RESOLUTION NO. 24-02

A RESOLUTION OF THE TOWN COMMISSION OF THE TOWN OF DUNDEE, FLORIDA; ACCEPTING AND APPROVING THE CHA MEMORANDUM RINER WATER TREATMENT PLANT CAPACITY EVALUATION DATED JANUARY 9, 2024, PREPARED CHA CONSULTING, INC. (CHA); PROVIDING FOR THE INCORPORATION OF RECITALS; PROVIDING FOR THE ADMINISTRATIVE CORRECTION OF SCRIVENERS ERRORS; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Town of Dundee is a Florida municipal corporation vested with home rule authority pursuant to the Municipal Home Rule Powers Act (F.S. Chapter 166) and Article VIII, §2 of the Florida Constitution; and

WHEREAS, pursuant to Section 2(b), Article VIII of the Florida Constitution and Chapter 166, Florida Statutes, the Town is vested with governmental, corporate and proprietary powers to enable it to conduct municipal government, perform municipal functions and render municipal services, including the general exercise of any power for municipal purposes; and

WHEREAS, in an effort to improve and strengthen the Town's operation of its potable water distribution system for both residential and commercial development, the Town entered into an agreement with CHA Consulting, Inc. ("CHA") to perform a comprehensive evaluation of the Town's water distribution network related to the Town's Riner Water Treatment Plant in order to identify and plan for improvements necessitated by and/or through concurrency management, substandard infrastructure, and new growth within the corporate limits of the Town of Dundee; and

WHEREAS, the CHA Memorandum Riner Water Treatment Plant Capacity Evaluation, January 9, 2024 (the "CHA Evaluation") is attached hereto as **Exhibit "A"** and made a part hereof by reference; and

WHEREAS, in the exercise of its legislative authority, the Town Commission accepts and approves the CHA Evaluation, incorporated herein as **Exhibit "A"** and a made a part hereof, to be known as the Town of Dundee Riner Water Treatment Plant Capacity Evaluation and included as data and analysis to support the unprecedented residential and commercial growth within the corporate limits of the Town of Dundee, Florida.

NOW, THEREFORE, BE IT RESOLVED BY THE TOWN COMMISSION OF THE TOWN OF DUNDEE, FLORIDA:

Section 1. **Incorporation of Recitals.** The above-referenced factual recitals (WHEREAS clauses) and referenced exhibits are incorporated herein as true and correct

statements which form a factual and material basis for the passage of this Resolution, and the Town Commission of the Town of Dundee, Florida, hereby adopts the above-referenced factual recitals as the legislative findings supporting the passage of this Resolution. The above factual recitals are hereby incorporated herein and serve as a factual and material basis for the passage of this Resolution.

Section 2. **Acceptance and Approval.** The Town Commission of the Town of Dundee, Florida, hereby accepts and approves CHA Memorandum Riner Water Treatment Plant Capacity Evaluation, January 9, 2024 (the "CHA Evaluation"), as attached hereto and made a part hereof as **Exhibit "A"**.

Section 3. **Administrative Correction of Scrivener's Errors.** Any provision in this Resolution may be renumbered or re-lettered and the correction of typographical and/or scrivener's errors which do not affect the intent may be authorized by the Town Manager or his/her designee, without the need of consideration by the Town Commission, by filing a corrected or recodified copy of same with the Town Clerk.

Section 4. **Conflicts.** All Resolutions in conflict with this Resolution are repealed to the extent necessary to give this Resolution full force and effect.

Section 5. **Severability**. If any section, subsection, sentence, clause, phrase of this Resolution, or the application thereof shall be held invalid by any court, administrative agency, or other body with appropriate jurisdiction, the remaining section, subsection, sentences, clauses, or phrases under application shall not be affected thereby. The Town Commission hereby declares that it would have passed this Resolution, and each section, subsection, clause, or phrase thereof, irrespective of the fact that any one or more sections, subsections, sentences, clauses, and phrases be declared unconstitutional.

Section 6. **Effective Date.** This Resolution shall take effect immediately upon passage.

READ, PASSED AND ADOPTED at a duly called meeting of the Town Commission of the Town of Dundee, Florida assembled on the 27th day of February, 2024.

TOWN OF DUNDEE

_____
Samuel Pennant, Mayor

ATTEST WITH SEAL:

_____
Trevor Douthat, Town Clerk

Approved as to form:

_____

Frederick J. Murphy, Jr., Town Attorney

Exhibit "A"
Resolution 24-02

CHA Evaluation

Memorandum

CHA CONSULTING, Inc.
3507 East Frontage Road, Ste. 180
Tampa, Florida 33706
Phone: (813) 549-0919

To: Tracy Mercer, Town of Dundee

From: CHA Consulting, Inc.

Date: February 23, 2024

RE: Riner Water Treatment Plant High-Service Pump Station Capacity Evaluation

This item has been digitally signed and sealed by Parsa Pezeshk on the date adjacent to the seal.

Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

This report is intended for review by Town of Dundee and other parties as considered necessary by Town of Dundee and CHA Solutions, Inc.

1. Introduction

The Town of Dundee (Town) owns and operates a potable water distribution system with an annual average daily demand (AADD) of approximately 1.00 MGD (based on 2022 monthly operating reports, MORs). The potable water distribution network consists of approximately 49 miles of pipe that distribute potable water from the Town's Hickory Walk and Riner water treatment plants (WTPs) to approximately 1,958 residential and 163 commercial customers. The Town contracted with CHA Consulting, Inc. (CHA) to construct a potable water hydraulic model for the Town's water distribution system, to use the newly developed model to determine the capacity of the existing high-service pump station (HSPS) at the Riner WTP, and to evaluate the system capacity to serve the future Woodland Ranch Estate developments. The hydraulic model developed can serve as a tool for the Town to evaluate water distribution system performance for capital planning purposes to determine improvements needed to accommodate future growth.

2. Woodland Ranch Estates Developments

To estimate the demands associated with Woodland Ranch Estates developments, the number of development units was multiplied by an assumed value of 2.53 persons per household (PPH, derived using SWFWMD REQPOP Calculator) to determine the functional population (FP) associated with fully occupied Woodland Ranch Estates developments. The proposed functional population was multiplied by a potable water demand of 114.7 gallons per capita day (gpcd) (based on Town's Public Supply Annual Reports, PSARs) to calculate the associated annual average daily demand (AADD) (see **Table 1**). In this manner, the potable water demand per development unit was calculated to be 290.2 gpd/unit (2.53 PPH *114.7 gpcd). **Figure 1** shows the location of Woodland Ranch Estates developments in Town of Dundee.

Table 1. Estimation of Potable Water Demands for Woodland Ranch Estates

Development	No. of Units	FP*	AADD**(gpd)
Woodland Ranch Estates Phases 1 & 2	308	779.24	89,378.8
Woodland Ranch Estates Phase 3	36	91.08	10,446.9
Woodland Ranch Estates Phases 1, 2, 3	344	870.32	99,825.7

