APPENDIX D
H&H study conducted by
H.Davis Cole & Associates, LLC and BKI
Burk-Kleinpeter, Inc

June 2014

DRAFT HYDRAULICS AND HYDROLOGIC (H&H) STUDY & PRELIMINARY DESIGN MEMORANDUM FOR VIOLET AREA SEWER IMPROVEMENTS

ST. BERNARD PARISH

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PRELIMINARY

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Draft Hydraulics and Hydrologic (H&H) Study & Preliminary Design Memorandum For Violet Area Sewer Improvements St. Bernard Parish

EXECUTIVE SUMMARY

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BKI BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

EXECUTIVE SUMMARY

The St. Bernard Parish Government (SBPG) Department of Water and Sewer operates an extensive sewer system which serves the industrial, commercial, and residential concerns throughout the parish. The current system consists of aging gravity and force main systems, including 92 lift stations. In addition to deterioration due to the age of the system, heavy damage was sustained during Hurricane Katrina in 2005 and the system has since been the subject of extensive repairs in an attempt to restore it to its pre-storm conditions.

The parish-operated sewerage system in the town of Violet, LA contains a combination of gravity sewer mains, sewer force mains, and nineteen (19) sewerage "lift" stations in order to transport sewage from the community to the old Violet Wastewater Treatment Plant (WWTP), which ultimately transfers sewage to the Munster WWTP as part of a regional system. This existing sewerage system during wet weather events, for all the reasons mentioned above, is operating under surcharged conditions.

Recently SBPG has applied for and received Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) funding to be utilized for improvements in the resiliency of pump stations and other sewerage infrastructure components for the town of Violet, Louisiana.

In order to address and determine the issues facing the sewerage system in the Town of Violet, LA, the development of an H&H model representing the Parish's sewerage system under severe wet weather conditions was necessary. The development of this H&H model required Geographic Information System (GIS) data from SBPG regarding the sewerage system layout, as well as data regarding the dimensions of the critical wet wells and their respective pump characteristics.

Once the H&H model was developed, several runs were completed. The results of the modeling were compared with conclusions from qualitative traditional methods along with Parish reported problems from the SBPG Department of Water & Sewer in order to validate the accuracy of the H&H model. After the accuracy of the H&H model was validated, evaluation of the H&H model coupled with qualitative traditional methods was completed to determine the root of the Violet sewerage system issues.

The SBPG Department of Sewer and Water staff determined that during dry weather events, i.e. normal/average flow conditions, the current system performs without any surcharge or sewerage discharge. However, during wet weather events, i.e. peak flow conditions, problems arise within the existing system. The present problems reported by SBPG Department of Water and Sewer staff during wet weather events generally include the following:

- Surcharging of and sewer discharge in the gravity sewer along E. St. Bernard Highway that conveys flow from lift station V1-06 to lift station V1-05 (two of the major collection and transmission stations);
- Surcharging of and sewer discharge at the wet well in lift station V1-05;

- Surcharging of and sewer discharge in the gravity sewer downstream of lift station V1-17 in Sewer Sub-Basin 3 along 3rd St.;

- Surcharging of and sewer discharge at the wet well of lift station V1-17 and its respective upstream gravity mains.

The above issues were validated by the qualitative analysis and modeling contained within this study. Generally, based upon the observed and calculated surcharged areas, the recommended system improvements include:

- Construction of a new force main from lift station V1-06 to lift station V1-05 directly connecting the two stations in reducing hydraulic loads on the gravity sewer collection system along E. St. Bernard Highway;

- Pumping and storage capacity upgrades at lift station V1-06 to reduce surcharging of the wet well gravity sewer main collection system upstream of the station along E. St. Bernard Highway;

- Construction of a new force main from lift station V1-05 to the new regional lift station V1-20 directly connecting the two stations and reducing hydraulic loads on the gravity sewer main collection system in sewer Sub-Basin 3;

- Pumping and storage capacity upgrades at lift station V1-05 to reduce surcharging of the wet well and gravity sewer main collection system upstream of the station;

- Construction of a new force main from lift station V1-17 to the new regional lift station V1-20 directly connecting the two stations and reducing hydraulic loads on the gravity sewer collection main system in sewer Sub-Basin 3;

- Reconstruction of lift station V1-17 to reduce the cycling time of the submersible pumps in lift station V1-17 while also eliminating surcharged conditions within lift station V1-17;

- Construction of a new regional lift station, V1-20 at the end of Allo Mumprhey Dr., to alleviate hydraulic loads on lift station V1-05 as well as the gravity sewer main system in sewer Sub-Basin 3;

- Construction of a new force main from the new regional lift station V1-20 at the end of Allo Mumphrey Dr. to the Violet Sewer Plant Transfer Station;

- Capacity upgrades at the Violet Sewer Plant Transfer Station;

The observations and recommendations contained within this report are based upon data obtained from pump controllers and other sources, without the benefit of flow monitoring. Observations and recommendations will be finalized in a final report after the completion of the flow monitoring.

Draft Hydraulics and Hydrologic (H&H) Study
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SECTION 1 – PROJECT BACKGROUND

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SECTION 1 – PROJECT BACKGROUND

INTRODUCTION

The St. Bernard Parish Government (SBPG) Department of Water and Sewer operates an extensive sewerage system which serves the industrial, commercial, and residential concerns throughout the parish. The existing sewerage system consists of aging gravity and force main systems, including 92 lift stations. The successful operation of these facilities is essential for the health, safety and overall quality of life for the parish's residents.

In addition to normal deterioration due to the age of the system, heavy damage was sustained during Hurricane Katrina in 2005 and the system has since been the subject of extensive repairs in an attempt to restore it to its pre-storm conditions.

Recently SBPG has applied for and received Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP) funding to be utilized for improvements in the resiliency of pump stations and other sewerage infrastructure components for the area of Violet, Louisiana. This funding will be used to reduce sewerage discharges in in this area thus improving the health, safety and overall quality of life for the area's residents.

The overall intent of this hazard mitigation project will be to provide improvements to the major pumping stations in the Violet sewerage service area while reducing hydraulic demands which over-burden the existing gravity main infrastructure.

An integral part in achieving these goals is the development of a Hydraulic and Hydrologic (H&H) Study of the sewer system in the Violet area. This consists of qualitative observations and the development of an H&H Study and system model to represent the Parish's current gravity and pressure main system. The model is a tool for the depiction of the existing and proposed conditions, and aids in the selection and evaluation of alternatives for the achievement of the project's goals. In addition, this H&H Study and Preliminary Design Memorandum (PDM) will outline conceptual-level improvements for the system and the anticipated design standards associated therewith.

PURPOSE

The focus of this H&H Study and PDM is to quantify existing and proposed H&H conditions to support the development of system improvements; while outlining general concepts for system improvements and proposed design standards. Specifically, this H&H Study and PDM contains the following items:

- A general system description and evaluation of the study area;
- An overview of procedures and assumptions utilized in the development of this study and underlying model;
- A description of general hydraulic findings;
- General "conceptual-level" recommendations for system improvements;

- Proposed design standards for system improvements;

BACKGROUND INFORMATION & PREVIOUS REPORTS

The observations, calculations, and modeling contained within this H&H Study and PDM were developed based upon our design team's personal experience and field reconnaissance within Violet and St. Bernard Parish, as well as several studies, reports, plans, and other items prepared by others.

The following reports, studies, or other references were utilized in the development of this study and memorandum:

- St. Bernard Parish Sanitary Sewer Overflow Control Program Pump Station Investigation Report, prepared by Montgomery Watson (MW), 2000;
- Plans and Specifications for Violet Lift Station Rehabilitation, prepared by Camp, Dresser & McKee (CDM), 2007;
- Geographic Information System (GIS) data, provided by St. Bernard Parish Government, 2014;
- Construction Plans for Sewer Pump Station Renovations, St. Bernard Parish, Louisiana (Lift Stations: V1-02, V1-03, V1-04, V1-06, V1-07, V1-08, V1-09, V1-10, and V1-11), prepared by Environmental Engineering Services, Inc., 2008;
- Construction Plans for Sewer Pump Rehabilitation No. 10, St. Bernard Parish, Louisiana (Lift Stations: V1-12, V1-13, V1-14, V1-15, and V1-16), prepared by All South Consulting Engineers, LLC., 2008;
- Construction Plans for Hi-Land & Violet Area Sewer Lift Station Repairs and Mitigation, St. Bernard Parish, Louisiana (Lift Stations: V1-05, V1-17, and V1-18), prepared by All South Consulting Engineers, LLC., 2008;
- Hydraulic Profile for Munster WWTP, prepared by CDM, 2009;

The following reference publications were utilized in the development of this study and memorandum:

- Civil Engineering Reference Manual, 11th Edition, Lindeberg;
- Cameron Hydraulic Data , 19th Edition, Flowserve;
- Recommended Standards for Wastewater Facilities (Ten States Standards), Great Lakes-Upper Mississippi River Board, 2004 Edition.

PROJECT LOCATION & STUDY AREA

The project is generally located in Violet, Louisiana, which is located along the eastern bank of the Mississippi River in east St. Bernard Parish. However, the project is not completely restricted to Violet. The project expands north into the area referred to as "Hi-Land", which is

also located along the eastern bank of the Mississippi River in east St. Bernard Parish. Figures 1.1 and 1.2 below illustrate the project location.

Figure 1.1 – Project Location within St. Bernard Parish

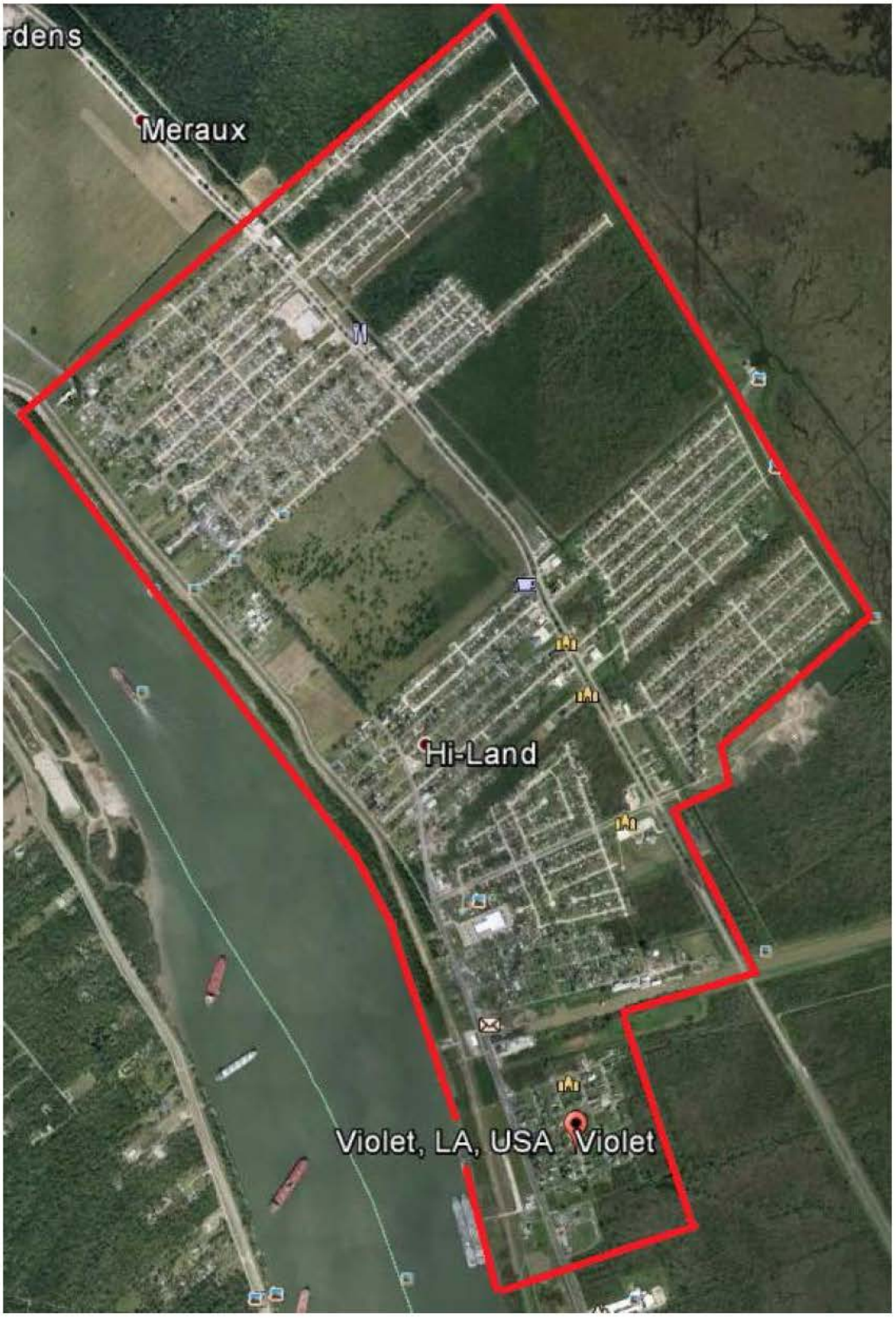

Figure 1.2 – Aerial View of Project Location

Specifically, this H&H Study and PDM focuses on how the nineteen (19) sewer lift stations located in the three (3) sub-basins of the Violet sewerage area behave hydraulically in terms of their interactions with each other and the gravity sewerage system. Figure 1.3 illustrates the location of the three (3) sub-basins, while Table 1.1 and Figure 1.4 illustrate and depict the locations of the lift stations within the three (3) sub-basins of the Violet sewer area.

Figure 1.3 – Location of the Three (3) Study Sub-Basins within the Violet Sewer Area

Figure 1.4 – Pump Station Locations within Study Sub-Basins

Table 1.1 - Pump Station Locations in Violet Sewer Area			
Pump Station No.	Location	Sub-Basin	Discharges To
V1-01	Angelique & 20 Arpent Canal	1	Violet WWTP
V1-02	Genie & Fable	1	Violet WWTP
V1-03	Meraux & Genie	1	Violet WWTP
V1-04	Woods & Tracy	1	V1-03
V1-05	Highland & St. Bernard Highway	3	Violet WWTP
V1-06	St. Bernard Highway & Livaccari	2	V1-05
V1-07	Claiborne & Landry	2	V1-06
V1-08	Fable & Legend	2	V1-06
V1-09	Maureen & Claiborne	2	V1-06
V1-10	Claiborne & Francis	2	V1-06
V1-11	Claiborne & Valmar	2	V1-06
V1-12	Meraux & Birch	2	V1-10
V1-13	2305 Meraux	2	V1-10
V1-14	Kenneth & Dove	3	V1-05
V1-15	2416 Guerra	3	V1-05
V1-16	2408 Jamie Ct.	3	V1-05
V1-17	3rd & Repose	3	V1-05
V1-18	4th & Canal	3	V1-17
V1-19	Millaudon School	3	V1-18

STUDY AND MOMORANDUM ORGANIZATION

This H&H study and Preliminary Design Memorandum is organized into three (3) sections with five (5) appendices:

- Section 1 – Project Background
- Section 2 – Existing System Description and Evaluation
- Section 3 – Conceptual Level Recommendations for System Improvements
- Appendix A – Figures
- Appendix B – Pump-Data Sheets
- Appendix C – Hydrographs
- Appendix D – Calculations
- Appendix E – SewerGEMS Visual Depiction

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SECTION 2 – SYSTEM DESCRIPTION AND EVALUATION

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SECTION 2 – EXISTING SYSTEM DESCRIPTION & EVALUATION

VIOLET AREA SEWER SYSTEM DESCRIPTION

The Parish-operated sewerage system in the Violet and Meraux areas consists of a combination of gravity sewer mains, sewer force mains, and nineteen (19) sewerage "lift" stations in order to transport sewage from the Violet area to the old Violet Wastewater Treatment Plant (Violet WWTP), where it is transferred to the Parish's consolidated Treatment Plant at Munster (Munster WWTP). Prior to the Parish's WWTP Consolidation Program, wastewater from the Violet area was treated at the Violet WWTP by a trickling filter process and was then discharged by an effluent pump station and pipeline to the Mississippi River. Currently, that effluent pipeline is abandoned in place.

The SBPG Department of Water and Sewer identifies its facilities in the Violet area with a "V" designation. The sewerage system within the Violet service area is completely self-contained with the exception of its interconnection with the Munster WWTP. The Violet service area currently contains 19 sewerage lift stations, approximately 550 manholes, 145,000 linear feet of gravity sewer mains, and 28,000 linear feet of sewer force mains.

Plate 1 of the exhibit plates attached as Appendix A to this study illustrates the existing general configuration of the Violet sewerage system.

The nineteen (19) lift stations in the study area are "submersible duplex" type stations, meaning that they each house two submersible sewage-handling pumps. In compliance with Recommended Standards for Wastewater Facilities (Ten States Standards) one pump is designed to serve the required pumping capacity with the second pump held in reserve as a spare. These stations transfer wastewater from low points in the collection system to the Violet Transfer Pump Station for transfer to the Munster WWTP for final treatment. Stations V1-05, V1-06, and V1-17 serve as the major collection stations in the area (Note: Station V1-17 is currently operating as a submersible simplex station, meaning it houses only one submersible pump, despite being designed as a submersible duplex station). Plate 2 of the exhibit plates attached as Appendix A to this study shows the existing lift station hierarchy.

For the purposes of this H&H study, the Violet sewer area was divided into three sub-basins based upon inspection of the operational schematics. Sub-Basin "1" includes the northeastern portion of the study area and includes stations V1-01, V1-02, V1-03, and V1-04. This sub-basin contains no major collection pump stations, and flow from Sub-Basin "1" flows directly to the Violet WWTP via large gravity piping. Sub-Basin "2" includes the southwestern portion of the study area and includes V1-06, V1-07, V1-08, V1-09, V1-10, V1-11, V1-12, and V1-13. Of these stations, V1-06 serves as the major collection station. Finally, Sub-Basin "3" includes the remaining stations V1-05, V1-14, V1-15, V1-16, V1-17, V1-18, V1-19, and a small private station at Violet Park. Of these stations, V1-05 serves as the major collection station. V1-05 also collects the effluent from V1-06 and all of sub-basin 2. Finally, while V1-17 does not serve as a major collection station for an entire sub-basin, it does collect all wastewater from areas east of its location and transfers it to V1-05.

PARISH REPORTED PROBLEMS

The SBPG Department of Sewer and Water staff has determined that during dry weather events, i.e. normal/average flow conditions, the current system performs without any surcharge or sewerage discharge. However, during wet weather events, i.e. peak flow conditions, problems arise within the existing system. The present problems reported by SBPG Department of Water and Sewer staff during wet weather events generally include the following:

- Surcharging of and sewer discharge in the gravity sewer along E. St. Bernard Highway that conveys flow from lift station V1-06 to lift station V1-05 (two of the major collection and transmission stations);
- Surcharging of and sewer discharge at the wet well in lift station V1-05;
- Surcharging of and sewer discharge in the gravity sewer downstream of lift station V1-17 in Sewer Sub-Basin 3 along 3rd St.;
- Surcharging of and sewer discharge at the wet well of lift station V1-17 and its respective upstream gravity mains;

Identifying the root cause and determining a recommended solution for each of the above mentioned problems is the main objective of this H&H Study and PDM.

EVALUATION OF THE EXISITING SYSTEM BY TRADITIONAL QUALITATIVE METHODS

Prior to the construction of the sewer model, HDCA conducted a conceptual level qualitative analysis of the design capacities for both the pump stations and gravity mains in the sewerage service area in order to provide a cursory overview of obvious deficiencies in the Violet sewer system. This was accomplished by inspection of the flow schematics and hierarchy diagrams for the major collection/transmission stations, algebraic summation of these station's flow demands, and analysis of gravity mains utilizing Manning's equation for open channel flow.

For the purposes of this study, gravity sewer mains were assumed to be surcharged when their free-flowing capacity, as calculated by Manning's equation, was exceeded. The Manning's equation is not reproduced herein, however it should be noted that an "n" value of 0.013, Manning's coefficient for concrete, was utilized for the calculations. Slope of gravity sewer mains and diameters were obtained from GIS data provided by SBPG.

To identify the extent of the surcharging of the gravity sewer mains along E. St. Bernard Highway as mentioned above, the Manning's equation was utilized to quantify their flow rate capacity. Table 2.1 below depicts these free-flowing capacities.

Table 2.1 - Flow Rate Capacities for Gravity Mains Along E. St. Bernard Highway

Conduit ID	Diameter		R_h	S	V	Q	
	(in.)	(ft.)	(ft.)	(ft.)	(ft./s)	(cfs)	(gpm)
CO - 206	12	1.000	0.250	0.0229	6.88	5.4	2425
CO - 207	8	0.667	0.167	0.0029	1.88	0.7	295
CO - 208	8	0.667	0.167	0.0029	1.86	0.6	291
CO - 216	8	0.667	0.167	0.0015	1.35	0.5	211
CO - 219	8	0.667	0.167	0.0028	1.85	0.6	290
CO - 220	8	0.667	0.167	0.0007	0.93	0.3	146
CO - 221	8	0.667	0.167	0.0033	2.00	0.7	314
CO - 222	8	0.667	0.167	0.0016	1.38	0.5	216
CO - 223	8	0.667	0.167	0.0029	1.87	0.7	293
CO - 224	8	0.667	0.167	0.0015	1.36	0.5	213
CO - 225	8	0.667	0.167	0.0026	1.78	0.6	278

HDCA determined that the controlling gravity main along E. St. Bernard Highway, CO-220, is an 8" gravity sewer main and has a flow rate capacity of 146 gallons per minute (GPM). The operation design pump capacity for station V1-06 is 530 GPM with a total dynamic head of 42 feet (ft.). It is evident that when station V1-06 is operating at its operational design pump capacity, the gravity main sewer system connecting stations V1-06 and V1-05 along E. St. Bernard Highway will be surcharged, leading to potential sewerage discharges in the area.

In regards to the surcharging of the wet well in station V1-05, HDCA algebraically summed the operational design pump capacities for all of station V1-05's upstream influent pumping stations. These upstream influent pumping stations include stations V1-06, V1-14, V1-15, V1-16, and V1-17.

Note that V1-06 is a major collection and transmission station with upstream influent stations V1-07, V1-08, V1-09, V1-10, V1-11, V1-12, and V1-13. Also note V1-17 is a major collection and transmission station as well with upstream influent stations V1-18 and V1-19.

From the algebraic summation of flow requirements for station V1-05 performed in Appendix E, the necessary pumping capacity for station V1-05 is 2,125 GPM. The design pumping capacity for station V1-05 is 1,800 GPM meaning that if the station is operating as designed, it is undersized. This deficiency in pumping capacity leads to and explains the surcharging experienced in station V1-05.

The surcharging of large gravity mains in Sewer Sub-Basin 3 near 3rd St. is related to downstream pipe diameter reductions as these gravity mains approach Station V1-05, as well as the surcharging of station V1-05 described above. Station V1-17 discharges into an 18" gravity main. This 18" gravity main is then constricted to a 12" gravity main at manhole V08-0374, which is the same manhole that Station V1-16 discharges to. As this gravity main

continues downstream towards it fluctuates pipe diameters at the following manholes until it reaches Station V1-05 as a 12" diameter gravity main:

- Manhole V08-0368: 12" to 18"
- Manhole V08-0367: 18" to 24"
- Manhole V08-0360: 24" to 16"
- Manhole V08-0344: 16" to 12"

From the algebraic summation of flow requirements for station V1-17 performed in Appendix E, the necessary pumping capacity for station V1-17 is 850 GPM. The actual pumping capacity for station V1-17 is 850 GPM. The upstream pumping station V1-18 has a pumping capacity of 850 GPM, however, station V1-17 is a collection and transmission station for its own gravity sewer main system. The inflow rate from this gravity sewer main system, combined with the station V1-18 pumping at capacity (850 GPM), would lead to station V1-17 operating under surcharged conditions.

The results of the calculations detailed above were utilized for validation of the parish reported problems. Additionally, they were utilized to guide the construction of the sewer model described below, while verifying the results obtained from the model.

SELECTION OF THE MODELING SOFTWARE

In order to appropriately model the existing and proposed sewer system of the Violet area, HDCA first had to determine which modeling software would be most applicable given the scope of the project. For the purposes of this study, HDCA selected Bentley's SewerGEMS V.8.0 software to model the Violet sewer system following a review of several industry standard programs. HDCA selected this software based on the following:

- SewerGEMS is capable of modeling both gravity and force main applications;
- SewerGEMS is capable of modeling both steady-state and dynamic conditions;
- SewerGEMS is readily compatible with most Geographic Information System (GIS) platforms;
- SewerGEMS is readily compatible with most Computer Aided Design & Drafting (CADD) platforms.

SewerGEMS V.8.0 lent itself well to this particular study. The Violet sewer system contains both force mains and gravity pipelines, required both steady state and dynamic analysis, and could be reconstructed geometrically using readily available GIS data in the possession of St, Bernard Parish Government. Given that SewerGEMS has the ability to model all of the above mentioned characteristics this project contains, it was selected by HDCA as the modeling software for this project.

CONSTRUCTION OF THE SEWERGEMS V.8.0 SYSTEM MODEL

First, the geometric configuration of the SewerGEMS model was constructed utilizing GIS data provided by SPBG. This data was utilized to create the sewer manhole, gravity main, pump station and force main node network. Once the "x" and "y" (latitudinal and longitudinal) coordinates of all system features were finalized the piping network connectivity was input manually as SewerGEMS was unable to directly import all of the vertical data provided by SBPG.

After completing the piping network connectivity, HDCA was able to determine the general flow pattern of the gravity main network by inspection based on the review of the elevations of manhole inverts throughout the system.

Once the general flow patterns of the gravity main network had been determined, HDCA was able to eliminate all of the unnecessary nodes and gravity mains from the SewerGEMS model, which in turn reduced the potential error in the models final calculation. It should be noted that areas of the system which were identified as problem areas by SPBG's operational staff were not removed from the model network. How HDCA accounted for the flow these components carried will be discussed later on in this section.

After the piping network was connected and the general flow patterns had been determined, the lift stations and their respective components needed to be constructed within the model. Since the study includes nineteen (19) duplex submersible stations, except Station V1-17 (which is operating as a simplex station at the time of this report), HDCA utilized the SewerGEMS procedure for modeling duplex submersible stations.

The SewerGEMS model requires a link to connect the suction side of the pump to a node. Since all 19 pumping stations are duplex submersible stations, they all contain wet wells. Therefore wet wells were selected to serve as the node linking the gravity mains entering the stations to their respective pumps. After placing the wet wells at their proper locations, the following data was entered for each wet well:

- Elevation of the Bottom of the Wet Well (Base) (ft.);
- Minimum Water Surface Elevation in the Wet Well (Minimum) (ft.);
- Elevation at which the Wet Well Flooded (Maximum) (ft.);
- Surrounding Grade Elevation (Ground) (ft.);
- Wet Well Diameter or Cross-Section Dimensions (ft.);
- An Initial Water Surface was Set Equal to the Minimum Water Surface Elevation for Each Lift Station;

The above dimensions for the 19 wet wells are listed in Table 2.2 below, and were sourced from St. Bernard Parish Sanitary Sewer Overflow Control Program pump station investigation report, prepared by Montgomery Watson. Additional information regarding the pump stations wet well geometry was obtained from construction drawings for rehabilitation projects undertaken and completed after Hurricane Katrina.

Table 2.2 - Dimensions of Wet Wells

Wet Well ID	Elevation					Diameter
	Base (ft.)	Minimum Allowable Water Surface (ft.)	Initial Water Surface (ft.)	Maximum Water Surface (ft.)	Ground (ft.)	(ft.)
LS V1-01	10.83	11.33	11.33	21.00	21.83	6.00
LS V1-02	1.70	2.70	2.70	19.00	20.00	9.00
LS V1-03	7.04	8.04	8.04	20.00	21.29	5.00
LS V1-04	8.14	9.14	9.14	20.00	21.72	5.50
LS V1-05	6.63	7.63	7.63	24.00	25.13	8.30
LS V1-06	12.42	13.42	13.42	24.00	24.92	6.50
LS V1-07	6.25	7.25	7.25	21.00	22.25	6.50
LS V1-08	5.89	6.89	6.89	21.00	22.89	6.00
LS V1-09	9.82	10.82	10.82	21.00	22.12	6.00
LS V1-10	7.32	8.32	8.32	21.00	22.12	6.50
LS V1-11	7.50	8.50	8.50	23.17	24.00	6.00
LS V1-12	13.18	14.18	14.18	22.00	22.93	5.00
LS V1-13	9.83	10.83	10.83	20.00	21.08	5.50
LS V1-14	11.71	13.21	13.21	20.96	21.96	6.00
LS V1-15	14.77	15.77	15.77	23.00	23.77	6.00
LS V1-16	8.04	9.04	9.04	20.00	21.04	5.00
LS V1-17	8.05	9.05	9.05	24.35	25.35	8.30
LS V1-18	10.09	11.09	11.09	25.00	25.92	10.00

The next step in completing the construction of the SewerGEMS model was connecting the wet wells to their respective pumps. Physically these pumps lie within the wet wells, however, in SewerGEMS the pumps and wet wells must be connected by a pressure pipe. In order to minimize headloss one of two techniques may be used: (1) either user define the pipes to have the minimum allowable lengths with the maximum allowable diameters or (2) tell SewerGEMS that these pipes are virtual (have no dimensions and have no headloss). The former was selected for a more accurate representation. Each wet well was connected to two pumps in parallel with two separate virtual force mains, except for Station V1-17 which currently houses one submersible pump. In order to accurately model the system, the two virtual force mains were joined at a pressure junction following the pumps to form one force main. This arrangement simulates the station's discharge manifold. Once the pumps were connected to their respective wet wells the following information had to be entered for each pump into the SewerGEMS model:

- Elevation of the Pump Centerline (ft.);
- Pump "On" Elevation (ft.);

- Pump "Off" Elevation (ft.);
- Pump Definition or Pump Curves (Sourced from Parish Documentation);

Given that the available resources did not contain the precise inlet elevations for the pumps, HDCA for the purposes of the model assumed that the pump inlet elevations were 6" above the base elevation for their respective wet wells in Table 2.2.

The "on" elevation refers to the elevation at which the pump will be activated. Since these stations are designed as duplex submersible pump stations, each wet well (except V1-17) contains two submersible pumps and each pump within the wet well will be activated at different elevations. The arrangement employed by SBPG Water and Sewer is the "lead" pump/"lag" pump arrangement. Due to the lack of data, HDCA assumed that the "lead" pump (denoted as Pump (1)) will be activated once the water level in the wet well is at the elevation of the lowest invert. HDCA also assumed that the "lag" pump (denoted as Pump (2)) will be activated once the water level in the wet well has risen to 1' above the lowest influent pipe.

The off elevation refers to the elevation at which the pump will be deactivated. HDCA assumed that both pumps, Pump (1) and Pump (2), for each respective wet well will be deactivated once the water level has fallen to a level 1.5' above the base of the wet well. All of the above mentioned elevations can be found in Table 2.3 below:

Table 2.3 – Pump Elevation Data

Pump ID (In SewerGEMS Model)	Wet Well Elevation		Pump Elevation		
	Ground (ft.)	Lowest Invert (ft.)	Centerline (ft.)	On (ft.)	Off (ft.)
Lead PMP V1-01	21.83	14.83	11.33	14.83	12.33
Lag PMP V1-01	21.83	14.83	11.33	15.83	12.33
Lead PMP V1-02	20.00	4.75	2.70	4.75	3.20
Lag PMP V1-02	20.00	4.75	2.70	4.75	3.20
Lead PMP V1-03	21.29	9.12	7.54	9.12	8.54
Lag PMP V1-03	21.29	9.12	7.54	10.12	8.54
Lead PMP V1-04	21.72	12.22	8.64	12.22	9.64
Lag PMP V1-04	21.72	12.22	8.64	12.72	9.64
Lead PMP V1-05	25.13	11.13	7.13	10.63	8.13
Lag PMP V1-05	25.13	11.13	7.13	11.63	8.13
Lead PMP V1-06	24.92	16.42	12.92	15.42	13.92
Lag PMP V1-06	24.92	16.42	12.92	16.42	13.92
Lead PMP V1-07	22.25	10.75	6.75	9.75	7.75
Lag PMP V1-07	22.25	10.75	6.75	10.75	7.75
Lead PMP V1-08	22.89	9.89	6.39	8.89	6.89
Lag PMP V1-08	22.89	9.89	6.39	9.89	6.89
Lead PMP V1-09	22.12	13.87	10.32	13.87	11.32
Lag PMP V1-09	22.12	13.87	10.32	14.87	11.32
Lead PMP V1-10	22.12	11.12	7.82	11.12	8.82
Lag PMP V1-10	22.12	11.12	7.82	12.12	8.82
Lead PMP V1-11	24.01	12.01	8.01	12.01	9.01
Lag PMP V1-11	24.01	12.01	8.01	13.01	9.01
Lead PMP V1-12	22.93	15.43	13.68	15.43	14.68
Lag PMP V1-12	22.93	15.43	13.68	16.43	14.68
Lead PMP V1-13	21.08	13.33	10.33	13.33	11.33
Lag PMP V1-13	21.08	13.33	10.33	14.33	11.33
Lead PMP V1-14	21.96	14.46	12.21	14.46	13.21
Lag PMP V1-14	21.96	14.46	12.21	15.46	13.21
Lead PMP V1-15	23.77	16.87	15.27	16.87	16.27
Lag PMP V1-15	23.77	16.87	15.27	17.87	16.27
Lead PMP V1-16	21.04	9.12	8.54	9.12	9.04
Lag PMP V1-16	21.04	9.12	8.54	10.12	9.04
Lead PMP V1-17	25.35	9.60	8.55	9.60	9.55
Lead PMP V1-18	25.92	14.42	10.59	14.42	11.59
Lag PMP V1-18	25.92	14.42	10.59	15.42	11.59

After assigning all of the elevation data the next step was to assign pump curves for each of the pumps represented in Table 2.3. HDCA consulted with SBPG and the appropriate

manufacturer's representatives in order to obtain pump data submittals containing pump performance curves, motor horsepower, and pump efficiency information. These curves were analyzed by HDCA and were then entered and assigned to appropriate pumps in SewerGEMS. The pump curves and model curve definition readouts for each respective pump can be found in Appendix C attached to this H&H study and preliminary design memorandum. The designed operational pump capacities in regards to flow (GPM) and total dynamic head (ft.) are depicted below in Table 2.4.

Table 2.4 - Designed Operation Pump Capacities

Pump Station No.*	Flow*** (GPM)	Total Dynamic Head*** (ft.)
V1-01	350	11.0
V1-02	1175	65.0
V1-03	525	23.0
V1-04	415	18.0
V1-05	1800	46.0
V1-06	530	42.0
V1-07	390	30.0
V1-08	350	20.0
V1-09	400	30.0
V1-10	475	44.0
V1-11	125	27.0
V1-12	250	13.5
V1-13	200	22.0
V1-14	235	13.0
V1-15	275	12.5
V1-16	235	13.0
V1-17**	850	36.0
V1-18	850	36.0

*Both submersible pumps within the pumping station are identical

**V1-17 only contained one submersible pump at the time of this H&H study

***Data from SBPG-provided submittals and not from hydraulic analysis

As mentioned above, the pumps are attached to their respective wet wells in SewerGEMS by two separate force mains. In order to accurately model the system, these pumps had to be reconnected to one force main. Thus, a pressure junction was placed immediately downstream of the pumps at the effluent elevation. Force mains were entered into the system to connect the two pumps to this pressure junction. Figure 2.3 from the SewerGEMS model that depicts the entire pumping station system (wet well, pumps, and pressure junction):

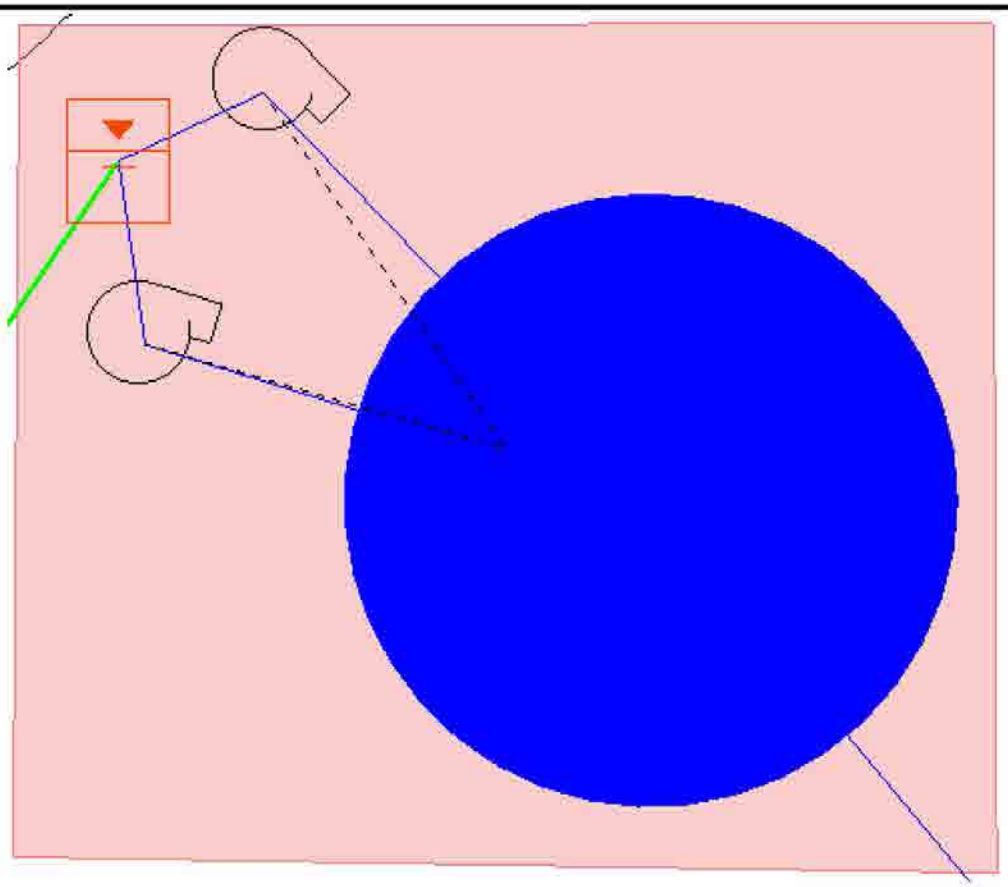

Figure 2.3 - SewerGEMS Depiction of Pumping Station

Once all of the pumping stations had been entered into the model with their respective wet wells and pumps, the next step was to assign hydrographs for these respective pumping stations.

In order to provide actual flow behavior for the model to consider and evaluate, HDCA assigned flow to the pump stations which were not major collection stations (V1-05, V1-06 and V1-17). The reason being that the majority of flow for all major collection stations materialize from upstream lift stations. Also, no demand was assigned to gravity nodes, as only gravity mains between pump stations along the critical path were modeled.

HDCA employed a two-pronged approach in order to compute flow demands. First, HDCA reviewed historical data from the multi-trode multi-smart "Intelligent Pump Controllers", which are currently in operation at each of the sewer lift stations in the study area. These station controllers are capable of tracking a variety of station operating parameters including station inflow, outflow, pump run times, total daily volume pumped, and other miscellaneous factors. Initially HDCA performed a rough "data pump" of all 19 stations in the study area. After that data was found inadequate, HDCA (in association with St. Bernard Parish Government) reprogrammed the station controllers to track inflow and outflow at each station. The demand hydrographs utilized for SewerGEMS are included in Appendix D attached to this study.

Because the stations controllers calculate inflow and outflow based on volumetric changes within the station wet well, this is not always reliable. Once the wet well becomes surcharged by the influent lines, volumetric change decreases dramatically, which skews the station inflow and outflow dramatically.

Accordingly, HDCA elected to supplement the station controller data with actual flow monitoring. HDCA elected to complete flow monitoring by sub-basins. Sub-basin 1 was monitored at the farthest manhole. Sub-basin 2 was monitored at the farthest downstream manhole, directly upstream of V1-06. Sub-basin 3 was monitored at its farthest downstream manhole, directly upstream of V1-05. In addition, two additional monitors were added at stations at V1-05 and V1-17. The flow monitor at V1-17 was just upstream of the lift station, while second monitor for V1-05 was placed directly upstream from the lift station to determine the flow coming from Sub-basin 2 (or Station V1-06).

All these data were then imported into SewerGEMS. However, dry and wet weather hydraulic data for the pumping stations were not readily available. HDC sent out a representative to collect the following data so the model would be able to depict what is happening dynamically within the sewer area.

- Inflow Rates for all Pumping Stations;
- Pump Flow Rates for each Pump;
- Daily Volume Pumped for all Pumping Stations;

Once these data were analyzed and imported into SewerGEMS model, it was now able to model the events that occur within the system. These model scenarios of the existing conditions were run in order to determine where the problems were lying and if the model results were consistent with the parish reported problems locations.

MODEL SCENARIOS & RESULTS – EXISTING CONDITIONS

Following the creation of the model, HDCA completed several model runs to determine the operating characteristic of the Violet system. The runs completed in SewerGEMS V.8.0 were:

- A 24-hr steady state simulation of the system, with an inflow at each station equal to the station's design capacity found in Appendix E, and;
- A 24-hr steady state simulation of the system, where the inflow rates at each station were equal to the inflow rates determined by service area population estimation with a peaking factor equal to six (6) found in Appendix E;

These model runs were used in order to model worst case flow scenarios for the Violet sewer system, and the associated system behavior.

The 24-hr steady state station's design capacity scenario was derived in the following manner. All stations, except the major collection and transmission stations (V1-05, V1-06, and V1-17), were given a fixed load inflow rate set to their respective design operating pump capacity. The major collection and transmission stations were not given fixed load inflow rates due to the fact that their upstream lift stations either produced flow rates that exceeded the

operational design pumping capacities (V1-05 and V1-06) or were equal to the operational design pumping capacities (V1-17). As mentioned above the calculations for these algebraic summation of flow rates to the major collection and transmission stations can be found in Appendix E, as well Table 2.5 below.

Table 2.5 - Algebraic Summation of Flow Rates

Tributary Stations to Lift Station V1-06	Flow (GPM)
V1-07	390
V1-08	350
V1-09	400
V1-10*	25
V1-11	125
V1-12	250
V1-13	200
V1-06	1,740
Tributary Stations to Lift Station V1-05	**Flow (GPM)**
V1-06	530
V1-14	235
V1-15	275
V1-16	235
V1-17	850
V1-05	2,125
Tributary Stations to Lift Station V1-17	**Flow (GPM)**
V1-18	850
V1-17	850

* From Table 2.4 station V1-10 has a capacity of 475 GPM. However, due to the configuration, V1-12 and V1-13 make up 450 GPM of that 475 GPM. Therefore V1-10 contributes only 25 GPM to station V1-06

The results from this scenario are as follows. Stations V1-05 and V1-06 were operating under surcharged conditions, which lead to all manholes along E. St. Bernard Highway in Sub-Basin 2 overflowing, as well as the manholes upstream of station V1-05 along E. St. Bernard Highway and Meraux Foundation Property in Sub-basin 3, and finally overflowing of nearly all upstream manholes of station V1-05 in Sub-Basin 3 downstream of V1-17. This correlates well with the parish reported problems detailed earlier in this section. The following figures from the model, Figure 2.4 and Figure 2.5, depict the areas of Violet that are operating under surcharged conditions. These surcharged areas are highlighted in yellow.

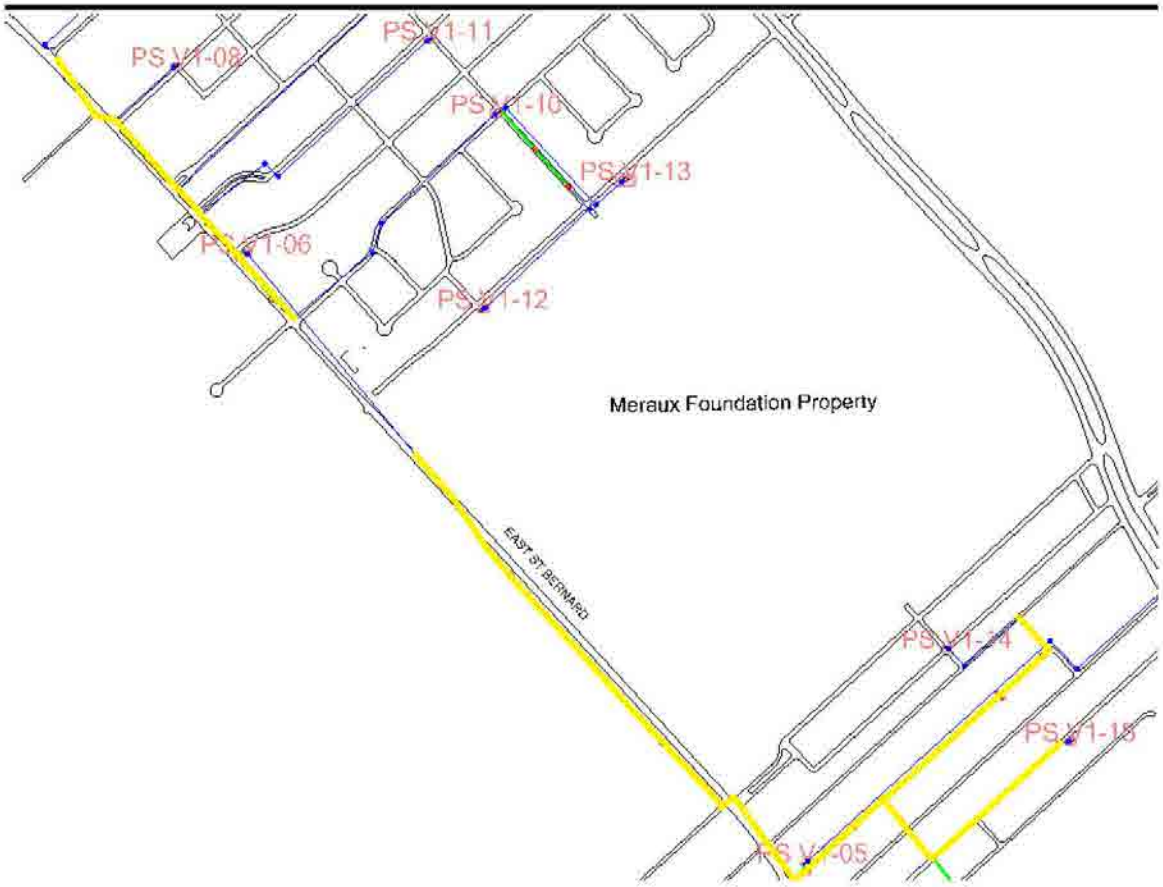

Figure 2.4 – Surcharged Conditions in Sub-Basin 2 and Sub-Basin 3

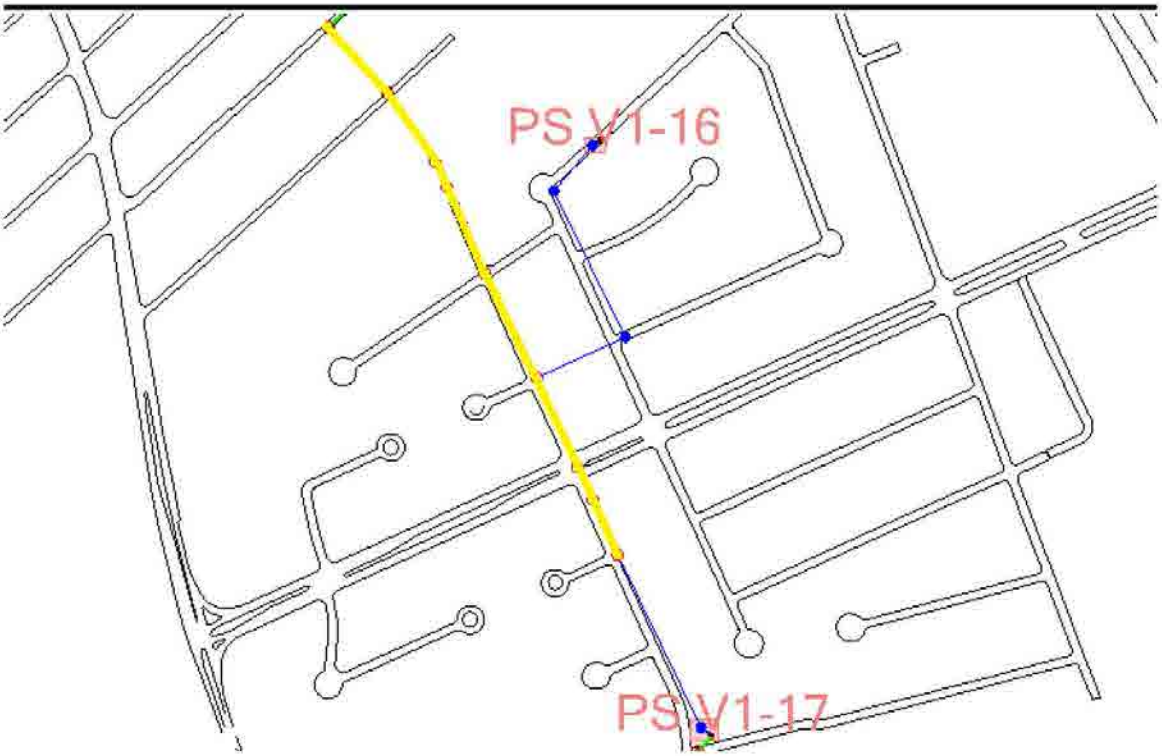

Figure 2.5 – Surcharged Conditions in Sub-Basin 3

The 24-hr steady state simulation derived from counting houses was determined using the following method. A formula from the Civil Engineer's Reference Manual was used in order to assign the proper inflow rates to each station by assigning the appropriate tributary area for each station using GIS data provided by SBPG, counting houses from google earth for each respective tributary area, multiplying the number of houses by the average household size of 2.92 persons per household in Violet, LA from 2010 census data, multiplying that result by 150 gallons per day (GPD), then converting the final answer from GPD to GPM. In order to best approximate current conditions a peaking factor of six (6) was applied to simulate a wet weather conditions in the model. This peaking factor was deemed to reflect a more severe wet weather event than using the CERM peaking factor equation. The CERM peaking equation factor uses the following equation to determine the peaking factor.

$$Peaking\ Factor = \frac{18 + \sqrt{\frac{No.\ of\ Houses}{1000}}}{4 + \sqrt{\frac{No.\ of\ Houses}{1000}}}$$

After calculating the CERM peaking factor for each lift station, it was determined that using this method the peaking factors ranged from 3.5 to 4.5. In order to be more conservative HDCA decided to use a peaking factor of six (6).

Commercial buildings were treated as residential households with the same average household size of 2.92 persons per household. The results from this calculation can be found in Appendix E, as well as Table 2.6 below. Note in this model every station was given a fixed load inflow rate.

Table 2.6 - Flow Rates From Service Area Population Estimation

Station	Total Number of		Avg. Flow		Peak Flow	
	Houses	Commercial	(gpd)	(gpm)	(gpd)	(gpm)
V1-01	0	0	0	0	0	0
V1-02	233	0	102054	71	612324	425
V1-03	44	0	19272	13	115632	80
V1-04	96	0	42048	29	252288	175
V1-05	359	7	160308	111	961848	668
V1-06	65	0	28470	20	170820	119
V1-07	47	0	20586	14	123516	86
V1-08	79	0	34602	24	207612	144
V1-09	112	0	49056	34	294336	204
V1-10	228	0	99864	69	599184	416
V1-11	46	0	20148	14	120888	84
V1-12	16	0	7008	5	42048	29
V1-13	25	0	10950	8	65700	46
V1-14	77	1	34164	24	204984	142
V1-15	11	0	4818	3	28908	20
V1-16	99	0	43362	30	260172	181
V1-17	197	2	87162	61	522972	363
V1-18	108	0	47304	33	283824	197
Violet WWTP	666	0	291708	203	1750248	1216

The results from this scenario mirrored the results from the 24-hr steady state station's design capacity scenario and reaffirmed the parish reported problems.

SUMMARY OF SYSTEM

Overall the Violet sewerage system is need of various improvements in order to prevent surcharging during severe wet weather events. The major collection and transmission stations V1-06 and V1-05 are severely obsolete, resulting in overflows of manholes and surcharged operated conditions throughout the sewerage area.

Sub-Basin 1 is operating appropriately and appears to have no flooding during peak weather events.

Sub-Basin 2 is experiencing surcharged gravity mains, overflowing manholes, and a surcharged major collection and transmission station (V1-06) during extreme events. These results are consistent with the parish reported problems.

Sub-Basin 3 is also experiencing surcharged gravity mains, overflowing manholes, and a surcharged major collection and transmission station (V1-05) during extreme events. This regions results were consistent with the parish reported problems, however it appears it is

experiencing more issues than originally thought. Station V1-05 appears to be the main issue in this region.

From Table 2.5, if the upstream lift stations for the major collection lift station V1-06 are operating at capacity, the inflow rate into lift station V1-06 would be 1,740 GPM. Also, from Table 2.6, the major collection lift station V1-06 receives an additional 120 GPM of flow from the service area population estimation from downstream gravity mains. This raises the total existing inflow rate into lift station V1-06 to 1,860 GPM, while the pumping capacity of the submersible pumps in lift station V1-06 are only 530 GPM. This explains the overflowing of manholes and surcharging of gravity mains upstream of lift station V1-06 along E. St. Bernard Highway, as well as the surcharging of the major collection lift station V1-06.

From Table 2.1, it is apparent that when the major collection lift station V1-06 is operating at capacity, 530 GPM, the downstream gravity mains along E. St. Bernard Highway are unable to convey this flow rate. The controlling gravity main, C0 – 220, is only able to handle a flow rate of 146 GPM. This explains the overflowing of manholes and surcharging of gravity mains downstream of the major collection lift station V1-06 along E. St. Bernard Highway.

From Table 2.5, if the upstream lift stations for the major collection lift station V1-05 are operating at capacity, the inflow rate into lift station V1-05 would be 2,125 GPM. Also, from Table 2.6, the major collection lift station V1-05 receives an additional 670 GPM of flow from the service area population estimation from downstream gravity mains. This raises the total existing inflow rate into lift station V1-05 to 2,795 GPM, while the pumping capacity of the submersible pumps in lift station V1-05 are only 1,800 GPM. This explains the overflowing of manholes and surcharging of gravity mains in Sewer Sub-Basin 3 en route to the major collection station V1-05, as well as the surcharging of the major collection lift station V1-05.

FLOW MONITORING

The observations and recommendations contained within this report are based upon data obtained from pump controllers and other sources, without the benefit of flow monitoring. Observations and recommendations will be finalized in a final report after the completion of the flow monitoring.

Draft Hydraulics and Hydrologic (H&H) Study
& Preliminary Design Memorandum
For
Violet Area Sewer Improvements
St. Bernard Parish

SECTION 3 – PRELIMINARY RECOMMENDATIONS FOR SYSTEM IMPROVEMENTS

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SECTION 3 – PRELIMINARY RECOMMENDATIONS FOR SYSTEM IMPROVEMENTS

PROPOSED IMPROVEMENTS FOR THE VIOLET SEWERAGE SYSTEM

The qualitative and model analysis in Section 2 of this H&H study and PDM were utilized in the development of preliminary recommendations for system improvements. Generally, based upon the observed and calculated surcharged areas, the recommended system improvements include:

- Construction of a new force main from lift station V1-06 to lift station V1-05 directly connecting the two stations in reducing hydraulic loads on the gravity sewer collection system along E. St. Bernard Highway;
- Pumping and storage capacity upgrades at lift station V1-06 to reduce surcharging of the wet well gravity sewer main collection system upstream of the station along E. St. Bernard Highway;
- Construction of a new force main from lift station V1-05 to the new regional lift station V1-20 directly connecting the two stations and reducing hydraulic loads on the gravity sewer main collection system in sewer Sub-Basin 3;
- Pumping and storage capacity upgrades at lift station V1-05 to reduce surcharging of the wet well and gravity sewer main collection system upstream of the station;
- Construction of a new force main from lift station V1-17 to the new regional lift station V1-20 directly connecting the two stations and reducing hydraulic loads on the gravity sewer collection main system in sewer Sub-Basin 3;
- Reconstruction of lift station V1-17 to reduce the cycling time of the submersible pumps in lift station V1-17 while also eliminating surcharged conditions within lift station V1-17;
- Construction of a new regional lift station, V1-20 at the end of Allo Mumprhey Dr., to alleviate hydraulic loads on lift station V1-05 as well as the gravity sewer main system in sewer Sub-Basin 3;
- Construction of a new force main from the new regional lift station V1-20 at the end of Allo Mumphrey Dr. to the Violet Sewer Plant Transfer Station;
- Capacity upgrades at the Violet Sewer Plant Transfer Station;

The following figures depict the locations of the proposed force mains mentioned above, as well as the location of the new regional lift station V1-20 at the end of Allo Mumphrey Dr.

Figure 3.1 – Proposed Force Main from Lift Station V1-06 to Lift Station V1-05

Figure 3.2 – Proposed Force Main from Lift Station V1-05 to V1-20, as well as Proposed Location of the New Regional Lift Station V1-20

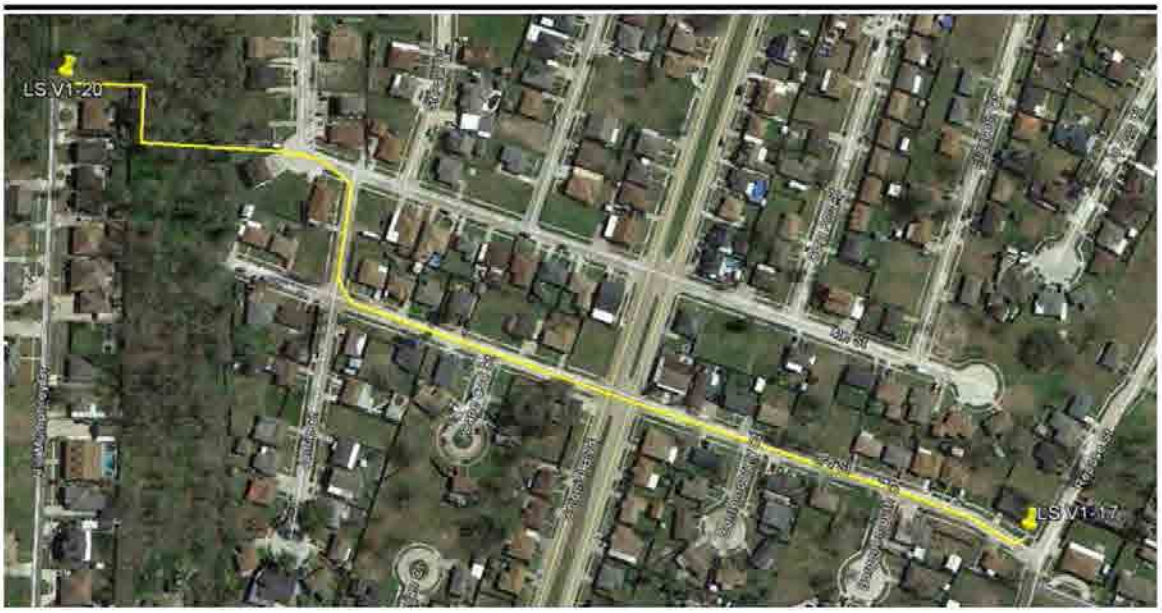


Figure 3.3 – Proposed Force Main from Lift Station V1-17 to V1-20

Figure 3.4 – Proposed Force Main from Lift Station V1-20 to the Violet Sewer Plant Transfer Station

For the purposes of the model runs described in this section, the improvements mentioned above have been incorporated into the SewerGEMS model prepared for this study.

