



Architectural, Structural, Mechanical, Electrical,  
and Plumbing Assessment of the Rhinelander  
Highway Shop for the Oneida County Highway  
Department

July 26, 2017



**BARRIENTOS**  
design & consulting

205 West Highland Drive; Suite 303  
Milwaukee, WI 53203  
office 414-271-1812 • fax 414-271-1830  
[www.barrientosdesign.com](http://www.barrientosdesign.com)

## GENERAL BUILDING OVERVIEW

- The Oneida County highway shop, located at 730 W. Kemp St. in Rhinelander, Wisconsin was constructed in 1955 on a 12.55-acre parcel of land. The office addition at the south side was constructed in 2001. There are nine principal structures/buildings (and building additions) along with a truck scale and fueling island and stock pile area.
- The first floor is 33,672 g.s.f. The second floor is 5,009 g.s.f.
- The main shop is in good overall condition. A few items are of concern as detailed in photograph comments below.
- Paint adhesion is an issue in the Repair Garage. Loose paint should be scraped away and exposed steel should be painted. See Structural commentary below.
- Lighting levels in the Repair Garage and Parking Garage are low and the fixtures are inefficient. See Electrical commentary attached.
- Floor drains should be flushed and cleaned. Provide a drain cover in the steel storage room.
- The primary architectural deficiency of this building is the exterior wall thermal performance.
  - The south half of the shop (Repair and Parts Storage) is a brick veneer on concrete block masonry. Exterior walls are 11" thick which leaves no space for thermal insulation. Also, there are several large glass block fenestrations (6'x12') that have a poor thermal performance (R Values are less than 2). On the east side of the building where there are two stories, the windows are aluminum with insulated glass.
  - The north half of the building is similarly comprised brick on block without a layer of insulation. The fenestration openings in this single story parking garage consist of insulated metal panels and a small insulated glass lite.
  - The roof assembly in the south portion of the building are comprised of metal panels with tapered insulation routing stormwater to 4 roof drains. This roof is in good condition and the membrane and flashings are about 10 years old.
  - The roof assembly in the north parking garage is a standing seam metal roof on insulated metal panels. This roof is also in good condition with the exception of some damage that was done to the wall and the roof near the vehicle wash bay on the east side.
  - The floor slabs in all areas are in fair condition with no large areas of water ponding at the time of inspection. Surface spalling is present throughout.
  - Man doors throughout garage areas have deteriorated weatherstripping. New weatherstripping should be installed at most doors.
  - Many of the overhead doors require adjustment to seal off air infiltration at jambs.

## CODE EVALUATION, LIFE SAFETY, AND ACCESSIBILITY

The Occupancy types of the Onieda Building are

- S-1 (Moderate-Hazard Storage): Motor Vehicle repair garage, welding. 10,982s.f.
- S-2 (Low-Hazard): Parking Garage, parts storage. 21,173 s.f.
- B: Business. 1,516 s.f.
- The allowable areas per the International Building Code (IBC) Table 503 won't allow non-separated occupancies. They are separated occupancies. Per IBC Table 508.4, the

parking garage needs to be separated from the repair garage/office areas by a 2-hour separation

- Fire Extinguishers are appropriately located in all areas of the main building so that occupants are within 75 feet of an extinguisher. Current codes require location signs above extinguishers. We recommend placing signs at extinguishers in the crew and garage areas.
- Exit lights are present in most locations, however, we advise installing a few more. There are no illuminated exit signs on the second floor. Exit lights placement are at the discretion of the building inspector at the time of construction and occupancy. Exit lights should be illuminated and have battery back-up.
- Emergency lighting is only present in the office/admin addition. See electrical commentary.
- Accessibility is a concern at a few locations noted in the commentary below.
- Second floor is not accessible without an elevator or lift. Highway garage functions can be accommodated on first floor, so an accessible means to the second floor is not required.