* *Assumption: 2.53 PPH*

** *Assumption: 114.7 gpcd*

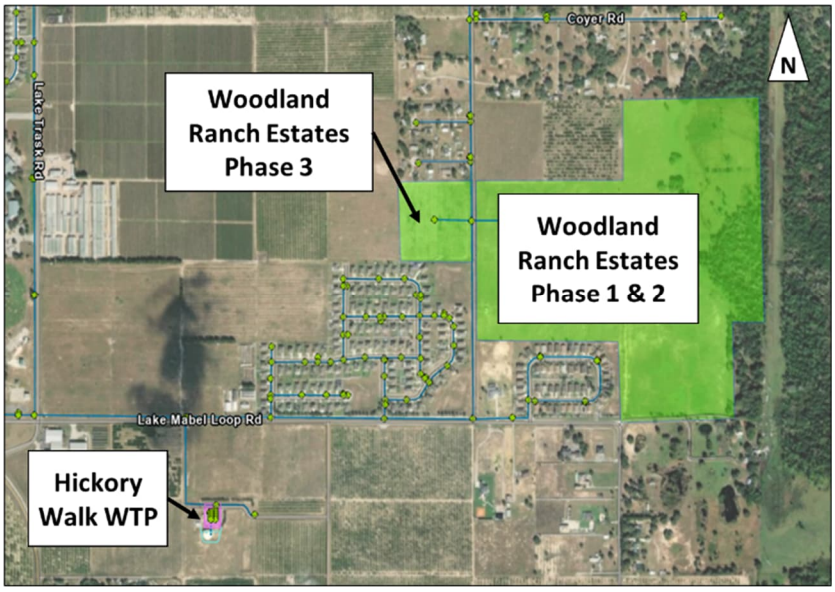

Figure 1. Location of Woodland Ranch Developments in Town of Dundee

3. Hydraulic Model Development

A hydraulic model for the Town's water distribution system was constructed in *Autodesk InfoWater Pro* hydraulic modeling software. Most of the pipe information was extracted from *DiamondMaps*™ (the online platform that the Town uses to document and track the system infrastructure). Several missing pipes were identified during model development and were added based on discussions with Town's operational staff according to their knowledge of the system. The customer meters in the potable water system were geocoded based on the customer meter data shared by the Town and the associated demands were allocated in the hydraulic model. The length distribution of potable pipes according to diameter is shown in **Table 2.** There are two (2) WTPs that supply potable water to the system: Hickory Walk and Riner. The parameters related to each WTP (high service pumps, HSP; ground storage tanks, GST) are summarized in **Table 3**. The curves for the pumps at Hickory Walk HSPS were adjusted based on SCADA flow, pressure, and speed data (see **Appendix B**). The curve for the pumps at Riner HSPS was confirmed using the SCADA pressure and speed data (flows are not recorded by SCADA system at Riner). The pump parameters for potable water HSPSs are shown in **Table 4.** The Town's potable water distribution system pipe network is shown in **Figure 2.** The pump curves used in the hydraulic model for Hickory Walk and Riner WTP HSPSs are shown in **Figure 3** and **Figure 4**, respectively.

Table 2. Potable Water Distribution System Pipes and Length Summary

Diameter (in)	Length (ft)	Length (mi)
1	656	0.1
2	39,901	7.6
4	9,140	1.7
6	103,096	19.5
8	18,353	3.5
10	82,162	15.6
12	4,352	0.8
20	2,453	0.5
Total Length =	260,113	49

Table 3. Water Treatment Plants: Summary of Parameters

WTP	Description
Hickory Walk	Number of high-service pumps: 4 (2 main and 2 jockey)
	Jockey HSP capacity, each: 585 gpm @ 185 ft TDH, 3500 rpm, VFD (HSP 1&2)
	Main HSP capacity, each: 1500 gpm @ 175 ft TDH, 1775 rpm, VFD (HSP 3&4), 100-hp motor
	HSPS discharge pressure setpoint: 45 psi
	HSPS elevation: 213 ft
	GST: Diameter=75 ft, Volume=0.75 MG, Side Water Depth = 23 ft
	HSPS has a flow meter (connected to the SCADA system)
Riner	Number of high-service pumps: 2
	HSP capacity, each: 1200 gpm @ 200 ft TDH, 3500 rpm, VFD, 100 hp motor
	HSPS discharge pressure setpoint: 75 psi
	HSPS elevation: 133 ft
	GST: Diameter=55 ft, Volume=0.25 MG, Side Water Depth = 14 ft
	HSPS has a flow meter (incompatible for connection to SCADA system)

Table 4. Pump Parameters for HSPSs at Hickory Walk and Riner WTPs

HSPS	Pump	Flow (gpm)	Head (ft)	Speed (rpm)	Manufacturer	Serial No.	Size	Model
Hickory Walk	HSP1	585	185	3500	Auroral Pentair	10-1963568-2	2.5X3X10B	411 BF
	HSP2	585	185	3550	Auroral Pentair	21-2607530	2.5X3X10B	411
	HSP3	1500	175	1775	Auroral Pentair	10-1963574-2	5X6X17	
	HSP4	1500	175	1775	Auroral Pentair	10-1963574-1	5X6X17	411 BF
Riner	HSP1	1200	200	3500	Aurora/Pentair	05-1270442-1	4X5X 10B	413 BF
	HSP2	1200	200	3500	Aurora/Pentair	22-2620622	4X5X10B	413N LFC