QUALITATIVE OBSERVATIONS FOR PROPOSED IMPROVEMENTS

Prior to the implementation of the proposed system improvements into the model HDCA conducted a conceptual level analysis of the proposed design capacities for both the pump stations and force mains in the sewerage service area. This was accomplished by inspection, with the proposed improvements implemented into the flow schematics and hierarchy diagram for the major collection/transmission stations, algebraic summation of these stations flow demands, and analysis of gravity and force mains utilizing Manning's equation for open channel flow and the fluid continuity equation.

PROPOSED FORCE MAIN FROM LIFT STATION V1-06 TO LIFT STATION V1-05

In order to eliminate the surcharging of gravity mains downstream from station V1-06 along E. St. Bernard Highway, a force main should be installed along E. St. Bernard Highway directly transferring flow from station V1-06 to station V1-05. This will eliminate the outflow from station V1-06 into the gravity main along E. St. Bernard Highway parallel to the Meraux Foundation Property. This will reduce the hydraulic demand on an overburdened gravity main line.

The diameter of this force main was determined by using the continuity equation, Q = VA, with the velocity set to 5 ft./s and the flow rate set to the pumping capacity of V1-06, which was calculated below to be 1,860 GPM. After the calculation, which can be found in Appendix D, a diameter of 12" was determined to be adequate. The installation of the force main should eliminate the surcharging of gravity mains downstream from station V1-06 along E. St. Bernard Highway.

CAPACITY IMPROVEMENTS TO LIFT STATION V1-06

To determine the capacity improvements of lift station V1-06, HDCA algebraically summed the operational design pump capacities for all of lift station V1-06's upstream influent pumping stations, which can be found in Table 2.4. These upstream influent pumping stations include V1-07, V1-08, V1-09, V1-10, V1-11, V1-12, and V1-13.

Note that V1-10 is a collection and transmission station with upstream influent stations V1-12 and V1-13.

From the algebraic summation of flow requirements for lift station V1-06 performed in Appendix D, the necessary pumping capacity for lift station V1-06 is 1,740 gallons per minute (GPM). However, the influent from the upstream pumping stations is not the sole contributor of influent to lift station V1-06. Part of the gravity sewer main system in Sub-Basin 2 leads directly to V1-06 bypassing all other pumping stations in the region. From the service area population estimation found in Appendix D, there is approximately an additional 120 GPM of influent for station V1-06. Therefore, HDCA determined that the improved operational design pumping capacity for V1-06 should be at least 1,860 GPM. This improvement in capacity,

along with the installation of the associated force main, should eliminate the surcharging of the upstream gravity mains along E. St. Bernard Highway upstream of lift station V1-06.

Given that the proposed pumping capacity for lift station V1-06 should be increased to 1,860 GPM, the desired and existing storage capacity for lift station V1-06 must be calculated to determine if any improvements in storage capacity are necessary. The storage capacity is directly related to the pump cycle time (the elapsed time between starts and stops of each pump). A typical design standard 12 starts per hour for a submersible pump. Given that lift station V1-06 is a submersible duplex station, enough storage volume must be available to limit the pumps to 12 starts per hour. The equation to determine the necessary volume, *V*, to achieve this design standard is as follows;

$$V = \frac{tQ}{4}$$

Where *t* is equivalent to the desired cycle time in minutes, and *Q* is the pump flow rate in GPM. Substituting five (5) minutes for the desired cycle time and 1,860 GPM for the pump flow rate of lift station V1-06, the necessary storage volume is 2,325 gallons. The existing storage capacity of lift station V1-06 is currently 950 gallons. Therefore an increase in storage capacity of 1,375 gallons is necessary. The calculations for the necessary storage capacity can be found in Appendix D. There are two (2) options that would increase the storage capacity for lift station V1-06: (1) the construction of a new lift station or (2) the construction of an auxiliary storage structure. The selection of which option is most prudent will be determined during the 30% design phase with SBPG input.

PROPOSED FORCE MAIN FROM LIFT STATION V1-05 TO THE NEW REGIONAL LIFT STATION V1-20

In order to reduce hydraulic loads on the gravity sewer main collection system in sewer Sub-Basin 3 upstream of lift station V1-05, a force main should be installed in order to directly transfer flow from lift station V1-05 to proposed lift station V1-20. Installation of this force main should eliminate the surcharging of the gravity sewer main collection system in sewer Sub-Basin 3 upstream of lift station V1-05. The diameter of this force main was determined by using the continuity equation Q = VA, with the velocity set to 5 ft./s and the flow rate set to the pumping capacity of V1-05, which was calculated below to be 3,275 GPM. After the calculation, which can be found in Appendix D, a diameter of 16" was determined to be adequate. This should eliminate the surcharging of the gravity sewer main collection system in sewer Sub-Basin 3 upstream of lift station V1-05.

CAPACITY IMPROVEMENTS TO LIFT STATION V1-05

The same process utilized for determining the required capacity improvements to lift station V1-06 was performed in order to determine the required capacity improvements to lift station V1-05. HDCA algebraically summed the operational design pump capacities for all of lift station V1-05's upstream influent pumping stations which can be found in Table 2.4. These upstream influent pumping stations include V1-06, V1-14, V1-15, and V1-16.

Note that under the proposed improvements, lift station V1-17 is no longer an influent pumping station to station V1-05. This is due to the fact that the proposed improvement

involve a force main directly transporting flow from station V1-17 to the new regional pumping station V1-20 at Allo-Mumprhey.

From the algebraic summation of flow requirements for lift station V1-05 performed in Appendix D, the necessary pumping capacity for station V1-05 is 2,605 GPM. However, the influent from the upstream pumping stations is not the sole contributor of influent to lift station V1-05. Part of the gravity sewer main system in Sub-Basin 3 leads directly to lift station V1-05 bypassing all other pumping stations in the region. From the service area population calculation found in Appendix D, there is approximately an additional 670 GPM of influent for lift station V1-05. Therefore, HDCA determined that the improved operational design pumping capacity for V1-05 should be at least 3,275 GPM. This improvement in capacity with the installation of the associated force main, should eliminate the surcharging of the upstream gravity mains in Sub-Basin 3.

Given that the proposed pumping capacity for lift station V1-05 should be increased to 3,275 GPM, the desired and existing storage capacity for lift station V1-05 must be calculated to determine if any improvements are necessary. The storage capacity is directly related to the pump cycle time (the elapsed time between starts and stops of each pump). A typical design standard 12 starts per hour for a submersible pump. Given that lift station V1-05 is a submersible duplex station, enough storage volume must be available to limit the pumps to 12 starts per hour. The equation to determine the necessary volume, *V*, to achieve this design standard is as follows;

$$V = \frac{tQ}{4}$$

Where *t* is equivalent to the desired cycle time in minutes, and Q is the pump flow rate in GPM. Substituting five (5) minutes for the desired cycle time and 3,300 GPM for the pump flow rate of lift station V1-05 (a more conservative measure), the necessary storage volume is 4,125 gallons. The existing storage capacity of lift station V1-05 is currently 2,485 gallons. Therefore an increase in storage capacity of 1,640 gallons is necessary. The calculations for the necessary storage capacity can be found in Appendix D. There are two (2) options that would increase the storage capacity for lift station V1-05: (1) the construction of a new lift station or (2) the construction of an auxiliary storage tank. The selection of which option is most prudent will be determined during the 30% design phase with SBPG input.

PROPOSED FORCE MAIN FROM LIFT STATION V1-17 TO THE NEW REGIONAL LIFT STATION V1-20

In order to reduce hydraulic loads on the gravity sewer main collection system in sewer Sub-Basin 3 downstream and upstream of lift station V1-17, HDCA is proposing a force main should be installed in order to directly transfer flow from lift station V1-17 to lift station V1-20. This installation of this force main should eliminate the surcharging of the gravity sewer main collection system in sewer Sub-Basin 3 downstream and upstream of lift station V1-17. The diameter of this force main was determined by using the continuity equation Q = VA, with the velocity set to 5 ft./s and the flow rate set to the pumping capacity of V1-17, which was calculated below to be 1,300 GPM. After the calculation, which can be found in Appendix D, a diameter of 10" was determined to be adequate. This should eliminate the surcharging of the gravity sewer main collection system in sewer Sub-Basin 3 downstream and upstream of lift station V1-17.

CAPACITY IMPROVEMENTS TO LIFT STATION V1-17

The same process utilized for determined required capacity improvements at lift station V1-06 and V1-05 was performed in order to determine the required capacity improvements to lift station V1-17. HDCA algebraically summed the operational design pump capacities for all of lift station V1-17's upstream influent pumping stations which can be found in Table 2.4. These upstream influent pumping stations include V1-18.

From the algebraic summation of flow requirements for lift station V1-17 performed in Appendix D, the necessary pumping capacity for station V1-17 is 850 GPM. However, the influent from the upstream pumping stations is not the sole contributor to lift station V1-17. Part of the gravity sewer main system in Sub-Basin 3 leads directly to lift station V1-17 bypassing all other pumping stations in the region. From the service area population calculation found in Appendix D, there is approximately an additional 375 GPM of influent for lift station V1-17. Therefore, HDCA determined that the improved operational design pumping capacity for V1-17 should be at least 1,225 GPM. This in capacity improvement along with the installation of the associated force main should eliminate the surcharging of the downstream and upstream gravity mains in sewer Sub-Basin 3.

Given that the proposed pumping capacity for lift station V1-17 should be increased to 1,225 GPM, the required and existing storage capacity for lift station V1-17 must be calculated to determine if any improvements are necessary. The storage capacity is directly related to the pump cycle time (the elapsed time between starts and stops of each pump). A typical design standard 12 starts per hour for a submersible pump. Given that lift station V1-05 is a submersible duplex station, enough storage volume must be available to limit the pumps to 12 starts per hour. The equation to determine the necessary volume, *V*, to achieve this design standard is as follows;

$$V = \frac{tQ}{4}$$

Where *t* is equivalent to the desired cycle time in minutes, and Q is the pump flow rate in GPM. Substituting five (5) minutes for the desired cycle time and 1,300 GPM for the pump flow rate of lift station V1-17 (a more conservative measure), the necessary storage volume is 1,625 gallons. The existing storage capacity of lift station V1-17 is currently 375 gallons. Therefore an increase in storage capacity of 1,250 gallons is necessary. The calculations for the necessary storage capacity can be found in Appendix D.

(Note: The operating range in lift station V1-17 is very shallow and implies that the influent gravity mains to this lift station are likely operating under surcharged conditions, which was alluded to by the employees of the SBPG Department of Water and Sewer. This also gives a potential explanation for pump maintenance difficulties at this station due to its short cycle time.)

There are two (2) options that would increase the storage capacity for lift station V1-17: (1) the construction of a new lift station or (2) the construction of an auxiliary storage tank. Due to the extremely shallow operating range of this lift station, construction of a new lift station is recommended, however, the selection of which option is most prudent will be determined during the 30% design phase with SBPG input.

PROPOSED NEW REGIONAL LIFT STATION V1-20

The construction of the proposed regional pumping station V1-20 at Allo-Mumphrey is the largest proposed improvement to the existing system. The primary purpose of lift station V1-20 is to alleviate the loads on lift station V1-05, as well as to reduce the loads on the gravity sewer mains downstream from lift station V1-17. The loads will be reduced on lift station V1-05 due to the proposed installation of a force main that will directly convey effluent from lift station V1-17 to lift station V1-20 bypassing lift station V1-05 in the process. This will also alleviate the loads on the gravity sewer main downstream from lift station V1-17 since V1-17's effluent is no longer being discharged into this gravity sewer main system.

The same process performed to determine lift station V1-05 and V1-06's pumping capacity was performed in order to conceptualize the operational design pumping capacity of lift station V1-20. Lift station V1-20's upstream influent pumping stations operational design pumping capacity, which can be found in Table 2.4, include lift stations V1-05 and V1-17.

From the algebraic summations calculation of flow requirements for lift station V1-20 performed in Appendix E, the necessary pumping capacity for lift station V1-20 is 4,500 GPM. Therefore, HDCA determined that the improved operational design pumping capacity for lift station V1-20 should be 4,500 GPM. This proposed improvement should eliminate the surcharging of the gravity mains in sewer Sub-Basin 3 and severely reduce the load on station V1-05.

Based upon preliminary hydraulic calculations and pump calculations contained in Appendix D, it is anticipated that lift station V1-20 will be a triplex submersible lift station. The anticipated required pump size is between 25 and 40 horsepower.

PROPOSED FORCE MAIN FROM THE NEW REGIONAL LIFT STATION V1-20 TO THE VIOLET SEWER PLANT TRANSFER STATION

The proposed lift station will potentially utilize the existing effluent force main from the decommissioned Violet WWTP effluent pump station. The feasibility of the reuse of this pipeline will be determined based upon the results of pipeline assessment work taken prior to the 30% design level.

The required diameter of this force main was determined by using the continuity equation Q = VA, with the velocity set to 5 ft./s and the flow rate set to the pumping capacity of the new regional lift station V1-20, which was calculated above to be 4,500 GPM. After the calculation, which can be found in Appendix D, a diameter of 20" pipeline will be acceptable for that use.

CAPACITY IMPROVEMENTS TO THE VIOLET WWTP TRANSFER PUMP STATION

In order to determine if improvements to the Violet WWTP Transfer Pump Station were necessary, HDCA conducted a preliminary analysis of the pumping capacity of the existing Violet WWTP Transfer Pump Station. HDCA utilized as-built drawings of the pump station, the hydraulic profile at the Munster WWTP, and Google Earth to estimate the force main length and develop the pumping system curve. Based upon information available to HDCA at

the time of this report, the design capacity at the Violet WWTP Transfer Pump Station is approximately 6,000 GPM.

From the algebraic summation of flow requirements for the Violet WWTP Transfer Pump Station performed in Appendix D, the necessary pumping capacity for the Violet WWTP Transfer Pump Station is 6,550 gallons per minute (GPM). However, the influent from the upstream pumping stations is not the sole contributor of influent to the Violet WWTP Transfer Pump Station. Part of the gravity sewer main system in Sub-Basin 3 leads directly to the Violet WWTP Transfer Pump station bypassing all other pumping stations in the region. From the service area population estimation found in Appendix D, there is approximately an additional 1,215 GPM of influent for the Violet WWTP Transfer Pump station. Therefore, HDCA determined that the improved operational design pumping capacity for the Violet WWTP Transfer Pump station should be at least 7,765 GPM.

MODEL RUNS FOR PROPOSED IMPROVEMENTS

Following the qualitative observations for the proposed improvements, the necessary adjustments to ameliorate the parish reported problems and those discovered through prior SewerGEMS model runs of the existing system were made in SewerGEMS. These adjustments included those mentioned above.

After these improvements were entered into the SewerGEMS model of the existing system, HDCA completed a couple of model runs to determine if the above mentioned proposed improvements eliminated the parish reported problems and the additional ones found from the existing SewerGEMS model runs of the Violet sewerage system. The runs completed in SewerGEMS V.8.0 included:

- A 24-hr steady state simulation of the improved system, with inflow rates at each station equal to the station's design capacity found in Appendix D and Table 3.1 below, and;
- A 24-hr steady state simulation of the improved system, where the inflow rates of each station were set equal to the inflow rates determined by the service area population estimation technique with a peaking factor equal to six (6) found in Appendix D;

These runs were used in order to model worst case scenarios for the Violet sewerage system.

Table 3.1 - Algebraic Summation of Flow Rates	
Tributary Stations to Lift Station V1-06	Flow (GPM)
V1-07	390
V1-08	350
V1-09	400
V1-10*	25
V1-11	125
V1-12	250
V1-13	200
V1-06	1740
Tributary Stations to Lift Station V1-05	Flow (GPM)
V1-06	1860
V1-14	235
V1-15	275
V1-16	235
V1-05	2605
Tributary Stations to Lift Station V1-17	Flow (GPM)
V1-18	850
V1-17	850
Tributary Stations to Lift Station V1-20	Flow (GPM)
V1-05	3275
V1-17	1225
V1-20	4500
Tributary Stations to The Violet WWTP Transfer Pumping Station	Flow (GPM)
V1-01	350
V1-02	1175
V1-03	525
V1-20	4500
Violet WWTP	6550

* From Table 2.4 station V1-10 has a capacity of 475 GPM, however, due to the configuration V1-12 and V1-13 make up 450 GPM of that 475 GPM. Therefore V1-10 contributes only 25 GPM to station V1-06

The 24-hr steady state station's design capacity scenario was designed in the following manner. All stations, except the major collection and transmission stations (V1-05, V1-06 and V1-17), were given a fixed load inflow rate set to their respective operational design capacities. The reason the major collection and transmission stations were not given these fixed load inflow rates is due to the fact that their upstream lift stations flow rates were utilized to determine the improved pumping design capacity of these major collection and transmission stations. However, these stations improved pumping design capacity were given additional inflow rates determined by the counting houses method. These algebraic sums of flow rates to the major collection and transmission stations as well as the population estimation method can be found in Appendix D.

The results from this scenario are as follows. The improved alterations to the system that were discussed above had a resounding effect on the system. All of the above mentioned parish reported problems, and those additionally found from the existing SewerGEMS model of the system, were resolved and eliminated in the proposed model.

The 24-hr steady state simulation derived from counting houses was determined using the following method. A formula from the Civil Engineer's Reference Manual was used in order to assign the proper inflow rates to each station by assigning the appropriate tributary area for each station using GIS data provided by SBPG, counting houses from google earth for each respective tributary area, multiplying the number of houses by the average household size in Violet, LA from 2010 census data, multiplying that result by 150 gallons per day (GPD), then converting the final answer from GPD to GPM. In order to be conservative and model a wet weather event the result in GPM was multiplied by a peaking factor of six (6) to account for this scenario. The results from this calculation can be found in Appendix E, as well as Table 3.2 below. Note in this model every station was given a fixed load inflow rate.

Table 3.2 - Flow Rates From Service Area Population Estimation

Station	Total Number of		Avg. Flow		Peak Flow	
	Houses	Commercial	(GPD)	(GPM)	(GPD)	(GPM)
V1-01	0	0	0	0.00	0	0
V1-02	233	0	102054	71	612324	425
V1-03	44	0	19272	13	115632	80
V1-04	96	0	42048	29	252288	175
V1-05	359	7	160308	111	961848	668
V1-06	65	0	28470	20	170820	119
V1-07	47	0	20586	14	123516	86
V1-08	79	0	34602	24	207612	144
V1-09	112	0	49056	34	294336	204
V1-10	228	0	99864	69	599184	416
V1-11	46	0	20148	14	120888	84
V1-12	16	0	7008	5	42048	29
V1-13	25	0	10950	8	65700	46
V1-14	77	1	34164	24	204984	142
V1-15	11	0	4818	3	28908	20
V1-16	99	0	43362	30	260172	181
V1-17	197	2	87162	61	522972	363
V1-18	108	0	47304	33	283824	197
Violet WWTP	666	0	291708	203	1750248	1215

The results from this scenario mirrored the results from the 24-hr steady state station's design capacity scenario and reaffirmed that the proposed improvements listed above will indeed eliminate the parish reported problems and those additionally discovered from the existing SewerGEMS model.

DESIGN STANDARDS FOR RECOMMENDED IMPROVEMENTS

Part of the purpose of this PDM is to define the required design standards for all recommended improvements to the Violet sewer system. These standards are anticipated to include, but not necessarily be limited to the following design codes and standards:

- Recommended Standards for Wastewater Facilities, Great Lakes – Upper Mississippi Board of State and Provincial Public Health and Environmental Managers;
- State of Louisiana Sanitary Code;
- State of Louisiana Plumbing Code;
- National Fire Protection Association Standard 820;
- International Building Code, International Code Council;
- International Electrical Code, International Code Council;

- ASCE 7-05, Minimum Design Loads for Buildings and Other Structures, American Society of Civil Engineers;

In addition to the codes and standards detailed above, equipment and other items selected and utilized for the design will be in accordance with the requirements of SBPG.

SUMMARY OF THE PROPOSED SYSTEM

The SewerGEMS model and calculations performed allowed HDCA to complete its analysis on the proposed improvements for the Violet sewerage system. Overall the proposed improvements to the Violet sewerage system was determined to have a magnificent effect. The parish reported problems and those additionally discovered from the existing SewerGEMS model were eliminated. These improvements should allow HDCA to achieve the project's overall goal by eliminating these issues and improving the health, safety, and overall quality of life for the area's residents.

FLOW MONITORING

The observations and recommendations contained within this report are based upon data obtained from pump controllers and other sources, without the benefit of flow monitoring. Observations and recommendations will be finalized in a final report after the completion of the flow monitoring.

Draft Hydraulics and Hydrologic (H&H) Study For
Violet Area Sewer Improvements
St. Bernard Parish

APPENDIX A – EXHIBIT PLATES

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

In Association With:

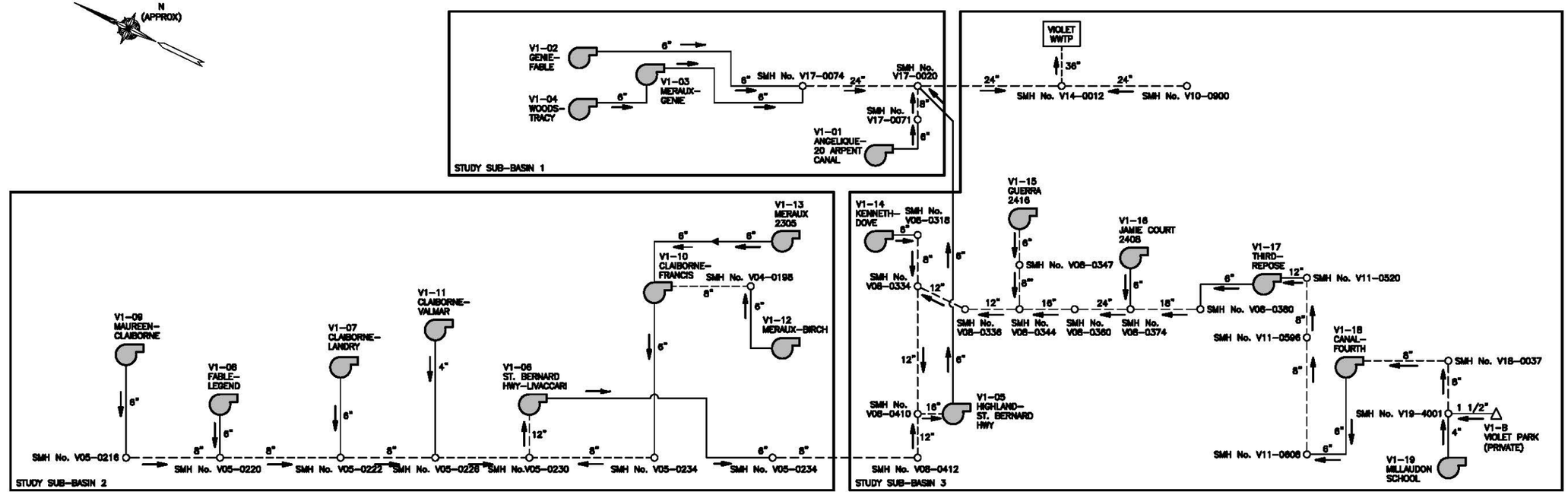
BKI BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

MISSISSIPPI RIVER GULF OUTLET / FLORIDA AVENUE CANAL

← TO CHALMETTE

TO HOPEDALE/ YSCLOSKEY →

N (APPROX)



MISSISSIPPI RIVER

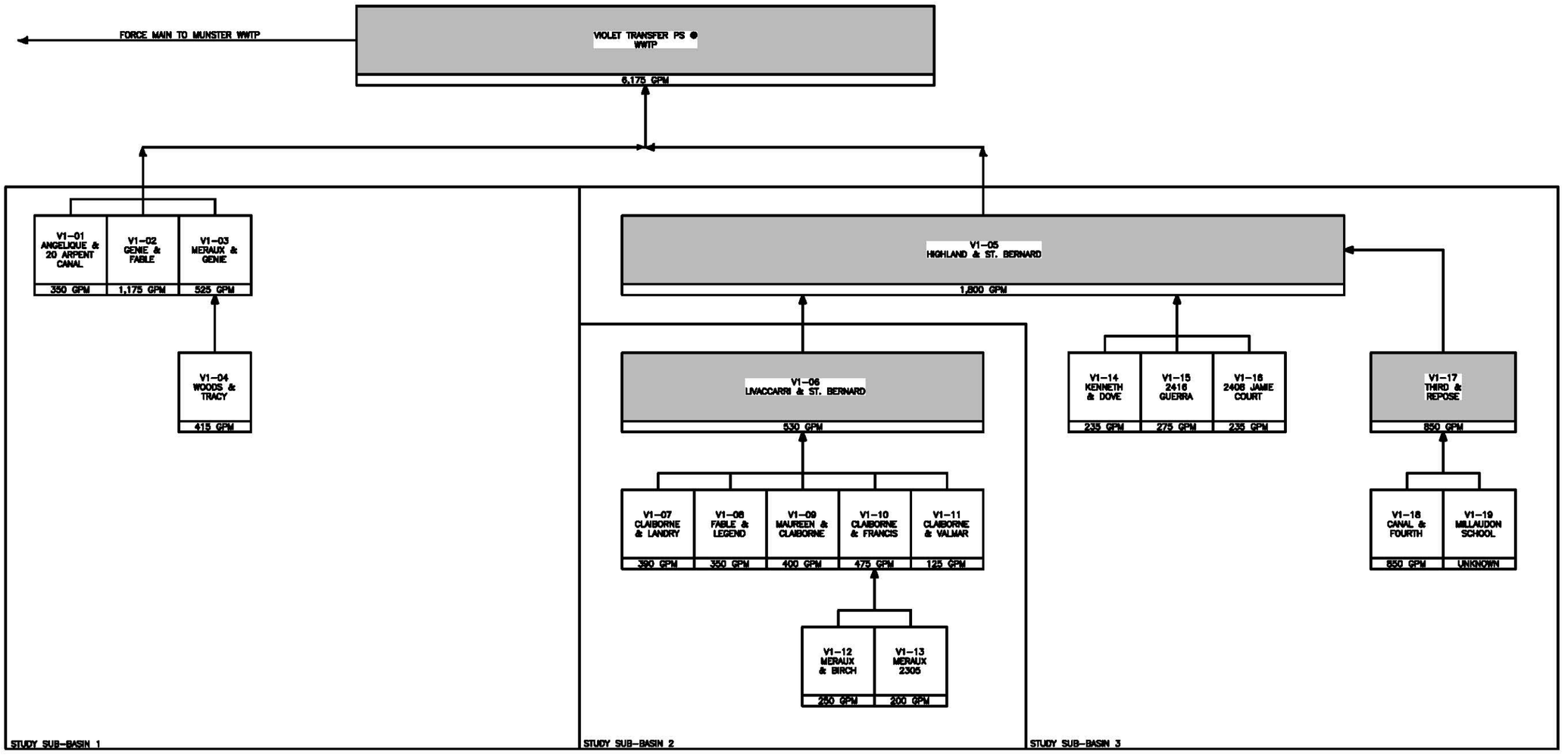
LEGEND:
- ▲ – REDUCER / INCREASER
- ○ – REDUCER / INCREASER
- △ – REDUCER / INCREASER
- ----- GRAVITY LINE
- —— PRIVATE STATION
- PUMP STATION

NOTE:
1) SCHEMATIC IS BASED UPON SSO OVERFLOW STUDY BY MWH (1999) AND GIS DATA PROVIDED BY SSPG. NOT ALL ITEMS HAVE BEEN FIELD VERIFIED.

HYDRAULICS AND HYDROLOGY (H&H) STUDY
VIOLET AREA SEWER IMPROVEMENTS
ST. BERNARD PARISH, LA
PLATE 1:
VIOLET AREA FLOW SCHEMATIC (EXISTING)

H. Davis Cole & Associates, LLC
NEW ORLEANS OFFICE
2321 N. Hullen Street, Suite B
Metairie, Louisiana 70001
Telephone: 504.836.2020
Facsimile: 504.836.2010

SHEET SIZE: 22x34 PROJECT NO: 2013-09 DATE: 6/2014



LEGEND:

– MAJOR COLLECTION/ DISTRIBUTION STATION

HYDRAULICS AND HYDROLOGY (H&H) STUDY
VIOLET AREA SEWER IMPROVEMENTS
ST. BERNARD PARISH, LA
PLATE 2:
VIOLET AREA HIERARCHY CHART (EXISTING)

H. Davis Cole & Associates, LLC
NEW ORLEANS OFFICE
2321 N. Hullen Street, Suite B
Metairie, Louisiana 70001
Telephone: 504.836.2020
Facsimile: 504.836.2010

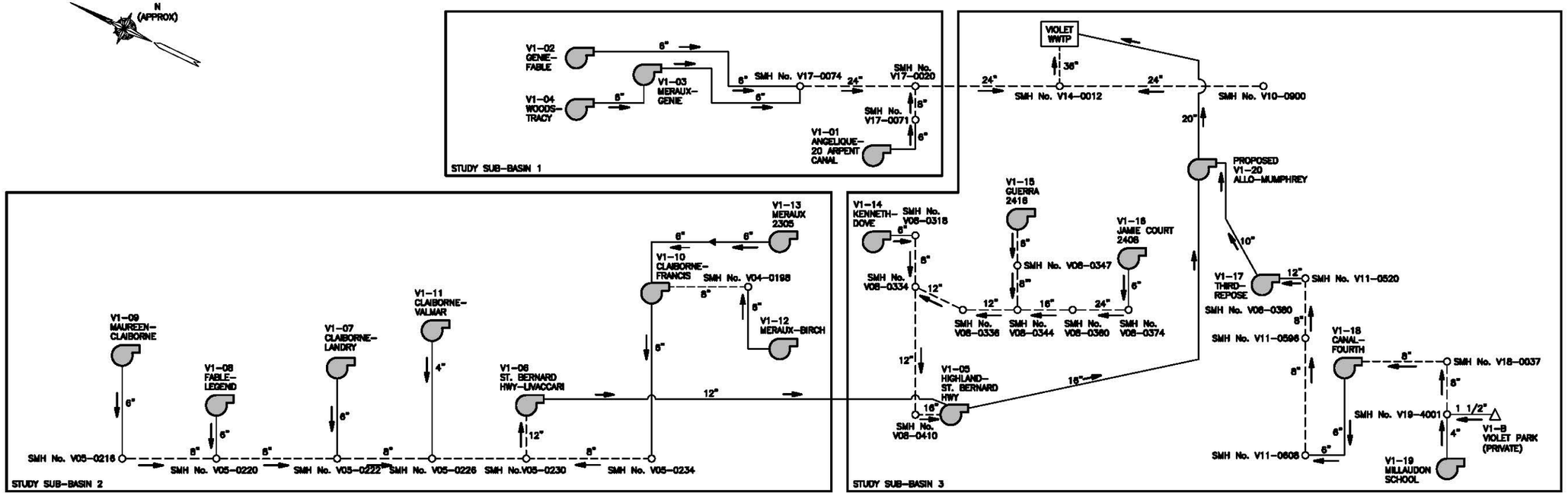
SHEET SIZE: 22x34 PROJECT NO: 2013-08 DATE: 6/2014

MISSISSIPPI RIVER GULF OUTLET / FLORIDA AVENUE CANAL

← TO CHALMETTE

TO HOPEDALE/ YSCLOSKEY →

N (APPROX)



MISSISSIPPI RIVER

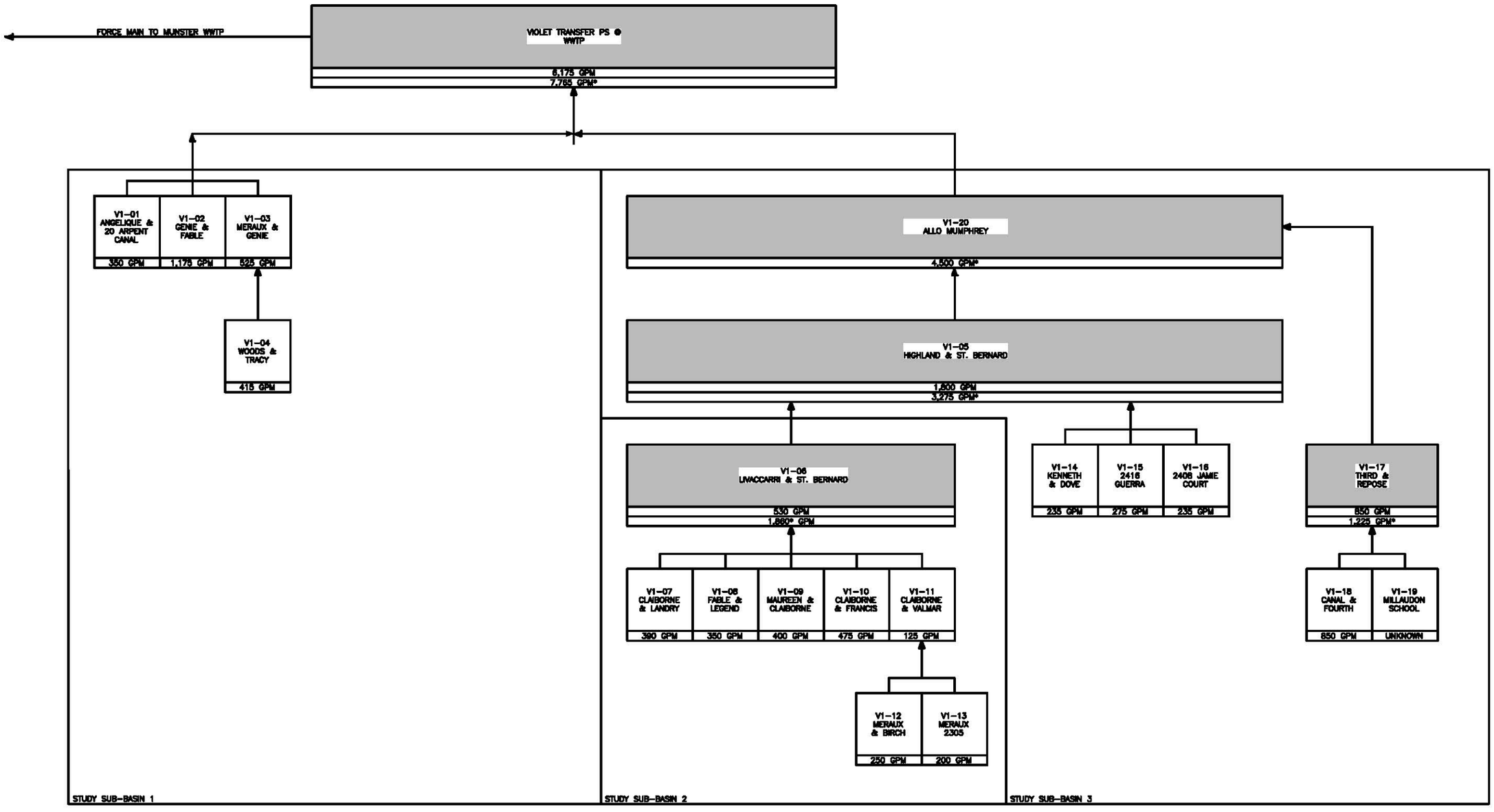
LEGEND:
- ▲ – REDUCER / INCREASER
- ○ – REDUCER / INCREASER
- △ – REDUCER / INCREASER
- ----- GRAVITY LINE
- —— PRIVATE STATION
- PUMP STATION

NOTE:
1) SCHEMATIC IS BASED UPON SSO OVERFLOW STUDY BY MWH (1998) AND GIS DATA PROVIDED BY SSPG. NOT ALL ITEMS HAVE BEEN FIELD VERIFIED.

HYDRAULICS AND HYDROLOGY (H&H) STUDY
VIOLET AREA SEWER IMPROVEMENTS
ST. BERNARD PARISH, LA
PLATE 3:
VIOLET AREA FLOW SCHEMATIC (PROPOSED)

H. Davis Cole & Associates, LLC
NEW ORLEANS OFFICE
2321 N. Hullen Street, Suite B
Metairie, Louisiana 70001
Telephone: 504.836.2020
Facsimile: 504.836.2010

SHEET SIZE: 22x34 PROJECT NO: 2013-09 DATE: 6/2014



LEGEND:

– MAJOR COLLECTION/ DISTRIBUTION STATION

415 GPM – EXISTING DESIGN PUMPING CAPACITY

415 GPM* – PROPOSED DESIGN PUMPING CAPACITY

HYDRAULICS AND HYDROLOGY (H&H) STUDY
VIOLET AREA SEWER IMPROVEMENTS
ST. BERNARD PARISH, LA
PLATE 4:
VIOLET AREA HIERARCHY CHART (PROPOSED)

H. Davis Cole & Associates, LLC
NEW ORLEANS OFFICE
2321 N. Hullen Street, Suite B
Metairie, Louisiana 70001
Telephone: 504.836.2020
Facsimile: 504.836.2010

SHEET SIZE: 22x34 PROJECT NO: 2013-09 DATE: 6/2014

Draft Hydraulics and Hydrologic (H&H) Study For
Violet Area Sewer Improvements
St. Bernard Parish

APPENDIX B – PUMP DATA SHEETS

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

In Association With:

BKI BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: JSEPT 25, 2008

JOB V1-01 ANGELIC ST & 20-ARPENT CANAL PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR HYDRO AIR

ENGINEER ALL SOUTH CONSULTING ENGINEERS LLC

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 350 TDH 11 RPM 1150 CURVE PG. 110 IMPEL. DIA. 7.0"

CONSTRUCTION: **HYDROMATIC S4NX200EB**

- ☐ BRONZE FITTED
- ☒ MECHANICAL SEAL
- ☒ ALL IRON
- ☐ (DOUBLE) PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

MFR HYDROMATIC HP 2 RPM 1150 FRAME N/A

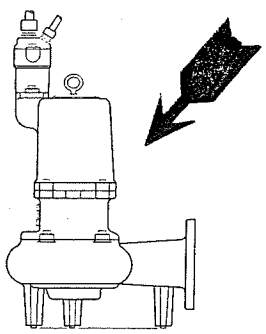
PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) S .S. CORD/CABLE HANGER BRACKET.

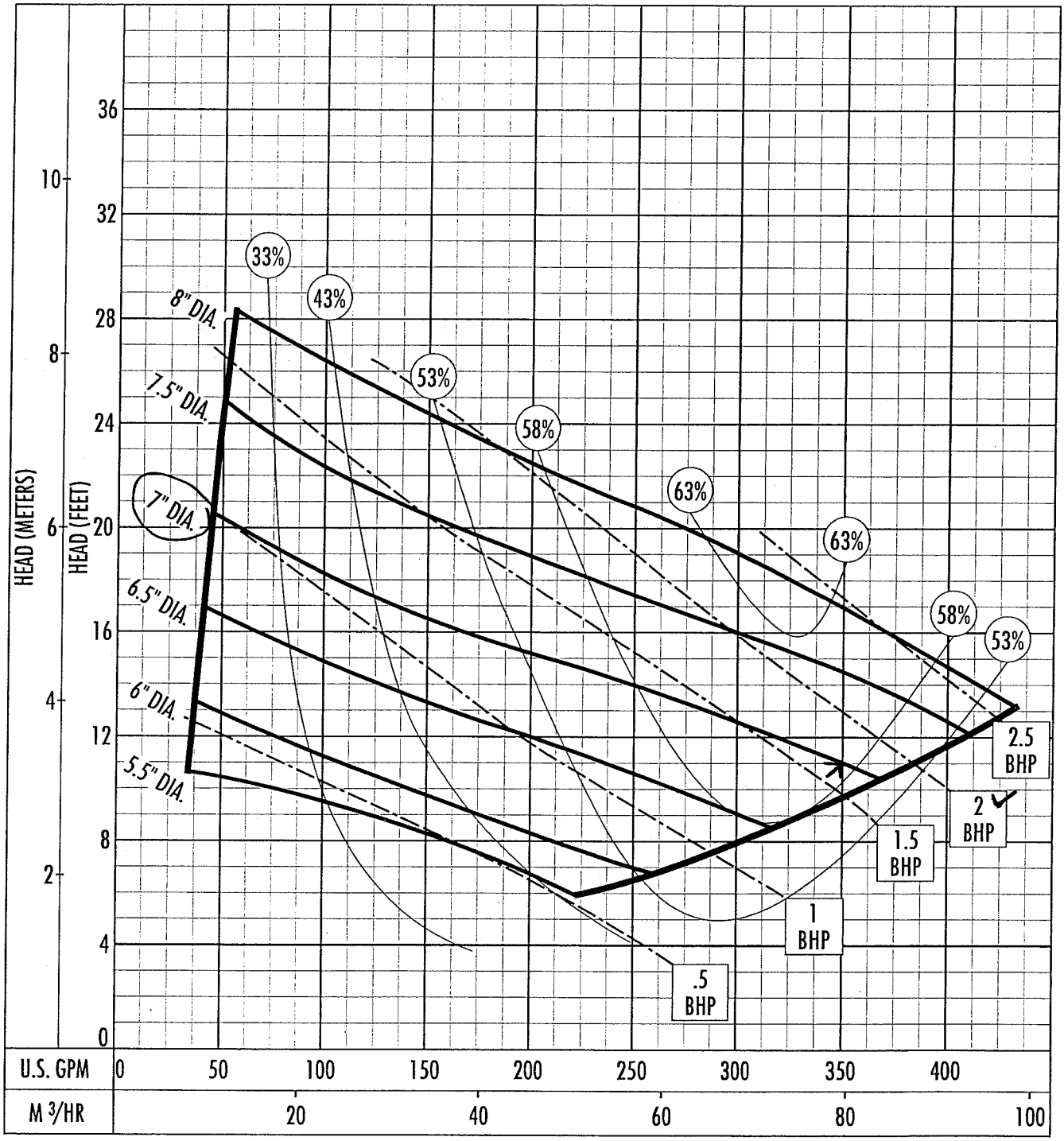
EXISTING HATCH TO REMAIN

------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve — S4N/S4NS/S4NX

RPM: **1150** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

HYDROMATIC®

Conditions of Service:
GPM: 350 TDH: 11

Fairbanks Morse
Pentair Water

CURVE NO.:	091942C
REV.	
PROJECT NO.:	091942

5" D5433MV SUBMITTAL CURVE

SPEED	IMPELLER	DIAMETER	VANES
1757	T5C1A	10.20	TWO
SPHERE	DRIVER	DATE	BY
3.50"	30	6/12/2008	JES

THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.

GUARANTEED VALUES			
FLOW	HEAD	EFF.	BHP
1175	68	70	-----
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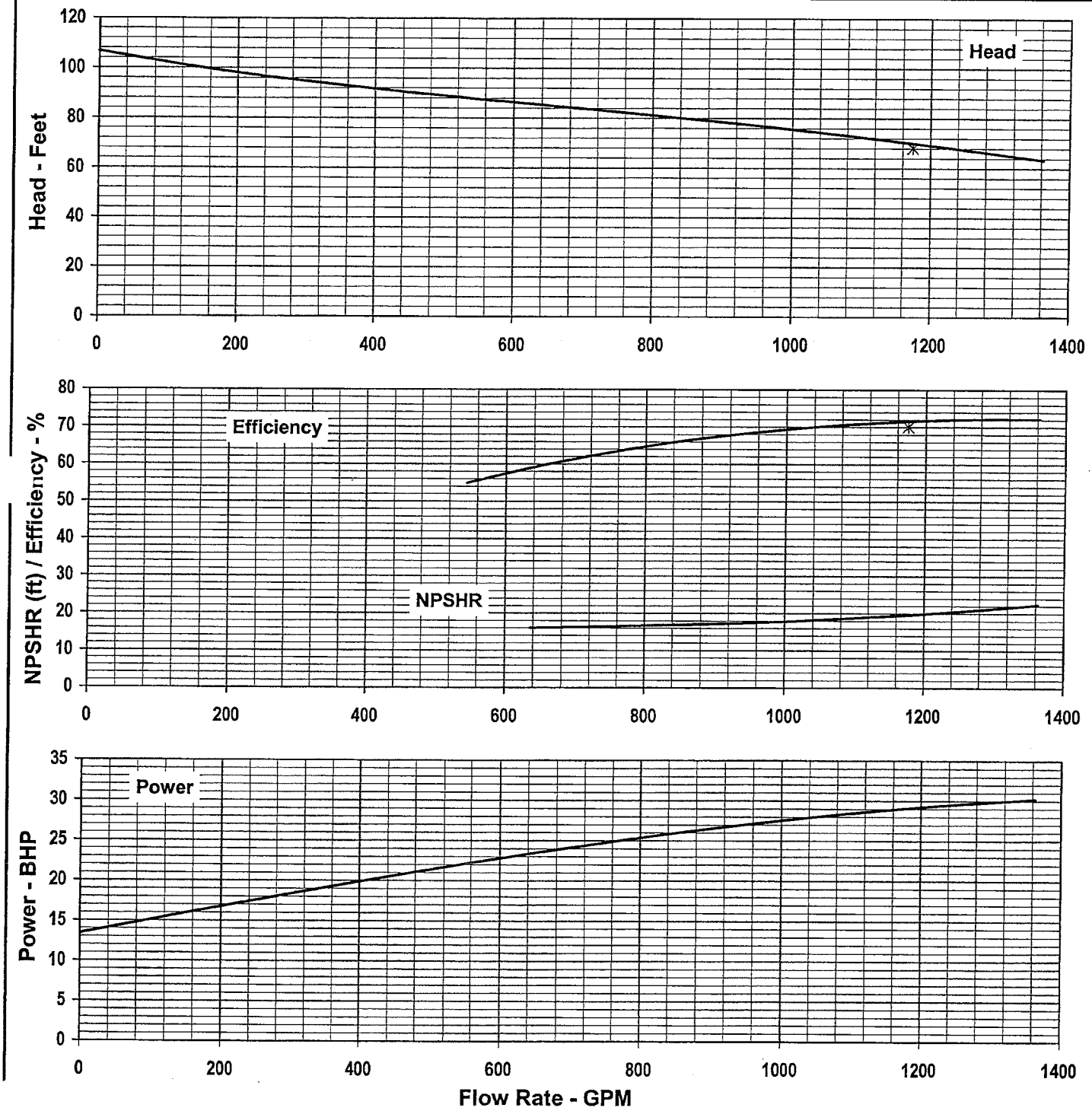
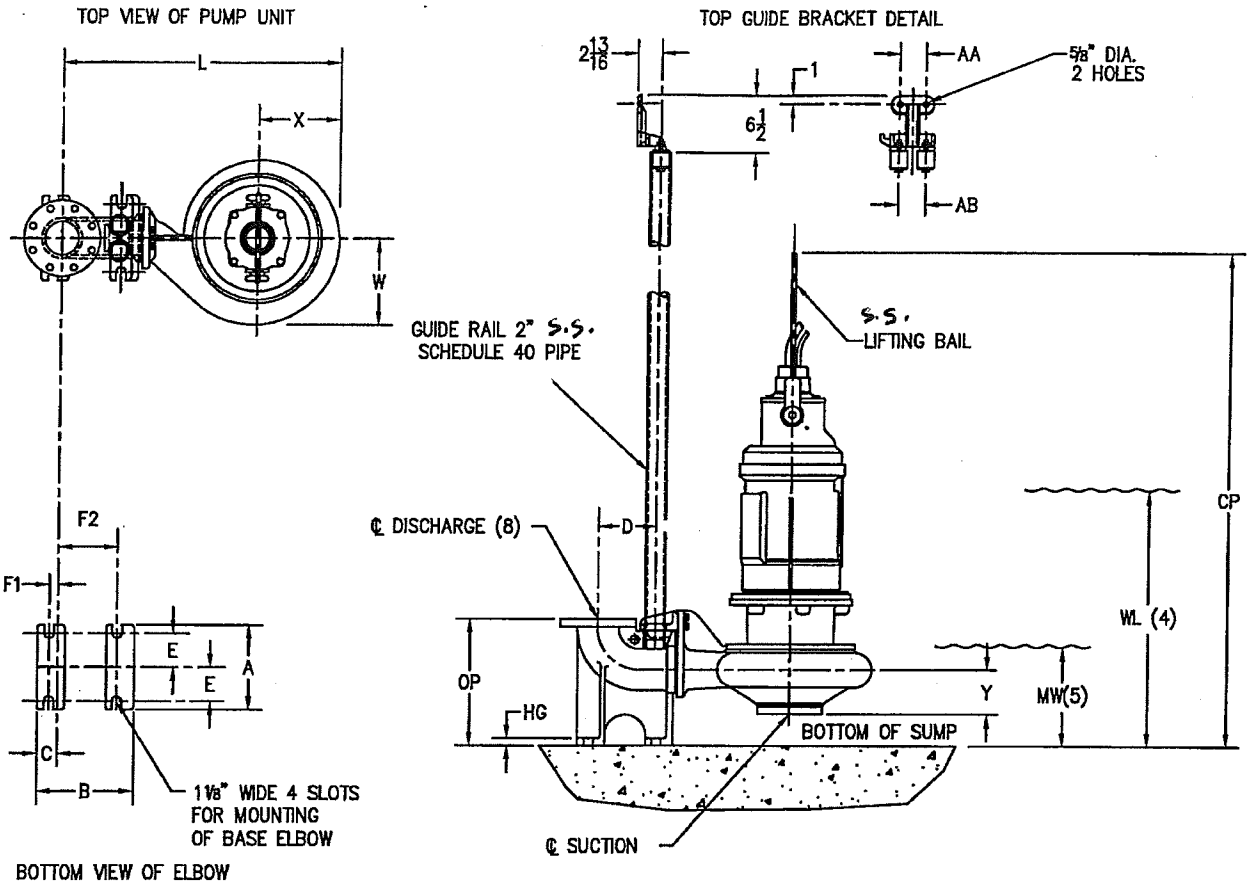




PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
5" D5433MV	250T	6	16	17½	4½	9¼	7	2⅞	10⅛	42⅝	11⅞	11¼	6¾	3	3⅛	63½	1¼	17¾	21½	41

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: PARSON & SANDERSON, INC.					P.O. NO.: 08-49938		Farbanks Morse PENTAIR PUMP GROUP
JOB NAME: ST. BERNARD PS V1-02					TAG NAME:		BASIC PUMP D5432MV AND D5433MV PULL-UP SUBMERSIBLE FAIRBANKS MORSE MTR
PUMP SIZE AND MODEL: 5" D5433MV		GPM: 1175	TDH: 68'	RPM: 1175	ROTATION: CLOCKWISE		
MOTOR: FAIRBANKS	HP: 30	FRAME: 250T	PHASE: 3	HERTZ: 60	VOLTS: 230	ENCLOSURE: SUBM.	
CERTIFIED FOR: 091942			CERTIFIED BY: H.LAWTON		DATE: 07/07/08		DWG NO: 091942SP REV NO: 0

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-03 GENIE-MERAUX PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **525** TDH **23** RPM **1750** CURVE PG. **109** IMPEL. DIA. **7.0"**

CONSTRUCTION: **HYDROMATIC S4NX500JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ (DOUBLE) PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

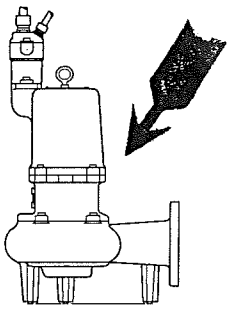
MFR **HYDROMATIC** HP **5** RPM **1750** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

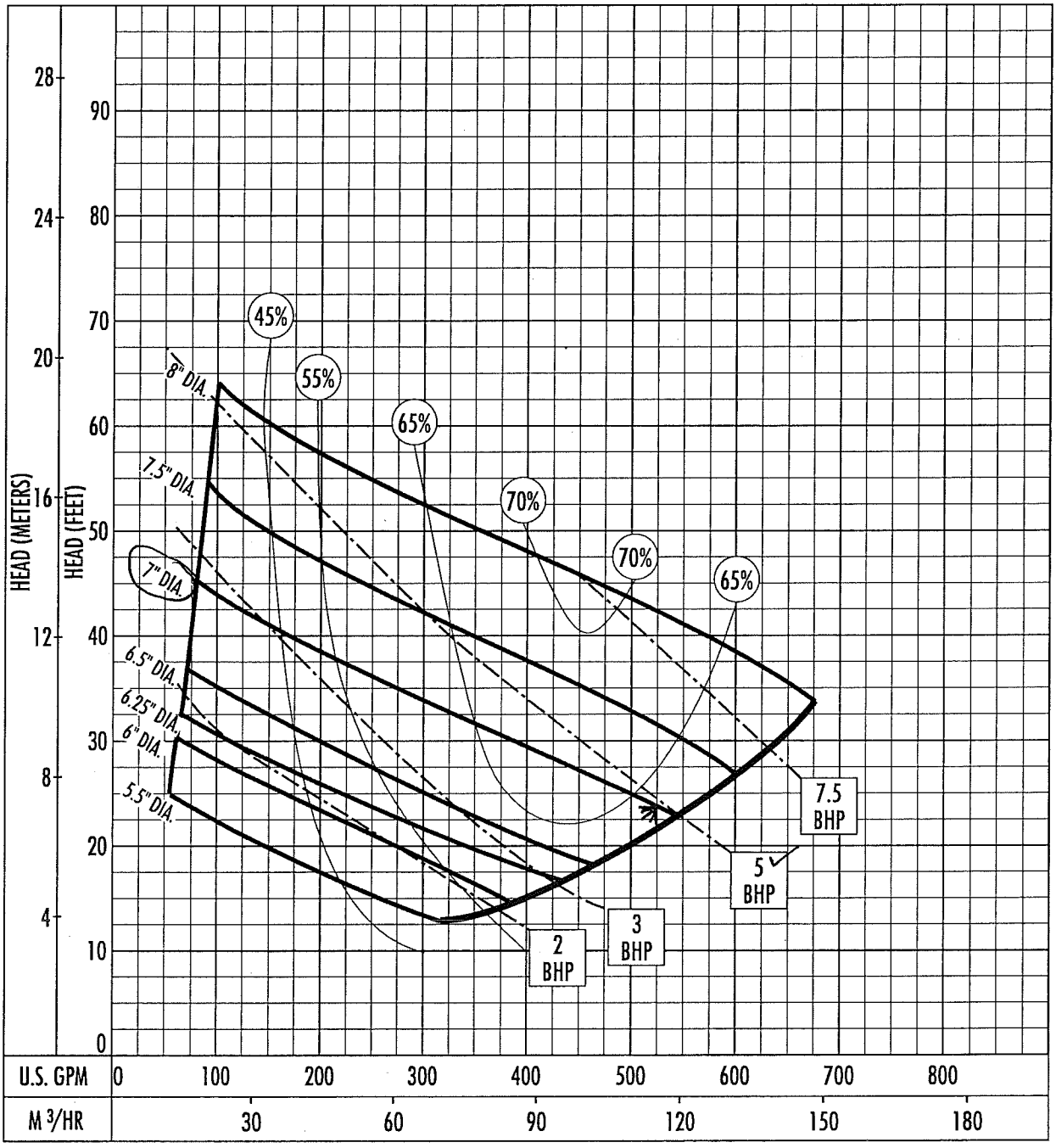
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 525 TDH: 23

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-04 WOODS - TRACY PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **415** TDH **18** RPM **1750** CURVE PG. **109** IMPEL. DIA. **6.25"**

CONSTRUCTION: **HYDROMATIC S4NX300JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ **(DOUBLE)** PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

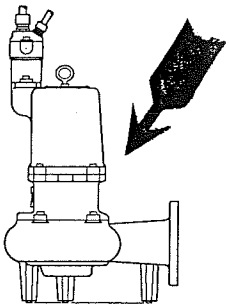
MFR **HYDROMATIC** HP **3** RPM **1750** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

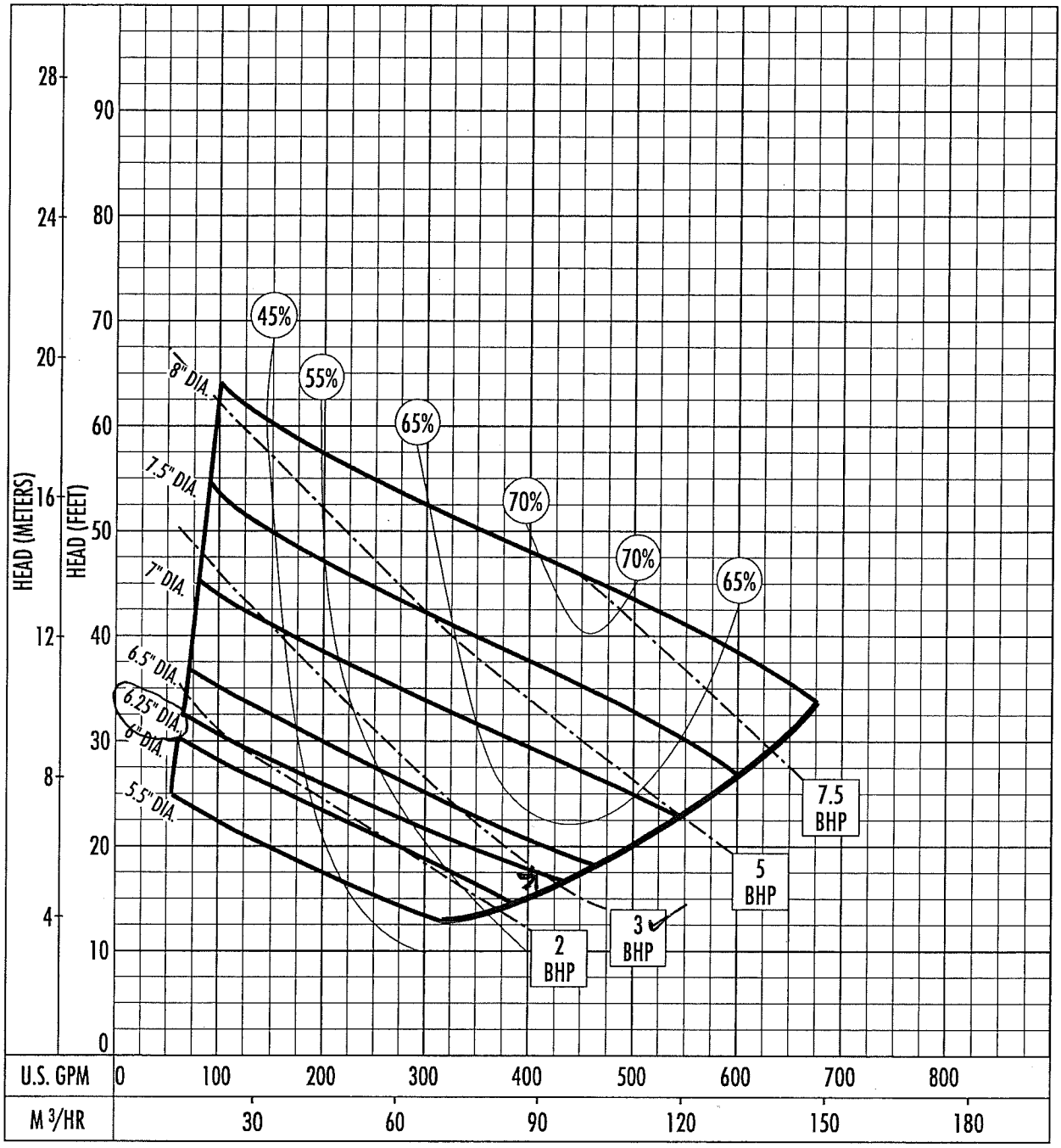
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 415 TDH: 18

