MASTER PLAN REPORT

MADISON METRO TRANSIT
FACILITY STUDY
MADISON, WISCONSIN

MARCH 9, 2018

Mead & Hunt

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Madison Metro Transit Building
Master Plan Report

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Madison Metro Transit Building

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Report prepared for

City of Madison – Metro Transit

Madison, Wisconsin

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

Introduction

Every day, over 30,000 riders rely on Madison Metro Transit to get to and from work, school, home, and through their daily lives, with over 13 million trips a year. Metro serves as a proven support network to the community and even provides shelter in emergency situations. Over the last 20 years, it was clear Metro would outgrow then abandon this facility and, accordingly, only invested in critical systems. While Metro has in fact outgrown the facility, the condition of the facility, along with the negative funding forecast, demands that the City refurbish the existing facility and systems for the long haul.

This study has identified that significant capital investment in the facility at 1101 E. Washington Ave, of up to $55M, is required over a 5 year period starting with the 2019 Capital Budget. Although the capital expenditure dollar value sounds extreme, in context this equates to $2.7 million budget spending when spread over the intended life-cycle of 20 years. This is easily absorbed into Metro's annual operating budget of $57 million. This expenditure is also significantly less than the cost of building a new facility on site or through the added expense of acquiring land elsewhere.

This critical capital investment would bring the facility up to current code, increase operational efficiencies, and allow the facility to continue to operate for at least 20 more years. Forty years ago, this property was designed to house and maintain 140 buses, but it is now servicing up to 223 buses to meet current ridership with future goals for expansion. The facilities and infrastructure have had no significant updates since its original construction, and nearly all components and workflows are past their useful life or are entirely deficient. This is creating undue hardship and stress on users of the building, resulting in deterioration of the overall work environment.

An initial study, conducted in 2005 to address the facility and space need issues of the Metro Transit group, called for major reconstruction and expansion that ultimately proved too ambitious and costly for the City. With continued maintenance challenges arising, the City of Madison Engineering Department and Metro Transit group contracted with Mead & Hunt, Inc. in May of 2017 to provide a more modest renovation and reuse strategy with a goal for Metro to remain at this site for at least another 20 years. Mead & Hunt's project team of architects, engineers, and teaming partner specialists orchestrated the new master plan consisting of a facility assessment, staff and key stakeholder functional investigations, concept designs for improved workflow, creation of a basis of design, and development of a phasing and capital budget plan. Kueny Architects, with expertise in fleet maintenance facilities, was part of the project team to program and develop the concept plans for the bus maintenance, servicing, and bus storage. Destree Architects was part of the project team to program and develop the bus driver dispatch and support areas. Ken Saiki Landscape Architects rounded out the project team to provide site improvement concepts and general planning support services.

Current Facility Challenges

Current challenges are numerous an interdependent. Working conditions, utilities, infrastructure, and occupant amenities are substandard, inefficient, and out-of-date. Inadequate ventilation, heating, and cooling have been identified as the most deficient system causing hazards to the occupants within the building, even described by users as foggy in the maintenance and bus storage areas. Nearly all of the mechanical units are past their useful life and inefficient, if not in complete failure. The general construction of the roof and exterior enclosure does not help the condition, with their poor insulative values. There is even concern over the ongoing annual maintenance budgets of $680,000 plus staff time being insufficient in comparison to the growing quantity of replacements, maintenance, and repairs. See the Facility Assessment section of this report for detailed information.

The current open-air wash line is creating the largest hazard to the building overall, located at the center of the building directly adjacent to the maintenance bays. As the buses go through the wash cycle, their idle exhaust and the resultant debris removed from the buses creates mass air-borne pollutants. The continuous water flow affects the humidity controls throughout the facility. Additionally, it causes extreme temperature fluctuations caused by constant in-and-out of buses. This poor air quality, humidity, and temperature fluctuations are causing extreme challenges and inefficiencies for the mechanics' daily health and operations. Metro purchases gallons of sport drink for employees that work in the facility during hot summer days because the extreme heat would otherwise cause dehydration. Although this is not an atypical

practice, the management has noted the quantity is significantly higher than average due to this challenging work environment.

Although Metro's Facility Department has been diligently providing repairs, water infiltration from the exterior and from within the building has been an ongoing challenge. The roof itself has had numerous reports of leaks in recent years and has even caused structural roof deck deterioration. These challenges have prompted an expedited 2018 flat-roof replacement through City Engineering, which will also provide enhanced insulation. The storm drains have also been overloaded at times creating flooding within the bus storage areas. Additionally, the general conditions and quantity of the toilet rooms and fixtures are substandard, with instances of sewer back-up sporadically over the years.

One significant challenge for the facility is related to gender equity. There is a current deficit in the quantity of toilet and locker rooms for women. According to Metro's Equitable Workforce Plan from 2017, Metro has 418 employees, with 117 being women. Out of these 117 women, at least 105 of them are bus drivers served at this facility. The trend is showing this number will be on the rise. It will be imperative that as improvements are made, equity in toilet/shower facilities will be required.

The Metro group has pro-actively made some upgrades to have more modern safety features, as would be required in new buildings, such as adding a sprinkler system in the bus storage area. However, these upgrades are in no way comprehensive. Refer to the list at the end of this summary for specific areas and systems that have more crucial code upgrade needs. With any future renovations, our recommendation is to meet current code requirement, with provisions for modern life-safety methods for building-wide sprinklers, fire detection, and fire alarm systems. We also recommend segregating areas with fire rated partitions to better improve the safety of the building. General upgrades will also provide more energy efficient systems with decreased maintenance, a key value to the City of Madison. With capital investment, these facility challenges can be met; and the operational efficiencies can be increased to better service to Madison Metro Transit customers.

Current Functional Challenges

Beyond the need for building and equipment replacement, the building exists to house the function, support services, and employees for the critical service of bus transportation for the citizens of the City of Madison. This building has three major functions that contribute to the safety of the buses on the road: Driver Dispatch, Bus Maintenance, and Bus Storage.

Human error is noted as the causative factor in nearly 85% of all bus driver incidents according to the National Transportation Safety Board. Fatigue and stress for drivers is a widely recognized problem for bus drivers, with challenges in proper eating, sleep schedules, constrained working environments, customer

interactions, passenger loading and unloading, time and schedule sensitivities, and traffic conditions. Several sources have cited countermeasures to stress and fatigue including support, promotion, and education on: psychological awareness, good health-sleep-physical fitness, and stress-management. Additional operational and management strategies are also recommended. The current facility with its aged conditions, shortage of space, and forced, inefficient work-flows are noticeably a challenge to dispatch and work environment for the Metro's drivers. A renovation to the building, providing very basic amenities, will likely produce innumerable results in creating safer drivers.

The Maintenance Department is also directly affected and constrained by the building and current equipment to efficiently service the 223 current bus stock. Their work bays are limiting due to the lift configurations, height limitations, and that they are not multi-functional or supported equally. The limited number of work bays, designed to service 140 buses, also limits the ability to provide preventative maintenance since so many are consumed by active break-downs. With lack of space directly adjacent to their shops due to poor space layout, their parts, tires, and storage areas located at the far ends of the facilities. This creates hours of lost time by staff to just traverse this extremely long building.

Enclosed bus storage greatly extends the life of the substantial investment of a bus and its components, enhances security, and is a requirement of the federal government for funding of new buses. The majority of Metro's buses are currently diesel and require heated conditions for proper function, and would otherwise require over 200 exterior block heaters. Circulation within this type of facility provides the greatest challenge, for both the buses and the pedestrians that are trying to access the buses themselves. The building is currently designed for right-hand turn circulation for buses, which creates a blind-spot turn direction for drivers, increasing the potential for incidents. Left-hand turns are the industry standard for current bus facilities, allowing the driver clear views of their path. Furthermore, with no definable path and low light levels throughout storage areas, pedestrians are difficult to distinguish.

With phased capital investment, these functional challenges can be met, starting with a redesign of the wash bay, which will improve all three functional aspects of the facility and result in better service for Metro Transit customers. The plan to accomplish the facility and functional challenges is detailed in the Preferred Design Solution Concept.

Preferred Design Solution Concept

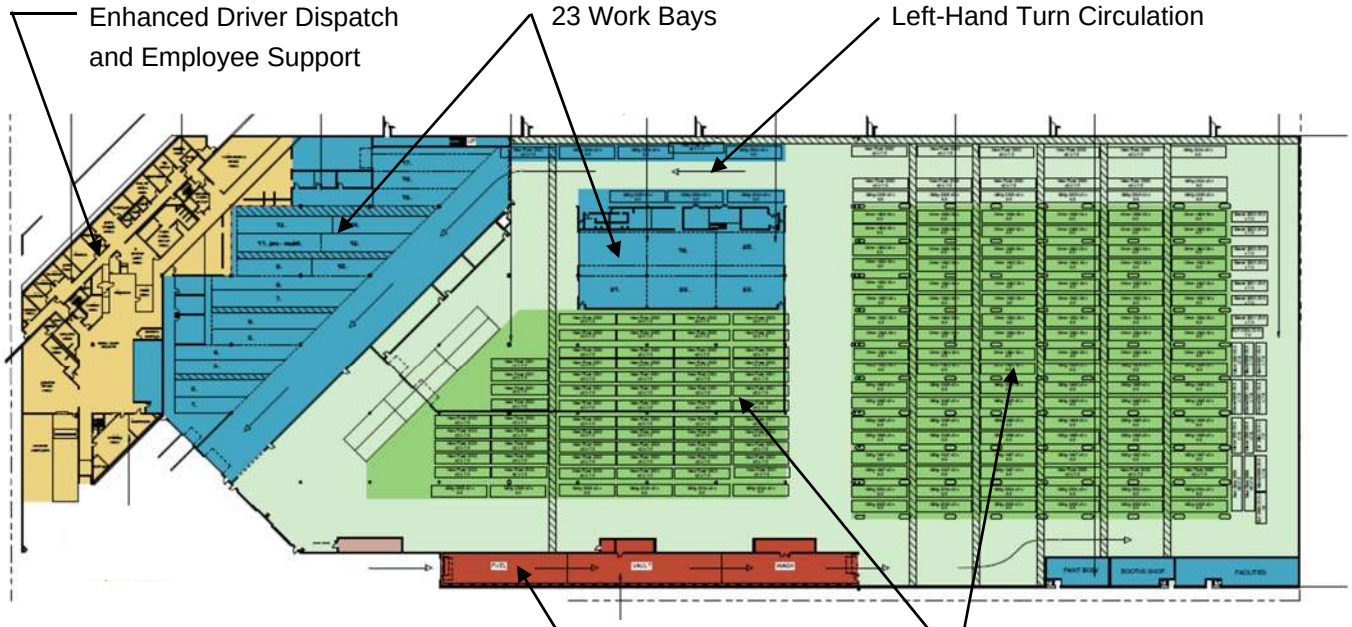
The development of the program and renovation strategies started with early guidance provided by the City of Madison Engineering group and Madison Metro. At the forefront were the following goals and objectives:

- Maintain functions generally **within the existing footprint**.
- Provide a **20-year solution** for the site.
- **Improve workflows** by reorganizing functional adjacencies.
- **Identify upgrade requirements** for utilities and life safety.
- **Staff safety and retention** are key priorities.
- Reorganize bus traffic flow for **Left-Hand turns** in lieu of current Right-Hand Turns for increased safety.
- **Sustainable Methods** and Decreased Maintenance are a value of the City**.**

Through the charrette process, development of three renovation options, and continued vetting by the major stakeholders, the project team was able to develop and refine a preferred concept design, referenced as Remodeling Option 1. This option optimizes the top priorities for renovation as indicated, by staff and key stakeholders, calling for improvements to the ventilation, safety, and toilet rooms.

The preferred design solution concept, Remodeling Option 1, moves the current centrally-located service/wash lanes into a small addition to the south side of the building. This simple solution eliminates the major contributor to vehicle circulation congestion, reduces humidity and temperature problems, and isolates pollution/exhaust fumes. The facility can then be reconfigured to provide left-hand turn bus circulation, an increased number of maintenance work bays, isolated spaces for enhanced safety zones for staff, and better space and amenities to the driver dispatch and building support areas for employees. This can be accomplished while maintaining the same quantity of bus parking in the storage areas.

Improvements to the air quality of the building would be the number one health and safety improvement to the facility that is currently the cause of the most distress to employees and their ability to work. Moving the wash bay out of the work areas will eliminate the major contributor of pollution in the facility. New HVAC systems will also provide separated zones, address negative pressure issues, and provide enhanced ventilation (above code minimums, in line with LEED requirements) to create a healthier environment. This remodeling option also provides additional safety features and benefits. The change in circulation patterns to incorporated left-hand turns will result in increased savings through reductions in inadvertent building and bus damage. Providing quality work environments and a commitment to employee satisfaction, with even modest improvements, are proven to improve worker productivity and efficiency. Metro Transit staff take pride in providing great, on-time customer service to transit customers. Providing them with a work environment that promotes this will help the organization to grow and serve the community even better in the future.



Remodeling Option 1

While there was a small cost premium (15%) for building the new wash bay as an addition vs. remodeling it in place, there are many advantages to the Remodeling Option 1 configuration, and the cost is easily recovered through operational efficiencies this solution provides. First, it is important to understand that the wash bay operates 365 days per year. It would be very difficult to rebuild it in place without dramatically affecting bus operations. Secondly, for the maintenance department operations, increasing service bays from 16 to 23 and the growing the space within the bays will improve the efficiency of each mechanic potentially by 10-15%. New lifts, product drops, and improved workspaces could also increase productivity by an additional 5%. This could equate in regular annual operational savings due to less bus down-time, less staff overtime, as well as lower expenses in hire training and attrition.

Phasing and Construction Timelines

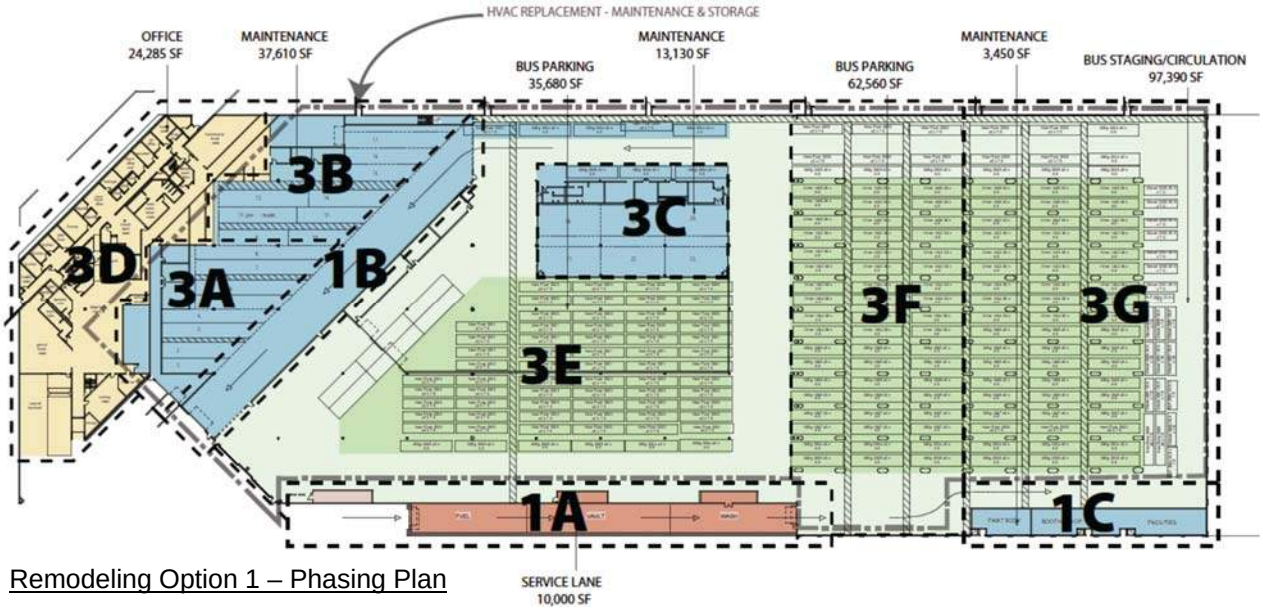
Strategies for phasing were first evaluated by establishing the primary considerations raised by the design team and the stakeholders. These considerations were then cross-evaluated with the staff and key stakeholders' top priorities of indoor air quality, safety, and toilet room renovations. The categories for evaluation were the critical paths for system failure and life safety, operational efficiencies, and the need for ongoing operations through the duration of construction and its effects.

Each phase/capital project also needs to be stand-alone, where no additional work or projects are required to have a complete and usable facility when they are complete. This stand-alone project strategy does involve some minor reconfigurations due to subsequent remodel areas but is minimized by the order presented below.

Goals for desired construction start, timelines for construction, and overall budget package amounts were established through discussions with the stakeholders. The flat roof replacement project is already underway through a maintenance allowance and is slated to start in 2018. The first interior construction project is desired to start in 2019, with subsequent annual projects over the next five years.

Each of the projects are self-supportable and do not required additional projects to complete each phase. Design for each phase would precede the construction work by 1 year. Additional phasing/sequencing breakdowns for construction or budget packages can be proposed by the areas on the phasing plans further delineated with A, B, and C areas. The stakeholders' desired schedule and capital budget plan breaks the project as follows:

Year	Phase		Design	Construction	Equipment
2018	1	Design: Service Line/Body Shop	$458,878		
2019	1	Service Line/Body Shop Construction		$4,681,269	
	1	Service Line/Body Shop Equipment			$1,260,173
	2	Design: HVAC Bus Maint. & Storage	$711,144		
2020	2	HVAC Bus Maintenance & Storage		$7,227,288	
	3	Design: Bus Maint., Dispatch/Support, Bus Storage	$2,438,010		
2021	3	Bus Maintenance, Dispatch/Support, & Bus Storage Renovations		$24,755,843	
	3	Renovation Equipment & Furniture			$2,738,260
	4	Design: Ongoing Maintenance	$977,083		
2022	4	Ongoing Maintenance		$9,911,304	
TOTAL			**$4,126,238**	**$46,575,705**	**$3,998,434**



Remodeling Option 1 – Phasing Plan

Phasing Detail

- Phase 1, 2019 – The new service lane addition and remodeling allows for the continued use of the existing lanes until the new lanes are operational. This eliminates any downtime or suspension of service activities for daily bus maintenance and cleaning. The resultant reclamation of the area of the old service lane provides extra area for bus maintenance and starts the separation for internal zoning of Mechanical ventilation systems. This construction project is estimated to require 9 months.
- Phase 2, 2020 - New mechanical distribution system upgrades to support the existing maintenance areas and bus storage areas, exclusive of the administrative support area. This upgrade would also include the creation of physical separations between work area activities, such as maintenance and the administration and bus storage, to support individual area ventilation requirements and vastly improve air quality within the existing building. This construction project is estimated to require 12 months.
- Phase 3, 2021 - Remodeling of the existing Maintenance, Driver Dispatch, and support areas, will reconfigure to the building to the Remodeling Option 1 layout. This construction activity requires temporary relocation of Maintenance bays, bus storage, and Driver Dispatch/support areas to other off-site facilities or on-site mobile facilities. The sequencing of this construction activity is more critical to maintaining Metro Transit Operations. This construction project is estimated to require 18 months.
- Phase 4, 2022 - On-going Building Maintenance is for the restoration of the existing building envelope, such as metal wall panel replacement and masonry tuckpointing and possible “Gisholt” clerestory roof replacement in the bus storage area. This also would provide for miscellaneous mechanical and electrical system upgrades not addressed in previous projects. This construction project is estimated to require 12 months.
- Note: Through the process of this report and concept development, there was a separate facility planned to house electric buses. However, a recent grant award has moved the timeline of electric bus acquisition to the forefront. Adjustments to the capital budget plan will already need to be made, to accommodate the affects of the electric buses. The scope of work requires additional investigations and considerations outside of this report scope and timelines.