N
W E
S

0 500 1,000 2,000 3,000
Feet

Riner WTP

Hickory Walk WTP

Pipe Diameter (in)
- 1
- 2
- 4
- 6
- 8
- 10
- 12
- 14
- 16
- 20
- Hydrants

CHA

TOWN OF DUNDEE

Potable Water Distribution System

FIGURE 2

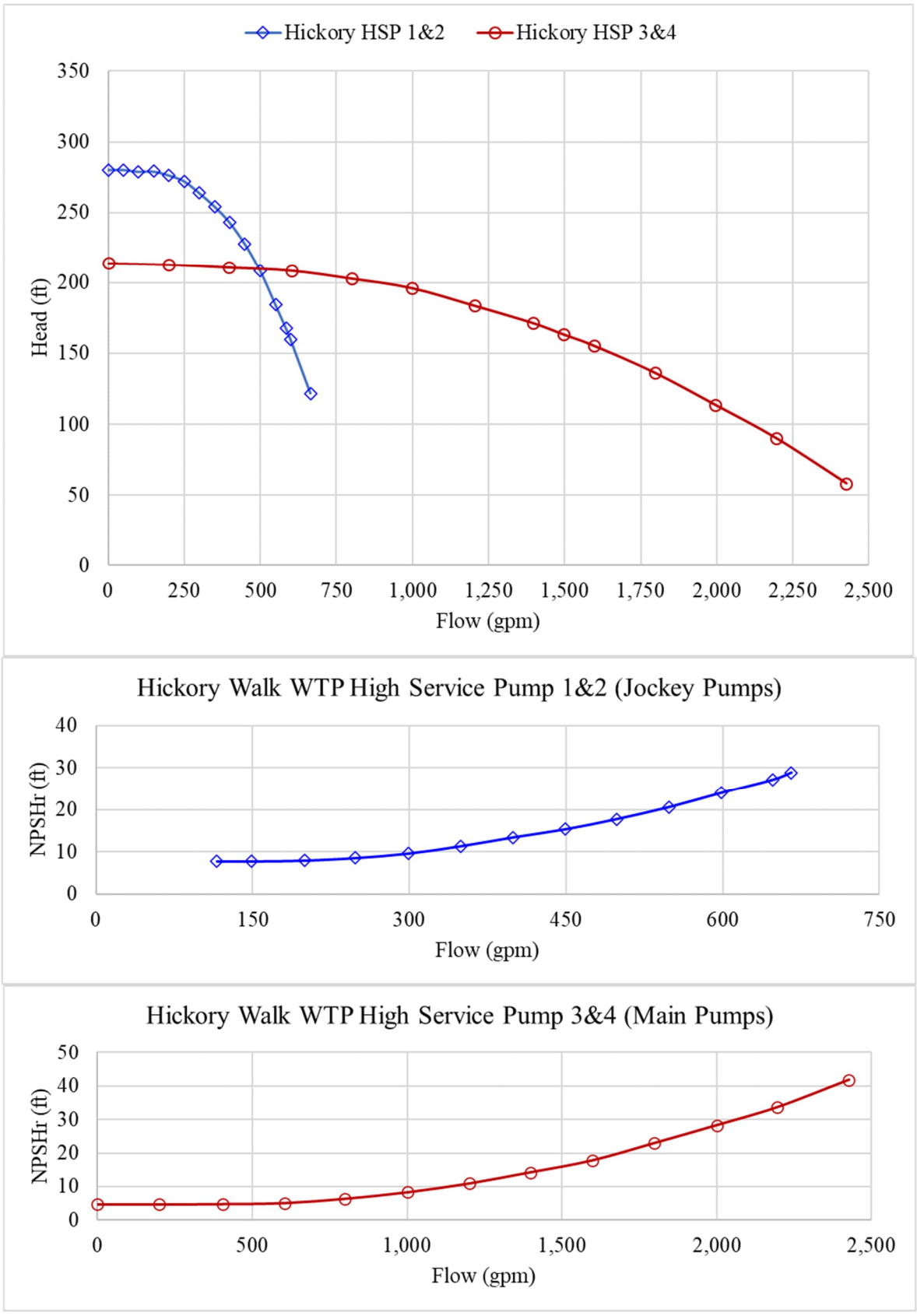

Figure 3. Pump Curves for Hickory Walk WTP HSPS

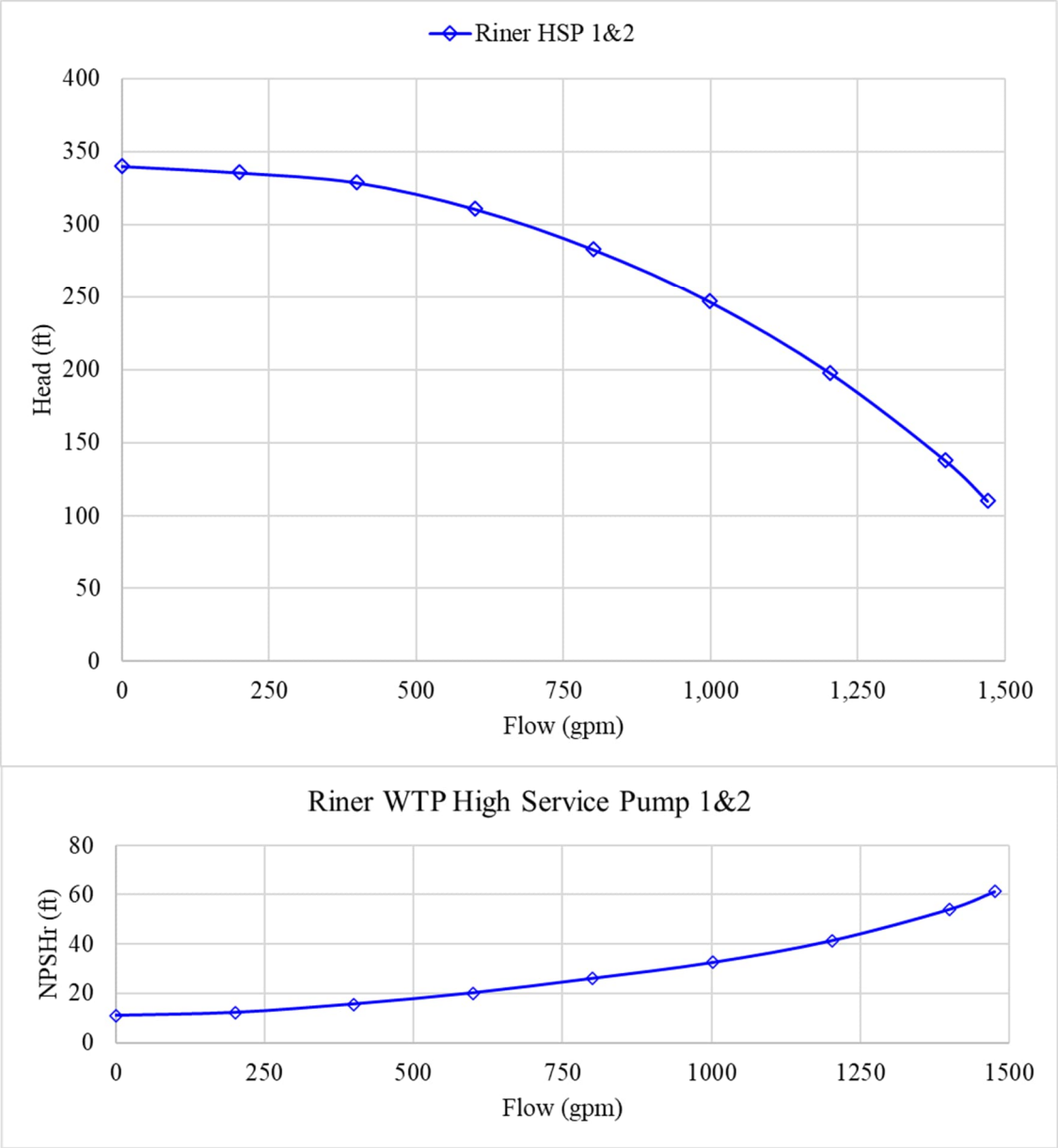

Figure 4. Pump Curves for Riner WTP HSPS

4. Flows and Peaking Factors

The average daily flows from Hickory Walk and Riner WTPs to the potable water distribution system for each month in 2022 are shown in **Table 5** and **Figure 5** (based on 2022 MORs). The total demand allocated in the hydraulic model from geocoded customer meters was 505 gpm. A global multiplier of 1.37 was applied to all base demands to bring the system demands to 691 gpm (to match 2022 AADF from WTPs to the distribution system). The estimated demand for Woodland Ranch Estates (99,825.7 gpd or 69.3 gpm) was added to the hydraulic model. The peaking factors used in the hydraulic model are shown in **Table 6**.

Table 5. Avg. Daily Flows from Hickory Walk and Riner WTPs to Potable Water Distribution System

Month	ADF (gpd)		
	Hickory Walk	Riner	Total
1	654,710	358,258	1,012,968
2	763,357	343,464	1,106,821
3	724,548	323,323	1,047,871
4	787,567	289,500	1,077,067
5	895,613	282,290	1,177,903
6	783,467	215,367	998,833
7	712,903	248,258	961,161
8	699,258	223,484	922,742
9	616,900	202,433	819,333
10	731,935	276,484	1,008,419
11	672,467	242,233	914,700
12	610,677	289,194	899,871
AADF (gpd) =	721,117	274,524	995,200
AADF (gpm) =	501	191	691

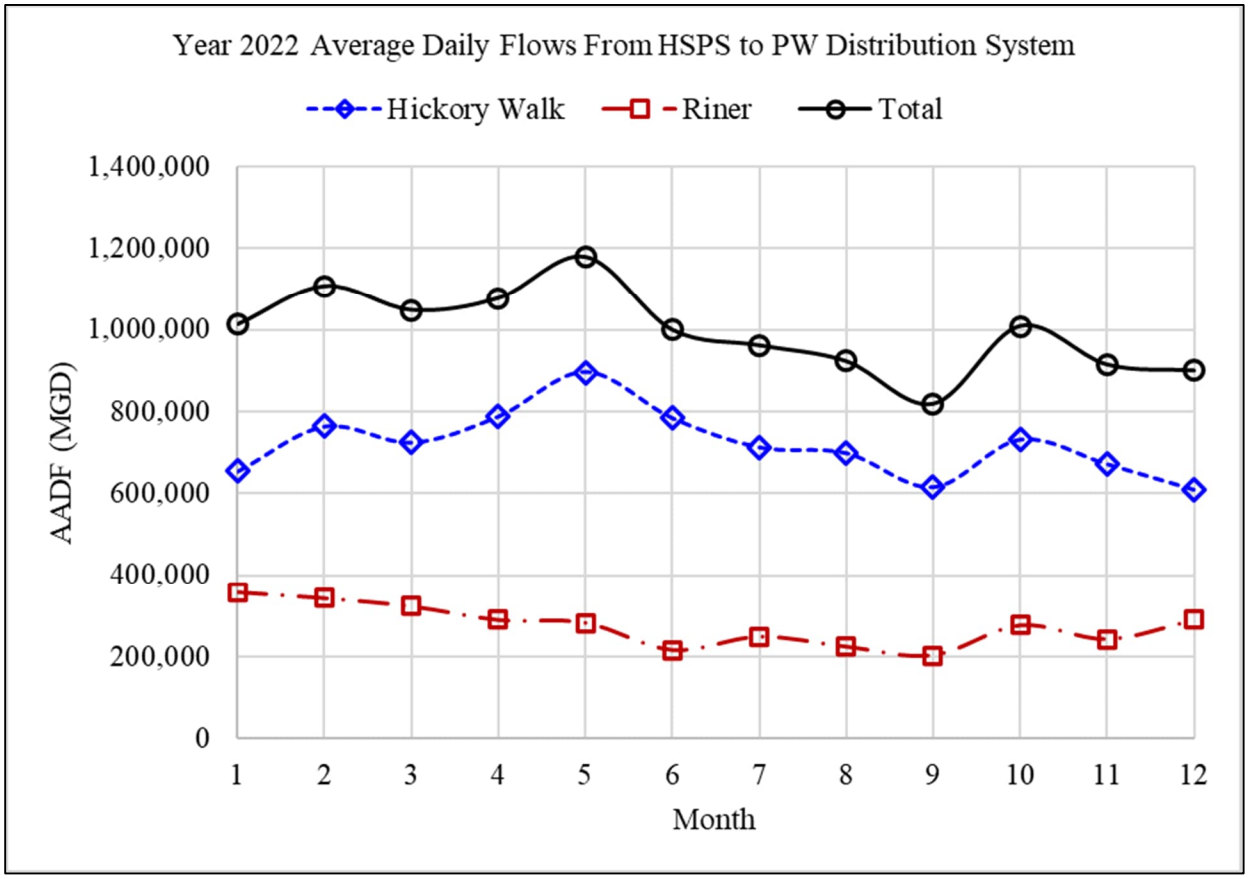

Figure 5. Average Daily Flow to PW Distribution System

Table 6. Peaking Factors used in the Hydraulic Model

Condition	Peaking Factor	Demand (gpm)	Demand (MGD)
Average Daily Demand (ADD)	1.00	760	1.09
Maximum Daily Demand (MDD)	1.55	1,179	1.70
Peak Hourly Demand (PHD)	3.11	2,365	3.41

5. Hydraulic Model Scenarios

In accordance with actual operational setpoints, the discharge pressure for Hickory Walk and Riner WTP HSPSs were set to 45 psi and 75 psi setpoints, respectively, in the hydraulic model. **Table 7** shows the discharge flows to the potable water distribution system from Hickory Walk and Riner HSPSs at ADD, MDD, and PHD conditions. The status of HSPs for ADD, MDD, and PHD scenarios in the hydraulic model are shown in **Table 8**. The hydraulic model pressure results for ADD, MDD, and PHD conditions are shown in **Figure 6**, **Figure 7**, and **Figure 8**, respectively.