HYDROMATIC®

Section 7 Pump Submittal

Certified Curves

Approved Submittal

Fairbanks Morse
Pentair Water

Certified Pump Performance Curve

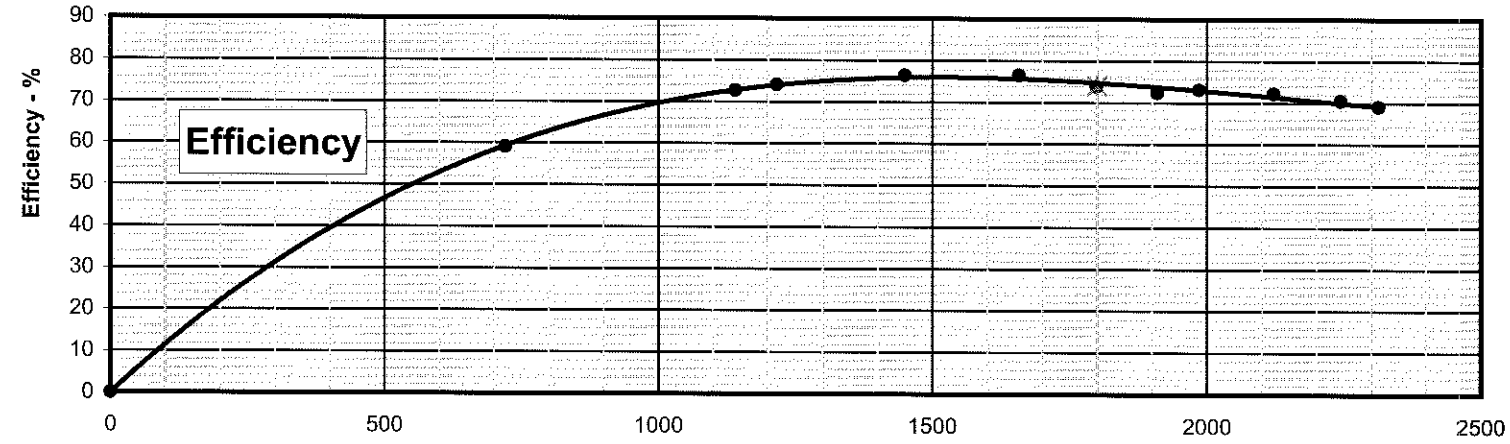
Serial Number:	**1725722-0**
Project Number:	092048
Test Date:	9/17/2008

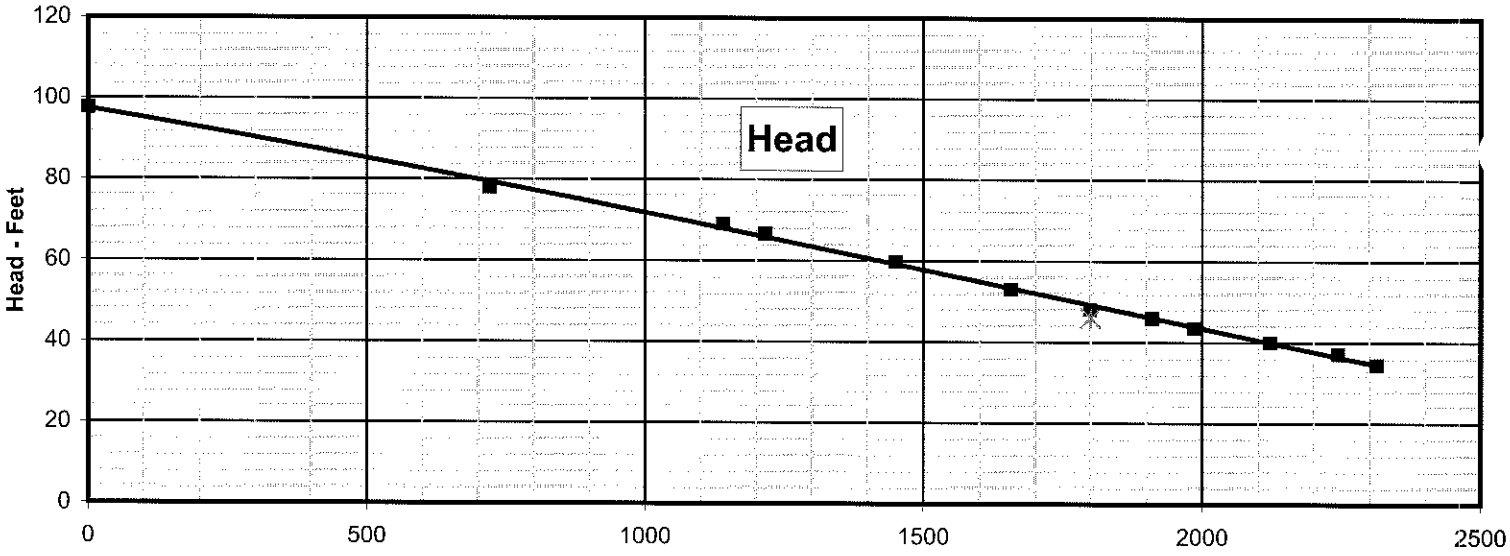
Guaranteed Values

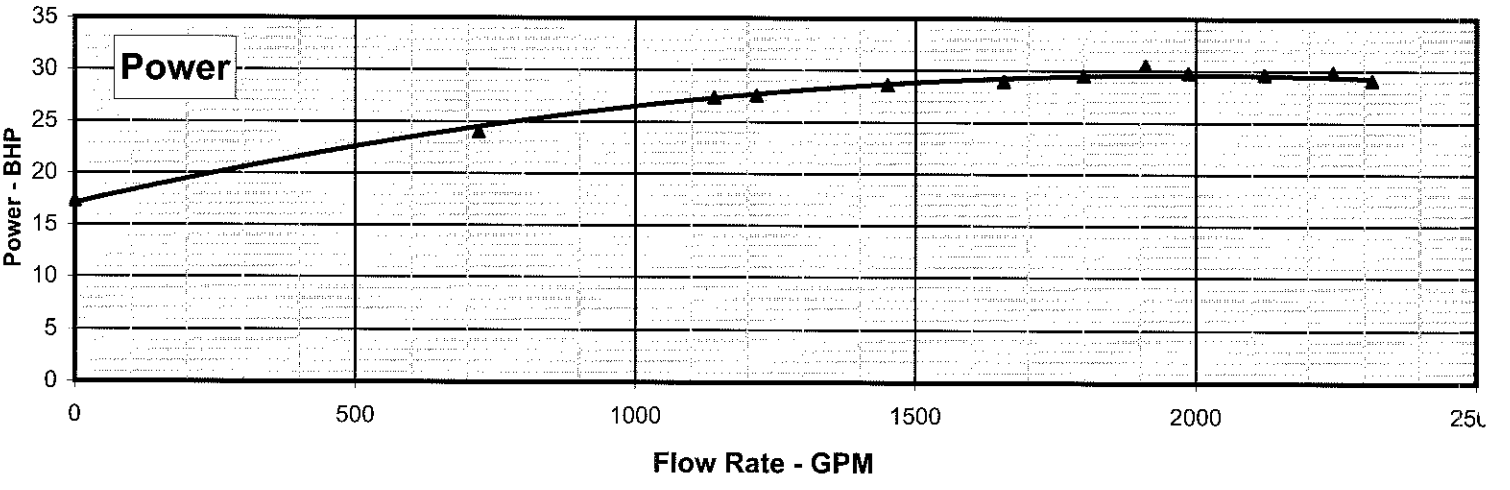
GPM	1800			
HEAD	46			
Eff	74			
RPM	1757			

Size-Model	6"	D5433MV	CW
Impeller:	T6C1ET		
Impeller Dia:	9.80"		
Driver:	Job Driver	HP:	30
RPM:	1757	Stages:	ONE

Certified By: John C. Mamie (Test Department) 10/08 (Date)







Fairbanks Morse

Pentair Water

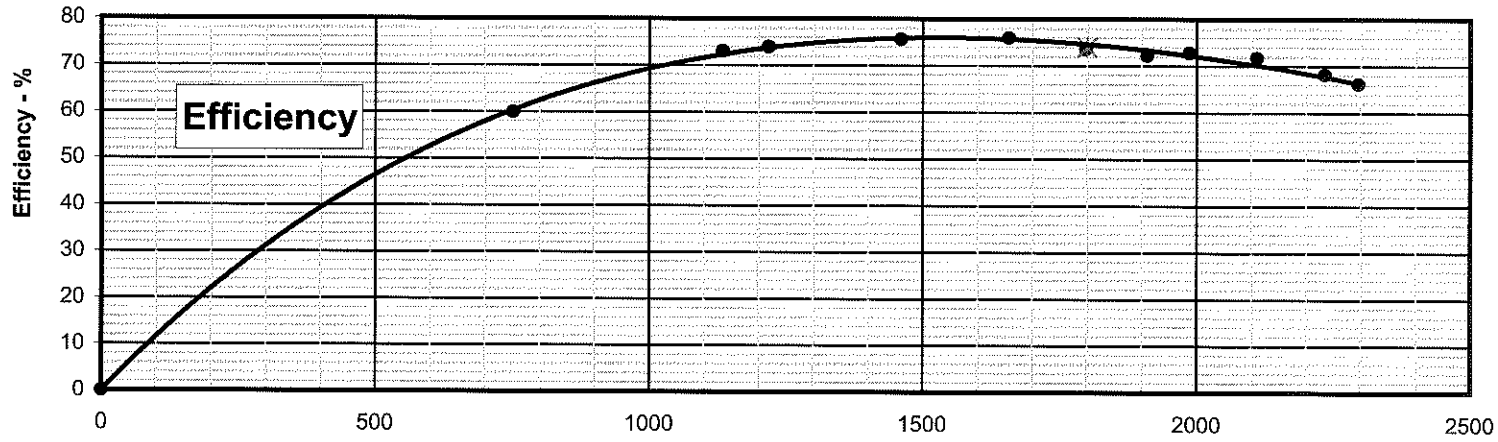
ıal Number:	1725722-1
Project Number:	092048
Test Date:	9/17/2008

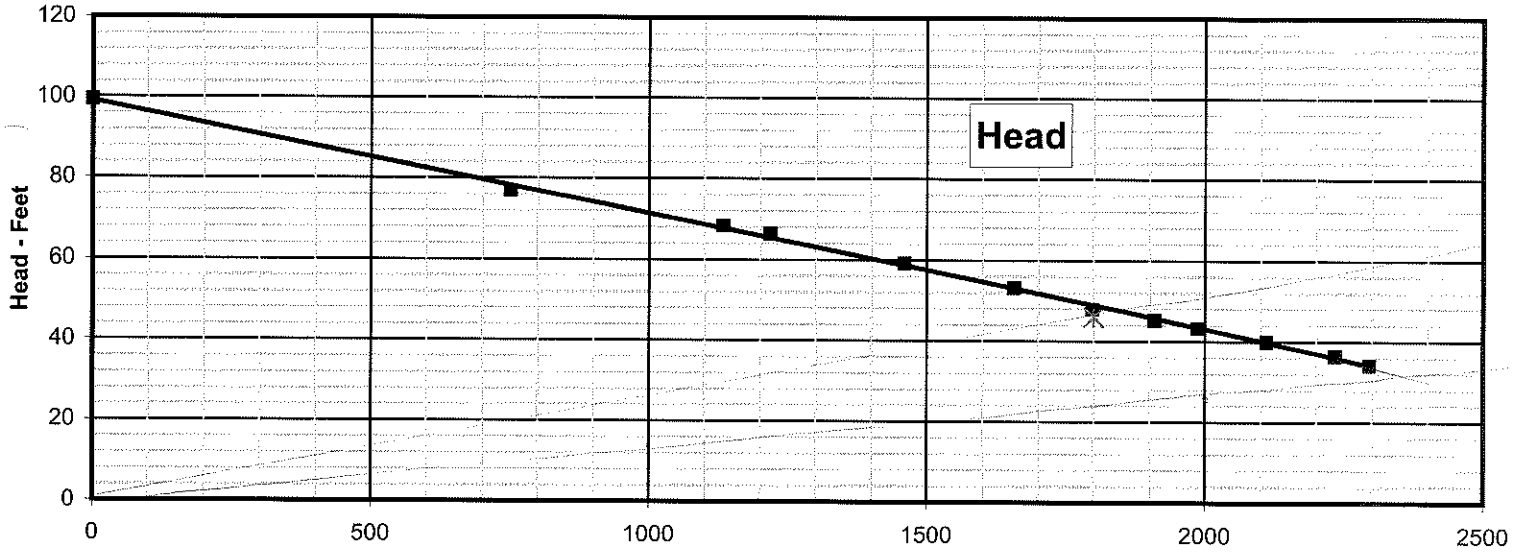
Certified Pump Performance Curve

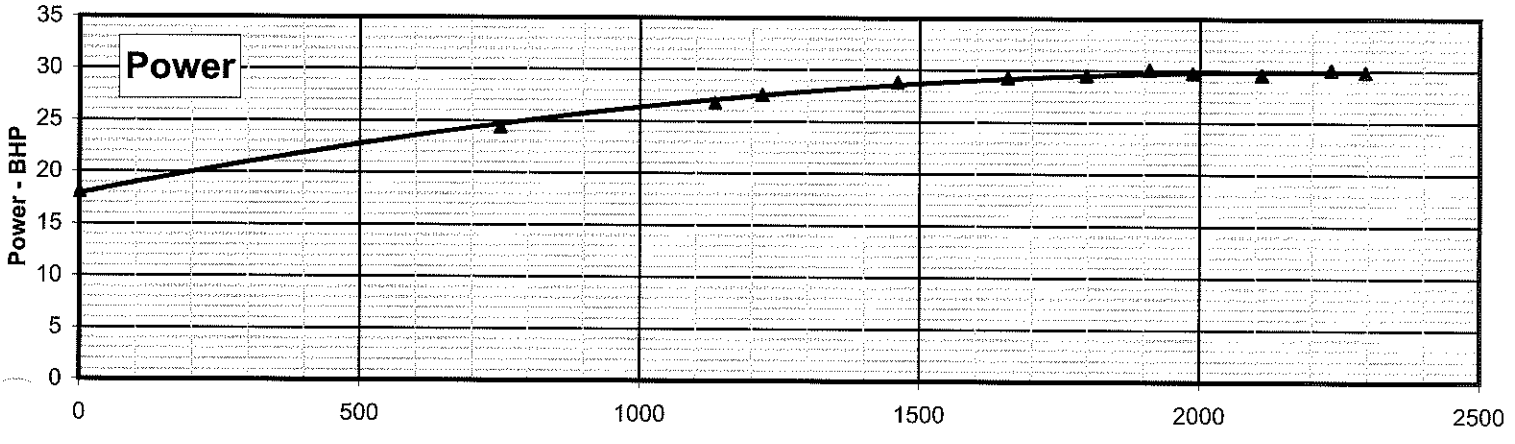
Guaranteed Values	
GPM	1800
HEAD	46
Eff	74
RPM	1757

Size-Model	6"	D5433MV	CW
Impeller:	T6C1ET		
Impeller Dia:	9.80"		
Driver:	Job Driver	HP:	30
RPM:	1757	Stages:	ONE

Certified By: John C. Mamie (Test Department) 10/08 (Date)







Fairbanks Morse Pump
Included Features

- Fairbanks Morse Submersible Motor
- U L Listed, Explosion Proof, Class 1, Division 1, Groups C & D
- Characteristics
  HP 30
  RPM 1800
  Ph/Hz/Volt 3/60/230
  Short Time In Air Duty
- Mechanical Seal
  Outer Seal
  Silicon Carbide Vs Tungsten Carbide
  Inner Seal:
  Silicon Carbide Vs Tungsten Carbide
- Winding Thermostats
- Moisture Detectors
- Stainless Steel Bolting
- Power Cable Length, Ft. 50
- Lifting Bail
- Dynamic Balance Impeller
- Stainless Steel Impeller & Casing Wear Rings
- Stainless Steel Impeller Fastener
- Certified Non-Witness Performance Test
- Standard Paint System
- 6 x 6 Elbow
- Stainless Steel Top Guide Bracket

Fairbanks Morse Pump
Technical Clarifications

1. Submersible motors are supplied with moisture detectors as standard equipment. A compatible controller must be connected to properly protect the motor. If a controller is not connected, the manufacturer's warranty is invalid.

Fairbanks Morse
Pentair Water

CURVE NO.:	092048C
REV.	
PROJECT NO.:	092048

6" D5433MV SUBMITTAL CURVE

SPEED	IMPELLER	DIAMETER	VANES
1757	T6C1C	9.80	TWO
SPHERE	DRIVER	DATE	BY
3.00"	30	7/11/2008	JES

THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.

GUARANTEED VALUES			
FLOW	HEAD	EFF.	BHP
1800	46	74	-----
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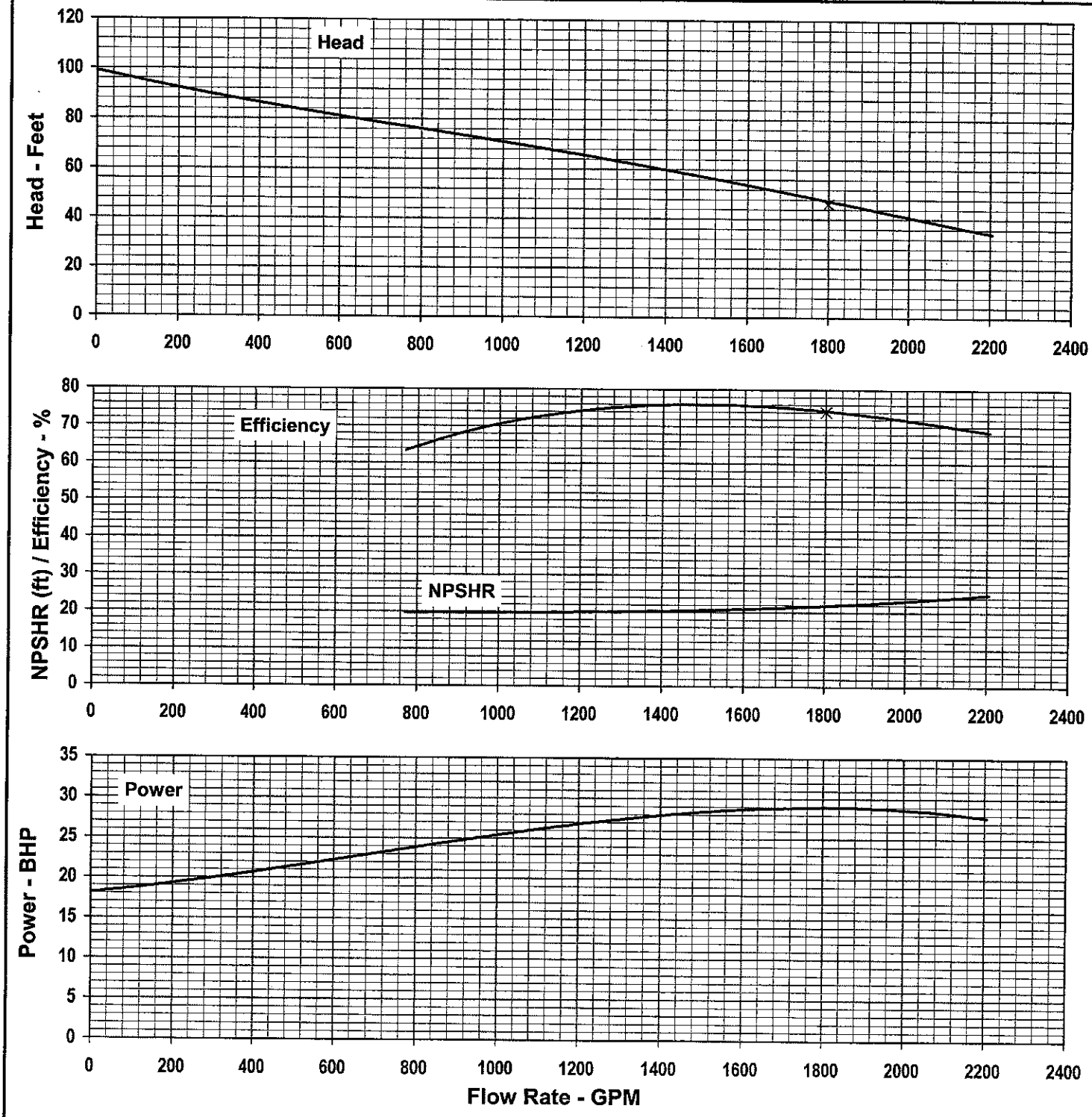
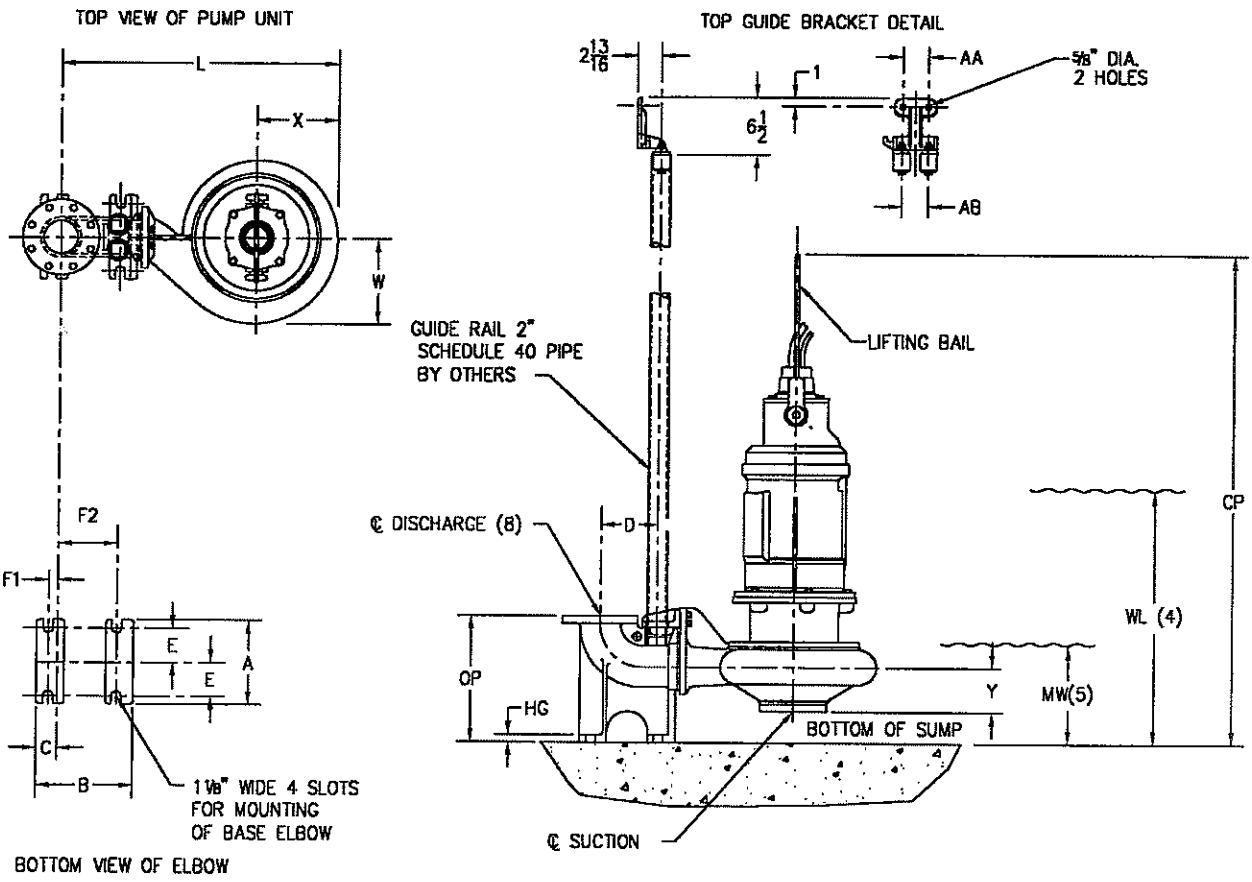




PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
6" D5433MV	250T	6	14	14½	3¼	8	6	1¾	9¼	39⅝	12⅜	11¼	8½	3	3⅛	62⅞	1	16	20⅝	41

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: PARSON & SANDERSON, INC.					P.O. NO.: 08-50134	Fairbanks Morse PENTAIR PUMP GROUP
JOB NAME: CITY OF ST. BERNARD					TAG NAME: ST. BERNARD V1-05'	BASIC PUMP D5432MV AND D5433MV PULL-UP SUBMERSIBLE FAIRBANKS MORSE MTR
PUMP SIZE AND MODEL: 6" D5433MV		GPM: 1800	TDH: 46'	RPM: 1757	ROTATION: CLOCKWISE	
MOTOR: FAIRBANKS	HP: 30	FRAME: 250T	PHASE: 3	HERTZ: 60	VOLTS: 230	ENCLOSURE: SUBM.
CERTIFIED FOR: 092048			CERTIFIED BY: H.LAWTON		DATE: 08/28/08	DWG NO: 092048SP / REV NO: 0

Fairbanks Morse Pump
Material List

Item	Description	Material	Specification
1	Impeller	Cast Iron	A48 Class 30
9	Capscrew, Impeller	Stainless Steel	A193 CL2- B8
9A	Washer, Impeller	Stainless Steel	A582 S41600
16	Wear Ring, Casing	Stainless Steel	A743 CA-40[1]
17	Wear Ring, Impeller	Stainless Steel	A743 CA-40[2]
30	Volute	Cast Iron	A48 Class 30
66	Ring, Flange	Brass	B505 AL932
76	Discharge Elbow	Cast Iron	A48 Class 30
102	Key, Impeller	Stainless Steel	A276 S30400
145	Bracket, Guide	Brass	B584 AL836
154	Seal, Flange	Rubber	BUNA-N
156	Gasket, Volute	Tag Board	F104
186	Impeller Shim	Stainless Steel	A582-303
376	Upper Guide Bracket	Stainless Steel	A743 GR CF-8
376A	Bushing, Upper Guide	Rubber	Commercial
	Bolting	Stainless Steel	Commercial

[1] 300-350 BHN
[2] 300-350 BHN

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-06 ST BERNARD HWY – LIVACCARI PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **530** TDH **42** RPM **1750** CURVE PG. **111** IMPEL. DIA. **8.0"**

CONSTRUCTION: **HYDROMATIC S4MX1000JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ **(DOUBLE)** PACKED

BASE:
- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:
- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

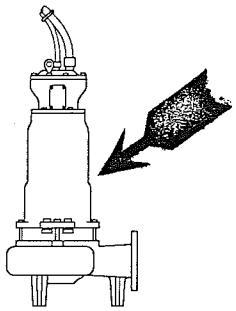
MFR **HYDROMATIC** HP **10** RPM **1750** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) ALUM H-20 PUMP W.W. ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

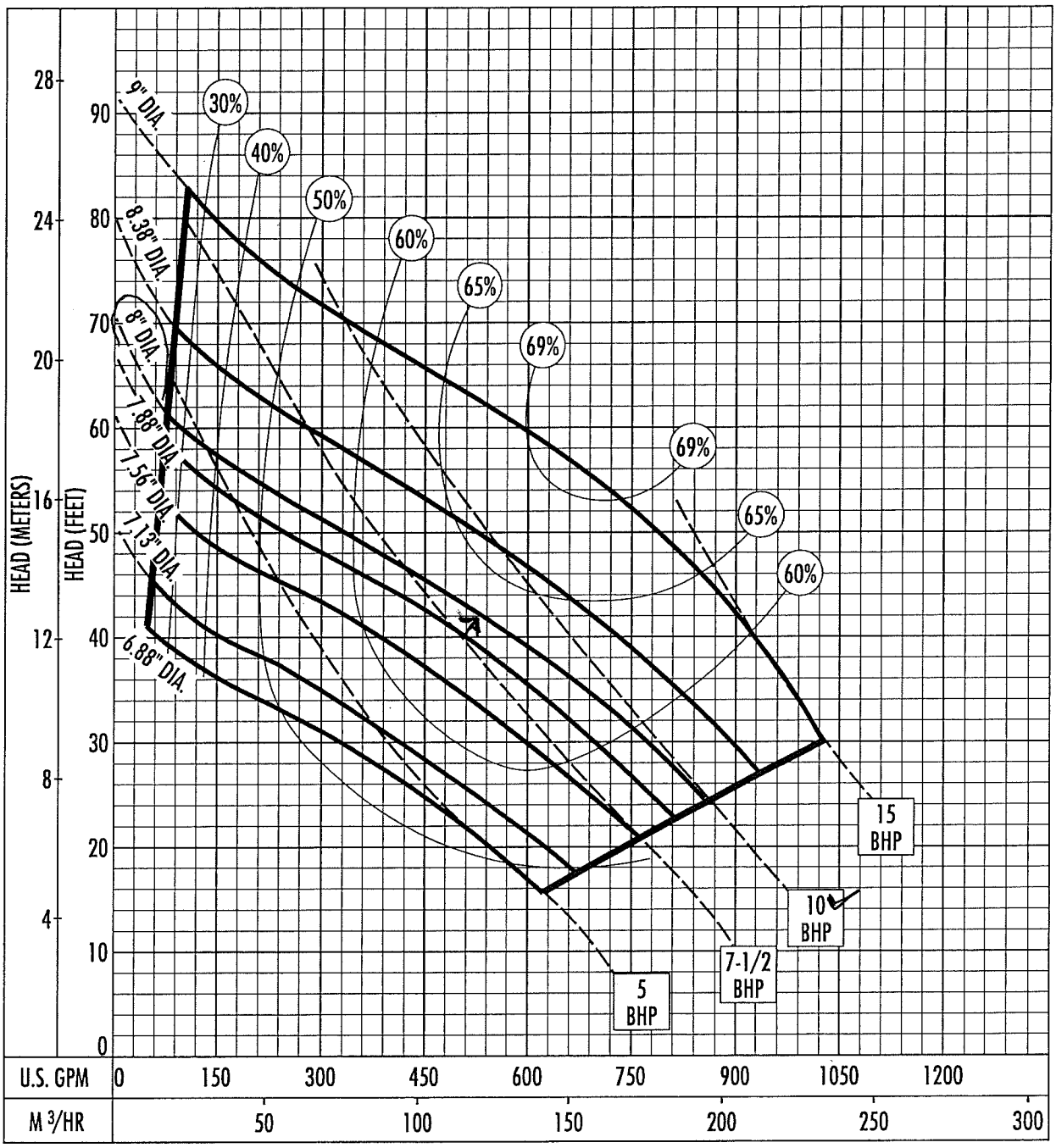
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4M/S4MX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 530 TDH: 42

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-07 CLAIBORNE - LANDRY PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **390** TDH **30** RPM **1750** CURVE PG. **109** IMPEL. DIA. **7.0"**

CONSTRUCTION: **HYDROMATIC S4NX500JC**

☐	BRONZE FITTED	☒	MECHANICAL SEAL
☐		☐	**(DOUBLE)**
☒	ALL IRON	☐	PACKED

BASE:			DRIVE:		
☒	CAST IRON	☐	DIRECT	☒	CLOSE COUPLED
☐	CHANNEL STEEL	☐	V-BELT	☒	SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

MFR **HYDROMATIC** HP **5** RPM **1750** FRAME **N/A**

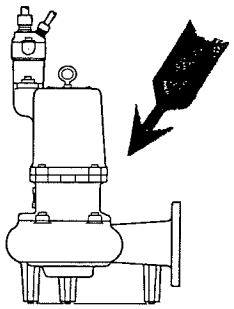
PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) S .S. CORD/CABLE HANGER BRACKET.

EXISTING HATCH TO REMAIN

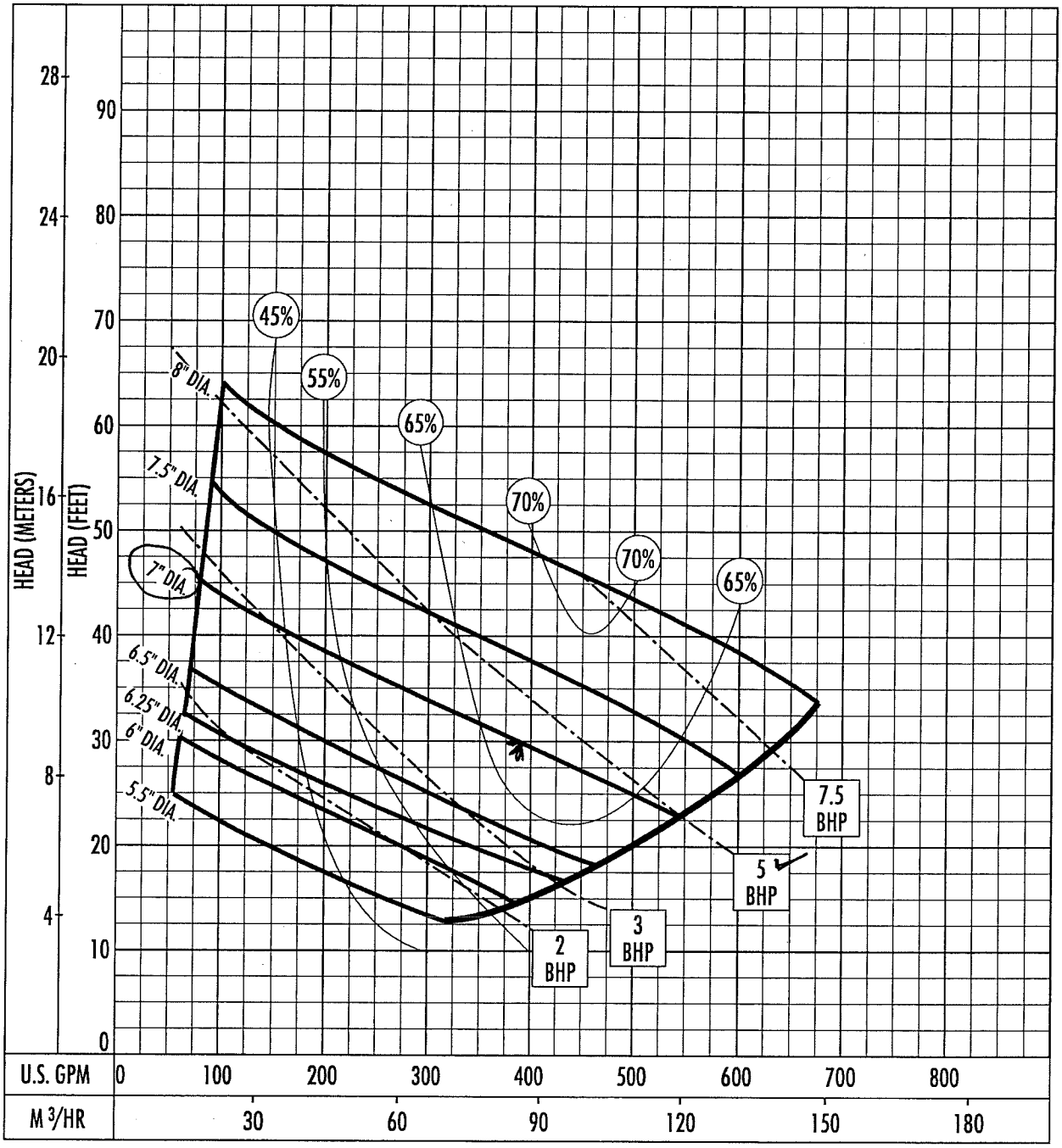
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 390 TDH: 30

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-08 FABLE - LEGEND PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **350** TDH **20** RPM **1750** CURVE PG. **109** IMPEL. DIA. **6.25"**

CONSTRUCTION: **HYDROMATIC S4NX300JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ **(DOUBLE)** PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

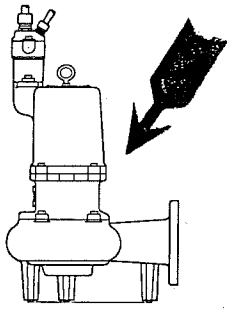
MFR **HYDROMATIC** HP **3** RPM **1750** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

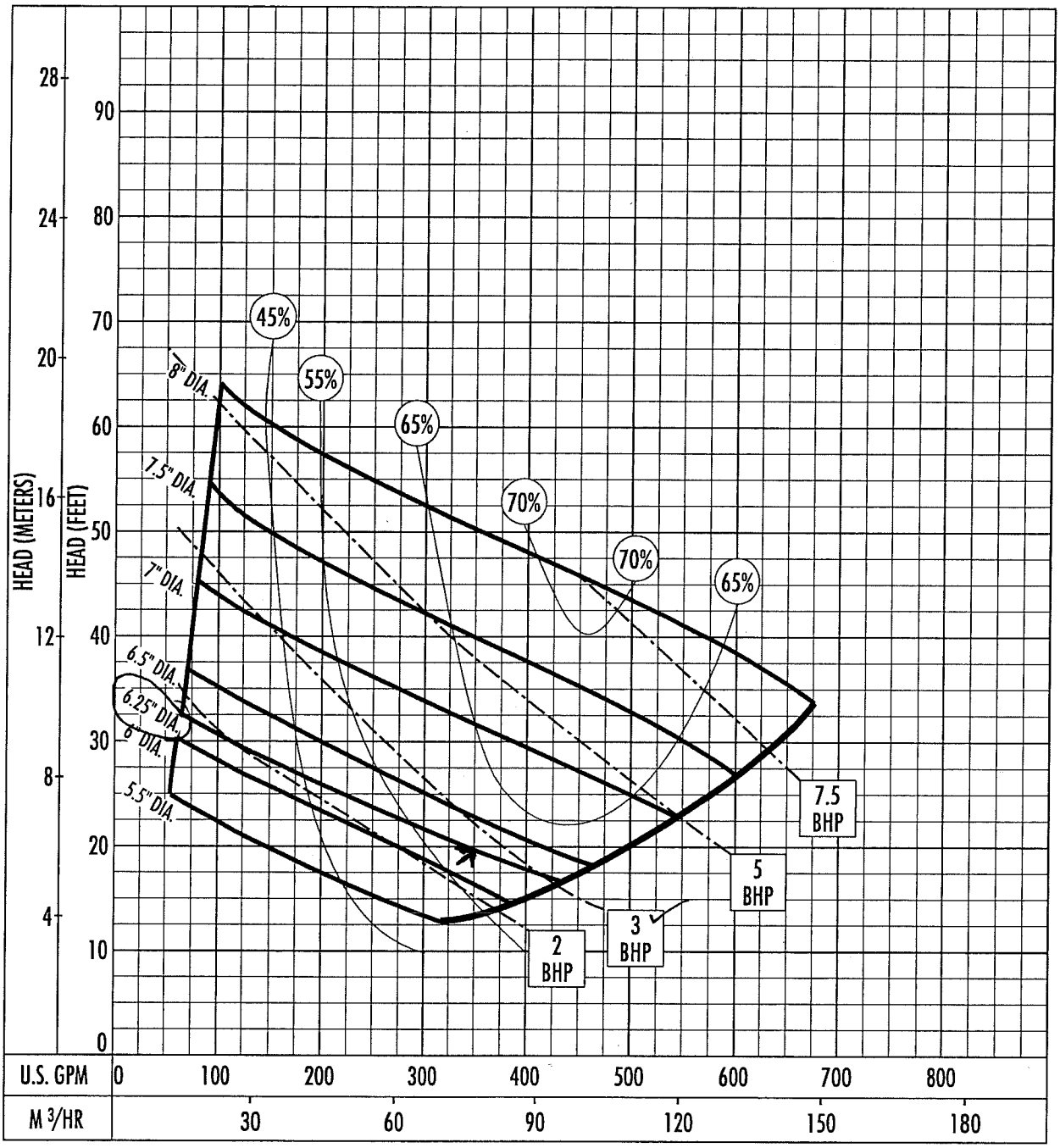
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 350 TDH: 20

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-09 MAUREEN - CLAIBORNE PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **400** TDH **30** RPM **1750** CURVE PG. **109** IMPEL. DIA. **7.0"**

CONSTRUCTION: **HYDROMATIC S4NX500JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ **(DOUBLE)** PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

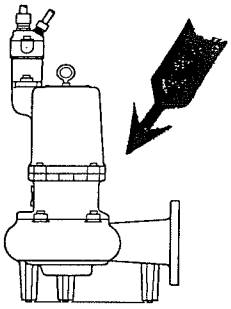
MFR **HYDROMATIC** HP **5** RPM **1750** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/ 35' CORDS, (2) S.S. PUMP LIFT CABLES, (1) S .S. CORD/CABLE HANGER BRACKET. NO GUIDE RAILS, EXISTING HATCH TO REMAIN

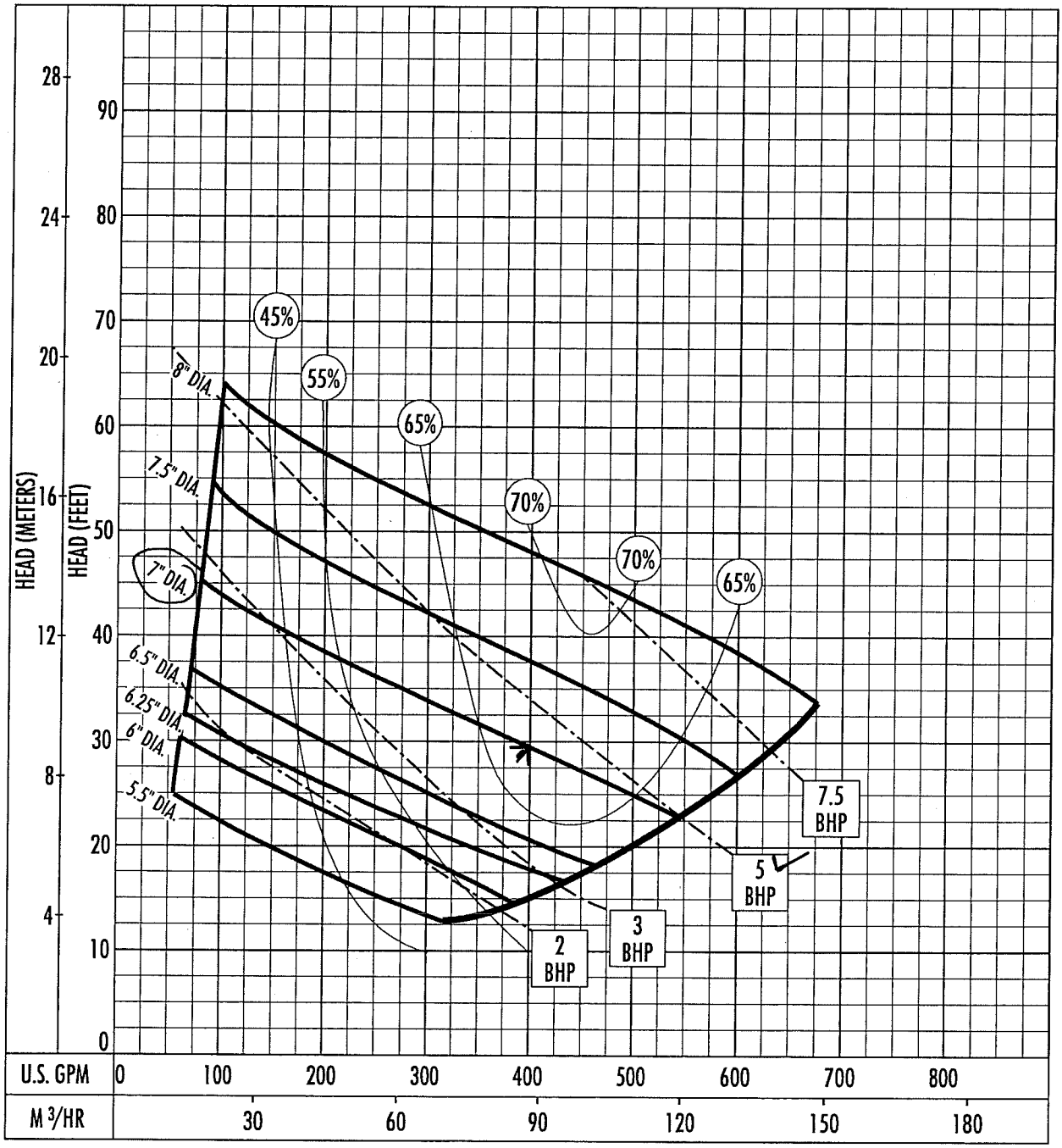
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 400 TDH: 30

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-10 CLAIBORNE - FRANCES – LIVACCARI PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **475** TDH **44** RPM **1750** CURVE PG. **111** IMPEL. DIA. **8.0"**

CONSTRUCTION: **HYDROMATIC S4MX1000JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ **(DOUBLE)** PACKED

BASE:
- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:
- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

MFR **HYDROMATIC** HP **10** RPM **1750** FRAME **N/A**

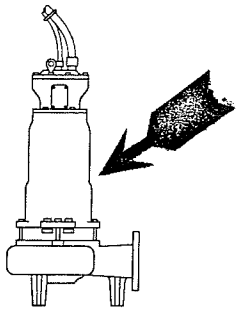
PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 W.W. PUMP DOOR & (1) S.S. HANGER BRACKET

PUMPS USE HOSE AND NO RAIL SYSTEM

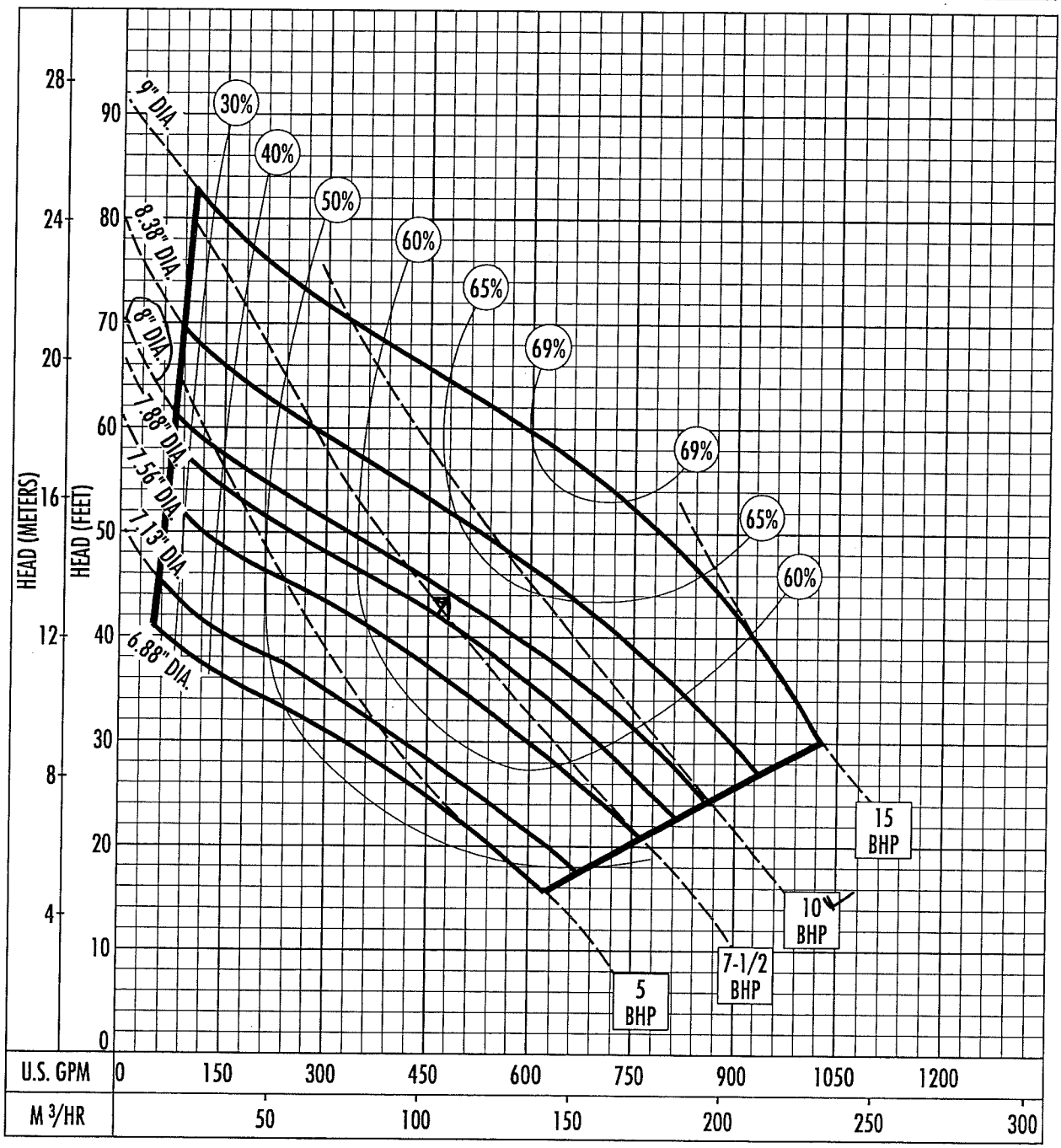
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4M/S4MX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 475 TDH: 44

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **JULY 22, 2008**

JOB **V1-11 CLAIBORNE – VALMAR PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BLD SERVICES**

ENGINEER **ENVIRONMENTAL ENGINEERING SERVICES, INC.**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **125** TDH **27** RPM **1750** CURVE PG. **109** IMPEL. DIA. **6.25"**

CONSTRUCTION: **HYDROMATIC S4NX300JC**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ (DOUBLE) PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

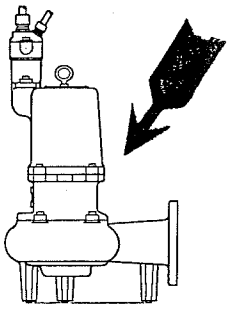
MFR **HYDROMATIC** HP **3** RPM **1750** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (2) ALUM H-20 PUMP W.W. & V.B. ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

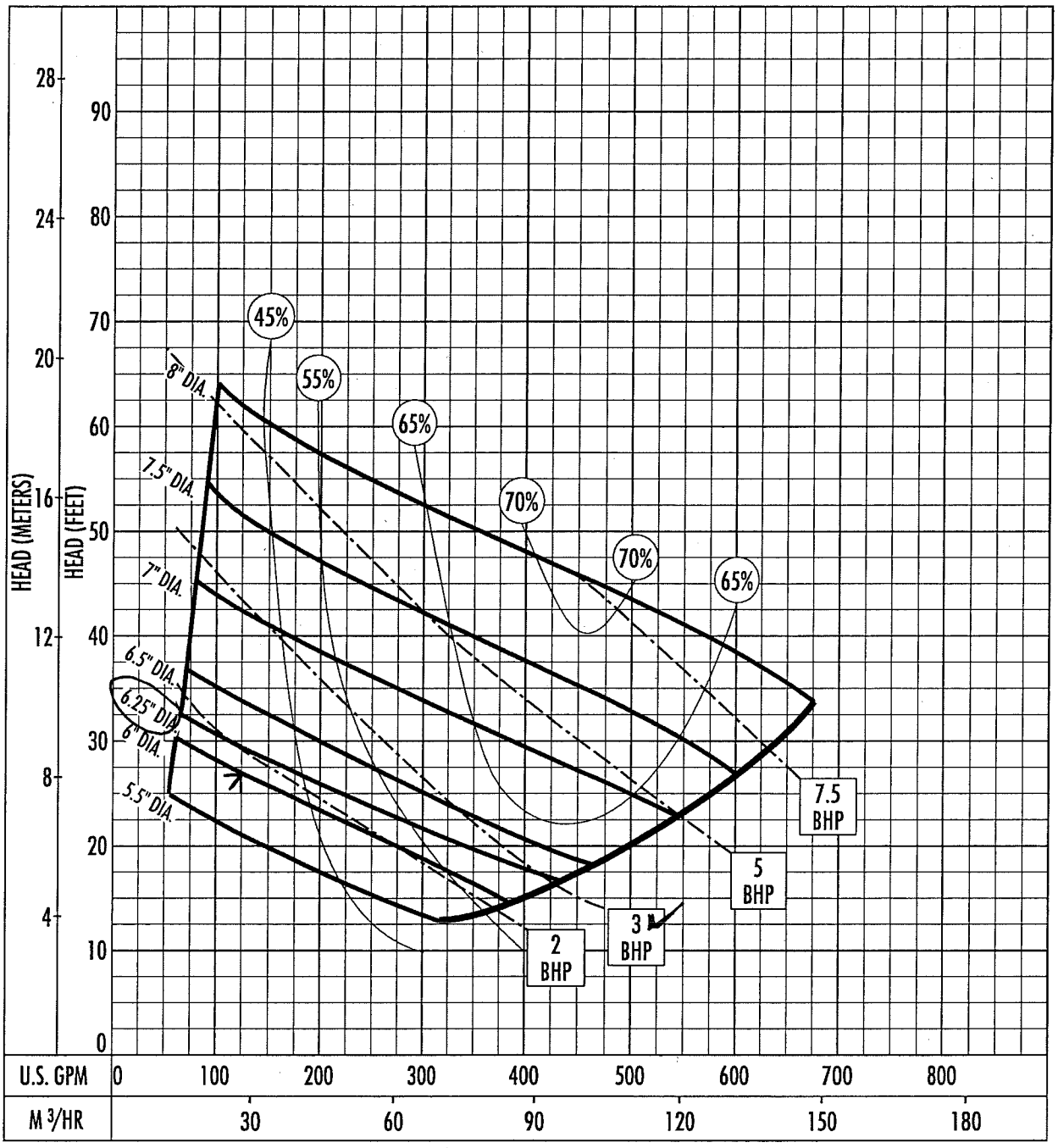
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 125 TDH: 27

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: OCT 16, 2008

JOB V1-12 PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR BOH BROTHERS CONST LLC

ENGINEER ALL SOUTH CONSULTING ENGINEERS LLC

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 250 TDH 13.5 RPM 1150 CURVE PG. 110 IMPEL. DIA. 7.0"

CONSTRUCTION: HYDROMATIC S4NX200EB

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ (DOUBLE) PACKED

BASE:
- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:
- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

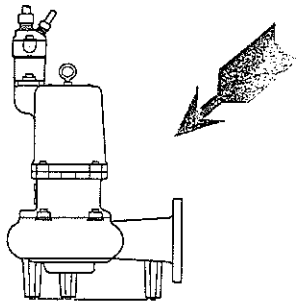
MFR HYDROMATIC HP 2 RPM 1150 FRAME N/A

PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

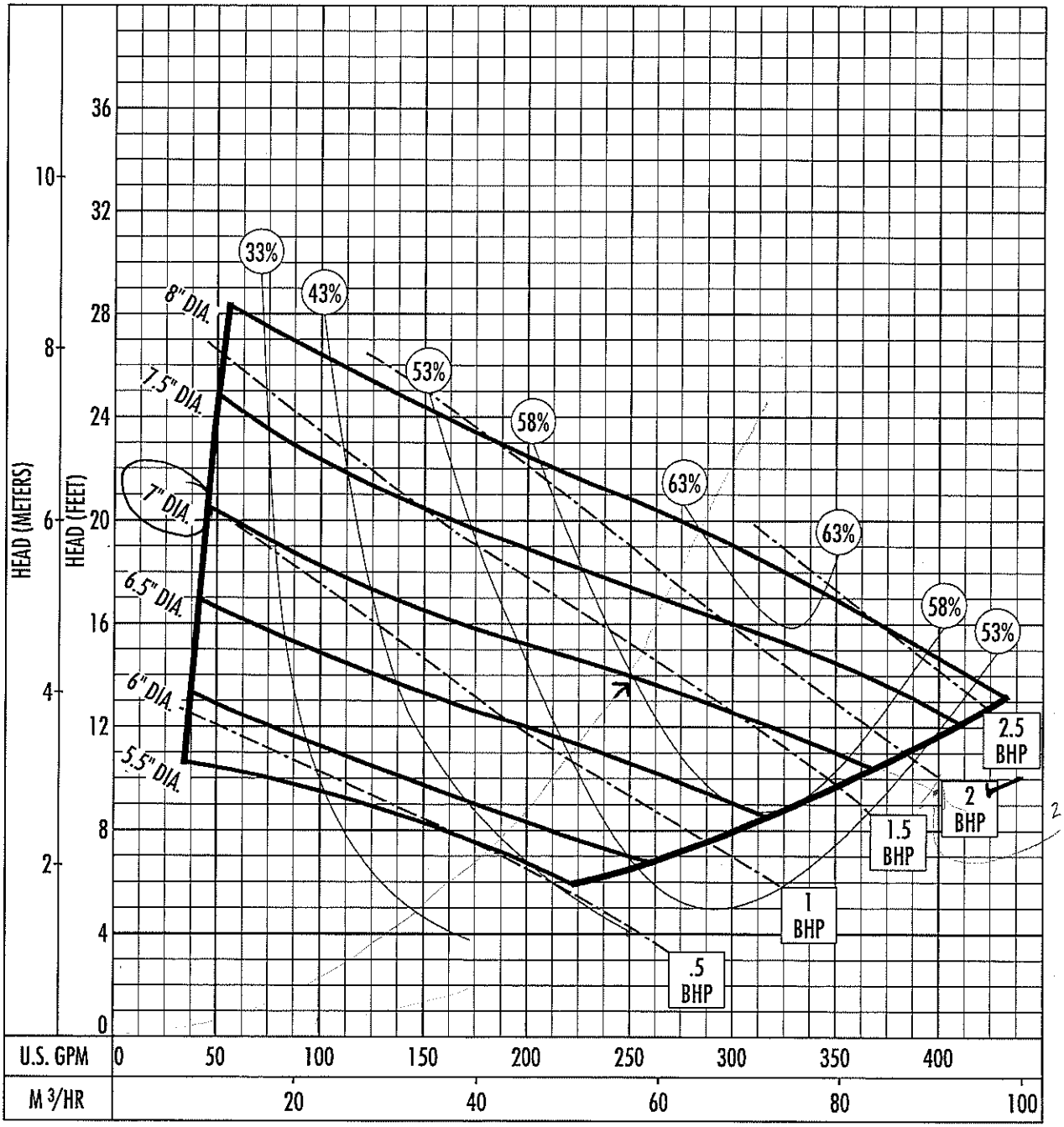
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

RPM: **1150** Discharge: **4"** Solids: **3"**



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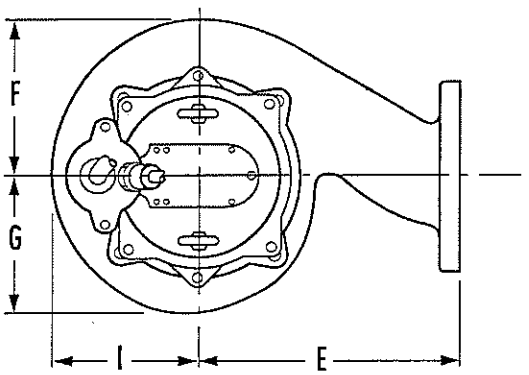
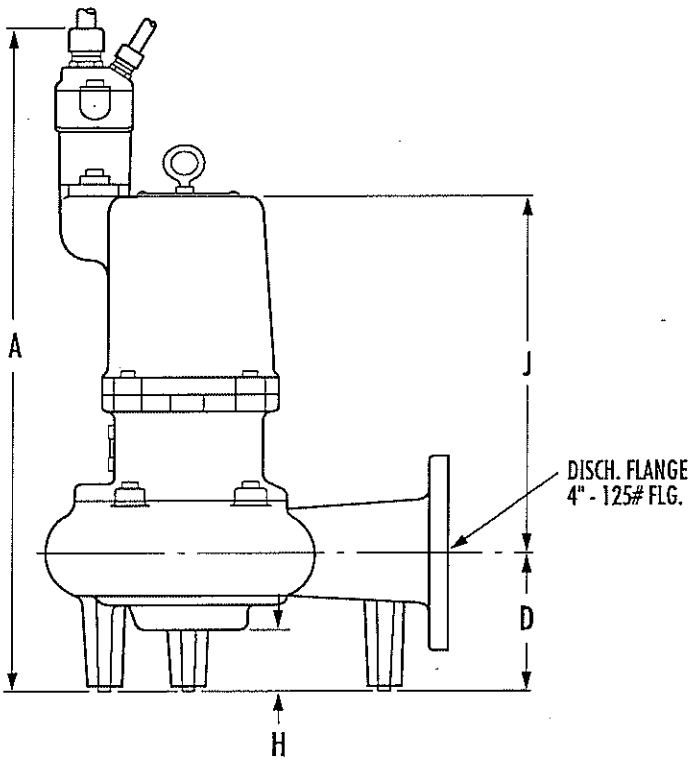
HYDROMATIC®

Conditions of Service:
GPM: 250 TDH: 13.5

Dimensional Data S4N/S4NS/S4NX





S4NX illustrated above

	A	D	E	F	G	H	I	J
S4N	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NS	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NX	31-1/2	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	16-3/4

ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Electrical Data

S4N/S4NS/S4NX

MODEL: S4N, S4NS & S4NX—Non-Clog Sewage Pumps

R.P.M.	1150			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, VFD SUITABLE			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	311°F (155°C)			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 90–65°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA	MTR. EFF. @ SF	MTR. EFF. 100% FL	MTR. EFF. 75% FL	MTR. EFF. 50% FL	PWR. FACT. @ SF	PWR. FACT. 100% FL	PWR. FACT. 75% FL	PWR. FACT. 50% FL
.75	200	1	N	1.2	8.3	9.0	43.5	1.1	8.7	1.7	.55	.52	.46	.37	.68	.65	.58	.50
	230				7.2	7.8	37.8											
.75	200	3	L	1.2	3.7	4.1	20.7	0.8	7.2	1.3	.69	.66	.63	.55	.69	.64	.57	.48
	230				3.2	3.6	18.0											
	460				1.6	1.8	9.0											
	575				1.3	1.4	7.2											
1.0	200	1	K	1.2	9.4	10.2	43.5	1.3	8.7	1.9	.59	.57	.52	.43	.75	.70	.65	.54
	230				8.2	8.9	37.8											
1.0	200	3	J	1.2	4.3	5.0	20.7	1.1	7.2	1.5	.71	.70	.68	.61	.74	.71	.64	.54
	230				3.8	4.3	18.0											
	460				1.9	2.2	9.0											
	575				1.5	1.7	7.2											
1.5	200	1	K	1.2	17.0	18.0	64.4	2.0	12.9	3.4	.58	.55	.50	.41	.65	.60	.53	.45
	230				14.7	15.6	56.0											
1.5	200	3	K	1.2	7.2	7.8	37.0	1.5	12.8	2.5	.74	.73	.71	.61	.67	.62	.57	.45
	230				6.2	6.8	32.2											
	460				3.1	3.4	16.0											
	575				2.5	2.7	12.9											
2	200	1	H	1.2	18.6	20.6	64.4	2.5	12.9	3.7	.60	.59	.55	.47	.73	.68	.60	.50
	230				16.2	17.9	56.0											
2	200	3	H	1.2	8.4	9.6	37.0	2.0	12.8	2.9	.74	.74	.73	.67	.73	.70	.62	.52
	230				7.3	8.3	32.2											
	460				3.6	4.2	16.0											
	575				2.9	3.3	12.9											

Technical Data S4NX

MODEL: S4NX — Explosion Proof Non-Clog Sewage Pumps

Physical Data:

DISCHARGE SIZE	4"
SOLIDS SIZE	3"
IMPELLER TYPE	BALANCED, ENCLOSED, 2 VANE
CABLE LENGTH	35' STANDARD 50' OPTIONAL
PAINT	PAINTED AFTER ASSEMBLY. DARK GREEN, WATER REDUCIBLE ENAMEL, ONE COAT, AIR DRIED.