## **STRUCTURAL EVALUATION**

Dan Sydow, PE – Ayres Associates



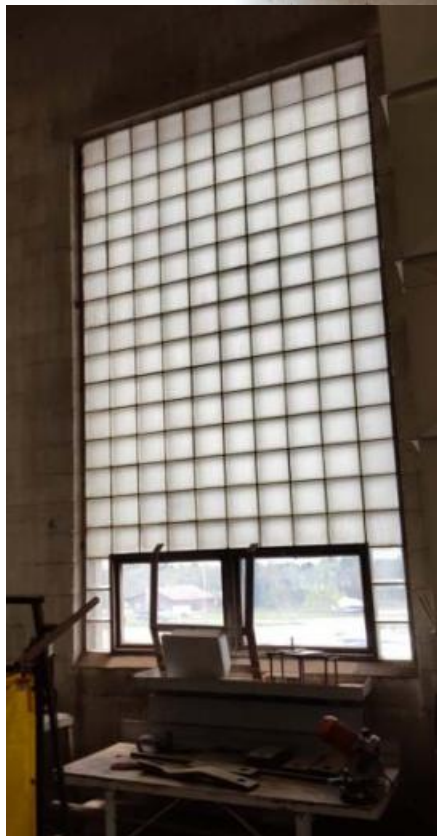
- The original highway shop & garage built in the 1950's consists of a structural steel main support system with concrete masonry unit (CMU) walls. The repair shop has steel columns spaced at 26 feet in a north-south line with 36" deep steel wide flange beams spanning approximately 70 feet east-west. The truck parking garage has steel frames spaced at 36 feet and spanning 90 feet. The two-story portion of the building has a structural steel support system and precast concrete hollow-core planks for the second floor. The structure is supported on concrete spread footings at the columns and a continuous concrete foundation wall in other locations with a bottom of footing elevation 5 feet below grade for frost protection. The interior of the building consists of an 8-inch thick concrete slab on grade with ½" steel reinforcement at 12 inches on center.
- The office addition built around 2001 at the south side of the building is typical "stick-frame" timber construction. The south and north walls are 2x6 timber bearing walls with timber trusses that span about 42 feet. The building exterior is rimmed with a concrete frost wall foundation. The interior of the building consists of a 4-inch thick concrete slab on grade.
- The steel girders/frames supporting the roof, roof purlins spanning between the steel girders/frames, and interior steel columns appear to be in good condition. Although the paint system on the structural steel is failing in most locations, no section loss in the structural steel was observed. The main structural system appears to be performing adequately for its current use and there are no obvious signs of structural distress.
- Re-painting of the steel should be implemented in the next 5 years to avoid potential loss of structural steel due to corrosion. Re-painting is recommended in the next 2 years at the area used for truck washing.
- The eave and wall above the east-facing garage door was damaged by a vehicle hit. It appears that the damage is non-structural, but the area should be repaired to avoid accelerated deterioration of the building.
- CMU walls appear to be in good condition with only minor "step" cracking as is typical for this type of structure and age. Some cracking was observed at the location

of a crane beam penetration, but is not a structural concern since the crane beam is not supported by CMU.

- Cast-in-place concrete walls extend to approximately 4 feet above grade. The concrete appears to be in good condition and performing well.
- The existing interior floor slab is in good condition and appears to be performing quite well given the age of the facility. Replacement of the floor slab is not likely needed for the next 20 years with routine maintenance, cleaning, and washing.

	<p>West view of exterior. Large glass block fenestrations and non-insulated masonry walls have poor thermal performance.</p>
	<p>East view of exterior showing office addition to the south and the office and parts</p>
	<p>Sliding pair of fire doors do not activate upon detection of fire. Bottom of door panels are deteriorating. Doors should be repaired or replaced and an operator linked to fire detection installed.</p>



 	<p>Current codes require location signs above extinguishers. We recommend placing signs at extinguishers in the crew and garage areas so that they can be readily seen around obstructions.</p>
	<p>South repair garage has several large glass block fenestrations (6'x12') that have a poor thermal performance (R Values are less than 2). Recommend replacement with insulated glass.</p>



Parking Garage is relatively dry. Lighting is adequate. See electrical comments.



PVC pipe at step at northwest corner of parking obstructs the rules of a stair riser. Recommend extending the concrete step/curb over the pipe with a flush riser to eliminate the tripping hazard.

	<p>Roof is approximately 10 years old. Flashing and roof membrane are in good condition. We estimate at least 10 more years before roof would need replacement. Roof should be inspected annually.</p>
	<p>Line set and electrical feed to rooftop condensers may be a source of water penetration. Provide a larger shroud or sealant at opening.</p> 
	<p>Masonry chimney is in good condition. Roof membrane termination strip is tight with no gaps.</p>



There are 2 old rooftop drains. The one to the northwest has a broken strainer and could be clogged by wind-blown debris. Recommend replacement of these two drains.



North parking garage metal roof is in good condition. Flashing between this roof and the wall to the south is also in good condition.



Recommend perimeter sealant at interior side of aluminum windows.





Second floor records room may have asbestos in VCT flooring. Some tiles have come loose or were removed. Tile should be tested and abated/replaced if positive. Asbestos testing company can provide further advice and assistance.



As the administration and reception addition is the only location with accessible toilet rooms, the only accessibility item lacking is a vertical grab bar on the side wall of the toilet. It should be 18" high and located 39"-41" from the back corner and the bottom of the grab bar mounted between 39" and 41" from the finished floor.



Extensive roof eave and block damage. Repair is needed, but the wall damage is not structurally critical.



Exhaust fan ports are damaged throughout Repair Garage. See mechanical evaluation.

## ARCHITECTURAL SUMMARY – RECOMMENDATIONS & BUDGETS

The following table summarizes the recommendations. All projects are budgeted in today's dollars (2017), and are to be inflated to the time when they are intended to be implemented.

Priority **One** (1) is work that needs to be done as soon as possible

Priority **Two** (2) is work that would be recommended to be done within 1 to 3 years

Priority **Three** (3) is work that is recommended to be done within the next three to five years.

Budget numbers are for construction only and do not include additional project related costs.

