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**To:** City of Prairie City, IA  
**From:** Andrew Inhelder, PE, MSA Professional Services, Inc.  
**Subject:** Commerce Drive Lift Station Analysis 2021  
**Date:** January 12, 2022

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The City of Prairie City commissioned MSA Professional Services, Inc (MSA) to investigate the Commerce Drive lift station capacity for existing and future wastewater flows in February 2021. However, after reviewing several months of data, it appeared there were performance issues with the pumps due to sand and grit in the collection system. The review was put on hold to investigate the sand and grit concern, along with identifying areas of inflow and infiltration (I/I). In November, the investigation was reinitiated using more recent data, from June 2021 to September 2021.

#### **Existing Conditions**

MSA staff visited the Commerce Drive lift station several times throughout 2021. Existing average daily flow was approximately 8,800 gpd (6 gpm) based on pump run times provided by the City for June 2021 to September 2021. The duplex lift station was installed in 1993 and includes a wet well with submersible pumps and valve vault. Pumps were replaced in 2019. Each submersible grinder pump is rated for 13 gpm at 18.5 feet of total dynamic head with 1 hp motors. When one pump cannot keep up with influent flow, the second pump turns on. Maximum flow, calculated between pump on and off cycles, was 9.3 gpm and occurred on June 2, 2021. There is not standby power at the lift station.

At least one of the pumps continued to experience performance issues throughout the review period. It was determined sand and grit was still entering the system, likely from the local car wash. The City has spoken to the car wash owner about installing additional infrastructure on their sewer service to stop sand and grit from entering the City's collection system.

A utility extension along Poplar Avenue was constructed for commercial development in 2020. Before the commercial development extension was installed, the lift station saw approximately 6,800 gpd (4.7 gpm). Shortly after the extension was constructed (and Dollar General was online), the lift station began to record high pump run times. However, this maybe have been due to sand and grit build up within the lift station, reducing the efficiency of the pumps and resulting in longer run times. It was also observed that I/I was potentially entering the collection system from certain areas upstream of the lift station. The sanitary sewer was televised and areas of I/I were eliminated in the public sanitary sewer main in May - July 2021.

Dollar General has a lift station on their sewer service with one 50 gpm submersible pump rated at 50 feet of total dynamic head with a 2 hp motor. This service flows to the Commerce Drive lift station. When this pump is active, the flow rate exceeds the capabilities of the Commerce Drive lift station pumps, however the volume of wastewater coming from Dollar General is minimal.

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At one of the lift station inspections, it was noted there was infiltration within the valve vault, which drains to the wet well. Infiltration was also noticed near the bottom barrel section of the wet well, between the pump discharge piping.

High water level (HWL) alarm was active multiple times throughout the review period. HWL alarm summary is provided below. In June and September the City experienced issues with grit in the wet well which damaged the pumps, resulting in the many HWL alarms.

**Table I: Commerce Drive Lift Station HWL Alarm Summary**

Month/Year	Average Daily Flow	HWL Alarm
June 2021	5.30 GPM	12
July 2021	4.96 GPM	0
August 2021	4.84 GPM	0
September 2021	4.95 GPM	25

### **Proposed Conditions**

Commerce Drive lift station is proposed to serve a service area for new development on the west side of town, along Poplar Avenue. The service areas are shown in the attached exhibits.

### Future Service Areas

Future service area includes 95 acres of residential and a total of 23 acres of commercial. 8 acres of the commercial area is already developed. Iowa Department of Natural Resources (DNR) design recommendations state a sewer usage of 100 gpd per capita be used when sizing sewer infrastructure and 10 people per acre for single family residential. Iowa DNR design recommendations for commercial wastewater flow is 5,000 gpd/acre, however the City has existing flow information from the lift station for the current commercial properties. Peaking factors are applied to residential, but not commercial wastewater flow.

Based on existing topography, the area outlined for service is currently not able to be completely served by gravity. Exhibits provided within the memo show the proposed residential and commercial growth boundaries capable of being served by gravity based upon assumed conditions. If the City would like to serve the areas hatched in red, additional lift stations would need to be constructed or installation of low head grinder pumps with each customer.