Temperature:

MAXIMUM LIQUID	140°F
MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./119°F MIN.

Technical Data:

POWER CORD TYPE		STW-A WATER RESISTANT 600V, 60°C			
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS			
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON	ASTM	A-48	CLASS 30
	CASING	CAST IRON	ASTM	A-48	CLASS 30
	IMPELLER	DUCTILE IRON	ASTM	A-536	
	CASING WEAR RING	300 SERIES STAINLESS STEEL			
	MOTOR SHAFT	416 STAINLESS STEEL			
	HARDWARE	300 SERIES STAINLESS STEEL			
	"O" RINGS	BUNA N			
MECHANICAL SEALS Standard: Optional: Optional:		UPPER AND LOWER CARBON/CERAMIC/BUNA-N, TYPE 21 LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/BUNA-N, TYPE 21 LOWER SILICON CARBIDE/SILICON CARBIDE/BUNA-N, TYPE 21			
UPPER BEARING		(RADIAL) SINGLE ROW — BALL			
LOWER BEARING		(THRUST) SINGLE ROW — BALL			

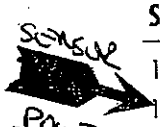
Power and Sensor Cable

All Submersible and Explosion Proof, 3/4 through 150 horsepower sewage pumps, come equipped as standard equipment with one power and one sensor cable.
The power cable size is a function of horsepower, voltage and amp draw.

Standard Pumps

Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
16-4	.424±.005	10	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
14-4	.571±.011	15	600	60	STW-A / Power
12-7	.740±.010	20	600	90	SOOW/SOOW-A /Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	32	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
6-3	1.01±.010	79	600	90	G-GC / Power
4-3	1.19±.010	104	600	90	G-GC / Power
2-3	1.34±.010	138	600	90	G-GC / Power
0-3	1.65±.010	186	600	90	G-GC / Power
4/0-3	2.04±.010	287	600	90	G-GC / Power

Explosion-Proof Pumps



Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
18-2	.375±.010	2	600	60	SJOW-A / Float
18-5	.485±.025	5.5	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	35	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
4-4	1.35±.100	60	600	60	STW-A / Power
2-4	1.55±.100	80	600	60	STW-A / Power
2-4W	1.48±.020	115	600	60	W / Power
0-4W or 1/0-4W	1.79±.040	163	600	60	W / Power

Nameplate Data

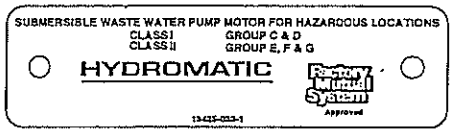
NON-CLOG

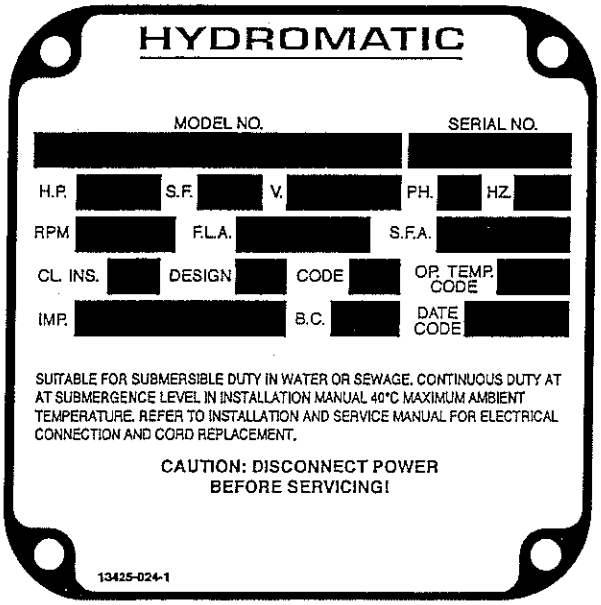
Explosion Proof Nameplate

Nameplate Data Used on Pump Models:

S3HX	H4HX	S4KX	S8FX
H3HX	S4PX	S4TX	S8LX
S4HX	S4LX	S6LX	S12LX
S4NX	S4BX	S6AX	
S4MX	H4QX		

Optional Nameplate for Above Models with F-M Approval

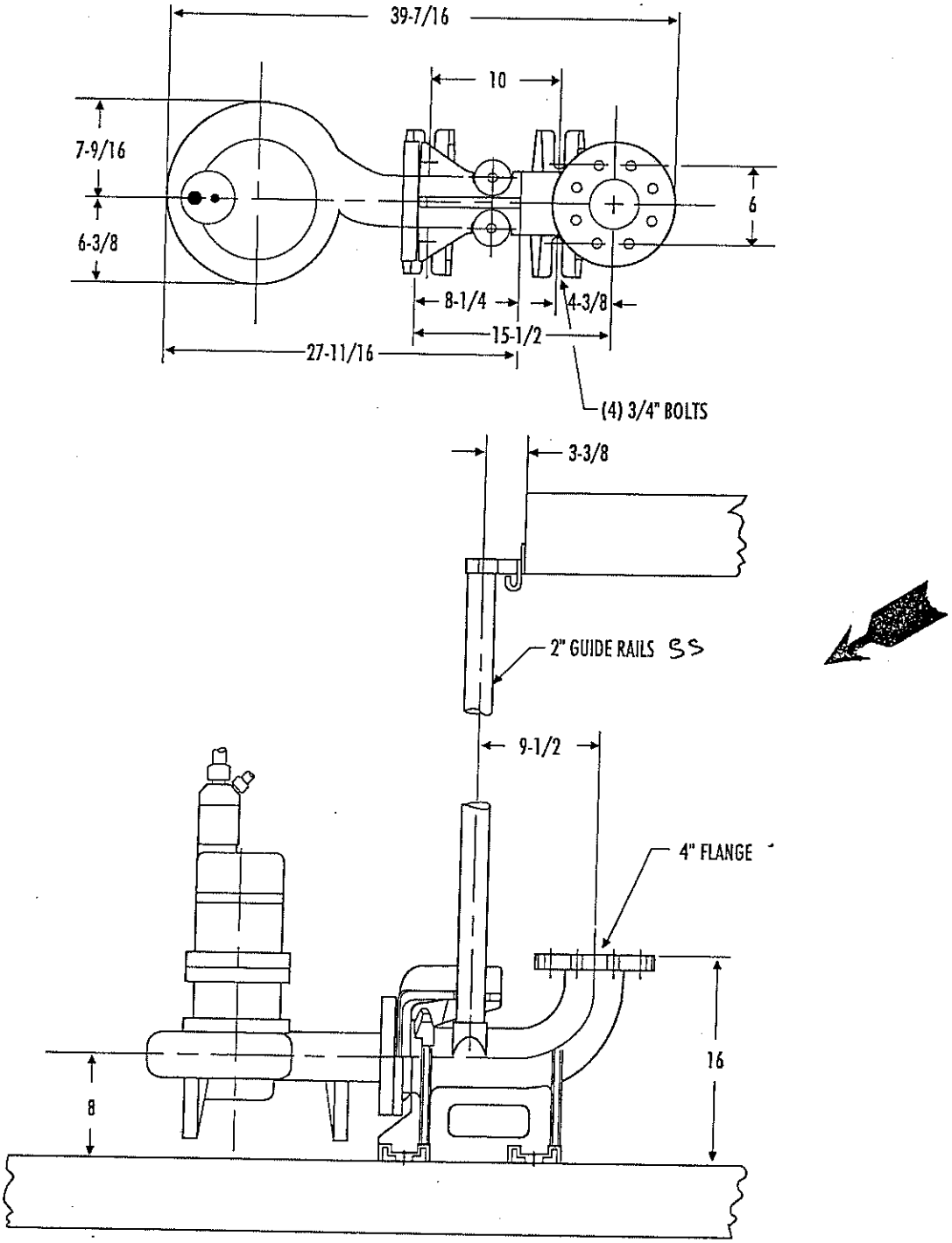




Material–303 Stainless Steel, 22 Gage

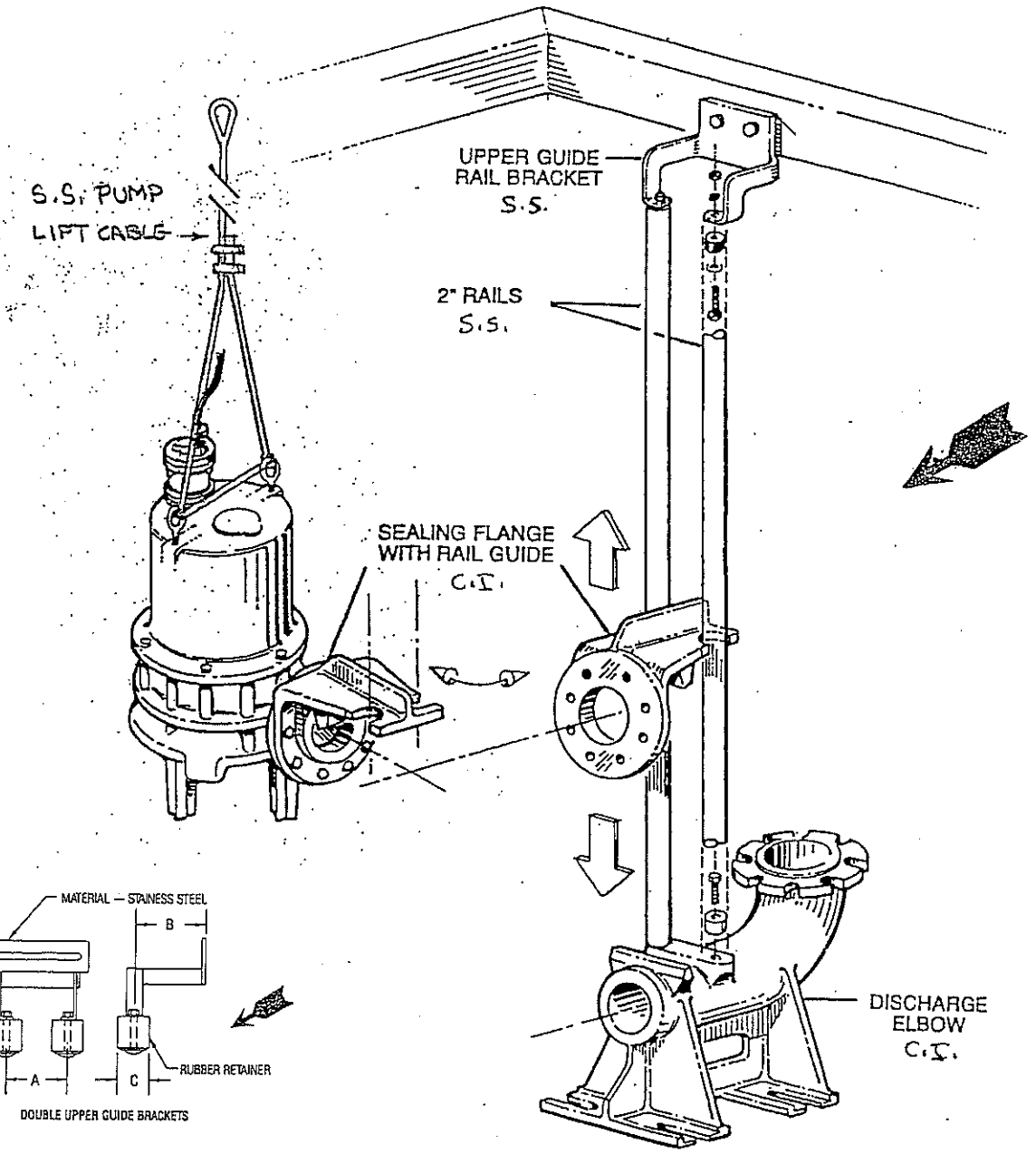
MODEL NO.	S3HX (etc.) followed by the pump model identification
SERIAL NO.	Individual Numbers–with specific records kept at factory
H.P.	Horsepower
S.F.	Service Factor
V	Voltage
PH	Phase
HZ	Hertz
RPM	Pump Speed
F.L.A	Full Load Amps
S.F.A.	Service Factor Amps
C.L. INS.	Class Insulation
DESIGN	NEMA TypeB (3 Phase) L (1 Phase)
CODE	National Electric Code Letter
IMP.	Impeller Trim Diameter the Pump is Built With
B.C.	Builders Code–Identifies Worker Who Built Pump
DATE CODE	Date Stamp-Month-Year (590–May 1990)
O.P. TEMP. CODE	Operating temperature code–T4, 258°F (All Pumps) this is the maximum temperature which the pump can obtain (set by factory mutual), and is limited by redundant heat sensors located in the motor windings.

S4N/S4NX

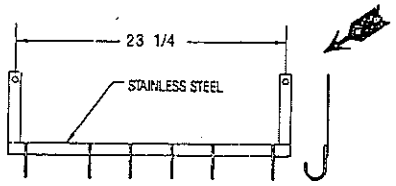


ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"



DOUBLE UPPER GUIDE BRACKETS



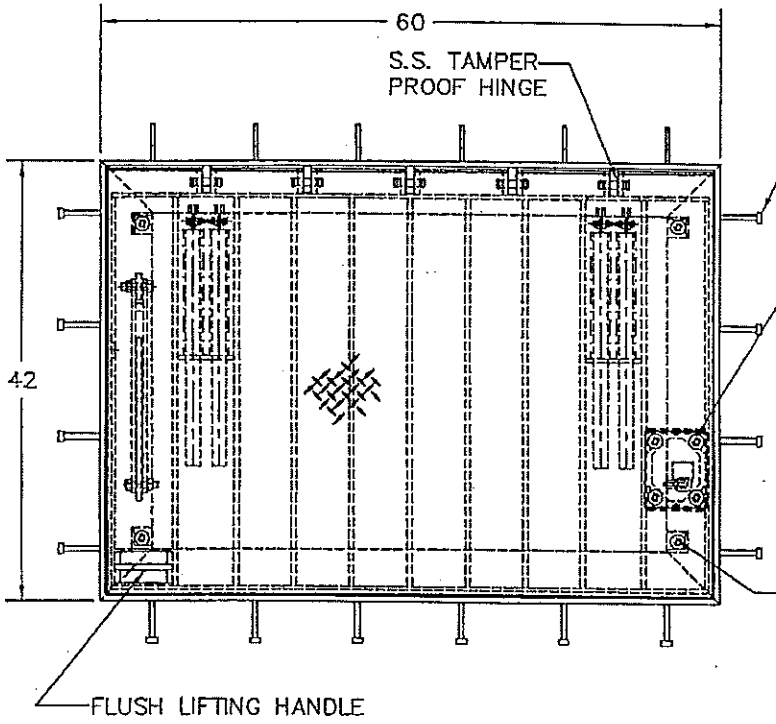
CABLE HOLDER

HYDROMATIC™ PUMPS

AURORA PUMP
A UNIT OF GENERAL SIGNAL

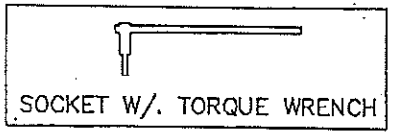
MTM RAIL SYSTEM

RCS184 - 3/92
SUPERSEDES - 8/91

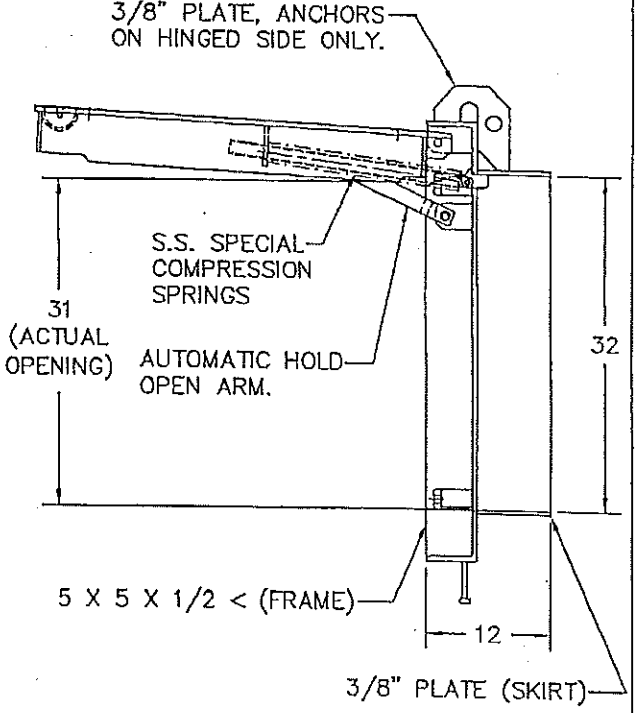


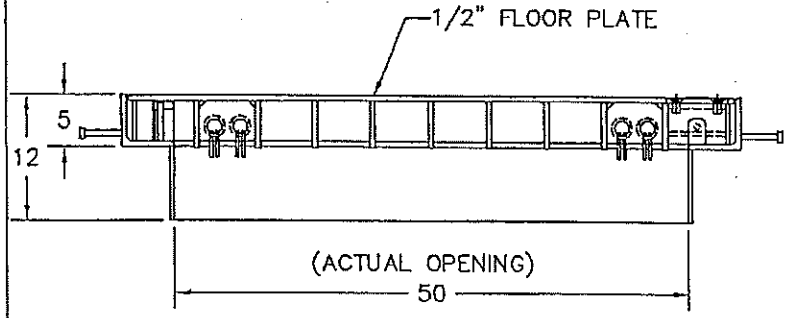
1/2 X 4 ANCHOR STUDS (TYP. 3–SIDES)

OVERSIZE RECESSED STAPLE FOR PADLOCK, WITH BOLTED DOWN LID. (4) 3/4 DIA. S.S. FLAT HEAD SOCKET CAP SCREW.



COVER BOLTED DOWN WITH (4) 3/4 DIA. S.S. FLAT HEAD SOCKET CAP SCREW. (SEE NOTE–6)





NOTES:

1– MATERIAL: STEEL, HOT DIP GALVANIZED AFTER FABRICATION
2– LOADING: DESIGNED FOR H–20 WHEEL LOADS
3– 316 STAINLESS STEEL NUTS & BOLTS
4– APPROXIMATE WEIGHT: 1241 LBS.
5– ALL WELDS CONTINUOUS.
6– IT IS ESSENTIAL THAT ALL BOLTS ARE IN PLACE WHENEVER COVER IS EXPOSED TO TRAFFIC
–"LOCTITE 242 BLUE", MUST BE APPLIED TO ALL BOLTS AFTER EACH USE.

Approved For Fabrication By:

X _____

Print Name: _____

Date: _____

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

HATCH DT–AHS 32 X 50 STEEL

DWN. BY: JM	SCALE: 1=12	QUOTE# 64984	DATE: 7/29/08
CHK. BY:	DWG. NO: 54273	SHEET 1 of 1	REV:

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **OCT 16, 2008**

JOB **V1-13 PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BOH BROTHERS CONST LLC**

ENGINEER **ALL SOUTH CONSULTING ENGINEERS LLC**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **200** TDH **22** RPM **1150** CURVE PG. **112** IMPEL. DIA. **8.0"**

CONSTRUCTION: **HYDROMATIC S4MX300EB**

- ☐ BRONZE FITTED
- ☒ MECHANICAL SEAL
- ☒ ALL IRON
- ☐ **(DOUBLE)** PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

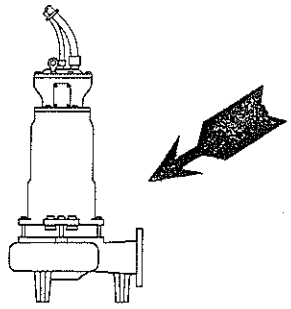
MFR **HYDROMATIC** HP **3** RPM **1150** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

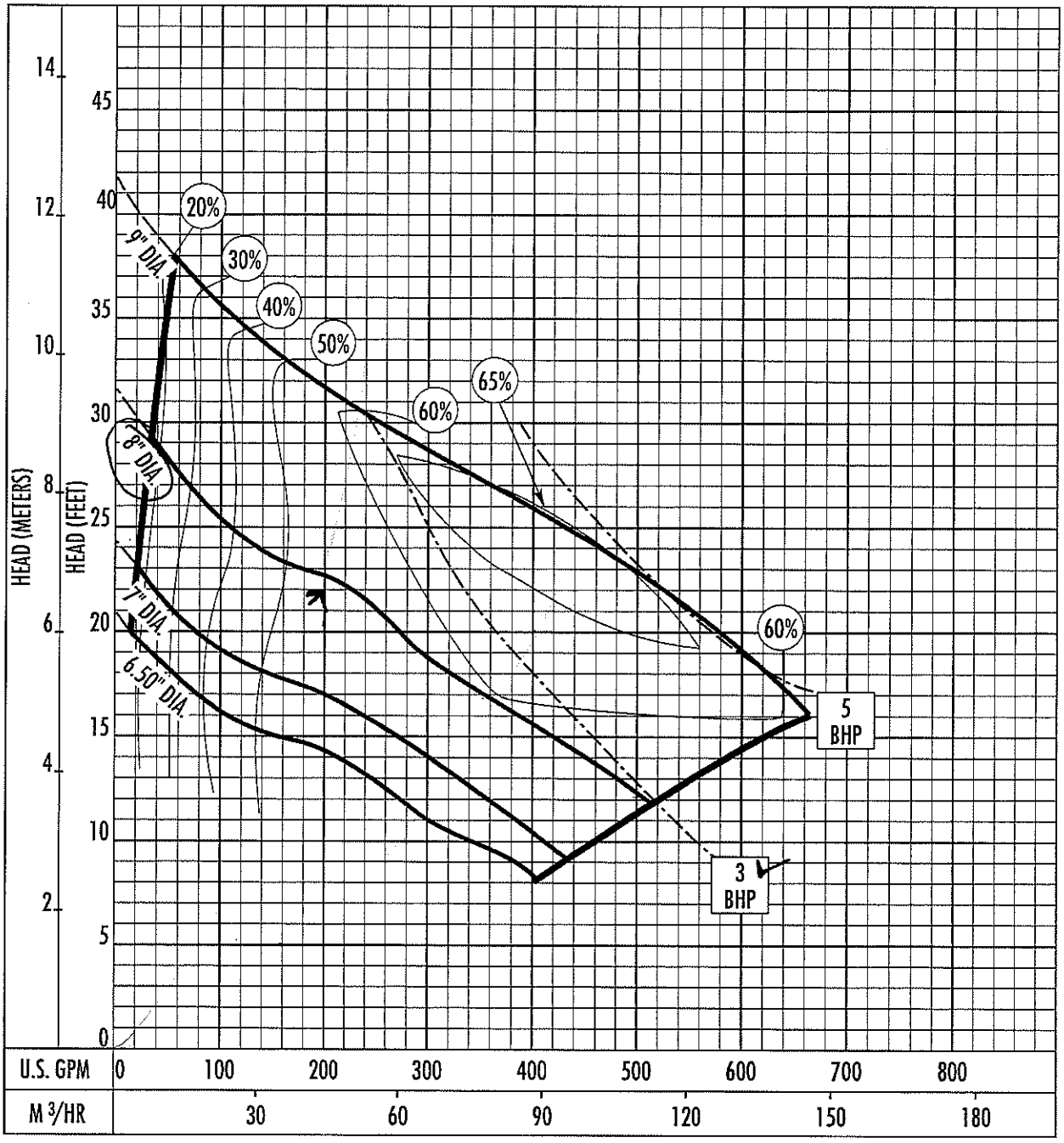
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4M/S4MX

RPM: **1150** Discharge: **4"** Solids: **3"**

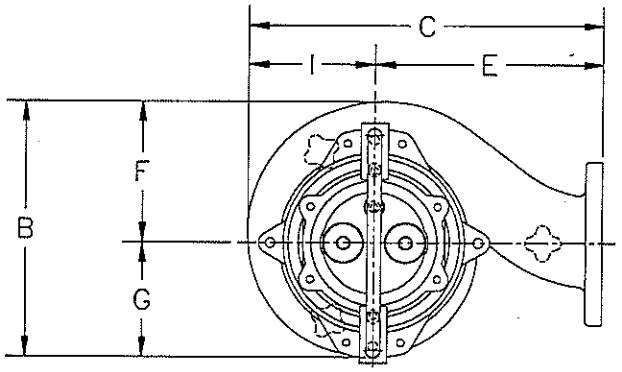


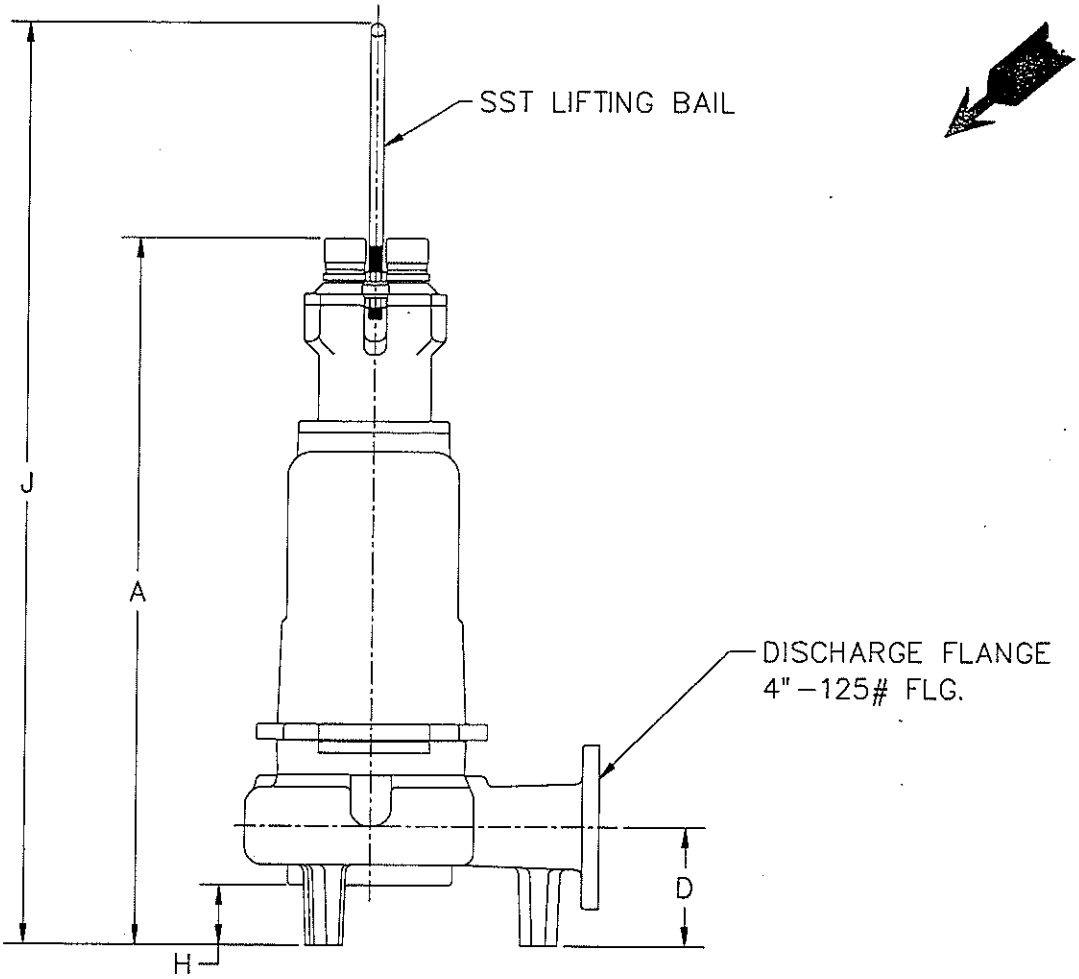
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

HYDROMATIC®

Conditions of Service:
GPM: 200 **TDH:** 22

Dimensional Data S4M/S4MX





	A	B	C	D	E	F	G	H	I	J
S4M	32–7/8	14–3/16	19–1/2	6–1/2	12–1/2	7–7/8	6–5/16	3–5/16	7	39–1/16
S4MX	38–3/4	14–3/16	19–1/2	6–1/2	12–1/2	7–7/8	6–5/16	3–5/16	7	50–9/16

ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Electrical Data **S4M/S4MX**

MODEL: S4M & S4MX—Non-Clog Sewage Pump

R.P.M.	1150			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, VFD SUITABLE			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	H			
STATOR WINDING CLASS	H			
MAXIMUM STATOR TEMPERATURE	356°F (180°C)			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED			
	TO OPEN AT 130°C AND AUTOMATICALLY RESET @ 96–68°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA	MTR. EFF. @ SF	MTR. EFF. 100% FL	MTR. EFF. 75% FL	MTR. EFF. 50% FL	PWR. FACT. @ SF	PWR. FACT. 100% FL	PWR. FACT. 75% FL	PWR. FACT. 50% FL
3	200	3	N	1.2	15.9	19.0	106	2.9	36.7	5.1	.80	.78	.75	.68	.61	.56	.48	.39
	230				14.2	14.8	92											
	460				7.2	7.6	46											
	575				5.1	5.6	36.8											
5	200	3	J	1.2	19.3	22.2	106	4.6	36.7	6.7	.81	.81	.80	.76	.72	.69	.62	.51
	230				16.8	19.3	92											
	460				8.4	9.6	46											
	575				6.7	7.7	36.8											

Technical Data S4MX

MODEL: S4MX — Explosion Proof Non-Clog Sewage Pumps

Physical Data:

DISCHARGE SIZE	4"
SOLIDS SIZE	3"
IMPELLER TYPE	BALANCED, ENCLOSED, 2 VANE
CABLE LENGTH	35' STANDARD 50' OPTIONAL
PAINT	PAINTED AFTER ASSEMBLY. DARK GREEN, WATER REDUCIBLE ENAMEL, ONE COAT, AIR DRIED.

Temperature:

MAXIMUM LIQUID	140°F
MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./119°F MIN.

Technical Data:

POWER CORD TYPE		STW-A WATER RESISTANT 600V, 60°C
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	DUCTILE IRON ASTM A-536
	CASING WEAR RING	300 SERIES STAINLESS STEEL
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	"O" RINGS	BUNA N
MECHANICAL SEALS Standard: Optional: Optional:		 UPPER AND LOWER CARBON/CERAMIC/BUNA-N, TYPE 21 LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/BUNA-N, TYPE 21 LOWER SILICON CARBIDE/SILICON CARBIDE/BUNA-N, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW — BALL
LOWER BEARING		(THRUST) SINGLE ROW — BALL

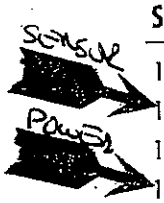
Power and Sensor Cable

All Submersible and Explosion Proof, 3/4 through 150 horsepower sewage pumps, come equipped as standard equipment with one power and one sensor cable.
The power cable size is a function of horsepower, voltage and amp draw.

Standard Pumps

Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
16-4	.424±.005	10	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
14-4	.571±.011	15	600	60	STW-A / Power
12-7	.740±.010	20	600	90	SOOW/SOOW-A /Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	32	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
6-3	1.01±.010	79	600	90	G-GC / Power
4-3	1.19±.010	104	600	90	G-GC / Power
2-3	1.34±.010	138	600	90	G-GC / Power
0-3	1.65±.010	186	600	90	G-GC / Power
4/0-3	2.04±.010	287	600	90	G-GC / Power

Explosion-Proof Pumps



Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
18-2	.375±.010	2	600	60	SJOW-A / Float
18-5	.485±.025	5.5	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	35	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
4-4	1.35±.100	60	600	60	STW-A / Power
2-4	1.55±.100	80	600	60	STW-A / Power
2-4W	1.48±.020	115	600	60	W / Power
0-4W or 1/0-4W	1.79±.040	163	600	60	W / Power

Nameplate Data

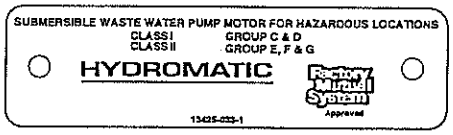
NON-CLOG

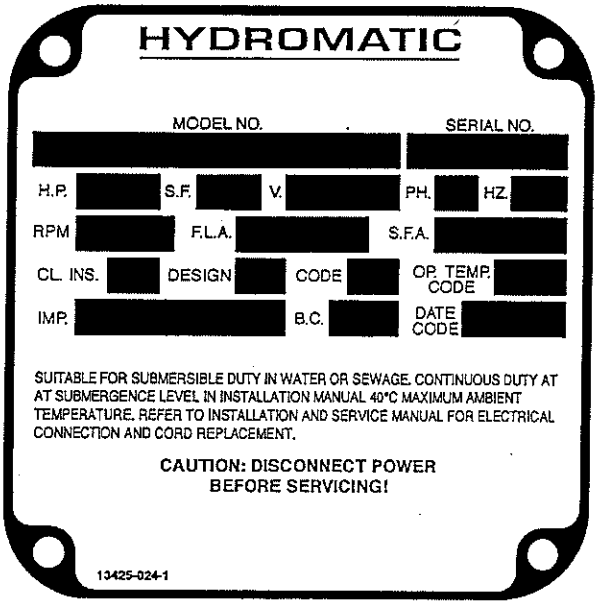
Explosion Proof Nameplate

Nameplate Data Used on Pump Models:

S3HX	H4HX	S4KX	S8FX
H3HX	S4PX	S4TX	S8LX
S4HX	S4LX	S6LX	S12LX
S4NX	S4BX	S6AX	
S4MX	H4QX		

Optional Nameplate for Above Models with F-M Approval

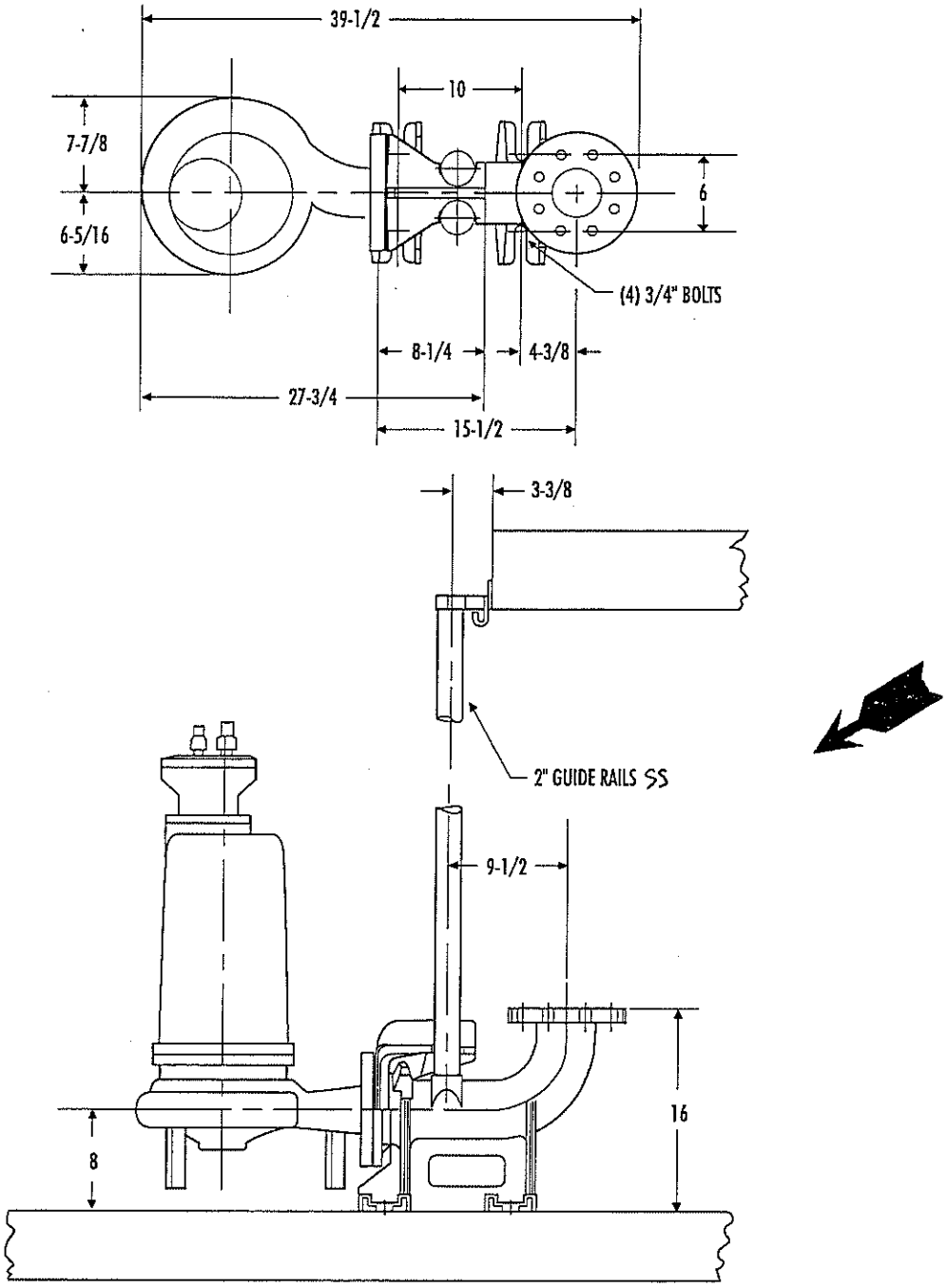




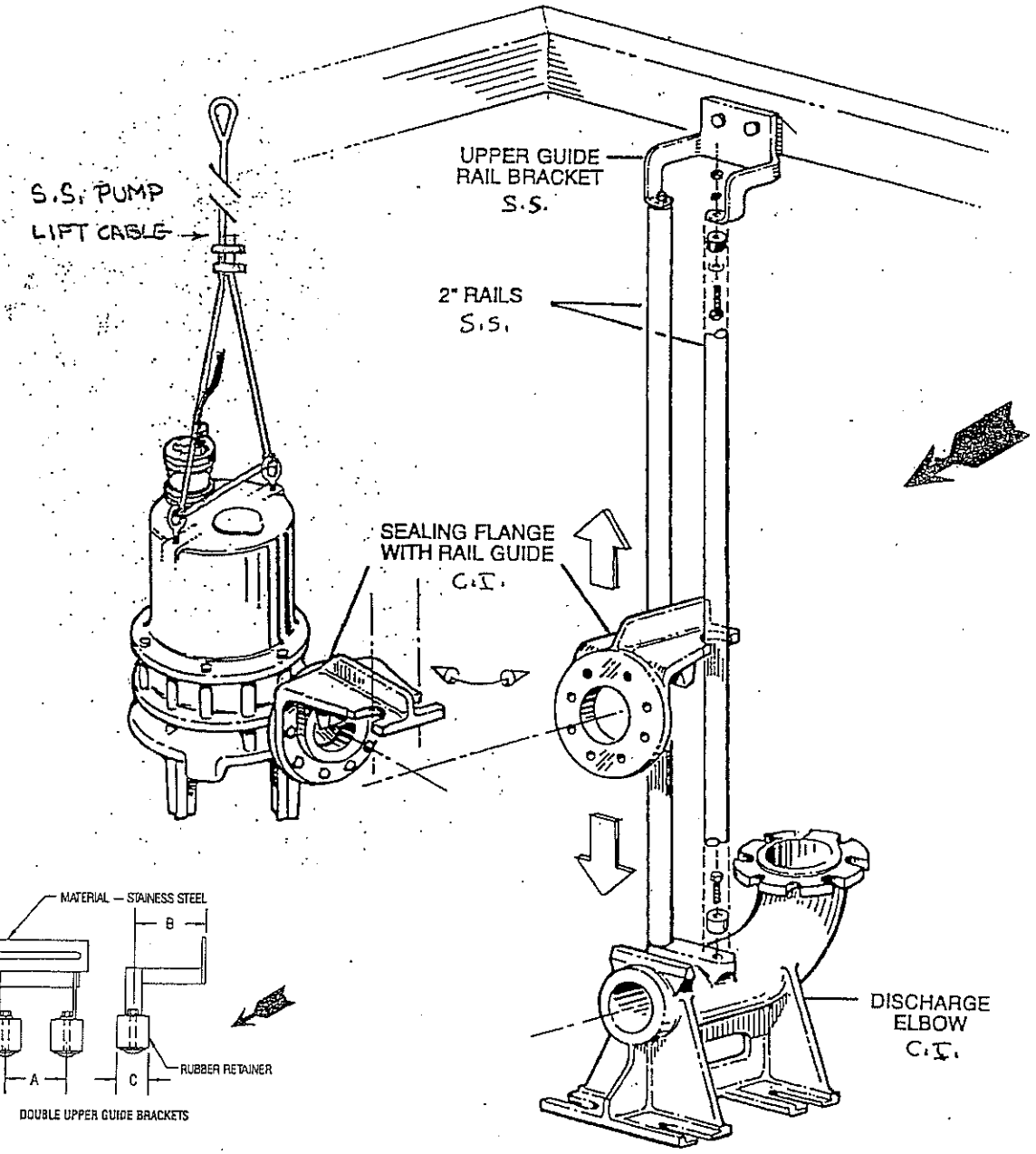
Material–303 Stainless Steel, 22 Gage

MODEL NO.	S3HX (etc.) followed by the pump model identification
SERIAL NO.	Individual Numbers–with specific records kept at factory
H.P.	Horsepower
S.F.	Service Factor
V	Voltage
PH	Phase
HZ	Hertz
RPM	Pump Speed
F.L.A	Full Load Amps
S.F.A.	Service Factor Amps
C.L. INS.	Class Insulation
DESIGN	NEMA TypeB (3 Phase) L (1 Phase)
CODE	National Electric Code Letter
IMP.	Impeller Trim Diameter the Pump is Built With
B.C.	Builders Code–Identifies Worker Who Built Pump
DATE CODE	Date Stamp-Month-Year (590–May 1990)
O.P. TEMP. CODE	Operating temperature code–T4, 258°F (All Pumps) this is the maximum temperature which the pump can obtain (set by factory mutual), and is limited by redundant heat sensors located in the motor windings.

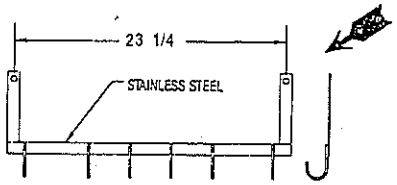
S4MN/S4M/S4MX



ALL DIMENSIONS IN INCHES
NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"



DOUBLE UPPER GUIDE BRACKETS

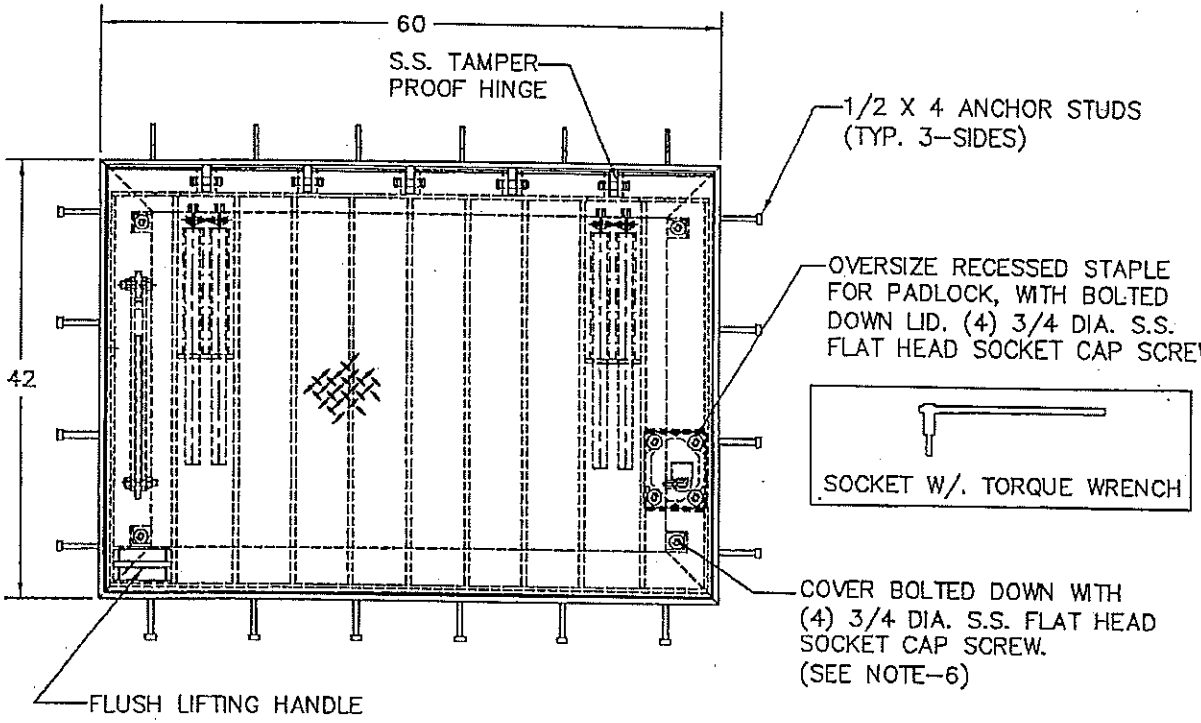


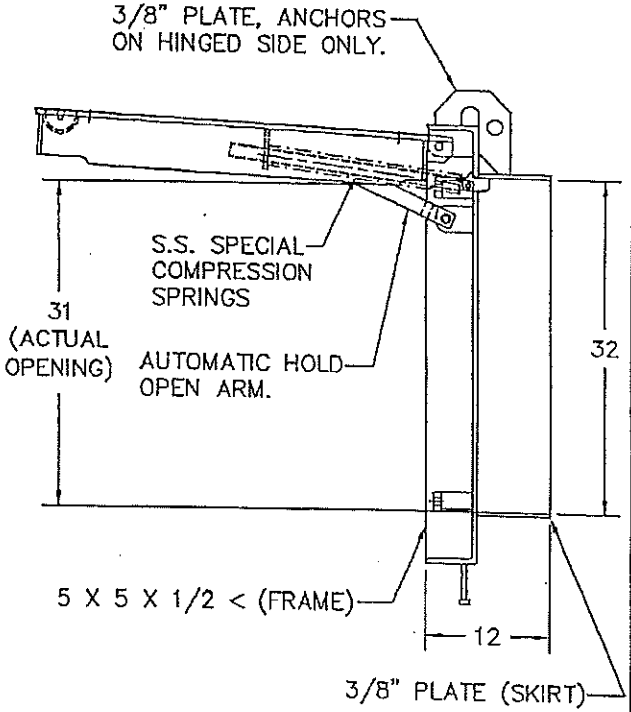
CABLE HOLDER

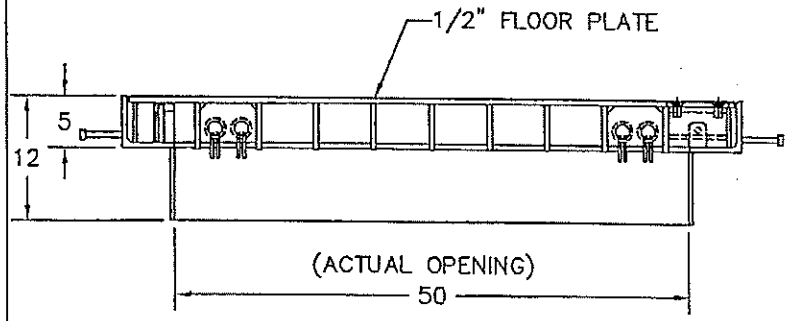
HYDROMATIC™ PUMPS
AURORA PUMP
A UNIT OF GENERAL SIGNAL

MTM RAIL SYSTEM

HCS (M - 3/92
SUPERSEDES - 6/91







NOTES:

1- MATERIAL: STEEL, HOT DIP GALVANIZED AFTER FABRICATION
2- LOADING: DESIGNED FOR H-20 WHEEL LOADS
3- 316 STAINLESS STEEL NUTS & BOLTS
4- APPROXIMATE WEIGHT: 1241 LBS.
5- ALL WELDS CONTINUOUS.
6- IT IS ESSENTIAL THAT ALL BOLTS ARE IN PLACE WHENEVER COVER IS EXPOSED TO TRAFFIC -"LOCTITE 242 BLUE", MUST BE APPLIED TO ALL BOLTS AFTER EACH USE.

Approved For Fabrication By:

X _____

Print Name: _____

Date: _____

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

HATCH DT-AHS 32 X 50 STEEL

DWN. BY: JM	SCALE: 1=12	QUOTE# 64984	DATE: 7/29/08
CHK. BY:	DWG. NO: 54273	SHEET 1 OF 1	REV:

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA. 70123

DATE: OCT 16, 2008

JOB V1-14 PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR BOH BROTHERS CONST LLC

ENGINEER ALL SOUTH CONSULTING ENGINEERS LLC

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 235 TDH 13 RPM 1150 CURVE PG. 110 IMPEL. DIA. 7.0"

CONSTRUCTION: HYDROMATIC S4NX200EB

- ☐ BRONZE FITTED
- ☒ MECHANICAL SEAL
- ☒ ALL IRON
- ☐ (DOUBLE) PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 60' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

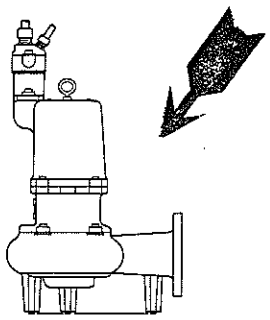
MFR HYDROMATIC HP 2 RPM 1150 FRAME N/A

PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/60' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

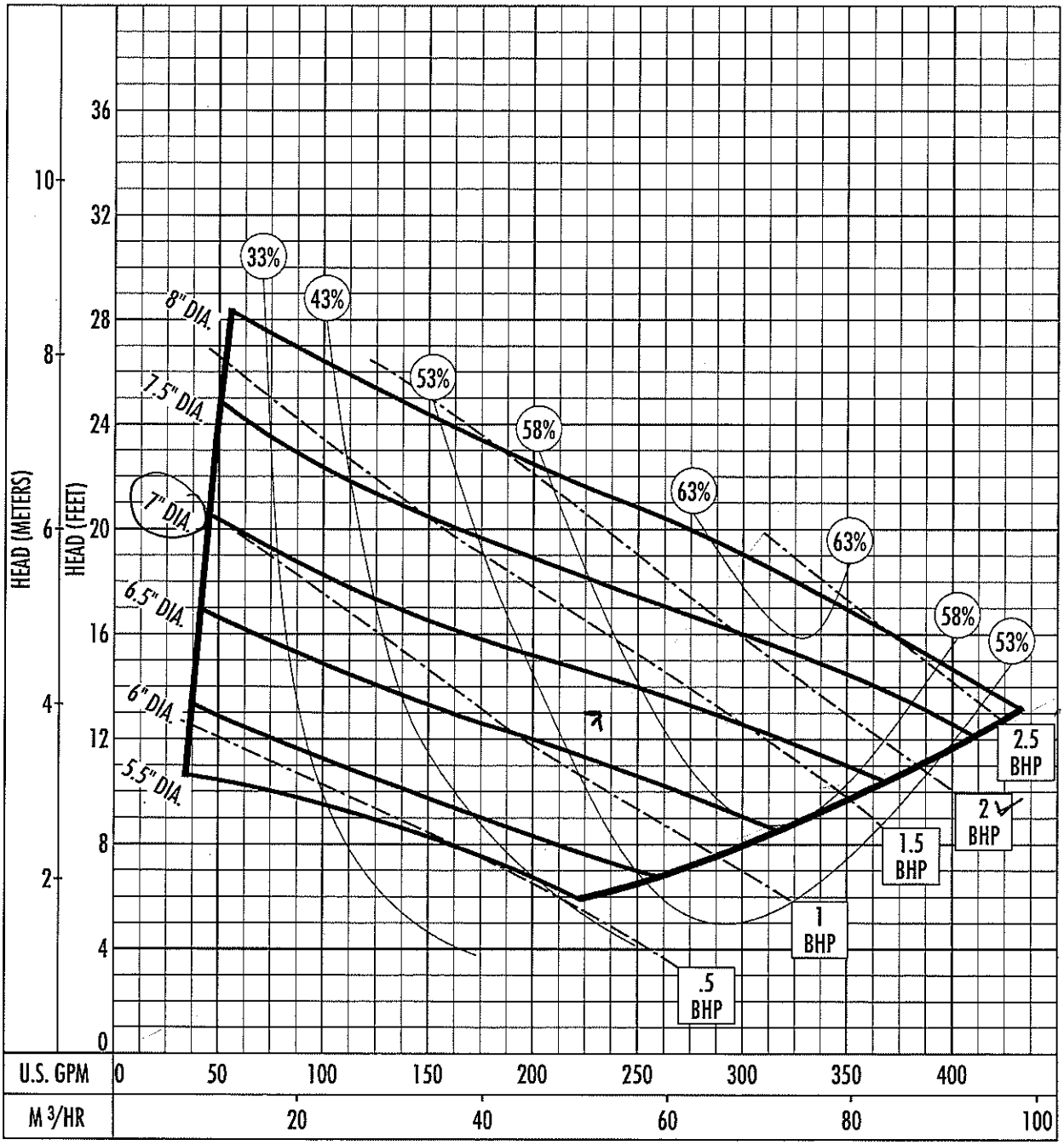
------ PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH------



Performance Curve

S4N/S4NS/S4NX

RPM: **1150** Discharge: **4"** Solids: **3"**

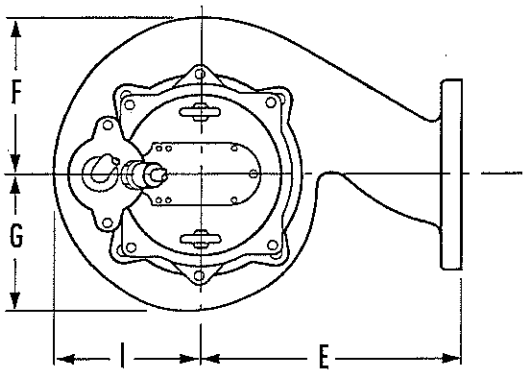


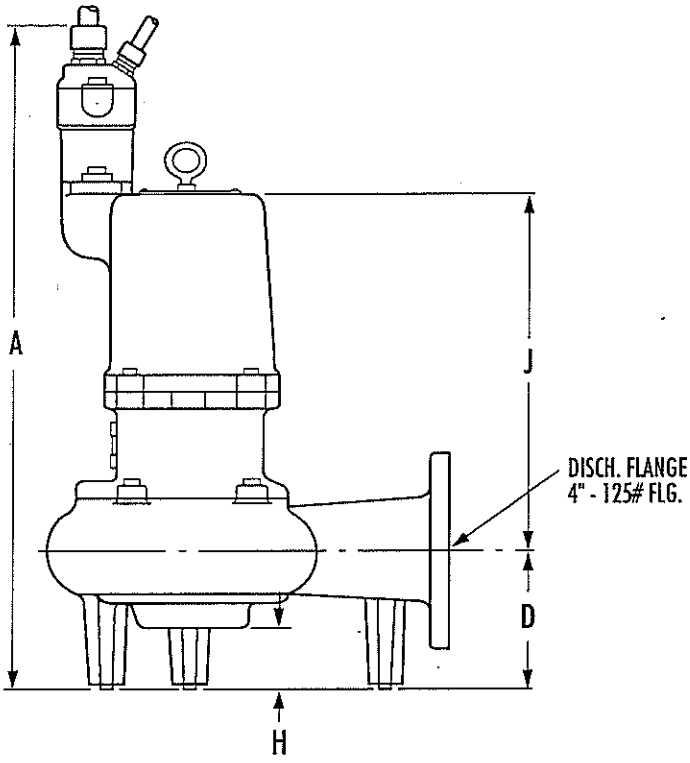
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

HYDROMATIC®

Conditions of Service:
GPM: 235 TDH: 13

Dimensional Data S4N/S4NS/S4NX





S4NX illustrated above

	A	D	E	F	G	H	I	J
S4N	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NS	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NX	31-1/2	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	16-3/4

ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Electrical Data

S4N/S4NS/S4NX

MODEL: S4N, S4NS & S4NX—Non-Clog Sewage Pumps

R.P.M.	1150			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, VFD SUITABLE			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	311°F (155°C)			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 90–65°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA	MTR. EFF. @ SF	MTR. EFF. 100% FL	MTR. EFF. 75% FL	MTR. EFF. 50% FL	PWR. FACT. @ SF	PWR. FACT. 100% FL	PWR. FACT. 75% FL	PWR. FACT. 50% FL
.75	200	1	N	1.2	8.3	9.0	43.5	1.1	8.7	1.7	.55	.52	.46	.37	.68	.65	.58	.50
	230				7.2	7.8	37.8											
.75	200	3	L	1.2	3.7	4.1	20.7	0.8	7.2	1.3	.69	.66	.63	.55	.69	.64	.57	.48
	230				3.2	3.6	18.0											
	460				1.6	1.8	9.0											
	575				1.3	1.4	7.2											
1.0	200	1	K	1.2	9.4	10.2	43.5	1.3	8.7	1.9	.59	.57	.52	.43	.75	.70	.65	.54
	230				8.2	8.9	37.8											
1.0	200	3	J	1.2	4.3	5.0	20.7	1.1	7.2	1.5	.71	.70	.68	.61	.74	.71	.64	.54
	230				3.8	4.3	18.0											
	460				1.9	2.2	9.0											
	575				1.5	1.7	7.2											
1.5	200	1	K	1.2	17.0	18.0	64.4	2.0	12.9	3.4	.58	.55	.50	.41	.65	.60	.53	.45
	230				14.7	15.6	56.0											
1.5	200	3	K	1.2	7.2	7.8	37.0	1.5	12.8	2.5	.74	.73	.71	.61	.67	.62	.57	.45
	230				6.2	6.8	32.2											
	460				3.1	3.4	16.0											
	575				2.5	2.7	12.9											
2	200	1	H	1.2	18.6	20.6	64.4	2.5	12.9	3.7	.60	.59	.55	.47	.73	.68	.60	.50
	230				16.2	17.9	56.0											
2	200	3	H	1.2	8.4	9.6	37.0	2.0	12.8	2.9	.74	.74	.73	.67	.73	.70	.62	.52
	230				7.3	8.3	32.2											
	460				3.6	4.2	16.0											
	575				2.9	3.3	12.9											

Technical Data S4NX

MODEL: S4NX — Explosion Proof Non-Clog Sewage Pumps

Physical Data:

DISCHARGE SIZE	4"
SOLIDS SIZE	3"
IMPELLER TYPE	BALANCED, ENCLOSED, 2 VANE
CABLE LENGTH	600' 50' OPTIONAL
PAINT	PAINTED AFTER ASSEMBLY. DARK GREEN, WATER REDUCIBLE ENAMEL, ONE COAT, AIR DRIED.

