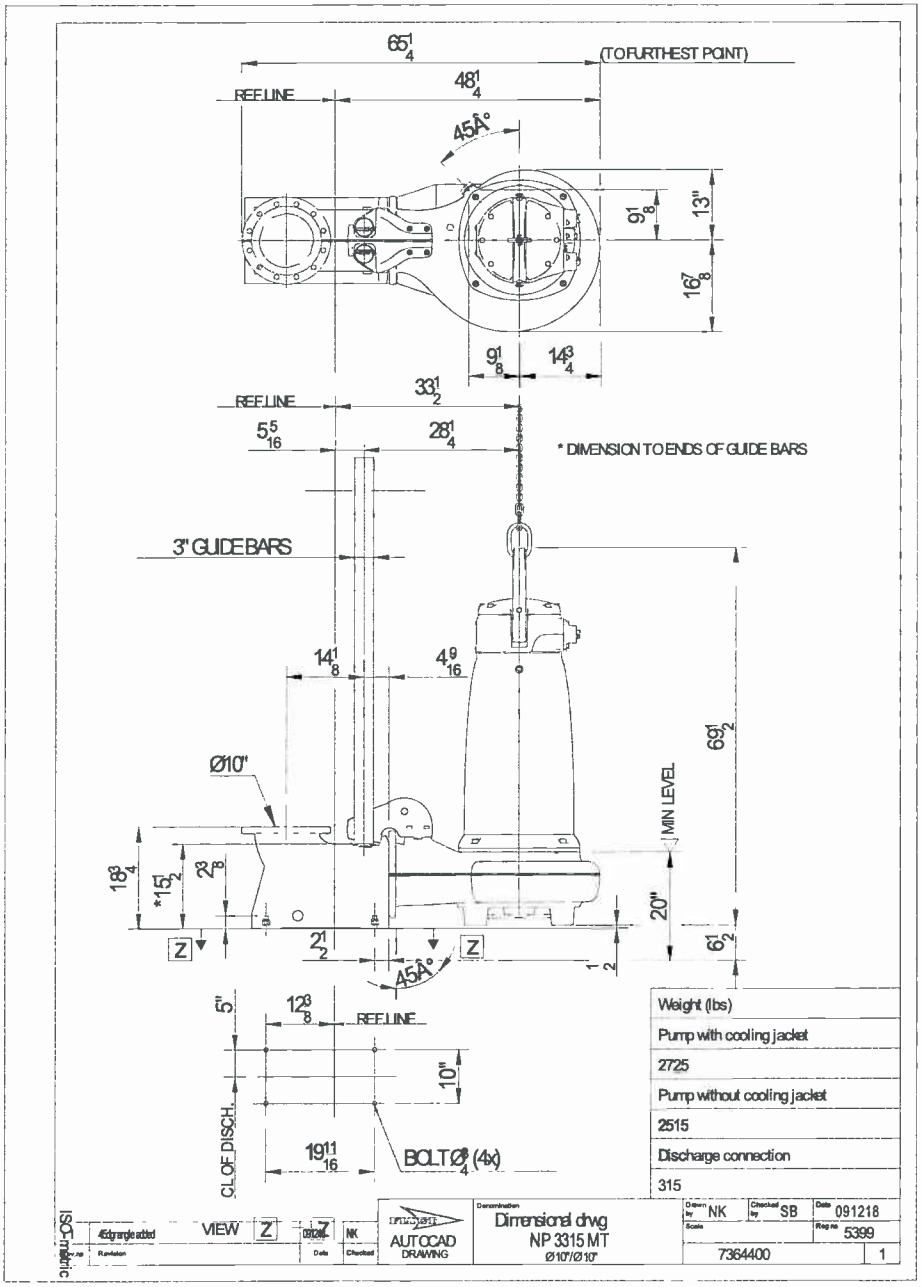


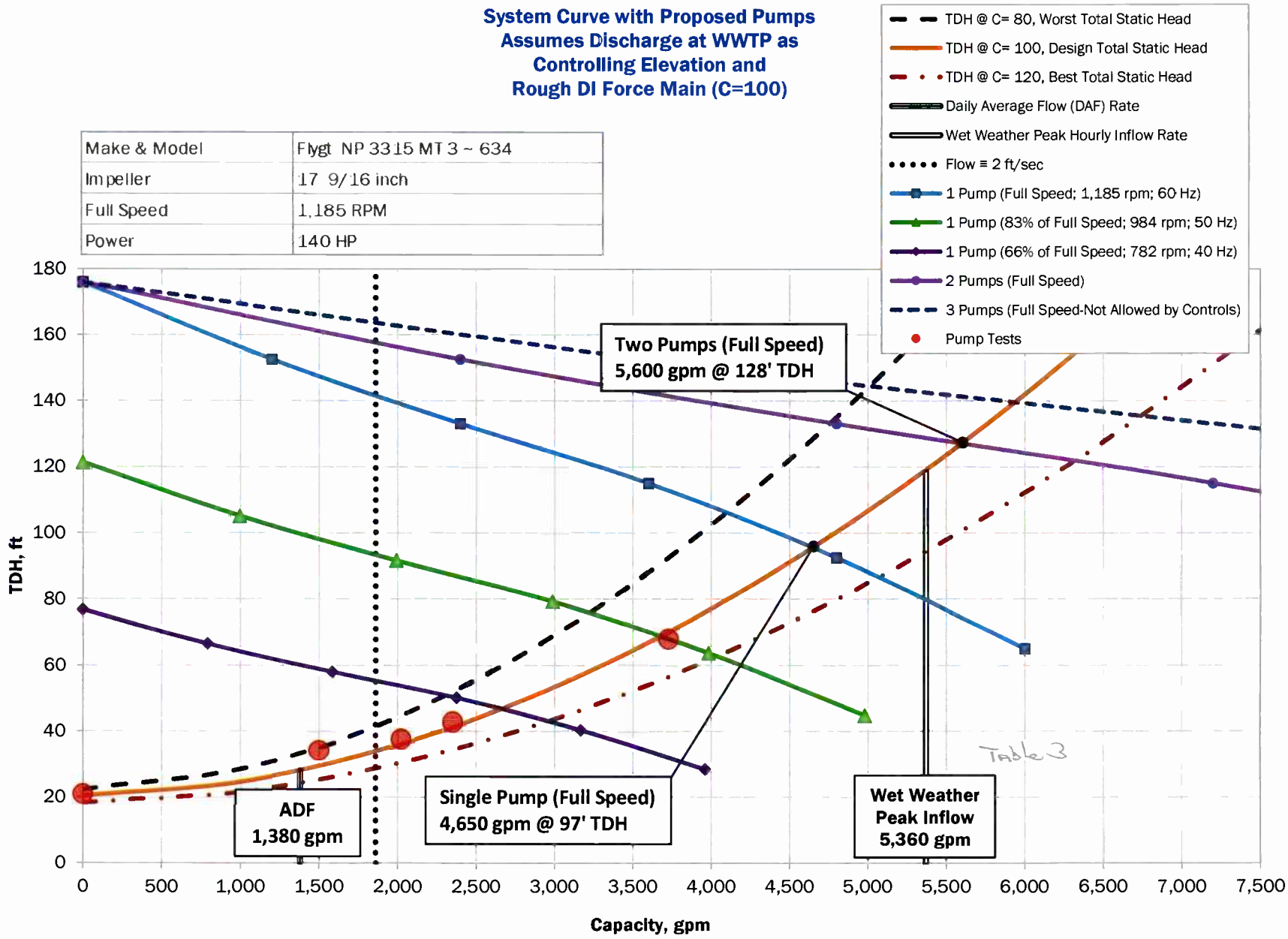
Project	Created by	Last update
Block	Created on 5/14/2019	

ClarkDietz

Allisonville Road Lift Station Improvements
City of Fishers, IN

System Curve with Proposed Pumps Assumes Discharge at WWTP as Controlling Elevation and Rough DI Force Main (C=100)