Table 7. Discharge Flows from WTPs at ADD, MDD, and PHD Conditions

HSPS	Discharge Flow (MGD)		
	ADD	MDD	PHD
Hickory Walk	1.09	1.49	2.40
Riner	*OFF*	0.20	0.99
Hickory Walk and Riner	1.09	1.69	3.39

Table 8. Status of HSPs in the Hydraulic Model for ADD, MDD, and PHD Scenarios

Model Scenario	Pumps Operating	
	Hickory Walk	Riner
ADD	HSP1	*NONE*
MDD	HSP 1&2	HSP1
PHD	HSP3	HSP1

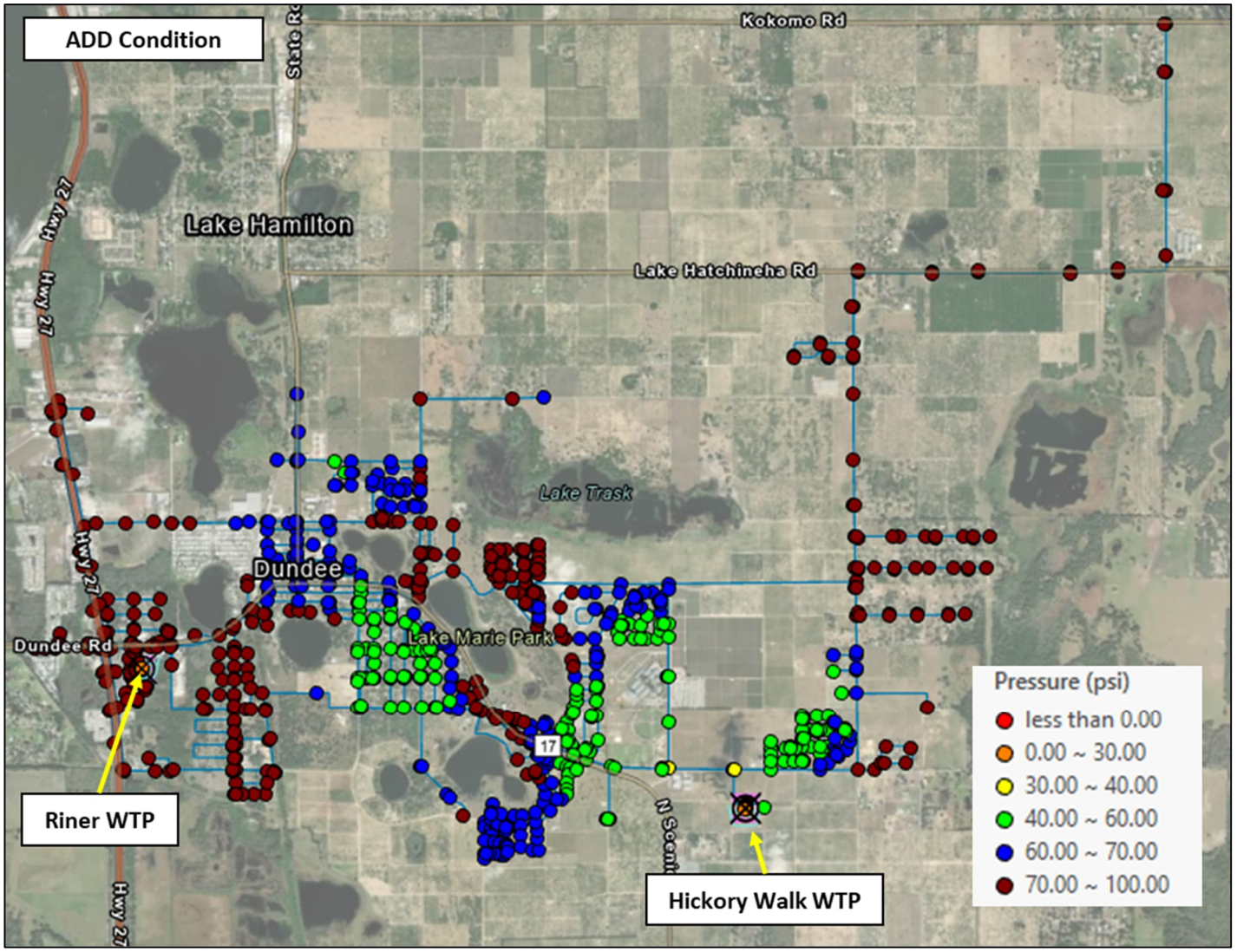

Figure 6. Potable Water System Pressure Results at ADD Condition

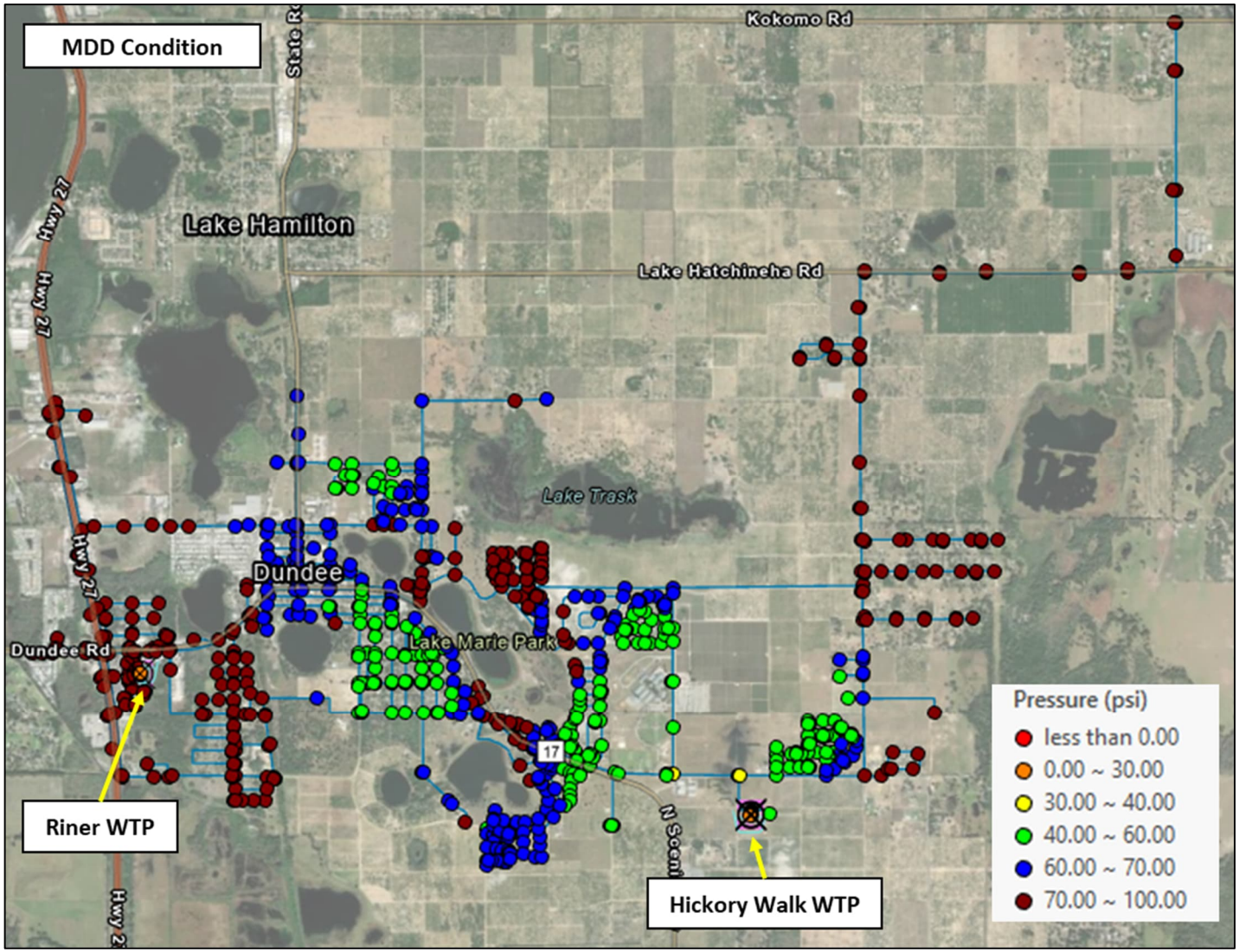

Figure 7. Potable Water System Pressure Results at MDD Condition

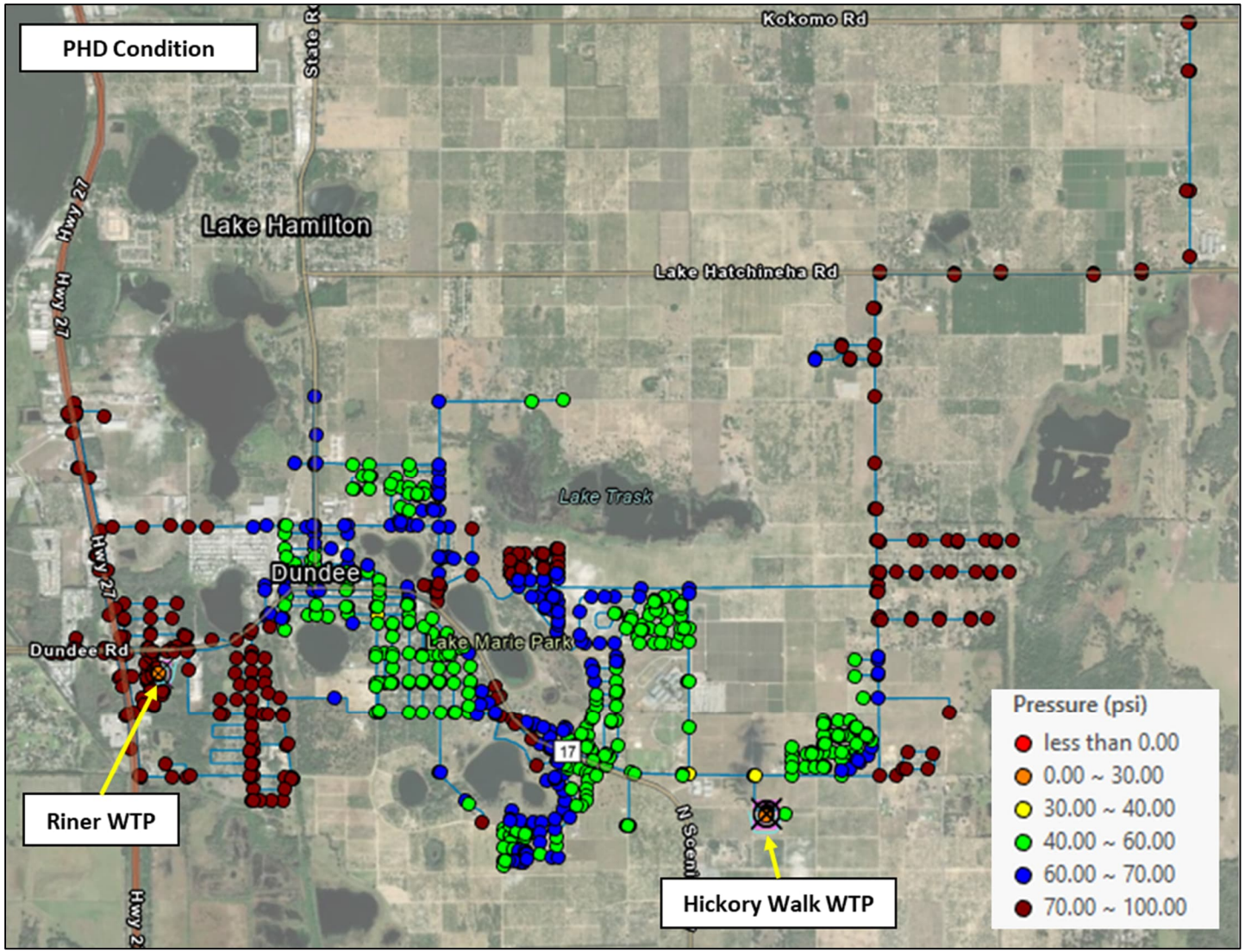

Figure 8. Potable Water System Pressure Results at PHD Condition

6. Capacity of Riner HSPS

The water levels in Hickory Walk and Riner GSTs are shown in **Figure 9** (according to SCADA data for 10/24/23 – 11/3/23 period). The minimum, average, and maximum water levels in Hickory Walk and Riner GSTs are shown in **Table 9**.

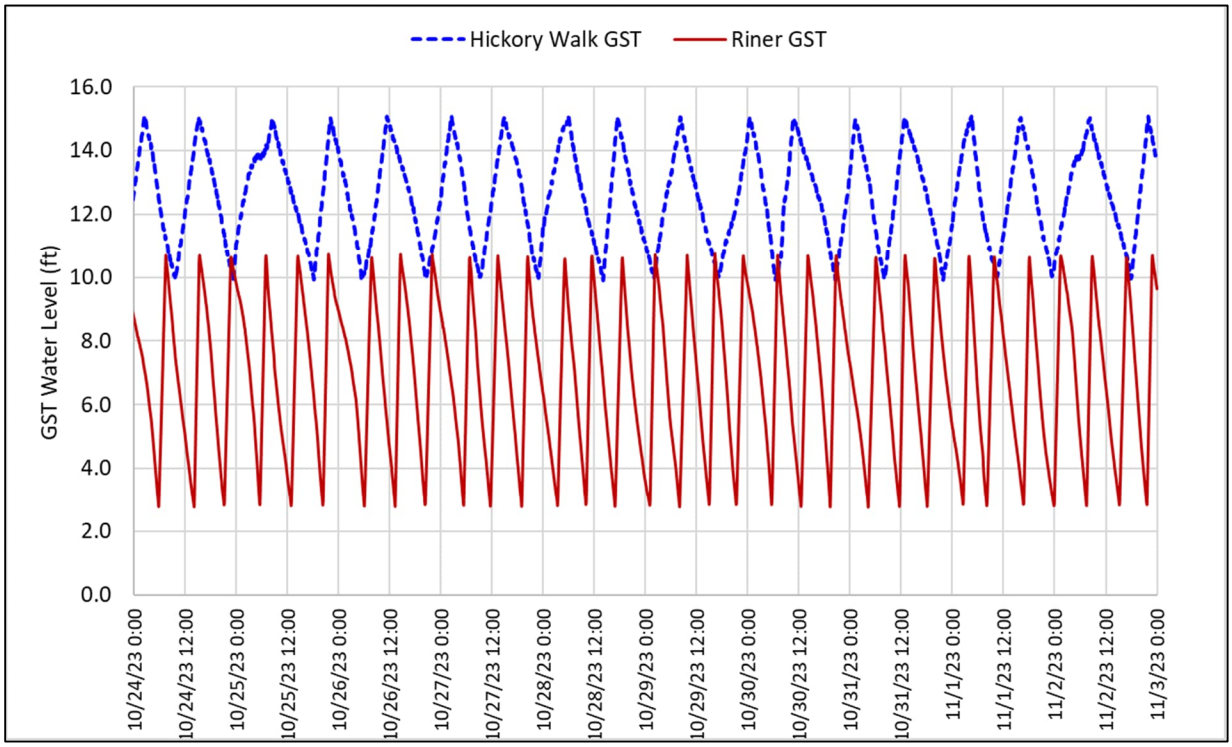

Figure 9. Water Level in GSTs at Hickory Walk and Riner WTPs (10/24/23 – 11/3/23)

Table 9. Water Level Data for Hickory Walk and Riner WTP GSTs (10/24/23 – 11/3/23)

Water Level	Hickory Walk GST	Riner GST
Minimum	9.9	2.8
Average	12.6	6.8
Maximum	15.1	10.7

To determine the capacity of pumps at Riner HSPS, one pump was operated based on a constant flow setpoint in the hydraulic model such that the required net positive suction head required ($NPSH_r$) was satisfied (by comparing to available net positive suction head, $NPSH_a$) when the water level in the GST was at the minimum level (assumed to occur at PHD condition). In this manner, the maximum flow capacity of a single pump was determined to be approximately 760 gpm (with a discharge pressure of 77.4 psi, pump speed of 83%, $NPSH_r$ = 20.5 ft, $NPSH_a$=21.0 ft (see **Figure 10**), which falls within the pump preferred operating region and power requirements (see **Appendix Figure A-1**). The total and firm capacities of Riner HSPS are shown in **Table 10**.