Current Life Safety Challenges to Be Addressed

As an existing building without any major renovations, the facility is held to the life-safety requirements from the period it was built. For this facility, the last overall construction project was 1982. The Metro group has pro-actively made some upgrades to have more modern safety features, as would be required in new buildings, however the list below are some of the more critical challenges that need addressing:

- Replacement of degraded metal decking at the roof (Intended to take place with the 2018 roof replacement project).
- Interior building ventilation does not meet current code requirements and is hazardous to the building occupants.
- Code required smoke detection is not present for any of the direct-fired make-up air units.
- Fire Detection and Alarm System is past its useful life and does not meet the latest standards to provide audible and visual notification. This system requires replacement (scheduled for 2018).
- Fire protection sprinkler systems should be provided in the administrative and employee support areas, where there are none currently.
- Emergency Shower/Eyewash stations require tepid water to meet OSHA requirements and are currently only provided with cold water.
- The water heater should be replaced with a sealed combustion type, to be a code compliant installation in the boiler room. This water heater has a gravity draft flue which is a code violation when installed in the same room as the building's heating boilers, which have power draft burners. When the boilers fire, it can create negative pressure in the room impairing the natural draft of the flue of the water heater drawing combustion fumes into the boiler room.
- Emergency egress lighting requires upgrades for code compliance. Currently the exterior does not have any emergency lighting to lead occupants to the public way, which is a current code requirement. The interior lighting levels are also questionable whether they meet current code levels, although not formally metered as part of this project.

Conclusion

The Madison Metro Department and its employees provide bus service at tremendous value to the City of Madison on a limited budget, always prioritizing service improvements when making capital expenditures. However their Transit Maintenance Facility is broken, due to a lack of investment over the past several decades. With modest renovations and maintenance projects for their current facility, they will be able to rejuvinate their workplace with new operational efficiencies and meet critical OSHA and life-safety requirements, that will take them through the next 20 years of devoted service. As one of the largest Madison employers with more than 500 employees, Metro employees need a workplace that affords their basic rights for safety and wellness.

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Madison Metro Transit Building Master Plan Report

PREFERRED DESIGN SOLUTION CONCEPT – REMODELING OPTION 1

MARCH 9, 2018

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MADISON TRANSIT COLOR LEGEND	AREA
Office/Support	30,698 SF
Bus parking s parking	98,240 SF
Maintenanceintenance	58,122 SF
Service lanervice lane	10,000 SF
Bus staging/circulation	90,197 SF

2nd FLOOR OFFICE 6,403 SF

OFFICE 24,285 SF

MAINTENANCE 37,610 SF

BUS PARKING 35,680 SF

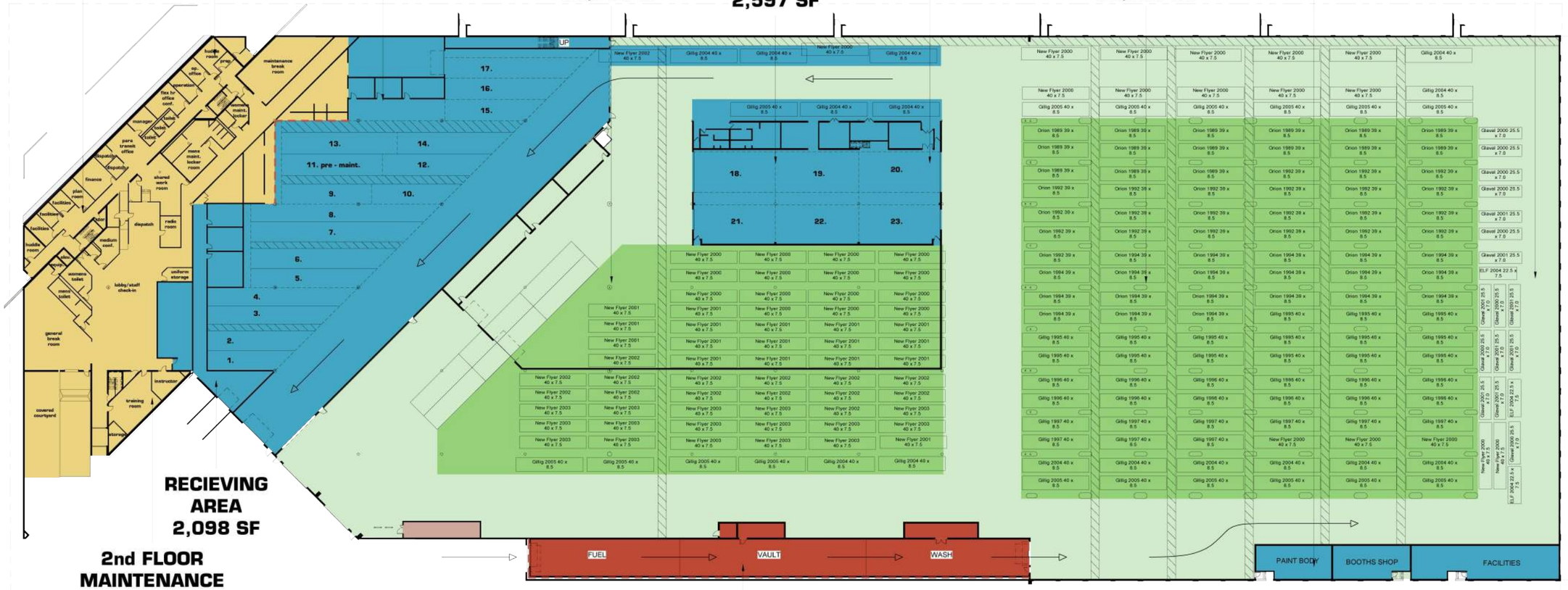
2nd FLOOR MAINTENANCE MECHANICAL 2,597 SF

MAINTENANCE 13,130 SF

BUS PARKING 62,560 SF

MAINTENANCE 3,450 SF

BUS STAGING/CIRCULATION 90,197 SF



RECIEVING AREA 2,098 SF

2nd FLOOR MAINTENANCE MECHANICAL 1,335 SF

REMODELING OPTION 1 - PREFERED OPTION

SERVICE LANE 10,000 SF

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Madison Metro Transit Building

Facility Assessment

Report prepared for

City of Madison – Metro Transit

Madison, Wisconsin

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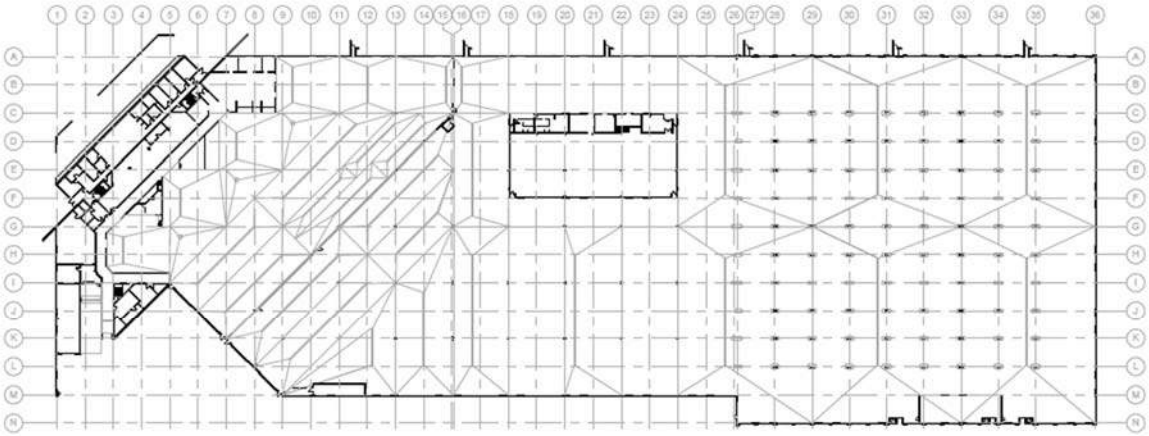
A. General Information

The Madison Metro Transit facility located at 1101 East Washington Avenue is currently fully occupied with its bus maintenance/mechanics group, bus driver dispatch group, paratransit group, and other support administrative functions, as well as bus storage. Support areas for bus drivers are also provided; however, they interact with the building on varying degrees. The building's construction and operations are generally maintained to be weather-tight. However, working conditions, utilities, general infrastructure, and occupant amenities are substandard, inefficient, and out-of-date. This report includes gross area calculations, building construction, mechanical-electrical-plumbing-fire protection-technology system descriptions, current condition assessments, and building code/life safety overview.

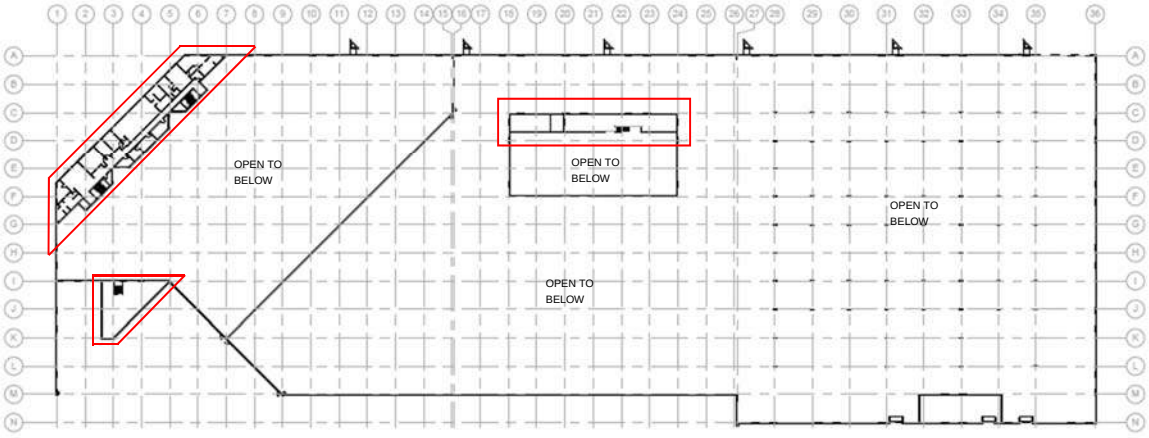
B. Gross Area Calculations

Building Area – Approximate Gross Square Footage (GSF)

First Floor:	266,922 SF
Second Floor:	10,335 SF
Building Total:	**277,257 SF**



FIRST FLOOR PLAN



SECOND FLOOR PLAN

C. Building Description

Construction

Building Overview

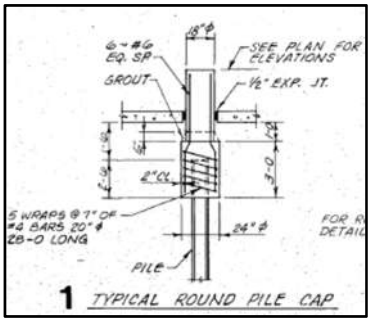
The Metro Transit facility consists of four definable areas. To the northeast is a non-historic, former Gisholt Ordnance Factory Building, composed of a three-story, brown, brick façade with a parapet roof portion and eight sawtooth roofs above. It is currently used as a bus storage area along with miscellaneous mechanical, and other storage uses. Adjacent to this is a 1979, two-story addition that runs the full length of East Washington Avenue up to Ingersoll Street. It is a steel structure with a brown brick base and tan metal panel siding above. It houses the bus maintenance/mechanic bays and additional bus storage. At the far southwest end of this addition is the administrative portion of the building that angles back from the corner leaving an outdoor open space. This is the only part of the building with fenestration. An infill addition was constructed in 1982 on the south side of the building. From the exterior, the addition was seamlessly incorporated into the 1979 structure and houses additional bus storage space.

Structure

Limited information is available regarding the foundation system of the former Gisholt building. The foundations are not exposed and cannot be visually verified in the 1979 building addition. Drawings provide some insight into the original construction. A continuous, stepped-width, concrete spread footing system is provided at the exterior bearing walls, with a stepped spread footing at each interior column. The existing concrete slab is covered with crushed compacted stone and 3 inches of bituminous paving.

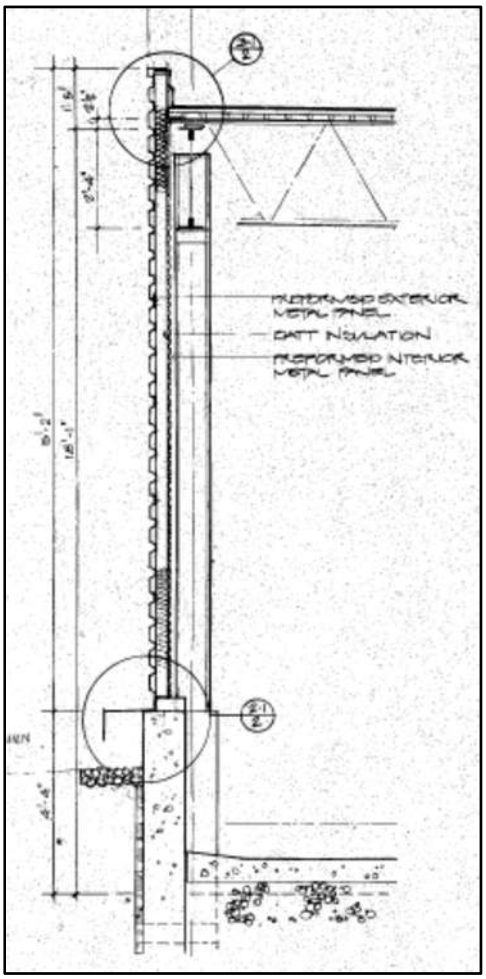
The 1979 and 1982 additions utilize piles for their primary foundation system. Continuous strip footings at exterior and bearing walls and grade beams/pile caps at each column are subsequently provided. The concrete floor slab is primarily composed of a 6-1/2 inch slab on compacted fill with woven wire fabric. Thicker 9 inch slabs are provided at relevant

maintenance functions, for instance at the hoists and lifts within the maintenance bays. 5 inch and 6 inch slabs are provided at the administrative areas and tool shop.



The primary structural system of the Gisholt building is a steel web and wide-flange columns supporting the steel sawtooth roof trusses above. Secondary steel wide-flange beams/girders were provided to support bridge cranes for its former use. Additional reinforcing cross bracing and mechanical platforms were added as part of the new construction work.

The primary structural system of the 1979 and 1982 additions consist of steel wide-flange columns supporting steel girders and a bar joist roof system. The second floor structure in the administrative area is an 8-inch precast concrete deck system.



Exterior Enclosure

The exterior enclosure of the Gisholt building is a solid brick masonry wall with brick pilasters. All of the original steel sash windows have been removed and infilled with concrete masonry units (CMU) and brick face, except for eight windows on the main body, and sixteen clerestory windows on the East Washington side. These windows have been replaced with translucent insulated window panels (commonly referred to by the manufacturer's name: Kalwall).

At the 1979 and 1982 additions, the foundation walls extend above grade, typically 32" above the first floor, providing a protective concrete barrier with insulated metal framing above. At the street sides, the wainscot is covered with face brick. All of the metal studs above are then covered with 1/2 inch sheathing and pre-formed exterior metal paneling on the exterior. Stairwells are comprised of CMU bearing walls that are faced with brick where exposed to the exterior.

These additions have very limited openings. At the East Washington side, a series of six, small triangular structures protrude from the main wall serving as emergency exits from the building. They are brick clad and contain one painted hollow metal door on the angled side of the wall. At the corner of Ingersoll and East Washington, where the building cuts back from the street, contains the façade with the only fenestration. They are comprised of medium-bronze aluminum storefront windows with insulated glazing. Small, covered recesses at each end of the main office corridor provide secondary exits to the building and also provide semi-enclosed outdoor seating areas.

The rear side of the building contains a major cut-away for bus circulation at the Ingersoll side and then an extensive wall parallel to the street/alley. At the cut-away, four large, high-speed, coiling overhead doors for the main bus entry point dominate the façade. Then a standard overhead door is provided at each the receiving dock and the paint shop, where they are semi-concealed under an overhang/canopy area. Hollow metal entry doors are sporadically placed around this area. A series of three, combination overhead door and hollow metal door groupings, then march down the parallel wall.

The building is primarily enclosed by a flat/low-slope roof, consisting of a fluted metal deck, minimal insulation, and a ballasted ethylene propylene diene monomer (EPDM) roof system. Core samples were taken to confirm this make-up. The sawtooth roofs are enclosed with the original, fluted metal deck at the sloped top side, cement asbestos siding on the vertical wall sides, and glazing at the low-sloped open end. During the 1979 addition, the glazing was removed, and an enclosure was erected to cover the low slope and vertical sides with insulated wall panels. Subsequently, these enclosed roofs were entirely encapsulated with a spray-foam and polyester/granular cover.

Interior

The interiors of the building are entirely utilitarian. In the bus maintenance/ mechanics and storage areas, all structural elements are exposed, with some painted. The Gisholt building's exterior walls have exposed painted masonry. Interior metal liner panels conceal the exterior metal stud walls at the bus storage and maintenance areas. Interior partitions are all exposed with painted CMU, forming small shop areas and separation walls. The floors are sealed concrete and asphalt, and no ceilings are provided. Hollow Metal doors and coiling overhead doors comprise a majority of the openings, with only a few hollow metal windows throughout the facility.

In the administrative and break areas, the walls are painted CMU and have gypsum board partitions. The main first-floor wall, separating the administrative and parts areas, has a unique interior brick face wall. Floor finishes on the first floor are a mix of carpet and vinyl tile flooring. The second-floor has a range of rubber dot patterned flooring and vinyl tiles. All of the ceilings are acoustic panels. An accordion partition is provided to separate a portion of the main second-floor break room into a training room.

The toilet, shower, and locker facilities are enclosed with a mix of painted CMU and gypsum board partitions. In the toilet and shower areas, the walls are covered with 2x2 inch full height ceramic tiles. The floors are typically 1x1 inch porcelain tiles. Some of the locker rooms have rubber flooring as seen on the second floor. Ceilings are painted gypsum board. All lockers are powder coated metal of varying sizes.

Equipment

Fuel, Vault, Vacuum and Wash

There are two fuel, vault, vacuum and wash service lanes. Most of the equipment has outlived their service life. Equipment includes: 2 fuel dispensing units, 2 lubrication stations, 2 collection fare vault stations, 2 high volume vacuum systems and 2 drive-through brush wash systems. For fuel storage, the City recently installed four 15,000-gallon diesel tanks, one 8,000-gallon diesel tank, and two 550-gallon unleaded tanks.

Bus Maintenance

There are currently 16 work bays containing a total of 11 two-post hoists and 1 three-post hoist. These are buried box vault type of hoists. There are 8 product bank reels, 1 bank for every 2 bays. Nearly every bay is equipped with air, electric, City owned tools and boxes, exhaust reels and sporadically placed workbenches. The City has several air compressors, one primary "corkscrew" and one backup. Lastly, the body shop has one large paint booth.

Services

Site Utilities

Water

A 4-inch domestic water service extends from the municipal water main on Ingersoll Street and enters through the west wall. The domestic water is metered and has a pressure-regulating valve (PRV), maintaining a pressure of 75 psi.

Storm and Sanitary

Horizontal storm system laterals exit through the foundation wall towards East Washington Avenue and Ingersoll Street. Two sanitary system laterals extend from the Gisholt building to the main line below East Washington Avenue, and the lateral from the west third of the building (office, repair garage, and bus wash areas) extends west to the sanitary sewer under South Ingersoll Street.

Natural Gas

Natural gas service is provided by Madison Gas and Electric (MG&E) who is responsible for the service to the gas meter.

Electrical Service

The buildings electrical service is provided by MG&E from a 750 KVA utility owned pad mounted transformer. The transformer is located adjacent to the building at the southeast corner of South Ingersoll Street.

Fire Protection System

Fire Suppression

The sprinkler system for the west portion (servicing bays) is supplied from the 8-inch combination fire and domestic water service connecting to the municipal water main on Ingersoll Street. The sprinkler system is a wet-pipe system, supplying sprinkler heads in the entire servicing area. It is equipped with a double-check valve backflow prevention assembly. The first and second floor of the administration office is not protected with a sprinkler system.