	Project	Reason for Recommendation	Budget	Priority
Architectural	Repair Roof and Wall at Northeast	Avoid accelerated deterioration of the walls	\$18,000	1
Architectural	Thermal Envelope: New Windows	Replace 10 glass block fenestrations	\$80,000	2
Architectural	Thermal Envelope: Insulate Exter. Wall	Uninsulated masonry. Propose insulated metal panels (11,440 s.f.)	\$400,400	2
Architectural	Replace Floor Slab in Parking and Repair Garages	Spauling surfaces, if cleaned regularly, should last 20 more years. Replacement will allow for trench drains. (26,200 s.f.)	\$249,000	3
Architectural	Trench Drains	Current drains are plugged and difficult to maintain.	\$35,000	3
Architectural	Exterior Door Weatherstripping	9 doors due to deterioration	\$1,800	1
Architectural	Re-Paint Walls and Ceilings (Repair/Parking)	Prevent corrosion. Prep/clean surfaces and paint.	\$48,000	3
Architectural	Fire Extinguisher Signage	Meet current life safety requirements.	\$650	1
Architectural	Replace Fire Door between Repair and Parking	Deterioration, life safety. Door to be electrically operated.	\$60,000	1

	Project	Reason for Recommendation	Budget	Priority
Architectural	Construct step over PVC pipe at northwest	Tripping hazard.	\$2,000	1
Architectural	Close openings at roof condensers	A/C line sets have gaps at roof penetration	\$300	1
Architectural	Replace 2 broken roof drains	Strainers are broken	\$1,400	2
Architectural	VCT flooring at Records Room (2 <sup>nd</sup> Floor)	May contain asbestos, in disrepair	\$3,000	3

## Facility Condition Assessment Summary

(See Mechanical, Electrical, and Plumbing breakdown at end of report)

	Architectural	HVAC	Electrical	Plumbing	Totals
Priority 1	\$82,750	\$250,000	\$225,000	\$132,000	\$689,750
Priority 2	\$481,800	\$125,000	\$30,000	\$21,000	\$657,800
Priority 3	\$335,000	\$125,000	\$140,000	-	\$600,000
Totals	\$899,550	\$500,000	\$395,000	\$153,000	\$1,947,000



# Building Assessment



## Oneida County

### Highway Building Assessment

Rhineland, WI 54501

July 26, 2017



255 North 21<sup>st</sup> Street  
Milwaukee, Wisconsin 53233  
(414) 475-5554

TABLE OF CONTENTS

INTRODUCTION..... 3

FIRE PROTECTION..... 4

PLUMBING SYSTEMS..... 5

HVAC SYSTEMS..... 9

ELECTRICAL SYSTEMS ..... 12

SUMMARY - RECOMMENDATIONS & BUDGETS.....17

## INTRODUCTION

This report has been developed for the County for identifying the current building's Mechanical (Heating, Ventilating, and Air Conditioning (HVAC), Electrical and Plumbing systems, and identifying areas in need of upgrading. An assessment was performed for the Existing Main Shop constructed in 1955 and the Office Addition constructed in 2001. Assessment for building, its systems and recommendations for engineering improvements are included.

### **AUTHORED BY:**

**Harwood Engineering Consultants, Ltd.**

255 North 21<sup>st</sup> Street  
Milwaukee, Wisconsin 53233  
(414) 475-5554

*Harwood Job No. 16-0023.01*

### **AS PREPARED FOR:**

**Barrientos Design & Consulting**

205 W. Highland Ave. #303  
Milwaukee, Wisconsin 53203  
(414) 271-1821

## Fire Protection

### GENERAL

Currently the building does not have fire protection.

#### Recommendations

A complete fire protection system should be installed if more than 50% of the building is being remodeled. This would require a new minimum 6" water service into the building with a double check valve assembly. Any areas subject to freezing shall be protected by a dry sprinkler system.

The final determination if the building would need to be sprinkled is left to the AHJ or the State of Wisconsin.



## Plumbing Systems

### GENERAL

Plumbing comments and observations are derived through visual inspection of the facility. Existing plumbing drawings were not available.

The plumbing systems infrastructure in the main shop is primarily 1955 original construction.

An office area was added in 2001.

### UTILITY INFRASTRUCTURE

#### Water Distribution

##### Observations

A 2" water service enters the building from the West and has a 2" compound meter.

#### Sanitary Sewer

##### Observations

The direction and size of the sanitary sewer lateral is undetermined. The size is most likely a 4".

#### Storm Sewer

##### Observations

The storm sewer lateral exists the building to the south.

### INTERIOR PLUMBING SYSTEMS

#### Interior Domestic Water Distribution System

##### Observations

The interior domestic water distribution system originates from the 2" water service with a 2" water meter 2". The 2" domestic water supply continues through the building serving plumbing fixtures.

Water distribution system is municipal supplied water.

A duplex water softener is provided for the pressure washer. Water softener is in poor to fair condition.

Hot water for the plumbing fixtures is generated by a single gas water heater located in the first floor janitor closet. Water heater is in good condition.

The brine solution tanks are protected by an 1 ½" back flow preventer.

##### Assessment

Water distribution piping appears in fair condition and of adequate size to serve the current building demand.

### Recommendations

Water distribution piping appears to be original to the building and could start to fail. Any damaged water piping should be replaced. Any new water distribution piping should be constructed out of type L copper and insulated.

Replace the existing water softener.

Provide back flow protection at pressure washer spray wand.

Hot water for the office bathrooms takes almost a minute to get from the current heater in the rear of the main shop. We recommend adding a small 10 gallon electric water heater near the office bathrooms to serve these fixtures.

### Interior Sanitary Drainage System

#### Observations

The interior sanitary drainage system connects to plumbing fixtures and drains and is routed below the first floor slab-on-grade and drains by gravity.

Piping underground material is unknown.