### Ultimate (Future) Design Flow

Based on the above stated planning area and Iowa DNR design recommendations, the additional residential flow anticipated would be 95,000 gpd and commercial flow would be 16,500 gpd (15 acres using existing commercial flow rate information of 1,100 gpd/acre). Iowa DNR also recommends adding capacity for inflow and infiltration (I/I), at a rate of 95 gallons/acre/day (95 gallons multiplied by 110 acres equals 10,500 gpd of I/I). Anticipate an additional wastewater flow for the currently undeveloped area of 122,000 gpd or 85 gpm.

In summary, the ultimate design flow for the Commerce Drive lift station is planned to be 130,800 gpd or 91 gpm.

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### Recommendations

The Commerce Drive lift station pumps have proven to be capable of handling existing flows, however, recommend continuing to monitor high water level alarms and pump run times. When users are connected to the next sanitary sewer extension, whether for commercial or residential, the pumps will need to be upsized. Pumps are recommended to be sized for the proportion of the service area expected to develop within 20 years. Recommend reevaluating the proposed pump sizes as development occurs, especially if residential development is planned as the next step which often results in higher peak flows.

Recommend eliminating infiltration within the valve vault and wet well with hydrophilic grout. Recommendations on this material have been previously sent to the City.

Confirm the car wash has amended the issue with sand and grit entering the public sanitary system. If larger pumps are installed, they will continue to have the impellers wear and motors damaged due to the sand and grit.

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**EXHIBITS**





# Residential Development Connection Below Grade Floor Gravity Connection Commerce Drive Lift Station Review Prairie City Jasper County, IA

Pipe planning assumes 0.4% slope with 8 - 12' minimum ground cover, connecting to the existing sanitary system at an elevation of 906.2

Proposed Residential Development



Proposed Pipe Depth below Surface (ft)