The sprinkler system in the east portion of the Gisholt building; used for bus storage, is supplied by 8-inch water service connecting to the municipal water main on East Washington Avenue. The water service enters through the north wall where a double-check valve backflow prevention assembly is provided. The 8-inch cross main is routed overhead to supply several riser valves located along the south wall. This main also supplies 2-1/2 inch fire department valves (FDV) located at interior columns. The sprinkler piping in all areas is black steel.

Fire Detection and Alarm System

The building's main fire alarm control panel is located in the facility manager's office. The main fire alarm control panel is an original non-coded, Johnson Controls 5000 zoned system with seventeen active areas based on site observations. The fire alarm/detection system consists of fire alarm manual pull stations, heat and smoke detection, and monitoring of the fire suppression system. Alarms are through horn/visual notification appliances. The system is believed to be monitored by Mid-Wisconsin Security via a Silent Knight Auto dialer. Metro has a planned for a maintenance replacement for the fire alarm panel in 2018, due to numerous false alarms.

Plumbing Systems

Sanitary Drain and Vent

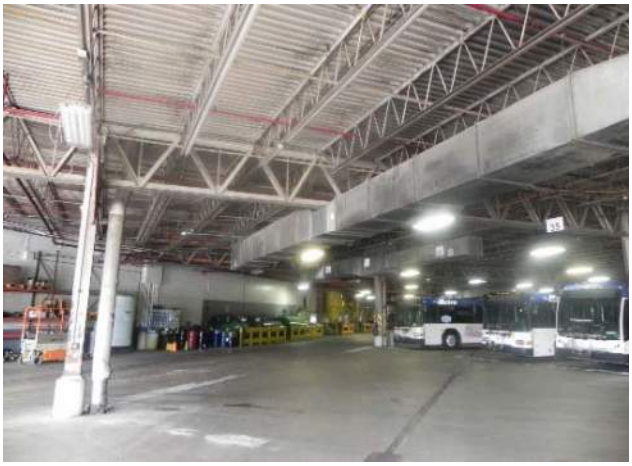
The existing sanitary and storm drainage are gravity systems. Building plumbing fixtures serving the west third of the building (office, repair garage, and bus wash areas) including water closets, lavatory sinks, break room sinks, water coolers, floor drains, trench drains, etc., extend west and are connected to the sanitary sewer under South Ingersoll Street. The sanitary and storm systems serving the bus parking and storage are extended horizontally below the floor north to East Washington Avenue. All of the floor and trench drains in the bus repair garage, parking and storage areas are connected to oil interceptors before running to the city sewer system. The interceptors are to pre-treat the wastewater separating the oils from the wastewater before entering the sanitary sewer. The sanitary drain lines from plumbing fixtures, water closets, etc. do not flow through interceptors; these fixtures run directly to the city sewer system. Backwater valves are installed on the sanitary building drain line before exiting the building.

In the bus parking and storage area (Gisholt building) the new floor was installed approximately three feet above the original slab. The floor slab was raised to be level with the west half of the building. The original slab and foundations were left in place. The sanitary drain lines serving the trench drains in the bus parking area were installed above the original floor and extend to the sewer system below East Washington Avenue.

A sanitary vent system is provided to maintain trap seals. All traps and fixtures are vented, and vent piping is collected and terminated through the roof in various locations. The sanitary drain and vent system is cast iron and galvanized steel.

Storm Roof Drainage

The roof over the west portion is flat, sloping to the drains in the middle of the building. Interior storm drain piping connects to the roof drains and goes vertical to below the slab. The vertical storm conductors connect to horizontal storm drain lines below the floor slab.



The roof over the bus storage area in the Gisholt building is a saw tooth type roof construction. The roof drains are located at the bottom of the saw tooth slopes where they connect to conductors running vertically under the slab. This roof drain system is original to the Gisholt building and extends to the storm sewer under East Washington Avenue.

Domestic Water

Domestic water is distributed horizontally in the ceiling space connecting all plumbing fixtures and hose bibs. In the boiler room, domestic water is piped through a duplex water softener supplying softened water to the domestic water heating system. The hot water system consists of a gas fired water heater with 100-gallon internal storage and a separate 400-gallon storage tank. The water heater was replaced November 12, 2013. This water heater has a gravity draft flue and is installed in the same room as the building's heating boilers, which have power draft burners. The domestic water distribution piping is in the ceiling space parallel to the cold-water piping supplying domestic hot and cold water to the plumbing fixtures. Domestic hot water temperature is maintained using circulation pumps located at the water heater. There are two pumps; one to circulate water from the storage tank, and the other to circulate water through the hot water distribution system maintaining set hot water temperature to the plumbing fixtures.

A second domestic water heater with an external storage tank is located on the mezzanine above rest room 165 (bus driver and maintenance workers locker/shower rooms). This water heater serves the domestic

needs of the restroom/shower room. Domestic cold and hot water piping are primarily copper with some galvanized steel.

Fixtures and Equipment

Water heater (boiler room): AO Smith, model BTR 197 118, gas-fired, an input of 199,000 Btu/hour, 100-gallon storage, with an additional 400-gallon storage tank.

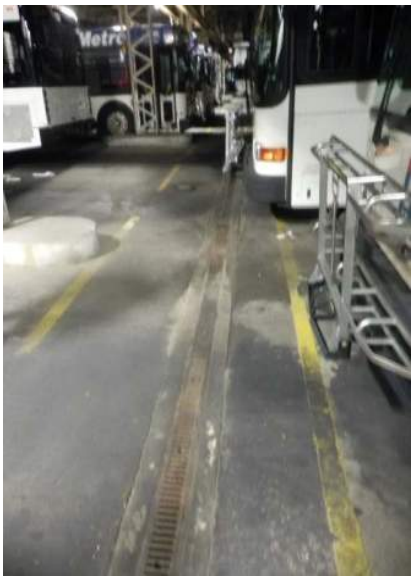
Water heater (mezzanine): Bock model EZ75-135N gas-fired, input of 135,000 Btu/hour, 67-gallon storage, with additional 115-gallon storage, insulated with a metal jacket.

Water softener: The water softener is a duplex alternating system, originally installed May 7, 2007. The softening system is metered measuring a pre-set number of gallons to initiate regeneration.

Water closets: Are made of vitreous china, siphon jet, wall mount with brass-body flushometers.

Lavatories: Are made of vitreous china, wall mounted, with faucets varying from manual lever handles to metered.

Urinals: Are made of vitreous china, wash down, and vary from wall to floor mounted throughout the building, with flushometers.



Wash fountains: Are made of stainless steel and molded stone, and floor mounted.

Trench drains: Are modular pre-formed and pre-sloped type, with heavy duty ductile iron grates.

Electric water coolers: The electric water coolers are surface mounted.

Emergency shower/eyewash stations: It appears there is only cold water provided to these fixtures. However, Occupational Safety and Health Administration (OSHA) requires the water to be tepid. Tepid is defined to be between 60°F and 100°F.

Mechanical Systems

Heating Systems

Boilers & Pumps

The boiler room contains two Cleaver Brooks, CB-200 fire-tube hot water boilers, an atmospheric water heater, buffer tank, and four hydronic base mounted pumps. The boilers are dual fuel supplied by natural gas and number 2 fuel oil. One base mounted pump returns water to the boilers, while the other three supply hot water to the different heating zones: administration/maintenance shops, perimeter radiation, and bus storage.

Cooling Systems

The facility does not have a central cooling system. Individual spaces throughout the building are served by rooftop units.

Air-Conditioning Units

The heating and cooling for the administrative offices, break room, locker rooms, and hallways are supplied by the gas-fired packaged rooftop air-conditioning unit AC-1. This unit supplies air-conditioning through an air-cooled direct expansion refrigeration system. Local electronic thermostats modulate airflow to the specific spaces through the individual air terminals. Supplemental cooling is provided for the dispatch room through a split ductless system with an outdoor condensing unit. Perimeter radiation for the administrative office is in the form of hot water baseboard heating.

The heating and cooling for the dispatch/maintenance office are supplied by gas-fired packaged rooftop air-conditioning unit AC-2. This is a 3-ton unit with an individual thermostat that supplies air-conditioning through an air-cooled direct expansion refrigeration system.

The cooling for the vault room is supplied by AC-3, a small condensing unit on the roof with a fan-coil system inside the vault room. HV-5 provides cooling to locker rooms through an air cooled direct expansion refrigeration system located within the supply duct.

Ventilation Systems

Perimeter windows in the break room and administration offices can be operated.

Hot Water Makeup Air Units

There are ten hot water makeup air units installed on the roof. These units utilize 100% outside air to provide heating and ventilation to the maintenance shops and a part of the bus storage area. The supply air is

tempered by the hot water system, with no means of cooling. The exterior piping insulation on some units has deteriorated. Code required smoke detection is not present for any of the hot water makeup air units.

Gas-Fired Makeup Air Units

There are five direct gas-fired makeup air units installed on the roof. These units utilize 100% outside air to provide heating and ventilation for the paint spray booth and a part of the bus storage area. The supply air is tempered by the burner within the unit, with no means of cooling. Code required smoke detection is not present for any of the direct gas-fired makeup air units.

Exhaust Fans

There are 17 general exhaust fans and four vacuum-system exhausts on the roof. The general exhaust fans are for the bathrooms, locker rooms, paint spray booth, bus storage, maintenance shops, boiler, and generator rooms. The roof curbs for all exhaust fans were replaced to repair roof leaks. Almost all fans are belt driven.

The bus storage area has four large exhaust fan systems. Heat recovery in these systems was decommissioned almost 32 years ago due to high maintenance costs. The coils and filters have been removed but the unused distribution piping and pumps remain.

Exhaust fan (EF-34) in the generator room does not have a damper. Roof intake for the generator room is blocked off with rigid insulation. Two of the four vacuum-system exhaust ports on the roof have damaged wire-frame netting, clogged by debris; the other two exhaust ports have missing wire-frame netting.

Specialty Systems

No specialty systems are present in this facility.

Control Systems

There is no central building control system. The existing thermostats are electronic, and the ones in the Administration area were upgraded with the replacement of AC-1 in 2004. The controls in the maintenance shop are manual start/stop, which operate all the airside mechanical systems.

Electrical Systems

Electrical Service

The building is served from a main multi-distribution switchboard (MDS) via underground service conductors from the utility-owned pad mounted transformer. The MDS is located in the main boiler room above the dispatch area as noted on the 1979 drawings. The switchboard consists of three sections: main disconnect, current transformer cabinet/power metering, and two distribution sections. The switchboard is rated at 1200 amperes at 480/277 volts, three-phase, 4-wire with a GFI protected main fusible switch fused at 1200A. The switchboard is a Gould I-T-E, type FC-1 manufactured in August 1980.

Electrical Distribution System-Normal

Electrical normal power is distributed throughout the facility from the MDS. The switchboard distributes 480/277 volt power to distribution panels, lighting panel boards, power panels and step-down transformers serving 208/120 volt branch panels. Distribution panels and panel boards are primarily located in the main boiler room, existing communications room, corridors, passage ways, and maintenance and service areas as well as the bus storage areas. The panel boards are a mix of original Gould I-T-E manufactured in 1980 and 1983 and some newer panel boards by other manufacturers.

Emergency Supply System (EPSS)

The EPSS consists of a diesel fuel powered, 480/277 volt, 3 Phase, 4 wire, 350 KW stand-by generator located in the mezzanine above the men's and women's locker rooms located in Maintenance Area 'B'. The EPSS provides stand-by power to allow the facility to maintain full operation if normal power is lost. MG&E has the ability to remove normal power to the facility from the grid and allow the building to operate off the EPSS. Madison Metro no longer participates in this program.

Wiring and Conduit

Interior conduit types appear to be of the appropriate type based for the environments in which they are installed in. Most of the wiring and conduit appear to be original to the building construction.

Equipment Connections

Generally speaking mechanical equipment, HVAC units, pumps, etc. are provided with local disconnecting means.

Lighting and Controls/Interior Lighting

The interior lighting in the 1979 portion of the building, which includes administrative and support spaces, corridors, restrooms, locker rooms, shop spaces, parts, and maintenance and storage spaces consists of original T12 fluorescent luminaires and incandescent luminaires located in the locker/restrooms. Exit sign lights are also original with fluorescent lamps. Some of the existing fluorescent fixtures in the engine repair shop have been retrofitted with a LED source. The general lighting in the bus maintenance/repair area, circulation lanes and the dry area of the bus wash area has been upgraded with open LED industrial luminaires installed in 2017.

The interior lighting in the 1982 portion of the building, which includes maintenance area B, locker rooms, restrooms, steam room, shop, welding room, storage, mezzanine storage, generator and mechanical rooms, and bus storage and exit lanes is original T12 fluorescent luminaires with the exception of the bus storage area and exit lanes which have T8 enclosed fluorescent luminaires. At each of the exit doors the exit lights are combination exit and emergency, which were installed in 2010.

In the Gisholt building the interior lighting consists of enclosed fluorescent high bay 6-lamp and T8's and the lower roof portion of the building comprises enclosed fluorescent low bay 4-lamp and T8's.

Exterior Lighting

The exterior lighting consists of original recessed square incandescent luminaires located under the canopies at the north and south vestibule. These fixtures have had replacement LED bulbs since 2017. Original recessed high-pressure sodium (HPS) luminaires are located in the loading dock ramp area, canopies on the north side exit vestibule and HPS floodlights on the southern portions of the roof parapet. These fixtures are planned to be replaced as part of the 2018 roof replacement.

Lighting Controls

The majority of the interior lighting controls throughout the 1979 building consist of local manual on/off controls through toggle switches. The maintenance bays, bus entrance, service lanes and circulation lanes are on 24 hours a day, seven days a week.

Interior lighting controls throughout the 1982 building consist of local manual on/off control through toggle switches and most of spaces have occupancy sensors.

Interior lighting controls throughout the Gisholt building is primarily occupancy sensors located on multiple fixtures.

Exterior lighting is controlled both through local manual on/off control through toggle switches and/or through photo-cell and time clock.

D. Existing Condition Assessment

Construction

Building Structure

The overall steel structural systems are in good condition, without degradation. The Gisholt building masonry walls do not show any signs of buckling or the possibility of collapsing. The concrete foundations do not show any signs of spalling or exposed rebar. The foundation wall at the end of the wash bay/service line along East Washington Avenue will also require further scanning and analysis for damage, as reports of numerous bus crashes have taken place, due to wet tires progressing off the wash lanes. Some degradation of the metal decking at the roof was observed where major, continuous roof leaks have occurred. These areas are recommended for repair and replacement.

There are two major areas of concern at the 1982 addition:

1. The concrete slabs and asphalt are experiencing extreme water infiltration through joints and around columns. This is believed to be due to surges in the storm water system, which also requires a comprehensive review.
2. High-frequency vibrations from bus traffic appears to be vibrating the structure. Additional isolation separators are likely needed.

A structural engineer should study these issues through a separate contract, and should be re-visited at the time of any forthcoming repair/renovation projects.

Exterior Enclosure

The exterior enclosure has been maintained and patched over the years to be mostly weather-tight. The walls and roof are poorly insulated and are not mitigating heating and cooling loss/gains, required of the building. The canopies over the East Washington exits currently house a large amount of plumbing for the toilet rooms. Since they are poorly insulated, many breaks and leaking have occurred due to freezing. Although they have been patched and repaired numerous times, the retrofit solutions do not solve the long-term problem. The sap, leaves and debris from the trees between the

sidewalk and the building along East Washington are also causing degradation of the roofing systems and adjacent wall construction.

The fenestration is not experiencing any metal discoloration or hazing within the insulated glazing units, signifying they are in satisfactory condition. However, knowing their vintage, replacement is recommended as part of a renovation project for the sake of building envelope longevity. The hollow metal doors are in relatively good condition, and only require maintenance painting. The overhead doors are in general working order. Updated controls and openers are recommended to provide ideal service, as well as providing emergency backup power to avert strenuous, manual operation procedures.

The masonry walls on the Gisholt building are showing signs of wear, and likely require a minimum 80%-100% repointing as required. Mortar testing should be done to appropriately replace the joints with in-kind mortar to prevent damage to the original brick and overall wall system.

The entire roof is past its useful life and is experiencing severe deterioration. Many of the seams are easily separated and are allowing water infiltration. Much of the ballast is black and discolored signifying a deteriorated condition. Replacement is recommended, though some areas of insulation could be reused, pending core sample review. However, with the current thickness of an inch to inch and a half, it is recommended to increase the thickness to a minimum of four inches or more per code and ideal insulative requirements. The roof drain areas are also experiencing numerous leaks.

The Sawtooth enclosure roof system is in very poor condition, although its structural framing appears to still be intact. Numerous reports of water infiltration have been noted due to the failing spray-foam caused by degraded material and seagull damage. Further analysis of this enclosure system should take place before removal, as asbestos panels were noted as replacement components in the 1979 addition project.

Interiors

All of the interior surfaces are past their useful life and require refurbishment. All flooring systems and acoustic ceilings in the administrative areas require replacement. The mechanic's work areas provide insufficient space and inefficient layouts to effectively work on the buses. Due to the poor air quality in the building, staining is observed on many of the wall surfaces.

The wall and floor tile, fixtures, and finishes in the toilet/locker/shower room are all in satisfactory condition, but are out-of-date and are sufficiently lacking in quantity for the use of the facility. The rooms and room layout do not meet modern privacy configurations or general ADA compliance.

Equipment

Fuel, Vault, Vacuum, and Wash

Most of the equipment in the fuel, vault, vacuum, and wash service lanes has outlived their service life and will need to be replaced as proposed in Phase 1. Specifically, the two-lane drive-through brush system is outdated and poorly equipped to adapt to differing body sizes and equipment, i.e. transit, paratransit, school buses with crossover mirrors and safety signs. Also, the system is incapable of washing the underbody; consequently, mechanics have to pre-clean each bus prior to performing engine and drive train maintenance, which adds another step in the cleaning process. However, new water recycling vaults were recently replaced with a general service life of 25-years. For fare collection, monies are emptied in the service lane then wheeled into the collection room on the other side of the building. Ideally, these fares should be emptied directly into a collection room. Their fuel system is relatively new, with four 15,000-gallon diesel tanks, one 8,000-gallon diesel tank, and two 550-gallon unleaded tanks.

Bus Maintenance

The original hoists are from the 1980s and require significant upgrades. There are eleven 2-post hoists and one 3-post hoist. Their “buried box vault” type of installation will prove challenging for repair or upgrades, and therefore complete replacement with new vertical hoists is recommended. The existing product reels, air and electric drops are in working condition, however more are needed. Some of the exhaust roll up reels no longer work. Workbenches are often unusable due to clutter; larger workbenches for each station are recommended along with some multi-tier racking. The welding area has no means of fume extraction. A fume extractor is recommended. The paint booth is too large for the smaller body repair currently being done. A smaller paint booth is recommended.

Services

Site Utilities

Water

The condition of the water service coming into the building is unknown. However, it is expected to be in fair condition, with only general maintenance required.

Storm and Sanitary

The condition of the sanitary services was scoped to the street under separate contract. Storm piping was not able to be scoped due to a high water table. The results revealed only a handful of breaks, but ultimately the entire system is in sound condition. Ongoing maintenance, cleaning and a system-wide flush is required to continue a useful system.

Additionally, a storm water pipe for the adjacent property travels under the building with an easement agreement. The condition and use of this pipe is unknown at this time and warrants further investigation.

Natural Gas

There is no reason to suspect any deficiency in the natural gas service to the building unless the gas demand required for increased ventilation needs exceeds the demand saved by higher efficiency systems and an improved thermal envelope.

Fire Protection

Fire Suppression

The existing sprinkler system appears to be in fair condition. The existing sprinkler heads may need to be replaced; most appear to be dirty, insulating them from the heat of a fire causing a delayed reaction.