Temperature:

MAXIMUM LIQUID		140°F
MAXIMUM STATOR		311°F
OIL FLASH POINT		390°F
HEAT SENSOR	Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./119°F MIN.

Technical Data:

POWER CORD TYPE		STW-A WATER RESISTANT 600V, 60°C			
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS			
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON	ASTM	A-48	CLASS 30
	CASING	CAST IRON	ASTM	A-48	CLASS 30
	IMPELLER	DUCTILE IRON	ASTM	A-536	
	CASING WEAR RING	300 SERIES STAINLESS STEEL			
	MOTOR SHAFT	416 STAINLESS STEEL			
	HARDWARE	300 SERIES STAINLESS STEEL			
	"O" RINGS	BUNA N			
MECHANICAL SEALS					
Standard:		UPPER AND LOWER CARBON/CERAMIC/BUNA-N, TYPE 21			
Optional:		LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/BUNA-N, TYPE 21			
Optional:		LOWER SILICON CARBIDE/SILICON CARBIDE/BUNA-N, TYPE 21			
UPPER BEARING		(RADIAL) SINGLE ROW — BALL			
LOWER BEARING		(THRUST) SINGLE ROW — BALL			

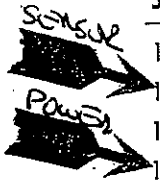
Power and Sensor Cable

All Submersible and Explosion Proof, 3/4 through 150 horsepower sewage pumps, come equipped as standard equipment with one power and one sensor cable.
The power cable size is a function of horsepower, voltage and amp draw.

Standard Pumps

Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
16-4	.424±.005	10	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
14-4	.571±.011	15	600	60	STW-A / Power
12-7	.740±.010	20	600	90	SOOW/SOOW-A /Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	32	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
6-3	1.01±.010	79	600	90	G-GC / Power
4-3	1.19±.010	104	600	90	G-GC / Power
2-3	1.34±.010	138	600	90	G-GC / Power
0-3	1.65±.010	186	600	90	G-GC / Power
4/0-3	2.04±.010	287	600	90	G-GC / Power

Explosion-Proof Pumps



Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
18-2	.375±.010	2	600	60	SJOW-A / Float
18-5	.485±.025	5.5	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	35	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
4-4	1.35±.100	60	600	60	STW-A / Power
2-4	1.55±.100	80	600	60	STW-A / Power
2-4W	1.48±.020	115	600	60	W / Power
0-4W or 1/0-4W	1.79±.040	163	600	60	W / Power

Nameplate Data

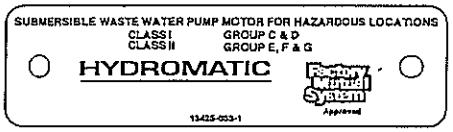
NON-CLOG

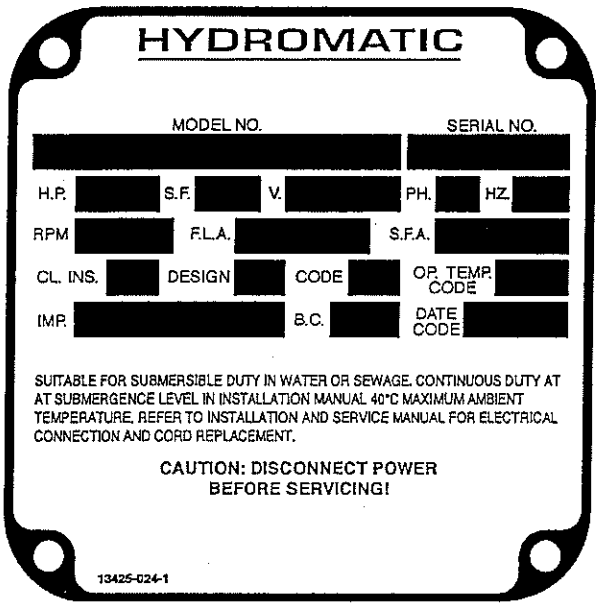
Explosion Proof Nameplate

Nameplate Data Used on Pump Models:

S3HX	H4HX	S4KX	S8FX
H3HX	S4PX	S4TX	S8LX
S4HX	S4LX	S6LX	S12LX
S4NX	S4BX	S6AX	
S4MX	H4QX		

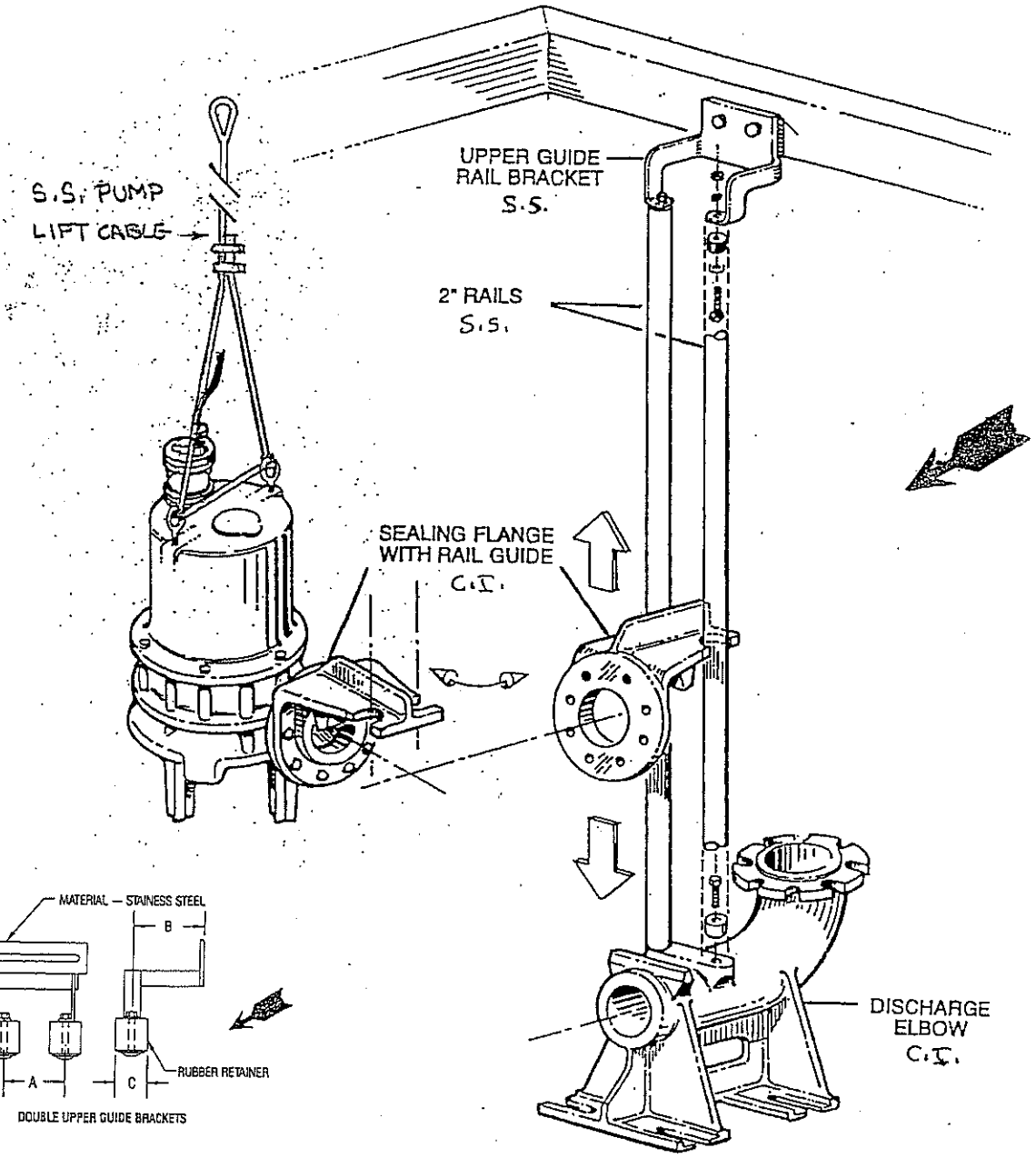
Optional Nameplate for Above Models with F-M Approval



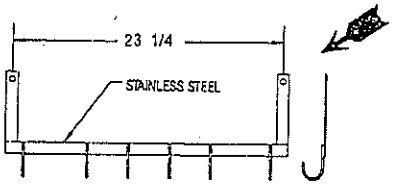


Material–303 Stainless Steel, 22 Gage

MODEL NO.	S3HX (etc.) followed by the pump model identification
SERIAL NO.	Individual Numbers–with specific records kept at factory
H.P.	Horsepower
S.F.	Service Factor
V	Voltage
PH	Phase
HZ	Hertz
RPM	Pump Speed
F.L.A	Full Load Amps
S.F.A.	Service Factor Amps
C.L. INS.	Class Insulation
DESIGN	NEMA TypeB (3 Phase) L (1 Phase)
CODE	National Electric Code Letter
IMP.	Impeller Trim Diameter the Pump is Built With
B.C.	Builders Code–Identifies Worker Who Built Pump
DATE CODE	Date Stamp-Month-Year (590–May 1990)
O.P. TEMP. CODE	Operating temperature code–T4, 258°F (All Pumps) this is the maximum temperature which the pump can obtain (set by factory mutual), and is limited by redundant heat sensors located in the motor windings.



DOUBLE UPPER GUIDE BRACKETS



CABLE HOLDER

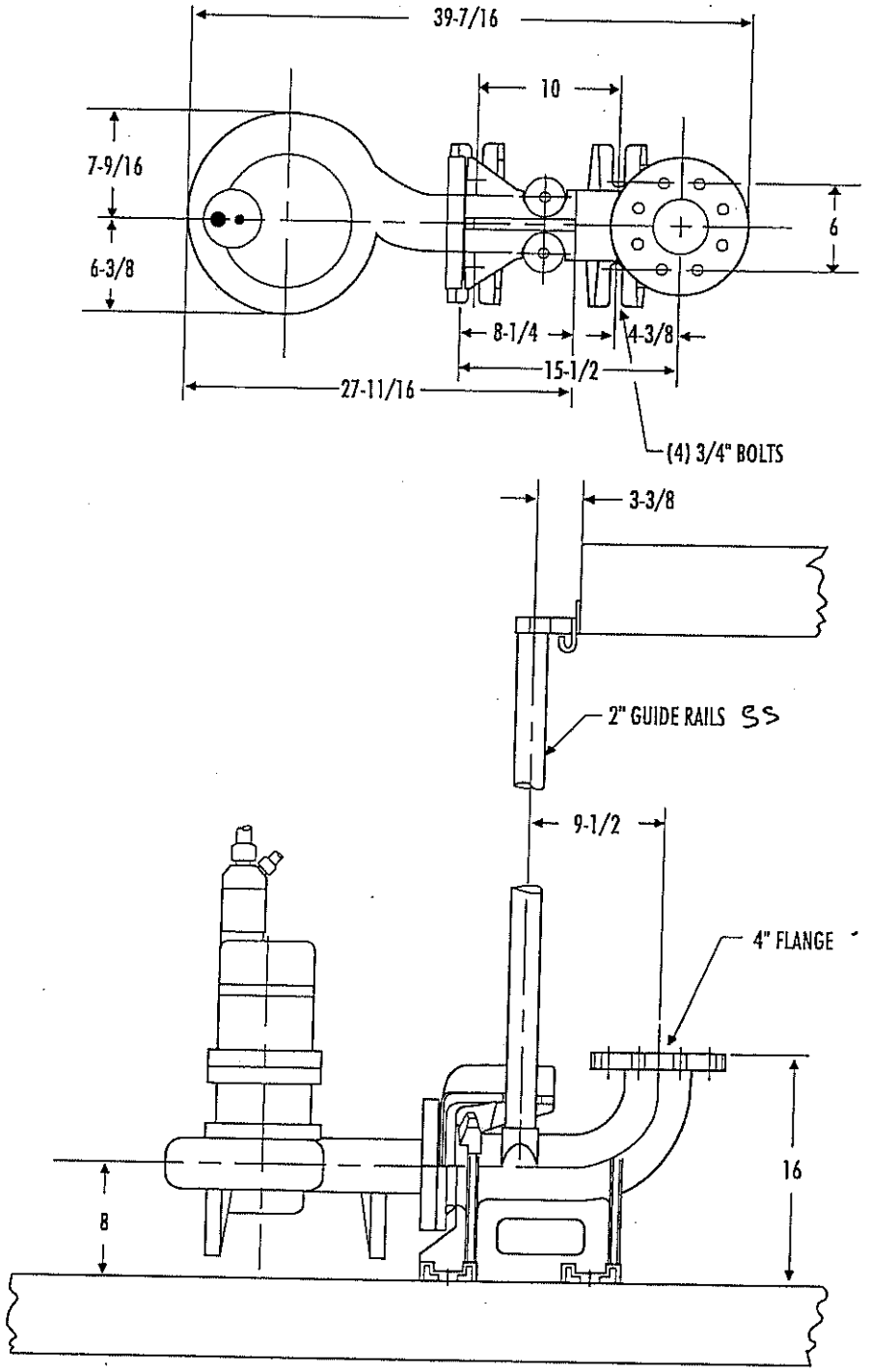
HYDROMATIC™ PUMPS

AURORA PUMP
A UNIT OF GENERAL SIGNAL

MTM RAIL SYSTEM

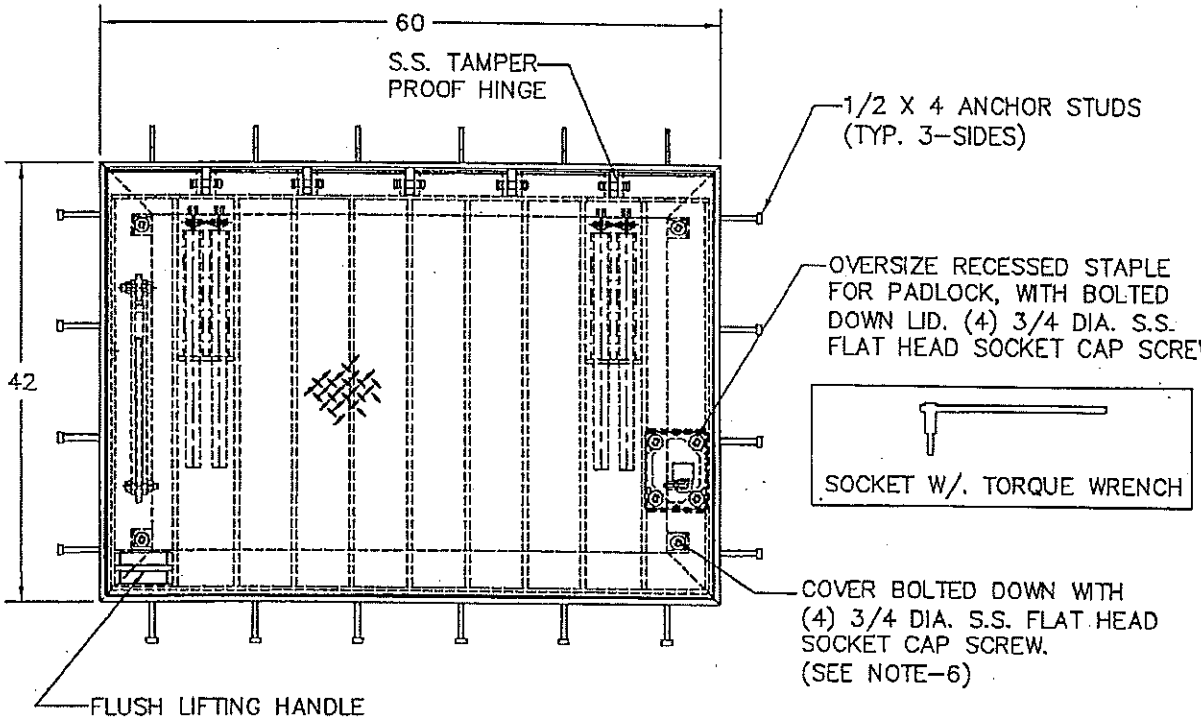
MCS184 - 3/92
SUPERSEDES - 8/91

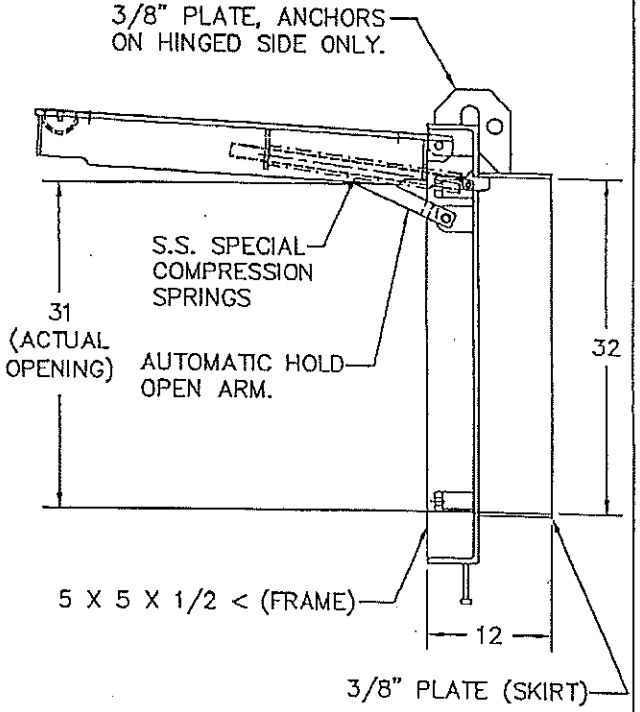
S4N/S4NX

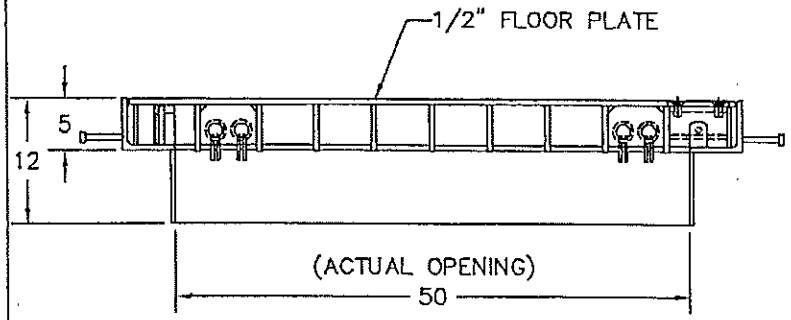


ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"







NOTES:

1- MATERIAL: STEEL, HOT DIP GALVANIZED AFTER FABRICATION
2- LOADING: DESIGNED FOR H-20 WHEEL LOADS
3- 316 STAINLESS STEEL NUTS & BOLTS
4- APPROXIMATE WEIGHT: 1241 LBS.
5- ALL WELDS CONTINUOUS.
6- IT IS ESSENTIAL THAT ALL BOLTS ARE IN PLACE WHENEVER COVER IS EXPOSED TO TRAFFIC
-"LOCTITE 242 BLUE", MUST BE APPLIED TO ALL BOLTS AFTER EACH USE.

Approved For Fabrication By:

X _____

Print Name: _____

Date: _____

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

HATCH DT-AHS 32 X 50 STEEL

DWN. BY: JM	SCALE: 1=12	QUOTE# 64984	DATE: 7/29/08
CHK. BY:	DWG. NO: 54273	SHEET 1 OF 1	REV:

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: **OCT 16, 2008**

JOB **V1-15 PUMP STATION**

ST BERNARD PARISH, LOUISIANA

CONTRACTOR **BOH BROTHERS CONST LLC**

ENGINEER **ALL SOUTH CONSULTING ENGINEERS LLC**

SERVICE **RAW DOMESTIC SEWERAGE**

PUMP DATA: TYPE **SUBMERSIBLE NON-CLOG** SIZE **4" DISCHARGE**

GPM **275** TDH **12.5** RPM **1150** CURVE PG. **110** IMPEL. DIA. **7.0"**

CONSTRUCTION: **HYDROMATIC S4NX200EB**

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ **(DOUBLE)** PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: **OIL COOLED MOTOR, 60' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.**

MOTOR DATA

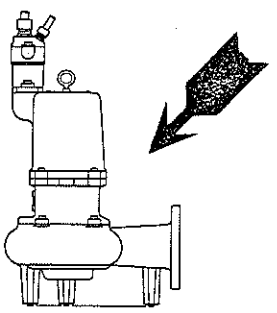
MFR **HYDROMATIC** HP **2** RPM **1150** FRAME **N/A**

PHASE **3** CYCLE **60** VOLTS **240** ENCLOSURE **X-PROOF**

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/60' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

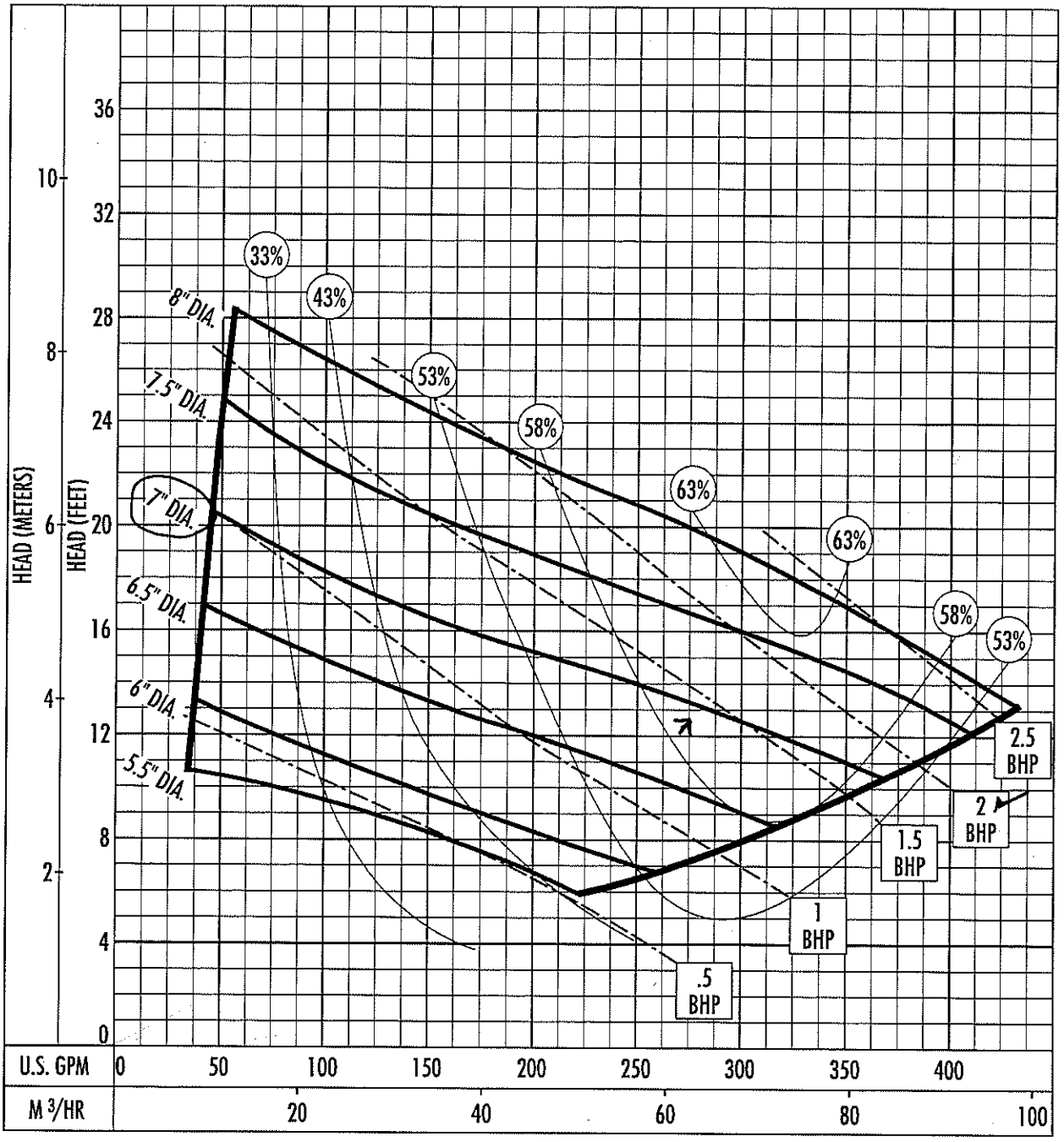
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH------



Performance Curve

S4N/S4NS/S4NX

RPM: **1150** Discharge: **4"** Solids: **3"**

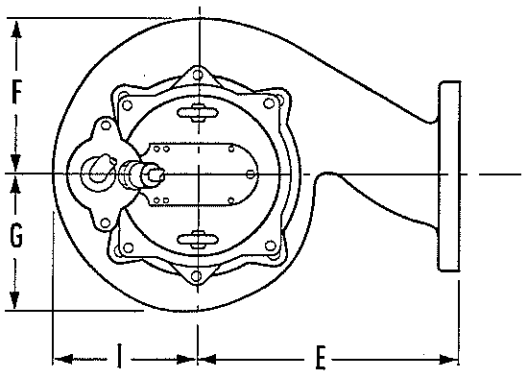


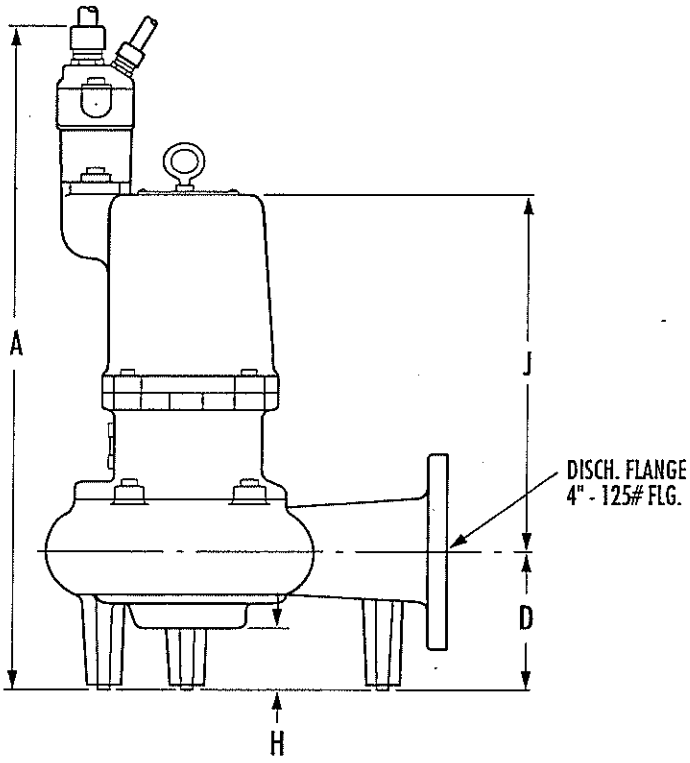
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

HYDROMATIC®

Conditions of Service:
GPM: 275 TDH: 12.5

Dimensional Data S4N/S4NS/S4NX





S4NX illustrated above

	A	D	E	F	G	H	I	J
S4N	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NS	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NX	31-1/2	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	16-3/4

ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Electrical Data — S4N/S4NS/S4NX

MODEL: S4N, S4NS & S4NX—Non-Clog Sewage Pumps

R.P.M.	1150			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, VFD SUITABLE			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	311°F (155°C)			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 90–65°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA	MTR. EFF. @ SF	MTR. EFF. 100% FL	MTR. EFF. 75% FL	MTR. EFF. 50% FL	PWR. FACT. @ SF	PWR. FACT. 100% FL	PWR. FACT. 75% FL	PWR. FACT. 50% FL
.75	200	1	N	1.2	8.3	9.0	43.5	1.1	8.7	1.7	.55	.52	.46	.37	.68	.65	.58	.50
	230				7.2	7.8	37.8											
.75	200	3	L	1.2	3.7	4.1	20.7	0.8	7.2	1.3	.69	.66	.63	.55	.69	.64	.57	.48
	230				3.2	3.6	18.0											
	460				1.6	1.8	9.0											
	575				1.3	1.4	7.2											
1.0	200	1	K	1.2	9.4	10.2	43.5	1.3	8.7	1.9	.59	.57	.52	.43	.75	.70	.65	.54
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1.5	200	3	K	1.2	7.2	7.8	37.0	1.5	12.8	2.5	.74	.73	.71	.61	.67	.62	.57	.45
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	460				3.1	3.4	16.0											
	575				2.5	2.7	12.9											
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	230				16.2	17.9	56.0											
2	200	3	H	1.2	8.4	9.6	37.0	2.0	12.8	2.9	.74	.74	.73	.67	.73	.70	.62	.52
	230				7.3	8.3	32.2											
	460				3.6	4.2	16.0											
	575				2.9	3.3	12.9											

Technical Data S4NX

MODEL: S4NX — Explosion Proof Non-Clog Sewage Pumps

Physical Data:

DISCHARGE SIZE	4"
SOLIDS SIZE	3"
IMPELLER TYPE	BALANCED, ENCLOSED, 2 VANE
CABLE LENGTH	60' 50' OPTIONAL
PAINT	PAINTED AFTER ASSEMBLY. DARK GREEN, WATER REDUCIBLE ENAMEL, ONE COAT, AIR DRIED.

Temperature:

MAXIMUM LIQUID	140°F
MAXIMUM STATOR	311°F
OIL FLASH POINT	390°F
HEAT SENSOR Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./119°F MIN.

Technical Data:

POWER CORD TYPE		STW-A WATER RESISTANT 600V, 60°C
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON ASTM A-48 CLASS 30
	CASING	CAST IRON ASTM A-48 CLASS 30
	IMPELLER	DUCTILE IRON ASTM A-536
	CASING WEAR RING	300 SERIES STAINLESS STEEL
	MOTOR SHAFT	416 STAINLESS STEEL
	HARDWARE	300 SERIES STAINLESS STEEL
	"O" RINGS	BUNA N
MECHANICAL SEALS Standard: Optional: Optional:		 UPPER AND LOWER CARBON/CERAMIC/BUNA-N, TYPE 21 LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/BUNA-N, TYPE 21 LOWER SILICON CARBIDE/SILICON CARBIDE/BUNA-N, TYPE 21
UPPER BEARING		(RADIAL) SINGLE ROW — BALL
LOWER BEARING		(THRUST) SINGLE ROW — BALL

Power and Sensor Cable

All Submersible and Explosion Proof, 3/4 through 150 horsepower sewage pumps, come equipped as standard equipment with one power and one sensor cable.
The power cable size is a function of horsepower, voltage and amp draw.

Standard Pumps

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14-4	.571±.011	15	600	60	STW-A / Power
12-7	.740±.010	20	600	90	SOOW/SOOW-A /Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	32	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
6-3	1.01±.010	79	600	90	G-GC / Power
4-3	1.19±.010	104	600	90	G-GC / Power
2-3	1.34±.010	138	600	90	G-GC / Power
0-3	1.65±.010	186	600	90	G-GC / Power
4/0-3	2.04±.010	287	600	90	G-GC / Power

Explosion-Proof Pumps

Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
18-2	.375±.010	2	600	60	SJOW-A / Float
18-5	.485±.025	5.5	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	35	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
4-4	1.35±.100	60	600	60	STW-A / Power
2-4	1.55±.100	80	600	60	STW-A / Power
2-4W	1.48±.020	115	600	60	W / Power
0-4W or 1/0-4W	1.79±.040	163	600	60	W / Power

Nameplate Data

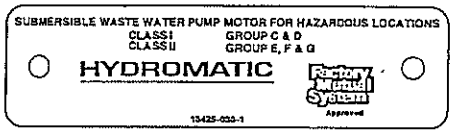
NON-CLOG

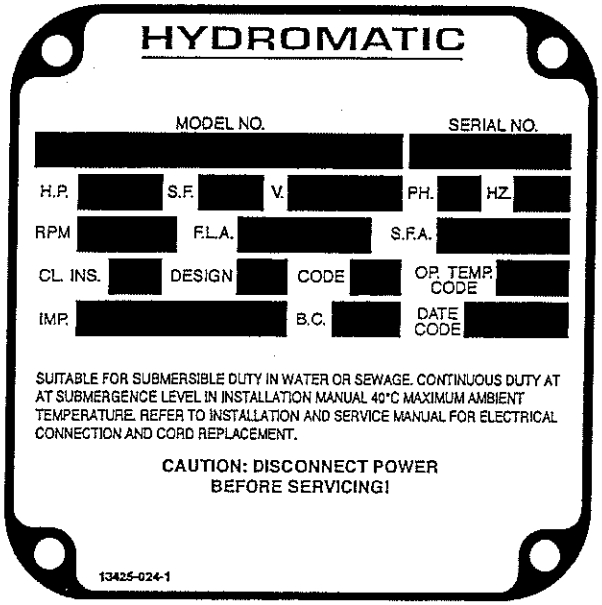
Explosion Proof Nameplate

Nameplate Data Used on Pump Models:

S3HX	H4HX	S4KX	S8FX
H3HX	S4PX	S4TX	S8LX
S4HX	S4LX	S6LX	S12LX
S4NX	S4BX	S6AX	
S4MX	H4QX		

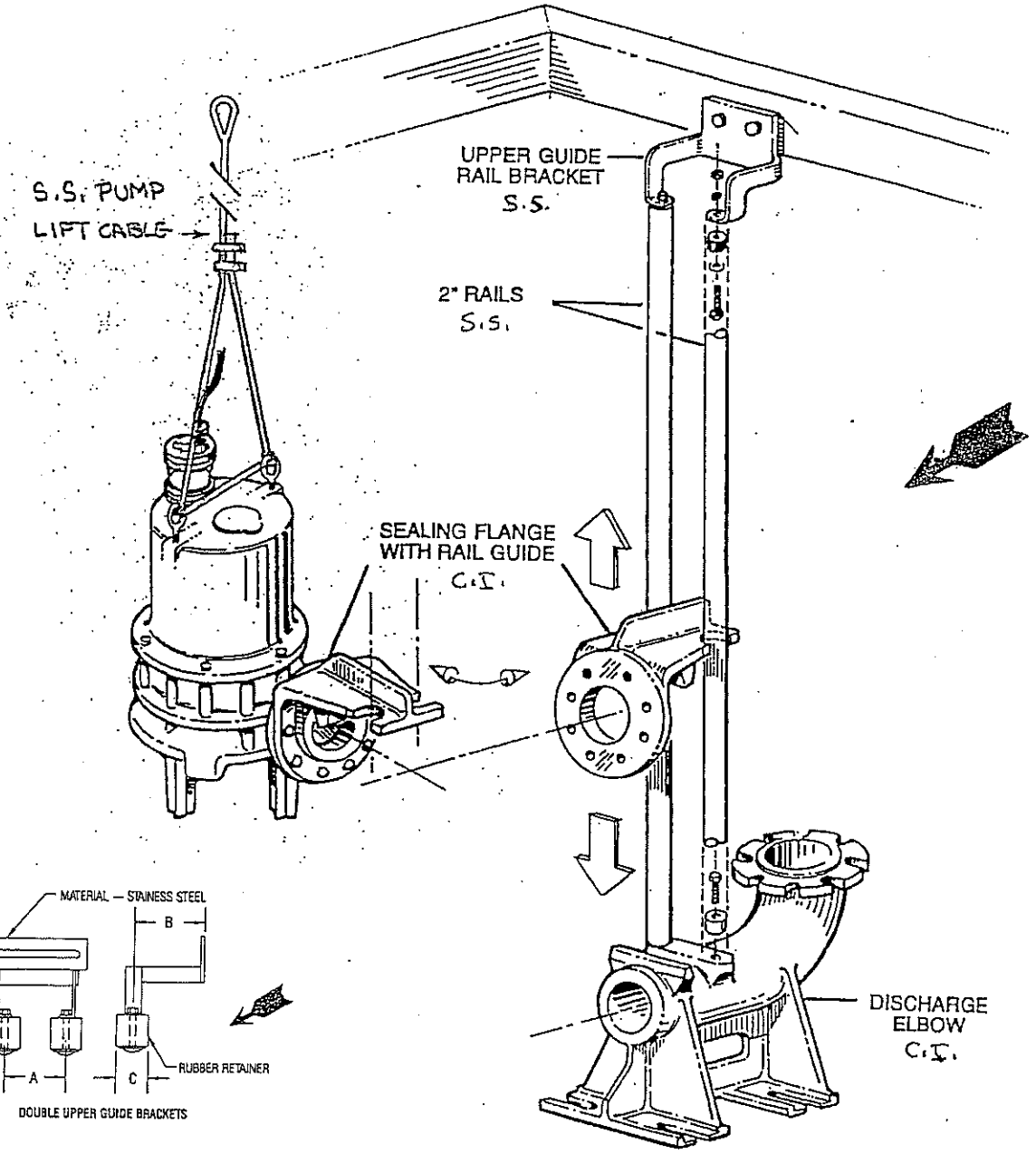
Optional Nameplate for Above Models with F-M Approval



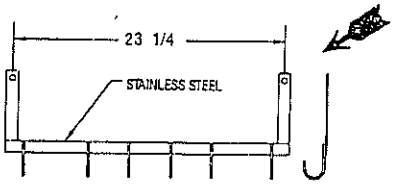


Material–303 Stainless Steel, 22 Gage

MODEL NO.	S3HX (etc.) followed by the pump model identification
SERIAL NO.	Individual Numbers–with specific records kept at factory
H.P.	Horsepower
S.F.	Service Factor
V	Voltage
PH	Phase
HZ	Hertz
RPM	Pump Speed
F.L.A	Full Load Amps
S.F.A.	Service Factor Amps
C.L. INS.	Class Insulation
DESIGN	NEMA TypeB (3 Phase) L (1 Phase)
CODE	National Electric Code Letter
IMP.	Impeller Trim Diameter the Pump is Built With
B.C.	Builders Code–Identifies Worker Who Built Pump
DATE CODE	Date Stamp-Month-Year (590–May 1990)
O.P. TEMP. CODE	Operating temperature code–T4, 258°F (All Pumps) this is the maximum temperature which the pump can obtain (set by factory mutual), and is limited by redundant heat sensors located in the motor windings.



DOUBLE UPPER GUIDE BRACKETS



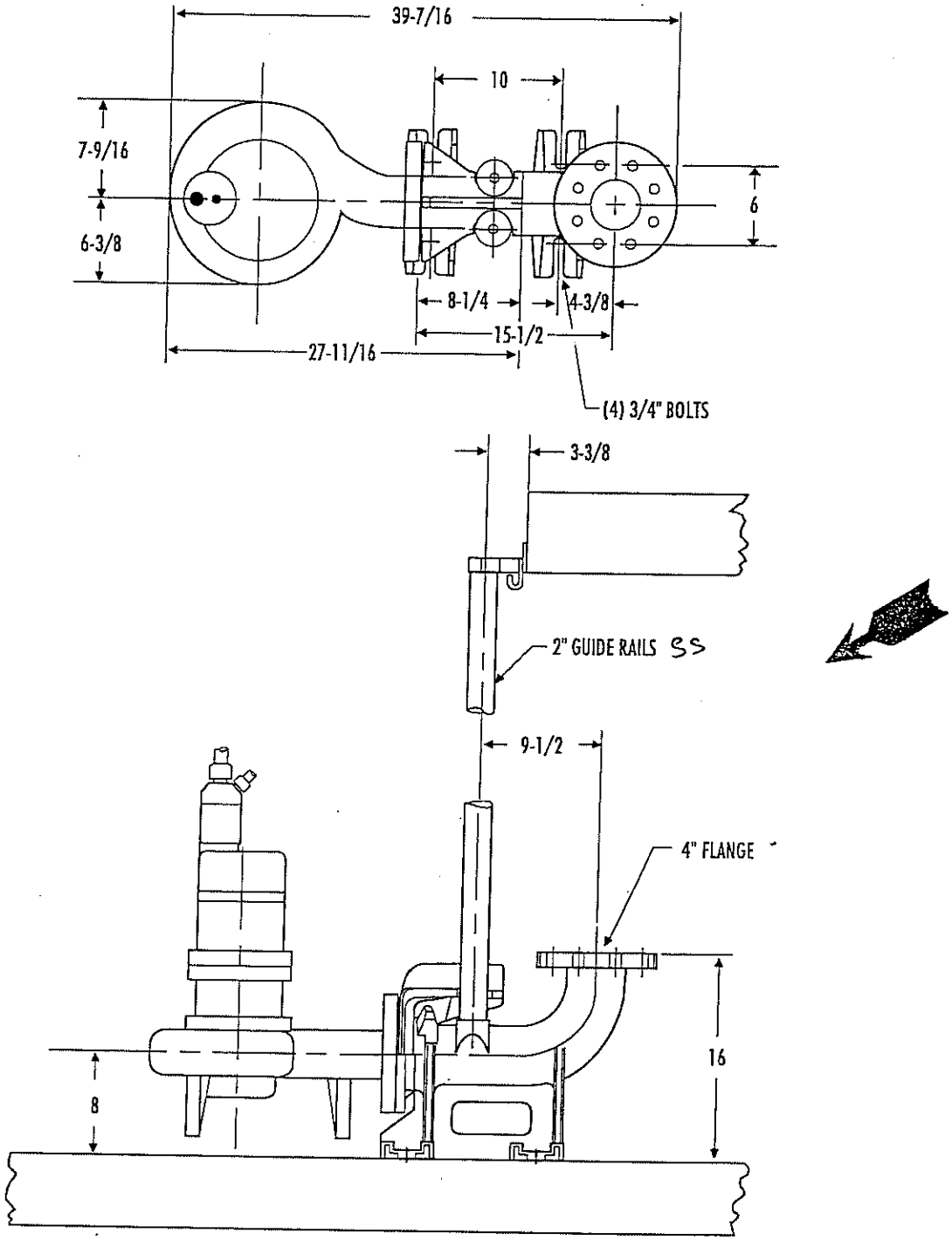
CABLE HOLDER

HYDROMATIC™ PUMPS
AURORA PUMP
A UNIT OF GENERAL SIGNAL

MTM RAIL SYSTEM

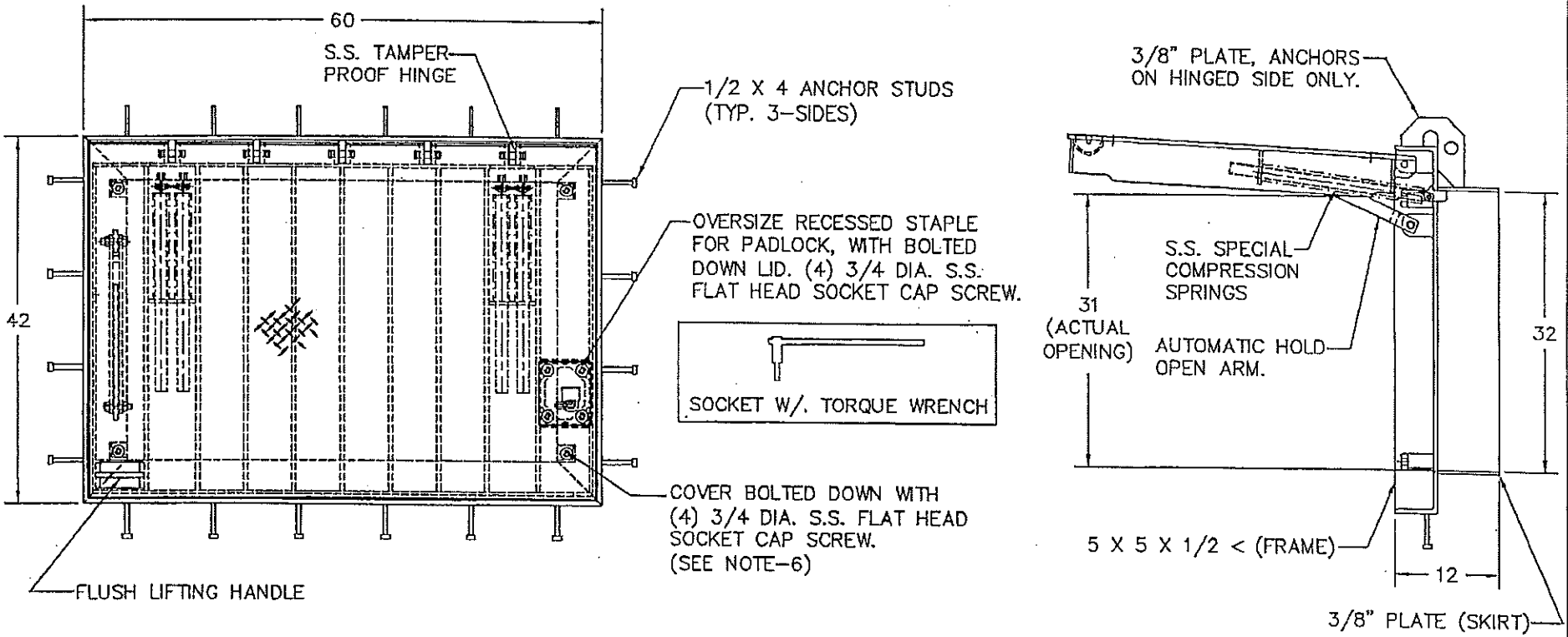
HCS184 - 3/92
SUPERSEDES - 6/91

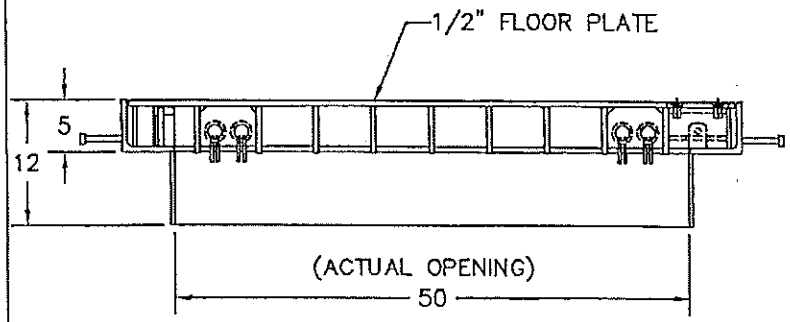
S4N/S4NX



ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"





NOTES:

1- MATERIAL: STEEL, HOT DIP GALVANIZED AFTER FABRICATION
2- LOADING: DESIGNED FOR H-20 WHEEL LOADS
3- 316 STAINLESS STEEL NUTS & BOLTS
4- APPROXIMATE WEIGHT: 1241 LBS.
5- ALL WELDS CONTINUOUS.
6- IT IS ESSENTIAL THAT ALL BOLTS ARE IN PLACE WHENEVER COVER IS EXPOSED TO TRAFFIC
-"LOCTITE 242 BLUE", MUST BE APPLIED TO ALL BOLTS AFTER EACH USE.

Approved For Fabrication By:

X _____

Print Name: _____

Date: _____

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

HATCH DT-AHS 32 X 50 STEEL

DWN. BY: JM	SCALE: 1=12	QUOTE# 64984	DATE: 7/29/08
CHK. BY:	DWG. NO: 54273	SHEET 1 OF 1	REV:

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: OCT 16, 2008

JOB V1-16 PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR BOH BROTHERS CONST LLC

ENGINEER ALL SOUTH CONSULTING ENGINEERS LLC

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 235 TDH 13 RPM 1150 CURVE PG. 110 IMPEL. DIA. 7.0"

CONSTRUCTION: HYDROMATIC S4NX200EB

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL
- ☐ (DOUBLE) PACKED

BASE:

- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:

- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

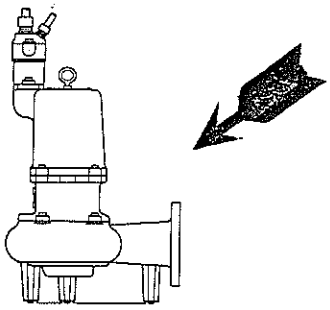
MFR HYDROMATIC HP 2 RPM 1150 FRAME N/A

PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

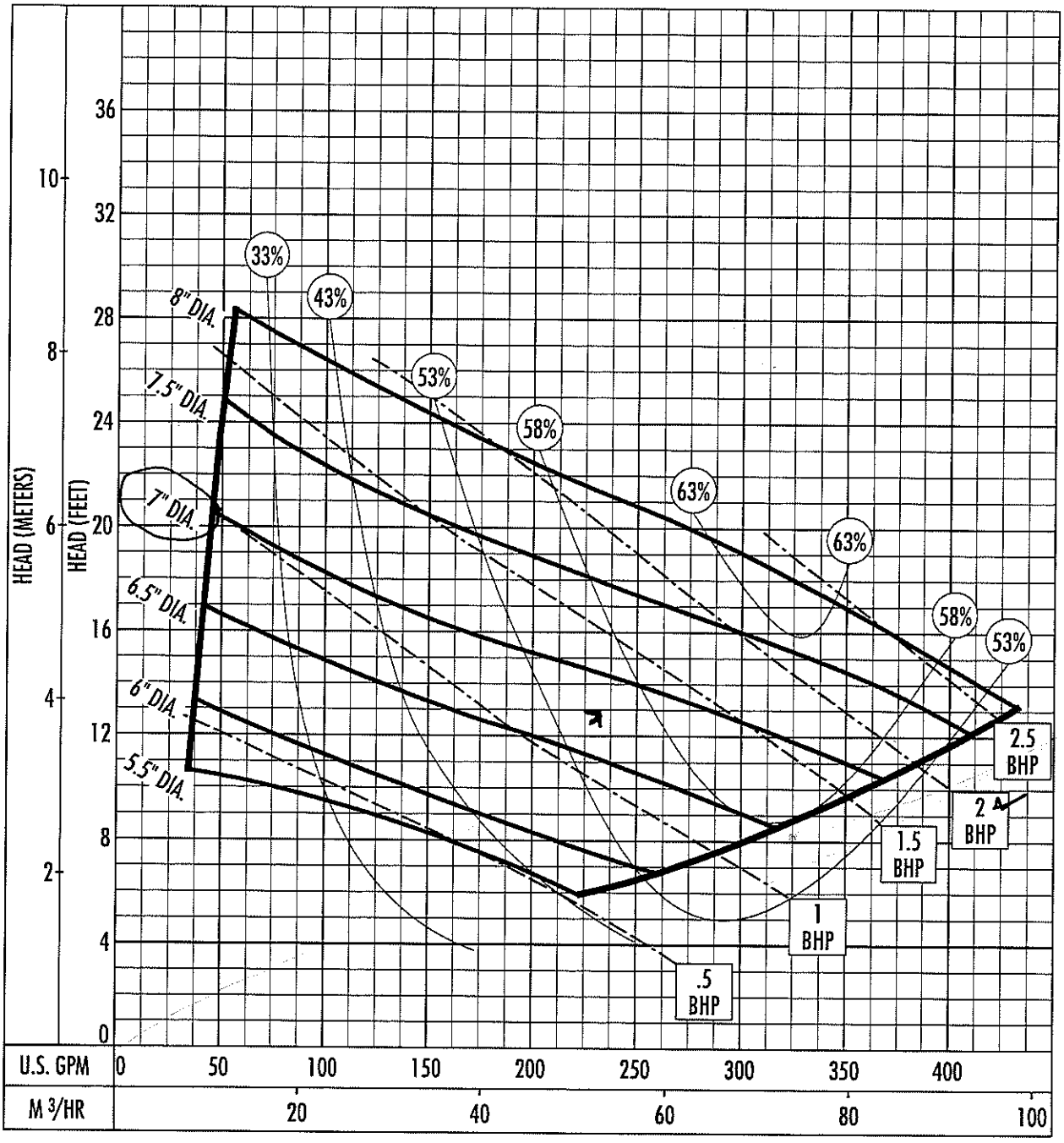
------ PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH------



Performance Curve

S4N/S4NS/S4NX

RPM: **1150** Discharge: **4"** Solids: **3"**

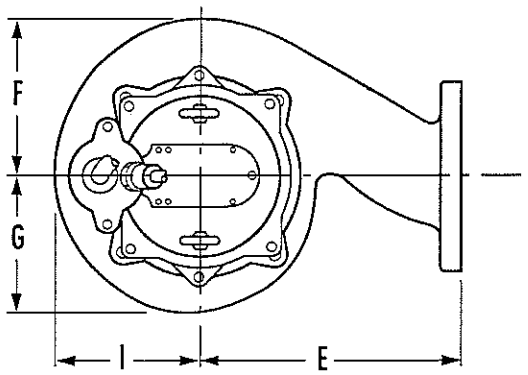


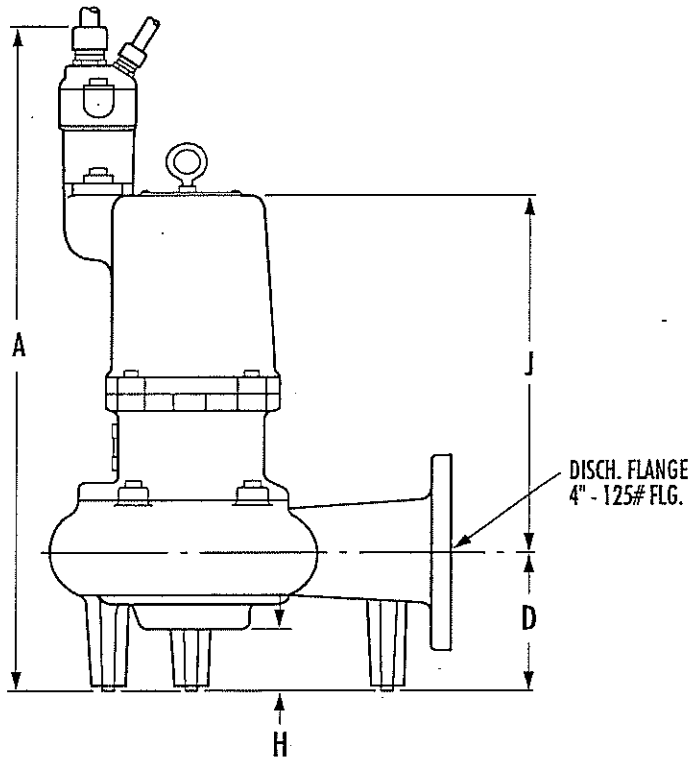
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

HYDROMATIC®

Conditions of Service:
GPM: 235 TDH: 13

Dimensional Data S4N/S4NS/S4NX





S4NX illustrated above

	A	D	E	F	G	H	I	J
S4N	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NS	28-9/16	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	15-7/16
S4NX	31-1/2	6-1/2	12-1/2	7-9/16	6-3/8	3-1/8	6-15/16	16-3/4

ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"

Electrical Data

S4N/S4NS/S4NX

MODEL: S4N, S4NS & S4NX—Non-Clog Sewage Pumps

R.P.M.	1150			
MOTOR TYPE	ENCLOSED, OIL COOLED INDUCTION, VFD SUITABLE			
MOTOR DESIGN NEMA TYPE	B (3ø) L (1ø)			
GENERAL INSULATION CLASS	F			
STATOR WINDING CLASS	F			
MAXIMUM STATOR TEMPERATURE	311°F (155°C)			
MOTOR PROTECTION	BI-METALLIC, TEMPERATURE SENSITIVE DISC, SIZED TO OPEN AT 120°C AND AUTOMATICALLY RESET @ 90–65°C DIFFERENTIAL, ONE IN SINGLE PHASE, TWO IN THREE PHASE			
ELECTRICAL RATINGS	HEAT SENSOR	24VDC 5AMPS	115VAC 5AMPS	230VAC 5AMPS
	SEAL FAIL	300VAC 5mA		
VOLTAGE TOLERANCE	±10%			

HP	VOLTAGE	PHASE	NEC CODE	SF	FULL LOAD AMPS	SF AMPS	LCKD. RTR. AMPS	RUN KW	START KVA	RUN KVA	MTR. EFF. @ SF	MTR. EFF. 100% FL	MTR. EFF. 75% FL	MTR. EFF. 50% FL	PWR. FACT. @ SF	PWR. FACT. 100% FL	PWR. FACT. 75% FL	PWR. FACT. 50% FL
.75	200	1	N	1.2	8.3	9.0	43.5	1.1	8.7	1.7	.55	.52	.46	.37	.68	.65	.58	.50
	230				7.2	7.8	37.8											
.75	200	3	L	1.2	3.7	4.1	20.7	0.8	7.2	1.3	.69	.66	.63	.55	.69	.64	.57	.48
	230				3.2	3.6	18.0											
	460				1.6	1.8	9.0											
	575				1.3	1.4	7.2											
1.0	200	1	K	1.2	9.4	10.2	43.5	1.3	8.7	1.9	.59	.57	.52	.43	.75	.70	.65	.54
	230				8.2	8.9	37.8											
1.0	200	3	J	1.2	4.3	5.0	20.7	1.1	7.2	1.5	.71	.70	.68	.61	.74	.71	.64	.54
	230				3.8	4.3	18.0											
	460				1.9	2.2	9.0											
	575				1.5	1.7	7.2											
1.5	200	1	K	1.2	17.0	18.0	64.4	2.0	12.9	3.4	.58	.55	.50	.41	.65	.60	.53	.45
	230				14.7	15.6	56.0											
1.5	200	3	K	1.2	7.2	7.8	37.0	1.5	12.8	2.5	.74	.73	.71	.61	.67	.62	.57	.45
	230				6.2	6.8	32.2											
	460				3.1	3.4	16.0											
	575				2.5	2.7	12.9											
2	200	1	H	1.2	18.6	20.6	64.4	2.5	12.9	3.7	.60	.59	.55	.47	.73	.68	.60	.50
	230				16.2	17.9	56.0											
2	200	3	H	1.2	8.4	9.6	37.0	2.0	12.8	2.9	.74	.74	.73	.67	.73	.70	.62	.52
	230				7.3	8.3	32.2											
	460				3.6	4.2	16.0											
	575				2.9	3.3	12.9											

Technical Data S4NX

MODEL: S4NX — Explosion Proof Non-Clog Sewage Pumps

Physical Data:

DISCHARGE SIZE	4"
SOLIDS SIZE	3"
IMPELLER TYPE	BALANCED, ENCLOSED, 2 VANE
CABLE LENGTH	35' STANDARD 50' OPTIONAL
PAINT	PAINTED AFTER ASSEMBLY. DARK GREEN, WATER REDUCIBLE ENAMEL, ONE COAT, AIR DRIED.