- Less than 8
- 8-10
- 10-12
- More than 12

Lift Station

Sewer Gravity Mains

Sewer Pressurized Mains

Future Expansion Area

Connection Point: S-70.5

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

Sanitary Manhole

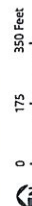
Sanitary Manhole

Sanitary Manhole

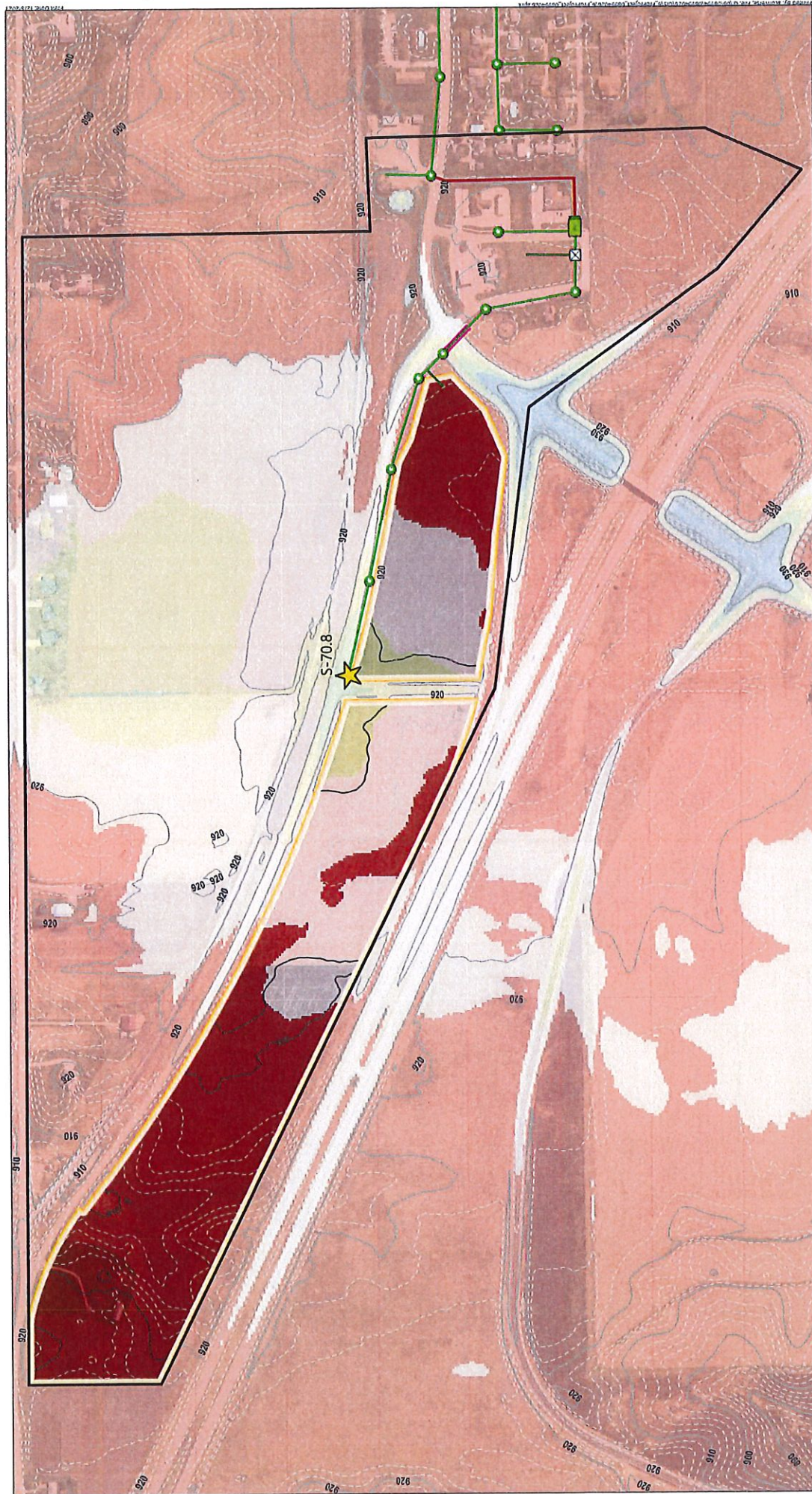
Sanitary Manhole



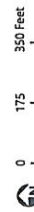
Data Sources:  
Sanitary System: Prairie City  
Aerial: Iowa State  
Contours: Iowa DNR LIDAR







Data Sources:  
Sanitary System: Prairie City  
Aerial: Iowa State  
Contours: Iowa DNR LIDAR



- Future Expansion Area
- Lift Station
- Sewer Gravity Mains
- Sewer Pressurized Mains
- Connection Point: S-70.8
- Sanitary Manhole
- Less than 4
  - 4 - 8
  - 8-10
- Proposed Commercial/Urban Reserve
- 10-12
- More than 12

# **Commercial Development Connection** Slab-on-Grade Gravity Connection Commerce Drive Lift Station Review Prairie City Jasper County, IA

Pipe planning assumes 0.4% slope with 4'-12" minimum ground cover, connecting to the existing sanitary system at an elevation of 910.8



PROJECT SCHEDULE

MSA anticipates the following estimated project schedules:

TASK NAME	START DATE	END DATE	DURATION (CAL DAYS)	PROGRESS
FY23 & FY24 Project Schedules				
Comprehensive Plan	8/1/22	4/15/23	258	60%
City Hall Alleyway Design & Construction <sup>(1)</sup>	12/14/22	7/14/23	213	35%
Library Construction <sup>(1)</sup>	6/1/23	12/1/23	184	
Fire/EMS Building Design & Construction <sup>(4)</sup>	3/8/23	10/1/24	574	
P2 Water Main Improvements Design & SRF <sup>(2)</sup>	4/12/23	12/27/23	260	
P2 Water Main Improvements Bidding & Construction <sup>(2)</sup>	2/1/24	9/2/24	215	
Trunk Water Relocation in Colfax Design <sup>(3)</sup>	6/1/23	9/8/23	100	
Library Site Plan	2/14/23	3/15/23	30	50%