#### Assessment

It is assumed that underground sanitary piping spans the length of the facility from North to South. Exact location and condition is unknown.

### Recommendations

The underground sanitary drain piping should be inspected via sewer camera to determine exact location, size, depth and condition prior to any remodeling. Document all finds similar to an as built.

An oil interceptor should be installed for all floor drains in the vehicle maintenance shop per code.

All floor drains within main shop shall be replaced with sediment bucket style floor drains.

### Interior Storm Sewer

#### Observations

The north half of the main shop building roof is sloped and sheet drains to grade. The south half of the main shop roof is served by roof drains and roof conductor piping that connects together below ground and exits to the south. The 2001 office addition roof is sloped to gutters and downspouts.

#### Assessment

Piping from south half of the shop roof backs up during high volume rain storms.

### Recommendations

Existing storm laterals should be camera inspected for any clogs or damaged pipe. Damaged piping should be removed and replaced.

### **Plumbing Fixtures**

#### Observations

Plumbing fixtures are generally from original construction.

#### **Water Closets**

Water Closets are constructed of vitreous china, floor mount tank type.

#### **Urinals**

Urinals are constructed of vitreous china, floor mount with manual operated flush valve.

#### **Lavatories**

Lavatories are constructed of vitreous china; wall hung with manually operated single handle faucets.

#### **Wash Fountains**

The wash fountain is a stainless steel full circle style.

#### **Eye wash**

The eye wash is a single station with push paddle operation. Eye wash is supplied with cold water only.

### Assessment

The existing plumbing fixtures are in fair condition. The majority of the plumbing fixtures in the building are not ADA compliant or water conserving.

### Recommendations

The eye wash should be provided with tempered water per ANSI standards.

### **Water Conservation**

As existing fixtures continue to age resulting in more repairs, they should be replaced with updated water conserving fixtures.

<b>Water Closets</b>	<b>High Efficiency 1.28 gallons per flush</b>
<b>Urinals</b>	<b>High Efficiency 0.125 gallons per flush</b>
<b>Lavatories</b>	<b>Faucets with 0.5 GPM aerators</b>
<b>Sinks</b>	<b>1.5 GPM aerators</b>

### **ADA Compliance**

The toilet room facilities throughout the building should be brought up to ADA standards if required.



## HVAC Systems

### GENERAL

The Heating, Ventilating and Air Conditioning (HVAC) fans, air distribution, compressors and coils and the temperature control system infrastructure is primarily circa 1955 in the Maintenance Area and Parking Garage. Gas fired furnaces with Direct Expansion (DX) cooling coils and remote compressor condensing units appear to range from 10 to 20 years in age.

### HVAC SYSTEMS

#### Offices and Parts Storage

##### Observations

The front main floor office is served by a gas fired DX cooled furnace and is located in the closet. The unit has an outside air intake duct connected to meet ventilation code requirements. The unit serves the area with under floor duct distribution system installed in the early 2000's.

The second level offices and conference areas are served by 2 different gas fired DX cooled furnaces located in the storage room. The units have an outside air intake duct connected to meet ventilation code requirements. These units have overhead air distribution.

The Parts Storage and Office is served by a gas fired DX cooled furnace located in the space. The unit does not have an outside air intake duct connected and does not meet ventilation code requirements.

The locker room on the main level has an exhaust system.

There is a locker room on the second level that has no exhaust air.

##### Assessment

The units appear to be in good working order. The outdoor air cooled compressor condensing units appear to be near the end of their useful life

The Parts Storage Unit and the locker room require upgrading for outside air to meet code ventilation

##### Recommendations

The parts Storage unit and Second Level Locker room need to be brought up to date as soon as possible to meet code.

Provide a new make-up air unit with heating, cooling and dehumidification for better environment in the Locker Room.

The remaining areas will require upgrading to new units with additional zone control in the next 3 to 5 years. At that time the control systems should be upgraded to a Direct Digital Controls (DDC) system for improved energy management for the systems

### Vehicle Storage Garage

#### Observations

The building is heated primarily by gas fired infrared heaters.

There is a make-up air unit mounted on underside of roof and gravity relief air ductwork near the floor that met the code at time of installation.

There are ceiling de-stratification fans to move heat from under roof deck down to floor area

#### Assessment

All the units have surpassed the recommended life expectancy based on the guidelines from the American Society of Heating Air Conditioning and Refrigeration Engineers (ASHRAE)

Wash Area should have additional manually operated air system to eliminate excessive moisture from this section of the building

#### Recommendations

This area requires up-grades to maintain code required ventilation for the current codes.

- Carbon Monoxide sensors (for gasoline vehicles) and Nitrogen Dioxide sensors (for Diesel Vehicles) should be installed to maintain proper amounts of ventilation.
- Install a new system to bring tempered outside air at a rate of 0.05 CFM per square foot and fan exhaust system to operate continuously. Provide a separate new system to bring tempered outside air at a rate of 0.7 CFM per square foot and fan exhaust system to operate when Carbon Monoxide sensors or Nitrogen Dioxide sensors indicate a high level or for 15 minutes every hour. This will save energy and meet code.
- Install one new gas fired unit heater pointed at overhead door and in the direction of wash area. The unit will have an automatic outside air damper to open whenever the wash bay exhaust was manually started.
- Install new exhaust system to be used when using wash bay
- Provide new de-stratification fans
- The control systems should be upgraded to a Direct Digital Controls (DDC) system for improved energy management for the systems.

