Lift Station Evaluation and Capital Improvement Plan

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ISG

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EXECUTIVE SUMMARY

Facilities Overview

The City would like to gain a better understanding of sanitary lift station facility needs in order to prioritize, budget and schedule improvements. Sixteen City-owned lift stations were reviewed as part of this evaluation. This report includes a review of the systems, deficiencies, recommendations, estimated costs, and proposed improvement schedule for each lift station.

General Operation and Maintenance Plan Recommendation

This report recommends the City develop, fund, and implement an operations and maintenance (O&M) plan to manage all sanitary lift stations. Implementing an O&M plan is the most effective way to proactively address lift station needs in a timely manner with adequate budget. An O&M plan helps ensure that all equipment is repaired on a regular basis, which prevents potential larger problems in the future. An O&M plan usually includes routine cleaning, maintenance, and other related services. Not only will implementing such a plan keep a lift station running and operating smoothly, but it will also assist by preventing premature equipment break downs and saving on costs.

Facility Capital Improvement Plan

This report also addresses lift station improvement needs such as rehabilitation, component replacement, and in a few cases replacement of the entire lift station. Evaluation categories were developed, the lift stations were physically visited and evaluated by ISG and Electric Pump experts, and specific recommendations were developed.

Evaluation Condition Categories

The following evaluations consider information gathered from field observations, review of current service areas, and information provided by City personnel. The evaluations performed on-site were limited to nondestructive, visual reviews of existing operations. The following categories were reviewed within the scope of this evaluation:

- Site: Review of existing site, including service truck accessibility, security measures, drainage, floodplain conflicts, space for expansion, and alarm signaling.
- Turf/Landscaping: Review of each lift station's surrounding vegetation and contours.
- Building Structure: Review of each lift station's building exterior condition, interior condition, roof condition, finishes, grating condition, and equipment accessibility.
- Wet Well Structure: Review of each lift station's top slab condition, interior wall condition, hatch condition, safety grate condition, and additional equipment affecting the structure. General condition and general functionality ratings were also reviewed.
- Dry Well Structure: Review of each lift station's interior wall condition, interior wall finish, equipment finish, entrance condition, grating condition, and equipment accessibility. General condition and general functionality ratings were also reviewed.
- Valve Vault: Review of each lift station's interior wall condition, interior wall finish, equipment finish, and drainage. General condition and general functionality ratings were also reviewed.

- Meter Vault: Review of each of the lift station's interior wall condition, interior wall finish, equipment finish, and drainage. General condition and general functionality ratings were also reviewed.
- Valves, Piping & Pumps: Review of each lift station's pump condition, pump functionality, seal water systems, pump guide rails, check valve accessibility, and bypass provisions.
- Odor Control: Review of each lift station's odor control condition and functionality. Complaints of objectionable odors from residents were also reviewed.
- Auxiliary Equipment – Hoists, Screening, Other: Review of each lift station's equipment not already included in the above categories.
- Control and Instrumentation: Review of each lift station's flow meters, level sensors, pump controllers, and alarms.
- Electrical: Review of each lift station's electrical equipment condition and code compliance.
- HVAC: Review of lift station heating, ventilation, and cooling systems equipment condition.

Lift Station Evaluations

The figure and associated list below provides a location and name for each lift station evaluated. All lift stations evaluated were City-owned and were not under construction; the lift stations also did not currently have contracts for improvements. Not all City-owned lift stations were evaluated because of proposed improvements, or construction, already in progress. Privately owned lift stations were not evaluated.

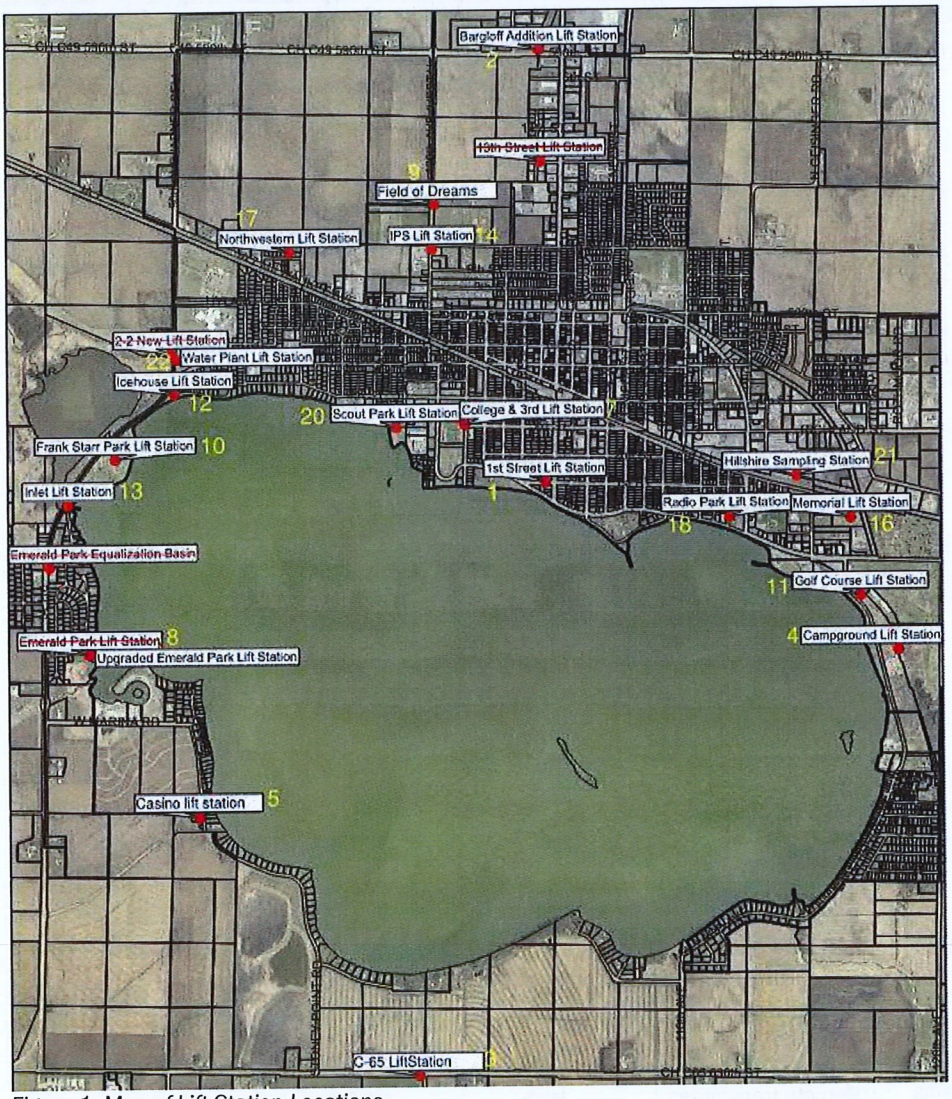


Figure 1. Map of Lift Station Locations.

1. 1st Street Lift Station
2. Bargloff Lift Station
3. C-65 Lift Station
4. Campground Lift Station
5. Casino Lift Station
7. College & 3rd Lift Station
8. Emerald Park Lift Station
9. Field of Dreams Lift Station
10. Frank Starr Park Lift Station
11. Golf Course Lift Station
12. Ice House Lift Station
13. Inlet Lift Station
14. IPS Lift Station
17. Northwestern Lift Station
20. Scout Park Lift Station
22. Water Plant Lift Station

Summary of Recommendations

The table below provides a summary of recommended improvements for each evaluated lift station along with cost estimates and suggested schedule for such improvements.

No.	Name	Improvement Recommendation	Priority	2021	2022	2023	2024	2025
1	1st Street	Full replacement	High			$348,000		
2	Bargloff	Site light	Medium	$1,800				
3	C-65	Conduit seal offs	High	$4,000				
		New terminal blocks	High	$800				
		Remote transmitter	Low	$3,000				
		Exterior light photocell	Low	$900				
		Strip/repaint door	Low	$50				
4	Campground	Above ground valve vault	Low					$99,560
		New pumps – 2	Low					
		New control panel	Low					
		Process piping	Low					
5	Casino	Exterior receptacle cover	High	$100				
		Conduit seal offs	High	$4,000				
		Terminal blocks	High	$800				
		Repair water main break	High	N/A				
		Remote transmitter	Medium	$4,000				
		Exterior light photocell	Low	$900				
		Remove bird's nest	Low	$35				
7	College & 3rd	New wet well conduits and seal offs	High	$3,500				
		Strip/repaint electrical equipment	Medium	$2,000				
		Document control panel wiring	Medium	$2,000	$100,000			
8	Emerald Park	Full rehabilitation	High	$58,500				
9	Field of Dreams	Conduit Seal offs	High	$4,000				
		Terminal Blocks	High	$600				
		Exterior receptacle cover	High	$100				
		Remote transmitter	High	$4,000				
		Locking hasps and pad locks	Medium	$50				
		Exterior light photocell	Low	$900				
10	Frank Starr Park	New check valve at discharge	Medium	$300				
11	Golf Course	Seal open penetrations	High	$200				
		Correct cord grips supporting conductors	High	$75				
		Interior light in valve vault	Low	$250				
12	Ice House	Full replacement	High		$450,000			

13	Inlet	Verify level sensor/alarm operation	High	N/A				
		Conduit seal offs	High	$3,000				
		Terminal blocks	High	$800				
		Repair panel insulation	Low	$100				
		Control panel ventilation	Low	$2,500				
		Site light	Low	$1,800				
14	IPS	Install gravity sewer to Field of Dreams	High		$265,525			
		Full rehabilitation	High		$59,760			
17	Northwestern	Full rehabilitation	High	$25,600				
20	Scout Park	Full replacement	High				$1,200,000	
		Interim rehabilitation	High	$11,600				
22	Water Plant	Exterior receptacle cover	High	$100				
		Conduit seal offs	High	$4,000				
		Terminal blocks	High	$800				
		Clean meter vault drain	Medium	N/A				
		Remote transmitter	Medium	$4,000				
		Exterior light photocell	Low	$900				
N/A	*Additional Maintenance	Duck bill non-return valves (5)	High	$9,350				
		Upper guide brackets (4)						
		Pump guide rail (80' x 2")						
		Air release valves (2)						
				Total:	$161,410	$775,285	$348,800	$1,200,000	$99,560

*Note: Duck bill non-return valves installed in Bargloff, C-65, Field of Dreams, Inlet, and Water Plant

Upper guide brackets (pairs) installed in Golf Course and Inlet

Pump guide rail (80' x 2") installed in Golf Course

Air release valves installed in Golf Course

Isolation/inspection of valves on additional lift stations is included

INTRODUCTION

Process Overview

In the summer of 2020, the City of Storm Lake requested ISG to conduct sanitary lift station evaluations and develop a capital improvement plan. The lift station evaluations were performed on sixteen lift stations throughout the City. ISG conducted on-site visits to each lift station to assess the general condition and functionality of the existing facilities using a categorized check list of structures, equipment and operation. A multi-disciplinary approach using electrical and process experts enabled the ISG team to evaluate all components of the lift station at once to minimize disruption to City operators. Evaluation of each lift station included consideration of the station's age, structure and equipment, overall condition, and appurtenances such as HVAC, lighting, access, and surrounding site conditions. All observations were limited to non-intrusive, non-destructive visual inspections only.

Scope of Evaluation

The purpose of these evaluations is multi-faceted and will assist the City with:

- Planning for maintenance and improvements of facilities
- Informing taxpayers and staff of facilities needs and schedule
- Prioritizing long- and short-term projects
- Developing strategies for financial planning and site master planning

Recommendations Approach

Recommendations for each lift station were based on two broad categories – safety and functionality. A safe lift station is one that does not pose a danger to operators or nearby residents and:

- Operator can safely run and maintain lift station components such as pumps, valves, and controls without subjecting operators to unsafe environment or exposure.
- Operators can safely approach, park vehicles and equipment, and maintain the lift station either from above wet wells or within dry wells, including access from roadways, proper surface drainage away from the facility, proper ventilation, fall protection, and trip hazards.
- Equipment or structure are mechanically and structurally sound and are not at risk of imminent failure.

A well-functioning lift station is one that operates:

- without unnatural noise,
- all pumps are operating at their most efficient point,
- valves operate properly and fully,
- there are a minimum of water leaks
- Controls operate as intended

A high priority rating signifies an unsafe and/or low functionality threat to the service of the lift station that must be addressed as soon as possible. A medium priority rating signifies a potential safety hazard and/or potential threat to functionality of the lift

station, especially as the equipment continues to age. A low priority indicates that safety or functionality are adequate but general maintenance may help ease operation.

Rating Criteria

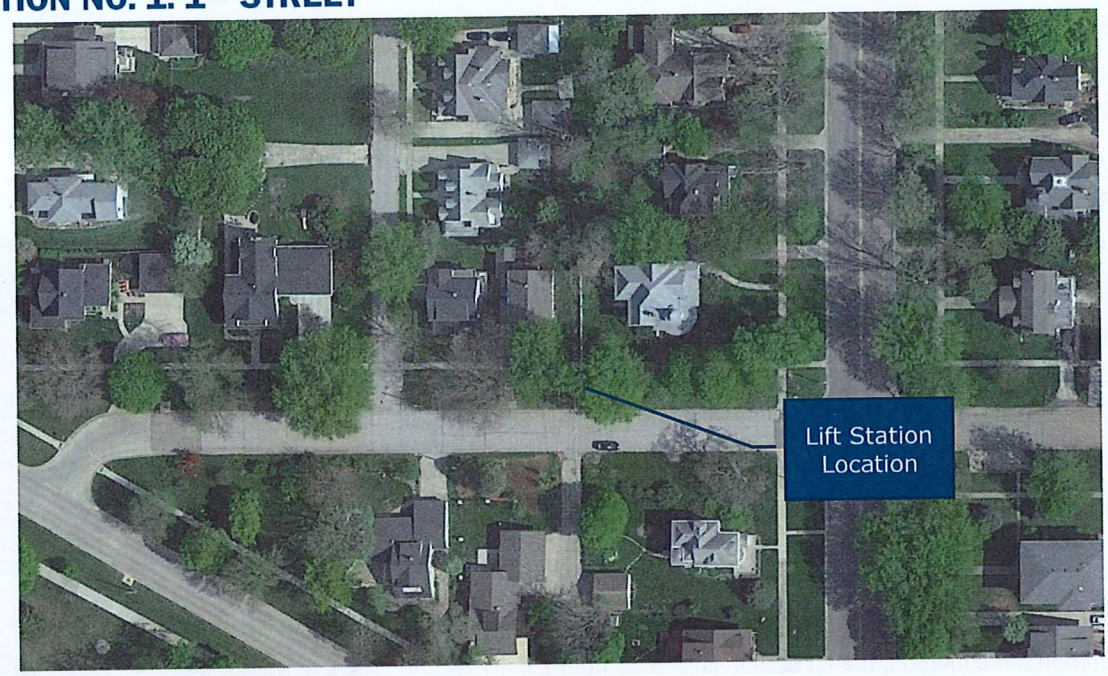
The following table identifies the safety and functionality rating system utilized for this assessment.

Criteria Rating	Description
1	New or nearly new equipment or structure Functions better than other similar structures or equipment
2	Well maintained, like-new Functions as intended
3	Visible degradation In service but maintenance or operational requirements are excessive
4	Equipment or structure integrity compromised In service but function is highly impaired
5	Equipment or structure integrity severely compromised; possible imminent failure Not currently functioning for its intended use

LIFT STATION DETAILED ASSESSMENTS

As noted above, sixteen lift stations were evaluated. This section provides assessment details by lift station and includes prioritized recommendations with cost estimates.

LIFT STATION NO. 1: 1ST STREET



Location: 109 West 1st Street, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 0.5 HP, Barnes

Category	Overall Rating	Notes
Site	3	• In residential area, on a slope graded away from nearest homes • No fence or gate
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	5	• Top slab and hatch appear aged and corroded. • Hatch is poorly secured with chain and pad lock
Dry Well Structure	N/A	N/A
Valve Vault	N/A	N/A
Meter Vault	N/A	N/A
Valves, Piping & Pumps	3	• Station is not fully duplex • No check valve or pump guide rails
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	2	• Fair condition
Electrical	4	• Enclosures aging and in poor condition • Explosion hazard from conduits leaving wet well
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 1, also known as 1st Street, was constructed on the Northern side of West 1st Street approximately half a block West of the intersection of West First Street and Lake Avenue North. 1st Street functions to pump wastewater from a small, residential service area of approximately 19 homes to an existing manhole approximately six feet East of the station. The wastewater increases in elevation by approximately eight feet and ties into existing gravity sanitary sewer approximately 10 feet away from the wet well. Wastewater is pumped by means of one 0.5 horsepower submersible pump that runs approximately 0.8 hours a week at the time of the field evaluation. The lift station consists of only a wet well and corresponding electrical controls mounted on a panel next to the lift station. Full replacement of the lift station is recommended because of several deficiencies noted below.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in fair condition; the lift station is located near a curb and between two homes along West 1st Street. Service vehicles have adequate space to access the lift station for maintenance via the paved road on site. The wet well hatch and electrical panel are surrounded by grass on a slope graded away from the homes, leading to sufficient drainage and a lack of hard surfaces surrounding the station. The lift station site does have an alarm signaling system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized personnel, and the wet well hatch is not securely protected from illegal access.

Figure 2. Hatch and Top Slab of 1st Street.

TURF/LANDSCAPING

The overall landscaping appeared in fair condition. The surrounding residential area prevents major modifications and expansions. There were no other notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

Not Applicable (N/A)

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The functionality of the wet well is fair, and the top slap and interior walls appeared in poor condition. The hatch to the wet well is aged, in poor condition, and is secured only by a chain and padlock; see Figure 2 for the hatch and top slab condition. The hatch also does not have a safety grate;

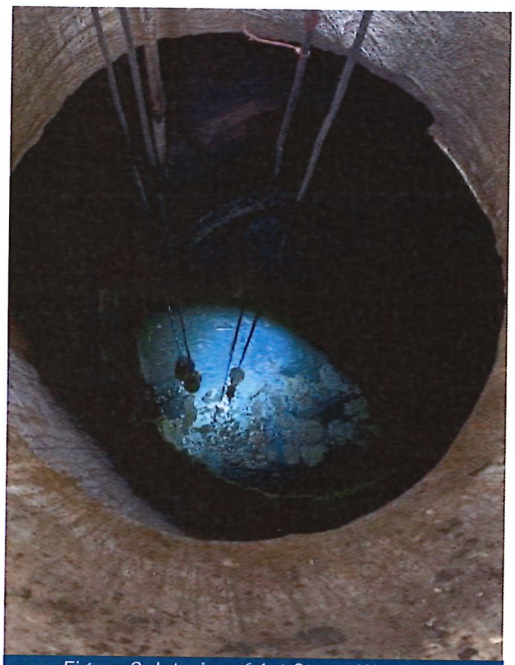


Figure 3. Interior of 1st Street Wet Well.

this is a safety issue as there is no protection for operators as they open the hatch. There is no grinder, screen, or trash basket in place to remove large solids from the wastewater. The interior walls are not epoxy coated, and no solids build-up was observed. There is no ladder leading into the wet well. There is one float level to signal the high-water alarm. See Figure 3 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

N/A

METER VAULT

N/A

VALVES, PIPING & PUMPS

There is one submersible pump in the wet well that is not on a variable frequency drive (VFD). There is no check valve in place to prevent wastewater from flowing backwards from the manhole and into the wet well. Ten States Standards require a wet well with no less than two pumps, so it can be fully duplex in case of pump failure; this non-standard implementation raises the priority of improvements to this lift station. There are no guide rails to remove the existing pump for service or replacement, and there are no bypass provisions.