Make & Model	Flygt NP 3315 MT 3 ~ 634
Impeller	17 9/16 inch
Full Speed	1,185 RPM
Power	140 HP



Estimation of Pump Cycles - ADF with 1 Pump at Full Speed

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	4,650	gpm	At Full Speed
Wet Well Diameter	$D_{wet\ well}$	22.73	ft	406 Sq Ft Avg w/Fillets -- Eq. Dia. = 22.73'
Pump ON	h_1	749.70	ft	
Pump OFF	h_2	746.20	ft	
Volume Corresponding to Pump ON	V_1	304,212	ft^3	
Volume corresponding to pump OFF	V_2	302,792	ft^3	
Pumped Wastewater volume	ΔV	1,420	ft^3	
Pumped Wastewater volume	ΔV	10,620	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	1,380	gpm	330 gpm Allisonville plus 1,050 gpm Hague
Fill Time	$t_{f,avg}$	7.7	min	
Pump Run Time	$t_{r,avg}$	3.2	min	
Pump Cycle Time	$t_{c,avg}$	11	min	
Pump Starts per Hour	$N_{p,avg}$	5	-	< 10 cycles per hour

Estimation of Pump Cycles - ADF with 1 Pump at Minimum Speed

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	2,650	gpm	At 66% of Full Speed
Wet Well Diameter	$D_{wet\ well}$	22.73	ft	406 Sq Ft Avg w/Fillets -- Eq. Dia. = 22.73'
Pump ON	h_1	749.70	ft	
Pump OFF	h_2	746.20	ft	
Volume Corresponding to Pump ON	V_1	304,212	ft^3	
Volume corresponding to pump OFF	V_2	302,792	ft^3	
Pumped Wastewater volume	ΔV	1,420	ft^3	
Pumped Wastewater volume	ΔV	10,620	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	1,380	gpm	330 gpm Allisonville plus 1,050 gpm Hague
Fill Time	$t_{f,avg}$	7.7	min	
Pump Run Time	$t_{r,avg}$	8.4	min	
Pump Cycle Time	$t_{c,avg}$	16	min	
Pump Starts per Hour	$N_{p,avg}$	4	-	< 10 cycles per hour

Estimation of Pump Cycles - Peak Inflow with 2 Pumps at Full Speed

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	5,600	gpm	At Full Speed
Wet Well Diameter	$D_{wet\ well}$	22.99	ft	415 Sq Ft Avg w/Fillets -- Eq. Dia. = 22.99'
Pump ON	h_1	750.10	ft	
Pump OFF	h_2	746.20	ft	
Volume Corresponding to Pump ON	V_1	311,377	ft^3	
Volume corresponding to pump OFF	V_2	309,758	ft^3	
Pumped Wastewater volume	ΔV	1,619	ft^3	
Pumped Wastewater volume	ΔV	12,110	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	5,360	gpm	1080 gpm Allisonville plus 2,900 gpm Hague plus 330 gpm wet AR plus 1,050 gpm wet HR
Fill Time	$t_{f,avg}$	2.3	min	
Pump Run Time	$t_{r,avg}$	50.5	min	
Pump Cycle Time	$t_{c,avg}$	53	min	
Pump Starts per Hour	$N_{p,avg}$	1	-	< 10 cycles per hour

Estimation of Pump Cycles - ADF with 1 Pump at Full Speed
CURRENT AVERAGE DAILY FLOWS

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	4,650	gpm	At Full Speed
Wet Well Diameter	$D_{wet\ well}$	22.73	ft	406 Sq Ft Avg w/Fillets -- Eq. Dia. = 22.73'
Pump ON	h_1	749.70	ft	
Pump OFF	h_2	746.20	ft	
Volume Corresponding to Pump ON	V_1	304,212	ft^3	
Volume corresponding to pump OFF	V_2	302,792	ft^3	
Pumped Wastewater volume	ΔV	1,420	ft^3	
Pumped Wastewater volume	ΔV	10,620	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	715	gpm	104 gpm Allisonville plus 611 gpm Hague
Fill Time	$t_{f,avg}$	14.9	min	
Pump Run Time	$t_{r,avg}$	2.7	min	
Pump Cycle Time	$t_{c,avg}$	18	min	
Pump Starts per Hour	$N_{p,avg}$	3	-	< 10 cycles per hour