### Vehicle Service Bay

#### Observations

This part of the building is heated primarily by gas fired unit heaters.

There is a make-up air unit mounted on the underside of roof and gravity relief air ductwork near the floor that met code at time of installation.

There are two (2) exhaust fans and ductwork installed to be used as vehicle exhaust connections.

### Assessment

The gas fired unit heaters are newer and have some operational life remaining.

All the remaining units have surpassed the recommended life expectancy based on the guidelines from the American Society of Heating Air Conditioning and Refrigeration Engineers (ASHRAE)

The engine exhaust system is outdated and cannot be used for the current day equipment exhaust designs.

The existing system does not meet current codes.

### Recommendations

As soon as possible upgrade the system as follows.

- Install a new system to bring tempered outside air at a rate of 0.5 CFM per square foot and fan powered exhaust system to operate continuously.
- Carbon Monoxide sensors (for gasoline vehicles) and Nitrogen Dioxide sensors (for Diesel Vehicles) should be installed to alarm if the environment is above setpoint for worker safety.
- Install new engine exhaust systems with pivoting arm to allow for use of overhead crane.
- Provide portable filter and exhaust system to be used for welding operations.
- Install one new gas fired unit heater pointed at overhead door located in an area that will not be impacted by use of overhead crane.
- Provide new de-stratification fans
- Update controls on the entire cooling system to DDC. Upgrade system to allow for new refrigerant to be used.

## Electrical Systems

### GENERAL

This assessment is intended to evaluate the existing electrical system and determine if it is feasible to update the electrical system of this existing building to meet the needs and safety concerns of the end user.

Life Safety, Energy and Accessibility codes have significantly advanced during the last 15 years. Any upgrades will need to be addressed in order to comply with current codes.

### ELECTRICAL SERVICE

#### Observations

The building is served from a pole mount transformers and enters the building and routed to under the slab to a main disconnect switch inside center area of the building. The service from Wisconsin Public Service (WPS) is a 240/120 volt 3 phase 4 wire Delta B HI, 400 amp service. Per WPS, the Peak Demand for the building was 38.8 KW or 94 Amps on February 2017. Peak Demand is the largest load on a service at a given time.

The service appears to be interconnected to a Manual Transfer switch where the utility service may be bypassed and a portable generator can be connected to the system via an inlet receptacle outside the building.

#### Assessment

Where the Overhead service enters from the roof into the building to below the floor is a violation to the current code, the service is limited to 8 feet upon entering the building before the first disconnecting device.

The 240/120 volt 3 phase 4 wire Delta B HI system is an obsolete voltage and any major remodel would trigger a requirement from WPS to upgrade the service to a 208Y/120 volt 3 phase 4 wire service.

Based on the Peak Demand, this electrical system has approximately 85 KW or 200 amps of spare capacity.

#### Recommendations

The Main service should be upgraded to a 208Y/120 volt 3 phase 4 wire system to a more standard service. The overhead service and meter should be relocated outside the building and a new Main Distribution Panel with proper Main Circuit Breaker rated for the new additional loads and Short Circuit Current should be located where the service enters the building. The Short Circuit Current is the Maximum rating, in amps, that the circuit breaker can withstand a short circuit before it fails which may cause an explosion. Typically Short Circuit Current rating are 10,000 amps to 60,000 amps.

## NORMAL POWER DISTRIBUTION

The Main Disconnect Switch appears to be original to the 1955 building with the addition of the Manual Transfer Switch added at a later date. These two devices serve the Main Distribution panel.

The Main Distribution Panel has been recently replaced. This panel serves the normal distribution panels throughout the building, 240 volt 3 phase equipment, and the normal side of the automatic transfer switch. In addition the Main Distribution panel appears to serve the other buildings throughout the site.

The Panelboards throughout the building serve receptacles, lighting and other smaller loads.

Per the current users some of the outlets, such as the welding outlets, do not work with their equipment.

### Assessment

The main Disconnect Switch appears to be at the end of life and may not operate reliably and could be a danger to the operator.

Per the current users a portable generator has not been used for years. It is not known if the Manual Transfer Switch will operate reliably or safely. It is also not known if the County has a Working Generator to plug into the Inlet receptacle located outside the building.

The Main Distribution Panel has recently been replaced and appears to be in good working condition.

Most of the Panelboards are original to the 1955 building with exception of a panel recently added and the panel for the 2001 Office addition.

### Recommendations

The Manual transfer Switch and Inlet receptacle should be removed if not being used to prevent Non-Trained personnel from using this system. When the service is upgraded, the entire distribution system will need to be replaced with new panels that are rated for the Short Circuit Current at their location on the electrical system.

In addition to the new panels the wiring to panels, receptacles, lighting and other equipment in the 1955 building should also be replaced. Because of their age the insulation on the cables can become brittle and begin to cause short circuits in the system.



## EMERGENCY POWER

### Observations

The building has a used Onan Natural Gas 20 KW installed in 2016. This generator serves an Automatic Transferswitch and a 120/240 volt 1 phase 100 amp panel. The panel serves the office telephone system, GDO (garage door opener), office furnace, computers, the fuel system and various receptacles and lights in the shop, stock room and locker room.