ODOR CONTROL

There are no notable issues or modifications to discuss in this category.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller is installed for remote monitoring by the wastewater plant via fiber optic cable.

ELECTRICAL

The lift station has aging equipment. All metallic enclosures have peeling paint or visible corrosion. Conduit seal-offs are not installed in the conduits from the wet well to the control panel to provide an explosion barrier.

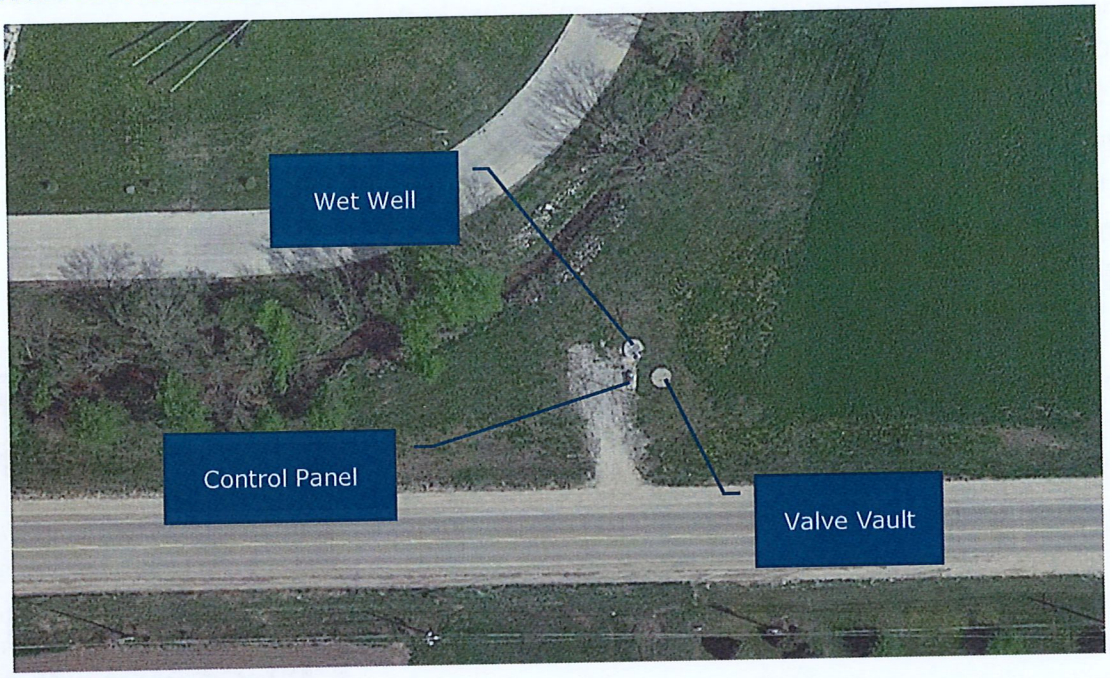
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Lift Station Overview	Full replacement by FY 2024	$348,000

LIFT STATION NO. 2: BARGLOFF



Location: 1039 590th Street, Storm Lake, IA 50588

Constructed: 2008

Pump Size and Name: 5.0 HP, Flygt

Category	Overall Rating	Notes
Site	2	• No hard surface for vehicle traffic
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	2	• Small amounts of infiltration
Dry Well Structure	N/A	N/A
Valve Vault	2	• No back-flow preventer • Gravity drainage to wet well
Meter Vault	N/A	N/A
Valves, Piping & Pumps	3	• No air release valve • Check valves have damper cylinders
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	1	• Trash basket
Control and Instrumentation	1	• Good condition
Electrical	1	• Good condition
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 2, also known as Bargloff, was constructed in 2008 on the north side of the City of Storm Lake along 590th Street. Bargloff functions to pump wastewater from a commercial and industrial service area with approximately 23 customers to a gravity sewer that ties into the Field of Dreams lift station. Wastewater is pumped by means of two 5 horsepower submersible pumps over approximately 520 feet. The lift station consists of a wet well, valve vault, and control panel.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance, but there is no paved or gravel access road on site; vehicles must drive on a grass surface. City personnel confirmed the site has sufficient drainage, and the hatches of the wet well and valve vault have not knowingly been submerged. The lift station site does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access, but the wet well, valve vault, and control panel are always locked.

Figure 4. Bargloff Wet Well Structure.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable issues or modifications to discuss.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in good condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatch to the wet well does not have a safety grate; this is a safety hazard as there is no protection for operators as they open the hatch to the wet well. There is no grinder or screen but there is a trash basket installed so large, solid materials can be removed from the wastewater. The trash basket was in place at the time of the field evaluation. The interior walls are not epoxy coated, and minimal solids build up was observed at the time of the field evaluation. Regular monitoring of potential solids build-up and routine removal of solids from the walls is recommended. The interior walls also exhibited evidence of infiltration through the seams of the precast concrete sections. Minimal corrosion and spalling were observed throughout the structure. See Figure 4 for the interior of the wet well.

Figure 5. Bargloff Valve Vault.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in good condition. The functionality of the vault is good, and the drainage from the vault to the wet well is good. The bottom slab of the valve vault is angled to allow for gravity drainage to the wet well; however, there is no back-flow preventer on the effluent side of the drainage pipe. Installation of a duck bill back-flow preventer is recommended to prevent flooding of the valve vault in the event the lift station floods with raw wastewater and surpasses the elevation of the valve vault drainpipe. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 5 for the interior of the valve vault.

METER VAULT

N/A

VALVES, PIPING & PUMPS

The two (2) submersible pumps in the wet well are not on VFDs. The pumps are 12 years old and in good condition. The check valves are accessible for maintenance and are in a horizontal orientation in the valve vault. The valves have damper cylinders to protect them from slamming shut as the pumps turn off. The Bargloff lift station does not have pressure relief valves, bypass provisions, or a flow meter.

ODOR CONTROL

There are no notable issues or modifications related to odor control.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The Bargloff lift station does not have a grinder or screen installed but does have a trash basket. The trash basket was in place at the time of the field evaluation. There were no other notable pieces of equipment, issues, or modifications related to auxiliary equipment.

CONTROL AND INSTRUMENTATION

The control panel is in good condition and utilizes microprocessor-based controls. An Allen Bradley Micrologix controller is installed for remote monitoring by the wastewater plant via telemetry.

ELECTRICAL

The electrical equipment is in good condition. There is no site lighting installed, and there was no streetlight observed near-by. Installing a site light for security and service purposes is recommended.

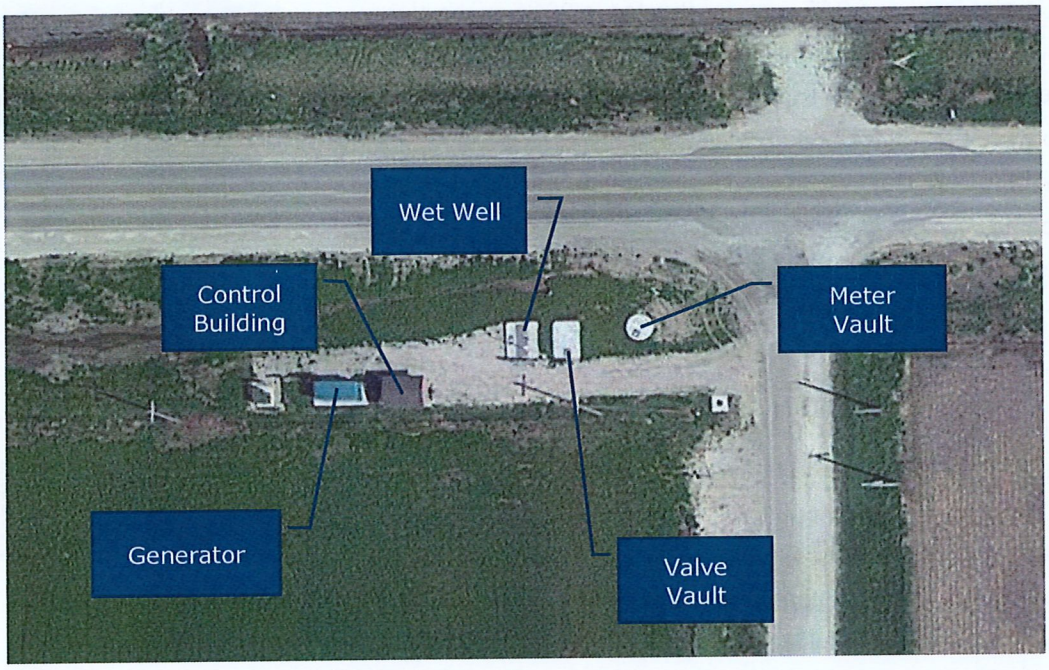
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Valve Vault	Install duck bill back-flow preventer on valve vault gravity drain	Cost included in Additional Maintenance items
Medium	Electrical	Install site light for security and service	$1,800

LIFT STATION NO. 3: C-65



Location: 6301 100th Ave, Storm Lake, IA 50588

Constructed: 2014

Pump Size and Name: 85 HP, ABS

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	1	• Door appeared weathered • Operators noted mice intrusion
Wet Well Structure	3	• Power wash interior walls to remove solids build-up
Dry Well Structure	N/A	N/A
Valve Vault	2	• No back-flow preventer • Gravity drainage to wet well
Meter Vault	1	• Good condition
Valves, Piping & Pumps	2	• Check valves have damper cylinders • Pumps combat back pressure caused by slowly operating check valves
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	1	• Trash basket
Control and Instrumentation	1	• Good condition
Electrical	4	• Interior building equipment is in good condition. • Exterior equipment is in fair condition. • Explosion hazard from level sensor conduits leaving wet well. • Wet well level sensor terminal blocks corroding.
HVAC	1	• Building HVAC equipment in good condition

LIFT STATION OVERVIEW

Lift station no. 3, also known as C-65, was constructed in 2014 on the corner of 630th St and 100th Ave. C-65 functions to pump all wastewater from the City's collection system directly to the wastewater treatment plant. Wastewater is pumped approximately 2.5 miles East from C-65 to the wastewater treatment plant by means of four 85.0 horsepower submersible pumps. The lift station consists of a control building, generator, wet well, valve vault, meter vault, and corresponding electrical controls.

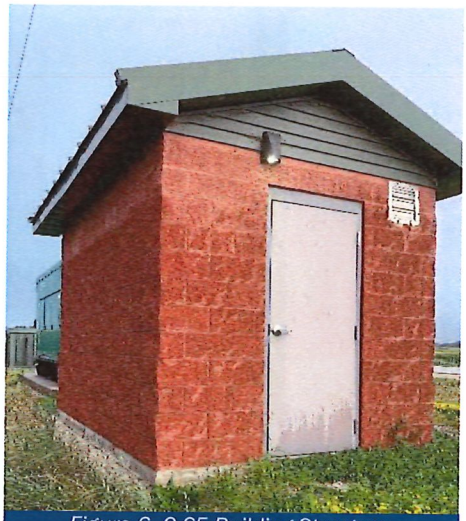


Figure 6. C-65 Building Structure.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the gravel access road on site. City personnel provided appropriate information to confirm the site has sufficient drainage, and the hatches of the wet well, valve vault, and meter vault have not been knowingly submerged. The lift station site does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized personnel, but the wet well, valve vault, meter vault, and control building are always locked.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

Figure 7. C-65 Wet Well.

BUILDING STRUCTURE

The overall building structure appeared in good condition. The coating on the door to the control building appeared in poor condition, and operators noted the presence of mice in the building. Repainting the door is recommended. Placing a bait trap in the building to capture mice is recommended to limit the risk of damage to electrical equipment. Any openings in the building should be filled with spray foam and caulked to inhibit unwanted mice intrusion. There were no other structural quality issues. Figure 6 shows the building structure.

WET WELL STRUCTURE

The overall concrete wet well structure appeared in fair condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatches to the wet well do not have safety grates; this is a safety issue as there is no protection for operators as they open the hatches to the wet well. There is no grinder or screen, but there is a trash basket installed so large, solid materials can be removed from the wastewater. The trash basket was not in place at the time of the field evaluation. The interior

walls are not epoxy coated and have minor buildup of solids. Operators were advised to monitor the solids build-up for future maintenance and power wash the walls to remove the solids build-up when maintenance is required. See Figure 7 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in good condition. The functionality of the vault is good, but the drainage from the vault to the wet well is poor. The bottom slab of the valve vault is angled to allow for gravity drainage to the wet well; however, there is no back-flow preventer on the effluent side of the drainage pipe. Operators noted that the vault has flooded with raw wastewater in the past, which has also flooded the meter vault to the east of the vault. There was a shallow layer of water along the bottom of the vault at the time of the field evaluation, signaling poor drainage conditions and necessary maintenance repairs to the drainpipe. Installation of a duck bill non-return valve is recommended. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 8 for the interior of the valve vault.

Figure 8. C-65 Valve Vault.

METER VAULT

The overall concrete meter vault structure appeared in good condition. The functionality of the vault is fair, and the drainage is fair. There is a gravity drain from the vault to the wet well; however, the vault has flooded with wastewater in the past. The electromagnetic meter does not work because it has been submerged in the past due to flooding causing the transmitter to short out. Removing the transmitter from the meter vault and installing a remote transmitter in the control building is recommended. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 9 for the interior of the meter vault.

Figure 9. C-65 Meter Vault.

VALVES, PIPING & PUMPS

The four submersible pumps in the wet well are on VFDs. The pumps are six years old and are in good condition. The pumps function well; however the check valves in the valve vault make noticeable mechanical noise. The check valves are accessible for maintenance and are in a horizontal orientation. They have damper cylinders (dash pots) to protect them from slamming shut as the pumps turn off. It is recommended to detach the dash pots if possible as they

may create additional slam if not properly adjusted. The valve vault also houses a pressure relief valve as a way to minimize hydraulic transients. It is not clear that the valve is operational. C-65 lift station does not have any bypass provisions.

ODOR CONTROL

There are no notable odor issues nor are there any recommended modifications.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The C-65 lift station does not have a grinder or screen installed but does have a trash basket. The trash basket was not in place at the time of the field evaluation. There were no other notable pieces of equipment, issues, or modifications.

CONTROL AND INSTRUMENTATION

The control system utilizes an Allen Bradley Compact Logix system that is located inside the building and is in good condition. The control system is monitored remotely by the wastewater plant via telemetry. The flow meter is operational, but city staff reported the flow meter structure has filled with water in the past. Maintenance of the meter vault drainage is needed.

ELECTRICAL

The wet well pump cable/conduit installation is adequate for the separation of an explosion hazard. Conduit seal-offs are not installed in the conduits from the wet well level sensors to the termination enclosure to provide an explosion barrier. The terminal blocks are also corroding.

HVAC

The building contains mechanical cooling, outdoor ventilation, and a resistive heater; all equipment appeared in good condition.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Electrical	Install conduit seal offs from wet well level sensors, or provide physical barrier from wet well like is done with pumps	$4,000
High	Electrical	Replace terminal blocks in wet well level sensor termination enclosure	$800
High	Valve Vault	Install duck bill non-return valve on valve vault gravity drain	Cost included in Additional Maintenance items
Low	Building Structure	Strip and repaint door	$50
Low	Control and Instrumentation	Relocate flow transmitter inside pump control panel, and provide submersible rated flow tube/connection	$3,000
Low	Electrical	Install photocell to exterior building light for automatic operation	$900

LIFT STATION NO. 4: CAMPGROUND

Location: 1001 Sunrise Park Road, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 15 HP, Barnes

Category	Overall Rating	Notes
Site	2	• I&I from camper service connections
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	3	• Poorly cast concrete • No easy access to pumps • Confined space
Dry Well Structure	N/A	N/A
Valve Vault	4	• Floods often • Place sump pump each time vault floods
Meter Vault	N/A	N/A
Valves, Piping & Pumps	4	• Valves in poor condition • No pump guide rails
Odor Control	5	• Many campers complain about odor
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	4	• Poor condition
Electrical	4	• Enclosures aging and in poor condition. • Explosion hazard from conduits leaving wet well.
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 4, also known as Campground, was constructed at Storm Lake Sunrise Campgrounds on Sunrise Road. Campground functions to pump wastewater from the campground sewer connections to a gravity sewer to the northeast of the station. Wastewater is pumped by means of one 15 horsepower submersible pump over approximately 560 feet. The lift station consists of a wet well, valve vault, and control panel.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station via the paved road on site. City personnel provided appropriate information to confirm the site has notable drainage issues resulting in I&I from service connection hook ups around the campground. Additionally, several service connection caps (RV dumps) were not in place at the time of the field evaluation. It is recommended that the City work with the campground manager to ensure service connection caps are secure and watertight when the connections are not in use. The City may consider installing removable risers on the service connections to limit I&I in areas where storm water pools. Storm water drainage may be evaluated and redesigned to limit I&I in the sanitary system, though this option will not be as low cost as the others. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access, but the wet well, valve vault, and control panel are always locked.

Figure 10. Campground Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable issues or modifications.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in fair condition. The functionality of the wet well was fair, and the top slab and interior walls appeared in poor condition. The concrete sections were poorly cast and appeared aged; there was notable cracking and spalling throughout the structure. The hatch to the wet well does not have a safety grate; this is a safety hazard as there is no protection for operators as they open the hatch to the wet well. There is no grinder, screen, or trash basket to remove solids from the

wastewater. The interior walls are not epoxy coated and minor solids build-up was noted at the time of the field evaluation. The wet well structure is classified as a confined space, and the pumps are not easily accessible for maintenance because of a lack of guiderails and pull chains. Servicing the pumps would require special procedures for a worker to enter the structure; hydrogen sulfide and raw sewage in the structure would also make servicing the pumps dangerous for workers. Removing and replacing the top slab is recommended in conjunction with improvements seen in other categories of this lift station. See Figure 10 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in poor condition. The functionality is poor, and the drainage from the vault is poor. The structure often floods with storm water and snowmelt, and a sump pump must be placed to remove the excess water. Excess water was observed on the bottom of the vault at the time of the field evaluation. The interior walls of the vault appeared in fair condition, and the top slab of the vault appeared in poor condition. See Figure 11 for the interior of the valve vault. After discussion with city staff on potential improvements, installing an above ground valve vault and decommissioning the existing valve vault is recommended.