Estimation of Pump Cycles - ADF with 1 Pump at Minimum Speed
CURRENT AVERAGE DAILY FLOWS

Design	Assumed	Calculated

Design Pump Flowrate	$Q_{p,design}$	2,650	gpm	At 66% of Full Speed
Wet Well Diameter	$D_{wet\ well}$	22.73	ft	406 Sq Ft Avg w/Fillets -- Eq. Dia. = 22.73'
Pump ON	h_1	749.70	ft	
Pump OFF	h_2	746.20	ft	
Volume Corresponding to Pump ON	V_1	304,212	ft^3	
Volume corresponding to pump OFF	V_2	302,792	ft^3	
Pumped Wastewater volume	ΔV	1,420	ft^3	
Pumped Wastewater volume	ΔV	10,620	gallons	
Minimum Cycle Time				
Influent flow	$Q_{i,avg}$	715	gpm	104 gpm Allisonville plus 611 gpm Hague
Fill Time	$t_{f,avg}$	14.9	min	
Pump Run Time	$t_{r,avg}$	5.5	min	
Pump Cycle Time	$t_{c,avg}$	20	min	
Pump Starts per Hour	$N_{p,avg}$	3	-	< 10 cycles per hour

NPSH Calculations

Parameter		Value		
Design flow	Q	7.7	mgd	Refer Data
Temperature of water	t	60	°F	
Temperature of water	T	289	°K	
Vapor pressure	p_v/γ	0.25	psia	
Specific gravity of water	s	1	-	
Vapor pressure head	H_v	0.58	ft	
Mole of air	M	28.97	kg/kgmole	
Universal Gas Constant	R	8,314	$kg.m^2/kgmol.s^2.K$	
Static Suction Head	H_{sh}			
High		5.40	ft	
Design		3.40	ft	
Low		1.40	ft	
Atmospheric head at Sea Level	H_a	34	ft	
Atmospheric pressure at Sea Level	p_a	14.7	psi	
Atmospheric pressure at Sea Level	p_a	101.35	kN/m^2	
Pump suction elevation	Δz	744.80	ft	Refer Data
Atmospheric pressure at pump sction	$p_{a,z}$	92.80	kN/m^2	$p_{a,z} = p_a \times e^{\left(-\frac{gM\Delta z}{RT}\right)}$
Atmospheric head at pump suction	$H_{a,z}$	31.1	ft	

$$NHSP_{a,i} = H_{a,z} + H_{sh} - h_{Ds,i} - H_v$$

Total Flow, $Q_{t,i}$		Dynamic Head Loss in Suction Pipe at C =120, $h_{Ds,i}$	Available NPSH, $NPSH_{a,i}$		
			High H_{sh}	Design H_{sh}	Low H_{sh}
mgd	gpm	ft	ft	ft	ft
0	0	0.00	35.9	33.9	31.9
1.5	1,070	0.00	35.9	33.9	31.9
3.1	2,140	0.00	35.9	33.9	31.9
4.6	3,220	0.00	35.9	33.9	31.9
6.2	4,290	0.00	35.9	33.9	31.9
7.7	5,360	0.00	35.9	33.9	31.9
9.3	6,430	0.00	35.9	33.9	31.9
10.8	7,500	0.00	35.9	33.9	31.9

Lift Station & Force Main Piping System

Design	Assumed	Calculated

Pump Station Type

		Case 1 Wet Weather Peak Inflow			
Pumping Liquid		Wastewater			
Storage Basin Volume		NA			mgal
Drainage Duration		NA			hr
Flow total	Q_t	7.7			mgd
Flow total	Q_t	5,370			gpm
Min velocity	V_{min}	2			ft/sec
Max velocity	V_{max}	8			ft/sec
Number of Pumps		1			-
Flow per pump	Q_{pump}	7.7			mgd
Flow per pump	Q_{pump}	5,370			gpm
Flow per pump	Q_{pump}	12.0			ft^3/sec