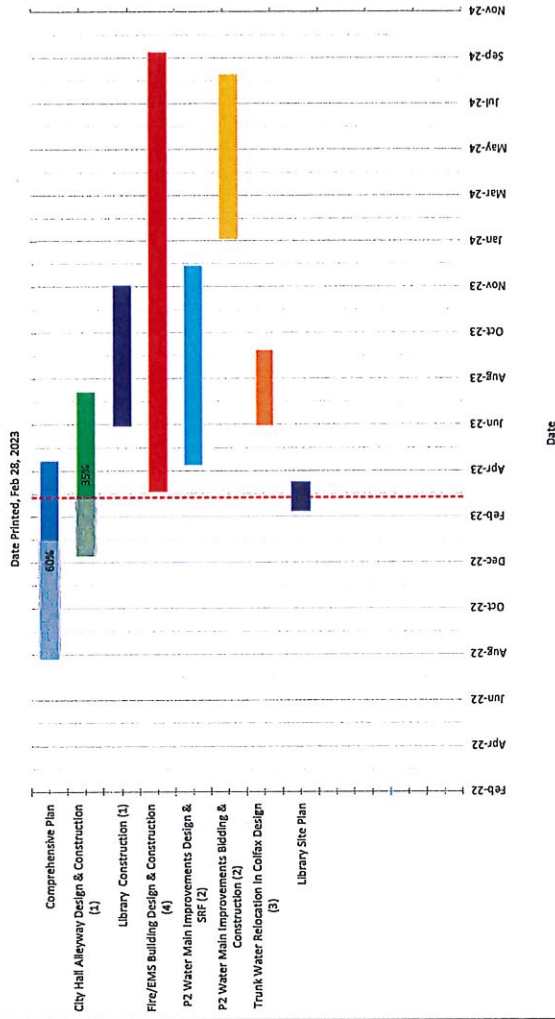
(1) Library improvements anticipated to begin June of 2023. Target alleyway reconstruction pavement complete prior to start of Library to maintain access to Dodge Garage. Duration of construction is assumed.

(2) Phase 2 Water Main Improvement includes road reconstruction along Jefferson St from Main to Marshall, and Main St from Jefferson St to the Bike Trail. This project is anticipated to be paid with SRF (for the water main portion), if utilizing this funding method, project would be anticipated to begin construction in spring of 2024. SRF applications are due quarterly, with review/approval taking roughly 5 months.

(3) Trunk Water Relocation in Colfax: agreement has been presented to Council for review/approval.

(4) Bidding mid/late summer of '23, with construction start Fall of '23, conservative estimate for building occupancy would be Fall of '24.

City of Prairie City Capital Improvements



## **Jerry Moore**

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**From:** Andrew Inhelder <ainhelder@msa-ps.com>  
**Sent:** Friday, March 3, 2023 10:59 AM  
**To:** Jerry Moore  
**Subject:** RE: Lift Station Pump Upsizing Quote

Hi Jerry,

I'll explain some of what the history here is and issues with the current layout.

### **Existing Pumps**

The existing pumps are grinder pumps which basically are spinning knives inside of the pump that grind the waste water down in order to pipe downstream. These pumps are not typically suited for applications where there is sediment entering the lift station. The City went through an exploratory process in the past identifying potential sources of sand, one large contribution was the car wash. The car wash ended up putting in a secondary settling basin on their site which has helped greatly with the sand issue, however the settling basin does not filter out 100% of sediment, especially suspended light sediment. This suspended sediment is entering the lift station pumps where the knives are trying to grind that sediment up and wearing the pumps knives down.

### **Problem**

When the pump knives wear down, the capacity for pumping is reduced. When new, the existing pumps may be pumping close to 13 gallons/min, and after wearing reduce to 10 gpm, or 5gpm, or even less. When this happens, the pumps are unable to keep up with the amount of wastewater entering the lift station and leads to high water alarms sounding. These have been increasing over the past several months and when that happens, Iowa Pump Works comes out to clean out the lift station and maintain the pumps. These costs add up over time, I don't have those costs in front of me but in the past the City Clerk was able to pull the costs to the city up for an analysis.