Temperature:

MAXIMUM LIQUID		140°F
MAXIMUM STATOR		311°F
OIL FLASH POINT		390°F
HEAT SENSOR	Open: Closed:	257°F MAX./239°F MIN. 194°F MAX./119°F MIN.

Technical Data:

POWER CORD TYPE		STW-A WATER RESISTANT 600V, 60°C			
SENSOR CORD TYPE		16-4 STW-A WATER RESISTANT 600V, 60°C, 10 AMPS			
MATERIALS OF CONSTRUCTION	MOTOR HOUSING	CAST IRON	ASTM	A-48	CLASS 30
	CASING	CAST IRON	ASTM	A-48	CLASS 30
	IMPELLER	DUCTILE IRON	ASTM	A-536	
	CASING WEAR RING	300 SERIES STAINLESS STEEL			
	MOTOR SHAFT	416 STAINLESS STEEL			
	HARDWARE	300 SERIES STAINLESS STEEL			
	"O" RINGS	BUNA N			
MECHANICAL SEALS Standard: Optional: Optional:		UPPER AND LOWER CARBON/CERAMIC/BUNA-N, TYPE 21 LOWER TUNGSTEN CARBIDE/TUNGSTEN CARBIDE/BUNA-N, TYPE 21 LOWER SILICON CARBIDE/SILICON CARBIDE/BUNA-N, TYPE 21			
UPPER BEARING		(RADIAL) SINGLE ROW — BALL			
LOWER BEARING		(THRUST) SINGLE ROW — BALL			

Power and Sensor Cable

All Submersible and Explosion Proof, 3/4 through 150 horsepower sewage pumps, come equipped as standard equipment with one power and one sensor cable.
The power cable size is a function of horsepower, voltage and amp draw.

Standard Pumps

Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
16-4	.424±.005	10	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
14-4	.571±.011	15	600	60	STW-A / Power
12-7	.740±.010	20	600	90	SOOW/SOOW-A /Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	32	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
6-3	1.01±.010	79	600	90	G-GC / Power
4-3	1.19±.010	104	600	90	G-GC / Power
2-3	1.34±.010	138	600	90	G-GC / Power
0-3	1.65±.010	186	600	90	G-GC / Power
4/0-3	2.04±.010	287	600	90	G-GC / Power

Explosion-Proof Pumps

Cable Size	O.D.	Amp Rating	Volts	Temp °C	Type Construction/Use
18-2	.375±.010	2	600	60	SJOW-A / Float
18-5	.485±.025	5.5	600	60	STW-A / Sensor
12-4	.670±.010	20	600	60	STW-A / Power
10-4	.729±.010	25	600	60	STW-A / Power
8-4	.958±.038	35	600	60	STW-A / Power
6-4	1.09±.050	45	600	60	STW-A / Power
4-4	1.35±.100	60	600	60	STW-A / Power
2-4	1.55±.100	80	600	60	STW-A / Power
2-4W	1.48±.020	115	600	60	W / Power
0-4W or 1/0-4W	1.79±.040	163	600	60	W / Power

Nameplate Data

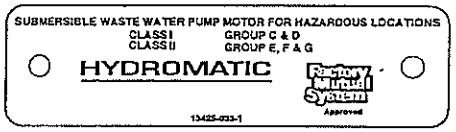
NON-CLOG

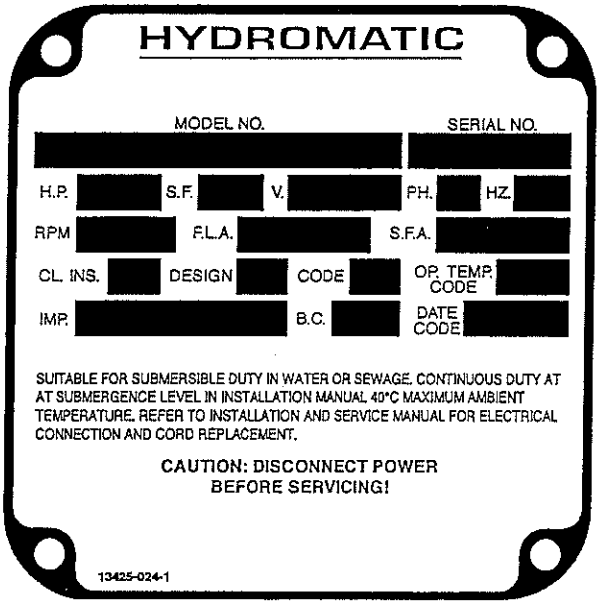
Explosion Proof Nameplate

Nameplate Data Used on Pump Models:

S3HX	H4HX	S4KX	S8FX
H3HX	S4PX	S4TX	S8LX
S4HX	S4LX	S6LX	S12LX
S4NX	S4BX	S6AX	
S4MX	H4QX		

Optional Nameplate for Above Models with F-M Approval

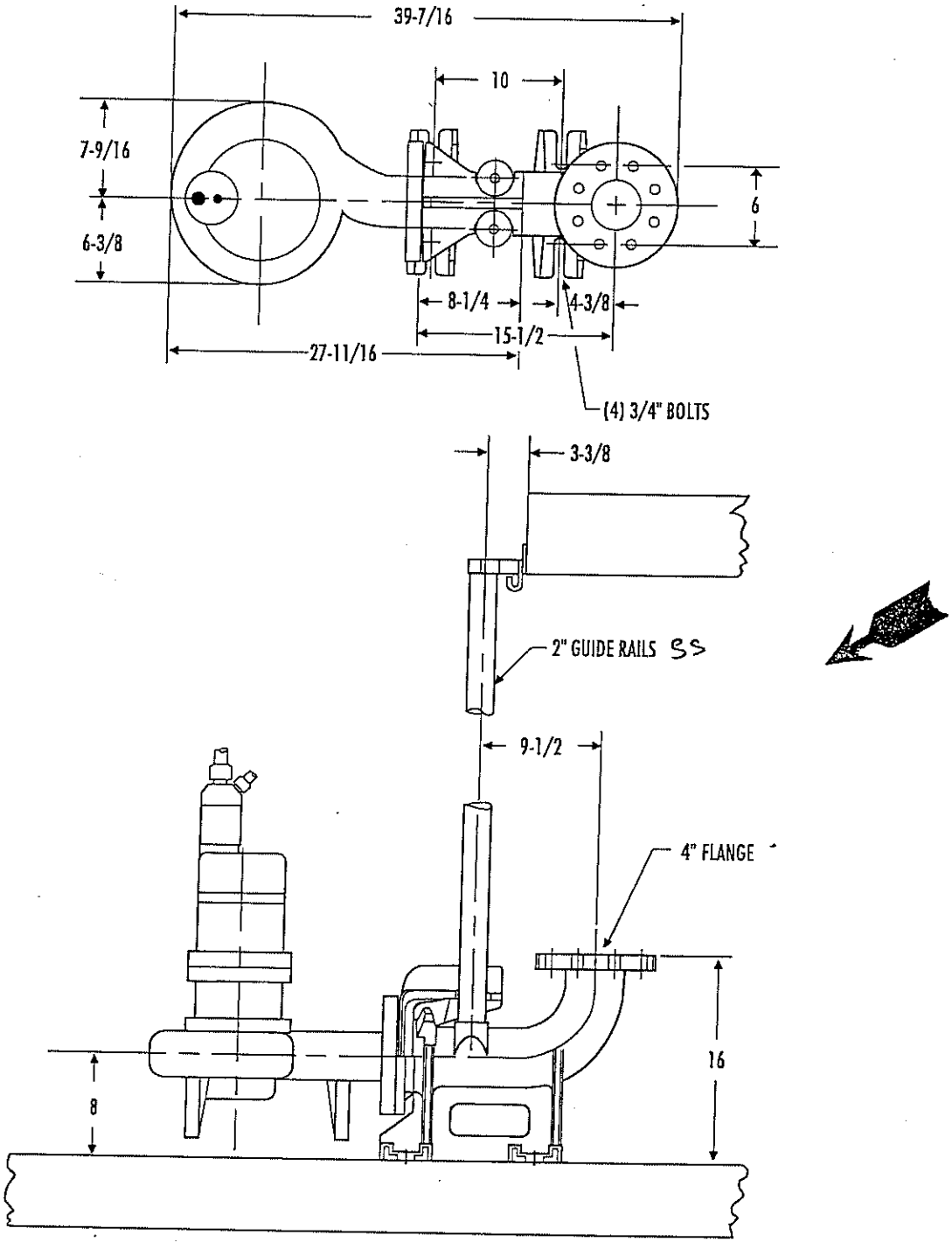




Material–303 Stainless Steel, 22 Gage

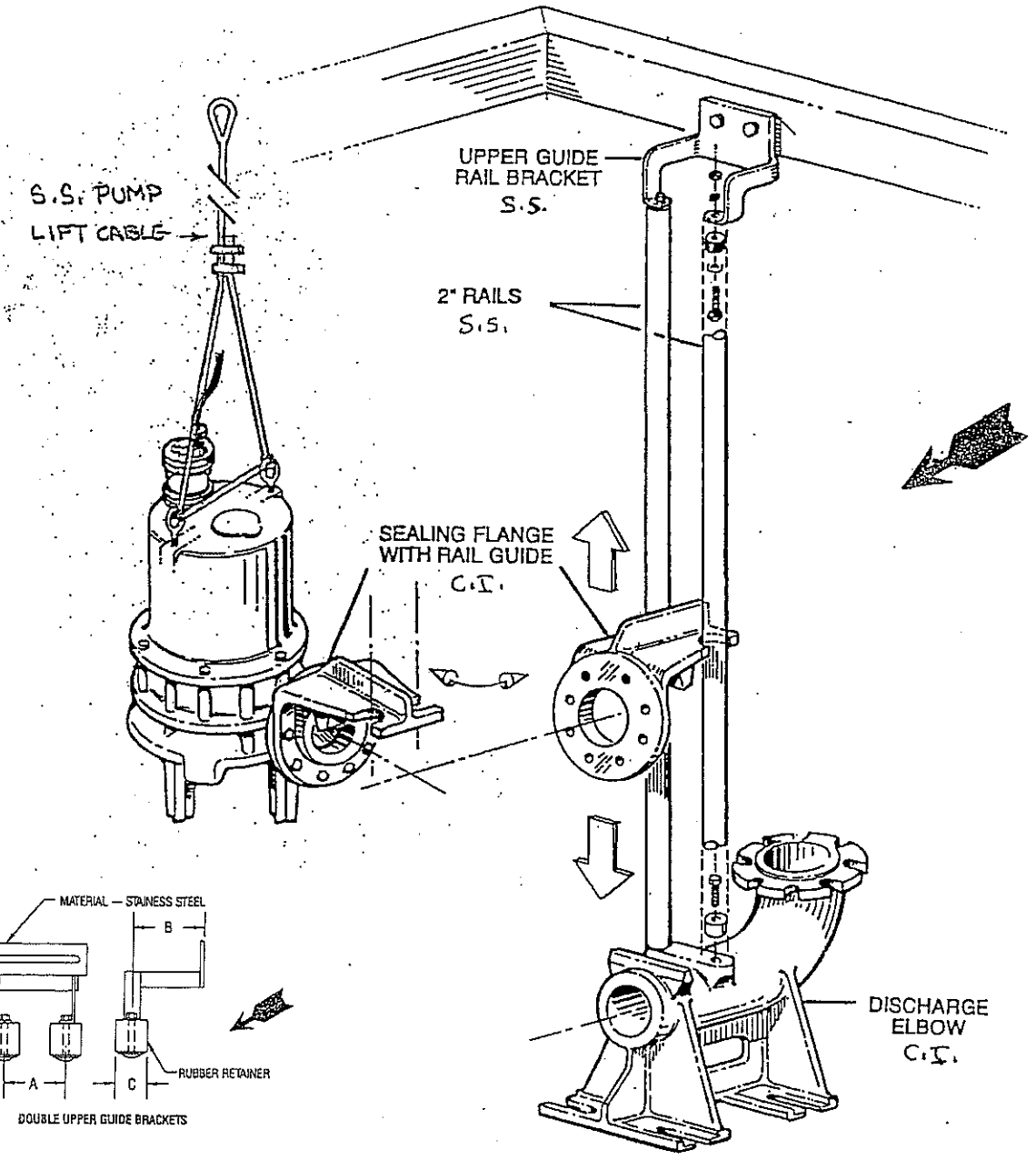
MODEL NO.	S3HX (etc.) followed by the pump model identification
SERIAL NO.	Individual Numbers–with specific records kept at factory
H.P.	Horsepower
S.F.	Service Factor
V	Voltage
PH	Phase
HZ	Hertz
RPM	Pump Speed
F.L.A	Full Load Amps
S.F.A.	Service Factor Amps
C.L. INS.	Class Insulation
DESIGN	NEMA TypeB (3 Phase) L (1 Phase)
CODE	National Electric Code Letter
IMP.	Impeller Trim Diameter the Pump is Built With
B.C.	Builders Code–Identifies Worker Who Built Pump
DATE CODE	Date Stamp-Month-Year (590–May 1990)
O.P. TEMP. CODE	Operating temperature code–T4, 258°F (All Pumps) this is the maximum temperature which the pump can obtain (set by factory mutual), and is limited by redundant heat sensors located in the motor windings.

S4N/S4NX

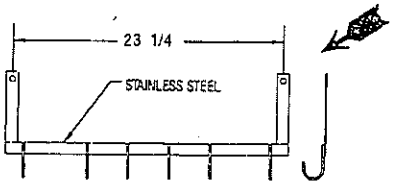


ALL DIMENSIONS IN INCHES

NOTE: CASTING DIMENSIONS MAY VARY ± 1/8"



DOUBLE UPPER GUIDE BRACKETS

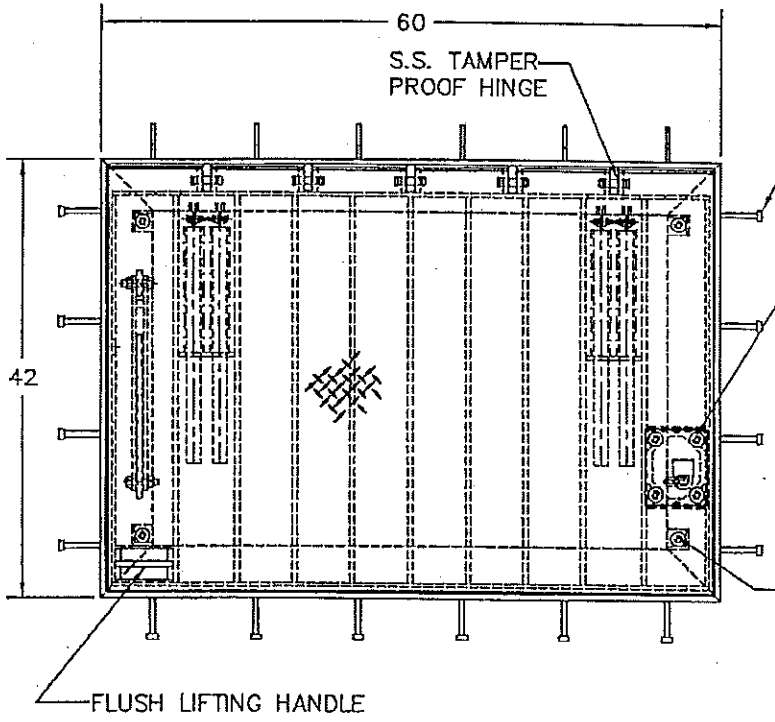


CABLE HOLDER

HYDROMATIC™ PUMPS
AURORA PUMP
A UNIT OF GENERAL SIGNAL

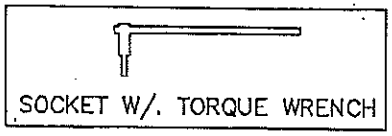
MTM RAIL SYSTEM

MCS188 - 3/92
SUPERSEDES - 8/91

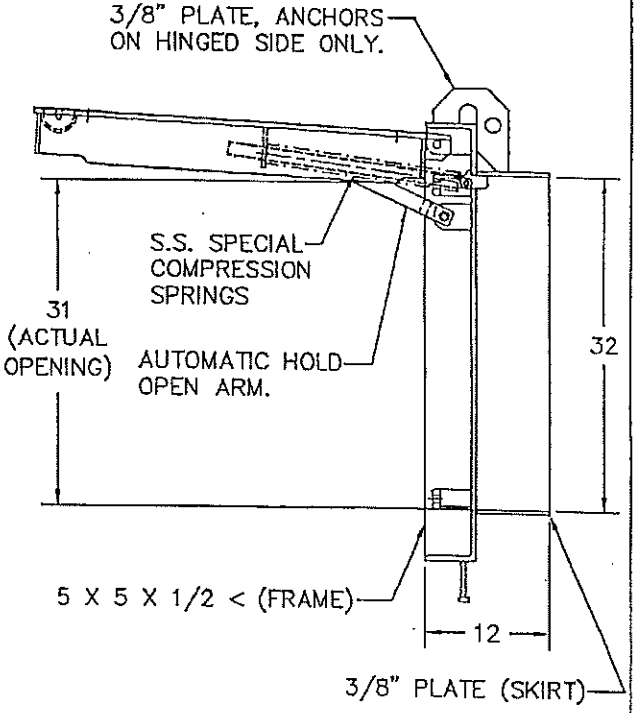


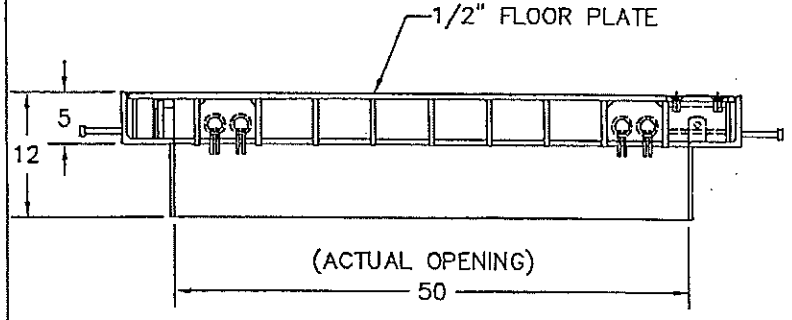
1/2 X 4 ANCHOR STUDS (TYP. 3–SIDES)

OVERSIZE RECESSED STAPLE FOR PADLOCK, WITH BOLTED DOWN LID. (4) 3/4 DIA. S.S. FLAT HEAD SOCKET CAP SCREW.



COVER BOLTED DOWN WITH (4) 3/4 DIA. S.S. FLAT HEAD SOCKET CAP SCREW. (SEE NOTE–6)





NOTES:

1– MATERIAL: STEEL, HOT DIP GALVANIZED AFTER FABRICATION
2– LOADING: DESIGNED FOR H–20 WHEEL LOADS
3– 316 STAINLESS STEEL NUTS & BOLTS
4– APPROXIMATE WEIGHT: 1241 LBS.
5– ALL WELDS CONTINUOUS.
6– IT IS ESSENTIAL THAT ALL BOLTS ARE IN PLACE WHENEVER COVER IS EXPOSED TO TRAFFIC –"LOCTITE 242 BLUE", MUST BE APPLIED TO ALL BOLTS AFTER EACH USE.

Approved For Fabrication By:

X _____

Print Name: _____

Date: _____

U.S.F. FABRICATION INC.
HIALEAH, FLORIDA

HATCH DT–AHS 32 X 50 STEEL

DWN. BY: JM	SCALE: 1=12	QUOTE# 64984	DATE: 7/29/08
CHK. BY:	DWG. NO: 54273	SHEET 1 OF 1	REV:

Section 7 Pump Submittal

Certified Curves

Approved Submittal

Fairbanks Morse
Pentair Water

Certified Pump Performance Curve

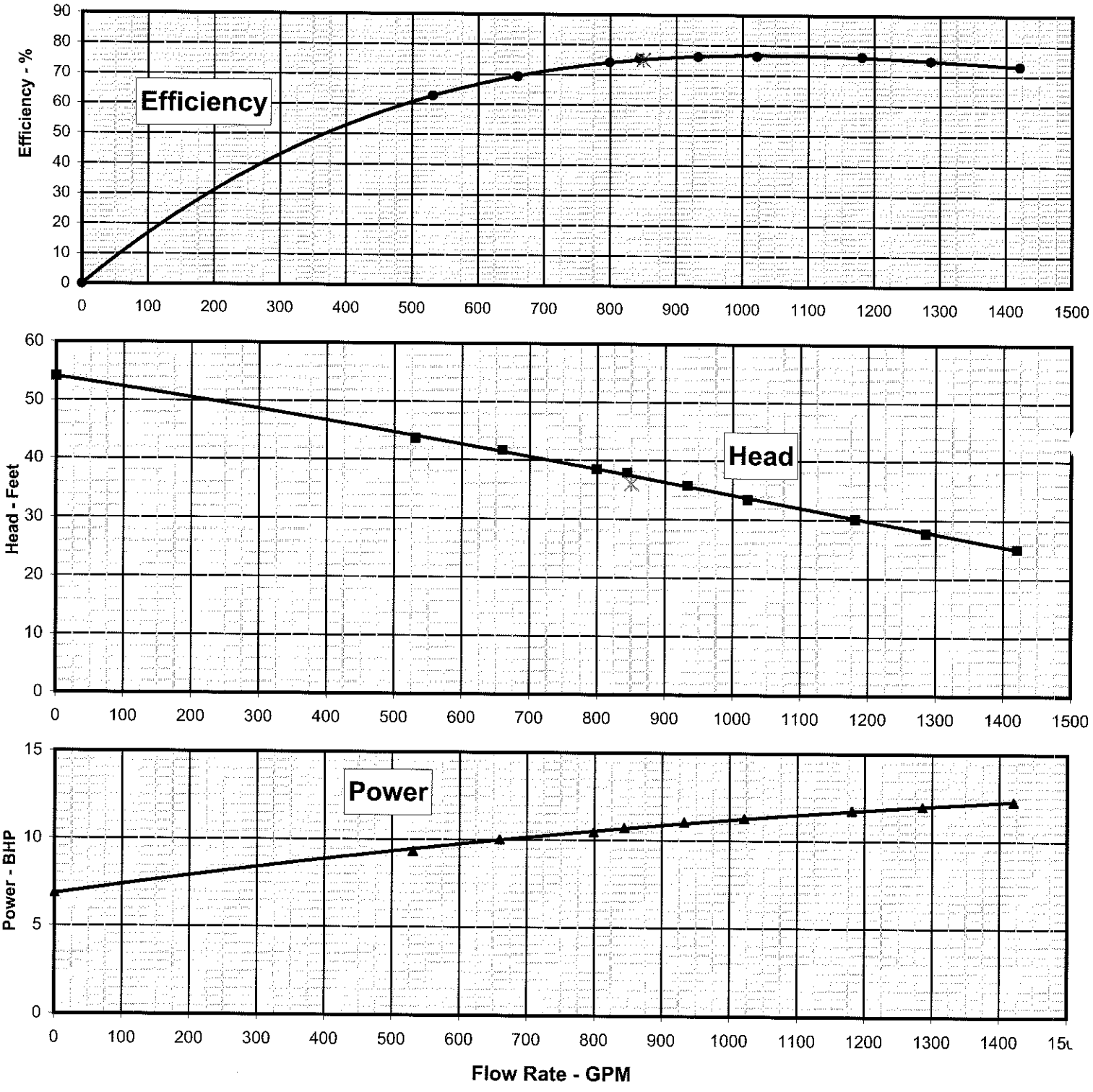
Serial Number:	1725778-0
Project Number:	092049
Test Date:	9/18/2008

Guaranteed Values

GPM	850
HEAD	36
Eff	75
RPM	1151

Size-Model	6"	D5433MV	CW	
Impeller:	T6C!FW			
Impeller Dia:	10.70"			
Driver:	Job Driver		HP:	15
RPM:	1151	Stages:	ONE	

Certified By: John C. Mamie — Test Department — 10/08 — Date



Fairbanks Morse

Pentair Water

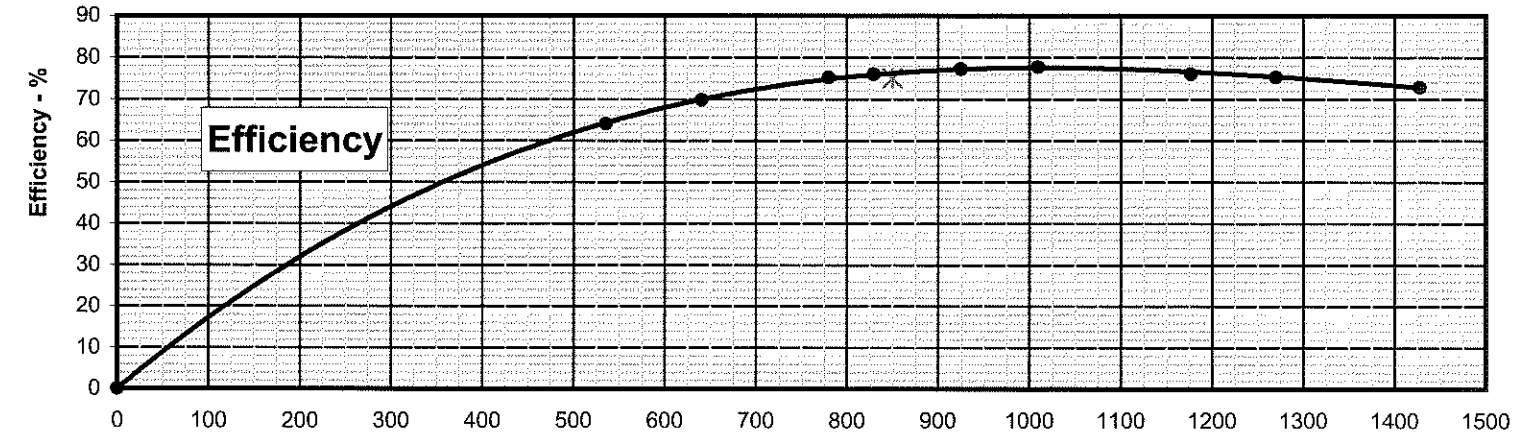
Serial Number:	1725778-1
Project Number:	092049
Test Date:	9/18/2008

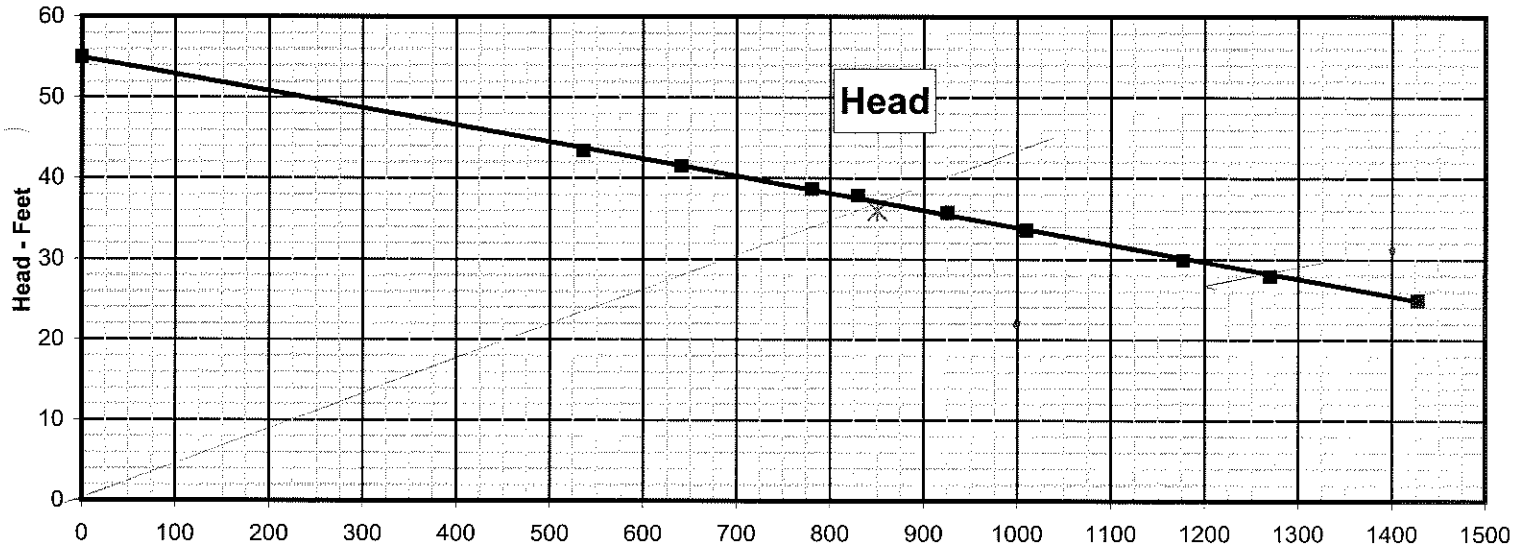
Certified Pump Performance Curve

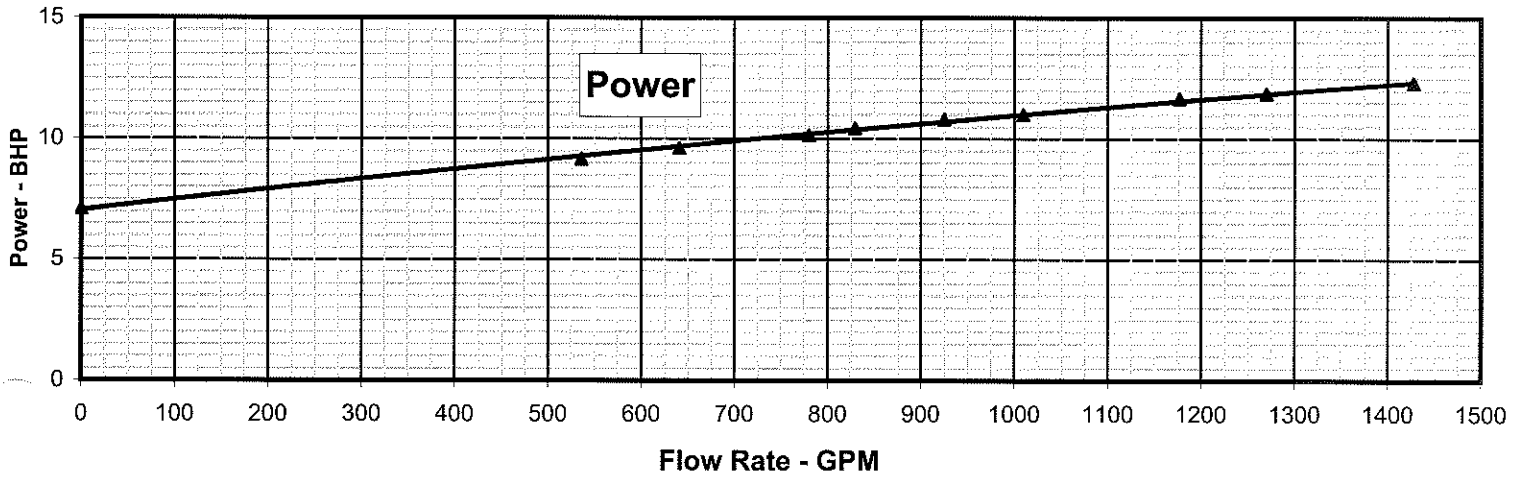
Guaranteed Values				
GPM	850			
HEAD	36			
Eff	75			
RPM	1151			

Size-Model	6"	D5433MV	CW	
Impeller:	T6C!FW			
Impeller Dia:	10.70			
Driver:	Job Driver		HP:	15
RPM:	1151	Stages:	ONE	

Certified By: John C. Marnie — Test Department — 10/08 — Date







Fairbanks Morse Pump
Included Features

- Fairbanks Morse Submersible Motor
- U L Listed, Explosion Proof, Class 1, Division 1, Groups C & D
- Characteristics
  HP 15
  RPM 1200
  Ph/Hz/Volt 3/60/230
  Short Time In Air Duty
- Mechanical Seal
  Outer Seal
  Silicon Carbide Vs Tungsten Carbide
  Inner Seal:
  Silicon Carbide Vs Tungsten Carbide
- Winding Thermostats
- Moisture Detectors
- Stainless Steel Bolting
- Power Cable Length, Ft. 50
- Lifting Bail
- Dynamic Balance Impeller
- Stainless Steel Impeller & Casing Wear Rings
- Stainless Steel Impeller Fastener
- Certified Non-Witness Performance Test
- Standard Paint System
- 6 x 6 Elbow
- Stainless Steel Top guide Brackets

1. Submersible motors are supplied with moisture detectors as standard equipment. A compatible controller must be connected to properly protect the motor. If a controller is not connected, the manufacturer's warranty is invalid.

Fairbanks Morse
Pentair Water

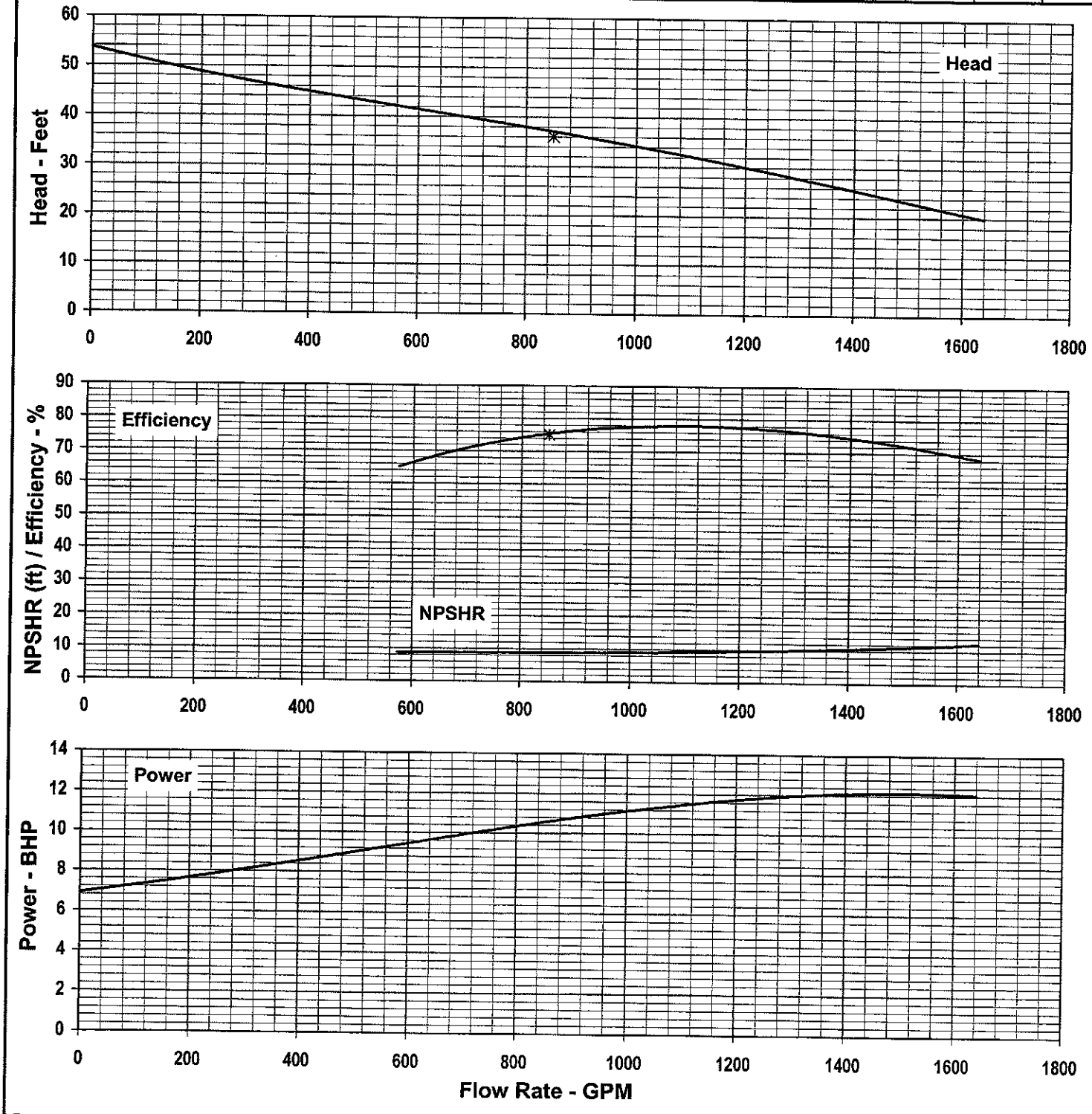
6" D5433MV SUBMITTAL CURVE

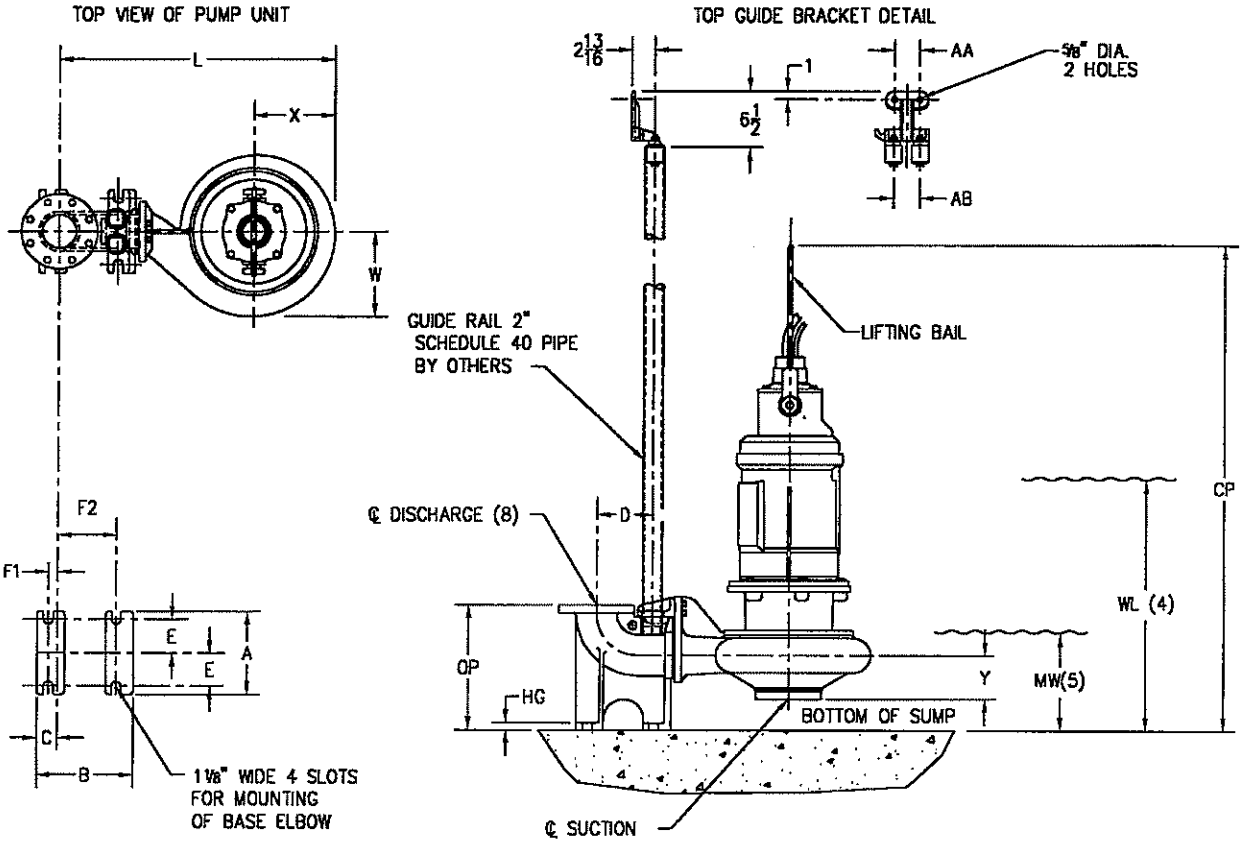
CURVE NO.:	092049C
REV.	
PROJECT NO.:	092049

SPEED	IMPELLER	DIAMETER	VANES
1151	T6C1C	10.70	TWO
SPHERE	DRIVER	DATE	BY
3.00"	15	7/11/2008	JES

THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.

GUARANTEED VALUES			
FLOW	HEAD	EFF.	BHP
850	36	75	----
-----	-----	-----	-----
-----	-----	-----	-----
-----	-----	-----	-----





PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
6" D5433MV	210T	6	14	14½	3¼	8	6	1¾	9¼	39⅝	12⅜	11¼	8½	3	3⅛	58⅞	1	16	20⅝	36

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: PARSON & SANDERSON, INC.					P.O. NO.: 08-50134	Fairbanks Morse PENTAIR PUMP GROUP
JOB NAME: CITY OF ST. BERNARD					TAG NAME: ST.BERNARD V1-17	BASIC PUMP D5432MV AND D5433MV PULL-UP SUBMERSIBLE FAIRBANKS MORSE MTR
PUMP SIZE AND MODEL: 6" D5433MV		GPM: 850	TDH: 36'	RPM: 1151	ROTATION: CLOCKWISE	
MOTOR: FAIRBANKS	HP: 15	FRAME: 210T	PHASE: 3	HERTZ: 60	VOLTS: 230	ENCLOSURE: SUBM.
CERTIFIED FOR: 092049			CERTIFIED BY: H.LAWTON		DATE: 08/28/08	DWG NO: 092049SP REV NO: 0

Fairbanks Morse Pump
Material List

Item	Description	Material	Specification
1	Impeller	Cast Iron	A48 Class 30
9	Capscrew, Impeller	Stainless Steel	A193 CL2-B8
9A	Washer, Impeller	Stainless Steel	A582 S41600
16	Wear Ring, Casing	Stainless Steel	A743 CA-40[1]
17	Wear Ring, Impeller	Stainless Steel	A743 CA-40[2]
30	Volute	Cast Iron	A48 Class 30
66	Ring, Flange	Brass	B505 AL932
76	Discharge Elbow	Cast Iron	A48 Class 30
102	Key, Impeller	Stainless Steel	A276 S30400
145	Bracket, Guide	Brass	B584 AL836
154	Seal, Flange	Rubber	BUNA-N
156	Gasket, Volute	Tag Board	F104
186	Impeller Shim	Stainless Steel	A582-303
376	Upper Guide Bracket	Stainless Steel	A743 GR CF-8
376A	Bushing, Upper Guide	Rubber	Commercial
	Bolting	Stainless Steel	Commercial

[1] 300-350 BHN
[2] 300-350 BHN

Section 7 Pump Submittal

Certified Curves

Approved Submittal

Fairbanks Morse
Pentair Water

Certified Pump Performance Curve

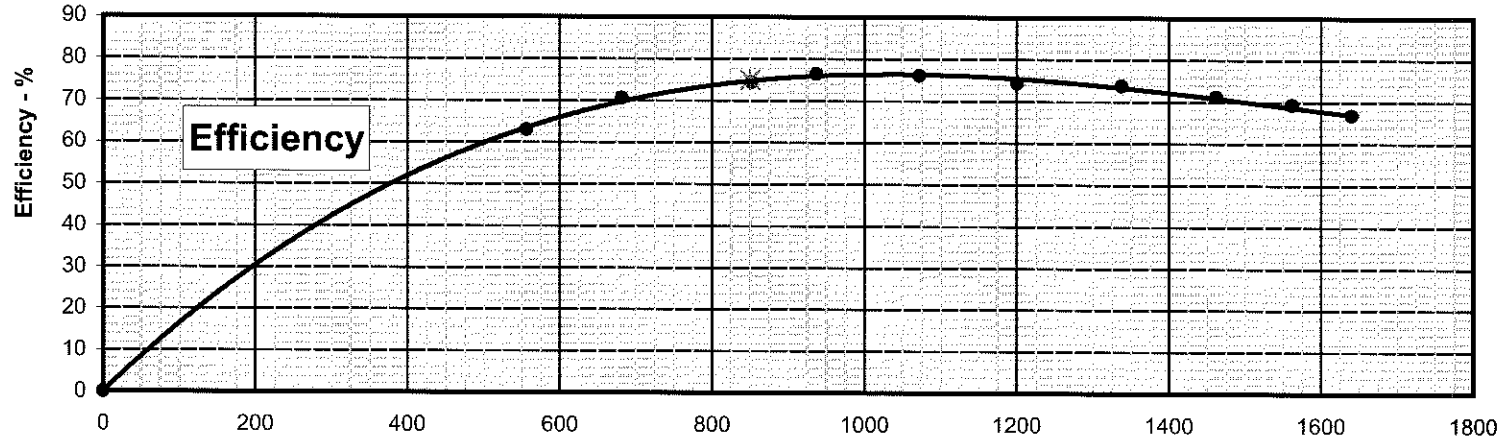
Serial Number:	**1725811-0**
Project Number:	092050
Test Date:	10/28/2008

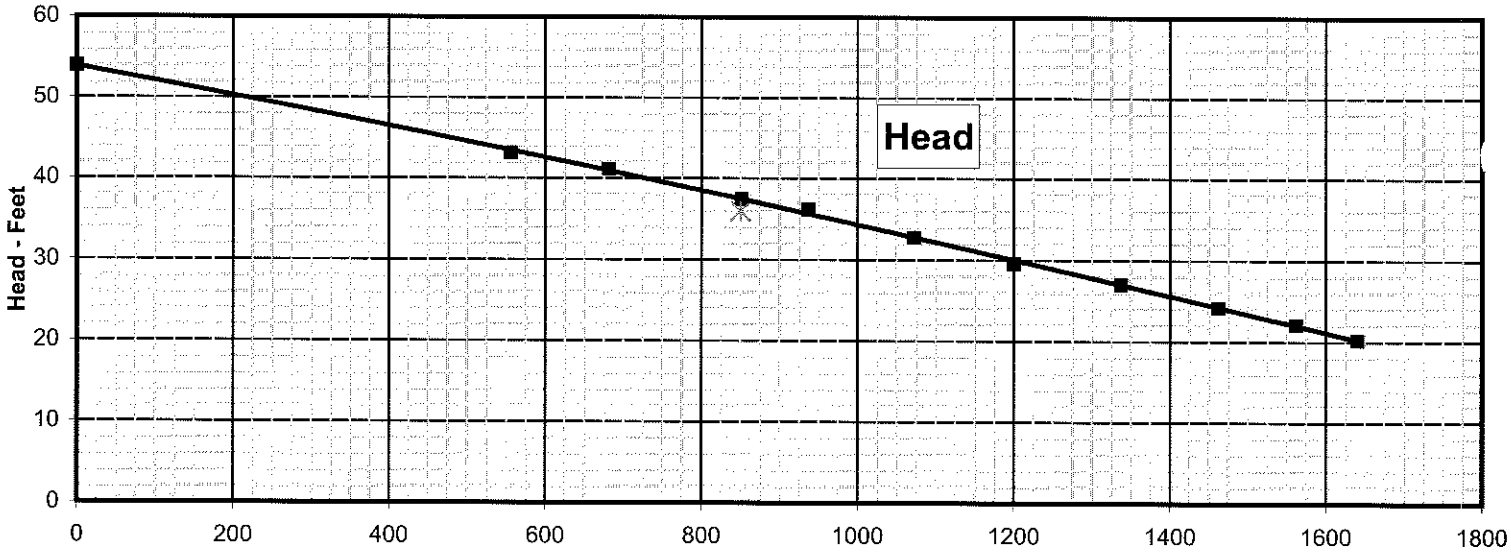
Guaranteed Values

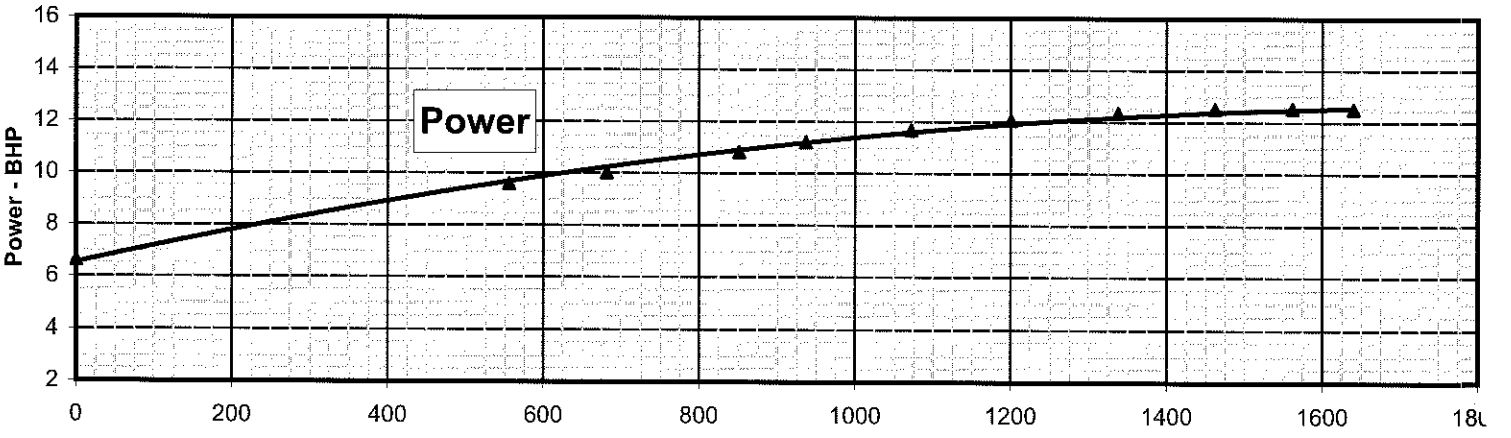
GPM	850
HEAD	36
Eff	75
RPM	1151

Size-Model	6"	D5433MV	CW
Impeller:	T6C1FW		
Impeller Dia:	10.70"		
Driver:	Job Driver	HP:	15
RPM:	1151	Stages:	ONE

Certified By: John C. Mamie (Test Department) 11/08 (Date)







Fairbanks Morse

Pentair Water

Certified Pump Performance Curve

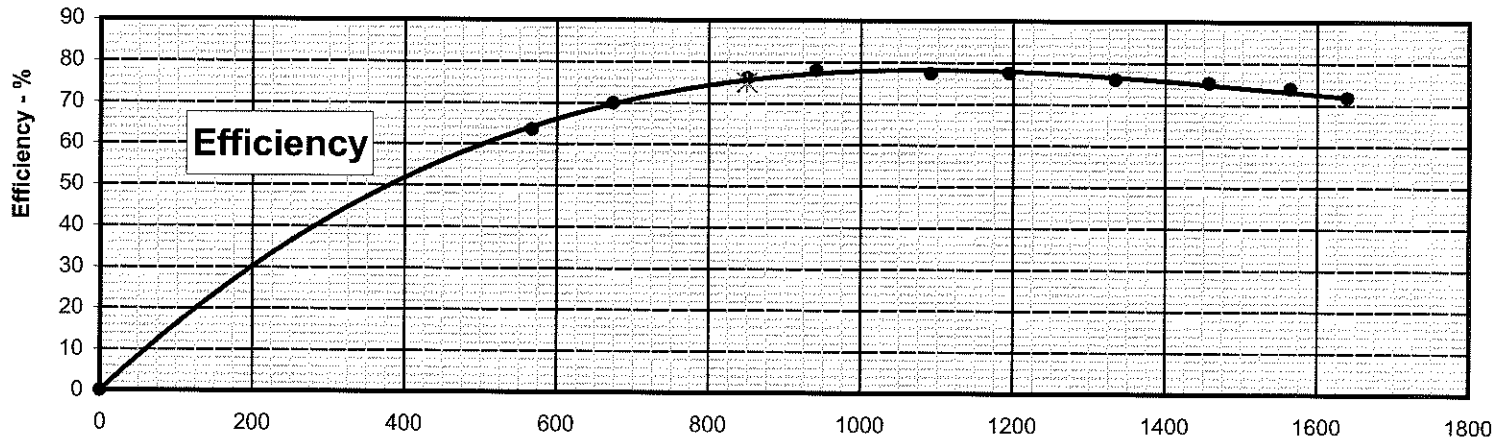
Serial Number:	1725811-1
Project Number:	092050
Test Date:	11/5/2008

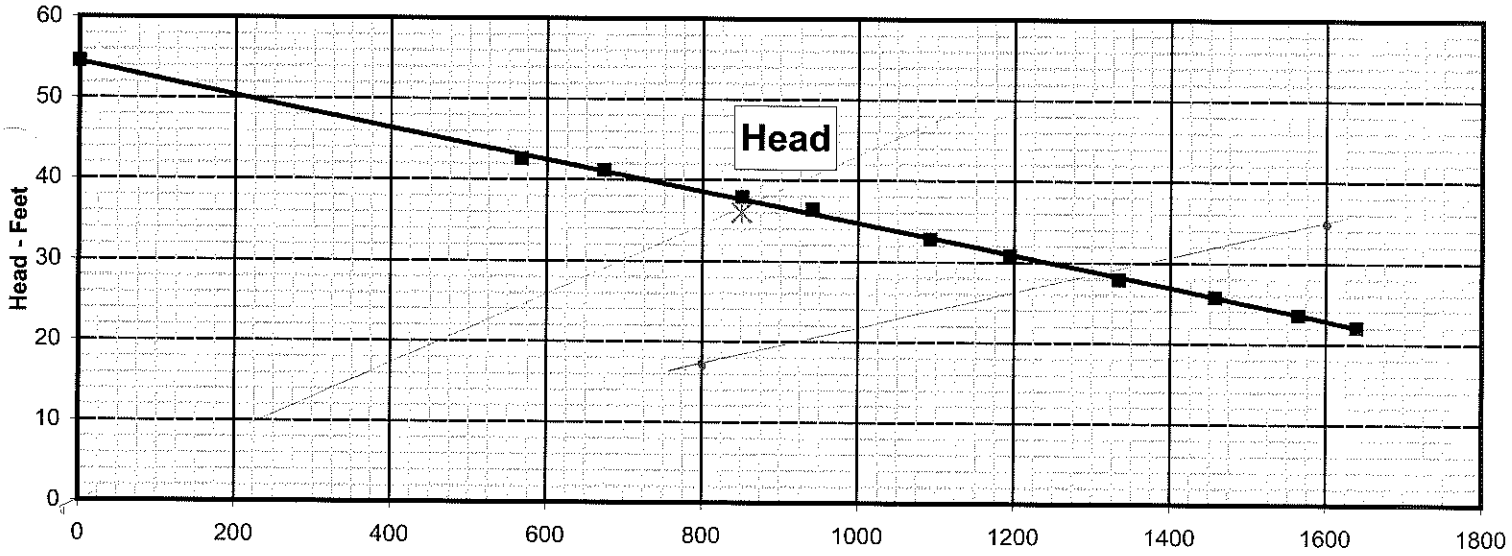
Guaranteed Values

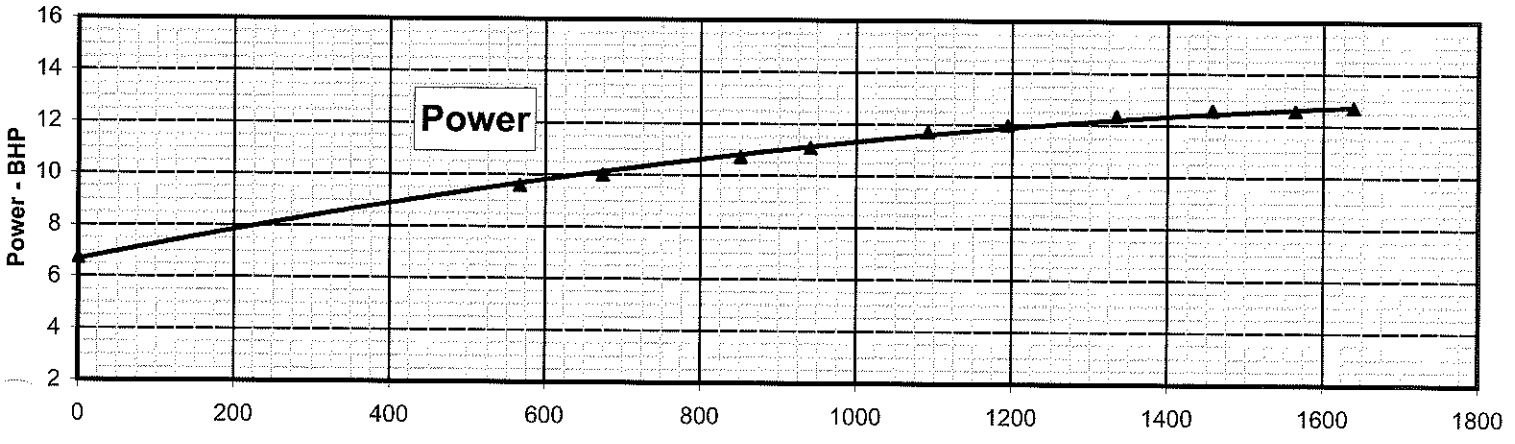
GPM	850			
HEAD	36			
Eff	75			
RPM	1151			

Size-Model	6"	D5433MV	CW	
Impeller:	T6C1FW			
Impeller Dia:	10.70"			
Driver:	Job Driver		HP:	15
RPM:	1151	Stages:	ONE	

Certified By: John C. Mamie — Test Department — 11/08 — Date







Fairbanks Morse Pump
Included Features

- Fairbanks Morse Submersible Motor
- U L Listed, Explosion Proof, Class 1, Division 1, Groups C & D
- Characteristics
  HP 15
  RPM 1200
  Ph/Hz/Volt 3/60/230
  Short Time In Air Duty
- Mechanical Seal
  Outer Seal
  Silicon Carbide Vs Tungsten Carbide
  Inner Seal:
  Silicon Carbide Vs Tungsten Carbide
- Winding Thermostats
- Moisture Detectors
- Stainless Steel Bolting
- Power Cable Length, Ft. 50
- Lifting Bail
- Dynamic Balanced Impeller
- Stainless Steel Impeller & Casing Wear Rings
- Stainless Steel Impeller Fastener
- Certified Non-Witness Performance Test
- Standard Paint System
- 6 x 6 Elbow
- Stainless Steel Top Guide Bracket

Fairbanks Morse Pump
Technical Clarifications

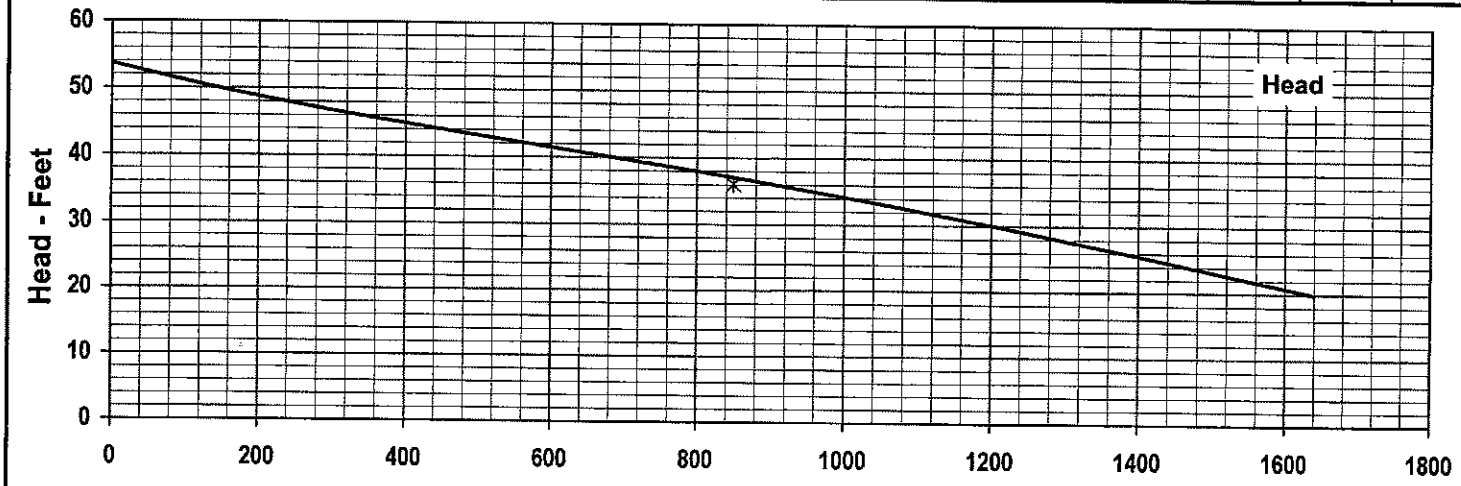
1. Submersible motors are supplied with moisture detectors as standard equipment. A compatible controller must be connected to properly protect the motor. If a controller is not connected, the manufacturer's warranty is invalid.