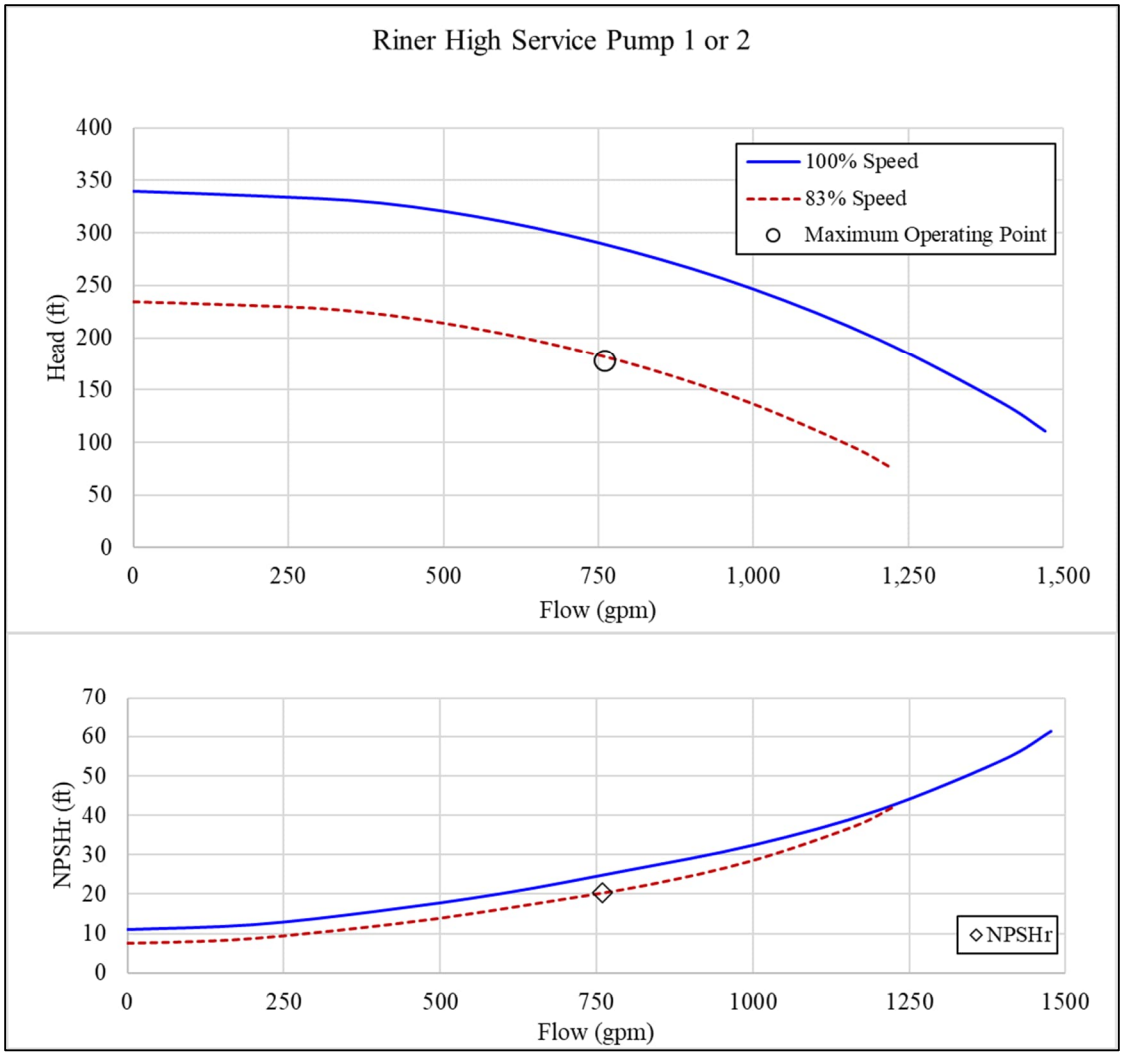

Figure 10. Maximum Capacity Operating Point for Riner HSP 1 or 2

Table 10. Riner HSPS Firm and Total Capacities

Parameter	gpm	MGD
Firm Capacity	760	1.1
Total Capacity	1520	2.2

7. Summary and Conclusions

For this project, a hydraulic model was developed for the Town of Dundee's potable water distribution system (in Autodesk InfoWater Pro software). The pipe network in the model was built based on available information extracted from *DiamondMaps*™ (the online platform that the Town uses to document and track the system infrastructure) and the operators' knowledge of the system. The customer meter locations were geocoded and introduced as a GIS layer, and the associated demands were allocated in the hydraulic model. The estimated demands associated with future Woodland Ranch Estates were added to the model at the development location. Based on the hydraulic simulation results, the potable water system appears to have adequate capacity to maintain a pressure of 40 psi or higher during ADD, MDD, and PHD conditions in the distribution system after the addition of Woodland Ranch Estates. The firm capacity of Riner HSPS was determined to be approximately 1.1 MGD at PHD condition. Based on the current spatial distribution of demands, most of the system demand is supplied by Hickory Walk HSPS. The hydraulic model simulations also suggest that the future Wooldland Ranch Estates developments will be supplied by Hickory Walk HSPS, rather than Riner. Overall, regardless of the specific distribution of water from each WTP, the Town's public water system appears to have the capacity to support the proposed Woodland Ranch Estates developments.