### **Recommendation**

With the development growth seen in the area of the lift station, these 13 gpm pumps will be undersized (or may already be) for this area, that plus the issue of them being grinder pumps (as opposed to non-clog pumps) is why we are recommending they be upsized and replaced with a type of pump that is less likely to wear due to suspended sediment.

### **Timing**

As far as the immediate need goes, the lift station is not overflowing at this point, so it's not a "hair on fire situation". However, the sediment will not disappear as time goes on. These pumps will continue to need an increasing amount of maintenance. I'd recommend the City look at the financial impacts of repairing the pumps at the current frequency and determine at what point it makes sense to improve the pumps to a non-clog model. If nothing is done, at some point the current pumps will not be able to keep up with the sanitary waste due to wear and the increasing development flows. The lift station may overflow, and potentially back wastewater into neighboring properties.

Hope this helps but please let me know of other questions here.

Thanks,  
Andrew



**Andrew Inhelder, PE** | Project Manager - Public Works  
MSA Professional Services, Inc.  
100% Employee Owned  
+1 (515) 635-3403





**From:** Jerry Moore <jerry.moore@prairiecitiyowa.us>  
**Sent:** Friday, March 3, 2023 10:29 AM  
**To:** Andrew Inhelder <ainhelder@msa-ps.com>  
**Subject:** [EXTERNAL] RE: Lift Station Pump Upsizing Quote

Andrew,


How dire is the situation with the existing lift station pump? Is it connected to an alarm system and is it sounding frequently? Is it failing and/or not keeping up or nearing its useful life cycle?

Thank you,  
Jerry

**From:** Andrew Inhelder <ainhelder@msa-ps.com>  
**Sent:** Friday, March 3, 2023 9:55 AM  
**To:** Jerry Moore <jerry.moore@prairiecitiyowa.us>  
**Cc:** Carl Van Der Kamp <prairiecitiysbrplant@gmail.com>  
**Subject:** Lift Station Pump Upsizing Quote

Hi Jerry,

I've attached a quote from Iowa Pump Works for the upsized lift station pumps. I requested quotes for all the below options listed in the project update, but Iowa Pump Works only provided the attached one which is our recommended option. In addition to this option (or whichever the City picks, MSA would charge ~\$750 for permitting)

- MSA solicited quotes for the below four options:
  - Option A – Replace with 2 larger capacity grinder pumps (not recommended)
    - This option would not require upsizing the 2" outlets within the lift station, grinder pumps in this location would wear quickly due to suspended sediment
    - #A1 – 2, 50gpm grinder pumps.
    - #A2 – 2, 95gpm grinder pumps.
  - Option B – Replace with 2 larger capacity non-clog pumps (recommended approach)
    - This option would require upsizing the 2" outlets within the lift station to 4"
    - #B1 – 2, 50gpm non-clog pumps (most likely will not be permitted by DNR (less than 2fps cleaning velocity in pumps))
    -  #B2 – 2, 95gpm non-clog pumps. (recommended pumps)
- In addition to the estimates from Iowa Pump Works, permitting costs would be \$750

Thanks,  
Andrew



Andrew Inhelder, PE | Project Manager - Public Works  
MSA Professional Services, Inc.  
100% Employee Owned  
+1 (515) 635-3403



## Jerry Moore

---

**From:** Andrew Inhelder <ainhelder@msa-ps.com>  
**Sent:** Friday, March 3, 2023 9:55 AM  
**To:** Jerry Moore  
**Cc:** Carl Van Der Kamp  
**Subject:** Lift Station Pump Upsizing Quote  
**Attachments:** Option B2 - Quote\_QTE003379\_1677709037938.pdf

Hi Jerry,

I've attached a quote from Iowa Pump Works for the upsized lift station pumps. I requested quotes for all the below options listed in the project update, but Iowa Pump Works only provided the attached one which is our recommended option. In addition to this option (or whichever the City picks, MSA would charge ~\$750 for permitting)