Fire Detection and Alarm System

The fire alarm main control panel is 38 years old. The panel and system are well beyond their technical life expectancies. As parts fail, they will be difficult to obtain. Although the system is functional, the main issue is reliability. In general, manual pull stations and heat detectors are robust devices that would not be expected to deteriorate. However, smoke detectors, electronics and other minor components likely require replacement due to their known short life spans in industrial applications with heavy soot and soil. The system may continue to work satisfactorily if properly maintained, but will need testing and inspections by trained specialists to ensure proper system responses will occur in an emergency. At present, the building's fire alarm system does not meet the latest NFPA 72, IBC and ADAAG code requirements for providing audible and visual notification coverage to the public and employee areas. This requires the system to be upgraded or replaced with an entirely new system.

Plumbing

Sanitary Drain and Vent

The sanitary drain and piping above ground appear in good condition. Underground storm piping corrosion/leaking is causing the underground sanitary piping to corrode, resulting in collapse, clogging, and co-mingling of surcharges. Of biggest concern are the toilet rooms in maintenance area B, as they are in the worst condition of the entire facility where the toilets are very prone to backups. Even the urinals back up.

The drainage systems should be scoped to determine the condition of the drainage systems. This will help in determining the life expectancy of this system.

Storm Roof Drainage

The above ground roof drainage system appears to be in good condition however the below ground system is known to be failing. The water overloading beneath slab areas is so significant at times, it causes overload, backpressure, and interior flooding, to a point where it is necessary to pump the water out. Scoping the interior of the storm piping can help determine the extent and locations of the failures and evaluate the life expectancy of this system.

Domestic Water

In general, the existing domestic water piping appears in good condition with some exceptions. Plumbing in the exterior canopies is experiencing regular maintenance issues and is extremely susceptible to freeze-thaw cycles.

Fixtures and Equipment

Water heater (boiler room): The water heater should be replaced with a sealed combustion type, to be a code compliant installation in the boiler room. Although the current water heater, installed in November 2013, appears to be in good condition, with a typical life of 10 to 15 years, it is not the appropriate type. This water heater has a gravity draft flue which is a code violation when installed in the same room as the building's heating boilers, which have power draft burners. When the boilers fire, it can create negative pressure in the room impairing the natural draft of the flue of the water heater drawing combustion fumes into the boiler room.

Water heater (mezzanine): This water heater was installed on September 9, 2013. The typical life of a domestic water heater is 10 to 15 years.

Water softener: The average salt-based water softener system lasts approximately 10 to 15 years. However, they can last much longer when properly maintained. A typical issue that ends the service life is due to problems with the brine tank. With its installation in 2007, it is anticipated to have 4-5 years of additional life remaining.

Water closets: The water closets appear in good condition and the vitreous china of the water closet can last for many years depending on maintenance and abuse. The brass body portion of the flushometer can last many years also depending on water condition and usage. The working mechanics of the flushometer will need periodic replacement probably on the average of every 2 to 5 years depending on usage.

Lavatories: The vitreous china sinks appear in good condition and should last for many years. However, many of the faucets are in rough condition. Faucets and spout types vary throughout the building and even within the rest room. Many of the faucets should be replaced.

Urinals: The urinals appear in good condition and the vitreous china part of the urinal can last for many years depending on maintenance and abuse. The brass body portion of the flushometer can last many years also depending on the water condition and usage. The working mechanics of the flushometer will need periodic replacement typically every 2 to 5 years depending on usage.

Wash fountains: One appears in good condition and the other seems in poor condition and in need of replacement.

Trench drains: The trench drains are in poor condition with broken grates. Many of the trench drains have dirt/debris build up, slowing and or blocking flow. The trench drains need to be replaced.

Electric water coolers: They appear in fair condition and will probably need to be replaced within 5 to 10 years.

Emergency shower/eyewash stations: This fixture appears in poor condition and should be replaced.

Mechanical

Overview

Most of the systems and equipment discussed in this section are either near or beyond their life expectancy, with many even 13 to 18 years beyond their useful life. Failure rates are occurring at an increasing rate as a result, necessitating a continual increase in Metro's maintenance budgets to repair or replace these systems. In fact, some systems and controls are either sitting completely non-operational, operating below their intended performance, or operating without functioning controls requiring manual operation.

Replacement can be proposed in a multitude of ways. To reduce large capital expenditures, replacements could occur and phased over time. The concerns with this approach are

- Some equipment/systems will likely fail before its respective phase, meaning that considerable expense may be necessary for repair on something that may be replaced by a new and potentially different concept in the next year or two.
- Since the replacement systems will typically be different (more efficient, per current code, etc.), any piece of equipment repaired or replaced due to failure will likely be removed and thrown away in a future phase due to incompatibility or because the function/needs of the space will be different.
- Delaying replacement of these energy consuming systems will mean the loss of potential energy savings.

As a result of the additional maintenance, repairs, replacements and energy use that would occur from a multi-year phasing, it is recommended that these systems be replaced as soon as practically possible. Refer to the *Madison Metro Mechanical Equipment Data Spreadsheet* at the end of this section.

Heating Systems

Boilers & Pumps

The existing boilers are original, almost 38 years old, and are in good working condition. However, the boilers are inefficient compared to current commercial boilers – at full load, the boilers are estimated to run at around 70% efficiency while new boilers under the same load would run around 85% efficiency. The boilers are operating beyond their life expectancy and are recommended to be replaced.

The hydronic pumps are original, almost 35 years old, and are in average working condition. The pumps do not have variable frequency drives (VFDs) to modulate the water flow to meet varying load demands. It is recommended that these pumps be replaced due to age, efficiency, and the need to operate them with VFDs, which would require a different type of motor.

Cooling Systems

Air-Conditioning Units

AC-1 was replaced in 2004 and is in adequate working condition. Although no issues or concerns were brought up by the staff, the unit is estimated to only have another 5-10 year life expectancy remaining. The electric damper controls were upgraded for the existing air terminal boxes serving the administrative offices. AC-2 was replaced in 2011 and is also in adequate working condition. AC-3 is around 15 years old and in average working condition and is nearing the end of its life expectancy. HV-5 is original, although it has been upgraded with additional cooling in the supply ductwork, and is in below-average working condition. If renovations result in similar cooling and ventilation loads that can be met by the existing units, it would be recommended to reuse them until they reach end of their useful life, which is typically in the 15-20 year range. The exceptions are AC-3 which is already 15 years old, and AC-5 that is past its useful life and is experiencing problems.

Ventilation Systems

In general, the maintenance and garage spaces are under- or poorly ventilated due to issues such as deficiencies in the original design, failure of equipment, and lack of a control system. The air quality within the maintenance and garage areas is so bad that at times it appears foggy. There is also no energy recovery component contained in the system which is very inefficient. It is recommended that all systems be replaced due to age, condition, capacity, and efficiency.

Operating the perimeter windows around the administrative offices and break room could cause unnecessary efficiency losses, erratic operation of the temperature control system, and security issues when opened.

Hot Water Makeup Air Units

All of the hot water make-up air units are original, ranging from 35 to 38 years old and are well beyond their life expectancy. There is a significant amount of rust on the units' roof and supporting structures. These units have received upgrades such as filters and electric damper actuator replacements on some units, and roof curb

replacements on all units. Despite these upgrades, all the hot water makeup air units' overall integrity and thermal efficiencies are deteriorated, with some having control issues as well. As discussed above, it is recommended that all make-up air systems be replaced.

Gas-Fired Makeup Air Units

All the gas-fired makeup air units were replaced with Hastings units in 2006. These units are in average working condition, with rust accumulated inside the main panels. Gas-fired makeup air unit H-12 has outdoor air intakes close to the vacuum-system exhaust, which allows for a higher possibility for the filter to become loaded with debris. These units are approaching the end of their life expectancy, with several having control issues as well. It is recommended that all make-up air systems be replaced.

Exhaust Fans

The current exhaust fans are operating beyond their life expectancies, with some having significant amount of rust. The missing damper in EF-34 is causing air to leak through that inlet when that fan is turned off, which could have unnecessary efficiency losses. The blocked roof intake could cause the generator to overheat due to a lack of air flow. The damaged and missing wire-frame netting on the vacuum-system exhaust ports could clog the vacuum pipes and cause debris to enter the intake of HV-12. As part of the ventilation and make-up air systems discussed above, it is recommended that all exhaust fans be replaced as part of a balanced and integrated ventilation system.

Specialty Systems

No specialty systems are present in this facility. Maintenance shops such as the welding and engine degreaser rooms lack specialty supply and exhaust air equipment. This lack of dedicated equipment forces these areas to draw air from the general area served by the rooftop makeup air units, which can create a negative pressure in the overall building. Each specialty function requiring a dedicated ventilation system needs to be provided with appropriate integrated systems as required per building code for the safety of the staff utilizing these areas.

Control Systems

The manual start/stop control panels for the airside mechanical systems are inefficient and difficult to operate. Controls are not integrated, so any new equipment installed will require complete replacement of controls in order to provide appropriate and required comfort, safety, and code compliant conditions in all work areas.

Electrical

Electrical Service

The switchboard and equipment overall appears to be in fair condition, and is approaching 38 years old. Parts for upgrades are likely not be available or would be sold at a premium. The equipment also does not have electrical arc flash hazard labeling. It is recommended that due to the age of the equipment that it be replaced.

Electrical Energy Usage

Based on the review of electrical energy data usage provided by the City of Madison, from Sept 2016 through Sept 2107, the highest peak demand is approximately 445 KW. Based on the utility information, the transformer 750 KVA rating, and main switchboard has adequate capacity to accommodate energy growth of approximately 225%. More growth could be accommodated, with the anticipated, energy efficient HVAC equipment and lighting, since overall energy demands would decrease.

PV Interconnection

Based on the information available in the record drawings, it appears that the service conductor's neutral conductors have been reduced from the transformer to the main switchboard. Based on the size they will not be adequate to carry the anticipated load of the proposed 500KW PV systems.

Electrical Distribution System-Normal

The electrical distribution panelboards, step-down transformers, and appliance/branch panelboards appear to be in fair condition. The life expectancy for panelboards and circuit breakers is 30 years. The equipment is approaching 38 years of age. As noted above, the availability of parts may be limited or unavailable. If available, they may be selling at a premium and could have long lead times. In the service lane and wash bay areas, the electrical panelboards are corroded due to environmental conditions and others due to physical damage. In several locations where panelboards have been located there is insufficient working clearance as required by NEC. Some of the transformers appear to be in fair to good condition, depending on location. However, the transformers are inefficient compared to contemporary transformers. Information on dry-type transformer loading from ANSI/IEEE C57.96 indicates that they can have a 20-year life expectancy for the insulation system in a transformer. However, due to degradation of the insulation, a transformer might fail before 20 years. The equipment currently does not have electrical arc flash hazard labeling. It would be recommended that due to the age of the equipment that it be replaced

Electrical Emergency Supply System (EPSS)

The generator and respective distribution (automatic transfer switch, paralleling switch, panels IMPS, and 1EPP1) were installed in 1982. Typical life expectancy for panelboards is 30 years, transfer switches and paralleling gear average life expectancy is 20 to 25 years. Typical life expectancy of a well-maintained standby generator is approximately 10,000 to 30,000 hours. The equipment overall appears to be in fair

condition but is approaching 35 years old. As noted above, the availability of parts may be limited or not available. If available, they may be selling at a premium and could have long lead times. Equipment currently does not have electrical arc flash hazard labeling. It is recommended that due to the age of the equipment that it be replaced

General Purpose Receptacles and Switches

In general, the wiring devices are original. Wiring devices do not have a life expectancy. Most outlets have tensioned contacts that can lose their tension with lots of use. Outlets if used frequently may need replacing after a couple years. If they are rarely used, they could last indefinitely.

The underground conduits are failing and experiencing circuit unreliability due to the storm water issues and building vibrations. It is recommended that that failing conduits be replaced

Mechanical Electrical Equipment

Disconnect switches mounted on the roof top equipment are severely corroded. Several of the interior disconnect switches are showing signs of corrosion and wear due to environmental conditions and some have physical damage. It is recommended that all corroded and damaged equipment be replaced.

Lighting and Controls/Interior Lighting

The 1979 portion of the building, housing the administrative spaces, support spaces, corridors, restrooms, locker rooms, shop spaces, parts, and maintenance and storage spaces, is predominantly lit by T12 fluorescent luminaires. They are outdated with the lamp sources are becoming obsolete, and are no longer compliant with Department of Energy (DOE) guidelines. Typical life expectancy of fixtures is 40 years. It would be recommended that all lighting be replaced.

The 1982 portion of the building, housing maintenance area B, locker rooms, restrooms, steam room, shop, welding room, storage, mezzanine storage, generator and mechanical room, and bus storage exit lanes is also lit with fluorescent luminaires. The original T12 fluorescent luminaires in the locker/restrooms, maintenance area 'B', mezzanine storage, compressor room, generator room and body shop are similarly outdated as the 1979 fixtures. However, they have been re-lamped with LEDs for some improved energy efficiencies. The remaining storage areas were replaced with T8 luminaires, installed in 2010, and appear to be in good condition. Although they could last another 10-20 years, they are still inefficient compared to modern LED fixtures, and the general lighting levels are still too low as recommended for tasks and safety.

Exterior Lighting

Primarily the exterior recessed square incandescent luminaires located under the canopies at the north and south vestibules are original to the building. Original recessed high pressure sodium (HPS) luminaires located in the loading dock ramp area, canopies of the

Northside buildings north side exit vestibule canopies and HPS floodlights located on the southern portions of the roof parapet. It is recommended that lighting be replaced.

The exterior canopy luminaires are original to the construction of the building. The incandescent and HPS recessed fixtures are showing degradation. Several of the fixtures are corroded beyond repair and missing lenses. The mounting brackets supporting the floodlights on the roof parapet are showing significant amounts of rust. The lamp sources are becoming obsolete and considered inefficient by current standards, although some have been re-lamped with fluorescent and LED bulbs. It is recommended that the lighting be replaced.

Emergency Egress Lighting

Interior emergency egress lighting is provided throughout the building utilizing several of the luminaires that are also used for general building illumination, which is acceptable. The combination exit/emergency light at the exterior egress doors located in the 1982 addition appear to be in fair condition. Several fixtures were randomly tested and were working properly. The building does not have emergency exterior lighting to lead the occupant(s) to the public way as required by current building codes. The adequacy of emergency egress lighting provided throughout the building was not verified. A lighting analysis of the existing emergency lighting system is required to confirm if lighting levels are adequate to meet the requirements of the NFPA 101 Life Safety Code.

Lighting Controls

Generally, the building's lighting controls are working as intended. Spaces without means of providing automatic "on/off" controls should have controls added to turn off lighting when space(s) are unoccupied. Controls shall meet the latest adopted IECC.

Electrical Overview

Unfortunately, many of the problems on an electrical system are not obvious to the naked eye. Many of the problems that can occur on a system are not even visible to the people that work in and around the electrical systems every day. Further in-depth electrical analysis should be performed, to include: short circuit, overcurrent device time-current coordination analysis, and arc flash hazard analysis.

Special Considerations

Hazardous Materials

Asbestos-containing materials were identified on the 1979 addition drawings, and are assumed to still be in place, although possibly encapsulated. Due to the vintage of the additions and the original Gisholt building, it is likely that lead-based paint is present. Most of the building has multiple layers of paint and may have been painted over (encapsulated) since that time, but will likely still register at levels above regulated limits when tested.

A complete hazardous materials investigation should be performed at the beginning of any project design to identify current asbestos-containing materials, lead-based paint, and other known hazards in the existing facility to be incorporated into the work.

Soil Contamination

Much of downtown Madison's isthmus contains contaminated soils with fly ash, due to its prior uses and the MG&E coal plant nearby. A higher groundwater level is also a challenge to working on the Isthmus. It is highly recommended that soil borings be taken to determine soil content, weight capacities, foundation recommendations, and ground water levels, before any project takes place. Soils disturbed during these construction activities must remain on site or it is recommended to utilize a unit price bidding structure for contaminated soil disposal and replacement. Groundwater generated from construction dewatering activities will also require documented procedures with the City of Madison.

Building Code, Life Safety and Accessibility Overview

General

Design and construction of any project on the building will need to comply with the current building code. Although the timing of projects may vary, general building code compliance at the time of this report shall be shown, adopting the 2015 International Building Code (IBC) and 2015 International Existing Building Code (IEBC) with Wisconsin additions and amendments.

- Repairs: include the patching or restoration or replacement of damaged materials, elements, equipment or fixtures for the purpose of maintaining such components in good or sound condition with respect to existing loads or performance requirements.
- Alterations – Level 1: includes the removal and replacement or the covering of existing materials, elements, equipment, or fixtures using new materials, elements, equipment, or fixtures that serve the same purpose.
- Alterations – Level 2: includes the reconfiguration of space, the addition or elimination of any door or window, the reconfiguration or extension of any system, or the installation of any additional equipment.
- Alterations – Level 3: applies where the work area exceeds 50 percent of the aggregate area of the building.
- Change of Occupancy: applies where the activity is classified as a change of occupancy such as changing the use of a structure from a storage building to an office building.
- Additions: applies when an existing building receives an addition.

Correcting all the deficiencies in the building will require evaluation and place the code analysis between the classifications of Alterations–Level 2 and Alterations–Level 3 of the IEBC. The following building code review table provides the building code analysis for the existing layout of the building. Any major modifications to the building shall require its own separate code review analysis.

Applicable Building Code Review

Applicable Building Code: 2012 International Building Code (IBC)		Referenced Sections
Building Square Footage & Height	First Floor: 266,517 SF Second Floor: 10,740 SF **Building Total: 277,257 SF** Building Height: +/-43'-0"	
Classification	Group S-1 Motor Vehicle Repair Garages complying with the maximum allowable quantities of hazardous materials listed in Table 307.1(1).	Section 311
Motor Vehicle Related Occupancies	Automatic Sprinkler System shall be provided.	Section 406
Building Construction Type	Type VB	Table 601
Allowable Building Height	60 feet, 2 stories, Sprinklered	Section 504 Tables 504.3 & 504.4
Allowable Building Area With Frontage & Sprinkler Increases	65,340 GSF, Sprinklered & 30 Feet Open Minimum width	Section 506 Table 506.2
Unlimited Area Buildings	The area of a Group B, F, M or S building no more than two stories above grade plane shall not be limited where the building is equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 and is surrounded and adjoined by public ways or yards not less than 60 feet in width.	Section 507
Occupant Load	Business Areas – 100 Gross Accessory Storage/Mech – 300 Gross Industrial Areas – 100 gross Parking Garages – 200 Gross 3,000 GSF/ 300 = 10 22,000 GSF / 100 = 220 195,550 GSF / 200 = 978 58,523 GSF / 100 = 585 Total = 1,793 Occupants	Table 1004.1.2
Exit Travel Distance to Grade	250 Feet w/ Sprinkler	Table 1017.2
Common Path of Egress Travel	S, >30 w/ Sprinkler – 100 Feet	Table 1006.2.1
Number of Exits	Occupant load of 1-500, requires 2 exits per story. Occupant load greater than 1000 requires 4 exits per story.	Table 1006.3.1
Corridor Construction	S, >30 w/ Sprinkler – 0 Hour 44" Minimum Width	Table 1020.1 Table 1020.2
Dead End Corridor Length	50 feet, Sprinklered	Section 1020.4
Accessibility	Sites, buildings, structures shall be accessible to persons with physical disabilities	Chapter 11

Planning, Zoning, Historic Landmarks, and Urban Design Considerations

Preliminary meetings were set with the City of Madison Planning Department, Design Assistance Team, Historic Landmarks, and Urban Design Staff to determine what requirements would be triggered with project renovations. As an existing building, the facility is grandfathered and would not require upgrades to meet current new development, zoning, or engineering requirements. If proposed projects exceed a 10% change to the building or site, then current zoning requirements would start to take effect.

For zoning and the considerations of minor additions, this property has no front or side yard setbacks. It was determined acceptable to consider Ingersoll the “front” of this property due to its major driveway position to this street. Maximum lot coverage of impervious surfaces is 85%. If the site exceeds 85% lot coverage, then new additions cannot further increase lot coverage above the maximum. Additionally, storm water requirements for particulate removal will only take effect when more than 4,000 sf of surface area is disturbed.