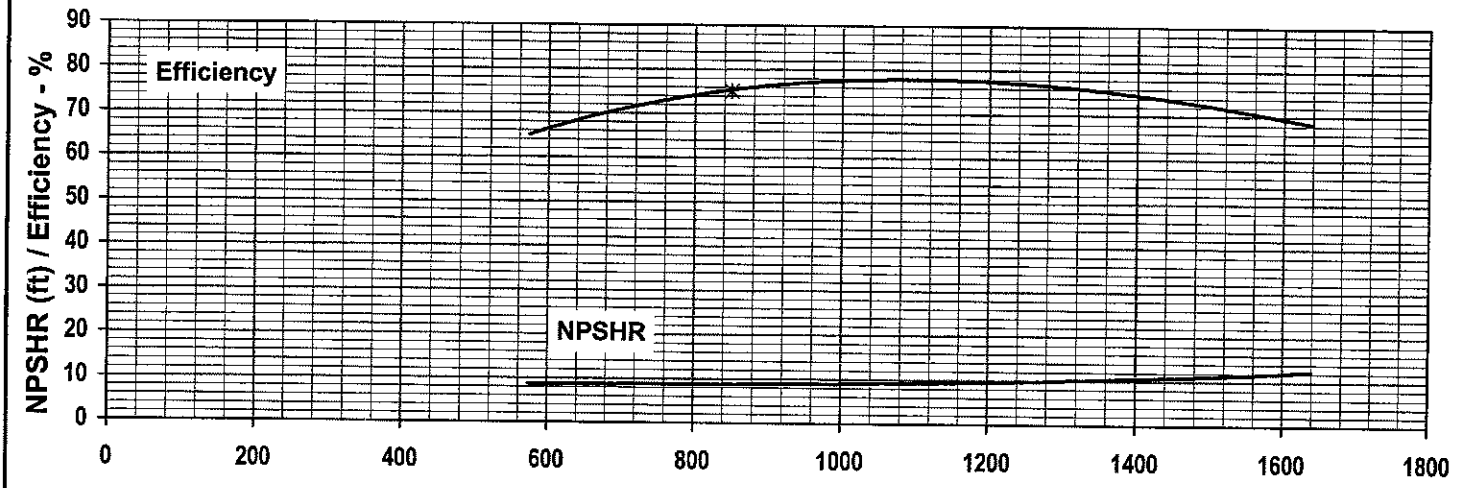
Fairbanks Morse
Pentair Water

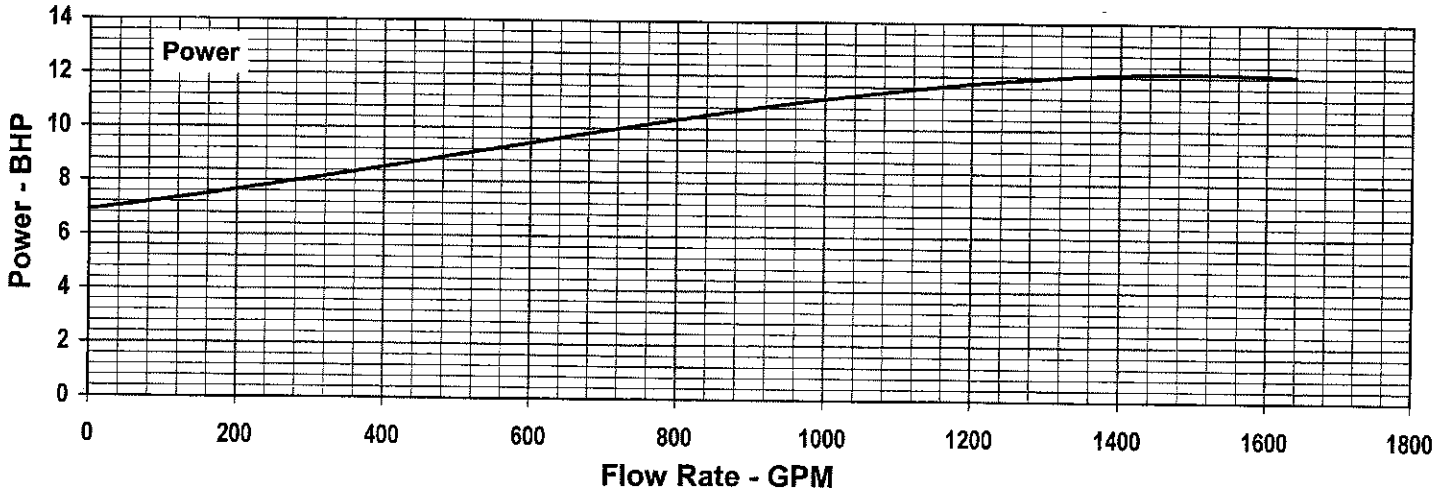
CURVE NO.:	092050C
REV.	
PROJECT NO.:	092050

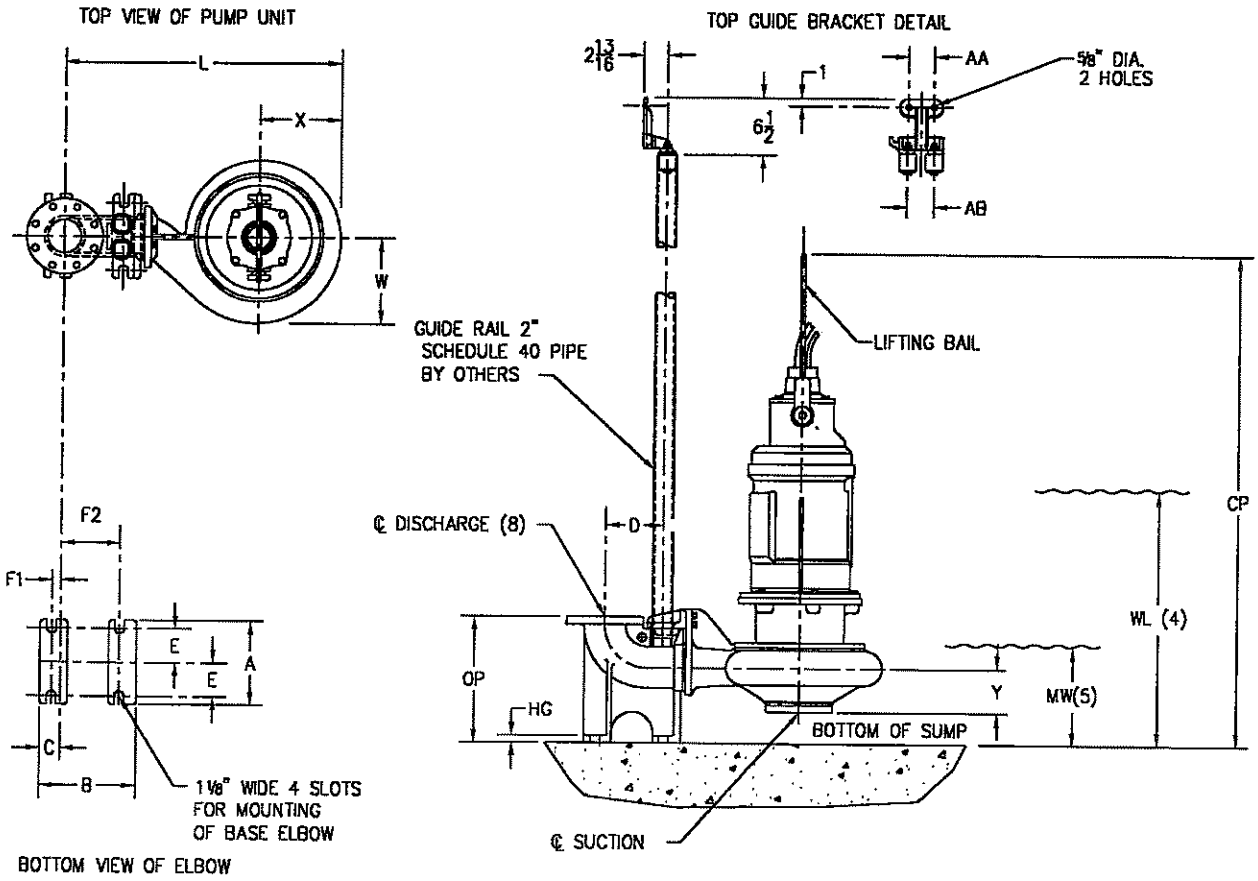
6" D5433MV SUBMITTAL CURVE

SPEED	IMPELLER	DIAMETER	VANES	GUARANTEED VALUES			
1151	T6C1C	10.70	TWO	FLOW	HEAD	EFF.	BHP
SPHERE	DRIVER	DATE	BY	850	36	75	-----
3.00"	15	7/11/2008	JES	-----	-----	-----	-----
THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.				-----	-----	-----	-----
				-----	-----	-----	-----









PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
6" D5433MV	210T	6	14	14 1/2	3 1/4	8	6	1 3/4	9 1/4	39 5/8	12 3/8	11 1/4	8 1/2	3	3 1/8	58 7/8	1	16	20 5/8	36

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: PARSON & SANDERSON					P.O. NO.: 08-50134	Fairbanks Morse PENTAIR PUMP GROUP
JOB NAME: CITY OF ST. BERNARD					TAG NAME: ST. BERNARD V1-18	BASIC PUMP D5432MV AND D5433MV PULL-UP SUBMERSIBLE FAIRBANKS MORSE MTR
PUMP SIZE AND MODEL: 6" D5433MV		GPM: 850	TDH: 36'	RPM: 1151	ROTATION: CLOCKWISE	
MOTOR: FAIRBANKS	HP: 15	FRAME: 210T	PHASE: 3	HERTZ: 60	VOLTS: 230	ENCLOSURE: SUBM.
CERTIFIED FOR: 092050			CERTIFIED BY: H.LAWTON		DATE: 08/28/08	DWG NO: 092050SP REV NO: 0

Fairbanks Morse Pump
Material List

Item	Description	Material	Specification
1	Impeller	Cast Iron	A48 Class 30
9	Capscrew, Impeller	Stainless Steel	A193 CL2-B8
9A	Washer, Impeller	Stainless Steel	A582 S41600
16	Wear Ring, Casing	Stainless Steel	A743 CA-40[1]
17	Wear Ring, Impeller	Stainless Steel	A743 CA-40[2]
30	Volute	Cast Iron	A48 Class 30
66	Ring, Flange	Brass	B505 AL932
76	Discharge Elbow	Cast Iron	A48 Class 30
102	Key, Impeller	Stainless Steel	A276 S30400
145	Bracket, Guide	Brass	B584 AL836
154	Seal, Flange	Rubber	BUNA-N
156	Gasket, Volute	Tag Board	F104
186	Impeller Shim	Stainless Steel	A582-303
376	Upper Guide Bracket	Stainless Steel	A743 GR CF-8
376A	Bushing, Upper Guide	Rubber	Commercial
	Bolting	Stainless Steel	Commercial

[1] 300-350 BHN
[2] 300-350 BHN

Draft Hydraulics and Hydrologic (H&H) Study For
Violet Area Sewer Improvements
St. Bernard Parish

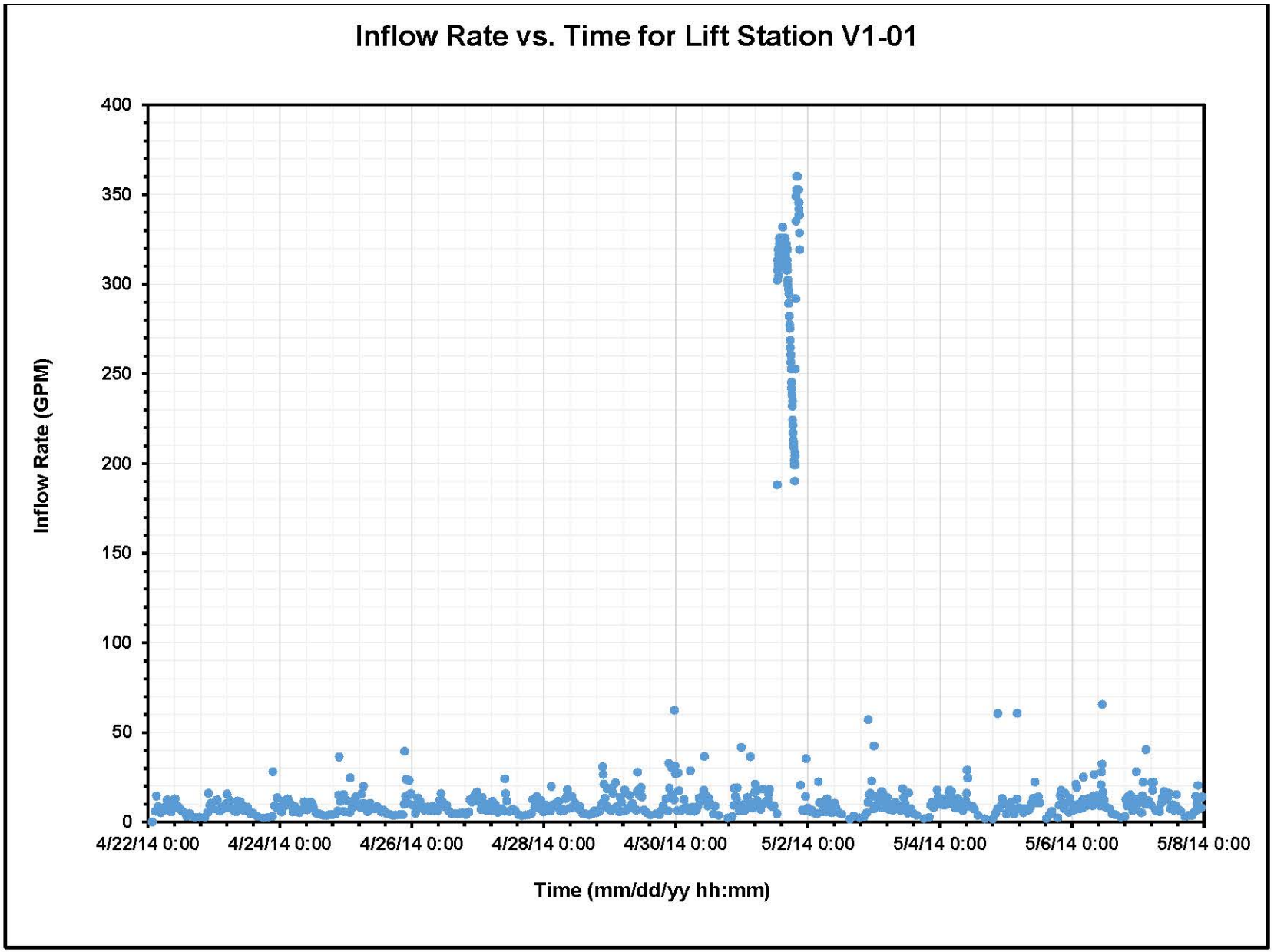
APPENDIX C – HYDROGRAPHS

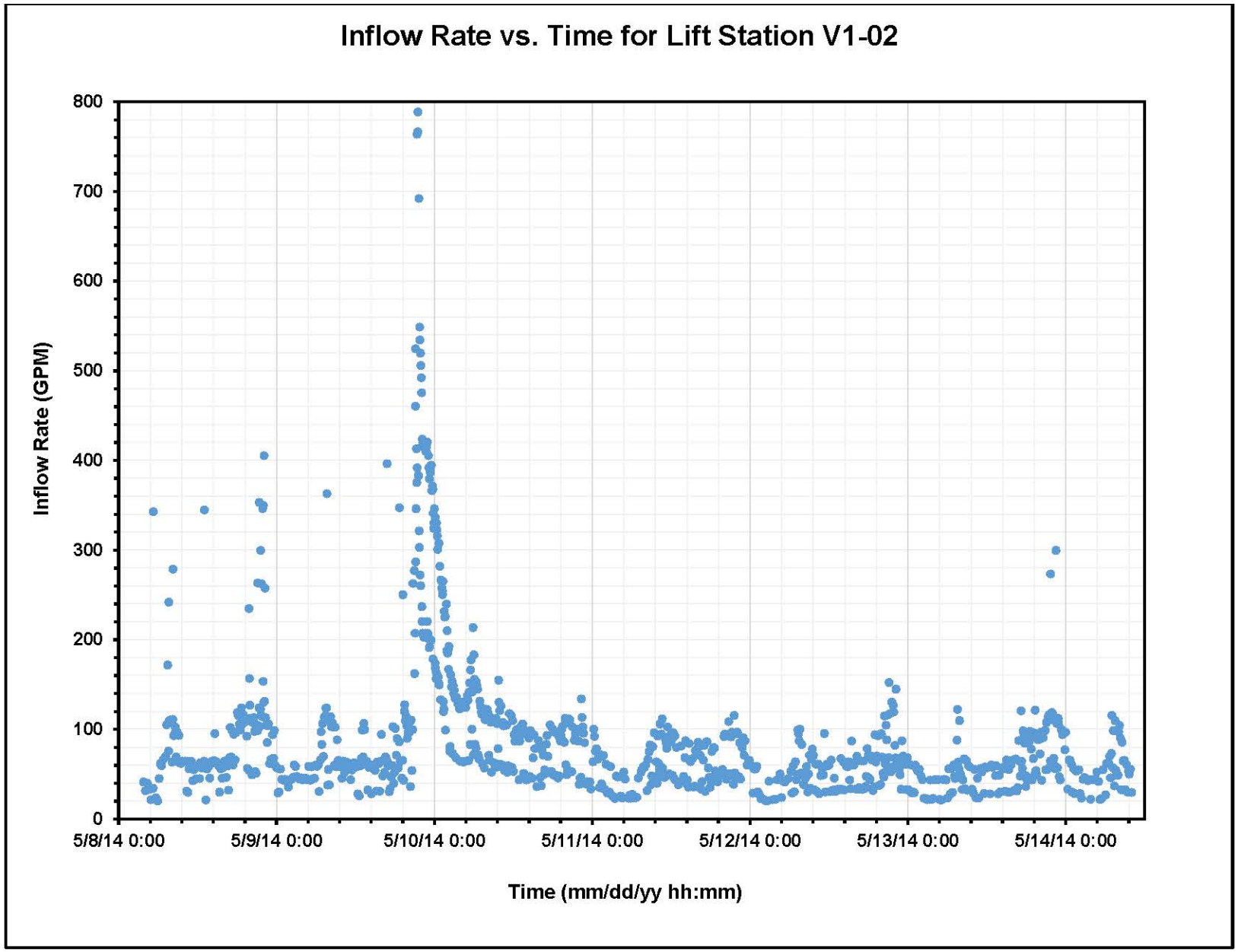
Prepared By:

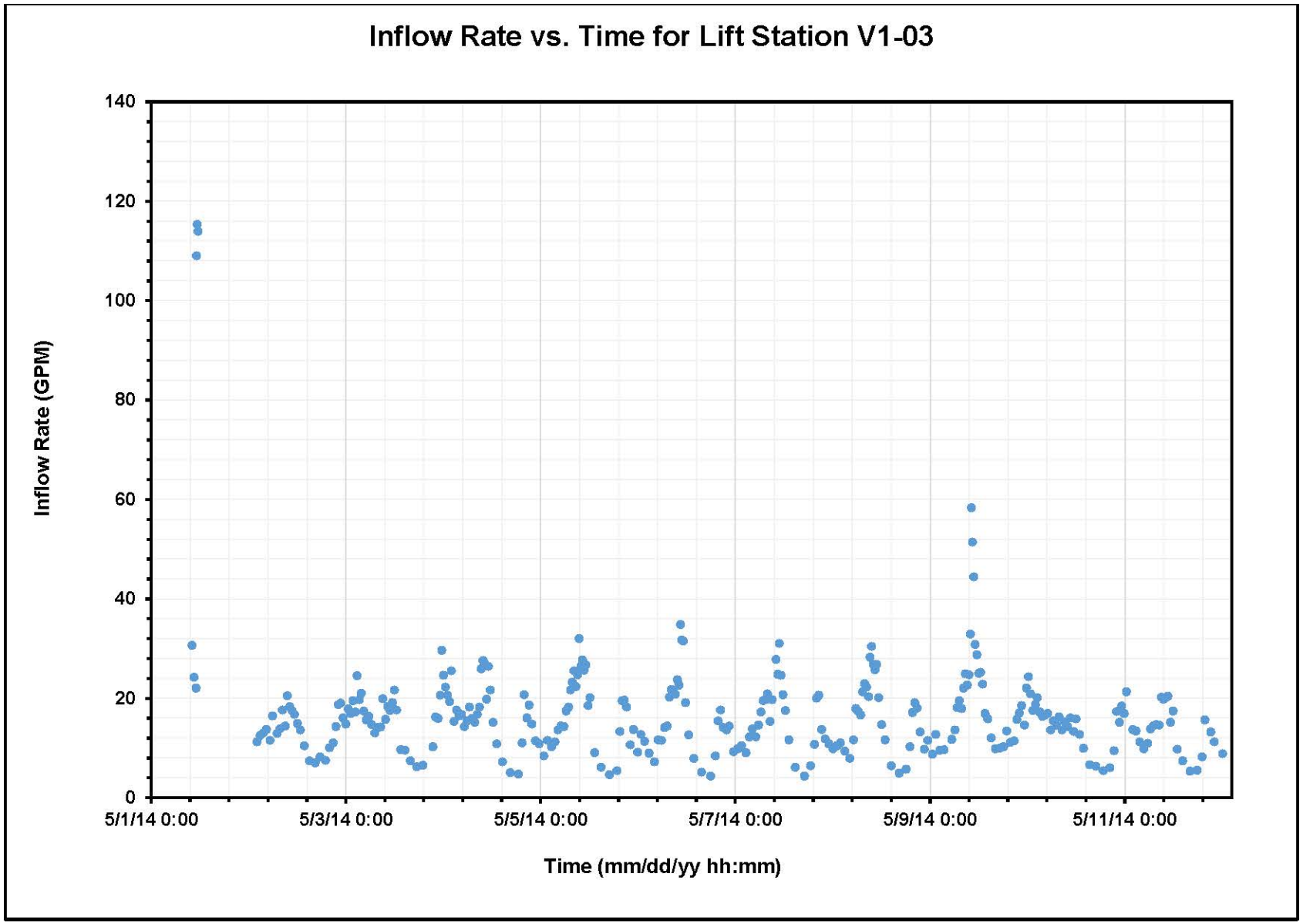
H. Davis Cole & Associates, LLC
Consulting Engineers

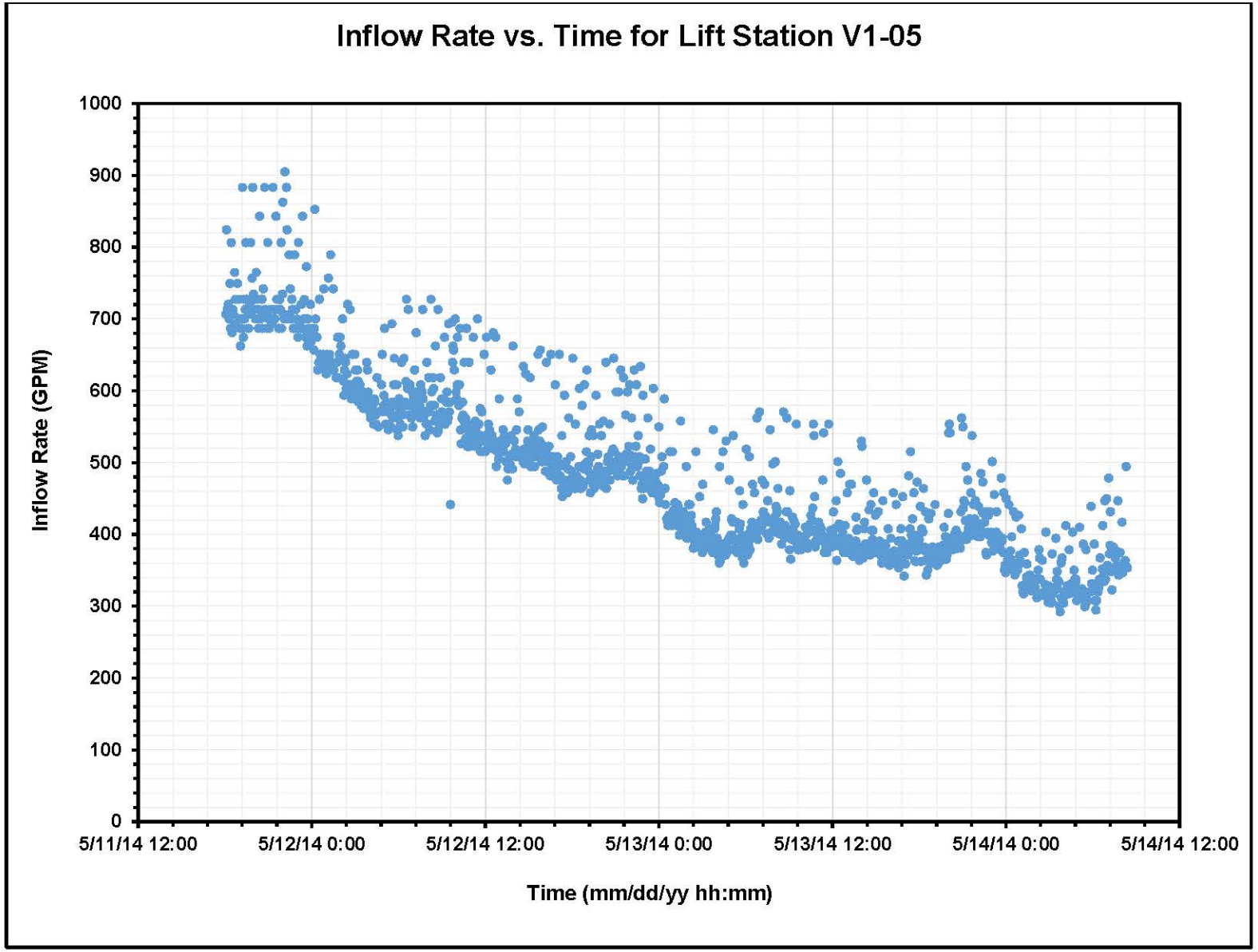
In Association With:

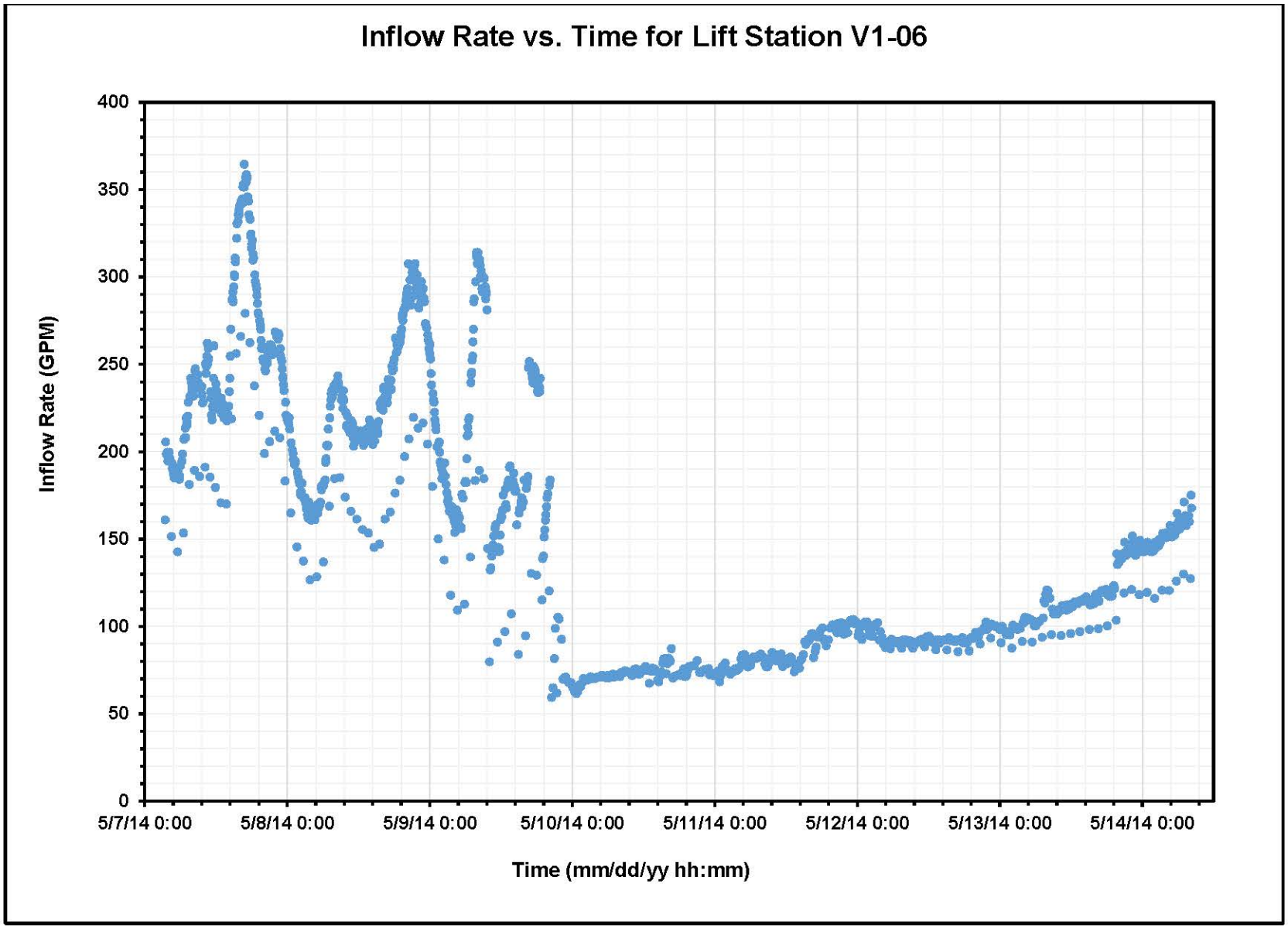
BKI BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

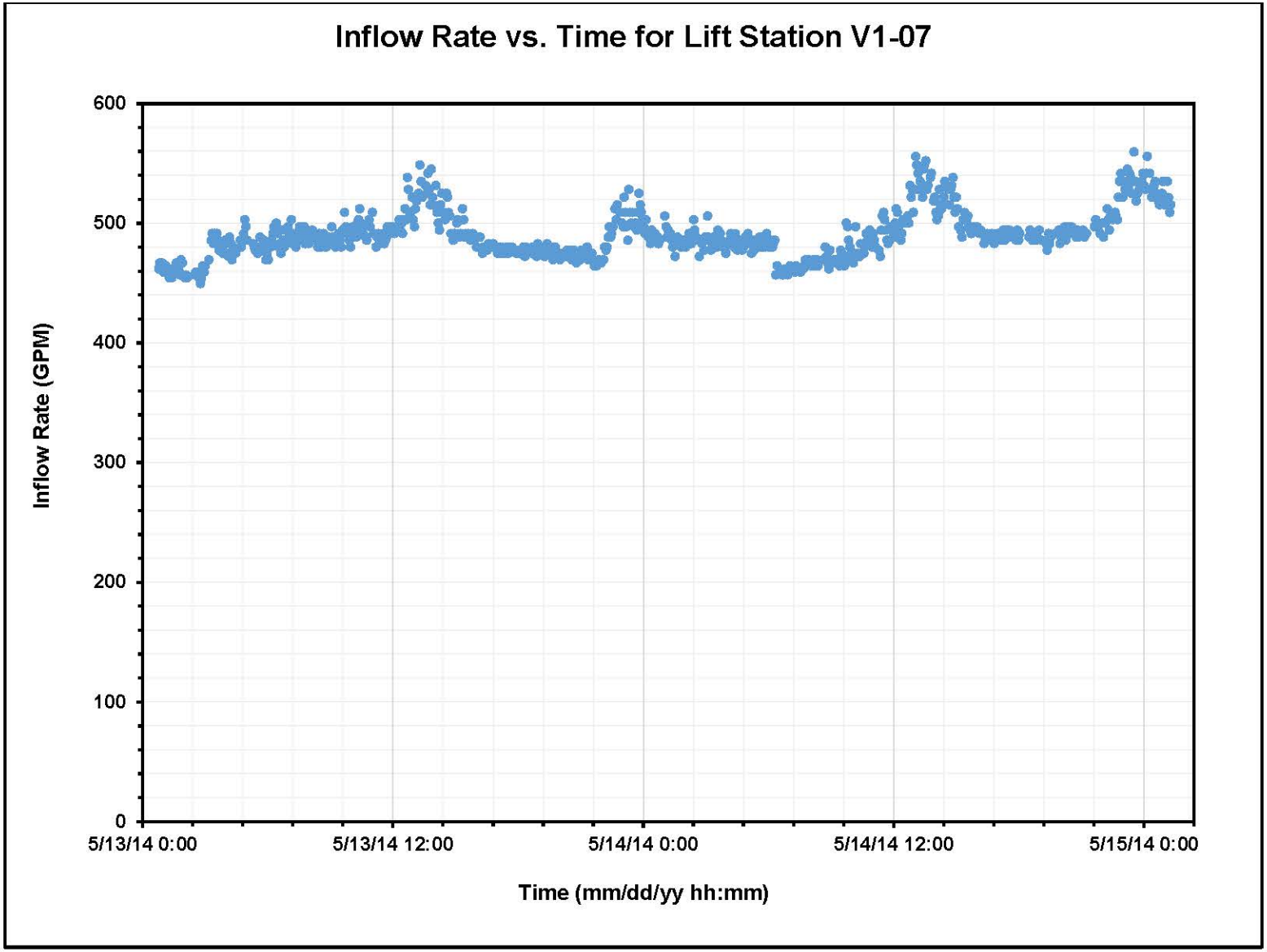

Inflow Rate vs. Time for Lift Station V1-01
Inflow Rate (GPM)
400
350
300
250
200
150
100
50
0
4/22/14 0:00
4/24/14 0:00
4/26/14 0:00
4/28/14 0:00
4/30/14 0:00
5/2/14 0:00
5/4/14 0:00
5/6/14 0:00
5/8/14 0:00
Time (mm/dd/yy hh:mm)

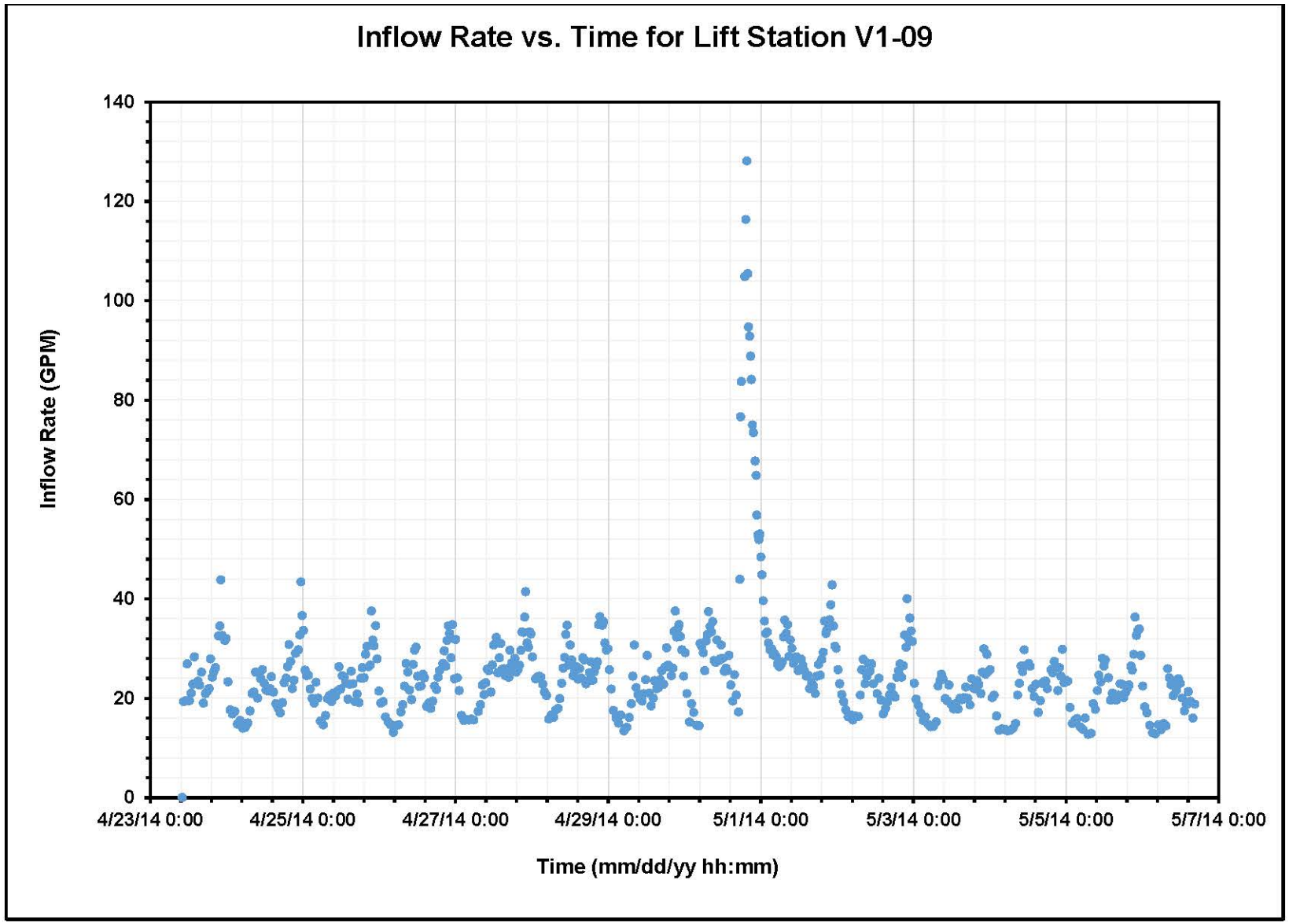

Inflow Rate vs. Time for Lift Station V1-02
Inflow Rate (GPM)
800
700
600
500
400
300
200
100
0
5/8/14 0:00
5/9/14 0:00
5/10/14 0:00
5/11/14 0:00
5/12/14 0:00
5/13/14 0:00
5/14/14 0:00
Time (mm/dd/yy hh:mm)

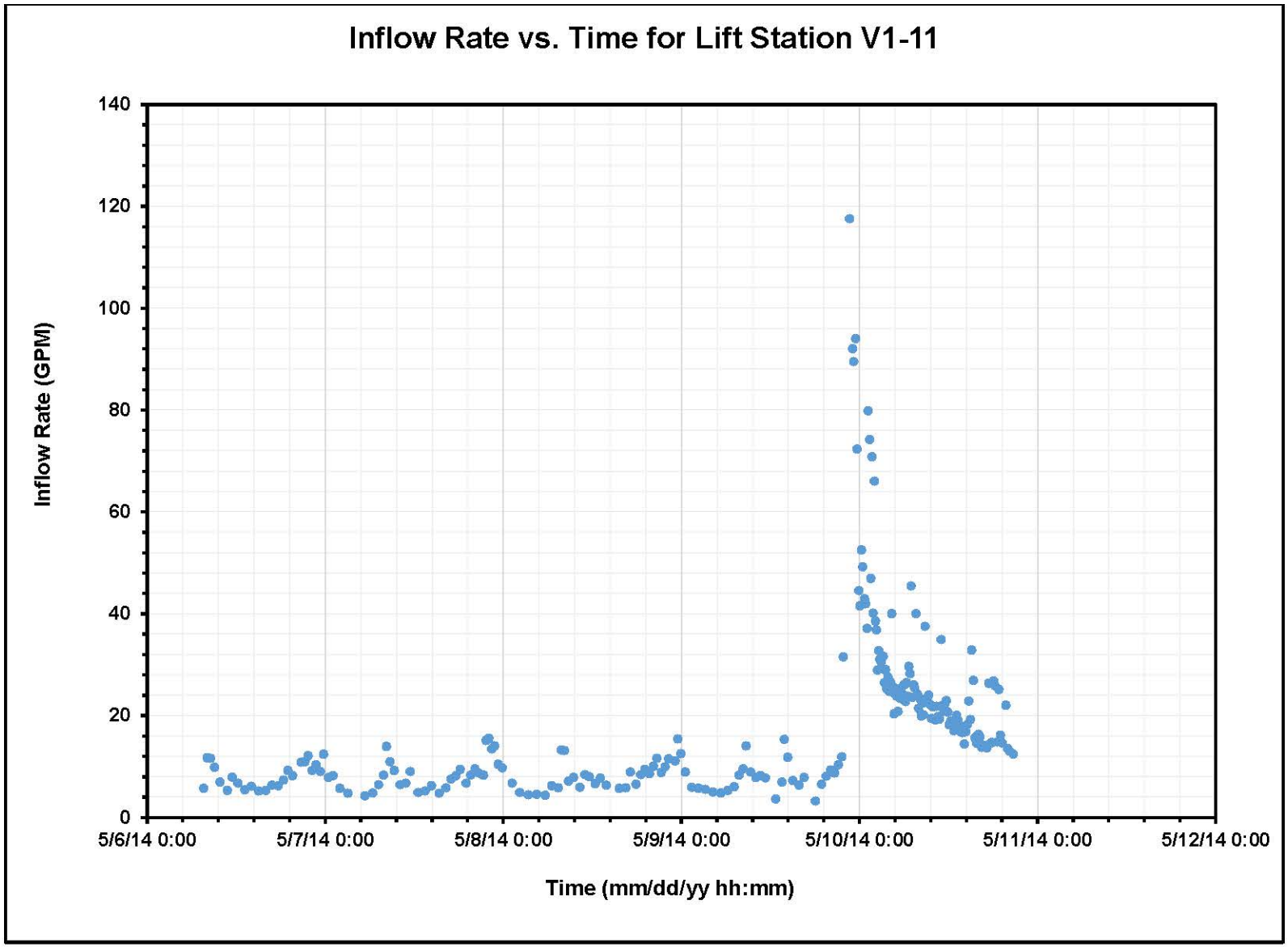

Inflow Rate vs. Time for Lift Station V1-03
Inflow Rate (GPM)
140
120
100
80
60
40
20
0
5/1/14 0:00
5/3/14 0:00
5/5/14 0:00
5/7/14 0:00
5/9/14 0:00
5/11/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-05
Inflow Rate (GPM)
1000
900
800
700
600
500
400
300
200
100
0
5/11/14 12:00
5/12/14 0:00
5/12/14 12:00
5/13/14 0:00
5/13/14 12:00
5/14/14 0:00
5/14/14 12:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-06
Inflow Rate (GPM)
400
350
300
250
200
150
100
50
0
5/7/14 0:00
5/8/14 0:00
5/9/14 0:00
5/10/14 0:00
5/11/14 0:00
5/12/14 0:00
5/13/14 0:00
5/14/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-07
Inflow Rate (GPM)
600
500
400
300
200
100
0
5/13/14 0:00
5/13/14 12:00
5/14/14 0:00
5/14/14 12:00
5/15/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-09
Inflow Rate (GPM)
140
120
100
80
60
40
20
0
4/23/14 0:00
4/25/14 0:00
4/27/14 0:00
4/29/14 0:00
5/1/14 0:00
5/3/14 0:00
5/5/14 0:00
5/7/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-11
Inflow Rate (GPM)
140
120
100
80
60
40
20
0
5/6/14 0:00
5/7/14 0:00
5/8/14 0:00
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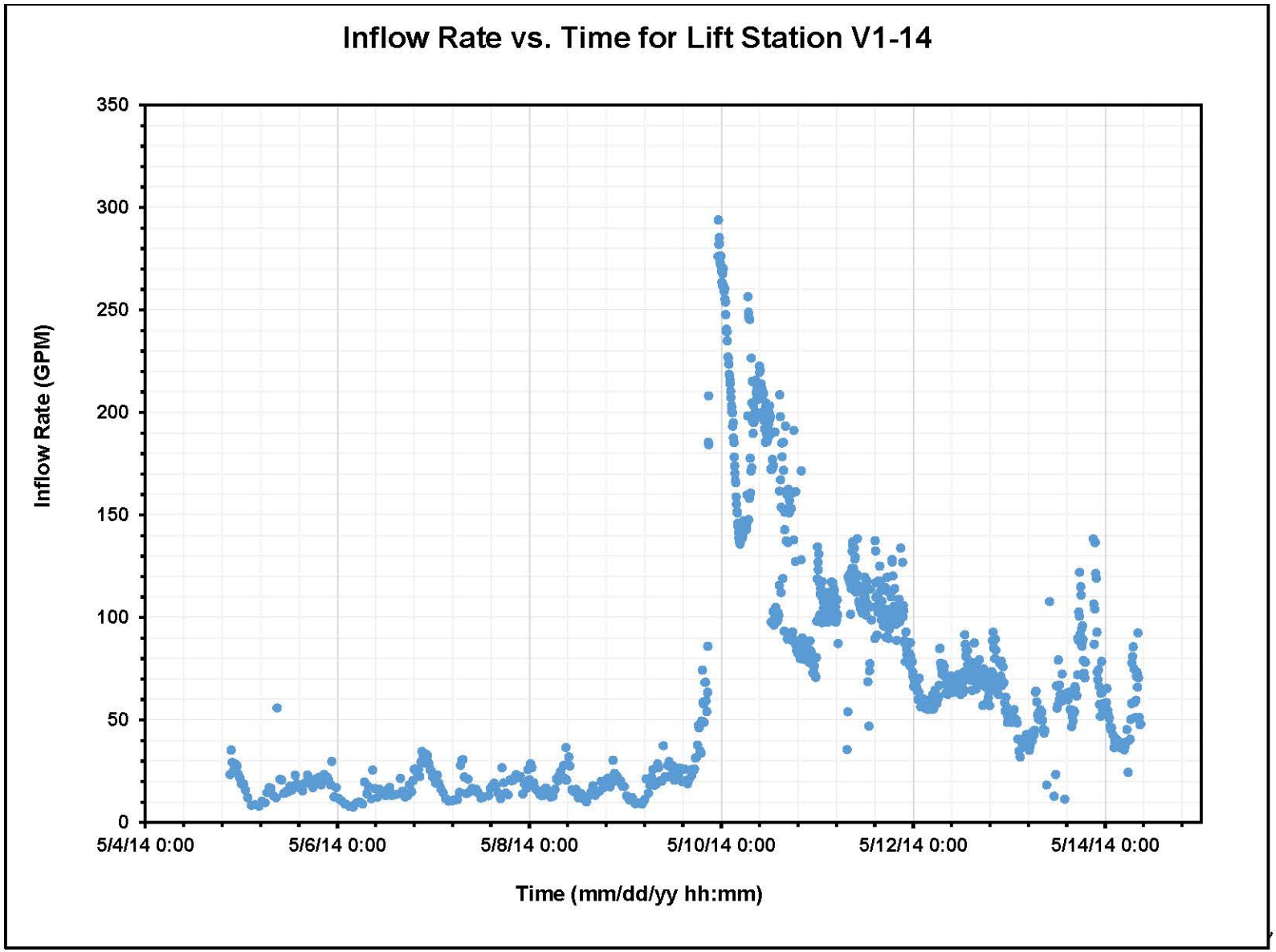
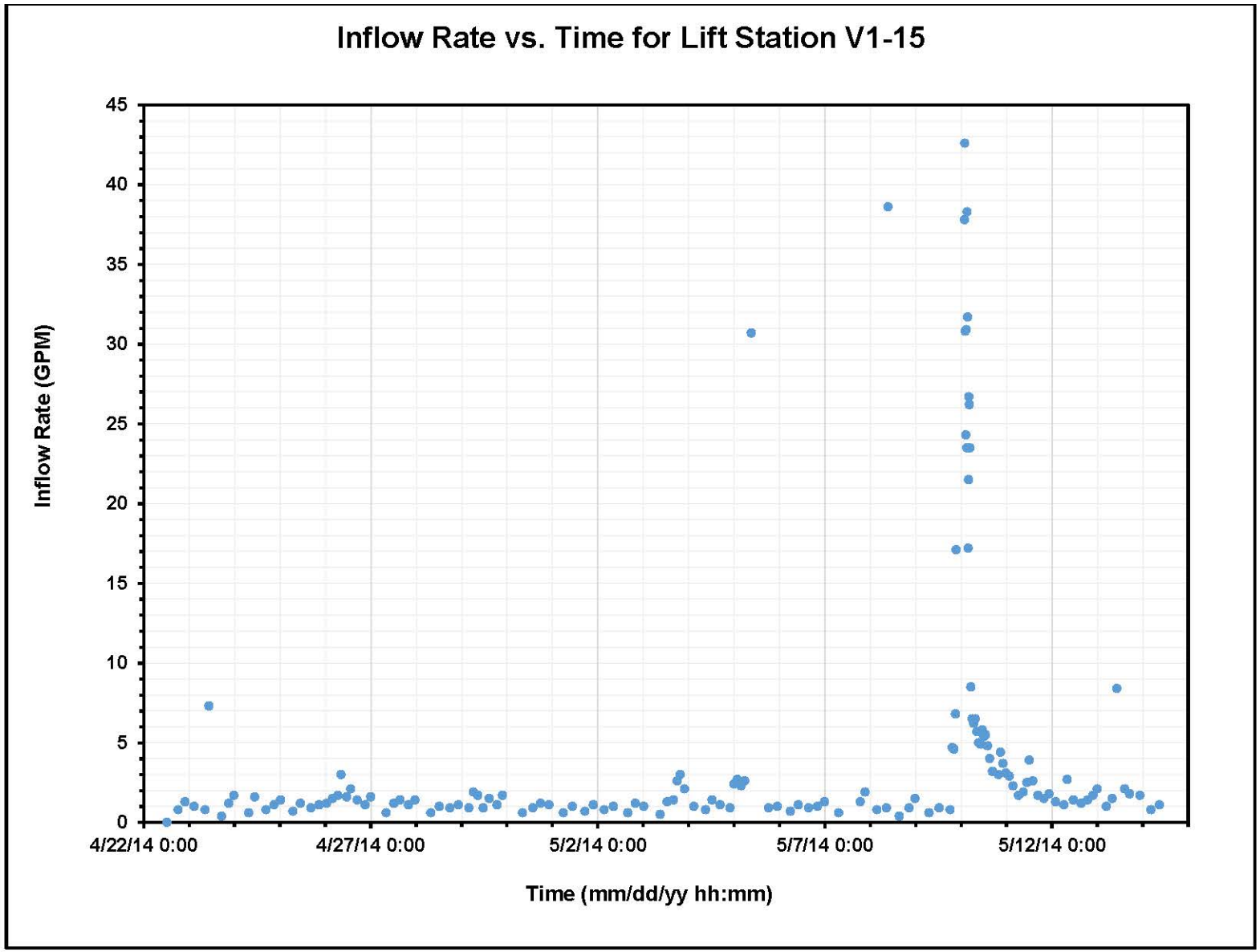
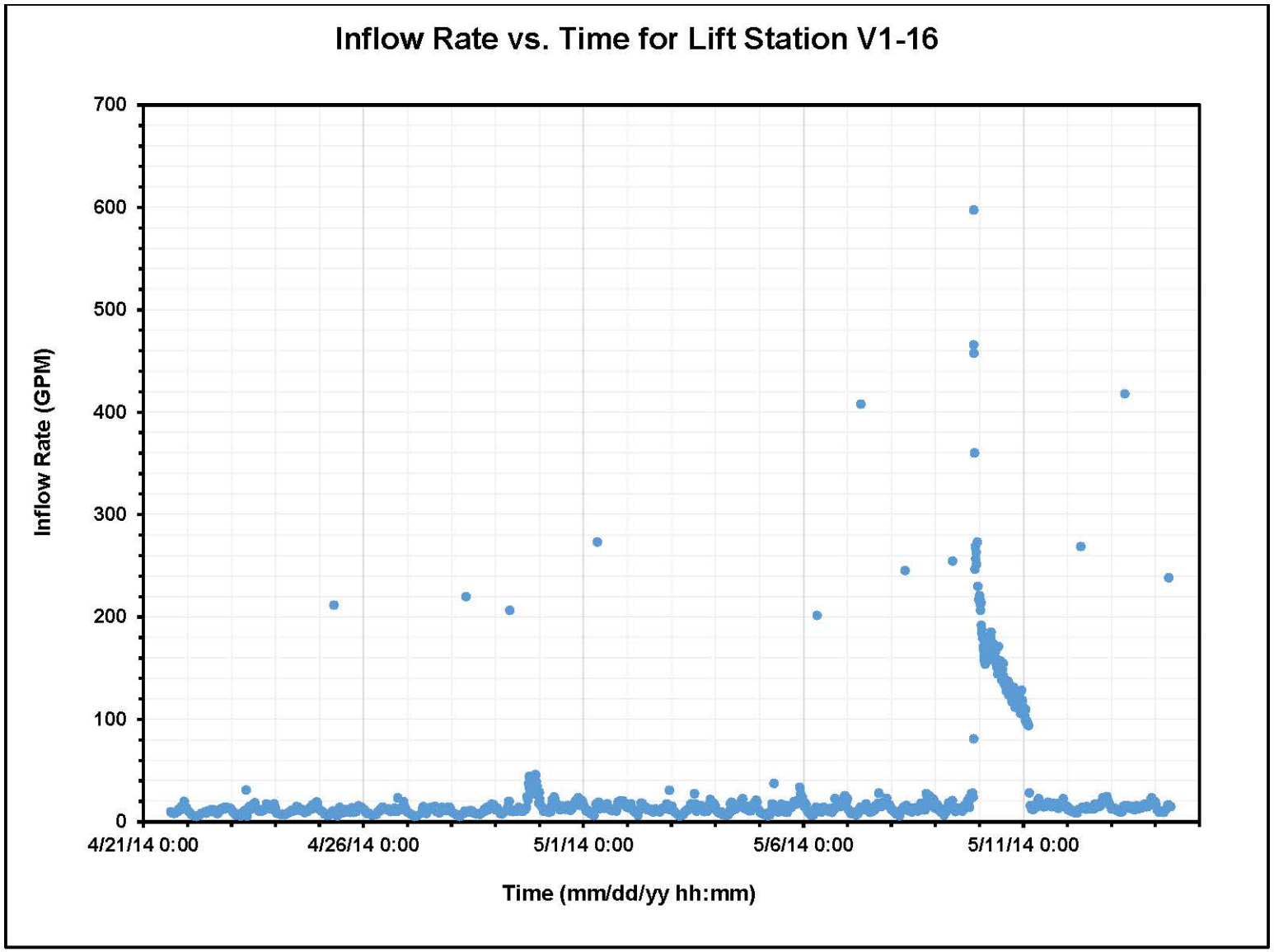
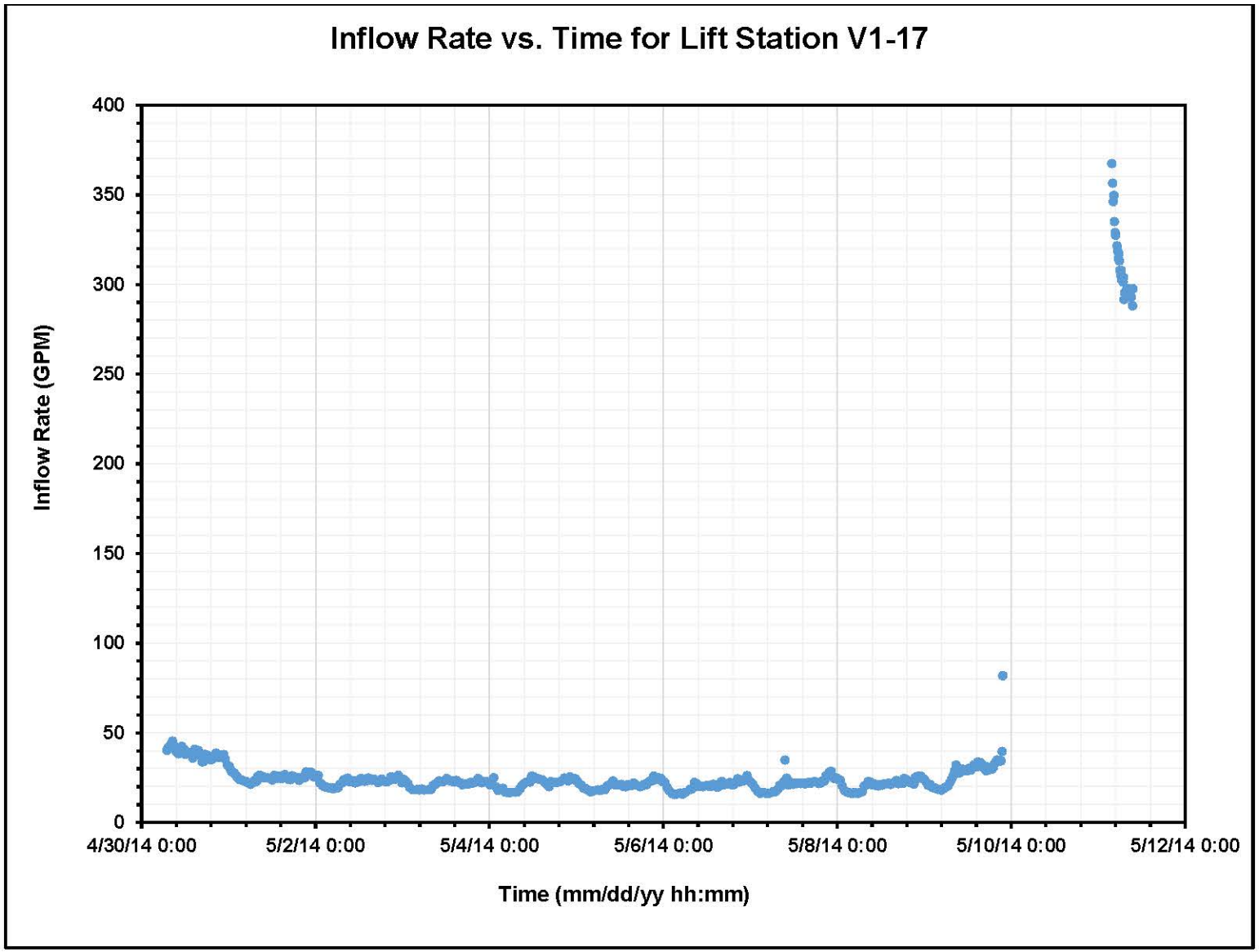
5/12/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-14
Inflow Rate (GPM)
350
300
250
200
150
100
50
0
5/4/14 0:00
5/6/14 0:00
5/8/14 0:00
5/10/14 0:00
5/12/14 0:00
5/14/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-15
Inflow Rate (GPM)
45
40
35
30
25
20
15
10
5
0
4/22/14 0:00
4/27/14 0:00
5/2/14 0:00
5/7/14 0:00
5/12/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-16
Inflow Rate (GPM)
700
600
500
400
300
200
100
0
4/21/14 0:00
4/26/14 0:00
5/1/14 0:00
5/6/14 0:00
5/11/14 0:00
Time (mm/dd/yy hh:mm)


Inflow Rate vs. Time for Lift Station V1-17
Inflow Rate (GPM)
400
350
300
250
200
150
100
50
0
4/30/14 0:00
5/2/14 0:00
5/4/14 0:00
5/6/14 0:00
5/8/14 0:00
5/10/14 0:00
5/12/14 0:00
Time (mm/dd/yy hh:mm)

Draft Hydraulics and Hydrologic (H&H) Study For
Violet Area Sewer Improvements
St. Bernard Parish

APPENDIX D – CALCULATIONS

Prepared By:

H. Davis Cole & Associates, LLC
Consulting Engineers

In Association With:

BURK-KLEINPETER, INC.
ENGINEERS, ARCHITECTS, PLANNERS, ENVIRONMENTAL SCIENTISTS

H. Davis Cole & Associates, LLC

CLIENT SBPG COMPUTED BY McGeary, William
PROJECT NO 2013-09 DATE 5/21/14
CHECKED BY/DATE D. MARTIN 5/28 PAGE NO 1

OVERVIEW STATEMENT:

Develop algebraic sums of all lift station flow requirements for existing conditions. In order to determine the necessary capacity for the major collection stations (VI-05, VI-06 & VI-17) during existing conditions, the upstream tributary stations operational design pump capacities must be algebraically summed up. This will allow H. Davis Cole & Associates, LLC (HDCA) to theoretically determine if the major collection stations operational design pump capacities are able to handle the combination of their upstream tributary stations flow.