- MSA solicited quotes for the below four options:
  - Option A – Replace with 2 larger capacity grinder pumps (not recommended)
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    - #A2 – 2, 95gpm grinder pumps.
  - Option B – Replace with 2 larger capacity non-clog pumps (recommended approach)
    - This option would require upsizing the 2" outlets within the lift station to 4"
    - #B1 – 2, 50gpm non-clog pumps (most likely will not be permitted by DNR (less than 2fps cleaning velocity in pumps))
    - **#B2 – 2, 95gpm non-clog pumps. (recommended pumps)**
- In addition to the estimates from Iowa Pump Works, permitting costs would be \$750

Thanks,  
Andrew



**Andrew Inhelder, PE** | Project Manager - Public Works  
MSA Professional Services, Inc.  
100% Employee Owned  
+1 (515) 635-3403  
  



Iowa Pump Works, Inc.  
825 SW Ordinance Rd  
Ankeny, IA 50023

Quote  
#QTE003379  
03/01/2023

**Bill To**  
Prairie City IA, City of  
203 E Jefferson St  
Prairie City IA 50228  
United States  
Phone:

**Ship To**  
Prairie City IA, City of  
88th St  
Prairie City IA 50228  
United States

**Details**

LEAD-TIME: STOCK 1-2 WEEKS

**Prepared By**  
Timothy Turnbull

**Phone**  
855-228-6383

**Email**  
[info@iowapumpworks.com](mailto:info@iowapumpworks.com)

**Sales Rep**  
Bryan Collins

**Expires**  
03/11/2023

**Terms**  
Net 30

Item	Comment	QTY	Rate	Amount
23891 BARMESA MODEL 4BSE502SS SUBMERSIBLE PUMP-4", 5 HP, 230V/1PH, FLA 28, 1750 RPM, OVERLOAD PROTECTION IN MOTOR, 40' CORD.		2	\$4,205.77	\$8,411.54
10288 ABS 4" GRA PEDESTAL KIT DN100 XFP W/ELBOW		2	\$924.00	\$1,848.00
23427 QUOTE ITEM	PIPING, VALVES, FITTINGS	1	\$10,000.00	\$10,000.00
23816 USEMCO POWERPACK DUPLEX PANEL 1PH - 900801, 120/240V, 4-FLOAT OPERATION		1	\$7,685.00	\$7,685.00
22548 ON-SITE SERVICE LABOR - STD	INCLUDES TRIP AND CONFINED SPACE	1	\$4,600.00	\$4,600.00

Thank you for your business.

Toll Free: 855-228-6383 | Email: [info@iowapumpworks.com](mailto:info@iowapumpworks.com) | Website: <http://www.iowapumpworks.com>



QTE003379





Iowa Pump Works, Inc.  
825 SW Ordinance Rd  
Ankeny, IA 50023

Quote  
#QTE003379  
03/01/2023

Subtotal \$32,544.54

Total \$32,544.54

*Pricing is valid for 10 days and does not include freight charges or applicable taxes.*

**Items quoted for repair and leftover 30 days, without a decision to repair, will be discarded.**

Signature: \_\_\_\_\_ Date: \_\_\_\_\_



# **Professional Janitorial Service Proposal**

Prepared for:

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**Prairie City City Hall**

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Submitted By:

**Iowa Office Cleaning**

201 W. Jefferson

Prairie City, Iowa 50228

515-210-0483

[iowaofficecleaning@yahoo.com](mailto:iowaofficecleaning@yahoo.com)

## **Iowa Office Cleaning**

201 W. Jefferson  
Prairie City, Iowa 50228

February 19 2023

City of Prairie City Iowa

**Subject: Janitorial Service Proposal- Iowa Office Cleaning**

Thank you for allowing Iowa Office Cleaning to prepare a professional cleaning service proposal for your consideration.