Although the Gisholt part of the building is from the early 1900s, this building is not considered historically significant. No review of modifications nor in-kind replacements will be expected. A review of project modifications shall only be required as to how it affects the adjacent, historic landmark portion of the Gisholt complex.

Since the project is located in Urban Design District 8 and is a city-owned property, all projects and renovations will be required to be reviewed by the Urban Design Committee. Any street side modifications to the façade, overhang infills, louvers, or new window patterning will require review. As a benchmark for modifications, new development expectations for District 8 are: 3 floors minimum, an added East Washington 15-foot setback requirement from the sidewalks, and 40% of the street-side elevation devoted to windows. Photometrics of any revised site lighting will also need to be reviewed.

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Madison Metro Transit Building Master Plan Report

EXISTING DRAWINGS

MARCH 9, 2018

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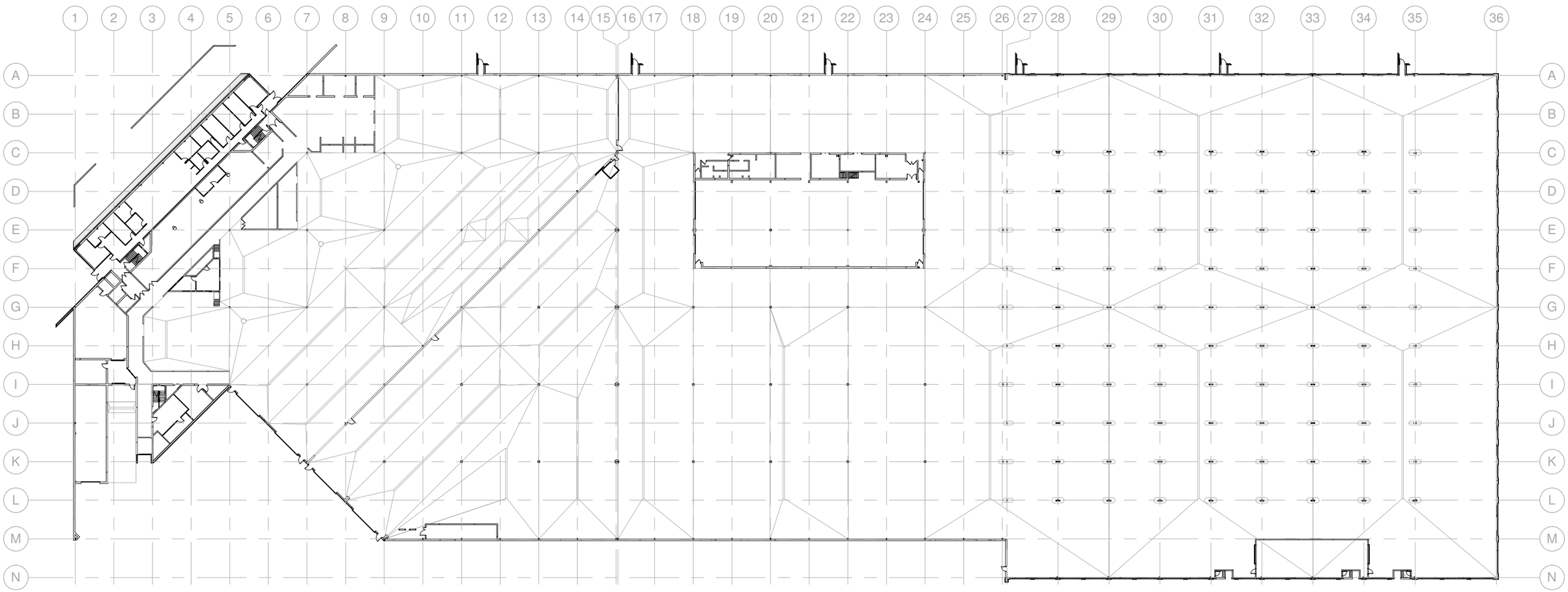

FIRST FLOOR PLAN

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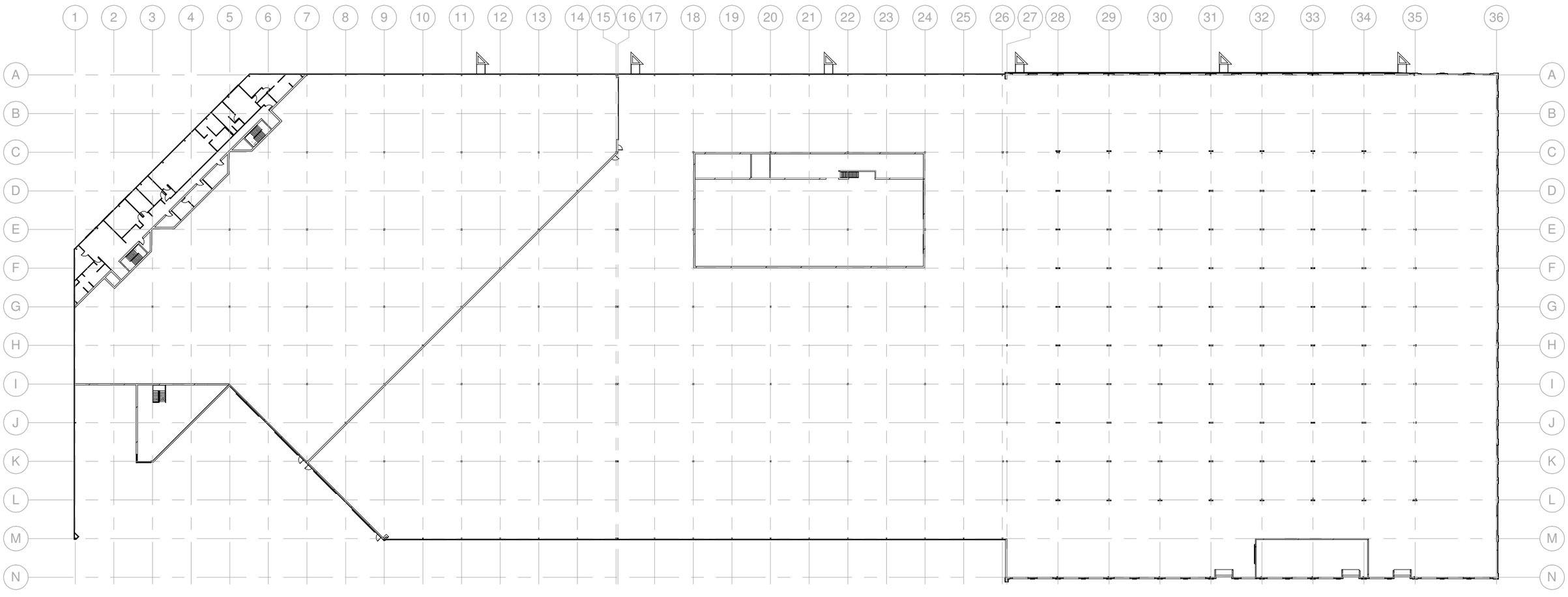

SECOND FLOOR PLAN

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Madison Metro Transit Building Master Plan Report

MECHANICAL EQUIPMENT DATA SPREADSHEET

MARCH 9, 2018

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Table 1-1 MECHANICAL EQUIPMENT DATA

AIR-CONDITIONING SYSTEMS

AC= Air conditioner	DATE	Useful Life Remaining	Cost for Replacement	MANUFACTURER	MODEL #	LOCATION	Refrigerant Type	Size	EDB	EWB	LDB	LWB	VFD	OA CFM	CFM	Serves
AC01	2004	6.00	$72,500	TRANE	YCD360A4HM1A6DF4A	Roof NW	R-22 (?)	30 Ton						1130	9850	Administration
AC02	2011	13.00	$10,000	CARRIER	5OTC-A04A2A5A0A0A0	Roof NE		3 Ton						75	760	Dispatch
AC03	2004	6.00	$13,000	TRANE	TTA090A400FA	Money Rm		7.5 Ton						0		
AC04	2000	2.00	$8,000	MITSUBISHI	MU-12-DN	Fink /Bulter		1 Ton						0		
AC05	2012	14.00	$8,000	CARRIER	40MVQ012-101	Dispath		1 Ton						0		
AC06	2012	14.00	$8,000	CARRIER	40MVQ012-101	Shop Office		1 Ton						0		

VENTILATION SYSTEMS

HV=Heating unit	DATE	Useful Life Remaining	Cost for Replacement	MANUFACTURER	MODEL #	LOCATION	WATER or GAS	Size (MBH)	EWT	LWT	GPM	HP	VFD	OA CFM	CFM	Serves	HRC
HV1	1985	-13.00	$31,600	MCQUAY	RDS802BY		Water	1,023	210	178.3	64.6	7.5		9,720	9,720	Room 150, Shop	
HV2	1985	-13.00	$31,600	MCQUAY	RDS800BY		Water	814	210	152.5	28.3	5		8,165	8,165	Room 150, Shop	
HV3	1985	-13.00	$31,600	MCQUAY	RDS800BY		Water	859	210	156.4	32.1	5		8,615	8,615	Room 150, Shop	
HV4	1985	-13.00	$31,600	MCQUAY	RDS800BY		Water	901	210	177.1	54.8	5		8,650	8,650	Room 150, Shop	
HV5	1985	-13.00	$19,300	MCQUAY	RDS800BY		Water	343	210	167.0	16.0	3		3,200	3,200	Parts	
HV6	1985	-13.00	$49,100	MCQUAY	RDS804BY		Water	1,734	210	139.2	48.9	10		15,000	15,000	Bus Storage	HRC-1
HV7	1985	-13.00	$49,100	MCQUAY	RDS804BY		Water	1,734	210	139.2	48.9	10		15,000	15,000	Bus Storage	HRC-2
HV8	1985	-13.00	$49,100	MCQUAY	RDS804BY		Water	1,734	210	139.2	48.9	10		15,000	15,000	Bus Storage	HRC-3
HV9	1985	-13.00	$49,100	MCQUAY	RDS804BY		Water	1,734	210	139.2	48.9	10		15,000	15,000	Bus Storage	HRC-4
HV10	1987	-11.00	$41,000	CARRIER	28CUL22STB1034		Water	1,184	180	150.0	79.0	15		12,185	12,185	Long term maint.	HRC-14
HV11	2006	8.00	$39,800	HASTINGS	SBD218		Gas	1,580	--	--	--			19,000	19,000	Active Storage	HRC-5
HV12	2006	8.00	$39,800	HASTINGS	SBD218		Gas	1,580	--	--	--			19,000	19,000	Active Storage	HRC-6
HV13	2006	8.00	$39,800	HASTINGS	SBD218		Gas	1,580	--	--	--			19,000	19,000	Active Storage	HRC-7
HV14	2006	8.00	$39,800	HASTINGS	SBD218		Gas	1,580	--	--	--			19,000	19,000	Active Storage	HRC-8
HV15	1985	-13.00	$53,800	HASTINGS	SVD-2222-62800		Gas	2,800	--	--	--			15,000	15,000	Paint Spray Booth	
HV16	1985	-13.00	$33,000	HASTINGS	CU-112-2-216		Gas		--	--	--						
HV17	1985	-13.00	$33,000	REZNOR	10 HP MOTOR		Gas		--	--	--						
HV18	2004	6.00	$33,000	CARRIER	CK3BXA024017AAAA		Gas		--	--	--						

EXHAUST SYSTEMS

Exhaust Fans	DATE	Useful Life Remaining	Cost for Replacement	MANUFACTURER	MODEL #	LOCATION	Type	HP	VFD	CFM	Serves	HRC	Controlled By	Notes
EF-1	1985	-18.00	$9,786			Roof		3		9,715				
EF-2	1985	-18.00	$8,628			Roof		2		8,170				
EF-3	1985	-18.00	$8,965			Roof		2		8,620				
EF-4	1985	-18.00	$8,080			Roof		2		7,440				
EF-5	1985	-18.00	$2,755			Roof		`1/12		340				
EF-6	1985	-18.00	$3,408			Roof		`1/2		1,210				
EF-7	1985	-18.00	$3,021			Roof		`1/6		695				
EF-8	1985	-18.00	$5,538			Roof		1.5		4,050				
~~EF-9~~	~~1985~~	~~-18.00~~	~~$28,000~~			~~156~~		~~15~~		~~34,000~~				~~removed~~
~~EF-10~~	~~1985~~	~~-18.00~~	~~$28,000~~			~~156~~		~~15~~		~~34,000~~				~~removed~~
EF-11	1985	-18.00	$2,695			Roof		`1/12		260				

Table 1-1 MECHANICAL EQUIPMENT DATA

EF-12	1985	-18.00	$2,500													
EF-13	1985	-18.00	$9,325			223		2		9,100						
EF-14	1985	-18.00	$7,000			151		10		6,000						
EF-15	1985	-18.00	$20,950					20		36,900	General	HRC-9	DDC	2 speed; 1800/1200 rpm		
EF-16	1985	-18.00	$20,950					20		36,900	General	HRC-10	DDC	2 speed; 1800/1200 rpm		
EF-17	1985	-18.00	$20,950					20		36,900	General	HRC-11	DDC	2 speed; 1800/1200 rpm		
EF-18	1985	-18.00	$20,950					20		36,900	General	HRC-12	DDC	2 speed; 1800/1200 rpm		
EF-19	1985	-18.00	$5,350					3		3,800	General	HRC-13	DDC	maintenance B		
EF-20	1985	-18.00	$2,800					0.5		400	CO exh		Switch	maintenance B		
EF-21	1985	-18.00	$5,125					3		3,500	Weld exh		Switch			
EF-22	1985	-18.00	$3,363					1.5		1,150	Weld exh		Switch			
EF-23	1985	-18.00	$3,363					1.5		1,150	Weld exh		Switch			
EF-24	1985	-18.00	$3,348					1.5		1,130	Weld exh		Switch			
EF-25	1985	-18.00	$4,450					2		2,600	Steam exh		Switch			
EF-26	1985	-18.00	$3,051					0.25		735	toilet/locker		DDC			

HEATING EQUIPMENT

	DATE	Useful Life Remaining	Cost for Replacement	MANUFACTURER	MODEL #	Size (MBH)					
WATER HEAT 01	2013	10.00	$8,000	BOCK	EZ75-135N	135					
WATER HEAT 02	2013	10.00	$13,000	AOSMITH	BTR197118	199					
BOILER 01	1980	7.00	$150,000	CLEAVERBROOKS	CB200-200	6695					
BOILER 02	1980	7.00	See above	CLEAVERBROOKS	CB200-200	6695					

LIGHTING

	T8	Useful Life Remaining	Cost for Replacement	T12	24W LED	150W HPS	M SENSOR				
Lighting Phase 2	120	NA	NA		9		YES				
Lighting Phase 1	133	NA	NA				YES				
Lighting MAB	262	NA	NA				YES				
Lighting Shop		NA	NA	250			NO				
Lighting Admin.		NA	NA	100			NO				
LT EX Parking		NA	NA			16	NO				
LT EX Doors		NA	NA			10	NO				

Madison Metro Transit Building

Concept Design: Efficiencies

Report prepared for

City of Madison – Metro Transit

Madison, Wisconsin

Report prepared by

Mead & Hunt

www.meadhunt.com

KUENY ARCHITECTS, LLC

KEN SAIKI DESIGN
LANDSCAPE ARCHITECTS

DESTREE
architecture & design

M&H project. # 4503500-170148.01

March 9, 2018

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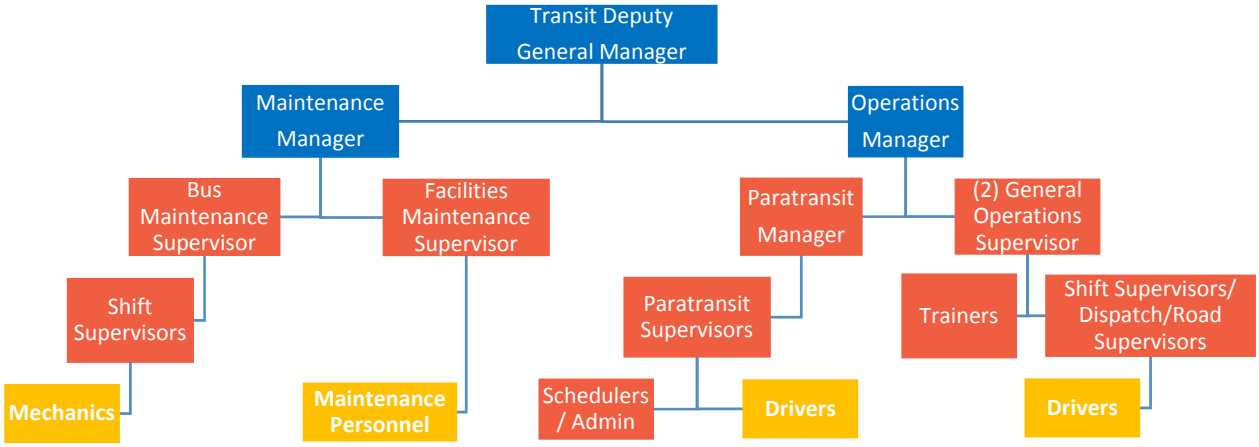
A. Introduction – Purpose/Scope

The purpose of this study is to analyze the viability of the existing facility of Madison Metro's 1101 East Washington Ave. Facility, to meet future needs of the City of Madison (up to 20 years). The staff and administration were engaged through a charrette process to determine appropriate programming. In depth studies of the operations of both mechanics and driver dispatch were also analyzed. Initial conceptual layouts were developed and vetted with the primary stakeholders. Final recommendations are made for a preferred option.

B. Program & Organization

The Metro Transit Building at 1101 East Washington Avenue houses three major functions for Metro: bus driver dispatch, bus maintenance, and bus storage. The building serves over 450 employees and is in operation 24 hours/day, seven days a week, with multiple shifts and layers of employee overlap and seniority. Metro currently services 223 buses out of this building, although it was originally designed for 140.

The following chart shows the general organization of the employees at Madison Metro Transit Building:



C. Charrette Process, Goals, & Objectives

Charrette Process

Our charrette process included a series of meetings that brought together project stakeholders and experts to understand the needs and goals of the Madison Metro Transit Building at 1101 East Washington Facility. The collaborative approach allowed the user groups to discuss their current space deficiencies, workflows, and daily tasks. General employee surveys and dialogue sessions were also conducted to gain understanding from the every-day users. Nineteen dialogue sessions were offered at multiple times through the day, allowing all shifts an opportunity to participate. Forty-five employees in total participated, with

groups from each of the departments covered: drivers, trainers, para-transit, facilities maintenance, and bus maintenance. This open forum allowed for an exchange of ideas, as well as promoted ownership and collaboration. Once an understanding of spatial needs and goals was attained, the design team created a series of realistic and achievable design concepts. These ideas were vetted by key stakeholders, and adjusted throughout discussions. This provided the design team a clear design path, in which to move forward. The charrette process delivers proven results for effective project scopes, streamlined schedules, and cost-efficient budgets, with early buy-in from stakeholders for a facility plan that promotes the future goals of the group.

Charrette Goals and Objectives

Early guidance provided by the City of Madison Engineering group and Madison Metro included the following objectives:

- Maintain functions generally **within the existing footprint**.
- Provide a **20-year solution** for the site.
- **Improve workflows** by reorganizing functional adjacencies.
- **Identify upgrade requirements** for utilities and life safety.
- **Staff safety and retention** are key priorities.
- Reorganize bus traffic flow for **Left-Hand turns** in lieu of current Right-Hand Turns for increased safety.
- **Sustainable Methods** and Decreased Maintenance are a value of the City**.**

Survey and Dialogue Session Results

D. Bus Maintenance & Storage

The City maintains approximately 223 buses in a facility that was intended for 140. Nearly all of the City's Bus Maintenance and Paratransit vehicles are serviced by Metro Transit, themselves. This includes scheduled and unscheduled repair service, inspections, preventative maintenance, brake and tire repair and replacement, body and fabrication work and engine and transmission rebuilding. This 24 hour / 7-days a week operation is also responsible for fueling, washing, vacuuming and cleaning each bus after shift pull-ins.