METER VAULT

N/A

VALVES, PIPING & PUMPS

The submersible pump in the wet well are not on VFDs. There are no guide rails for pump removal and maintenance, and the pumps are not easily accessible without confined space entry. Replacing the existing pumps with new pumps and guide rails is recommended for future maintenance concerns; the seasonal use of this lift station suggests it may be a lower priority to service the pumps compared to other lift station pump maintenance. The check valves are accessible for maintenance and are in a horizontal orientation in the valve vault. The check valves and plug valves appeared in poor condition, and one check valve had a broken external lever. All existing valves will be decommissioned when the above ground valve vault is installed and in service.

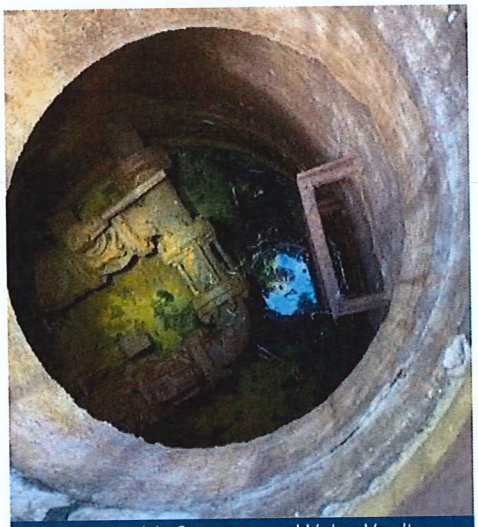


Figure 11. Campground Valve Vault.

ODOR CONTROL

Operators confirmed campers with sites close to the lift station complain of odor. The recommended above ground valve vault is expected to seal the top

slab and hatch of the lift station more securely so odors are minimized. The vent installed on the top slab may also be replaced with a vent of a smaller diameter to minimize odors.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The control panel electrical components are corroded. The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller was installed for remote monitoring by the wastewater plant via fiber optic cable.

ELECTRICAL

The electrical equipment is aged. All metallic enclosures have peeling paint or visible corrosion. Conduit seal-offs are not installed in the conduits from the wet well to the control panel to provide an explosion barrier.

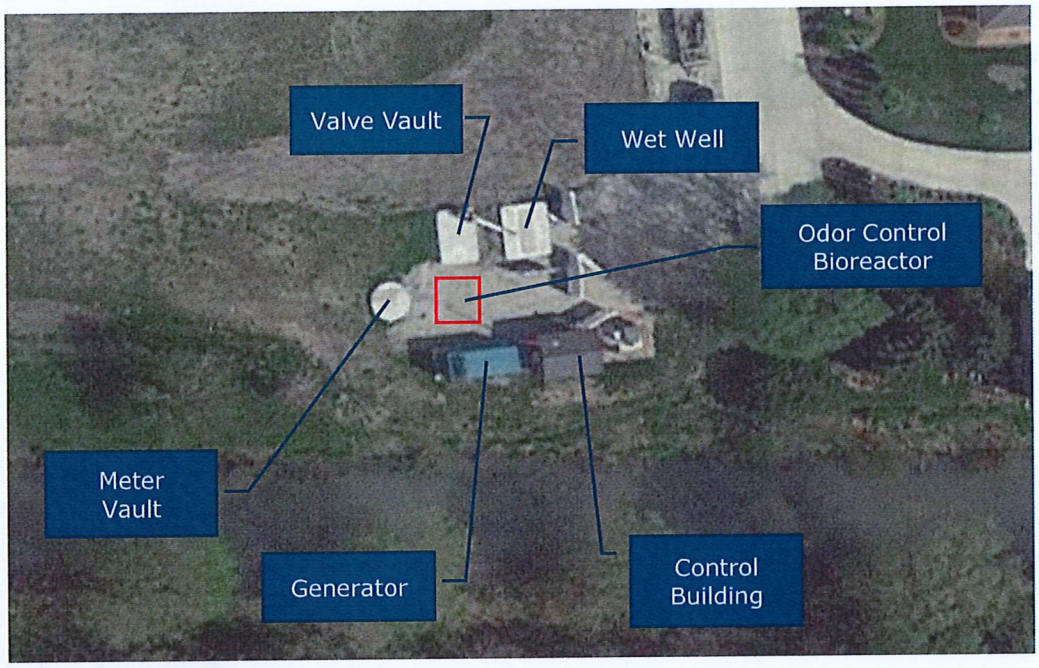
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
Low	Valve Vault	Install above ground valve vault	$99,560
Low	Valves, Piping & Pumps	Replace existing pumps with new pumps and guide rails	
Low	Electrical	Install new control panel	
Low	Valves, Piping & Pumps	Replace process piping	

LIFT STATION NO. 5: CASINO



Location: 221 Casino Rd, Storm Lake, IA 50588

Constructed: 2014

Pump Size and Name: 85 HP, ABS

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	1	• Good condition
Wet Well Structure	2	• Nearby water main break leading to I&I in lift station • Minor solids build up on interior walls • Minimal corrosion or spalling on structure
Dry Well Structure	N/A	N/A
Valve Vault	3	• Has a back-flow preventer • Gravity drainage to wet well • Possible I&I from nearby water main break
Meter Vault	1	• Good condition
Valves, Piping & Pumps	2	• Check valves have damper cylinders
Odor Control	2	• Air filtration system in place
Auxiliary Equipment – Hoists, Screening, Other	1	• Trash basket
Control and Instrumentation	3	• Generally good condition, but flow meter is not working
Electrical	4	• Interior building equipment is in good condition. • Exterior equipment is in fair condition. • Explosion hazard from level sensor conduits leaving wet well. • Wet well level sensor terminal blocks corroding.
HVAC	1	• Building HVAC equipment in good condition

LIFT STATION OVERVIEW

Lift station no. 5, also known as Casino, was constructed in 2014 on the south dead end of Casino Road. Casino functions to pump wastewater from a large residential service area of approximately 60 homes to a gravity sewer that feeds to the C-65 lift station. Wastewater is pumped by means of four 85 horsepower submersible pumps over approximately 6,700 feet. The lift station consists of a control building, generator, wet well, valve vault, meter vault, odor control bioreactor, and corresponding electrical controls.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the paved and gravel access roads on site. City personnel provided appropriate information to confirm the site has sufficient drainage, and the hatches of the wet well, valve vault, and meter vault have not knowingly been submerged. The lift station site does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does have a fence and gate completely enclosing the lift station to protect from unauthorized personnel; the fence is not pictured in the aerial above as the most recent aerial photo was taken prior to the construction of the fence. The wet well, valve vault, meter vault, and control building are always locked.

Figure 12. Casino Building Structure.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications needed.

BUILDING STRUCTURE

The overall building structure appeared in good condition. There were no structure quality issues or modifications needed. See Figure 12 for the building structure.

WET WELL STRUCTURE

The overall concrete wet well structure appeared in good condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatches to the wet well do not have safety grates; this is a safety hazard as there is no protection for operators as they open the hatches to the wet well. There is no grinder or screen, but there is a trash basket installed so large, solid materials can be removed from the wastewater. The trash basket was not in place at the time of the field evaluation. The interior walls are not epoxy coated, and minor solids build up was observed at the time of the field evaluation. The walls and the top slab of the wet well showed minimal corrosion and spalling. There was notable I&I around one of the wet well effluent pipes; city personnel noted a nearby water main break. Performing a leak detection analysis on the water main servicing the nearby area to determine the source of the leak, and repairing the leak, is recommended to limit I&I in the lift station. See Figure 13 for the interior of the wet well.

Figure 13. Casino Wet Well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in fair condition. The functionality of the vault is good, and the drainage from the vault to the wet well is good. The bottom slab of the valve vault is angled to allow for gravity drainage to the wet well, and there is a back-flow preventer on the effluent side of the drainage pipe; the back-flow preventer was noted as a duck bill non-return valve. Water was noted on the bottom of the vault at the time of the field evaluation, though it was draining to the wet well. The excess water most likely came from I&I due to the nearby water main break. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 14 for the interior of the valve vault.

Figure 14. Casino Valve Vault.

METER VAULT

The overall concrete meter vault structure appeared in good condition. The functionality of the vault is fair, and the drainage is fair. There is a gravity drain from the vault to the wet well, however, the vault has flooded with wastewater in the past. The electromagnetic meter is no longer operational because of the flooding. In the past, the meter was submerged in water causing the transmitter to short out. Removing the transmitter from the meter vault and installing a remote transmitter in the control building is recommended. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 15 for the interior of the meter vault.

Figure 15. Casino Meter Vault.

VALVES, PIPING & PUMPS

The four submersible pumps in the wet well are on VFDs. The pumps are six years old and in good condition. The check valves are accessible for maintenance and are in a horizontal orientation in the valve vault. The valves have damper cylinders to protect them from slamming shut as the pumps turn off. The valve vault also houses a pressure relief valve as a way to minimize or adsorb hydraulic transients. The Casino lift station does not have any bypass provisions in case of backups.

ODOR CONTROL

Historically, odor has been a residential complaint about the Casino lift station. An air filtration system with a bioreactor to minimize odor has been installed, though it is not seen in the aerial above. The system was evaluated in good condition. The residential complaints have been reduced since the installation of the odor control system. See Figure 16 for the odor control system.

Figure 16. Casino Odor Control System.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The Casino lift station does not have a grinder or screen installed but does have a trash basket. The trash basket was not in place at the time of the field evaluation. There were no other notable pieces of equipment, issues, or modifications to discuss.

CONTROL AND INSTRUMENTATION

The control system utilizes an Allen Bradley Compact Logix system that is located inside the building and is in good condition. The flow transmitter does not work and is locally mounted on the flow tube in the meter vault. City staff reported the meter vault has filled with water in the past. As stated in the meter vault category, the existing transmitter should be removed, and a new transmitter should be installed in the control building.

ELECTRICAL

The wet well pump cable/conduit installation is adequate for the separation of an explosion hazard. Conduit seal-offs are not installed in the conduits from the wet well level sensors to the termination enclosure to provide an explosion barrier. The terminal blocks are also corroding. The building exterior light has a bird's nest on top, and the exterior receptacle is missing a weatherproof cover.

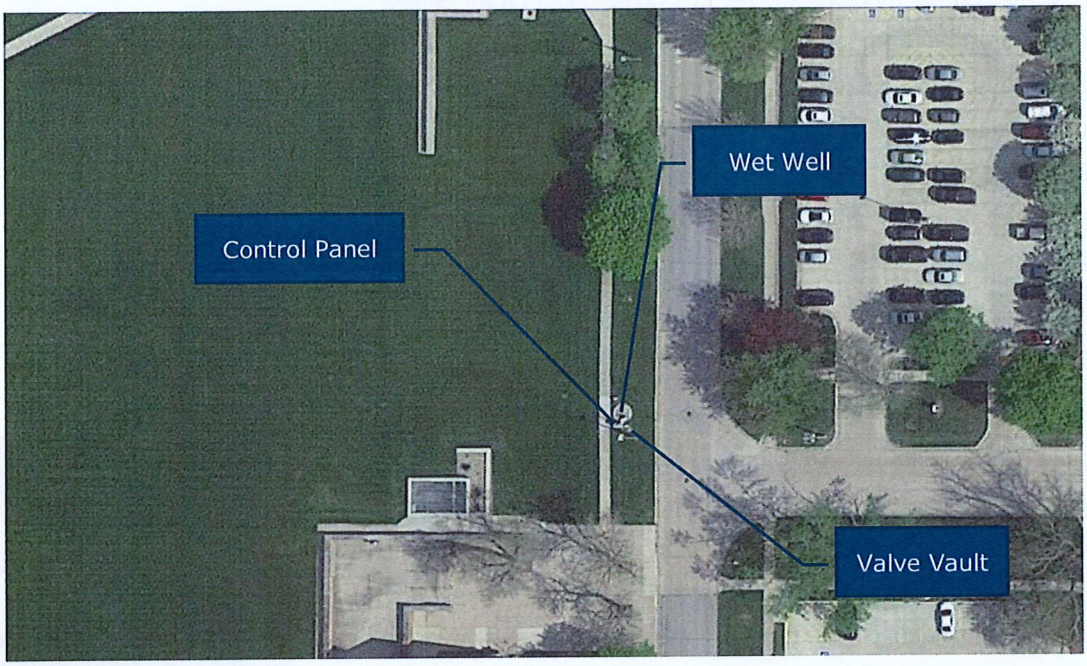
HVAC

The building contains mechanical cooling, outdoor ventilation, and a resistive heater. The equipment appears to be in good condition.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Electrical	Install weatherproof in-use cover (exterior receptacle)	$100
High	Electrical	Install conduit seal offs from wet well level sensors, or provide physical barrier from wet well like is done with pumps	$4,000
High	Electrical	Replace terminal blocks in wet well level sensor termination enclosure	$800
High	Wet Well Structure	Perform leak detection analysis and repair water main break	By others
Medium	Control and Instrumentation	Repair/replace and relocate flow transmitter inside pump control panel, and provide submersible rated flow tube/connection	$4,000
Low	Electrical	Install photocell to exterior building light for automatic operation	$900
Low	Electrical	Remove bird nest from exterior light fixture	$35

LIFT STATION NO. 7: COLLEGE & 3RD



Location: 401 College Avenue, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 5 HP, Flygt

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	4	• Interior lining is deteriorating • Corroded inlet pipes • Hatch in poor condition
Dry Well Structure	N/A	N/A
Valve Vault	4	• Drainage unknown • Top ring of structure has moved
Meter Vault	N/A	N/A
Valves, Piping & Pumps	4	• Corroded pipes • New check valve, no plug valve • Bypass system in place
Odor Control	2	• Activated carbon barrel connected to wet well vent
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	3	• Fair condition
Electrical	4	• Enclosures aging and in poor condition • Explosion hazard from conduits leaving wet well
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 7, also known as College & 3rd, was constructed on the Buena Vista University campus at the intersection of College Avenue and West 3rd Street. College & 3rd functions to pump wastewater from a small, residential area and nearby college to a gravity sewer directly to the south of the station. Wastewater is pumped by means of two 5 horsepower submersible pumps over approximately 43 feet. The lift station consists of a wet well, valve vault, odor control provision, and control panel.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the paved road on site. City personnel provided appropriate information to confirm the site has sufficient drainage, and the hatches of the wet well and valve vault have not knowingly been submerged. The lift station site does have an alarm signaling system in place to notify operators of any malfunctions or emergencies. The site does not have a security fence or gate to protect from unauthorized access, but the wet well and control panel are always locked, and the valve vault is protected with a manhole cover.

Figure 17. College & 3rd Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The functionality of the wet well was fair, but the top slab and interior walls of the wet well appeared aged and in poor condition. The hatch to the wet well is in poor condition and does not have a safety grate; this is a safety hazard as there is no protection for operators as they open the hatch. There is no grinder, screen, or trash basket installed in the wet well, and minimal solids build-up was observed at the time of the field evaluation. The influent pipes appeared aged and severely corroded. The interior walls of the wet well have a fiberglass lining that is deteriorating, and the top slab is cracked and spalling. Replacing the top slab and hatch to the wet well is not recommended until significant rehabilitation is done to the lift station. See Figure 17 for the interior of the wet well.

Figure 18. College & 3rd Valve Vault.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in fair condition. The functionality of the valve vault is fair, and the drainage from the wet well is unknown. Personnel could not confirm if there was gravity drainage directly to the wet well, or if the vault structure does not have a bottom slab, the design of which may have been intended to allow infiltration into the soil below. See Figure 18 for the interior of the valve vault.

METER VAULT

N/A

VALVES, PIPING & PUMPS

The two submersible pumps in the wet well are not on VFDs. There was one check valve and no shut off valves observed in the valve vault. The existing, original pipes and valves appeared aged and severely corroded. There was a newer effluent line routed from the wet well to the vault to improve the functionality of the station. The newer line allowed for installation of a bypass provision and a new check valve, but limited space in the vault for additional valving. The bypass provision consists of a vertical barrel on the check valve to which a sump pump is connected and routed above ground to a nearby manhole on West 3rd Street.

ODOR CONTROL

College & 3rd has historically had problems with odor. A barrel with activated carbon media was installed over the vent of the wet well to filter the air leaving the wet well. The media in the barrel is changed approximately once a year. City personnel confirmed the activated carbon has improved the odor control. See Figure 19 for the activated carbon barrel.

Figure 19. College & 3rd Odor Control.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller was installed for remote monitoring by the wastewater plant via fiber optic cable.

ELECTRICAL

The electrical equipment is aging. All metallic enclosures have peeling paint or visible corrosion. The conduits from the wet well to the control panel are PVC

and are not rated for explosion hazard. Conduit seal-offs are not installed in the conduits from the wet well to the control panel to provide an explosion barrier.