18" 2 fps	1,860 gpm
18" 3 fps	2,790 gpm

Suction Side

Pipe			
Location		Wet well to Pump	
Pipe Material		NA	-
Class		NA	-
Manning's Coefficient		NA	-
Pipe Length	L	NA	ft
Nominal Diameter	D	NA	in
Outside Diameter	D_o	NA	in
Thickness	t	NA	in
Inside Diameter	D_i	NA	in
Inside Diameter	D_i	NA	ft
Flow Area	A	NA	ft^2
Flow			
Case 1		7.7	mgd
Velocity			
Case 1		NA	ft/sec

Pipe Fittings	k_i	Number
Σ		0.00

Pipe Factors		
Manning's Friction Facto	K_f	
Minor Loss Factor	K_m	

Static Suction Head			
Pump Suction Elevation		744.80	ft
Wet well water level			
High Water Level		750.20	ft
Design Water Level		748.20	ft
Low Water Level		746.20	ft
Static Suction Head	H_{sn}		
High		5.40	ft
Design		3.40	ft
Low		1.40	ft

Discharge Side

Pipe					
Location		Pump to Header	Header	Force Main	
Pipe Material		Ductile Iron	Ductile Iron	Ductile Iron	-
Class		Class 52	Class 52	PC 350	-
Manning's Coefficient		0.012	0.012	0.012	-
Pipe Length	L	25	25	7307	ft
Nominal Diameter	D	12	18	18	in
Outside Diameter	D_o	13.20	19.50	19.50	in
Thickness	t	0.28	0.36	0.36	in
Inside Diameter	D_i	12.64	18.78	18.78	in
Inside Diameter	D_i	1.05	1.57	1.57	ft
Flow Area	A	0.87	1.92	1.92	ft^2
Flow					
Case 1		7.7	7.7	7.7	mgd
Velocity					
Case 1		13.7	6.2	6.2	ft/sec

Pipe Fittings	k_i	Number		
10"				
90° Elbow	0.42	1		
Expansion (10"x12")	0.12	1		
12"				
90° Elbow	0.42	1		
Swing Check Valve	2.5	1		
Plug Valve	0.7	1		1
Expansion (12"x18")	0.12	1		
18"				
Tee (Flow Branch)	1.8		2	
Tee (Flow Through)	0.6		2	
Plug Valve	0.7		2	
45° Elbow	0.19		1	8
90° Elbow	0.42			5
Expansion (14"x18")	0.12			2
Magmeter (14")	0.05			1
Exit	1			1
Σ		4.28	6.39	5.61

Pipe Factors				
Manning's Friction Factor	K_f	0.01	0.00	0.45
Minor Loss Factor	K_m	0.09	0.03	0.02

768.5 matches with observed static

Static Discharge Head				
Pump Suction Elevation		744.80	ft	
Force Main Elevations				
High Point		778.50	ft	
Dischage		765.00	ft	
Controlling Elevation		768.50		Capacity of FM < Design Flow
Static Discharge Head	H_{sd}	23.70	ft	

Dynamic Head Losses

Design	Assumed	Calculated

Hazen Williams Coefficient			
Minimum	C_{min}	80	-
Maximum	C_{max}	120	-

$$h_{m,i} = \sum k_i \times h_{v,i}$$

$$h_{v,i} = \frac{V_i^2}{2g}$$

$$h_{f,i} = 0.002083 \times L_i \times \left(\frac{100}{C}\right)^{1.85} \times \frac{Q_{i,gpm}^{1.85}}{d_{i,in}^{4.8655}}$$