The space-needs discrepancy, with 223 buses versus 140, results in buses continually being moved around either for trip service or maintenance contributing to the consistently poor air quality. This is the #1 complaint from nearly all employees, followed by inadequate space, noise, poor lighting and inconsistent heating in the winter and extreme heat and humidity in the summer. This is due in part, to the location of the wash service lanes, which exhaust heat, humidity and debris into the maintenance bays. All service bays have original service equipment including the ground hoists, which are original to the building, and not always compatible for newer vehicle types.

Space Needs

Currently, there are eight service bays, three inspection bays, four maintenance B bays and one quick service bay totalling 16 bays for (47) A, B, and C mechanics on rotating shifts. Metro intends to fill five mechanic vacancies in the immediate future. There is very little space available for staging of vehicles while waiting for parts or service. Presently, the "tunnel," the long drive at the north (E. Washington) side of the building, running the entire length of the building, is used for staging. This results in buses being parked wherever there is room, often requiring 4-5 buses being moved to get to the needed bus for maintenance. Mechanics reported they spend an average of two hours on each shift just moving buses. This major problem could be solved by providing more accessible bus staging area for vehicles waiting for service. With the current staff and bus counts, additional space is needed in nearly all areas including maintenance bays, staging, and larger areas for engine building, tires, steam cleaning, tools, detailing and supervisory offices.

The following table lists space needs, actions, and recommendations for Bus Maintenance:

	Current Space Needs	Future Space Needs Actions and Recommendations
(A)	The fuel, wash and vault service lane needs to be relocated.	Provide a 10,000 SF addition to house the service lane.
(B)	Repurpose service lane.	Use for vehicle staging, drive lane or bus storage.
(C)	Inability to stage and circulate vehicles waiting for service.	Increase the size of vehicle staging areas.
(D)	Insufficient quantity of maintenance bays.	Add a minimum of 5-7 more maintenance bays

	Current Space Needs	Future Space Needs Actions and Recommendations
(E)	The current right-hand vehicle circulation pattern is hazardous.	Correct to left hand, counter-clockwise patterns.
(F)	Insufficient number of supervisory spaces.	Add more supervisory spaces to plan.
(G)	Inadequate size and location of office and supervisory spaces.	Add larger, more accessible office areas.
(H)	Storage space is needed for palletized materials.	Create an assessable pallet rack area next to parts.
(I)	Engine building room is undersized.	Increase the size of the room by 40%.
(J)	Tire storage is separated from the shop and the mounting of rims.	Create a shop/storage area central to maintenance.
(K)	Detailing room is too small and needs work tables.	Create a larger shop/storage space with worktables.
(L)	Location of receiving dock is less than ideal.	Create a parts temporary holding/receiving area 250-300 SF.
(M)	All equipment and parts storage rooms need shelving.	Add appropriate shelving to all storage rooms/areas.

Fleet Overview

The long-range composition of the fleet is planning to include the use of more hybrid and electric buses. From an operational perspective, one advantage of replacing the diesel buses with far more fuel-efficient hybrids and electric buses is they should require less maintenance over a longer period of ownership. With such a fleet, significant overhauls would be less frequent meaning fewer number of service bays are needed for major work, but more will be needed for increased preventative maintenance. Metro currently has 16 bays, and this project to seek optimization is planning for a maximum of 21-23 bays. Although a separate facility is in the planning stages for Metro, it is likely the initial roll-out of these vehicles will be in advance of that project. This 1101 E. Washington facility will need to plan for some hybrid or electric bus fleet, requiring service bay equipment reconfigurations to allow access to the top of the vehicles and overhead charging.

Special Equipment

The primary equipment expense for this project will be to replace the original hoists from the 1980's. The demolition and removal costs are likely to be excessive due to the buried "box vault" type of installation used in the 1980's. A contingency factor has been added to account for this. Per our discussions with management, the following equipment will be needed for the new maintenance bays.

Bays	Standard Repair	Quick Service	Inspection	Total
Number of Bays	17	2	4	**23**
2 Post Lift (50,000 lb.)	11	2	4	**17**
3 Post Lift (75,000 lb.)	1	-	-	**1**
Exhaust Reel, Round	17	2	4	**23**
Product Reel Bank (7 Products)	10	1	2	**13**
Air/Electric Drops	17	2	4	**23**
Waste Oil Pump	5	1	2	**8**
Work Bench (32" x 72")	17	2	4	**23**

Notes:

(1) Existing portable lifts will be used in at least 6 bay locations.

(2) Areas reviewed but determined not to need additional equipment include Unit Shop, Tire Shop, Battery Shop, Parts, Brake Shop, and Buildings and Grounds.

E. Driver Dispatch & Support Programming

The staff population that utilizes the driver dispatch and support functions of this facility has tripled over the last 20 years, while the accommodations themselves have had little to no improvements, other than short-term modifications to administrative areas. With the success and growth of the Metro Transit System, improvements are needed to support the work functions, wellness and safety of the Mechanics, Bus Drivers and Administrative Team. Based on current best practices, anticipated continued growth, similar project benchmarking, recent guidelines from GSA and Transit Cooperative Research Program (TCRP) studies, the following are our recommendations.

Administrative Support

Provide office space and conference spaces for Dispatch, Para-Transit, Facilities, Operations, Training and related Administrative staff from adjacent 1245 E. Washington facility. Reinforce adjacencies of divisions to maximize work flow and provide security, privacy, and confidentiality. Provide workspaces that promote mobility, productivity, and ergonomic standards.

Staff Check-in

Centralization of staff check-in and all of its related support needs is a crucial requirement for the proper function of a transportation support facility. This centralized area will provide Dispatch the opportunity to observe employee entry, that staff is appropriately attired, uniform storage, driver supply storage, driver and mechanic computer kiosks, mail boxes, forms area, collaboration space, reception to administrative support and other functions. This hub of activity will be adjacent to toilet facilities, conference areas, breakroom, and training. It will be the destination for all staff, a welcoming start for all employee's shifts.

Wellness Amenities

Fatigue and stress is a widely recognized problem for bus drivers, with challenges in proper eating, sleep schedules, constrained working environments, customer interactions, passenger loading and unloading, time and schedule sensitivities, and traffic conditions. Several sources have cited that countermeasures to stress and fatigue include support, promotion, and education on psychological awareness, good health-sleep-physical fitness, and stress-management in addition to operational and management strategies. To

support the health and wellness of the growing staff during times such as break, as well as encouraging staff to remain on-site during the down time for split shift drivers, it is recommended to provide a variety of areas with levels of interaction and privacy. Break rooms with both interior and exterior spaces, wellness room for exercise or meditation and a quiet room for resting. A semi-quiet area for reading, availability to training materials, computer access for staff and open areas for collaborative discussions.

Locker and Toilet Facilities

Modern, accessible toilet and locker room facilities for all staff to accommodate best practices, privacy and the surge of staff at peak embarkment times. The current toilet facilities have significantly low toilet counts and do not meet any ADA guidelines for accessibility.

Please refer to the MFS 1101 programming chart below for additional detail.

MFS 1101 - Program

Existing - 2017	SF		Recommended Spaces	NEW SF	*Office = 150 - 200sf per person, per CoreNet Study for GSA*
First floor			**First floor**		
Dispatch	215		Dispatch counter	340	64sf/staff (4 staff) plus support
			Workstations & support	340	64sf/staff (4 staff) plus support
Lobby	192		Lobby/Staff Check-in	1,500	mailboxes, posting area, supplies, counter, forms, collaboration space, adj to Dispatch, storage
			Touchdown space	216	36/sf per 6 kiosks, Lotus station
			Lost & Found	40	area for cart
Men's Toilet - lobby	79		Men's Toilet - lobby	400	Increase fixture count per code
Women's Toilet - lobby	79		Women's Toilet - lobby	280	Increase fixture count per code
Radio Room	113		Radio Room	240	3 staff, adj to dispatch, window connection
Large Office	190		---	---	
Closed Office	93		---	---	
Closed Office	93		---	---	
			Training Room	600	Size for 10 - 12 persons + staff, 40 -50/sf
			Instructor's Office	120	private office with 2 side chairs
			Break Room - Loud	1,500	Social Zone
			Conference Room	192	Adj to Dispatch/Staff Check-in, 8-10 person
			Toilet	63	Private and Adj to Conference room
			Workroom	200	Copier, supplies, forms
			Shared kitchenette	150	
			Para-Transit	400	4 staff = 2 dispatch, 1 scheduler, 1 eligability staff, Adj to Dispatch
			Para-Transit manager office	120	private office with 2 side chairs
			Para-Transit file space	64	
			Operations Administrative Assistant	120	Gatekeeper to operations offices, General Adminstrative functions, uniform processing
			Closed Offices - Operations	420	Jim (meeting area), Chris & Phil
Open Office	966			---	
Conference	148		Conference	240	Medium conference Room
Large Office	198		Conference/Flex Office	150	for HR and Admin from 1245
Large Office	195		Operations - Road Supervisors	200	Touchdown space for 4-6 staff, personal storage cabinets for 12 persons, 6-8 supervisors

		Facilities	540	plan room w/ touchdown space, Office for Jim (meeting area), Jeff, Chuelor
Large Office	197	Finance	320	3 staff - Need staff count, side chair for guests, private room
Large Office	252	Conference/Flex Office	160	Adj to Finance, greeter position and space for Admin from 1245
		Open Teaming space	150	
		IT	100	
Storage	51	Storage	60	Maintain
Storage	51	Storage	60	Maintain
Men's Toilet - office	108	Men's Toilet - office	200	increase count & ADA
Women's Toilet - office	99	Women's Toilet - office	200	increase count & ADA
		Staff Huddle/Phone Rooms	280	quantity of 2 min/phone room
		Maintenance Break Room	1,000	
		Maintenance Women's Lockers	320	
		Maintenance Men's Lockers	900	
Janitor	63	Janitor	80	Maintain
Sub-Total	**3,382**	**Sub-Total**	**12,265**	***These subtotals have NO load factor***

Existing - 2017	**XTG SF**	**Recommended Spaces**	**NEW SF**	**Notes**
Second floor		**Second floor**		
Training Room	325		---	
Instructor's Office	157		---	
IT	101	IT	100	Maintain
Break Room	602		---	Social Zone
		Reference Library - Semi Quiet	750	Training Videos, touchdown stations, reading, quiet visitng, 75/sf per, size for 10
		Wellness Room	800	Decompress - size for 20 persons @ 40/sf + machines
Storage	154	Support Storage	154	Maintain
Women's Lockers	290	---	---	with toilet facilities
Men's Lockers	1,148	Locker Area	1,400	with toilet facilities
		Private shower rooms	500	
		Mother's Room	120	sink and 2 lounge chairs
Shop Women's Lockers	189	---	---	relocate to first floor
Shop Men's Lockers	479	---	---	relocate to first floor
Mechanic's Break room	297	---	---	break room on first for Mechanics
Sleeping Room	141	Quiet Room	500	LazyBoy Lounge Chairs, No talking, 50sf per chair, 10 chairs
Elevator	121	Elevator	121	
Storage	159	Clean Storage	159	Maintain
Storage	55	---	---	
Janitor	94	Janitor	94	Maintain
Janitor	66	---	---	
Corridor	729	Corridor	729	Maintain
Sub-Total	**5,107**	**Sub-Total**	**5,427**	***These subtotals have NO load factor***

F. Overall Plan Options

Several building options were considered and developed as part of the study, generally maintaining the existing overall footprint.

Existing Option

This option for consideration maintains the current configuration as it stands, with only upgrades MEP systems and minor interior finishes. It will house the current consolidated functions with 223 bus stalls in the storage area and 16 maintenance bays. Some of the deficiencies with this option include right-hand-turn bus circulation; the debris and ventilation challenges of the in-place service lane are not solved; and only maintains the status quo for work flows, described as inefficient and in shortage currently. This option also creates challenges for wash lane construction sequencing, as the wash lane requires continuous use 365 days a year.

Remodeling Option 1

Remodeling Option 1 keeps the current adjacencies relatively intact, except with a major move of the service lane into a new 10,000 SF addition to the south side of the building. This eliminates the congestion of vehicles, humidity, exhaust fumes, and heat loss due to the continuous opening of the overhead doors in the winter months. It also allows a major shift in the circulation pattern of the vehicles in the building to left-hand turns, which is safer and increases visibility for the drivers.

The bus stall count remains at 223, with an increase in maintenance bays to 23. The layout maximizes proximities and provides better safety zones. This option also allows for the potential of overflow maintenance of articulated buses. One drawback of this option is that the maintenance area is configured in a way that the mechanics will still be required to pull-in and back-out of maintenance bays. It also has some overlap of driver-pedestrian circulation through maintenance areas.

Remodeling Option 2

This option, similar to Remodeling Option 1, moves the service lane to a new addition and modifies the circulation pattern in the same fashion. However, this option moves the maintenance shop to the center of the building to offer in-out driving patterns for the mechanics and allows for easier staging of vehicles.

This option's bus stall count maintains the 223 stalls, with an increase to 21 maintenance bays. The new layout also maximizes proximities and provides better safety zones. Its downfalls are its maintenance bays 45-degree parking angles will prove difficult for maneuvering, and the bus storage areas are separated and an inefficient use of space.

Renovation Benefits Summary

Service/Wash Line Addition and Upgrades

Installing (2) High Pressure Wash Systems with underbody chassis washers will prove to be cost effective in many ways such as removing sand and other coarse particles which could potentially scratch finishes. The underbody chassis washers reduce rust damage done to undercarriages, making it easier for a mechanic to service vehicles. Mechanics currently pre-clean prior to performing engine and drive train maintenance, which adds to the maintenance time for each bus. The proposed system will do this automatically. The wash system will also prevent some repairs from becoming major, i.e., rubber gaskets, boots etc. will last longer protecting parts like steering mechanisms. Savings would show up as fewer dollars spent annually on parts and fewer service hours required in maintenance. With such a wash system in

place we typically see a 5% increase in the value of the fleet over the life of each vehicle (on new vehicles) or 3% increase over the entire fleet.

Mechanics Bus Bays and Workshops

The current layout proves to be very inefficient. Remodeling Option 1's layout aims to enhance the current condition within the existing footprint with the following improvements:

- Increase the number of service bays from 16 to 23.
- Increase the overall length and expand the amount of space in approximately half of the bays along with supplying (18) new vehicle hoists, (23) product drops and creating more efficient workspaces.
- This layout also includes building new supervisory and scheduling offices in front of Bays 1-8. This will enable problems to be solved in real time rather than being remotely located (as they are now).
- Adding more parts on hand (such as windshields etc.) should result in less "down time" and more buses available for service in a shorter period of time. The 2020 projected date of enacting an MRP system will help identify products that should be in stock at all times.
- Efficiencies will also occur in staging of vehicles. By increasing the amount of space (in the tunnel or service lane) buses can be retrieved more quickly, (Instead of having to move around 4-5 buses to get to one, a technician may only have to move one or two).

These improvements will improve the efficiency of each supervisor, mechanic or technician by a certain percentage. We typically see at least a 10-15% increase in productivity.

One way of better understanding this increased productivity is through a multiplier of calculated shop hours and applied rates. For example, if every mechanic or technician can become 10% more efficient due to improvements and added space:

8 hour shift x .10% increase = 48 minutes saved every day per mechanic multiplied by an eventual staff of 50 mechanics = 2,400 minutes a day saved/divided by 60 minutes in an hour = 40 hours per day x 365 days = 14,600 hrs. annually.

Generally, labor savings are realized mainly through operational savings through less bus down-time, reduction in overtime hours, and less new hire training and attrition.

NOTE: Possible savings projected here are generalizations based on experience with new facilities and not to be construed as actual savings. For precise analysis, a specific fleet management study is recommended.

Driver Dispatch and Support

Human error is noted as the causative factor in nearly 85% of all bus driver incidents according to the National Transportation Safety Board. Fatigue and stress is a widely recognized problem for bus drivers, with challenges in proper eating, sleep schedules, constrained working environments, customer interactions, passenger loading and unloading, time and schedule sensitivities, and traffic conditions. Several sources have cited countermeasures to stress and fatigue including support, promotion, and education on psychological awareness, good health-sleep-physical fitness, and stress-management in addition to operational and management strategies. The current facility with its poor conditions, shortage of space, and forced, inefficient work-flows are noticeably a challenge to dispatch and work environment

for the Metro's drivers. A renovation to the building, providing very basic amenities, will likely produce innumerable results in safer drivers.

The increased safety with left-hand turns will likely reduce inadvertent bus damage as well. Providing quality work environments and a commitment to employee satisfaction, with even modest improvements, are proven time and again to improve worker productivity and efficiency which applies to all of the employees at the 1101 E. Washington facility.

Summary

The plans were reviewed by all stakeholders. Due to the increased safety opportunities, better workflows, efficiencies, real savings potential, and preferable phasing opportunities of Option 1, it is acknowledged as the preferred plan.

G. Exterior Site Concepts

East Washington Avenue and Ingersoll Street Intersection

The open space adjacent to the intersection of East Washington Avenue and Ingersoll Street is re-envisioned as a dynamic, visually engaging space that discourages loitering through improved natural surveillance. A deconstructive approach to the design preserves some of the existing hardscape elements while creating an entirely new and reimagined space.

Natural surveillance is achieved by increasing perceptual access into and through the space. Removing entire sections of the existing wall and re-sculpting the lawn will result in uninterrupted site lines from the intersection to the building. Decorative site lighting is proposed to highlight some of the proposed elements of the design, like the remaining wall sections, while improving street presence and natural surveillance at night.

Existing, mature canopy trees would be preserved without the need of the retaining wall by re-sculpting the lawn into a circular mound enveloping the root mass. Urban tolerant, native and/or adaptive species would be planted to minimize maintenance and provide multi-seasonal interest.

Main Entry

The redesigned site at the parking lot side of the building will create a new, enhanced main entry component, designed to enhance the pedestrian experience while improving way-finding and street presence. The existing driveway would be marked and lit to provide a safer pedestrian crossing, while creating a designated space along the building for an improved entry experience. A screen wall with foundation plantings around the existing transformer would screen the utility while providing an opportunity for supplemental signage for enhanced street presence and improved wayfinding. An entry plaza is proposed as a forecourt to the building to improve the pedestrian's entry experience. Additional plantings within that plaza would provide visual separation between the building and the parking lot.