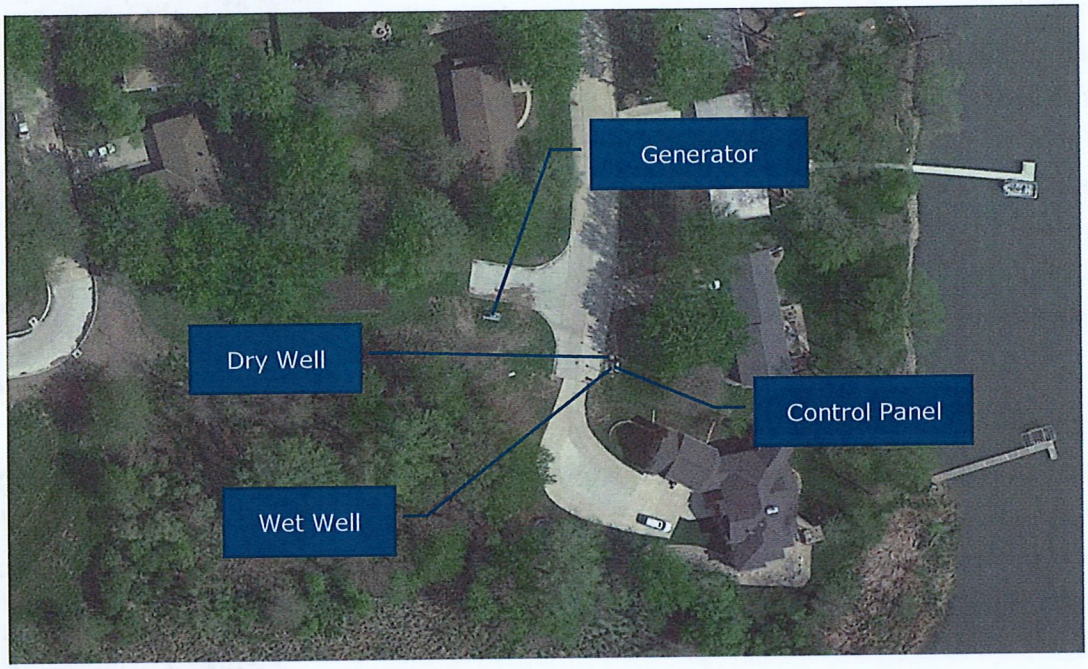
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Electrical	Transition wet well conduits from PVC to RMC and install conduit seal-offs to mitigate explosion hazard	$3,500
Medium	Electrical	Strip and repaint electrical enclosures	$2,000
Medium	Control and Instrumentation	Document control panel wiring and provide wiring schematics	$2,000

LIFT STATION NO. 8: EMERALD PARK



Location: 1106 Emerald Drive, Storm Lake, IA 50588

Constructed: 1968

Pump Size and Name: 7.5 HP, Smith and Loveless

Category	Overall Rating	Notes
Site	2	• I&I in wet well because of insufficient drainage
Turf/Landscaping	3	• Wet well hatch is in a low spot
Building Structure	N/A	N/A
Wet Well Structure	4	• Structure is aged, severe corrosion • Hatch in poor condition
Dry Well Structure	3	• Raw wastewater at the bottom of the structure
Valve Vault	N/A	N/A
Meter Vault	N/A	N/A
Valves, Piping & Pumps	4	• Pump 1 leaks and does not run • Pump 2 runs and does not have seal water • Check valves and pipes are corroded and in poor condition
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	3	• Aging controls • No dry well ventilation alarm per NFPA 820
Electrical	4	• Enclosures aging and in poor condition • Explosion hazard from conduits leaving wet well • Damaged conduit outside
HVAC	4	• Dry well ventilation does not appear to meet NFPA 820 code requirements to mitigate explosion hazard

LIFT STATION OVERVIEW

Lift station no. 8, also known as Emerald Park, was constructed in 1968 at the southern dead end of Emerald Drive. Emerald Park functions to pump wastewater from a large residential service area of approximately 90 houses to a force main that ties into the gravity sewer feeding the Casino lift station. Wastewater is pumped by means of two 7.5 horsepower flooded suction pumps over approximately 950 feet. The lift station consists of a wet well, dry well, and control panel. Full rehabilitation of the lift station is recommended because of several deficiencies noted at the time of the field evaluation.

Figure 20. Emerald Park Site Layout.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the paved road on site. The site did not appear to have sufficient drainage as the hatch to the wet well was in a low spot in the landscaping. This allows for I&I to enter the wet well through the hatch. The dry well structure has a steel manway elevated from the ground surface to protect from I&I entering the structure. The lift station does have an alarm signaling system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access, but the hatch to the wet well, steel manway of the dry well, and control panel are always locked. See Figure 20 for the site layout.

Figure 21. Emerald Park Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in fair condition. The hatch to the wet well was in a low spot of wood chips and surrounding grass lawns. Regrading around the lift station to improve drainage is recommended.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The functionality is fair, but the top slab and interior walls are in poor condition with corrosion, cracking, and spalling. The interior walls are not epoxy coated, but minimal solids build-up was observed at the time of the field evaluation. The hatch to the wet well is in poor condition and does not have a safety grate; this is a safety hazard as there is no protection for operators as they open the hatch. There is no grinder, screen, or trash basket installed in the wet well. See Figure 21 for the interior of the wet well.

DRY WELL STRUCTURE

The overall coated steel dry well structure appeared in fair condition. The functionality is poor and considered unsafe because the structure has the potential to harbor high carbon dioxide and hydrogen sulfide gasses without an updated ventilation system or proper electrical functions. The equipment in the dry well is accessible, but poorly functioning. The interior walls are in fair condition, but the equipment is aged and requires maintenance or replacement; there is raw wastewater at the bottom of the structure because of the aged and malfunctioning equipment.

Figure 22. Emerald Park Dry Well Interior.

VALVE VAULT

N/A

METER VAULT

N/A

VALVES, PIPING & PUMPS

The two pumps in the dry well are flooded suction, are not on VFDs, and are 52 years old. The seal water systems do not work on either of the pumps. Pump 1 leaks and has rusted to the point where it no longer runs. Pump 2 is operational, but the seal water system is broken causing excessive bearing wear. Additionally, the seal water systems utilize raw wastewater which is a health hazard to operators. Isolating and removing both pumps for inspection is recommended to evaluate the options of replacing or repairing the pumps. The equipment in the dry well has significant corrosion and the check valves are in poor condition. Replacing the check valves at the time of pump inspection is recommended. The dry well has sump pumps to drain excess water from the structure, but the sump pumps have failed and were submerged at the time of the field evaluation. Replacing the sump pumps is recommended. See Figure 22 for one of the pumps and the interior of the dry well.

ODOR CONTROL

There are no notable issues or modifications needed.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller is installed for remote monitoring by the wastewater plant via telemetry.

ELECTRICAL

The equipment is aging. All metallic enclosures have peeling paint or visible corrosion. Conduit seal-offs are not installed in the conduits from the wet well and dry well to the control panel to provide an explosion barrier. There is a damaged conduit leading to the antenna.

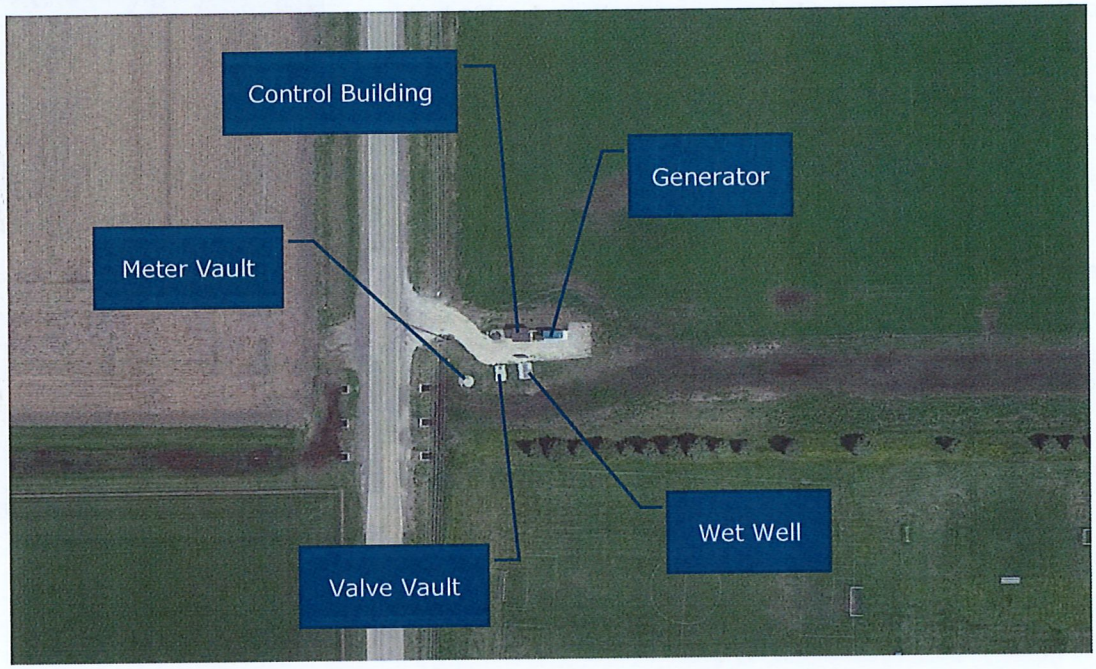
HVAC

The dry well has a vent fan that appears to energize with the lights but does not meet NFPA 820 code requirements.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	N/A	Full rehabilitation	$58,500

LIFT STATION NO. 9: FIELD OF DREAMS



Location: 100th Avenue, Storm Lake, IA 50588

Constructed: 2014

Pump Size and Name: 85 HP, ABS

Category	Overall Rating	Notes
Site	3	• Poor drainage, snow melt floods meter vault
Turf/Landscaping	1	• Good condition
Building Structure	1	• Good condition
Wet Well Structure	1	• Lime build up on interior walls • Interior walls not epoxy coated
Dry Well Structure	N/A	N/A
Valve Vault	2	• Not locked • Gravity drainage to wet well
Meter Vault	2	• Not locked
Valves, Piping & Pumps	3	• 4 check valves, 1 pressure relief valve
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	1	• Trash basket
Control and Instrumentation	3	• Generally good condition, but flow meter is not working
Electrical	4	• Interior building equipment is in good condition. • Exterior equipment is in fair condition. • Explosion hazard from level sensor conduits leaving wet well. • Wet well level sensor terminal blocks corroding.
HVAC	1	• Building HVAC equipment in good condition

LIFT STATION OVERVIEW

Lift station no. 9, also known as Field of Dreams, was constructed in 2014 near recreational athletic fields along 100th Avenue. Field of Dreams functions to pump wastewater from a large commercial area and large residential area to a gravity sewer that ties into the Water Plant lift station. Wastewater is pumped by means of four 85 horsepower submersible pumps over approximately 6,400 feet. The lift station consists of a control building, generator, wet well, valve vault, and meter vault.

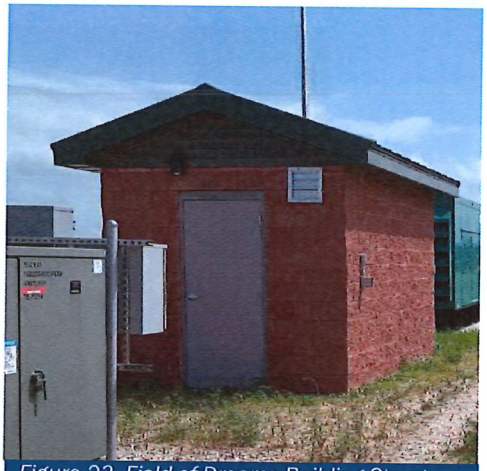


Figure 23. Field of Dreams Building Structure.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the gravel access road on site. City personnel confirmed the site has fair drainage although the meter vault has been historically flooded and submerged by snow melt. There are no cost-effective recommendations for this problem at this time. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access. The control building and wet well are always locked, but the valve vault and meter vault are not.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no plants or structures obstructing access to the lift station. There were no issues or modifications to discuss.

BUILDING STRUCTURE

The overall building structure appeared in good condition. There were no structure quality issues or modifications to discuss. See Figure 23 for the building structure.

WET WELL STRUCTURE

The overall concrete wet well structure appeared in good condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatches to the wet well do not have safety grates; this is a safety hazard as there is no protection for operators as they open the hatches to the wet well. There is no grinder or screen, but there is a trash basket installed so large, solid materials can be removed from the wastewater. The trash basket was not in place at the time of the field evaluation. The interior walls are not epoxy coated and there is a thin layer of lime build-up on the walls and pipes. Lime softening waste generated by the

Figure 24. Field of Dreams Wet Well.

water plant is poured directly into the Field of Dreams lift station primarily to reduce odor further downstream and to provide alkalinity to the wastewater treatment plant. The lime raises the pH of the wastewater and reduces hydrogen sulfide for odor control in the collection system. The lime build-up was not a concern at the time of the field evaluation. See Figure 24 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in good condition. The functionality of the vault is good, and the drainage from the vault is good. The bottom slab of the vault is angled to allow for gravity drainage to the wet well, however, there is no back-flow preventer on the effluent side of the drainage pipe. Installation of a duck bill back-flow preventer is recommended to prevent flooding of the valve vault in the event the lift station floods with raw wastewater and surpasses the elevation of the valve vault drainpipe. The hatch to the valve vault does not have a lock to protect from unauthorized access; installation of a locking hasp and padlock is recommended. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 25 for the interior of the valve vault.

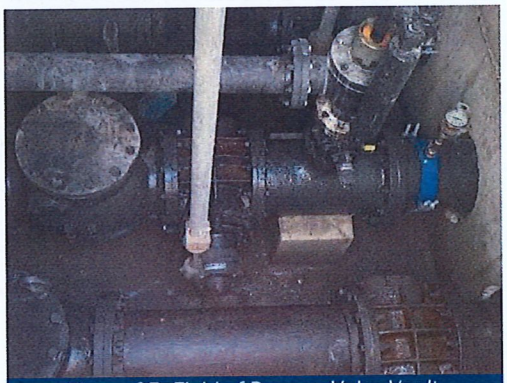


Figure 25. Field of Dreams Valve Vault.

METER VAULT

The overall concrete meter vault structure appeared in good condition. The functionality of the vault is good, and the drainage is fair. The vault has a history of flooding with snow melt because of site contours. The electromagnetic meter does not work because of the flooding. The meter has been submerged in the past causing the transmitter to short out. Removing the transmitter from the meter vault and installing a remote transmitter in the control building is recommended. The hatch to the meter vault does not have a lock to protect from unauthorized access; installation of a locking hasp and padlock is recommended. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 26 for the interior of the meter vault.

Figure 26. Field of Dreams Meter Vault.

VALVES, PIPING & PUMPS

The four submersible pumps in the wet well are on VFDs. The pumps are six years old and are in good condition. The pump guide rails are in good condition, though they are covered in a thin layer of lime from the water treatment plant. The check valves are accessible for maintenance and are in a horizontal

orientation in the valve vault. The check valves and plug valves in the valve vault appeared in good condition. The valve vault also houses a pressure relief valve in an effort to limit hydraulic transients. The Field of Dreams lift station does not have any bypass provisions.

ODOR CONTROL

The Field of Dreams lift station uses lime softening waste from the water treatment plant to reduce odors in the collection system downstream of the lift station. The lime is transported from the treatment plant and dumped directly into the lift station. This strategy appears to adequately control odor in the lift station and downstream collection system.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The Field of Dreams lift station does not have a grinder or screen installed but does have a trash basket. The trash basket was not in place at the time of the field evaluation. There were no other notable pieces of equipment, issues, or modifications needed.

CONTROL AND INSTRUMENTATION

The control system utilizes an Allen Bradley Compact Logix system that is located inside the building and is in good condition. There is remote monitoring by the wastewater plant via telemetry. The flow transmitter does not work and is locally mounted in the meter vault. City staff reported the meter vault has filled with water in the past, which appears to have damaged the transmitter. As stated in the meter vault category, the existing transmitter should be removed, and a new transmitter should be installed in the control building.

ELECTRICAL

The wet well pump cable/conduit installation is adequate for the separation of an explosion hazard. Conduit seal-offs are not installed in the conduits from the wet well level sensors to the termination enclosure to provide an explosion barrier. The terminal blocks are also corroding.

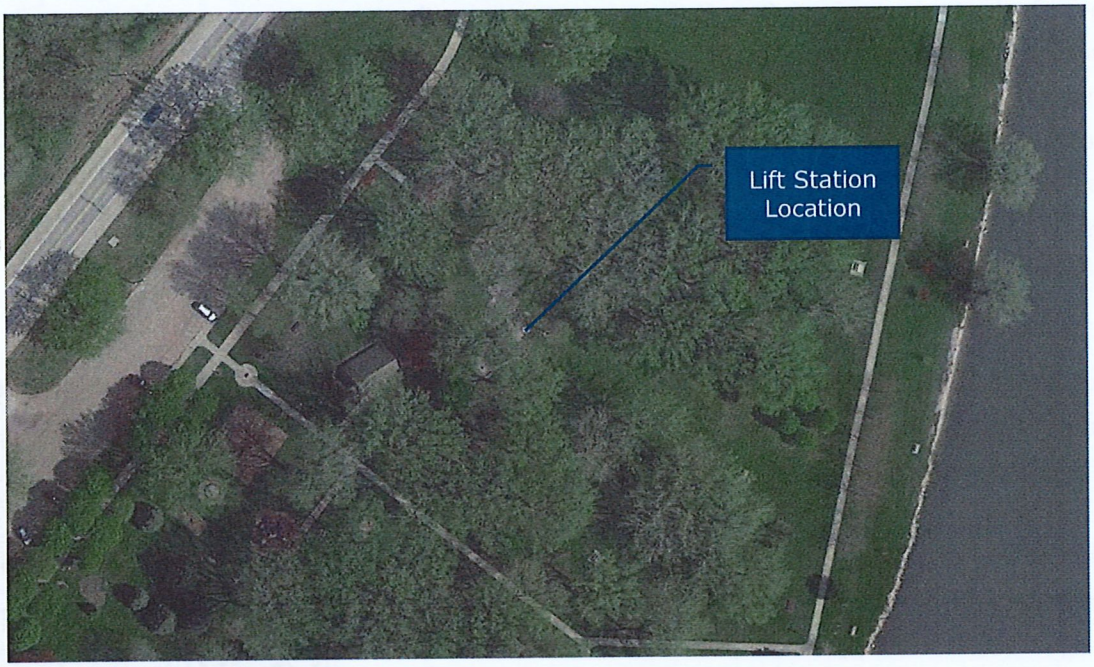
HVAC

The building contains mechanical cooling, outdoor ventilation, and a resistive heater. The equipment appears in good condition.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Electrical	Install conduit seal offs from wet well level sensors, or provide physical barrier from wet well like is done with pumps	$4,000
High	Electrical	Replace terminal blocks in wet well level sensor termination enclosure	$600
High	Electrical	Install weatherproof in-use cover (exterior receptacle)	$100
High	Valve Vault	Install duck bill back-flow preventer on valve vault gravity drain	Cost included in Additional Maintenance items
High	Control and Instrumentation	Repair/replace and relocate flow transmitter inside pump control panel, and provide submersible rated flow tube/connection	$4,000
Medium	Valve Vault/Meter Vault	Install locking hasp and pad lock on valve and meter vaults	$50
Low	Electrical	Install photocell to exterior building light for automatic operation	$900

LIFT STATION NO. 10: FRANK STARR PARK



Location: Frank Starr Park, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 2 HP, Eone

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	3	• Surrounded by flat, grassy landscaping
Building Structure	4	• Houses park bathrooms and lift station control room
Wet Well Structure	2	• Hatch is not locked • Minor solids build-up on interior walls
Dry Well Structure	N/A	N/A
Valve Vault	N/A	N/A
Meter Vault	N/A	N/A
Valves, Piping & Pumps	4	• Station is not fully duplex • Check valve built into grinder pump • No pump guide rails • No secondary check valve
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	2	• Grinder pump
Control and Instrumentation	2	• Good condition
Electrical	2	• Good condition
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 10, also known as Frank Starr Park, was constructed in the middle of Frank Starr Park on the western side of Storm Lake. Frank Starr Park functions to pump wastewater from the original park bathrooms to a gravity sewer that ties into the Inlet lift station. Wastewater is pumped by means of one 2 horsepower submersible grinder pump over approximately 1,500 feet. The lift station consists of a wet well and control panel inside the nearby building that houses the original park bathrooms.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the open grass in the park; there is no access road on site. The hatch of the wet well is flush with the ground, and the site does not exhibit sufficient drainage contours. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies; however, the alarm light is located inside the control room of the nearby building where it cannot be seen unless the door is open. The site does not have a fence and gate to protect from unauthorized personnel. The control room in the nearby building is always locked but the wet well is not.