Appendix A – High Service Pump Curves

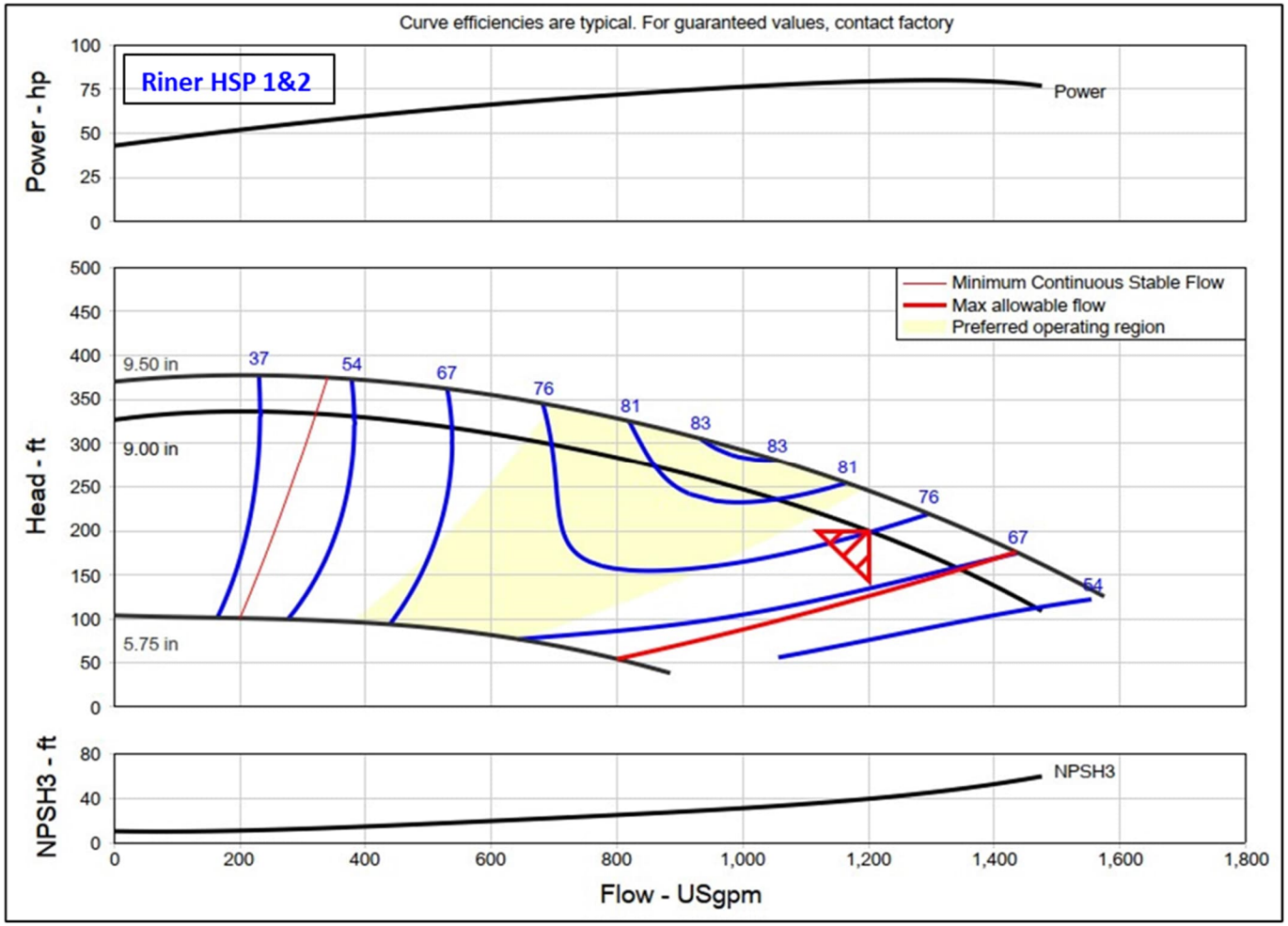

Figure A-1. Riner Pump Curves for High Service Pumps 1 and 2

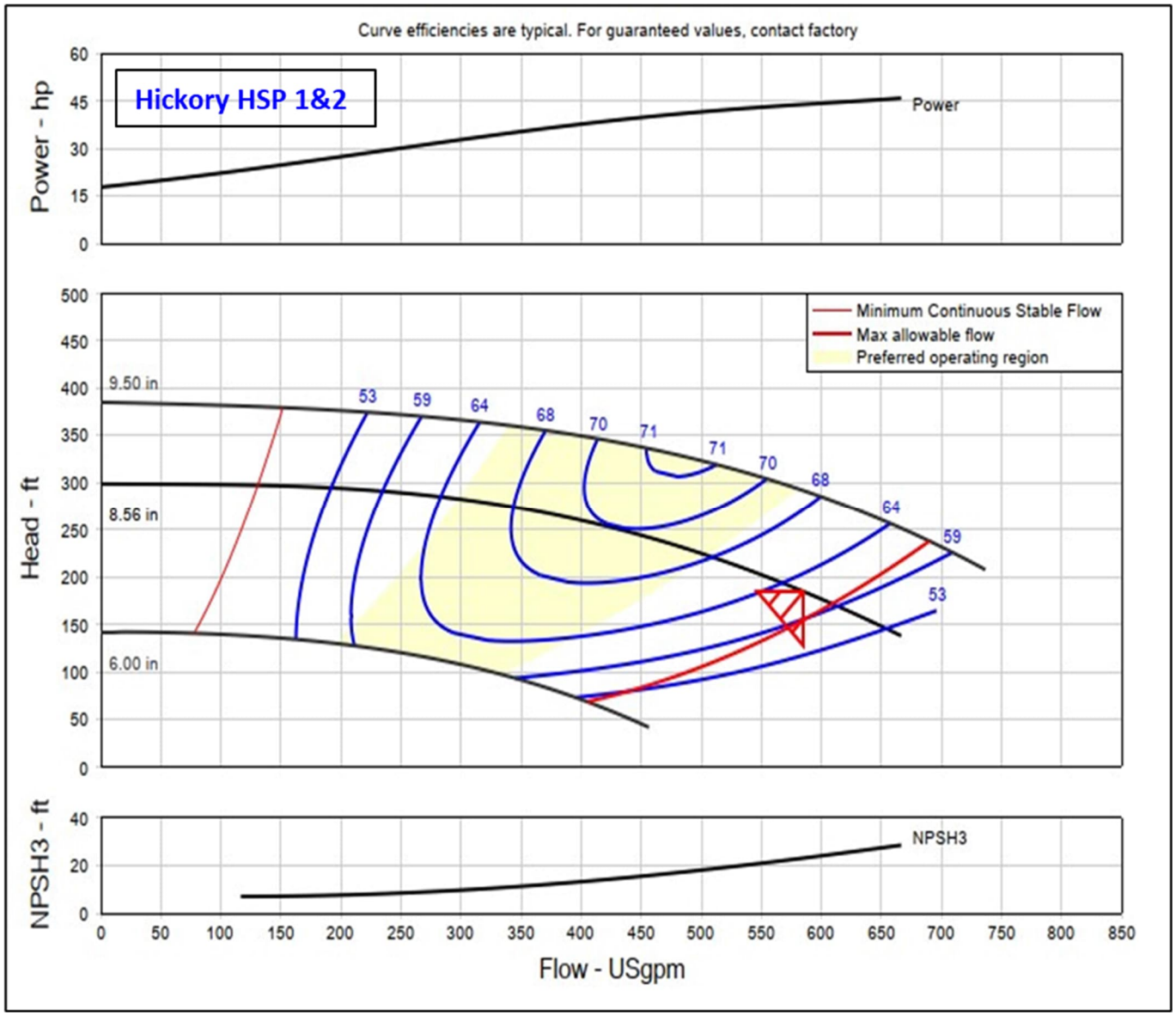

Figure A-2. Hickory Walk Pump Curves for High Service Pumps 1 and 2

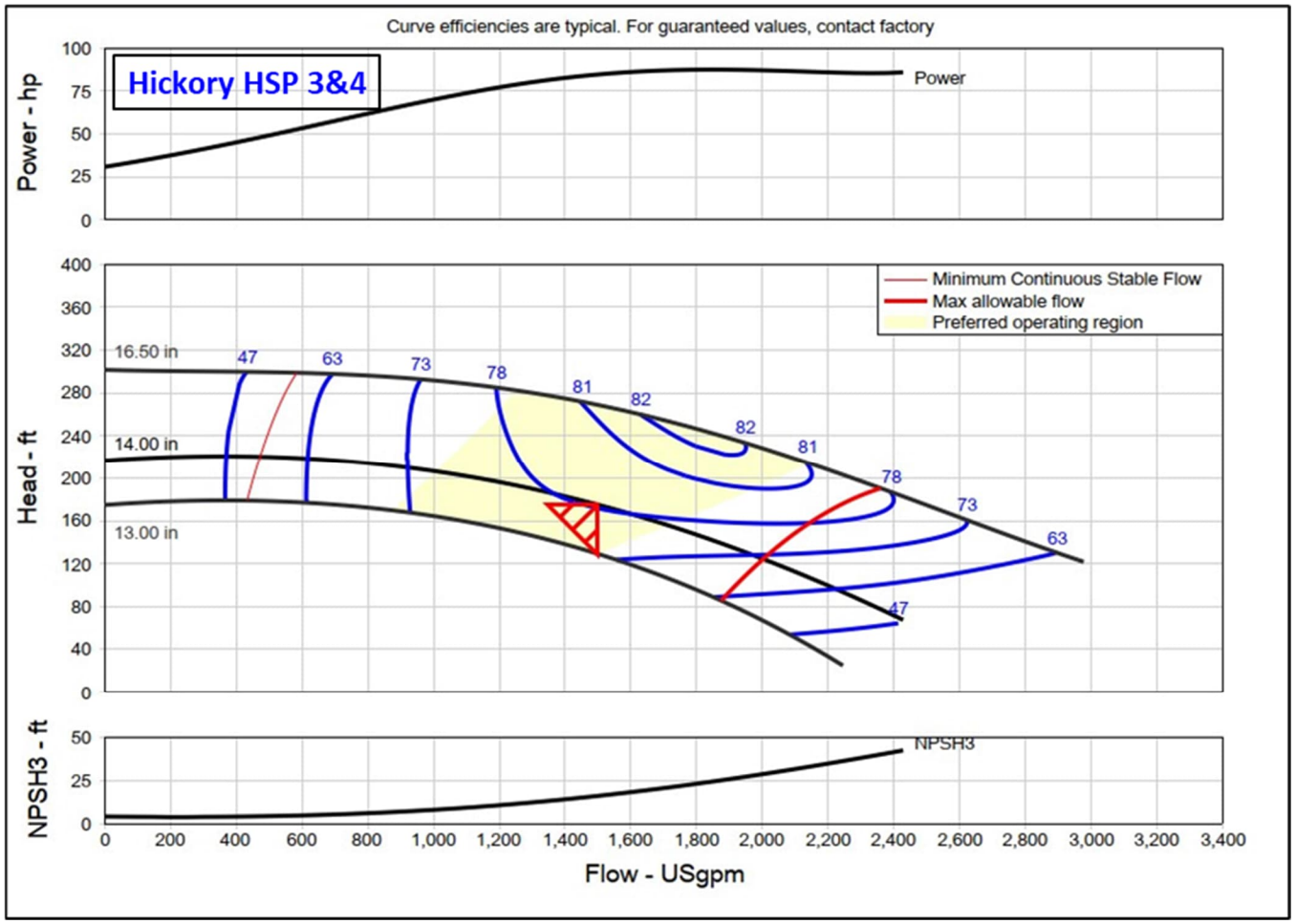

Figure A-3. Hickory Walk Pump Curves for High Service Pumps 3 and 4

Appendix B – Hickory Walk HSPS Capacity

Per Town's request, the capacity of Hickory Walk HSPS was also determined according to the following methodology:

1) Pump curves for jockey and booster pumps were adjusted according to operating point data (flow, pressure, and speed) from SCADA data (**Figure B-1**).