Madison Metro Transit Building Master Plan Report

REMODELING OPTION DRAWINGS

MARCH 9, 2018

KUENY ARCHITECTS, LLC

Mead & Hunt

DESTREE architecture & design

KEN SAIKI DESIGN
LANDSCAPE ARCHITECTS
303 S. PATERSON
SUITE ONE
MADISON, WI 53703
Phone: 608 251-3600

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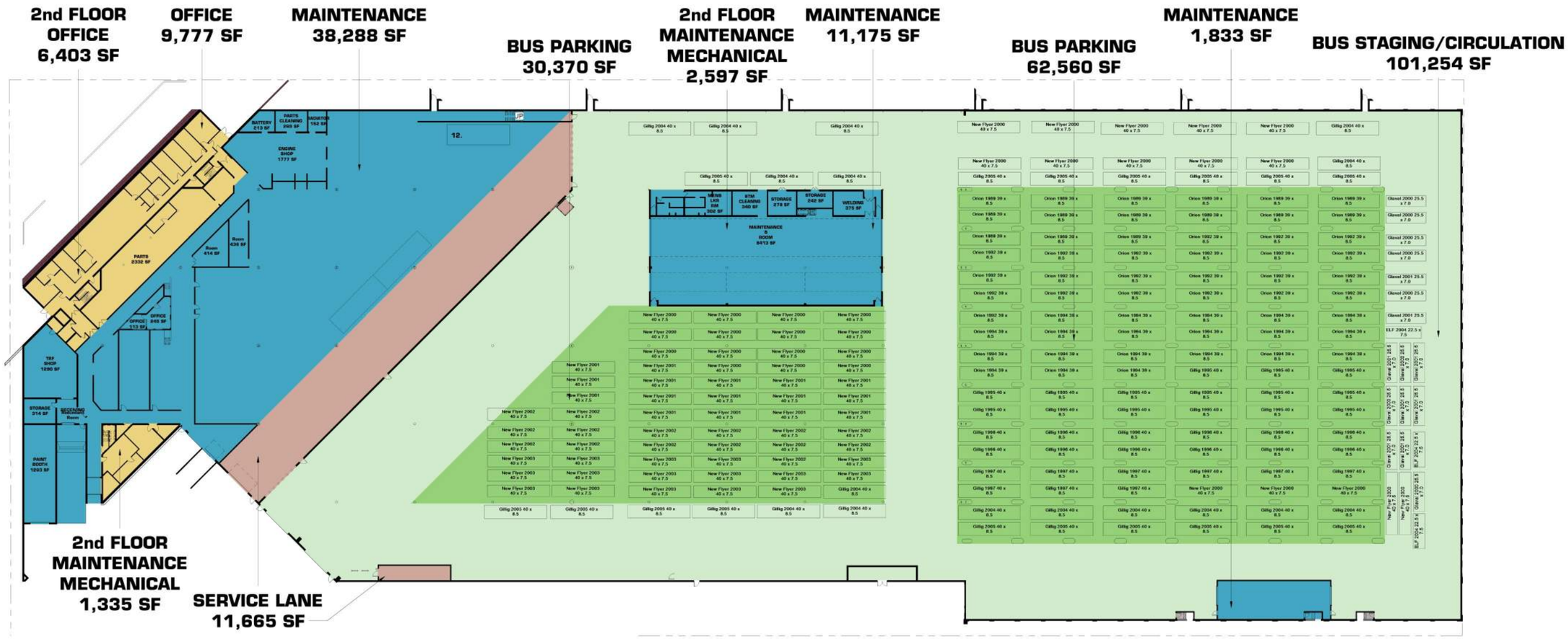
MADISON TRANSIT COLOR LEGEND	AREA
Office/Support	16,180 SF
Bus parking	92,930 SF
Maintenance	55,228 SF
Service lane	11,665 SF
Bus staging/circulation	101,254 SF



EXISTING OPTION

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MADISON TRANSIT COLOR LEGEND	AREA
Office/Support	30,698 SF
Bus parking s parking	98,240 SF
Maintenanceintenance	58,122 SF
Service lanervice lane	10,000 SF
Bus staging/circulation	90,197 SF

2nd FLOOR OFFICE 6,403 SF

OFFICE 24,285 SF

MAINTENANCE 37,610 SF

BUS PARKING 35,680 SF

2nd FLOOR MAINTENANCE MECHANICAL 2,597 SF

MAINTENANCE 13,130 SF

BUS PARKING 62,560 SF

MAINTENANCE 3,450 SF

BUS STAGING/CIRCULATION 90,197 SF

2nd FLOOR MAINTENANCE MECHANICAL 1,335 SF

REMODELING OPTION 1

SERVICE LANE 10,000 SF

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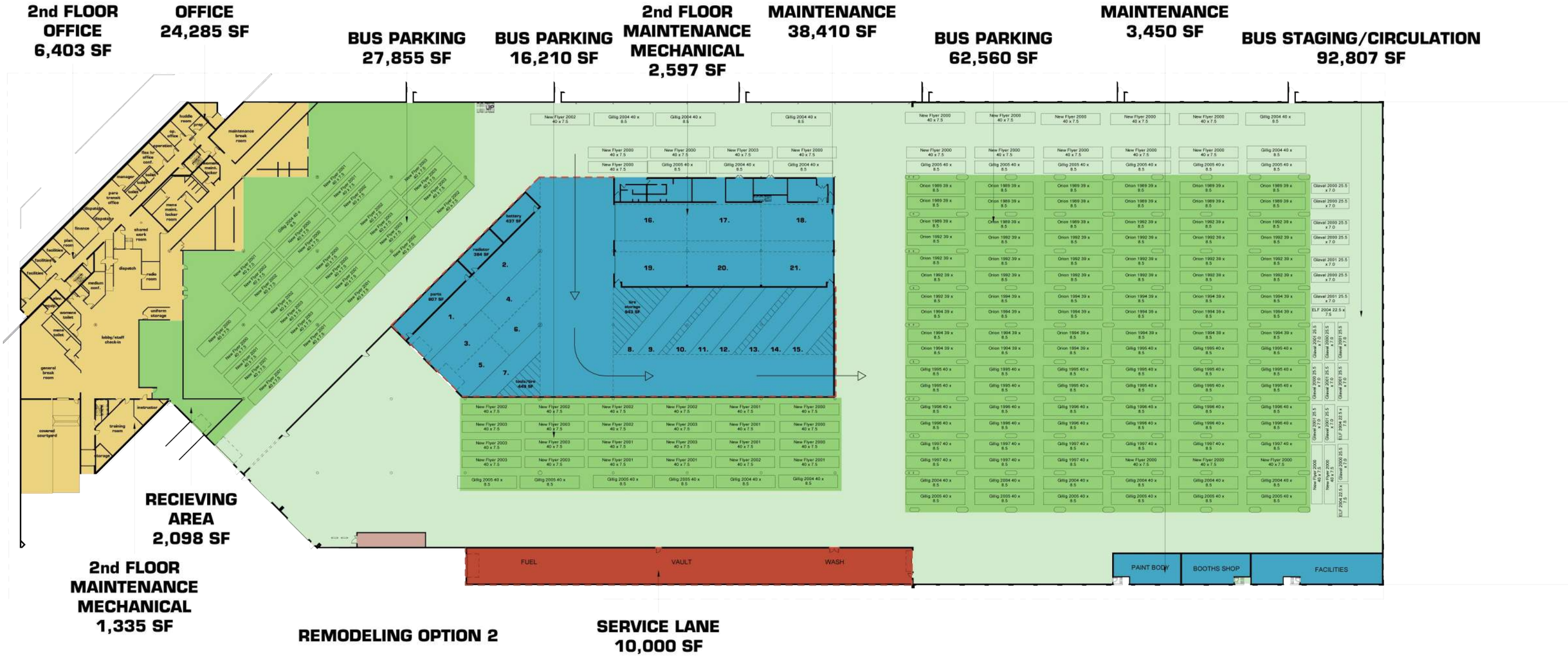
MADISON TRANSIT COLOR LEGEND	AREA
Office/Support	30,698 SF
Bus parking	106,625 SF
Maintenance	45,792 SF
Service lane	10,000 SF
Bus staging/circulation	92,807 SF



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18,600 SF


EMPLOYEE COURTYARD
HUDDLE RM
PHONE RM
MAINTENANCE BREAK ROOM
OPERATIONS
OPEN TEAMING
KITCHENETTE
WOMEN'S TOILETS
MEN'S TOILETS
JANITOR
WOMEN'S MAINTENANCE LOCKER ROOM
MEN'S MAINTENANCE LOCKER ROOM
PARA TRANSIT OPEN OFFICE
FLEX HR OFFICE/ CONF
IT
SHARED WORK ROOM
FINANCE
ROAD SUPERVISORS
DISPATCH WORKSTATIONS
SUPPLY STORAGE
STORAGE
FACILITIES
OPEN TO BELOW
TOILET
DISPATCH
RADIO ROOM
MEDIUM CONFERENCE
ELEV
GREETER
WOMEN'S TOILETS
MEN'S TOILETS
LOST & FOUND
LOBBY/ STAFF CHECK -IN
GENERAL BREAK ROOM
UP
INSTRUCTOR'S OFFICE
TRAINING ROOM
COVERED COURT YARD
EMPLOYEE ENTRY
0' 5' 10' 20'

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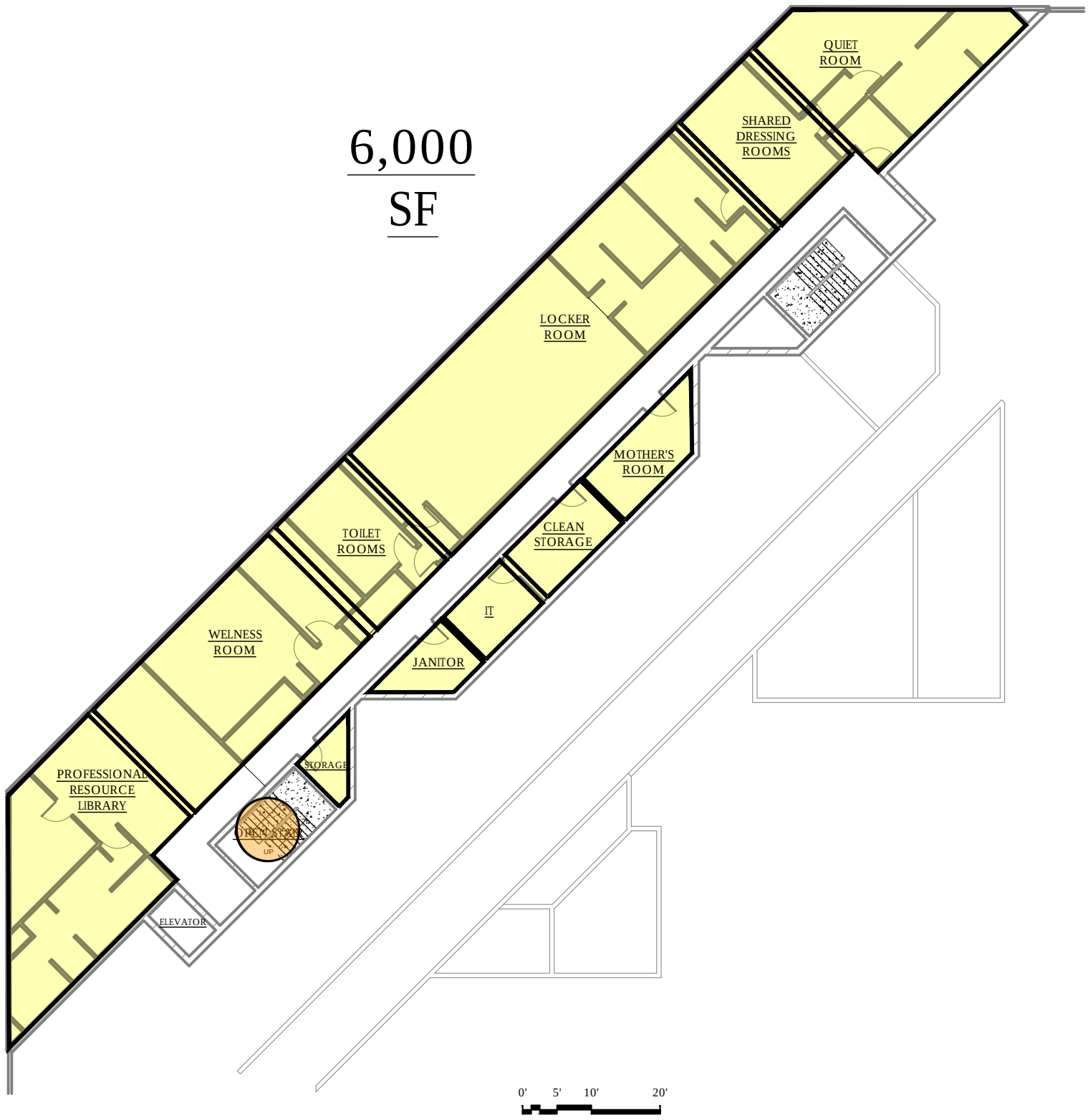
6,000 SF


QUIET ROOM
SHARED DRESSING ROOMS
LOCKER ROOM
MOTHER'S ROOM
CLEAN STORAGE
TOILET ROOMS
IT
WELNESS ROOM
JANITOR
STORAGE
PROFESSIONAL RESOURCE LIBRARY
OPEN STAIR
UP
ELEVATOR
0'
5'
10'
20'

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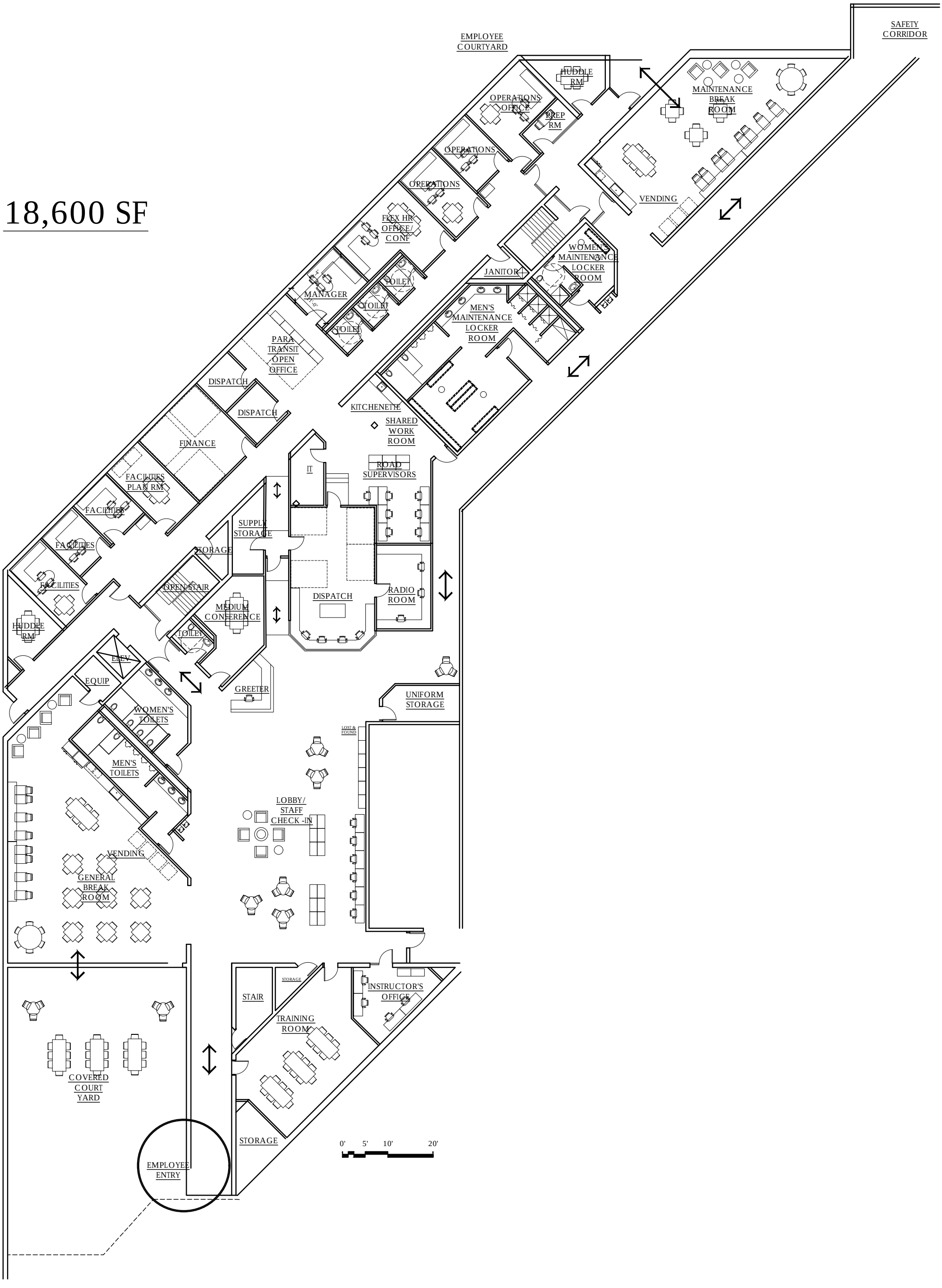
18,600 SF


EMPLOYEE COURTYARD
SAFETY CORRIDOR
HUDDLE RM
OPERATIONS OFFICE
KREP RM
OPERATIONS
OPERATIONS
MAINTENANCE BREAK ROOM
VENDING
FLEX HR OFFICE/ CONF
WOMEN'S MAINTENANCE LOCKER ROOM
JANITOR
TOILET
MANAGER
TOILET
TOILET
MEN'S MAINTENANCE LOCKER ROOM
PARA TRANSIT OPEN OFFICE
DISPATCH
KITCHENETTE
SHARED WORK ROOM
DISPATCH
FINANCE
IT
ROAD SUPERVISORS
FACILITIES PLAN RM
FACILITIES
SUPPLY STORAGE
FACILITIES
STORAGE
FACILITIES
OPEN STAIR
DISPATCH
RADIO ROOM
MEDIUM CONFERENCE
HUDDLE RM
TOILET
ELEV.
EQUIP
GREETER
UNIFORM STORAGE
WOMEN'S TOILETS
LOST & FOUND
MEN'S TOILETS
LOBBY/ STAFF CHECK -IN
VENDING
GENERAL BREAK ROOM
STORAGE
STAIR
INSTRUCTOR'S OFFICE
TRAINING ROOM
COVERED COURT YARD
STORAGE
EMPLOYEE ENTRY
0' 5' 10' 20'

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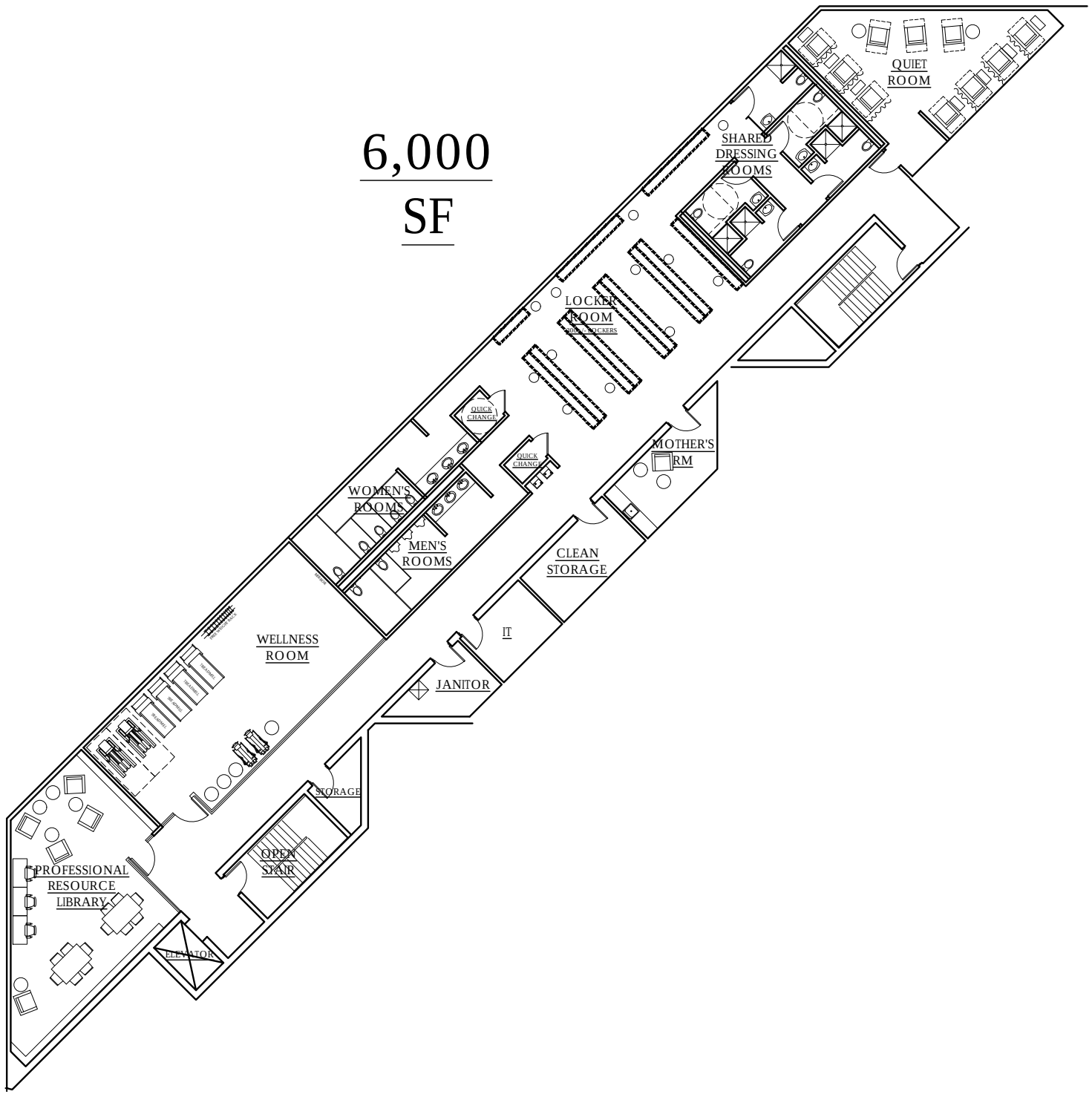
6,000