Figure 27. Frank Starr Park Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

The overall building structure appeared in fair condition. The building primarily houses the original bathrooms for the park and the control panel for the lift station. No structural quality issues were noted, and no modifications are recommended. If the City chooses to demolish the building, the lift station may be decommissioned.

WET WELL STRUCTURE

The overall concrete wet well structure appeared in fair condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatch to the wet well is in poor condition and does not have a safety grate; this is a safety issue as there is no protection for operators as they open the hatch to the wet well. The hatch is also always unlocked and unprotected from unauthorized access. There is no screen or trash basket, but there is a grinder pump installed in the wet well. The interior

walls were not epoxy coated, and there was minor solids build-up at the time of the field evaluation. See Figure 27 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

N/A

METER VAULT

N/A

VALVES, PIPING & PUMPS

The single submersible grinder pump in the wet well is not on a VFD. There are no pump guide rails, and the system is not fully duplex. Ten States Standards requires a lift station to have no less than two pumps for redundancy in case of pump failure. A check valve is built into the pump and a manually operated gate valve exists at the discharge point of the wet well. Installing a second check valve at the discharge point of the station is recommended to replace the gate valve. The Frank Starr Park lift station does not have bypass provisions in case of back-ups. The priority of this lift station is low because the bathrooms serviced by the lift station are only recreationally and seasonally used. The lift station does not pump high enough volumes of wastewater for recommended improvements to be of immediate concern. The lift station may be evaluated again at a later time if the grinder pump fails, or the lift station and bathroom facility may be decommissioned or demolished if the City elects to do so.

ODOR CONTROL

There are no notable issues or modifications needed.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The Frank Starr Park lift station does not have a screen or trash basket but does have a grinder pump. There were no other notable pieces of equipment, issues, or modifications needed.

CONTROL AND INSTRUMENTATION

The control system utilizes a simplex controller that is located inside the building and is in good condition. An Allen Bradley Micrologix controller was installed for remote monitoring by the wastewater plant via fiber optic cable.

ELECTRICAL

Conduit seal-offs are not installed in the conduits from the wet well to the building but may not be required to do so because of the low volume of wastewater discharged at the lift station. Lights did not work in the building.

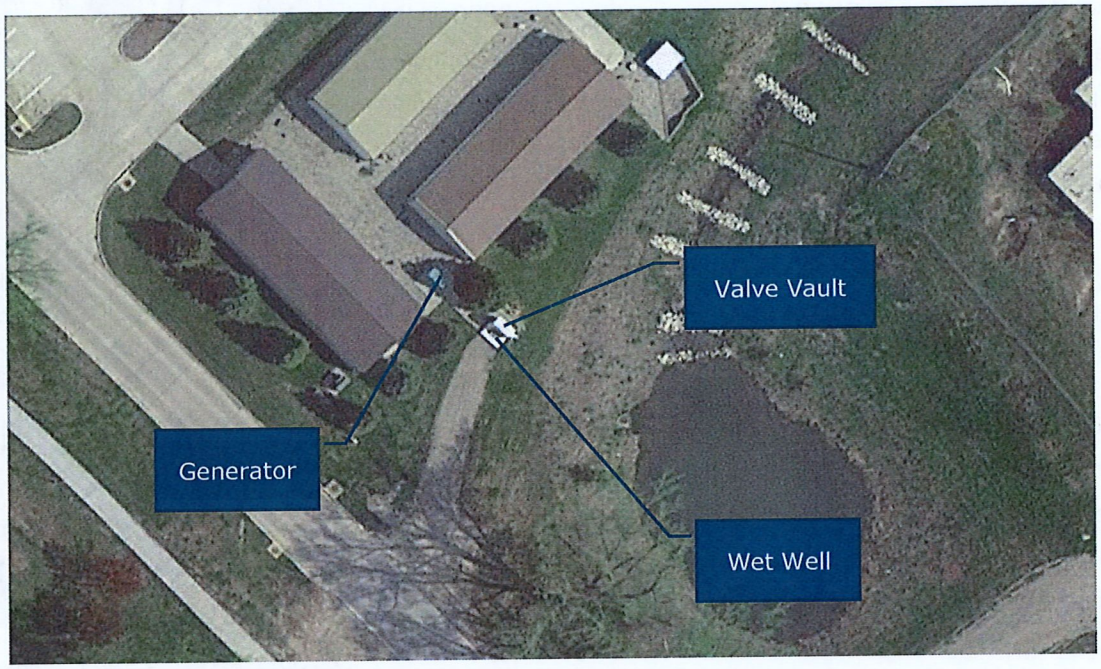
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
Medium	Valves, Piping & Pumps	Install new check valve	$300

LIFT STATION NO. 11: GOLF COURSE



Location: 1101 Sunrise Park Road, Storm Lake, IA 50588

Constructed: 2006

Pump Size and Name: 10 HP, Flygt

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	2	• Pipes are significantly corroded
Dry Well Structure	N/A	N/A
Valve Vault	2	• Above ground • No drain for excess water
Meter Vault	N/A	N/A
Valves, Piping & Pumps	2	• Air release valves need replacing • Pump guide rails are not stainless steel • Pump 1 check valve does not work
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	2	• Good condition
Electrical	2	• Good condition
HVAC	2	• Good condition

LIFT STATION OVERVIEW

Lift station no., 11, also known as Golf Course, was constructed in 2006 on the western side of the Sunrise Golf Course along Sunrise Park Road. Golf Course functions to pump wastewater from a small, commercial service area, including King's Pointe Resort and Sunrise Campground, to a gravity sewer that ties into the Memorial lift station. Wastewater is pumped by means of two 10 horsepower submersible pumps over approximately 2,000 feet. The lift station consists of a wet well, above ground valve vault, control panel, and generator. The control panel is located in the above-ground valve vault.

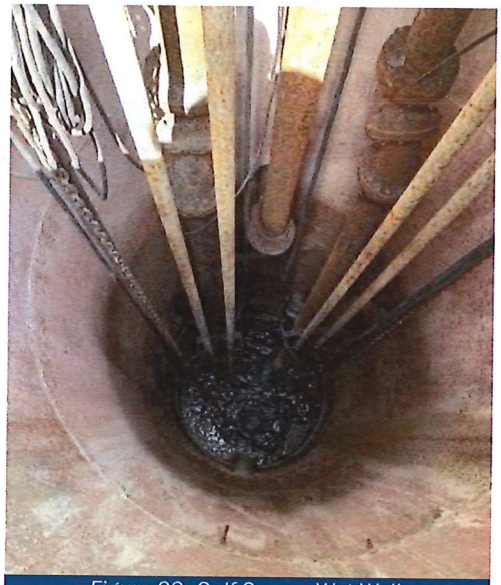


Figure 28. Golf Course Wet Well.

SITE

The site is not located in the 100-year floodplain. The overall site appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the grassy lawn surrounding the site. There is no gravel or paved road on site for vehicles to drive on. City personnel confirmed the site has sufficient drainage as the wet well and valve vault are elevated from the ground surface. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access, but the wet well and valve vault are always locked.

Figure 29. Golf Course Valve Vault.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no issues or modifications needed.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in good condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatches to the wet well do not have safety grates; this is a safety hazard as there is no protection for operators as they open the hatches to the wet well. There is no grinder, screen, or trash basket installed, and the interior walls are not epoxy coated. There was minimal solids build-up at the time of the field evaluation. The walls and top slab of the wet well showed minimal corrosion and spalling, but the pipes showed significant corrosion. See Figure 28 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in good condition. The functionality is good, and the above ground structure shows minimal signs of damage on the outside. The steel supports for the pipes inside the vault appeared significantly corroded, and the bottom of the vault appeared corroded. The vault historically pooled excess water from condensation, frost, and precipitation, and there is no drain. See Figure 29 for the interior of the valve vault.

METER VAULT

N/A

VALVES, PIPING & PUMPS

The two submersible pumps in the wet well are not on VFDs. The pumps are 14 years old and in good condition. The pump guide rails are in poor condition as they are rusted and corroded. Replacing the existing guide rails with stainless steel is recommended. The check valves are accessible for maintenance and are in a vertical orientation in the valve vault; the plug valves are also in a vertical orientation. The check valve for Pump 1 was malfunctioning at the time of the field evaluation. Isolating, removing, and inspecting the check valves is recommended. The air release valves no longer operate and replacing them is recommended. The lift station does have a bypass provision in case of backups.

It should be noted that on the day of the field review, the pump elapsed time meters were evaluated and noted to be excessively high for the service area this lift station serves. It is recommended to evaluate sources of potential I&I that could be contributing to these flows, which could include water main leaks, infiltration from the adjacent stormwater detention pond, or a leak from the King's Pointe Pool.

ODOR CONTROL

There are no notable issues or modifications to discuss in this category.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller was installed for remote monitoring by the wastewater plant via fiber optic cable.

ELECTRICAL

The main distribution breaker and automatic transfer switch is located inside an adjacent building. The cord grips are not properly fitted around the cable sheath between the wet well and the above ground valve vault which could lead to failure. There are also open penetrations between the wet well and the above ground valve vault.

HVAC

The above ground valve vault has a vent fan and a portable heater installed that appeared in good condition..

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Electrical	Seal open penetrations and unused cord grip connectors between above ground valve vault and wet well	$200
High	Electrical	Correct cord grip installations supporting conductors by insulation versus cable sheath.	$75
Medium	Valves, Piping & Pump	Replace air release valves and pump guide rails	Cost included in Additional Maintenance items
Medium	Valves, Piping & Pumps	Isolate/inspect check valves	Cost included in Additional Maintenance items
Low	Electrical	Add interior light to valve vault building enclosure	$250

LIFT STATION NO. 12: ICE HOUSE

Location: 35 1/2 Vista Drive, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 11.3 HP, Barnes

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	3	• Steel manway appeared severely rusted and aged • Concrete walls appeared in good condition
Dry Well Structure	N/A	N/A
Valve Vault	2	• Gravity drainage to wet well
Meter Vault	N/A	N/A
Valves, Piping & Pumps	2	• Station not fully duplex • Check/Gate valves in poor condition • History of sewer back-ups in nearby neighborhood
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	3	• Fair condition.
Electrical	4	• Enclosures aging and in poor condition • Explosion hazard from conduits leaving wet well
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 12, also known as Ice House, was constructed just south of the intersection of Vista Drive and West 5th Street. Ice House functions to pump wastewater from a small residential area with approximately 40 homes to a gravity sewer that ties into the Scout Park lift station. Wastewater is pumped by means of one 11.3 horsepower submersible pump over approximately 1,300 feet. The lift station consists of a wet well, valve vault, and control panel. Full replacement of the lift station is recommended because of significant deficiencies noted. The replacement lift station should include rerouted force main conveying wastewater from the Ice House and Water Plant lift stations to the Casino lift station. This will reduce flows seen at the Scout Park and Memorial lift stations; this is advantageous to allow for improved operation of these lift stations. The proposed location of the replacement lift station is on the City-owned property directly to the West of the existing site.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the paved road on site. There is no hatch to the wet well, but there is a steel manway elevated from the ground surface to prevent unwanted drainage from entering the wet well. The steel manway of the wet well is always locked, and the valve vault is covered with a manhole to protect from unauthorized access. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized personnel.

Figure 30. Ice House Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in fair condition. The functionality of the wet well is poor, the steel manway appeared in poor condition, and the concrete interior walls appeared in good condition. There is no safety grate at the entrance to the steel manway, which is a safety hazard to operators opening the manway. The steel manway is severely rusted and aged; see Figure 30 for the steel manway and interior of the wet well. There is

no grinder, screen, or trash basket installed in the wet well. The concrete interior walls are not epoxy coated, and there was no solids build-up at the time of the field evaluation.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in good condition. The functionality of the vault is fair, and the drainage from the vault is fair. The bottom of the vault is open to allow for gravity drainage downward from the valves and pipes. The interior walls of the vault appeared in good condition, and there was minimal corrosion and spalling. See Figure 31 for the interior of the valve vault. However, the valves are configured in an atypical fashion, having been rerouted in the past and not removed.

Figure 31. Ice House Valve Vault.

METER VAULT

N/A

VALVES, PIPING & PUMPS

The single submersible pump in the wet well is not on a VFD. There are no pump guide rails and the pump will need to be removed via chain and hoist for servicing. The lift station is not fully duplex, which is not consistent with Ten States Standards requiring a minimum of two pumps for redundancy in the case of pump failure. The check valves and gate valves appear severely rusted and aged. The valves are manually actuated and are recommended to be exercised regularly. The lift station does not have bypass provisions in case of sewer backups. The nearby neighborhood serviced by the Ice House lift station has a history of sewer backups which may be attributed to the issues previously described.

ODOR CONTROL

There are no notable issues or modifications to discuss in this category.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller was installed for remote monitoring by the wastewater plant via fiber optic cable.

ELECTRICAL

The electrical equipment is aging. All metallic enclosures have peeling paint or visible corrosion. Conduit seal-offs are not installed in the conduits from the wet well to the control panel to provide an explosion barrier.

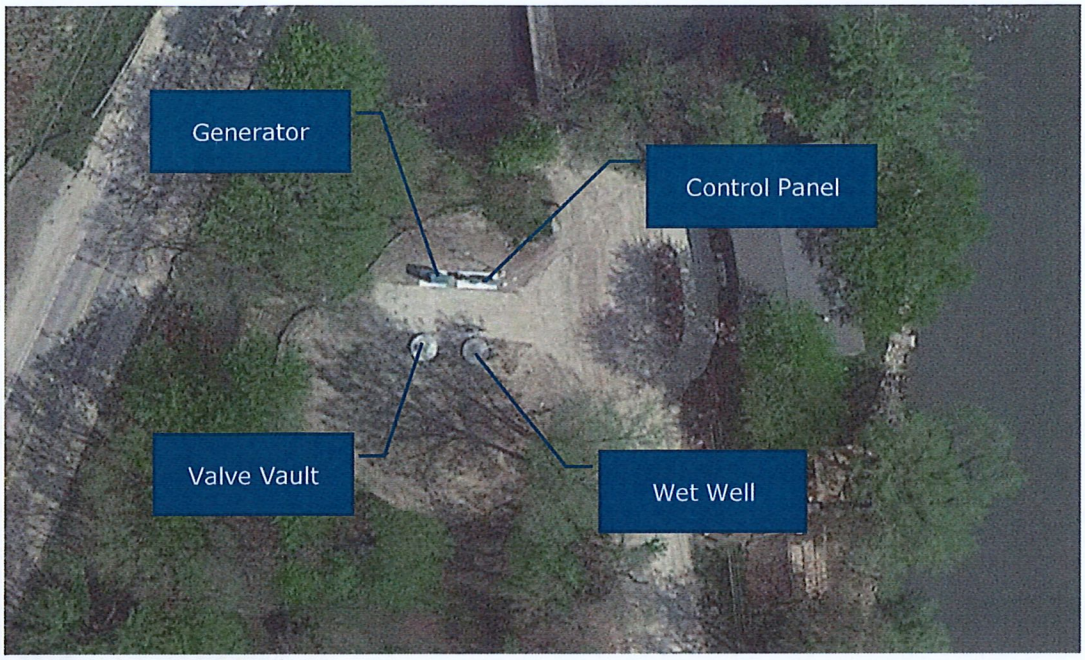
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	N/A	Full Replacement across the street to the West of existing site	$450,000

LIFT STATION NO. 13: INLET



Location: 130 N. Emerald Drive, Storm Lake, IA 50588

Constructed: 2013

Pump Size and Name: 12 HP, ABS

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	4	• Flooded at time of field evaluation • Minor solids build up on interior walls
Dry Well Structure	N/A	N/A
Valve Vault	3	• Flooded at time of field evaluation • Gravity drainage to wet well • No back-flow preventer
Meter Vault	N/A	N/A
Valves, Piping & Pumps	3	• Rusted pump guide rail brackets • Check valves have damper cylinders
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	1	• Trash basket
Control and Instrumentation	1	• Good condition
Electrical	4	• Exterior equipment is in good condition. • Explosion hazard from level sensor conduits leaving wet well. • Wet well level sensor terminal blocks corroding.
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 13, also known as Inlet, was constructed in 2013 on the western side of Storm Lake on North Emerald Drive. Inlet functions to pump wastewater from a large, residential service area with approximately 90 homes to a force main that ties into the gravity sewer feeding the Casino lift station. Wastewater is pumped by means of two 12 horsepower submersible pumps over approximately 200 feet. The lift station consists of a control panel, generator, wet well, and valve vault.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the gravel access road on site. City personnel confirmed the site has sufficient drainage, and the hatches of the wet well and valve vault have not knowingly been submerged. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies. However, the high-water alarm did not alert at the time of the field evaluation. The wet well and valve vault were flooded with raw wastewater, and the pumps were turned on manually to pump the water down. The site has a fence and gate concealing the lift station from the nearby residential area, though the fence does not completely enclose the site. The control panel, wet well, and valve vault are locked to protect from unauthorized personnel.

Figure 32. Inlet Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The functionality of the wet well was poor, the interior walls were in fair condition, and the top slab was in good condition. The hatches to the wet well do not have safety grates; this is a safety issue as there is no protection for operators as they open the hatches to the wet well. There is no grinder or screen, but there is a trash basket installed so large, solid materials can be removed from the wastewater; the trash basket was in place at the time of the field evaluation. The interior walls are not epoxy coated and have minor solids build-up. Minimal corrosion and spalling were observed on the structure at the time of the field evaluation. See Figure 32 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in fair condition. The functionality of the vault is good, but the drainage from the vault is poor. The bottom slab of the vault is angled to allow for gravity drainage to the wet well; however, there is no back-flow preventer on the effluent side of the drainage pipe. The valve vault was flooded with raw wastewater at the time of the field evaluation because of a lack of a back-flow preventer and a failed high-water alarm. Installation of a duck bill back-flow preventer is recommended. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 33 for the interior of the valve vault.

Figure 33. Inlet Valve Vault.

METER VAULT

N/A

VALVES, PIPING & PUMPS

The two submersible pumps in the wet well are not on VFDs. The pumps are seven years old and are in good condition. The pump guide rails are in good condition, but the brackets connecting the guide rails to the wet well walls are in poor condition. Replacing the existing brackets with stainless steel brackets is recommended. See Figure 34 for the existing guide rail brackets. The check valves are accessible for maintenance and are in a horizontal orientation in the valve vault. The valves have damper cylinders (dash pots) to protect them from slamming shut as the pumps turn off. The Inlet lift station does not have any bypass provisions in case of backups.