$$h_{D,i} = h_{m,i} + h_{f,i}$$

	Pipe	Flow Qi mgd	Flow Qi gpm	Flow Qi ft^3/sec	Velocity V_i ft/sec	Velocity Head $h_{v,i}$ ft	Minor Losses $h_{m,i}$ ft	Frictional Losses, ft h_{fi} C=80	C=100	C=120	Total Dynamic Losses, ft h_{Di} C=80	C=100	C=120
Suction Side	Wet well to Pump	0	0	0	0	0	0	0	0	0	0	0	0
		1.5	1,070	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		3.1	2,140	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		4.6	3,220	7.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		6.2	4,290	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		7.7	5,360	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		9.3	6,430	14.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
		10.8	7,500	16.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Discharge Side	Pump to Header	0	0	0.0	0	0.0	0	0	0	0	0	0	0
		1.5	1,070	2.4	2.7	0.1	0.5	0.1	0.1	0.1	0.6	0.6	0.6
		3.1	2,140	4.8	5.5	0.5	2.0	0.5	0.3	0.2	2.5	2.3	2.2
		4.6	3,220	7.2	8.2	1.1	4.5	1.1	0.7	0.5	5.6	5.2	5.0
		6.2	4,290	9.6	11.0	1.9	8.0	1.8	1.2	0.9	9.8	9.2	8.9
		7.7	5,360	12.0	13.7	2.9	12.5	2.7	1.8	1.3	15.2	14.3	13.8
		9.3	6,430	14.3	16.5	4.2	18.0	3.8	2.5	1.8	21.8	20.5	19.8
		10.8	7,500	16.7	19.2	5.7	24.5	5.1	3.3	2.4	29.6	27.9	26.9
	Header	0	0	0.0	0	0.0	0	0	0	0	0	0	0
		1.5	1,070	2.4	1.2	0.0	0.2	0.0	0.0	0.0	0.2	0.2	0.2
		3.1	2,140	4.8	2.5	0.1	0.6	0.1	0.0	0.0	0.7	0.7	0.6
		4.6	3,220	7.2	3.7	0.2	1.4	0.2	0.1	0.1	1.5	1.5	1.5
		6.2	4,290	9.6	5.0	0.4	2.5	0.3	0.2	0.1	2.7	2.6	2.6
		7.7	5,360	12.0	6.2	0.6	3.8	0.4	0.3	0.2	4.2	4.1	4.0
		9.3	6,430	14.3	7.5	0.9	5.5	0.6	0.4	0.3	6.1	5.9	5.8
		10.8	7,500	16.7	8.7	1.2	7.5	0.7	0.5	0.3	8.2	8.0	7.9
	Force Main	0	0	0	0	0	0	0	0	0	0	0	0
		1.5	1,070	2.4	1.2	0.0	0.1	5.9	3.9	2.8	6.0	4.0	2.9
		3.1	2,140	4.8	2.5	0.1	0.5	21.2	14.0	10.0	21.7	14.5	10.5
		4.6	3,220	7.2	3.7	0.2	1.2	45.1	29.8	21.3	46.3	31.1	22.5
		6.2	4,290	9.6	5.0	0.4	2.2	76.7	50.7	36.2	78.8	52.9	38.4
		7.7	5,360	12.0	6.2	0.6	3.4	115.7	76.6	54.7	119.1	80.0	58.0
		9.3	6,430	14.3	7.5	0.9	4.8	162.1	107.3	76.6	166.9	112.1	81.4
		10.8	7,500	16.7	8.7	1.2	6.6	215.5	142.6	101.8	222.1	149.2	108.4

Total Dynamic Head

Design	Assumed	Calculated

Total Static Head	H_{ts}			$H_{ts} = H_{sd} - H_{sh}$
Worst		22.30	ft	
Design		20.30	ft	
Best		18.30	ft	

$$TDH_i = H_{ts} + \sum h_{D,i}$$

Total Flow, $Q_{t,i}$			Flow per pump, $Q_{pump,i}$	TDH, ft when C =		
mgd	gpm	ft^3/sec	mgd	80 Worst	100 Design	120 Best
0.0	0	0	0	22	20	18
1.5	1,070	2.39	1.5	29	25	22
3.1	2,140	4.77	3.1	47	38	32
4.6	3,220	7.18	4.6	76	58	47
6.2	4,290	9.57	6.2	114	85	68
7.7	5,360	11.95	7.7	161	119	94
9.3	6,430	14.34	9.3	217	159	125
10.8	7,500	16.73	10.8	282	205	161