REFERENCES:

- PARSON & ANDERSON, INC.
  - VI-01, VI-03, VI-04, VI-06, VI-07, VI-08, VI-09, VI-10, VI-11, VI-12, VI-13, VI-14, VI-15, and VI-16
- FAIRBANKS MORSE
  - VI-02, VI-05, VI-17 & VI-18

ASSUMPTIONS

- For these calculations HDCA will assume 3 scenarios
  (1) Steady-state inflow rate for all tributary stations will be set to 100 gpm
  (2) Steady-state inflow rate for all tributary stations will be set to half their respective capacities
  (3) Steady-state inflow rate for all tributary stations will be set to their respective full capacities
- HDCA will assume no infiltration from possible leaks in connecting force mains from station to station
- HDCA is only taking into consideration the capacity of one pump per station, NOT two (2) pumps in parallel

CAPACITY FOR MAJOR COLLECTION STATION VI-06

Station VI-06 has an operational design pumping capacity of 530 gpm (PARSONS ; ANDERSON, INC.)

The upstream tributary stations for VI-06 and their respective operational design capacities are as follows:

- VI-07 = 390 gpm (PARSONS ; ANDERSON, INC.)
- VI-08 = 350 gpm (PARSONS ; ANDERSON, INC.)
- VI-09 = 400 gpm (PARSON ; ANDERSON, INC.)
- VII-10* = 475 gpm (PARSON ; ANDERSON, INC.)
- VI-11 = 125 gpm (PARSON ; ANDERSON, INC.)
- VI-12* = 250 gpm (PARSON ; ANDERSON, INC.)
- VI-13* = 200 gpm (PARSON ; ANDERSON, INC.)

* NOTE: VI-12 & VI-13 are upstream tributaries to VI-10, however VI-10 is not considered a major collection system. Also, note that VI-10 is able to handle it's upstream tributary capacities (200 gpm + 250 gpm = 450 gpm < 475 gpm)

Considering Scenario (1) [100 gpm steady-state] the total inflow rate from VI-06's upstream tributary stations is:

$$100 \frac{\text{gpm}}{\text{station}} \left(7 \text{ stations} \right) = [700 \text{ gpm} > 530 \text{ gpm NOT OK!}]$$

Even at the lowest assumed steady-state scenario, VI-06 w/ only one pump running is incapable of handling such inflow rates.

Considering Scenario (2) [1/2 capacity, steady state] the total inflow rate from VI-06's upstream tributary stations is:

$$= \frac{[390 + 350 + 400 + [475 - 250 - 200]^{*} + 125 + 250 + 200] \text{ gpm}}{2}$$

$$[= 870 \text{ gpm} \geq 530 \text{ gpm}]$$

* Note: This corresponds to VI-10's contribution to VI-06. Since HDCA is already considering VI-12 & VI-13's contribution (which are upstream tributary stations for VI-10) these values must subtracted from VI-10's total contribution.

Considering Scenario (3) [Full Capacity Steady State] the total inflow rate from VI-06's upstream tributary stations is:
= [390 + 350 + 400 + (475 - 250 - 200)* + 125 + 250 + 200] gpm
[= 1,740 gpm > 530 gpm NOT OK!]

USE 1,740 FOR PUMP STAT. / FM CAP. FOR PRELIM DESIGN DM 5/28

* Note: Same note as scenario (2)

After calculating the inflow rates for the three assumed scenarios it is evident that VI-06 is incapable of handling wet weather events for Sub-Basin (2). Therefore it seems apparent that improvements for this station are necessary.

CAPACITY FOR MAJOR COLLECTION STATION VI-17

Station VI-17 has an operational design capacity of 850 gpm (FAIRBANKS MONROE)

The upstream tributary stations for VI-17 are VI-18 & VI-19. HDCA assumed that VI-19 (which is an upstream tributary station for VI-18) is insignificant for two (2) reasons:

(1) VI-19 has a small pumping capacity and a small ~~drainage~~ SERVICE area; DM 5/28

(2) SBPG has reported no flooding during wet weather events in that region.

Therefore the only upstream tributary station taken into consideration for VI-17 and it's operational design capacity is:
- VI-18 = 850 gpm (FAIRBANKS MONROE)

Considering Scenario (1) [100 gpm steady-state] the total inflow rate from VI-17's upstream tributary station is:
= 100 gpm/station (1 station) = [100 gpm < 850 gpm OK!]

Considering Scenario (2) [1/2 capacity steady state] the total inflow rate from VI-17's upstream tributary station is:
= 850 gpm (1/2) = [425 gpm < 850 gpm OK!]

Considering Scenario (3) [full capacity steady state] the total inflow rate for VI-17's upstream tributary station is:
= [850 gpm = 850 gpm OK]

After calculating the inflow rates for the three assumed scenarios it is evident that VI-17 is more than capable of handling scenarios (1) + (2). Scenario (3) is not as clear cut. Given the assumption that HDCA is only considering one pump for their capacities and the fact VI-17 only contains one (1) active submersible pump currently. If VI-18 were to be operating w/ two (2) pumps in parallel at full capacity it would overflow the wet-well in VI-17. Therefore improvements must be made to VI-17 in order for it to handle scenario (3).

CAPACITY FOR MAJOR COLLECTION STATION VI-05

Station VI-05 has an operational design capacity of 1800 gpm (FAIRBANKS MONROE)

The upstream tributary stations for VI-05 and their respective operational design capacities are as follows:

- VI-06 = 530 gpm (PARSONS & ANDERSON, INC.)*
- VI-14 = 235 gpm (PARSONS & ANDERSON, INC.)
- VI-15 = 275 gpm (PARSONS & ANDERSON, INC.)
- VI-16 = 235 gpm (PARSONS & ANDERSON, INC.)
- VI-17 = 850 gpm (FAIRBANKS MONROE)*

* NOTE: VI-06 & VI-17 are major collection systems and this may impact the results

Considering Scenario (3) [full capacity steady-state] the total inflow rate from VI-05's upstream tributary stations is:

= 530 gpm + 235 gpm + 275 gpm + 235 gpm + 850 gpm

[= 2125 gpm > 1800 gpm NOT OK] LEADS TO SURCHARGING

After calculating the inflow rates for Scenario (3) it is clear that VI-05 station is unable to handle the flows @ full capacity from its respective upstream tributary stations. Improvements to this station will be necessary, especially when considering that the capacities of VI-06 & VI-17 will increase as well.

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: JSEPT 25, 2008

JOB V1-01 ANGELIC ST & 20-ARPENT CANAL PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR HYDRO AIR

ENGINEER ALL SOUTH CONSULTING ENGINEERS LLC

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 350 TDH 11 RPM 1150 CURVE PG. 110 IMPEL. DIA. 7.0"

CONSTRUCTION: HYDROMATIC S4NX200EB

☐	BRONZE FITTED	☒	MECHANICAL SEAL
☐		☐	(DOUBLE)
☒	ALL IRON	☐	PACKED

BASE:			DRIVE:		
☒	CAST IRON	☐	DIRECT	☒	CLOSE COUPLED
☐	CHANNEL STEEL	☐	V-BELT	☒	SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

MFR HYDROMATIC HP 2 RPM 1150 FRAME N/A

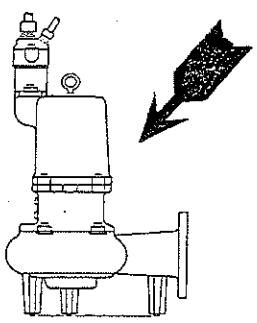
PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) S .S. CORD/CABLE HANGER BRACKET.

EXISTING HATCH TO REMAIN

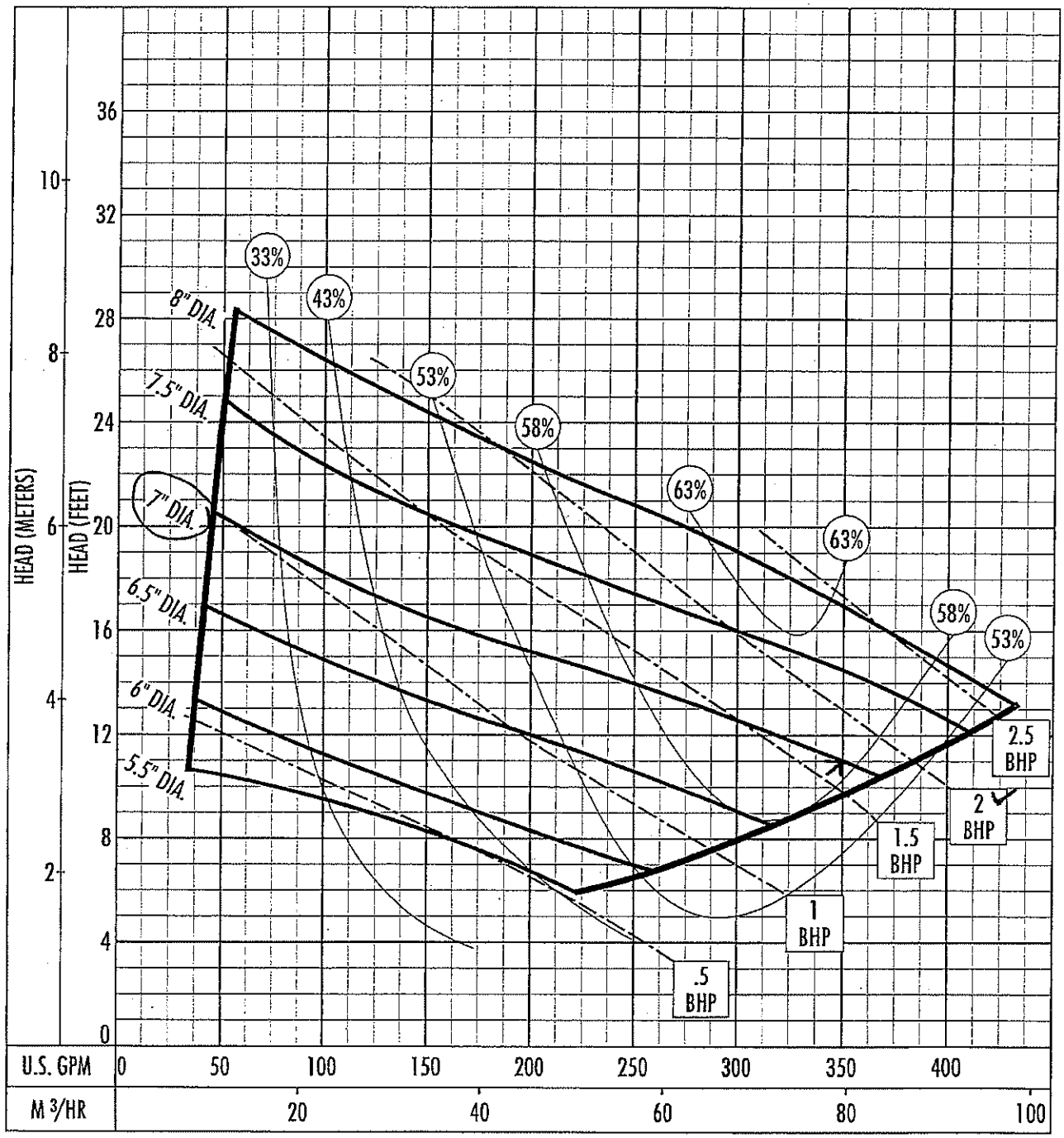
------- PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH-------



Performance Curve

S4N/S4NS/S4NX

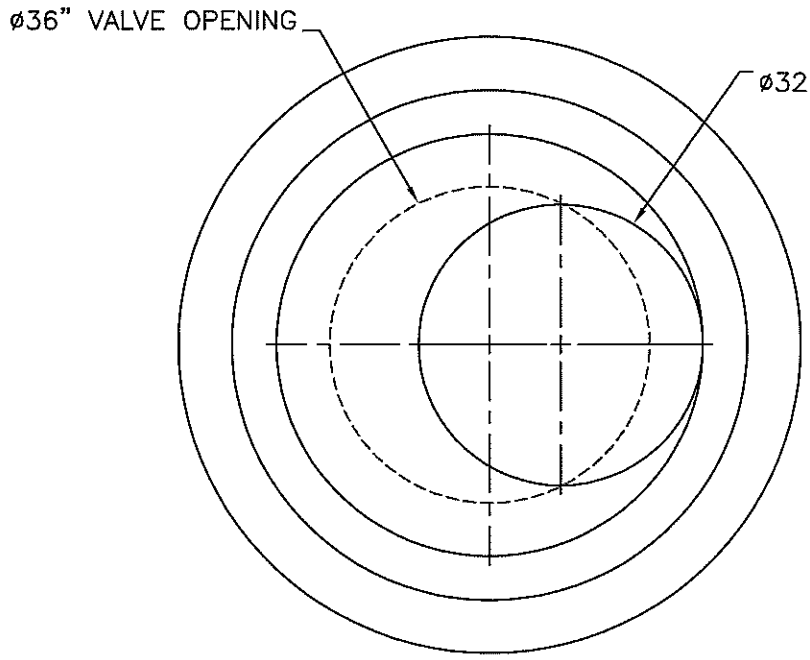
RPM: **1150** Discharge: **4"** Solids: **3"**



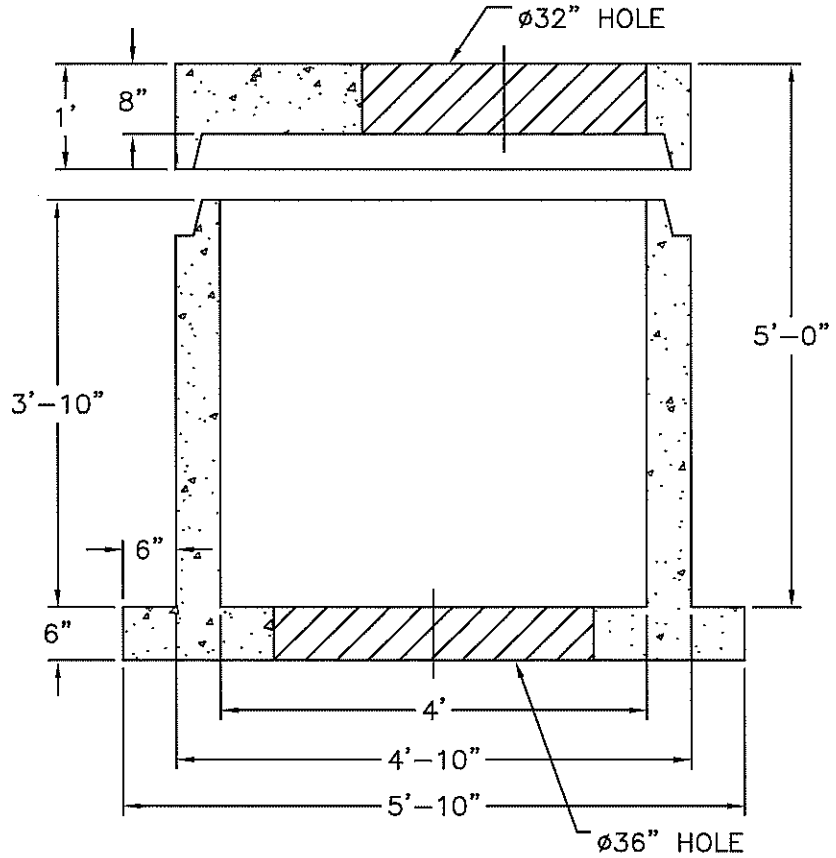
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

HYDROMATIC®

Conditions of Service:
GPM: 350 TDH: 11



NOTE:
1. MANHOLE REINFORCED WITH 6X6X6 GAUGE WIRE MESH
2. FLAT TOP REINFORCED WITH 6X6X6 WIRE MESH AND #4 REBAR FOR ADDED SUPPORT AT HOLE LOCATION
3. 4,000 PSI MIN. DESIGN STRENGTH AT 28 DAYS



48" AIR RELEASE MANHOLE	STANDARD DESIGN	3/5/09

gainey's CONCRETE PRODUCTS

NPCA CERTIFIED PLANT

28021 Coker-Vail Road Holden, LA
Phone (225) 567 - 2700 Fax (225) 567 - 3089

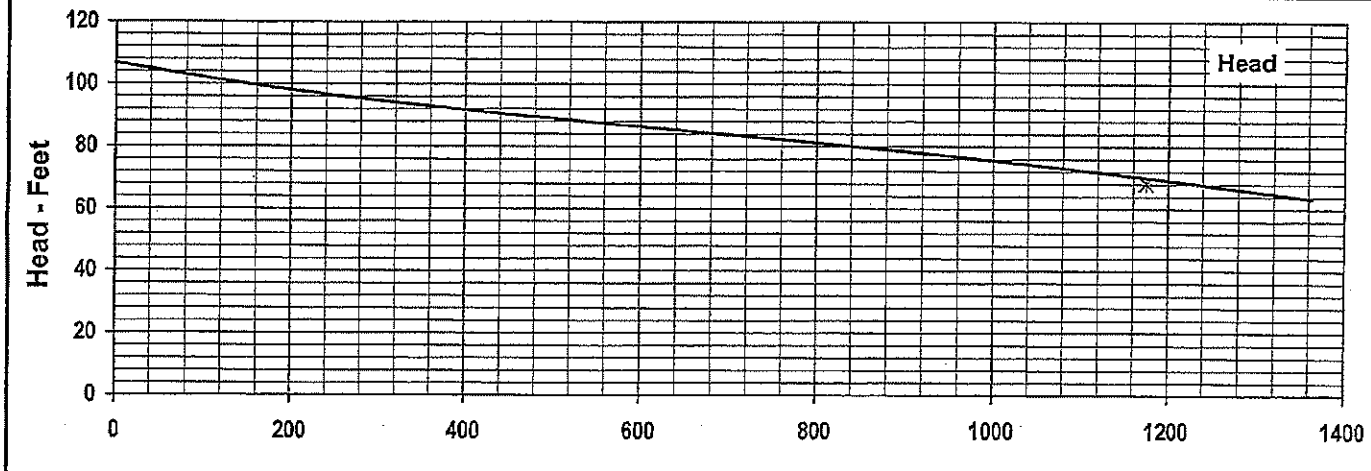
www.gaineysconcrete.com

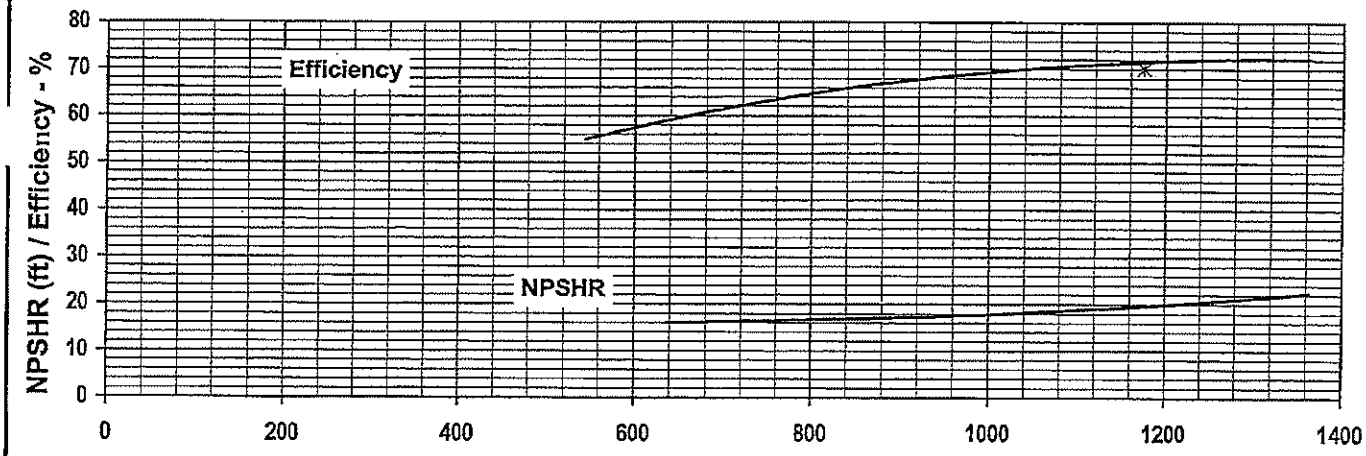
Fairbanks Morse
Pentair Water

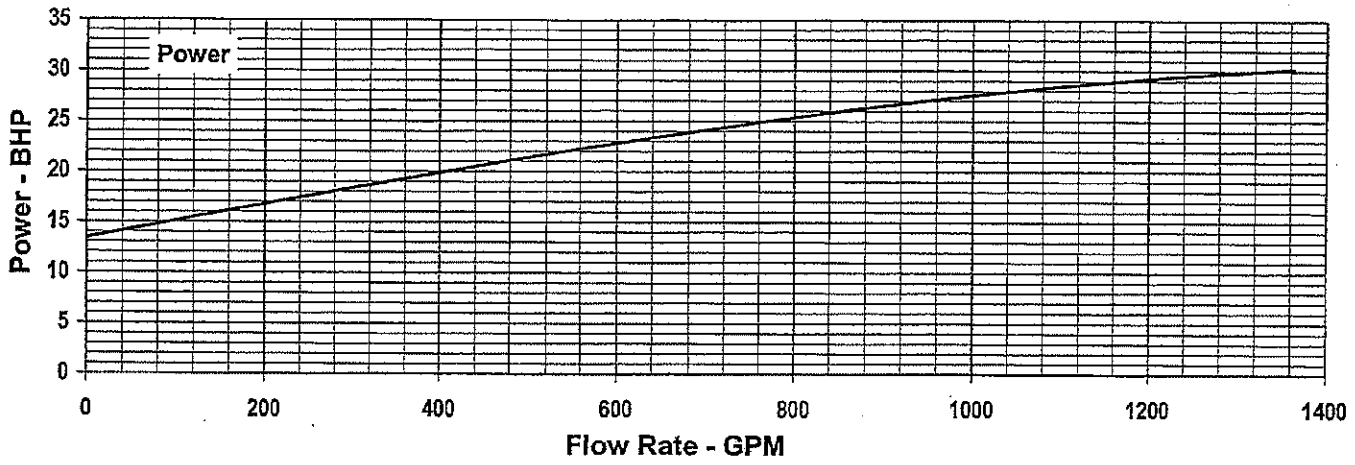
5" D5433MV SUBMITTAL CURVE

CURVE NO.:	091942C
REV.	
PROJECT NO.:	091942

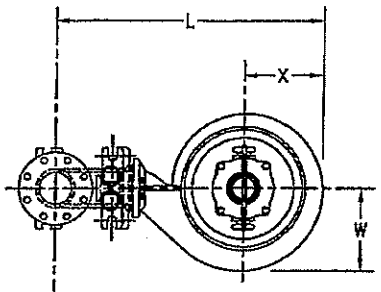
SPEED	IMPELLER	DIAMETER	VANES	GUARANTEED VALUES			
1757	T5C1A	10.20	TWO	FLOW	HEAD	EFF.	BHP
SPHERE	DRIVER	DATE	BY	1175	68	70	----
3.50"	30	6/12/2008	JES	----	----	----	----
THIS CURVE IS BASED ON THE ACTUAL TEST PERFORMANCE OF A SIMILAR PUMP. ONLY THE INDICATED POINT(S) IS GUARANTEED.				----	----	----	----
				----	----	----	----



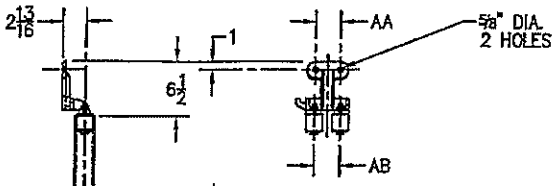


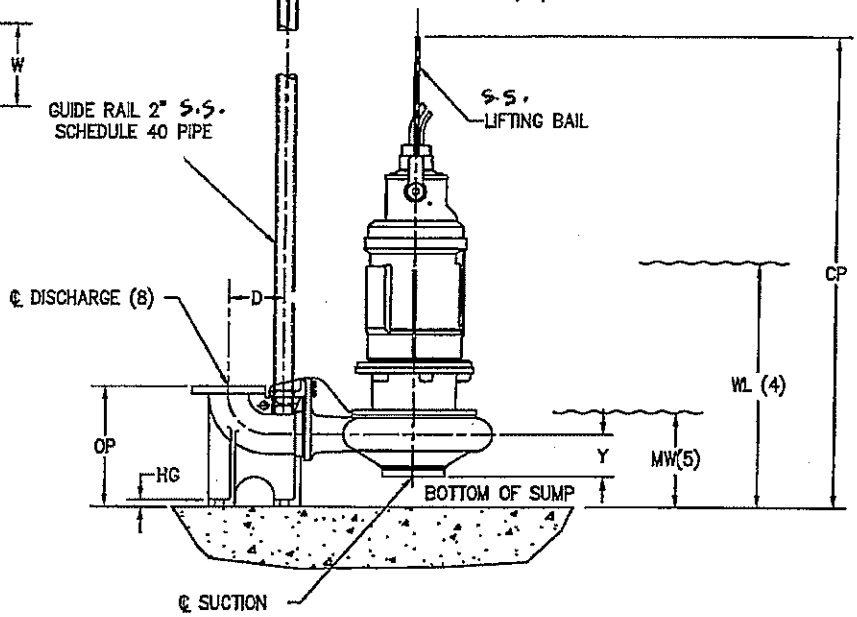


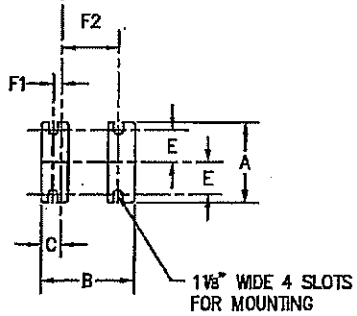
TOP VIEW OF PUMP UNIT



TOP GUIDE BRACKET DETAIL







BOTTOM VIEW OF ELBOW

PUMP	MOTOR FRAME	DISCH	A	B	C	D	E	F1	F2	L	W	X	Y	AA	AB	CP	HG	MW	OP	WL
5" D5433MV	250T	6	16	17 1/2	4 1/2	9 1/4	7	2 7/8	10 1/8	42 5/8	11 7/8	11 1/4	6 3/4	3	3 1/8	63 1/2	1 1/4	17 3/4	21 1/2	41

NOTES:

(1) DISCHARGE FLANGE IS 125# ANSI DRILLING UNLESS NOTED.
(2) ALL DIMENSIONS ARE IN INCHES UNLESS NOTED.
(3) 5400'S AND 5400K'S ARE DIMENSIONALLY IDENTICAL.
(4) RECOMMENDED LOW WATER LEVEL FOR CONTINUOUS OPERATION. 210 FRAME AND WATER JACKETED 250 THRU 440 FRAME UNITS CAN OPERATE CONTINUOUSLY AT "MW" WATER LEVEL.
(5) WATER LEVEL MAY BE DRAWN DOWN TO THIS LEVEL FOR SHORT TIME DUTY IN AIR MOTOR RATINGS. DRAW DOWN CAN OCCUR OVER A PERIOD OF 15 MINUTES.
(6) BASES ARE DESIGNED TO HAVE FULL CONTACT WITH GROUT OR A SOLE PLATE GROUTED IN PLACE.
(7) NOT FOR CONSTRUCTION, INSTALLATION, OR APPLICATION PURPOSES UNLESS CERTIFIED. DIMENSIONS SHOWN MAY VARY DUE TO NORMAL MANUFACTURING TOLERANCES.
(8) IF RISER PIPE IS NOT SAME SIZE AS THE DISCHARGE ELBOW, AN ECCENTRIC INCREASER MUST BE USED LIMITED TO TWO SIZES LARGER MAXIMUM.

UL LISTED
ISO-9001 CERTIFIED
CSA CERTIFIED (THRU 365 FRAME)

CUSTOMER: PARSON & SANDERSON, INC.					P.O. NO.: 08-49938	Fairbanks Morse PENTAIR PUMP GROUP
JOB NAME: ST. BERNARD PS V1-02					TAG NAME:	BASIC PUMP D5432MV AND D5433MV PULL-UP SUBMERSIBLE FAIRBANKS MORSE MTR
PUMP SIZE AND MODEL: 5" D5433MV		GPM: 1175	TDH: 68'	RPM: 1175	ROTATION: CLOCKWISE	
MOTOR: FAIRBANKS	HP: 30	FRAME: 250T	PHASE: 3	HERTZ: 60	VOLTS: 230	ENCLOSURE: SUBM.
CERTIFIED FOR: 091942			CERTIFIED BY: H.LAWTON		DATE: 07/07/08	DWG NO: 091942SP REV NO: 0

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA. 70123

DATE: JULY 22, 2008

JOB V1-03 GENIE-MERAUX PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR BLD SERVICES

ENGINEER ENVIRONMENTAL ENGINEERING SERVICES, INC.

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 525 TDH 23 RPM 1750 CURVE PG. 109 IMPEL. DIA. 7.0"

CONSTRUCTION: HYDROMATIC S4NX500JC

☐ BRONZE FITTED	☒ MECHANICAL SEAL
☐	☐ (DOUBLE)
☒ ALL IRON	☐ PACKED
	☐

BASE:		DRIVE:	
☒ CAST IRON	☐	DIRECT	☒ CLOSE COUPLED
☐ CHANNEL STEEL	☐	V-BELT	☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

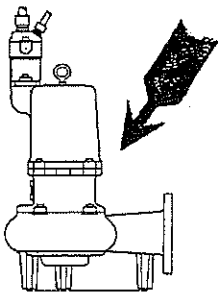
MFR HYDROMATIC HP 5 RPM 1750 FRAME N/A

PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

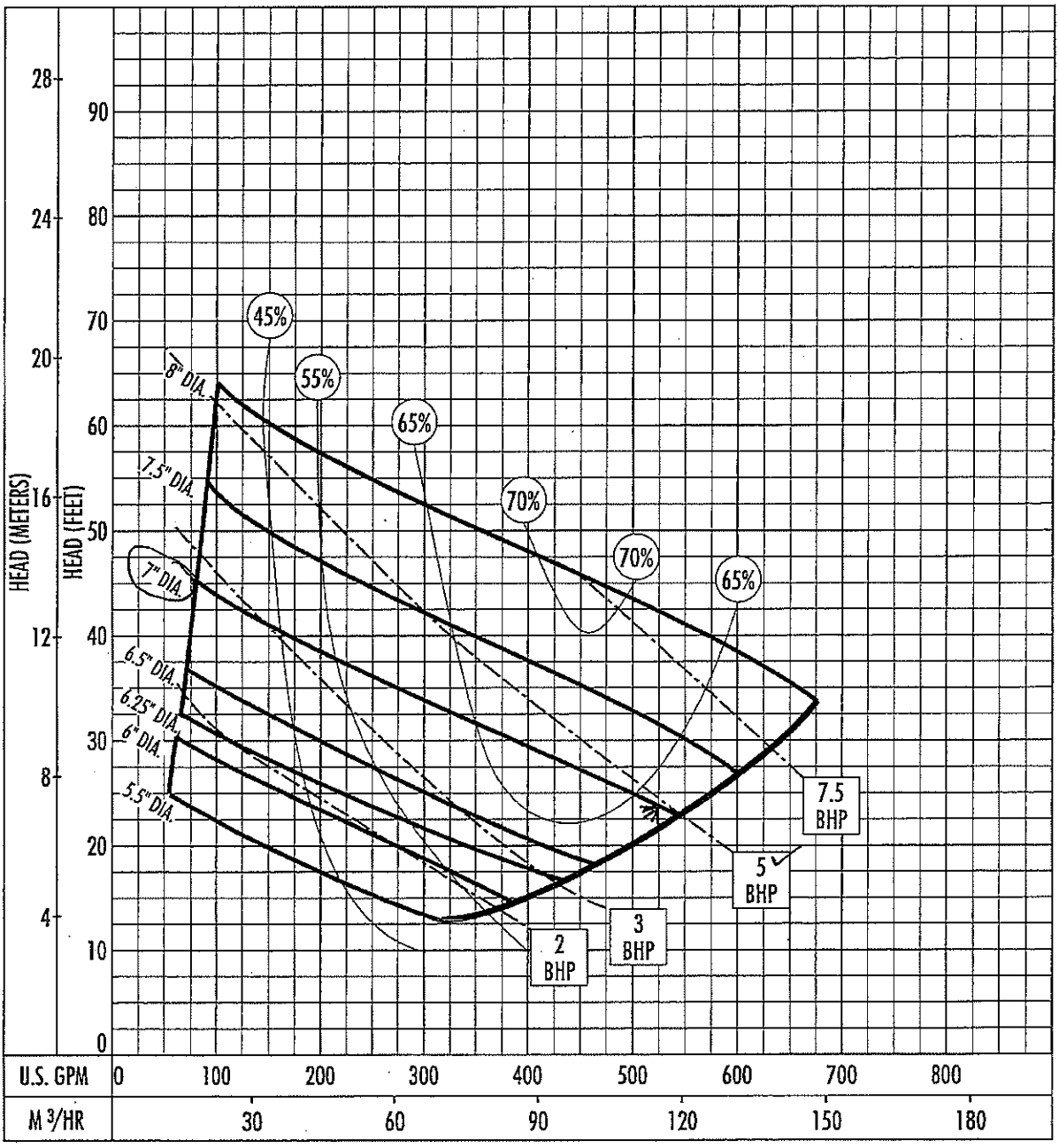
------ PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 525 TDH: 23

HYDROMATIC®

PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: JULY 22, 2008

JOB V1-04 WOODS - TRACY PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR BLD SERVICES

ENGINEER ENVIRONMENTAL ENGINEERING SERVICES, INC.

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 415 TDH 18 RPM 1750 CURVE PG. 109 IMPEL. DIA. 6.25"

CONSTRUCTION: HYDROMATIC S4NX300JC

- ☐ BRONZE FITTED
- ☒ ALL IRON
- ☒ MECHANICAL SEAL (DOUBLE)
- ☐ PACKED

BASE:
- ☒ CAST IRON
- ☐ CHANNEL STEEL

DRIVE:
- ☐ DIRECT
- ☐ V-BELT
- ☒ CLOSE COUPLED
- ☒ SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

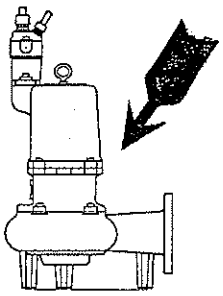
MFR HYDROMATIC HP 3 RPM 1750 FRAME N/A

PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) GALV STEEL H-20 PUMP ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

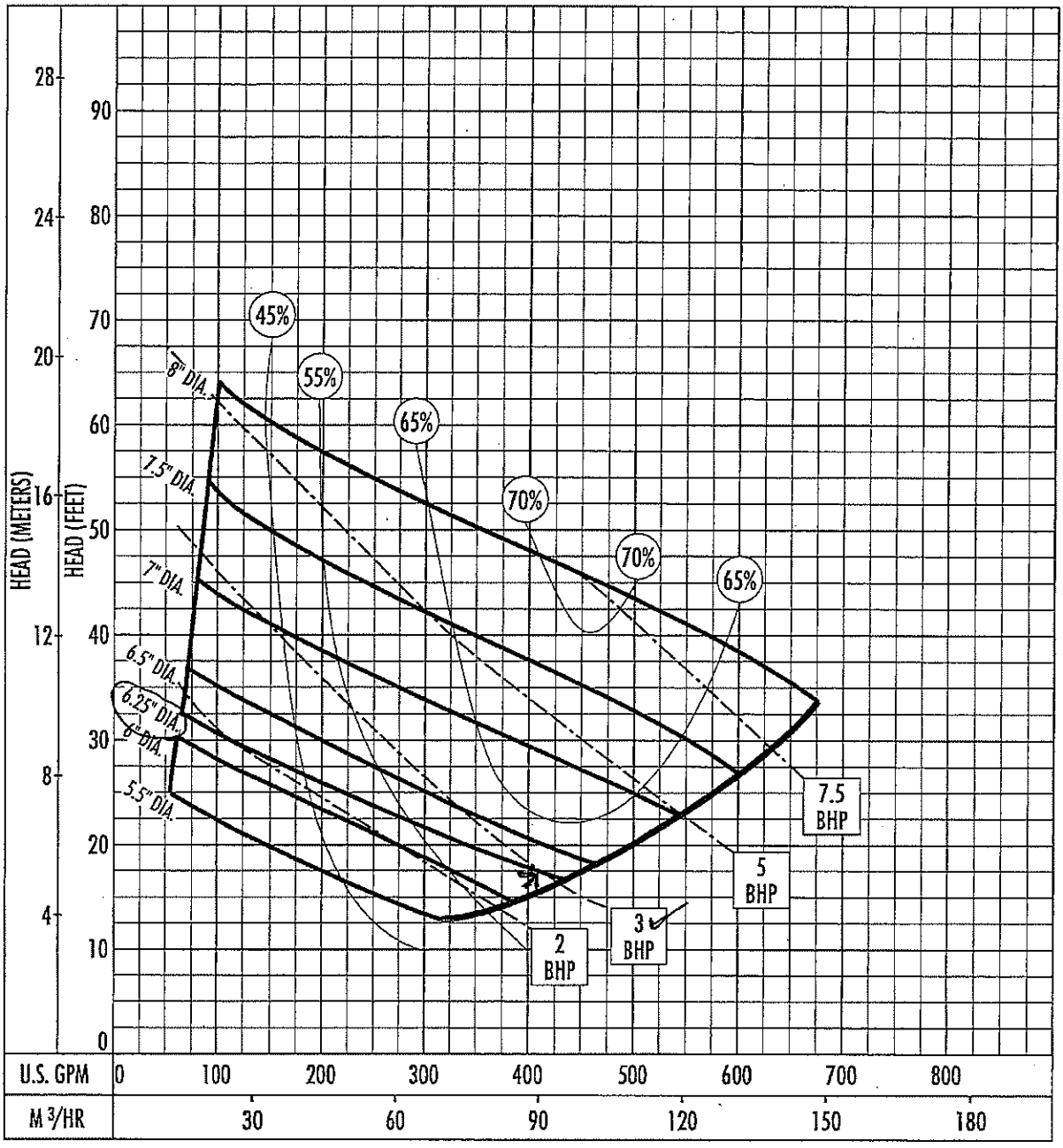
------ PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH------



Performance Curve

S4N/S4NS/S4NX

RPM: **1750** Discharge: **4"** Solids: **3"**



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: 45 TDH: 18

HYDROMATIC®

Fairbanks Morse

Pentair Water

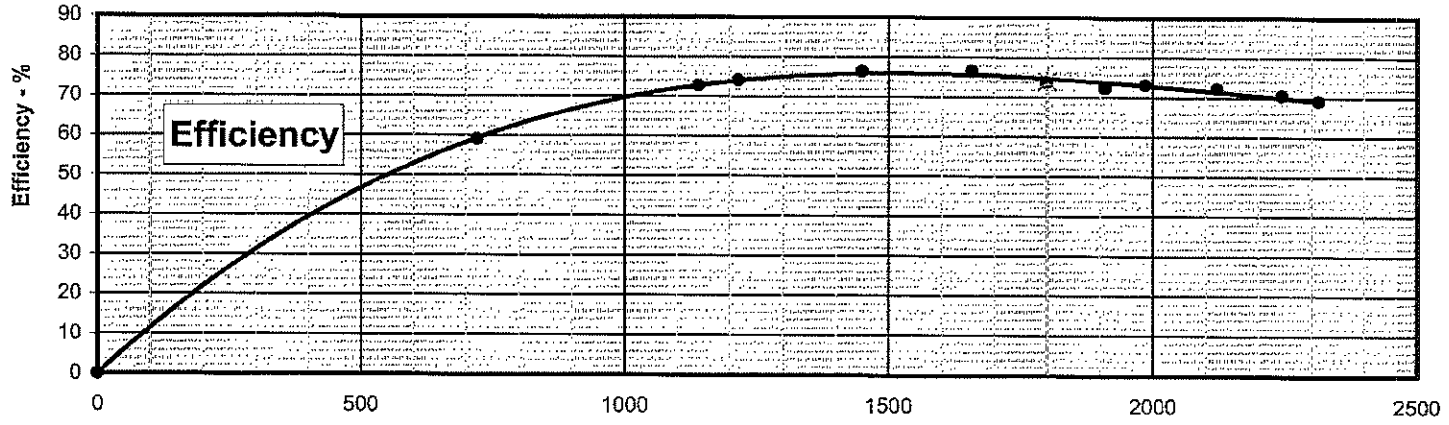
Certified Pump Performance Curve

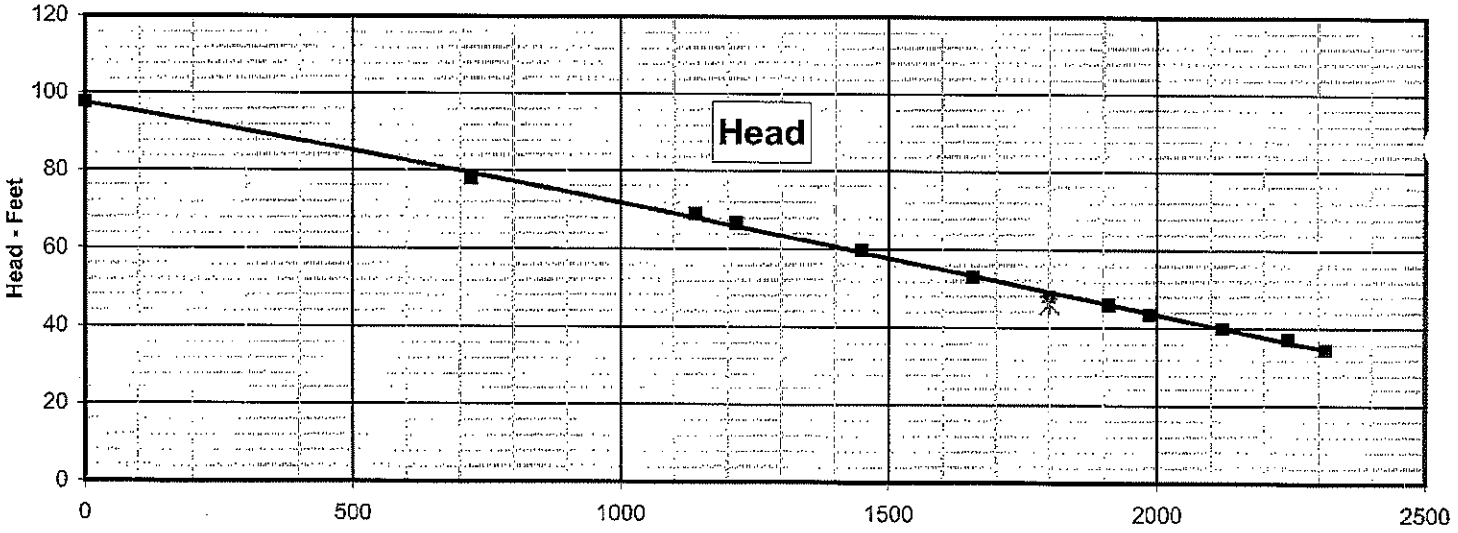
Serial Number:	1725722-0
Project Number:	092048
Test Date:	9/17/2008

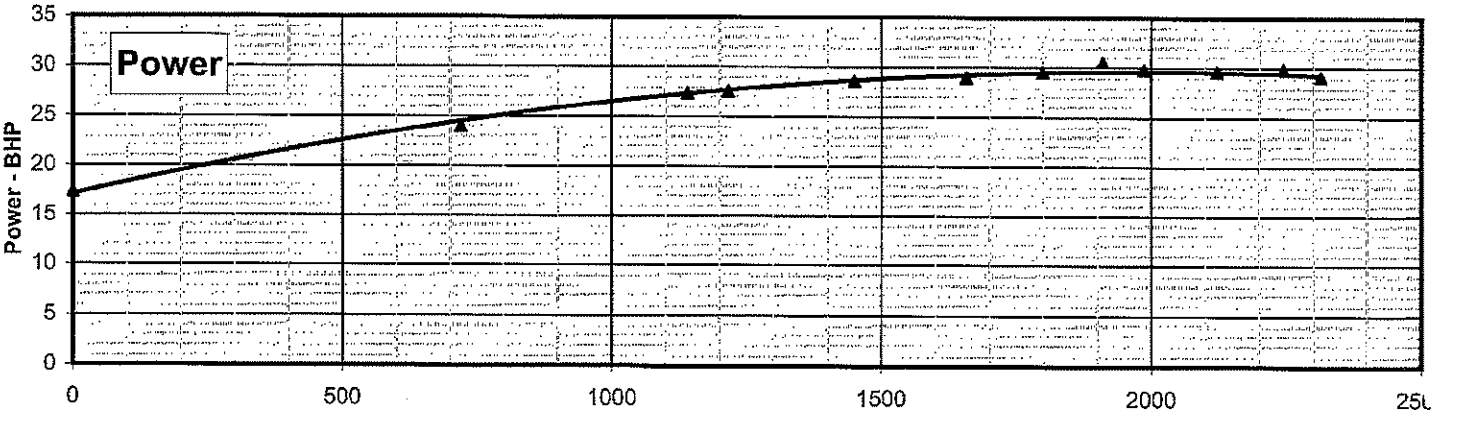
Guaranteed Values	
GPM	1800
HEAD	46
Eff	74
RPM	1757

Size-Model	6"	D5433MV	CW
Impeller:	T5C1ET		
Impeller Dia:	9.80"		
Driver:	Job Driver	HP:	30
RPM:	1757	Stages:	ONE

Certified By: John C. Mamie (Test Department) 10/08 (Date)







Fairbanks Morse

Pentair Water

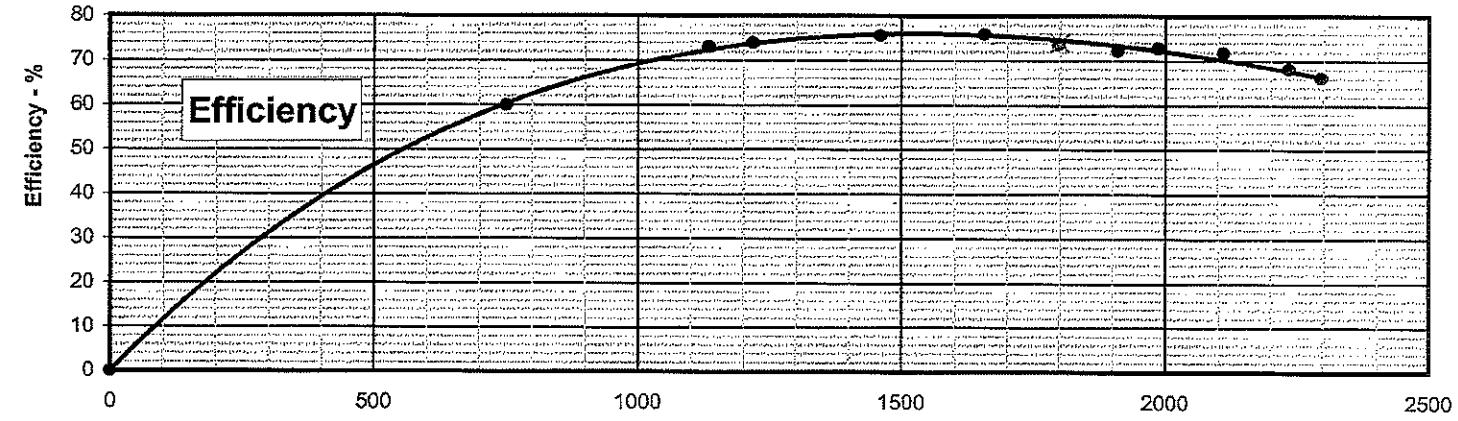
Certified Pump Performance Curve

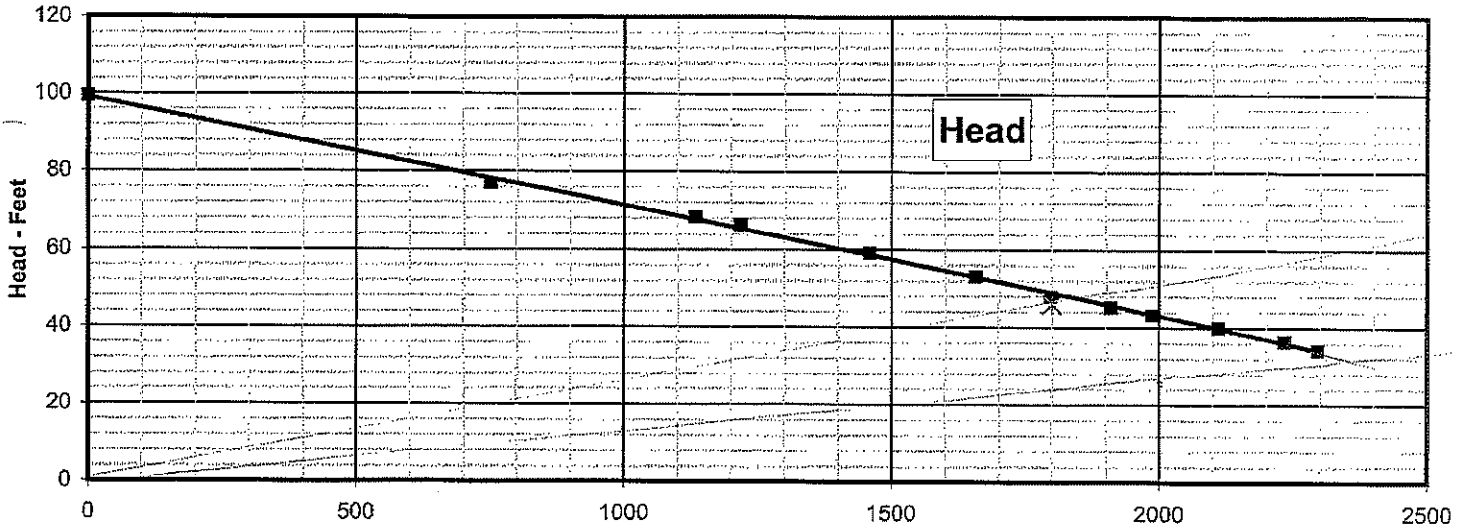
Serial Number:	1725722-1
Project Number:	092048
Test Date:	9/17/2008

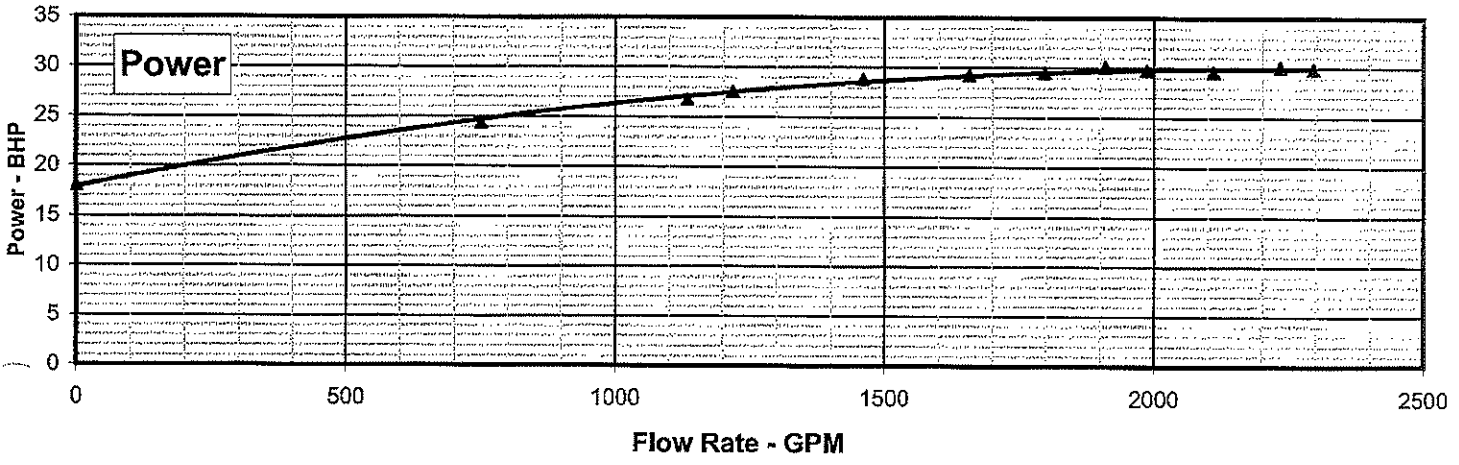
Guaranteed Values	
GPM	1800
HEAD	46
Eff	74
RPM	1757

Size-Model	6"	D5433MV	CW
Impeller:	T6C1ET		
Impeller Dia:	9.80"		
Driver:	Job Driver	HP:	30
RPM:	1757	Stages:	ONE

Certified By: John C. Mamie (Test Department) 10/08 (Date)







PARSON & SANDERSON, INC.

405 COMMERCE POINT
HARAHAN, LA 70123

DATE: JULY 22, 2008

JOB V1-06 ST BERNARD HWY – LIVACCARI PUMP STATION

ST BERNARD PARISH, LOUISIANA

CONTRACTOR BLD SERVICES

ENGINEER ENVIRONMENTAL ENGINEERING SERVICES, INC.

SERVICE RAW DOMESTIC SEWERAGE

PUMP DATA: TYPE SUBMERSIBLE NON-CLOG SIZE 4" DISCHARGE

GPM 530 TDH 42 RPM 1750 CURVE PG. 111 IMPEL. DIA. 8.0"

CONSTRUCTION: HYDROMATIC S4MX1000JC

☐	BRONZE FITTED	☒	MECHANICAL SEAL
☐		☐	(DOUBLE)
☒	ALL IRON	☐	PACKED

BASE:		DRIVE:			
☒	CAST IRON	☐	DIRECT	☒	CLOSE COUPLED
☐	CHANNEL STEEL	☐	V-BELT	☒	SUBMERSIBLE

SPECIAL REQUIREMENTS: OIL COOLED MOTOR, 35' PUMP, POWER & SENSOR CORDS, S.S. FASTENERS, S.S. PUMP SHAFT, S.S. PUMP SHAFT SLEEVE, PERM. LUBRICATED BALL BEARINGS, MOTOR OVER-TEMP SENSOR, MOISTURE SENSOR, S.S.WEAR RING, EPOXY SEALED CORDS & NON-OVERLOADING EXPLOSION-PROOF MOTOR WITH CLASS "H" INSULATION.

MOTOR DATA

MFR HYDROMATIC HP 10 RPM 1750 FRAME N/A

PHASE 3 CYCLE 60 VOLTS 240 ENCLOSURE X-PROOF

AUXILIARY EQUIPMENT

(2) 4" PUMPS W/35' CORDS, (2) 4" BASE 90° PUMP ELBOWS, (2) 4" PUMP SEAL FLANGES, (4) 2" S.S. PUMP GUIDE RAILS & BRACKETS, (2) S.S. PUMP LIFT CABLES, (1) ALUM H-20 PUMP W.W. ACCESS DOOR & FRAME WITH LIFTING SPRINGS, (1) S .S. CORD/CABLE HANGER

------ PLEASE VERIFY VOLTAGE, PHASE & POWER CORD LENGTH------