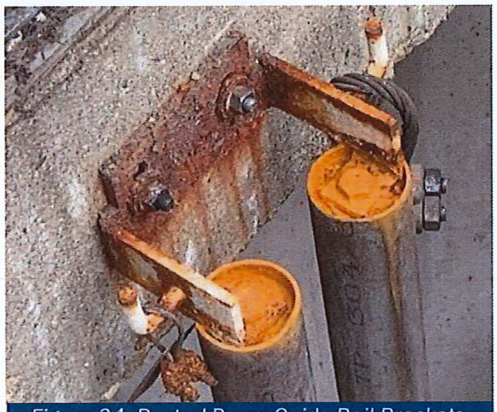


Figure 34. Rusted Pump Guide Rail Brackets.

ODOR CONTROL

There are no notable issues or modifications to discuss in this category.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The Inlet lift station does not have a grinder or screen installed but does have a trash basket. The trash basket was in place at the time of the field evaluation. There were no other notable items to discuss.

CONTROL AND INSTRUMENTATION

The control system utilizes an Allen Bradley Compact Logix system. There is remote monitoring by the wastewater plant via fiber optic cable. The control panel is mounted outdoors and has blue insulation on the interior that is falling away. The wet well high-level situation was observed while onsite, but the alarm did not initiate.

ELECTRICAL

The wet well pump cable/conduit installation is adequate for the separation of an explosion hazard. Conduit seal-offs are not installed in the conduits from the wet well level sensors to the termination enclosure to provide an explosion barrier. The terminal blocks are also corroding.

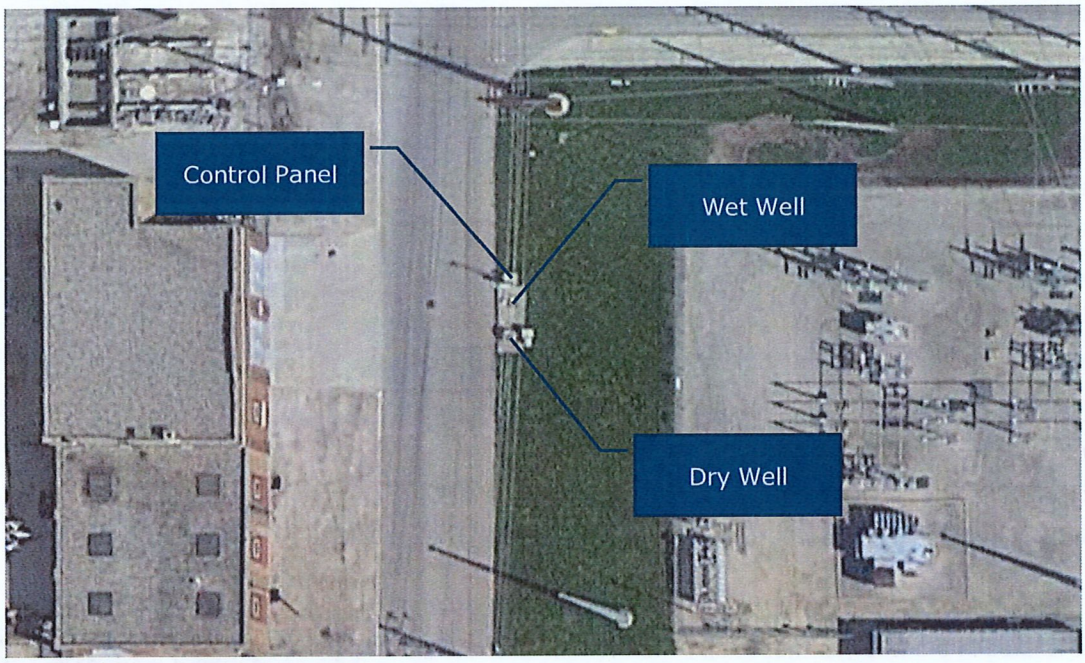
HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Control and Instrumentation	Verify level sensor operation, and high-level alarm operation	N/A
High	Valve Vault	Install duck bill back flow preventer on valve vault gravity drain	Cost included in Additional Maintenance items
High	Electrical	Install conduit seal offs from wet well level sensors, or provide physical barrier from wet well like is done with pumps	$3,000
High	Electrical	Replace terminal blocks in wet well level sensor termination enclosure	$800
Medium	Valves, Piping & Pumps	Replace pump guide rail brackets with stainless steel	Cost included in Additional Maintenance items
Low	Control and Instrumentation	Repair loose styrofoam in control panel.	$100
Low	Control and Instrumentation	Install ventilation in control panel if experiencing issues with high temperatures.	$2,500
Low	Electrical	Add site light for security and service	$1,800

LIFT STATION NO. 14: IPS



Location: 1023 North Vestal Street, Storm Lake, IA 50588

Constructed: 1966

Pump Size and Name: 3 HP, Fairbanks

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	5	• Top slab is cracked • Lining on interior walls is deteriorating • Vent possibly hit by a vehicle
Dry Well Structure	4	• Prefabricated "Can" structure appeared in poor condition
Valve Vault	N/A	N/A
Meter Vault	N/A	N/A
Valves, Piping & Pumps	5	• Valves do not work • Seal water does not work • Impellers are shot
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	5	• Sump pumps do not work
Control and Instrumentation	3	• Fair condition
Electrical	4	• Enclosures aging and in poor condition • Explosion hazard from conduits leaving wet well
HVAC	4	• Dry well ventilation needs to be updated to meet NFPA 820 code requirements to mitigate explosion hazard

LIFT STATION OVERVIEW

Lift station no. 14, also known as IPS, was constructed in 1966 just south of the intersection of West 10th Street and Vestal Street. IPS functions to pump wastewater from a small, industrial area with 4 customers to a gravity sewer that ties into the Field of Dreams lift station. Wastewater is pumped by means of two 3 horsepower flooded suction pumps over approximately 600 feet. The lift station consists of a wet well, dry well, and control panel. Decommissioning the lift station and gravity feeding wastewater to the Field of Dreams lift station is recommended because of significant deficiencies noted at the time of the field evaluation. If the City chooses to keep the IPS lift station in service, full rehabilitation including new pumps, valves, and process piping will be required to avoid lift station failure. Although construction of a 1000-ft gravity system may be costly, decommissioning the lift station will save both in rehabilitation and long-term operation costs.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the paved road on site. City personnel confirmed the site has sufficient drainage, and the hatch of the wet well has not knowingly been submerged. The dry well structure has a steel manway elevated from the ground surface to prevent I&I from entering the dry well. The lift station does have an alarm signaling system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access, but the hatch to the wet well, the steel manway to the dry well, and the control panel are always locked.

Figure 35. IPS Wet Well.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The functionality, top slab, and interior walls also are in poor condition. The top slab is cracked, and the lining on the interior walls is deteriorating. The hatch to the wet well does not have a safety grate; this is a safety hazard as there is no protection for operators as they open the hatch. The hatch and vent from the wet well may have been hit by a vehicle and appeared damaged.

There is no grinder, screen, or trash basket installed in the wet well. There was minimal solids build-up at the time of the field evaluation. See Figure 35 for the interior of the wet well.

DRY WELL STRUCTURE

The overall coated steel dry well structure appeared in poor condition. Safety is also poor as the structure contained high carbon dioxide levels without ventilation. The equipment in the dry well is accessible, but poorly functioning. The interior walls and equipment are aged and require maintenance or replacement.

VALVE VAULT

N/A

METER VAULT

N/A

VALVES, PIPING & PUMPS

The two pumps in the dry well are flooded suction and are not on VFDs. The seal water systems on the pumps do not function properly. The pumps are approximately 54 years old and are in poor condition. The check valves are also in poor condition and do not function properly. City personnel confirmed neither the pumps nor the check valves can be easily isolated for maintenance. Full replacement of the dry well is recommended if the gravity bypass and station decommissioning option is not selected. See Figure 36 for one of the pumps and the interior of the dry well.

Figure 36. IPS Dry Well Interior.

ODOR CONTROL

There are no notable issues or modifications needed.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The IPS lift station does not have a grinder, screen, or trash basket installed. The sump pump installed in the dry well is in poor condition and does not function properly. The sump pump was submerged with raw wastewater at the time of the field evaluation.

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix control was installed for remote monitoring by the wastewater plant via telemetry.

ELECTRICAL

The equipment is aging. All metallic enclosures have peeling paint or visible corrosion. Conduit seal-offs are not installed in the conduits from the wet well and dry well to the control panel to provide an explosion barrier.

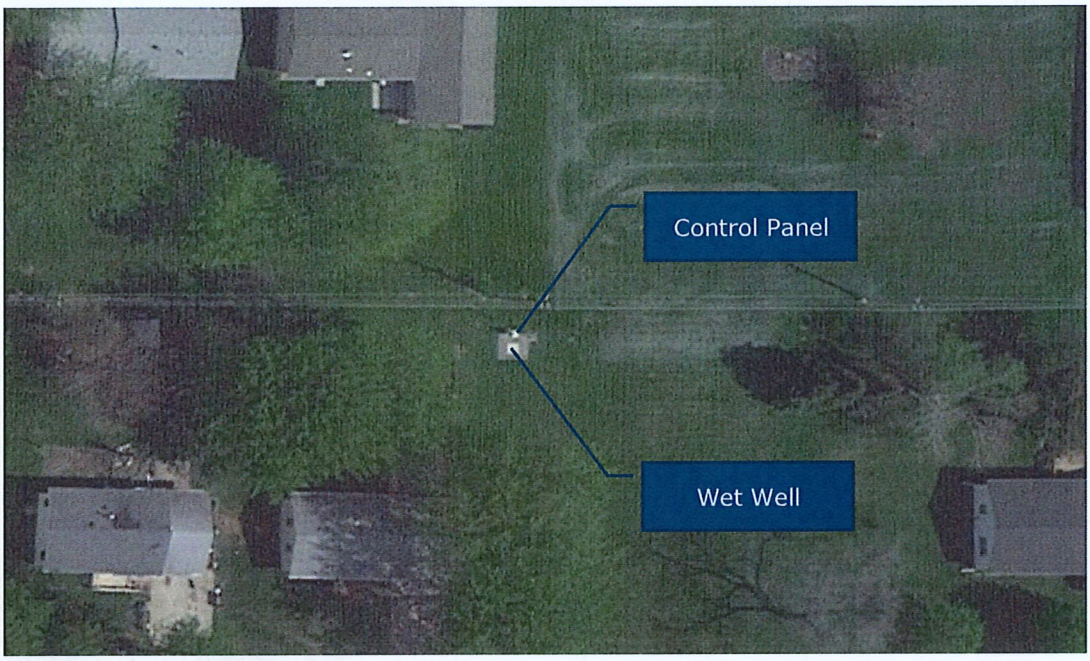
HVAC

The dry well has a vent fan that appears to energize with the lights but does not meet NFPA 820 code requirements.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	N/A	Decommission lift station and gravity feed wastewater to Field of Dreams lift station	$265,525
High	N/A	Full rehabilitation	$59,760

LIFT STATION NO. 17: NORTHWESTERN



Location: 1151 1/2 Maple Street, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 1 HP, Goulds

Category	Overall Rating	Notes
Site	3	• Potentially will need ROW access or easement • Poor drainage
Turf/Landscaping	1	• Good condition
Building Structure	N/A	N/A
Wet Well Structure	4	• Major solids build-up • Cast-in-place, I&I through seams of concrete • Top slab appeared in poor condition
Dry Well Structure	N/A	N/A
Valve Vault	N/A	N/A
Meter Vault	N/A	N/A
Valves, Piping & Pumps	3	• Station is not fully duplex • Inlet pipe appeared in poor condition • Check valve not accessible
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	3	• Fair condition
Electrical	4	• Enclosures aging and in poor condition. • Explosion hazard from conduits leaving wet well.
HVAC	N/A	N/A

LIFT STATION OVERVIEW

Lift station no. 17, also known as Northwestern, was constructed in a residential area on the northwest side of the City. This lift station is currently on residential property not owned by the City and is surrounded by several other residential properties. Northwestern functions to pump wastewater from the small, nearby neighborhood with approximately 10 homes to a gravity sewer that ties into the Scout Park lift station. Wastewater is pumped by means of one 1 horsepower submersible pump and gravity flows approximately 6,500 feet. The lift station consists of a wet well and control panel. Full rehabilitation of the lift station is recommended because of several deficiencies noted at the time of the field evaluation.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in poor condition. Service vehicles do not have an access road or ample space to access the lift station for maintenance. The existing ground and nearby construction of a house have caused poor drainage around the site. The site is located on residential property; purchase of an easement is recommended to be obtained by the City to allow for access to the site. The lift station does have an alarm signaling system in place to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect from unauthorized access, but the wet well and control panel are always locked. See Figure 37 for the site.

Figure 37. Northwestern Site.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. The grass was cut, and there were no plants obstructing access to the wet well or control panel. There were no other notable landscaping issues or modifications to discuss.

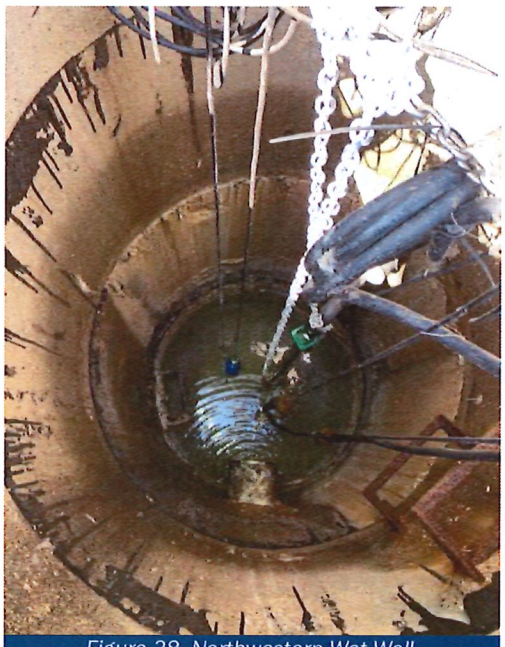


Figure 38. Northwestern Wet Well.

BUILDING STRUCTURE

N/A

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The general functionality of the wet well is poor, and the top slab and interior walls appeared in poor condition. The hatch to the wet well does not have a safety grate and is a safety hazard to operators as they are not protected when they open the hatch. The top slab is cracked and flush with the ground, the hatch is offset from its original placement, and water infiltrates the cast-in-place wet well through the seams of the interior walls. Removing the existing top slab and replacing it with a new, raised slab is recommended; a new, accessible latch

with a safety grate is also recommended. The interior walls and bottom of the structure also have major solids build-up. There is no grinder, screen, or trash basket on the inside of the wet well. See Figure 38 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

N/A

METER VAULT

N/A

VALVES, PIPING & PUMPS

The single submersible pump in the wet well is a 1 horsepower sump pump and is not on a VFD. There are no pump guide rails, and the station is not fully duplex. Removing the existing sump pump and installing two rail mounted submersible sump pumps for redundancy is recommended. The check valve in the wet well is in a vertical orientation against Ten State Standard guidance and is not accessible for maintenance. The inlet pipe also appeared in poor condition.

ODOR CONTROL

There are no notable issues or modifications needed.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes relay-based controls. An Allen Bradley Micrologix controller was installed for remote monitoring by the wastewater plant via telemetry.

ELECTRICAL

The equipment is aging. All metallic enclosures have peeling paint or visible corrosion. Conduit seal-offs are not installed in the conduits from the wet well to the control panel to provide an explosion barrier.

HVAC

N/A

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	N/A	Full rehabilitation	$25,600
High	Site	Easement purchase	TBD by City

LIFT STATION NO. 20: SCOUT PARK

Location: 904 Lighthouse Drive Scout Park, Storm Lake, IA 50588

Constructed: Unknown

Pump Size and Name: 75 HP, Smith and Loveless

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	2	• Appeared aged, but in fair condition
Wet Well Structure	5	• Barrell structure is spalling, interior walls are deteriorating • Wastewater is plunging more than 2 feet.
Dry Well Structure	5	• Hearing protection required • Grating appeared aged and in poor condition • Equipment is accessible
Valve Vault	N/A	N/A
Meter Vault	N/A	N/A
Valves, Piping & Pumps	5	• Pump 1 does not work, seal water does not work • Impeller on Pump 3 is in poor condition • Pumps 2 and 3 have poor seal water systems • Pump 1 gate valve does not work
Odor Control	1	• Good condition
Auxiliary Equipment – Hoists, Screening, Other	N/A	N/A
Control and Instrumentation	2	• Good condition
Electrical	4	• Equipment inside building and is in fair condition • Explosion hazard from conduits leaving wet well
HVAC	4	• Generator room louvers in open position • Permanent cooling system not installed in electrical room • Explosion hazard risk due to dry well ventilation that does not appear to meet NFPA 820 code

LIFT STATION OVERVIEW

Lift station no. 20, also known as Scout Park, was constructed along Lighthouse Drive in Scout Park. Scout Park functions to pump wastewater from a large commercial and residential service area with over 100 homes, several businesses, several churches, a hospital, an elementary school, and a middle school to a gravity sewer that feeds into the Memorial lift station. Wastewater is pumped by means of three 75 horsepower flooded suction pumps over approximately 11,300 feet. The lift station consists of a wet well, dry well, building, generator, and control panel. The building structure houses the entrance to the dry well, the generator, and the control panel. Full replacement of the lift station is recommended because of several deficiencies noted at the time of the field evaluation.

SITE

The site is not located in the 100-year floodplain. The overall site appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the paved road and grassy lawn on site. City personnel provided appropriate information to confirm the site has sufficient drainage, and the manhole to the wet well has not been submerged. The lift station site does have an alarm system to notify operators of any malfunctions or emergencies. The site does not have a fence and gate to protect against unauthorized access, but the wet well is protected by a manhole cover and the building structure is always locked.

Figure 39. Scout Park Building Structure.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications needed.

BUILDING STRUCTURE

The overall building structure appeared in fair condition. The structure appeared aged and weathered, and the roof and door appeared to have storm damage. See Figure 39 for the building structure.

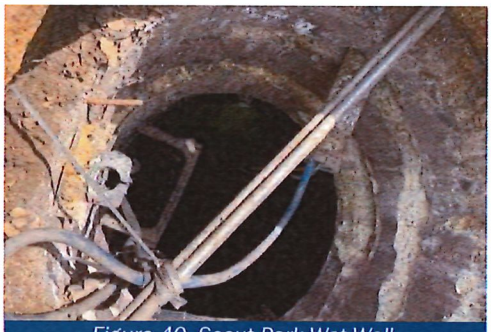


Figure 40. Scout Park Wet Well.