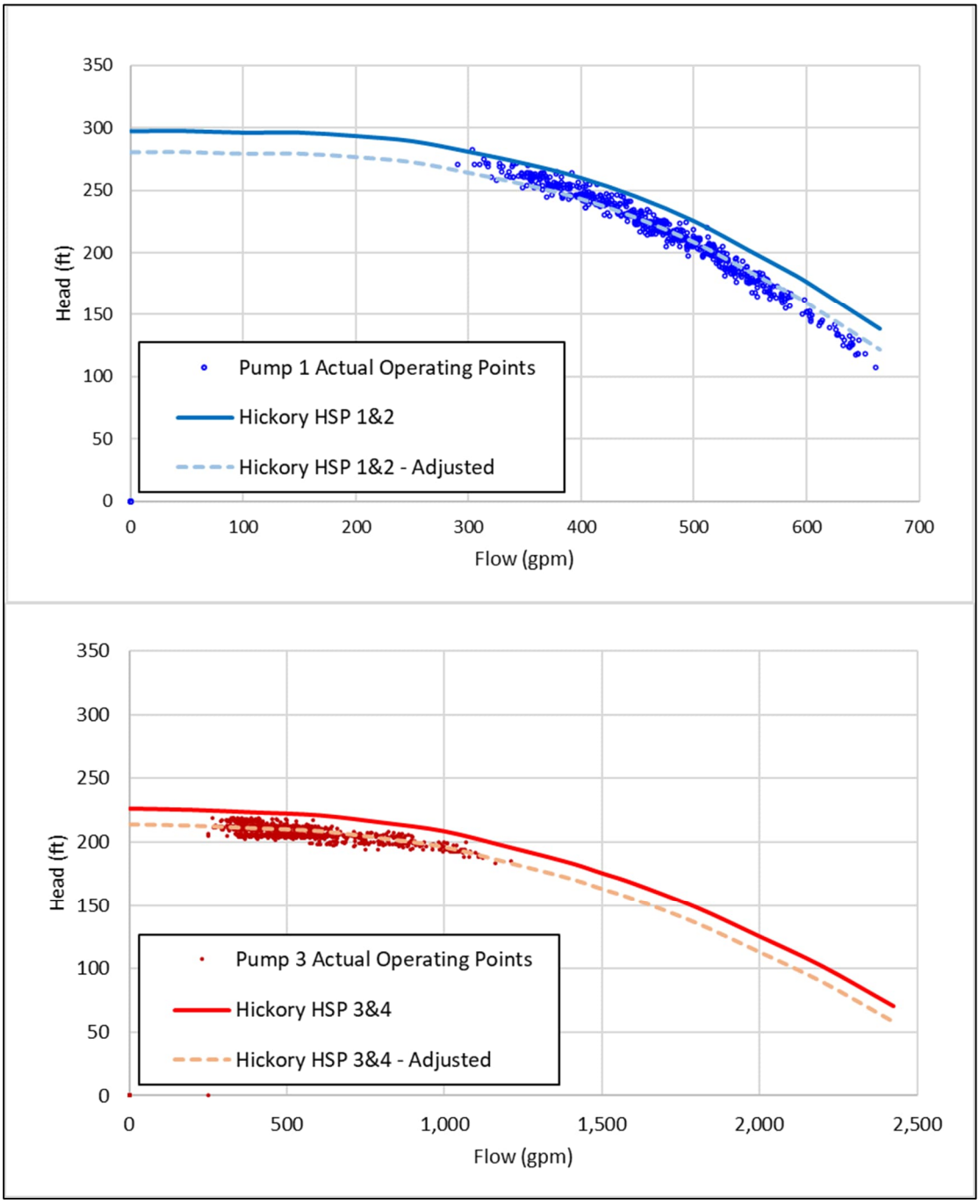

Figure B- 1. Hickory Walk HSPS Adjusted Pump Curves

2) Based on SCADA screenshots from the plant, the operational speed range for Hickory Walk HSP is 30%-95%. The pump curve for one of the main pumps (pump 3 or 4) was calculated at 95% speed (based on pump affinity laws) and compared to the maximum allowable flow curve of the pump at 45 psi pressure setpoint (which is the typical setpoint for Hickory Walk HSPS). Accordingly, the maximum capacity point per main pump is calculated to be 1,895 gpm (2.7 MGD) or 3,790 gpm (5.5 MGD) for both main pumps operating. It was assumed that the jockey pumps are both off when the main pumps are operational.

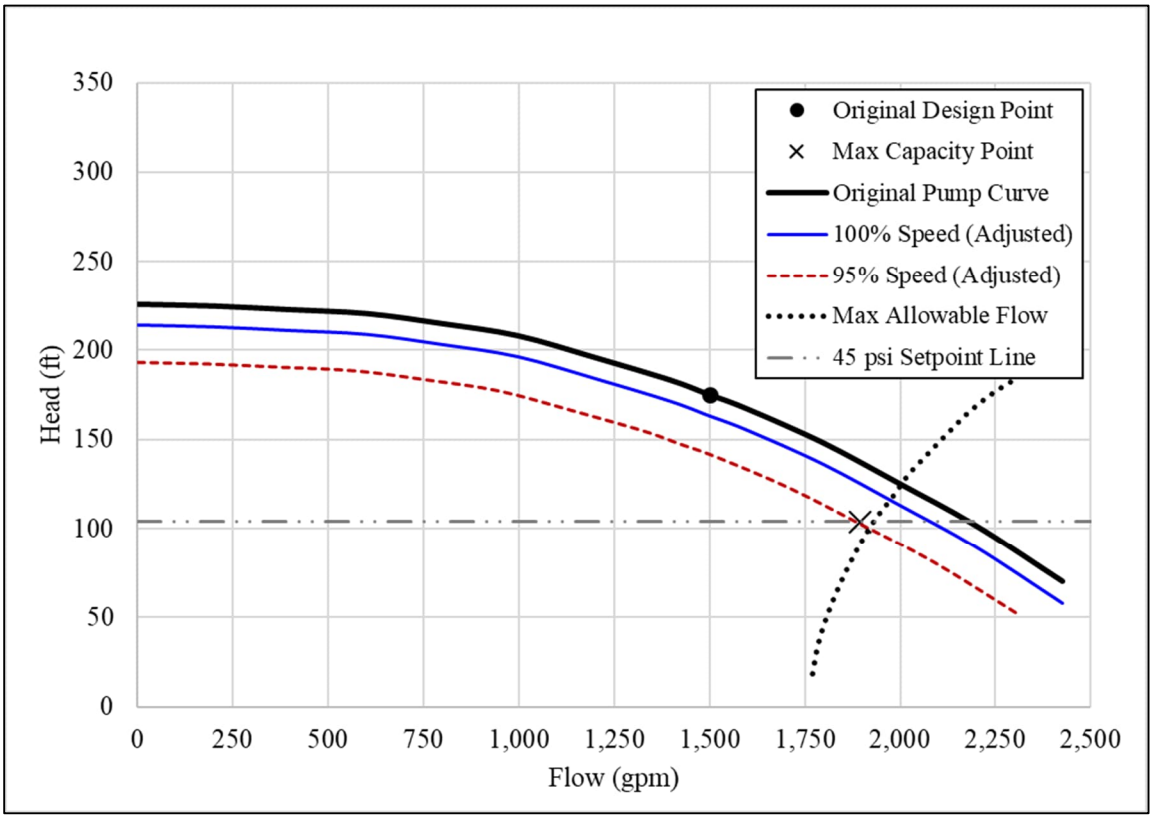

Figure B- 2. Maximum Capacity Point for Hickory Walk HSPS Main Pump

3) The $NPSH_r$ for pump 3 or 4 is approximately 25.4 ft (per $NPSH_r$ curve at 1,895 gpm). Considering the minimum level in the GST, losses from the GST to the HSPS, and losses on the pump suction manifold, the $NPSH_a$ was calculated to be 37.4 ft. As a result, the NPSH required is met at 1,895 gpm flow. Furthermore, the existing 100 hp motor is adequate to supply the power requirement at this flow according to **Figure A-3** power curve.

Appendix C – Site Pictures

Figure C-1. Hickory Walk WTP High Service Pump Station

Figure C-2. Hickory Walk WTP Ground Storage Tank

Figure C-3. Riner WTP High Service Pump Station

Figure C-4. Riner WTP Ground Storage Tank and HSPS Building

Figure C-5. A Beautiful Day in Town of Dundee! (GST Top View)