**Before we start...** Iowa Office Cleaning is thoroughly trained on how to perform each cleaning task, as well as important safety issues. Our goal is to clean each customer's facility professionally and safely.

**During the start...** We know a seamless, no hassle start up is important to every customer. So at Iowa Office Cleaning, we combine up front preparation and training to ensure a smooth and successful startup.

**After the start...** A strong systematic approach to keep your buildings looking good! At Iowa Office Cleaning, we offer strong quality control to plan for, and not lose track of, the many necessary cleaning details.

We look forward to the opportunity of becoming a trusted and valued partner in improving and maintaining the appearance of your buildings. Please call if you have any questions, or need additional information as you review our proposal.

Sincerely,

Judith Martin  
Owner/Cleaner  
Iowa Office Cleaning

Iowa Office Cleaning



**Iowa Office Cleaning**  
***Professional Janitorial Service Proposal***

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**General**

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Iowa Office Cleaning agrees to provide all labor, supervision, material, and equipment necessary to assure performance of specified cleaning service for the customer. Iowa Office Cleaning is willing to clean all carpets agreed upon. Iowa Office Cleaning is willing to move light furniture, included but not limited to, tables and chairs.

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**Service Schedule and Bidding of service**

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Given acceptance of proposal, Iowa Office Cleaning is willing to begin services as early as March 2023

**Dates of suggested cleaning would imply**

To be determined

**Bidding per clean**

**\$375**

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**Equipment**

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Iowa Office Cleaning will furnish and maintain all necessary cleaning equipment inclusive of but not limited to; vacuums, mops, mop buckets and brooms.

Squeegee, bucket, ladder, and window cleaning solution.

Commercial carpet cleaner, any cleaning solutions required.

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**Insurance**

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Iowa Office Cleaning will furnish all forms of insurance required by law and shall maintain the same in force.

- Comprehensive General Liability
- Property Damage
- Worker's Compensation

**Iowa Office Cleaning**

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**Employee Status**

Personnel supplied by Iowa Office Cleaning are deemed employees of Iowa Office Cleaning and will not for any purpose be considered employees or agents of the customer.

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**Equal Opportunity Employer**

Iowa Office Cleaning is an equal opportunity employer. All necessary employment forms will be maintained by our office as required by law.

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**Term**

This term of this agreement shall be for a period of one (1) year.

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**Cancellation**

This agreement may be terminated or canceled at any time with a minimum of thirty (30) days written notice from either party

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**Agreement**

This agreement is made and entered into as of February \_\_ 2023, by and between Iowa Office Cleaning, with its principal place of business located at 201 W Jefferson, Prairie City, Iowa 50228 and city of Prairie City in Prairie City Iowa, with its principal place of business located in Prairie City Iowa.

NOW, THEREFORE, in consideration of the mutual promises and benefits to be derived by the parties they mutually agree to the terms and conditions as outlined in the above agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement effective as of the date and first year written above.

Iowa Office Cleaning

By: Judith M Martin

Name: Judith M Martin

Date: February 2023

Time: \_\_\_\_\_

Iowa Office Cleaning

City of Prairie City in Prairie City Iowa

By: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Time: \_\_\_\_\_



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### References

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- ★ City of Prairie City
- ★ City Clerk: Christie Busby
- ★ (515) 994-2649
  
- ★ Prairie Escape Wellness Center
- ★ Owner: Kirsten Weiland
- ★ (515) 447-0948
  
- ★ First Interstate Bank
- ★ Bank Manager: Melissa Masterson
- ★ (515) 994-2619
  
- ★ Vortex Racing Products
- ★ Owner: Lynton Jeffrey
- ★ (515) 371-2081
  
- ★ Jalapeno Pete's/Schaffer's Bridal/Wild Rose Casinos
- ★ Owner: Sue & Gary Kirke
- ★ (515) 490-8533
  
- ★ A-Team Apparel
- ★ Owner: Bruce Burkland
- ★ (515) 994-9244
  
- ★ Shomo/Umble Insurance
- ★ Melanie Umble
- ★ (515) 994-2446