WET WELL STRUCTURE

The overall concrete wet well structure appeared in poor condition. The barrel of the structure is severely spalled, and the interior walls of the structure are deteriorating. The inlet pipe to the wet well allows wastewater to plunge more than two feet to the wet well. There is no grinder, screen, or trash basket installed in the wet well. See Figure 40 for the interior of the wet well.

DRY WELL STRUCTURE

The overall coated steel dry well structure appeared in poor condition. The steel manway at the entrance to the dry well appeared in good condition as it is protected by the building structure. The remainder of the structure, however, appeared aged and rusted. Operators also must wear hearing protection in order to enter the structure because of equipment noise. The equipment in the dry well is accessible but failing. See Figure 41 for the entrance to the dry well.

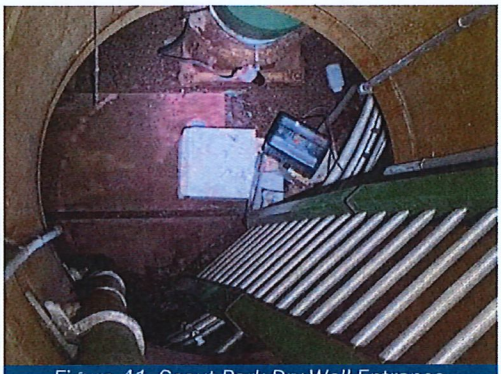


Figure 41. Scout Park Dry Well Entrance.

VALVE VAULT

N/A

METER VAULT

N/A

VALVES, PIPING & PUMPS

The three pumps in the dry well are flooded suction and are on VFDs. Neither the seal water system on Pump 1 nor the pump are operational. The gate valve for Pump 1 is frozen closed. Isolating the pump for service and maintenance is difficult because of these issues. Pumps 2 and 3 have poor seal water systems, and the impeller on Pump 3 is in poor condition. The pumps will wear quickly without properly functioning seal water systems. Replacing the pumps and valves is recommended as interim rehabilitation to keep the station in service awaiting full replacement. The lift station also does not have bypass provisions in case of backups. See Figure 42 for the check valves in the interior of the dry well.

Figure 42. Scout Park Dry Well Interior.

ODOR CONTROL

There are no notable issues or modifications needed.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

N/A

CONTROL AND INSTRUMENTATION

The lift station utilizes an Allen Bradley Micrologix PLC controller. The lift station is remote monitored via fiber optic cable. Part of the old control system appears to still be utilized for the wet well water level, which may be confusing to troubleshoot.

ELECTRICAL

The electrical equipment is a mix of old/unused and new equipment in the generator room. The VFD room makes it confusing to understand what is in service and what is not. Conduit seal-offs are not installed in the conduits from the wet well and dry well to provide an explosion barrier.

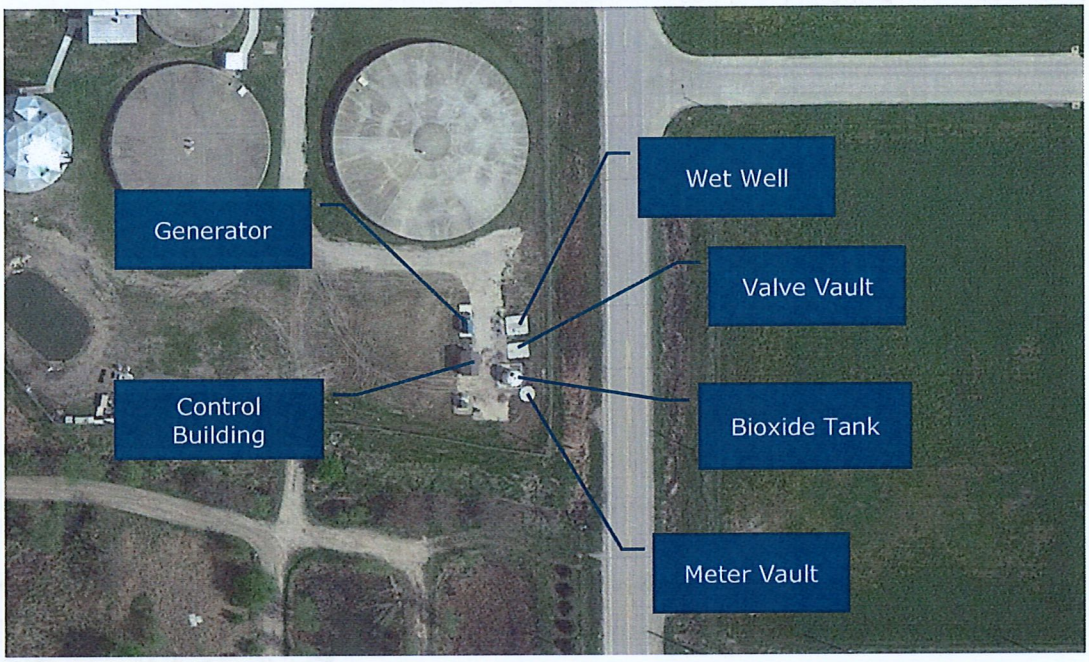
HVAC

The dry well ventilation does not appear to meet NFPA 820 code requirements. A portable mechanical cooling unit was installed to maintain temperature for variable frequency drives.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	N/A	Full replacement	$1,200,000
High	N/A	New pumps and valves (interim rehabilitation)	$11,600

LIFT STATION NO. 22: WATER PLANT



Location: 6011 Highway 110, Storm Lake, IA 50588

Constructed: 2014

Pump Size and Name: 58 HP, ABS

Category	Overall Rating	Notes
Site	1	• Good condition
Turf/Landscaping	1	• Good condition
Building Structure	1	• Good condition
Wet Well Structure	1	• Lime added directly to wet well • Interior walls not epoxy coated
Dry Well Structure	N/A	N/A
Valve Vault	2	• No back-flow preventer • Gravity drainage to wet well
Meter Vault	2	• Flooded at time of field evaluation • Has a history of flooding
Valves, Piping & Pumps	1	• Valves appear in good condition
Odor Control	1	• Use bioxide for odor control • Secondary containment needs sump pump for drainage of storm water
Auxiliary Equipment – Hoists, Screening, Other	1	• Trash basket
Control and Instrumentation	3	• Generally good condition, but flow meter is not working
Electrical	4	• Interior building equipment is in good condition. • Exterior equipment is in fair condition. • Explosion hazard from level sensor conduits leaving wet well. • Wet well level sensor terminal blocks corroding.
HVAC	1	• Building HVAC equipment in good condition

LIFT STATION OVERVIEW

Lift station no. 22, also known as Water Plant, was constructed in 2014 on the property of the Storm Lake water treatment plant on Highway 110. Water Plant functions to pump wastewater from the water plant and small residential service area of approximately 10 homes to a gravity sewer that feeds into the Casino lift station. Wastewater is pumped by means of four 58 horsepower submersible pumps over approximately 8,700 feet. The lift station consists of a control building, generator, wet well, valve vault, bioxide tank, and meter vault.

SITE

The site is not located in the 100-year floodplain. The overall site of the lift station appeared in good condition. Service vehicles have ample space to access the lift station for maintenance via the gravel access road on site. City personnel confirmed the site has sufficient drainage, and the hatches of the wet well and valve vault have not knowingly been submerged. The lift station does have an alarm system in place to notify operators of any malfunctions or emergencies. The site does have a fence and gate because it is located on the City's water plant property, and all structures are always locked.

Figure 43. Water Plant Building Structure.

TURF/LANDSCAPING

The overall landscaping appeared in good condition. There were no notable landscaping issues or modifications to discuss.

BUILDING STRUCTURE

The overall building structure appeared in good condition. There were no structure quality issues or modifications to discuss. See Figure 43 for the building structure.

WET WELL STRUCTURE

The overall concrete wet well structure appeared in good condition. The functionality of the wet well is good, and the top slab and interior walls appeared in good condition. The hatches to the wet well do not have safety grates; this is a safety issue as there is no protection for operators as they open the hatches to the wet well. There is no grinder or screen, but there is a trash basket installed so large, solid materials can be removed from the wastewater. The trash basket was not in place at the time of the field evaluation. The interior walls are not epoxy coated and there is a thick layer of lime build-up on the walls and pipes. Lime softening waste generated by the water plant is poured directly into the Water Plant lift station primarily to provide alkalinity to the wastewater treatment plant. The lime also raises the pH of the wastewater and

Figure 44. Water Plant Wet Well.

reduces hydrogen sulfide to control odors in the collection system. The lime build-up was not a concern at the time of the field evaluation. See Figure 44 for the interior of the wet well.

DRY WELL STRUCTURE

N/A

VALVE VAULT

The overall concrete valve vault structure appeared in good condition. The functionality of the vault is good, and the drainage from the vault is good. The bottom slab of the vault is angled to allow for gravity drainage to the wet well; however, there is no back-flow preventer on the effluent side of the drainage pipe. Installation of a duck bill back-flow preventer is recommended to prevent flooding of the valve vault in the event the lift station floods with raw wastewater and surpasses the elevation of the valve vault drainpipe. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 45 for the interior of the valve vault.

Figure 45. Water Plant Valve Vault.

METER VAULT

The overall concrete meter vault structure appeared in good condition. The functionality of the vault is fair, and the drainage is poor. There is a gravity drain from the vault to the wet well; however, the vault has flooded with storm water in the past and the vault was flooded with storm water at the time of the field evaluation. City staff confirmed this was because the gravity drain is blocked. Cleaning the gravity drain to repair the drainage in the vault is recommended. The electromagnetic flow meter is functional, but the remote mounted flow transmitter is not. Repairing or replacing the flow transmitter is recommend; refer to the control and instrumentation category. The interior walls and top slab of the vault appeared in good condition with minimal corrosion and spalling. See Figure 46 for the interior of the meter vault.

Figure 46. Water Plant Meter Vault.

VALVES, PIPING & PUMPS

The four submersible pumps in the wet well are on VFDs. The pumps are six years old and in good condition. The pump guide rails are in good condition, though they are covered in a thick layer of lime from the water treatment plant. The check valves are accessible for maintenance and are in a horizontal orientation in the valve vault. The check valves and plug valves observed in the valve vault and meter pit appeared in good condition. The valve vault also houses a pressure relief valve intended to provide relief from hydraulic transients. The Water Plant lift station does not have any bypass provisions in case of backups.

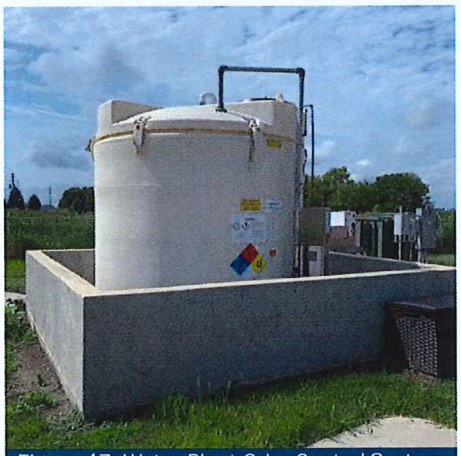


Figure 47. Water Plant Odor Control System.

ODOR CONTROL

The Water Plant lift station has an odor control system consisting of a bioxide tank, chemical feeds, and secondary containment. Bioxide is dosed directly to the wet well via the chemical feeds to remove and prevent the formation of hydrogen sulfide, reduce corrosivity, and eliminate sewage odors. The secondary containment is a concrete containment wall surrounding the bioxide tank that often collects storm water. City staff noted that the secondary containment needs a sump pump to drain excess storm water. See Figure 47 for the odor control system.

AUXILIARY EQUIPMENT – HOISTS, SCREENING, OTHER

The Water Plant lift station does not have a grinder or screen installed but does have a trash basket. The trash basket was not in place at the time of the field evaluation. There are no other notable pieces of equipment, issues, or modifications to discuss in this category.

CONTROL AND INSTRUMENTATION

The control system utilizes an Allen Bradley Compact Logix system that is located inside the building and is in good condition. There is remote monitoring by the wastewater plant via fiber optic cable. The flow transmitter is remote mounted in the pump control panel, but it does not work. Repairing or replacing the flow transmitter is recommended for ease of operation.

ELECTRICAL

The wet well pump cable/conduit installation is adequate for the separation of an explosion hazard. Conduit seal-offs are not installed in the conduits from the wet well level sensors to the termination enclosure to provide an explosion barrier. The terminal blocks are also corroding.

HVAC

The building contains mechanical cooling, outdoor ventilation, and a resistive heater. The equipment appears in good condition.

RECOMMENDATIONS BASED ON PRIORITY

Priority	Category	Recommendation	Estimated Cost
High	Electrical	Install weatherproof in-use cover (exterior receptacle)	$100
High	Electrical	Install conduit seal offs from wet well level sensors	$4,000
High	Electrical	Replace terminal blocks in wet well level sensor termination enclosure	$800
High	Valve Vault	Install duck bill back-flow preventer on valve vault gravity drain	Cost included in Additional Maintenance items
Medium	Meter Vault	Clean out gravity drain	N/A
Medium	Control and Instrumentation	Repair/replace and relocate flow transmitter inside pump control panel, and provide submersible rated flow tube/connection	$4,000
Low	Electrical	Install photocell to exterior building light for automatic operation	$900

CONCLUSION

The City of Storm Lake may use this report to gain a better understanding of sanitary lift station facility needs to prioritize, budget and schedule recommended improvements. Rehabilitation, component replacement, and full replacement of select lift stations are some examples of the recommended improvements. The lift stations evaluated in this report were reviewed based on two broad categories – safety and functionality. The evaluation categories for each lift station included site, turf/landscaping, building structure, wet well structure, dry well structure, valve vault, meter vault, valves, piping & pumps, odor control, auxiliary equipment, control and instrumentation, electrical, and HVAC.

While not addressed specifically in this report, our assessments of the lift stations lead us to recommend the City develop, fund, and implement an O&M plan to manage all sanitary lift stations. This plan may help address general operation and maintenance needs effectively and proactively with an adequate budget. The O&M plan would address routine cleaning, maintenance, and other related services. Some examples of these services include power washing interior walls of wet wells, routine inspection and cleaning of valves, routine exercising of valves, and routine inspection of lift station sites. This will assist in preventing premature equipment breakdowns, while saving costs on repairs.

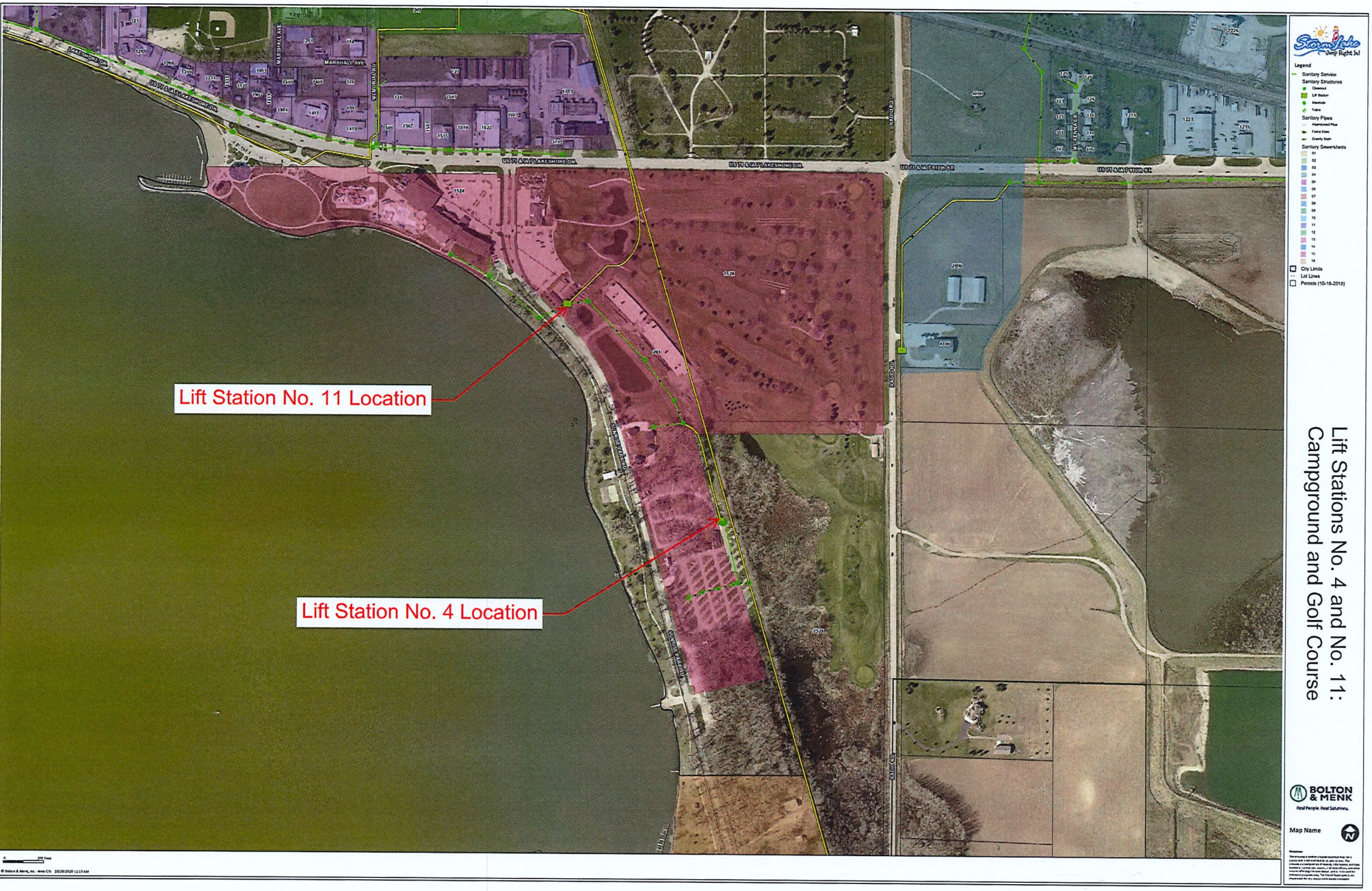
The goal of this report is to help the City gauge the intended use of the $200,000 yearly wastewater budget. The summary table found in the executive summary includes recommendations for the yearly budget. Replacements and/or rehabilitation of the 1st Street, Ice House, IPS, and Scout Park lift stations will most likely require other funding sources such as grants or loans. Consulting the City's financial advisor is recommended to conduct a financial analysis and maximize the use of grants and loans.