There is not an Automatic Transfer switch for Life Safety loads such as Emergency egress lighting.

### Assessment

The system appears to back up the fuel system, and limited lighting and power loads in the remainder of the building.

Without a second Automatic Transfer switch and Panelboard the Life Safety loads cannot be added to this back up system. Current codes require Life Safety loads and other Emergency loads to have separated Transfer switch, panelboards and raceways from other non-life safety equipment.

### Recommendations

It may be advisable to temporary put a demand meter on the generator when all systems are in operation to verify the load and spare capacity of the generator. Once know, more non-Life Safety loads may be added to the system.

## LIGHTING

### Observations

The majority of the lighting appears to utilize T-12 fluorescent lamps. Local light switches are used for turning lights on and off except for the office toilet rooms that have occupancy switches.

The exterior has a mixture of incandescent lights, HID lighting and at some exterior doors new LED lights above the door.

Egress lighting is only provided in the lower office area at the exit doors with combination exit/emergency battery units. Exit lights in the upper office area and shop area are present but many do not work and do not appear to be battery backed-up.

### Assessment

Due to their low efficiency compared to modern lamps, the T-12 fluorescent lamps generally used in this building are being phased out of production and are getting scarce and expensive. In addition, the lack of automatic controls will allow these inefficient light sources to remain on longer than they need to.

There are no significant automatic lighting controls (motion sensors, timers, switches, etc.) in the building for shutting lights off when not in use except maybe for the exterior lighting. Current energy codes require this for new and significantly renovated buildings.

Emergency Life Safety Egress lighting is required in all buildings. The office area has some Life Safety Egress lights above the exit doors but may not meet Current code egress requirements.

Lighting levels in the shop areas appear low and may not be adequate for the maintenance work required in this space.

#### Recommendations

Code officials may not require a new owner to upgrade lamping and controls to comply with current energy codes. However, it would behoove the owner to install modern LED lamps or LED light fixtures and automatic lighting controls (motion sensors, timers, etc.), even if it's a phased replacement over a period of time. Energy saved by replacing the existing old lighting and control technologies would likely pay itself off in a year or two.

Egress lighting will need to be added in all areas of the building. This could be added by providing Emergency Battery Units in the office areas. In the shop area some of the new High Bay LED fixtures could be served via a small central Inverter (battery system) to provide power when normal power is lost. If the existing generator has the capacity to support the Emergency Egress Lights then a new Transfer Switch and panel can be added to the generator to support the Emergency Life Safety Egress lighting.

## **FIRE ALARM**

#### Observations

There is no Fire Alarm System in this building.

#### Assessment

Existing Codes do not require a Fire Alarm System for this Building Type.

#### Recommendations

Code officials may not require a Fire Alarm System for this type of building. It is recommended that the County contact their Insurance Company to verify if there are any discounts when a Fire Alarm System is provided in this building, or any future building.

## **TELECOMMUNICATIONS**

#### Observations

The cabling infrastructure and equipment has been upgraded to a relatively modern system.

Assessment

Telecommunications systems installations tend to be dependent on the user's equipment and furniture configuration.

Recommendations

No recommendations at this time.

**OTHER LOW VOLTAGE SYSTEMS**Observations

A small public address system appears to provide communication to various locations inside and outside of the building.

A small door monitoring system is provided at the (4) doors to the first floor office area.

A small CCTV system monitors exterior areas of the site and off site locations.

Assessment

It does not appear the PA system is being used at this time.

The Door Monitoring system and CCTV system are in good condition and appear to have mostly been installed in the recent years.

Recommendations

No recommendations at this time.

### SUMMARY – RECOMMENDATIONS & BUDGETS

The following table summarizes the recommendations. All projects are budgeted in today's dollars (2016), and are to be inflated to the time when they are intended to be implemented.

Priority **One** (1) is work that needs to be done as soon as possible

Priority **Two** (2) is work that would be recommended to be done within 1 to 3 years

Priority **Three** (3) is work that is recommended to be done within the next three to five years.