Appendix A: Sewershed Maps

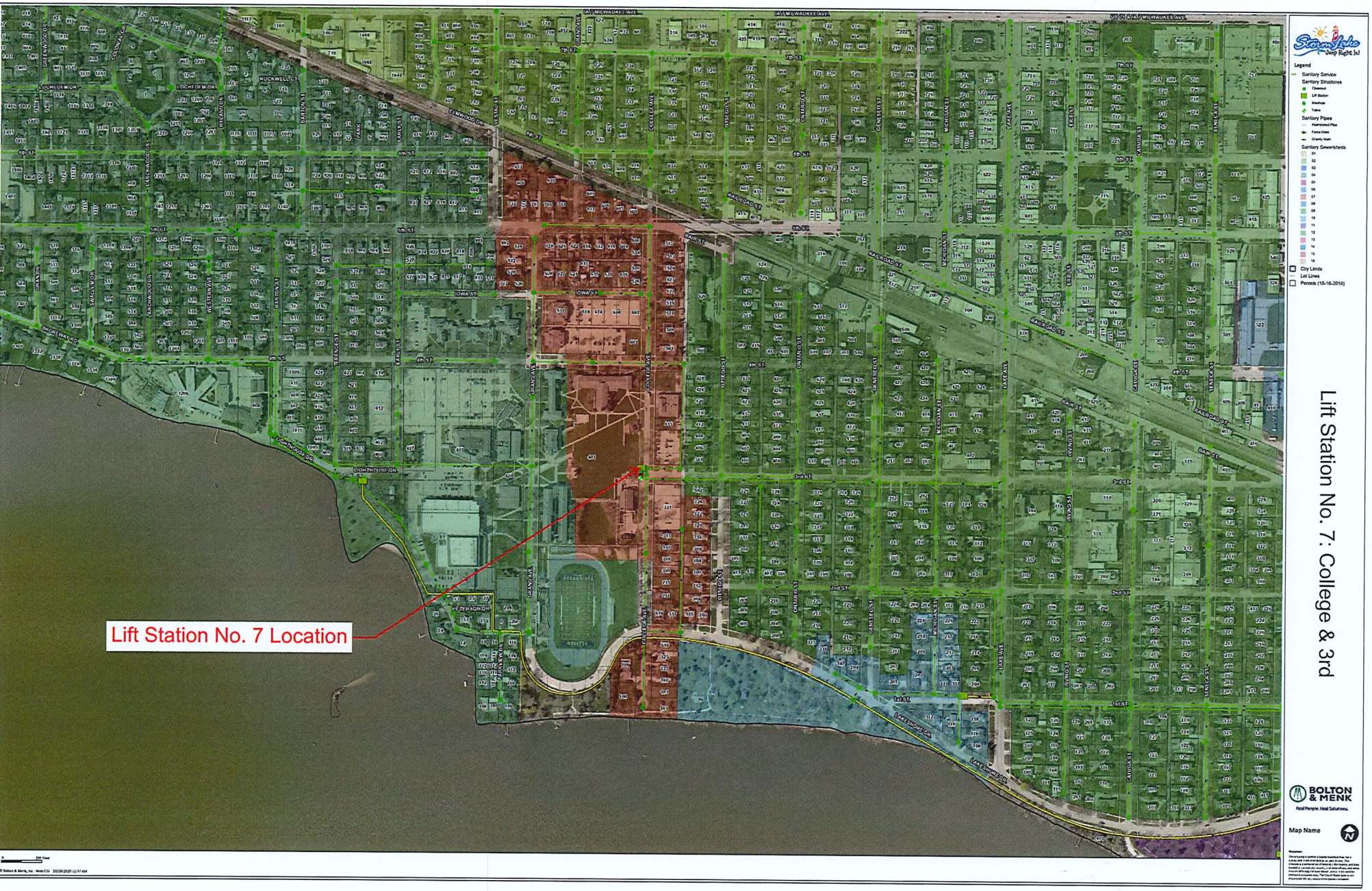
Overview of Sewersheds

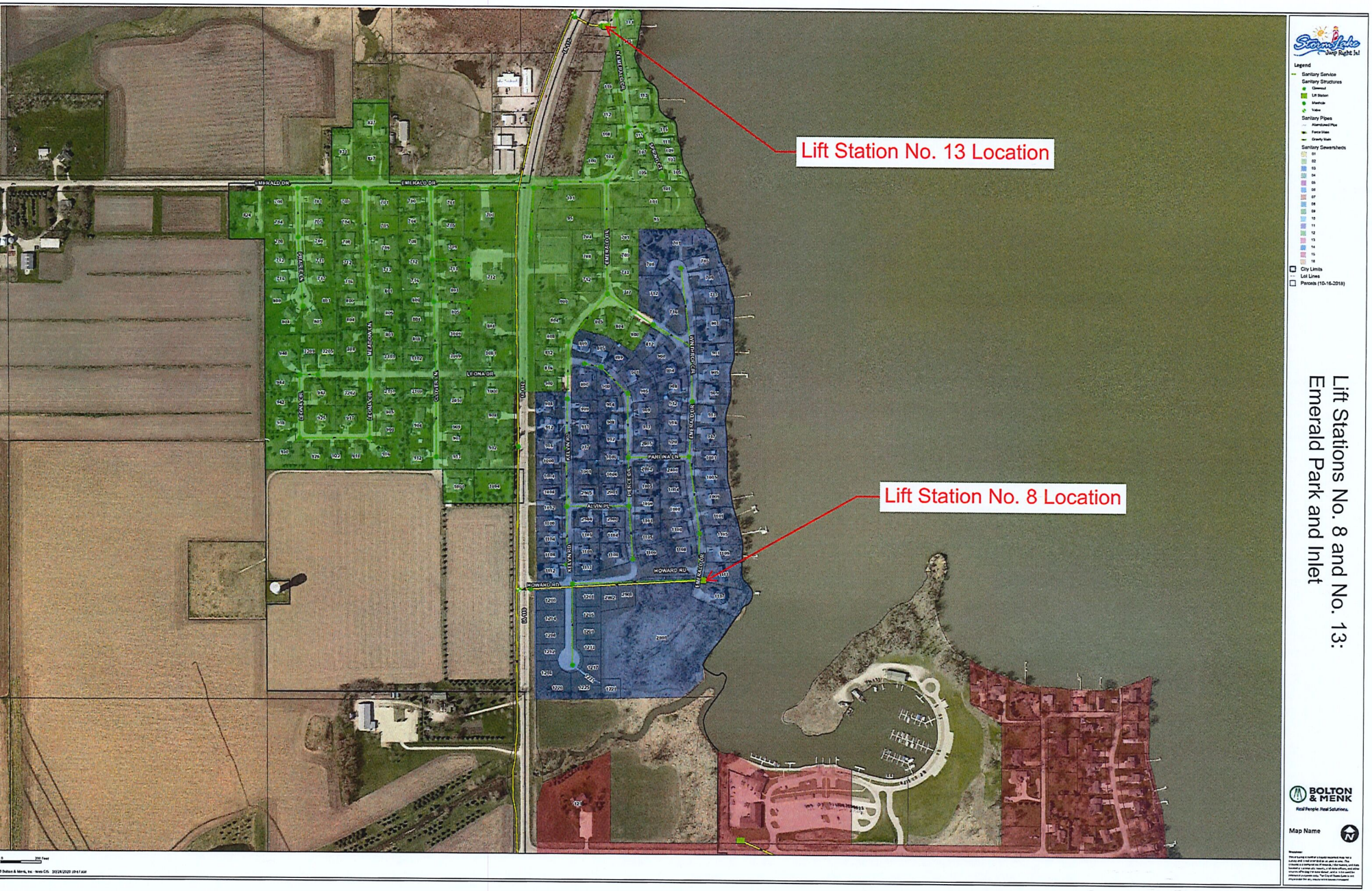

Lift Station No. 1 Location
Lift Station No. 1: 1st Street
Storm Lake
Jump Right In!
Legend
Sanitary Service
Sanitary Structures
Sanitary Pipes
Sanitary Sewersheds
City Limits
Lot Lines
Parcels (10-16-2018)
BUENA VISTA
COLLEGE AVE
ONTARIO ST
GENESEE ST
MICHIGAN ST
LAKE AVE
ERIE ST
CAYUGA ST
LAKESHORE DR
1st ST
2nd ST
BOLTON & MENK
Real People. Real Solutions.
Map Name


Lift Station No. 2: Bargloff
Lift Station No. 2 Location
BOLTON & MENK
Real People. Real Solutions.
Map Name
Legend


Lift Station No. 11 Location
Lift Station No. 4 Location
Lift Stations No. 4 and No. 11:
Campground and Golf Course
Legend
Sanitary Service
Sanitary Structures
Sanitary Pipes
Sanitary Sewersheds
City Limits
Lot Lines
Parcels (10-16-2018)
BOLTON & MENK
Real People. Real Solutions.
Map Name

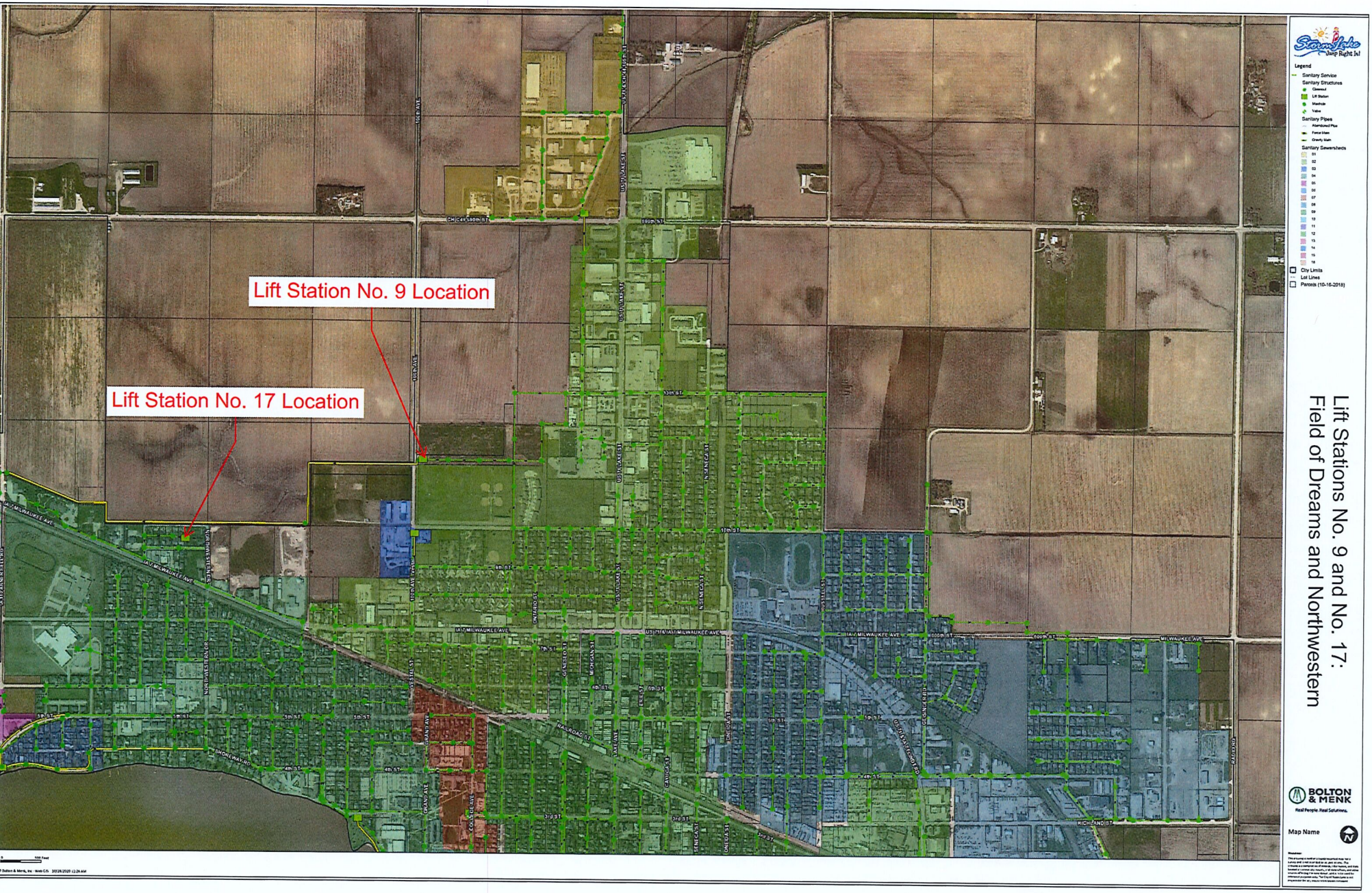
Lift Station No. 5: Casino


Lift Station No. 7 Location
Lift Station No. 7: College & 3rd
Storm Lake
Jump Right In!
Legend
Sanitary Service
Sanitary Structures
Cleanout
Lift Station
Manhole
Valve
Sanitary Pipes
Abandoned Pipe
Force Main
Gravity Main
Sanitary Sewersheds
City Limits
Lot Lines
Parcels (10-16-2018)
BOLTON & MENK
Real People. Real Solutions.
Map Name

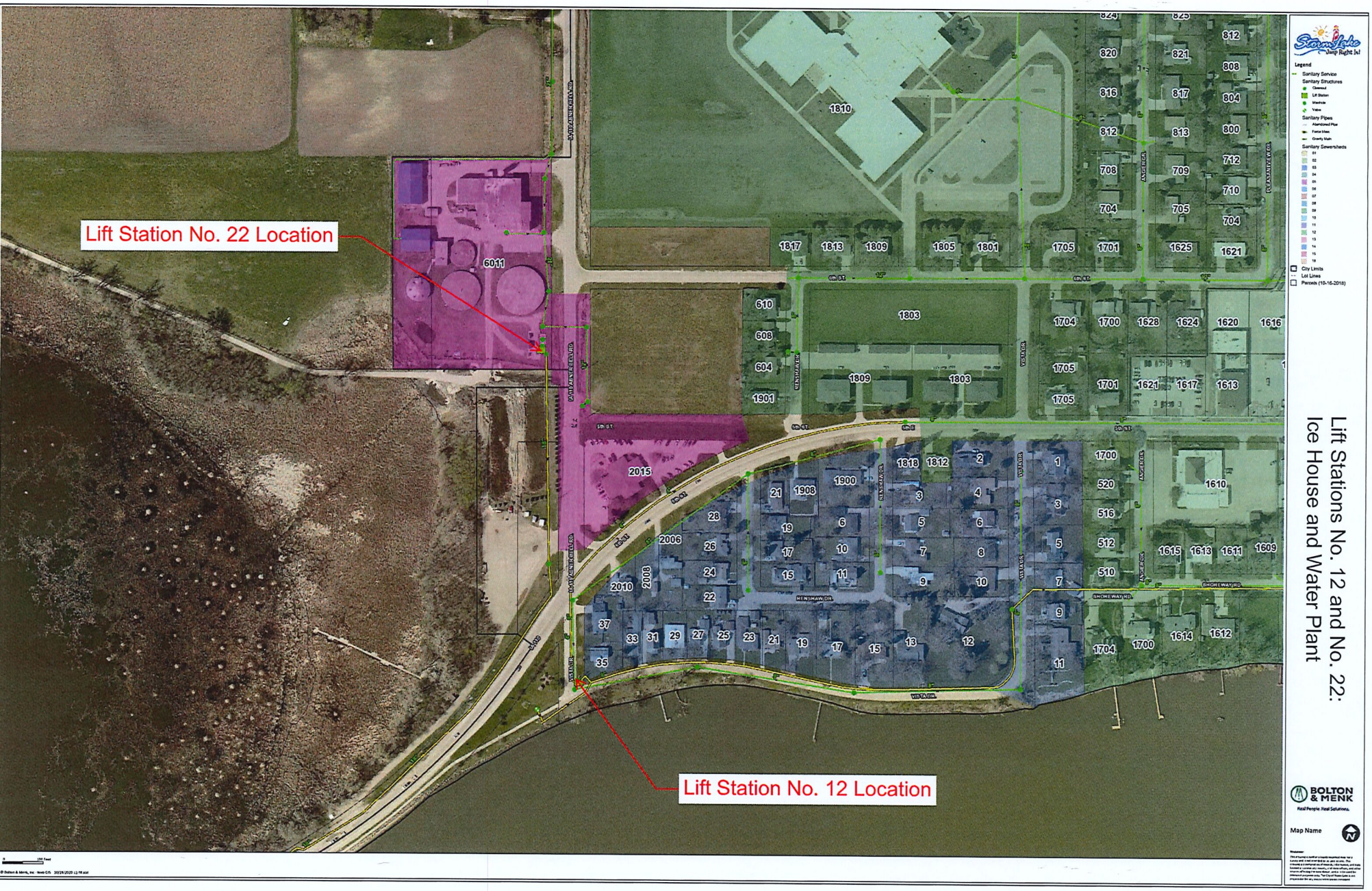


Lift Stations No. 8 and No. 13: Emerald Park and Inlet

BOLTON & MENK
Real People. Real Solutions.


Lift Station No. 9 Location
Lift Station No. 17 Location
Legend
Sanitary Service
Sanitary Structures
Sanitary Pipes
Sanitary Sewersheds
City Limits
Lot Lines
Parcels (10-16-2018)
Lift Stations No. 9 and No. 17:
Field of Dreams and Northwestern
BOLTON & MENK
Real People. Real Solutions.
Map Name

Lift Stations No. 10 and No. 20: Frank Starr Park and Scout Park


Lift Station No. 22 Location
Lift Station No. 12 Location
Lift Stations No. 12 and No. 22:
Ice House and Water Plant
Storm Lake
Legend
Sanitary Service
Sanitary Structures
Sanitary Pipes
Sanitary Sewersheds
City Limits
Lot Lines
Parcels (10-16-2018)
BOLTON & MENK
Real People. Real Solutions.
Map Name
6011
2015
1810
1803
1809
1803
1901
1817
1813
1809
1805
1801
1705
1701
1625
1621
1704
1700
1628
1624
1620
1616
1705
1701
1621
1617
1613
610
608
604
1818
1812
1900
1908
2006
2008
2010
1700
520
516
512
510
1610
1615
1613
1611
1609
1614
1612
1704
1700
SHORE WAY RD
KENSHAW DR
VISTA DR
ANGELINA
6TH ST
5TH ST


Lift Station No. 14 Location
Lift Station No. 14: IPS
Storm Lake
Legend
Sanitary Service
Sanitary Structures
Cleanout
Lift Station
Manhole
Valve
Sanitary Pipes
Abandoned Pipe
Force Main
Gravity Main
Sanitary Sewersheds
City Limits
Lot Lines
Parcels (10-16-2018)
BOLTON & MENK
Real People. Real Solutions.
Map Name
1117
5941
1124
1122
1118
1114
1102
1020
1016
1014
1010
1006
1002
701
1018
1014
824
830
820
811
826
823
821
1123
1301
410
406
914
910
906
405
401
824
820
10th St
9th St
8th St
CHEROKEE ST
BANTA AVE
EXPRESSWAY

Lift Stations