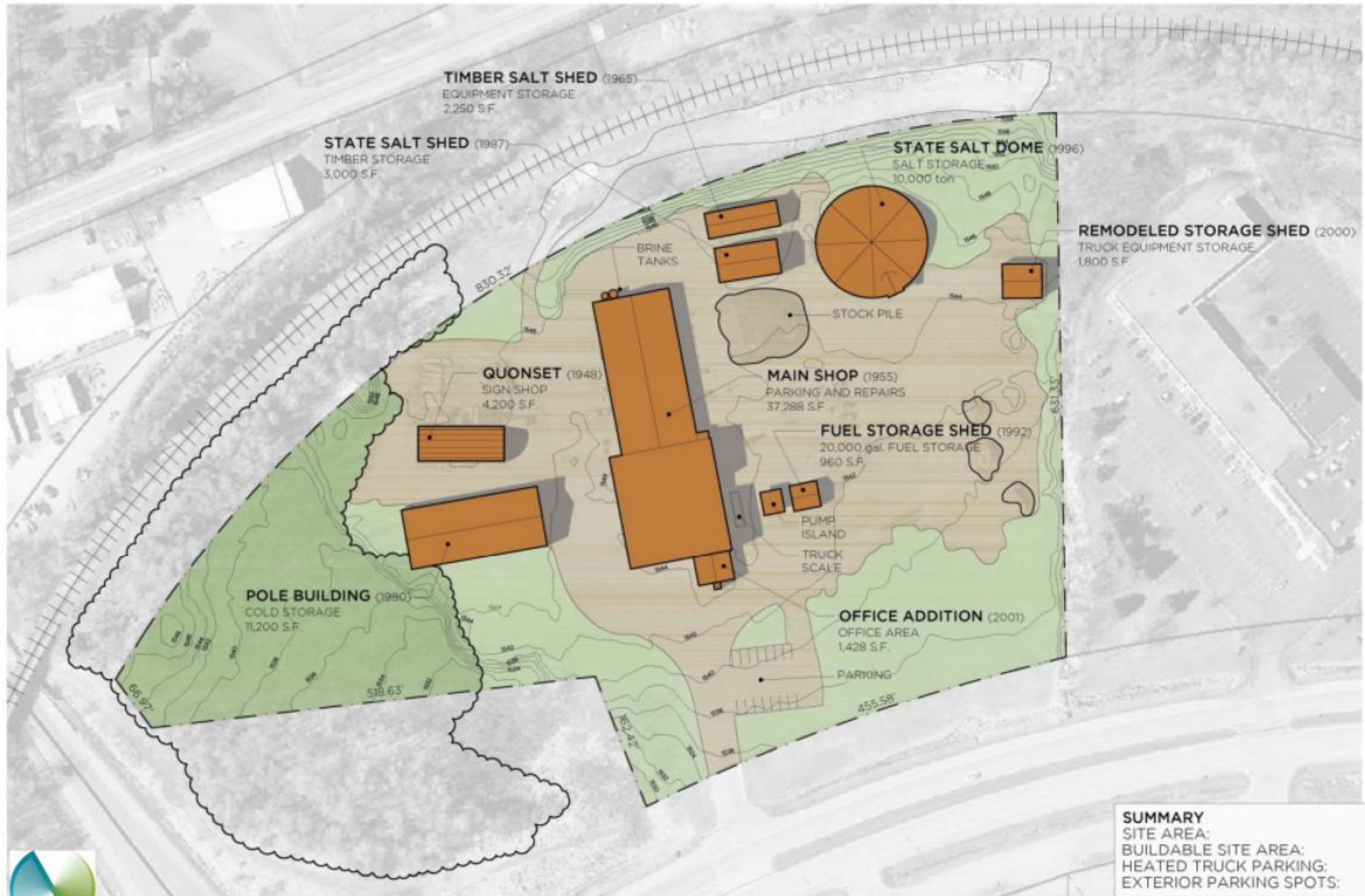
Budget numbers are for construction only and do not include additional project related costs.

	Project	Reason for Recommendation	Budget	Priority
HVAC	Upgrade Office and Parts Storage HVAC Systems	Replace equipment before it fails and improve energy efficiency	\$100,000	3
HVAC	Provide new make-up air unit for Locker Room	Provide proper environment including de-humidification for clothes in lockers	\$25,000	3
HVAC	Update Parts Storage and 2 <sup>nd</sup> floor locker room outside air and exhaust	Current Controls do not operate correctly	\$25,000	1
HVAC	Update Vehicle Storage Bay.	Replace equipment before it fails and improve energy efficiency	\$125,000	2
HVAC	Update Vehicle Service Area	Current system is not operating correctly or to code	\$225,000	1

	Project	Reason for Recommendation	Budget	Priority
Electrical	Replace Existing Electrical Service and Distribution	Existing Electrical Service is obsolete and doesn't meet current code and may be a safety issue	\$200,000	1
Electrical	Electrical Wiring in 1955 building	Existing cables may be at end of life and begin to fail.	\$30,000	2
Electrical	Replace existing lighting and controls	Original T-12 lighting is obsolete and may not provide the proper light levels for tasks. Maintenance and replacement parts are expensive and may not be available. New lighting will be energy efficient.	\$110,000	3
Electrical	Add Life Safety Egress Lighting	Code officials will require Life Safety Egress lighting with a remodel.	\$25,000	1
Electrical	New Fire Alarm System	System would be added at owner's preference.	\$30,000	3



	Project	Reason for Recommendation	Budget	Priority
Fire Protection	Install complete sprinkler system with double check valve	Code required	\$2.50-\$3.00/Sq. Ft.	1
Plumbing	Install oil interceptor for all drains in the maintenance area	Code required	\$8,000-\$10,000	1
Plumbing	Replace existing plumbing fixtures with water conserving type	Fixtures are dated	Approximately \$1,500 per fixture installed	2
Plumbing	Camera sanitary sewer and document size, location and condition.	Need to know size, location and condition prior to any connection are made to existing sanitary sewer	\$1,000	1
Plumbing	Camera storm sewer to determine reason for backing up during heavy rain events.	Storm sewer backs up	\$1,000	1
Plumbing	Replace existing water softener	Equipment is near life expectancy	\$3,500-\$4,000	2
Plumbing	Replace floor drains in main shop with sediment bucket style drains	Code required	\$1,000 per drain (cost could increase depending on amount of floor cutting required)	2
Plumbing	Provide hot water and mixing valve to provide tempered water to eye wash	ANSI Recommendation	\$3,500-\$5,000	2
Plumbing	Provide new water heater for office bathrooms	Currently hot water takes a long time to get to these fixtures	\$1,000	2



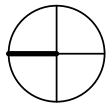
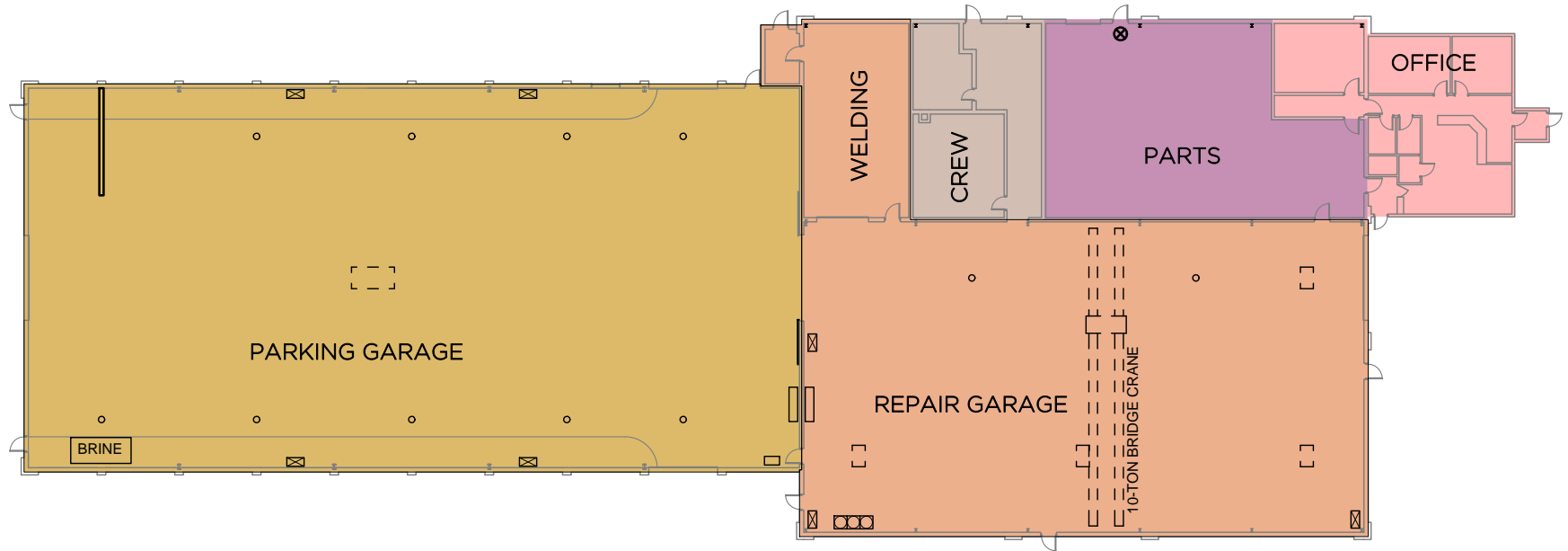
SUMMARY	
SITE AREA:	12.55 acres
BUILDABLE SITE AREA:	11.42 acres
HEATED TRUCK PARKING:	(12) spots
EXTERIOR PARKING SPOTS:	(14) spots



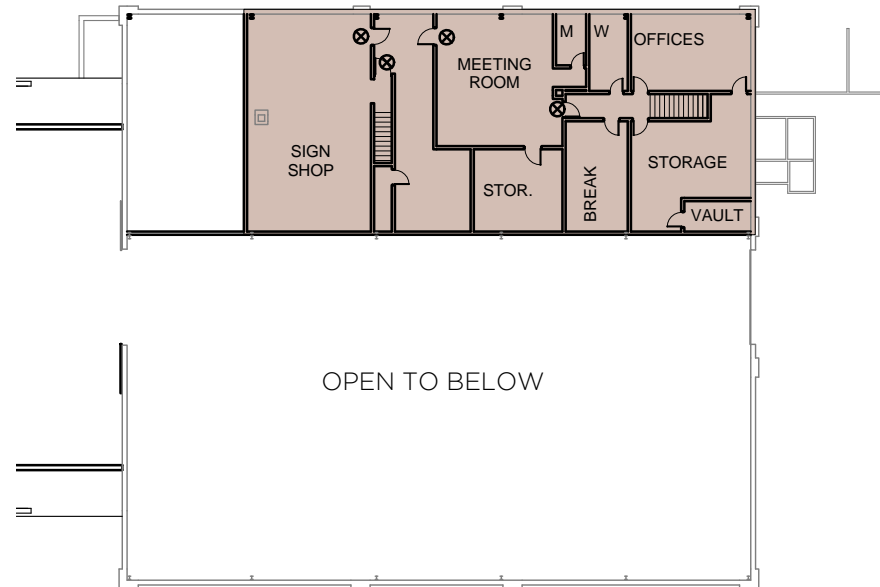
**BARRIENTOS**

205 West Highland Avenue  
Suite 303  
Milwaukee, WI 53203  
office: 414-271-1812  
www.barrientosdesign.com

## EXISTING SITE PLAN



1 FIRST FLOOR PLAN  
1" = 40'-0"



2 SECOND FLOOR PLAN  
1" = 40'-0"