SF



0' 5' 10' 20'

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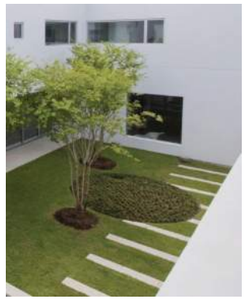

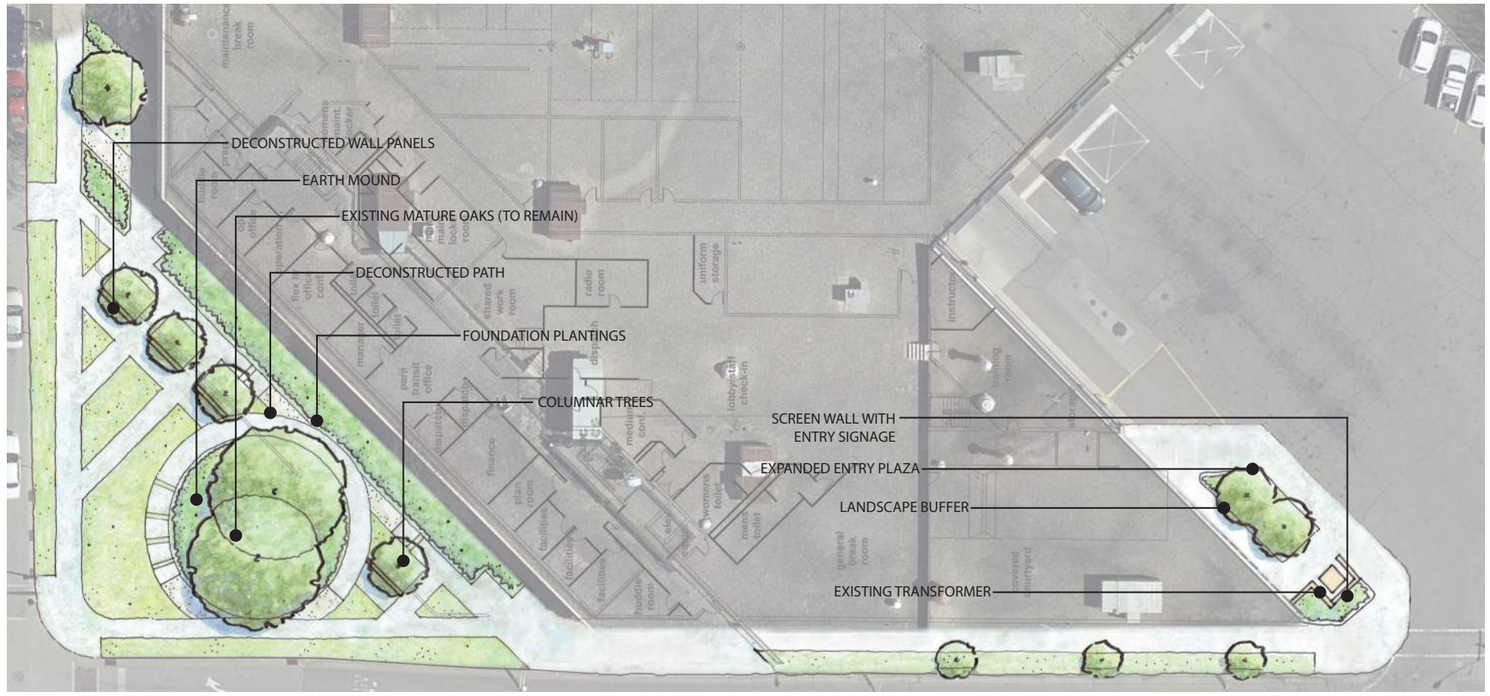
DECONSTRUCTED WALL PANELS
EARTH MOUND
EXISTING MATURE OAKS (TO REMAIN)
DECONSTRUCTED PATH
FOUNDATION PLANTINGS
COLUMNAR TREES
SCREEN WALL WITH ENTRY SIGNAGE
EXPANDED ENTRY PLAZA
LANDSCAPE BUFFER
EXISTING TRANSFORMER

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Madison Metro Transit Building

Basis of Design & Construction Cost Estimates

Report prepared for

City of Madison – Metro Transit

Madison, Wisconsin

Report prepared by

Mead & Hunt

www.meadhunt.com

KUENY ARCHITECTS, LLC

DESTREE architecture & design

M&H project. # 4503500-170148.01

March 9, 2018

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A. Introduction – Purpose/Scope

The purpose of this report is to identify the extent of work and the level of quality for cost estimating purposes. The intent for the project and systems is to meet a 20-year life-cycle.

B. Basis of Design (All Options)

Structural

1. All of the existing steel structure and few masonry bearings walls shall remain intact.
2. Minor patching of damaged areas of the roof deck shall be repaired.
3. Much of the under-floor piping is inadequate as well as outdated equipment. Removal of the existing slab and replacement slab and footing may be required for new layouts.
    - Most slab replacement shall consist of a minimum 6 ½" slab on compacted fill with WWF 66x44.
    - 9" mat slabs shall be placed at new mechanics bays for the lifts.
4. A new steel grate mezzanine will be installed at the Gisholt east end of the building, approximately 22,000 SF.

Building Envelope

Existing Exterior Walls

1. The Gisholt east end of the building shall be 100% repointed, with miscellaneous brick repair.
2. The Gisholt east end of the building clerestory windows shall be replaced in kind with insulated sandwich panels assemblies.
3. The remaining portion of the building shall be re-clad with new corrugated metal siding with exposed fasteners, at the exterior, infilled with new spray-foam insulation, and have replacement interior metal liners.
4. Existing entries and windows shall be replaced with new insulated aluminum storefront window systems.
5. Existing hollow metal doors and frames shall be repainted.
6. Existing main building brick facades require only mild cleaning.
7. It is assumed that the existing Overhead Bus Entry doors are in sufficient shape and only require maintenance, not replacement.

Existing Roof

1. Flat roof replacement shall be handled as an expedited separate project, not considered in this report. New cap flashings also assumed as part of the separate project.
2. New penetrations shall be provided for new tubular skylights or unit skylights throughout the flat roof in the Mechanic's and storage areas.
3. The upper, perimeter sawtooth roofs at the Gisholt east end of the building requires removal of all asbestos siding and cementitious coating. Replacement metal panel enclosures shall be provided.
4. Central Sawtooth roof area and structure to be cut out, and replaced with a low-slope, ballasted, flat roof system and structure with new tubular skylights or unit skylights.

Service Bay Addition

1. All new walls shall be comprised of 8" CMU, insulated, rain screen walls, clad in metal panels.
2. Two new aluminum, overhead, rapid-action, insulated, coiling doors shall be at the entry of the addition and at the entry to the existing building bus storage.
3. Personnel doors shall be fiberglass-reinforced doors with aluminum frames.

Building Interiors

Wall Systems

1. All wall systems adjacent to mechanics maintenance bays, workshops, and bus storage shall be painted CMU.
2. All toilet and locker rooms shall be painted CMU.
3. All offices, training rooms, and break areas shall be painted gypsum board over metal studs.

Finishes

1. Mechanics maintenance bays, workshops and bus storage shall have exposed, sealed concrete floors and ceilings.
2. Public areas, break rooms, and open locker areas shall have rubber floors and acoustic ceiling panels.
3. Offices and training rooms shall have carpet and acoustic ceiling panels.
4. Toilet rooms shall have ceramic tile floors and six-foot-high wall wainscoting, full height tile in showers, and painted gypsum ceilings.
5. All countertops and built-in work surfaces shall be solid surface material, with plastic-laminate casework.
6. Lockers shall be entirely replaced with HDPE material.
7. All new toilet accessories, partitions, locker benches, etc. shall be provided.

Vertical Circulation

1. Provide one-for-one elevator replacement, machine-room-less hydraulic, jack-less elevator.
2. Provide new rubber treads and risers on stairs, and paint hand and guard rails.

Equipment

Bays	Standard Repair	Quick Service	Inspection	**Total**
2 Post Lift (50,000 lb.)	11	2	4	**17**
3 Post Lift (75,000 lb.)	1	-	-	**1**
Exhaust Reel, Round	17	2	4	**23**
Product Reel Bank (7 Products)	10	1	2	**13**
Air/Electric Drops	17	2	4	**23**
Waste Oil Pump	5	1	2	**8**
Work Bench (32" x 72")	17	2	4	**23**

Notes:

(1) Existing portable lifts will be used in at least 6 bay locations.

(2) Areas reviewed but determined not in need of additional equipment include Unit Shop, Tire Shop, Battery Shop, Parts, Brake Shop, and Buildings and Grounds.

Fire Protection

System Descriptions

1. The existing sprinkler system for the west portion (service bays) is supplied from the 8-inch combination fire and domestic water service connecting to the municipal water main in Ingersoll Street. The existing sprinkler system is a wet-pipe system supplying water to sprinkler heads in the entire servicing area. It is equipped with a double check backflow prevention assembly. The first and second floor of the administration office are not presently protected with a sprinkler system. Under new construction fire protection will be added in this area.
2. The sprinkler system in the east portion (Gisholt Building) used for bus storage is supplied by an 8-inch water service connecting to the municipal water main in East Washington Avenue. The water service enters through the north wall where a double check backflow prevention assembly is provided. The 8-inch cross main is routed overhead and supplies several fire risers located along the south wall. This main also supplies 2-1/2 inch fire department valves (FDV) located at interior columns. The sprinkler piping in all areas is black steel.
3. Design Criteria: All new piping will be provided in accordance to NFPA. The new and modified fire protection system will be hydraulically designed by the sprinkler contractor.
4. Distribution: The fire protection system material will be in accordance with NFPA standard requirements for building and area type. Plastic piping will not be acceptable.

Systems Design

1. The fire protection for this building will include a new fire protection system for the administration area, modify the existing system to accommodate expanded repair area, modify, and replace existing sprinkler heads in the storage/parking garage and extend fire protection to new bus washing service lane, depending on options selected.
2. First consideration to repair existing systems no floor plan modifications and repair, adjust or replace existing sprinkler heads as required in bus storage/parking garage. Add new fire protection to administration area with new fire riser connected to the existing fire protection service header.
3. Option 1, Remodel existing office area providing fire protection to unprotected area. Add new fire protection to the administration area with new piping, sprinkler heads, fire riser connected to the existing fire protection service header located in bus storage area. Modify the existing fire protection system extending piping and adding sprinkler heads to accommodate expansion of the maintenance area. At the service lane addition, extend the existing fire protection. In the Storage/bus parking area replace sprinkler heads locations to accommodate parking area modifications.
4. Option 2, has the same extent of work as option 1 except an increased modified area at the existing bus storage/parking area to accommodate new location of maintenance service area.

Plumbing

System Descriptions

Sanitary Waste and Vent

System Description

1. A sanitary waste and vent system will be repaired or reconfigured depending on final design option selected.
2. The existing sanitary system will be repaired as required to allow fixtures to drain without backing up. It has be reported that there is possible damage to the underground system causing the sanitary system to back up.
3. Plumbing fixtures and devices will be drained by gravity through conventional sanitary waste system.
4. All fixtures will be trapped and vented to the atmosphere.

Design Criteria

1. The sanitary drainage system will be pitched to maintain flow at a minimum velocity of 2 fps when flowing half full. Horizontal drain piping will be pitched at ¼" per foot for piping 2" and smaller and 1/8" for piping 3" and larger. Vent piping will be graded and connected so as to drain back to the sanitary system by means of gravity.

Equipment and Material

1. Maintenance bays will be run through trench drains and catch basins to intercept sand, oil and debris before connecting to the sanitary sewer system.

Distribution

1. Below ground sanitary waste and vent piping will be type PVC-DWV schedule 40 with solvent cement joints and or no-hub cast iron pipe.
2. Above ground sanitary waste and vent piping will be hub-less cast-iron pipe with heavy duty stainless steel couplings, galvanized steel pipe with threaded cast-iron drainage fittings and threaded malleable iron vent fittings, or type PVC-DWV schedule 40 solid pipe with solvent cement fittings.

Storm and Clearwater Waste

System Description

1. The existing storm system will be repaired as required to allow roof to drain without backing up and severe ponding on the roof.
2. It has been reported that there is possible damage to the underground system causing the storm system to back up to the roof.

Design Criteria

1. The storm drainage system will be sized based on a maximum rainfall rate as determined by the Wisconsin Plumbing Code.

Distribution

1. Above and below ground storm piping will be type PVC-solid wall schedule 40 pipe with solvent cement joints.
2. Roof drain bodies and portions of above ground storm piping will be insulated to prevent condensation on the pipe.

Water Service

System Description

1. There is an existing domestic water entrance and separate fire entrance that will remain.

Equipment and Material

1. A new water meter will be provided in accordance with City water utility company if required.

Domestic Water

System Description

1. Domestic water will be provided to all plumbing fixtures and any other devices and fixtures that require a domestic water supply. Hot water will be generated at 140°F to help prevent legionella disease and then tempered down to 120°F (adjustable) through a master mixing valve for distribution.
2. Only water supplied to hot water systems will be softened.

Design Criteria

1. The piping will be sized to limit the velocity to a maximum of 8 fps for cold water and 6 fps for hot water.
2. The water heater will be sized for 100% of the design hot water load.

Equipment and Material

1. Domestic hot water will be produced by gas-fired high efficient condensing type water heaters.
2. Only the domestic hot water will be softened. Water will be softened through a twin alternating water softening system.
3. The hot water system temperature will be maintained through a thermostatic mixing valve by recirculating the hot water through a continuous loop with an in-line circulating pump.
4. Water hammer arrestors will be provided at all solenoid valves and at other potential water hammer sources and will be located in accessible spaces.

Distribution

1. The domestic hot and cold-water systems will be Type L copper tube with wrought copper fittings and soldered joints. Solder will be lead-free, 95-5 type solder.
2. The water system piping will be insulated with rigid fiberglass insulation with a vapor barrier.
3. Isolation valves will be provided at all branch piping run-outs to fixture groups, and at fixtures requiring maintenance.

Non-Potable Water Systems

System Description

1. A non-potable water system will be provided to the wash bay for vehicle washing.

Design Criteria

1. The piping will be sized to limit the velocity to a maximum of 8 fps. A reduced pressure backflow preventer will protect the domestic water supply and will be sized for 100% of the design load

Equipment and Material

1. Water hammer arrestors will be provided at all solenoid valves and at other potential water hammer sources and will be located in accessible spaces.

Distribution

1. The non-potable water system will be Type L copper tube with wrought copper fittings and soldered joints. Solder will be lead-free, 95-5 type solder.
2. The non-potable water system will be insulated the same as the domestic water system.

3. Isolation valves will be provided at run-outs to fixtures.

Fixtures & Equipment

Gas water heater	Gas fired, high efficiency, tank type, west end of bldg. (domestic use)
Water softener	Hot water will be softened with a simplex or duplex automatic softening system. Using one brine tank and one softening tank.
Floor drains	Heavy duty cast iron in nonpublic area, and standard duty public areas.
Trench drains	Formed in place with heavy duty cast iron grate H-20 load rating
Catch basins	Precast, heavy duty cast iron grates Hs-20 load rating
Wall hydrants	Freeze-proof, chrome wall plate
Water closets	Wall hung, 1.28 gpf, with automatic battery powered flushometers.
Urinals	Wall hung, 0.5 gpf, with automatic battery powered flushometers.
Lavatories	Wall hung or integral with counter, with manual single lever faucet
Sinks	Stainless steel break room sink with gooseneck ADA faucet.
Water coolers	Dual level electric watercooler with bottle filler.
Showers	ADA compliant with low flow heads.
Emergency shower/ eyewash	Bradley or equal emergence shower/eyewash will be installed throughout the shop and work bays as required by code and OSHA requirements.

HVAC

Heating System Description

Boilers and Pumps System

System Description

General Note: At the time of design and determinations of phasing, the viability of in-floor heat will need to be determined with the coordination of all systems.

1. Heating hot water system will serve heating coils and terminal heating devices such as unit heaters, cabinet unit heaters, radiant floor manifolds, etc.
2. Heating hot water system will consist of two high efficiency condensing hot water boilers (each sized for 67% of the peak load), boiler pumps, two boiler primary pumps, and four distribution pumps (two for the radiant floor system, and two for the make-up air units, air handling units, and terminal units) and distribution piping system.
3. Condensing boilers sized for approximately 6 MMBTU each and equal to AERCO Benchmark BMK 6000.
4. Hot water will be distributed at supply temperature of 140 °F. OA temperature reset will allow supply temperature down to 100°F.
5. Heating hot water system will be a variable volume utilizing a modulating 2-way control valve at each heating device/radiant floor zone. Distribution pumps will each be provided with variable frequency drives (VFD).
6. A differential pressure transmitter between the supply and return mains will be utilized to vary the speed of the pumps, via variable frequency drives, to maintain a constant pressure differential between the piping mains.

7. Sealed Combustion boilers in mechanical room and will have direct intake and exhaust connections to outdoors.
8. Radiant floor heating: Vehicle maintenance repair, and service areas will be provided with an underfloor radiant heating system. Provide manifolds assembly with balancing valves, control valve and flow meters. Manifolds and zone pump serving the radiant zones shall be wall mounted enclosed cabinetry. Approximately 55.850 sf.
9. Heating system will utilize baseboard radiation for perimeter area serving the Administrative offices. Approximately 200 linear feet.

Design Criteria

1. General
    - Heating water piping will be sized as follows:
        - Maximum pressure drop of 4 ft of water/100 ft of piping for piping 6" and smaller.
        - Coils will be sized for water temperature drop of approximately 20°F.

Distribution

1. Heating water will be distributed through Type L copper piping with soldered joints or steel piping with welded joints.
2. Unions will be provided at terminal heating devices in copper piping.
3. Piping will be insulated with rigid glass fiber insulation with insulation jacket.
4. Underfloor radiant tubing will be 5/8” PEX with an oxygen diffusion barrier.
5. Reserve Capacity and Redundancy
    - Two boilers will each be sized to provide 67% of the final design heating load.
    - Two pumps will each be sized for 100% of the final design load for each of the radiant floor and AHU/MAU systems. Two pumps will operate in parallel.

Equipment and Material

1. Hot water boiler(s) will be high efficiency condensing type with natural gas burner(s).
2. Distribution pumps will be end suction centrifugal type with VFDs.
3. The heating hot water system will also include the following components:
    - Chemical pot feeder.
    - Air separator.
    - Bladder type expansion tank.
    - Glycol fill tank and pump.
    - Piping specialties.

Reserve Capacity and Redundant Systems

1. There will be no provision for using number 2 fuel oil system as backup fuel source.
2. Boilers and hot water pumps will be on emergency power.

Cooling Systems Descriptions

Central System

System Description

1. Facility will not have any central cooling system. Individual spaces throughout the building will be served by rooftop units.

Rooftop Air Handling Unit (Office Administrative Areas)

System Description

1. One packaged rooftop air handling unit will serve the office spaces and be located on the roof. The variable air volume (VAV) rooftop unit will distribute ventilation and conditioned air to VAV air terminals with hot water reheat coils serving each zone. System will be single supply duct with a ducted return air back to rooftop unit.
2. Unit will serve administrative offices, breakroom locker rooms and hallway. Approximately office area is 9,777 sq.ft. The new packaged rooftop unit will be 12,000 cfm.
3. System will be controlled with demand control ventilation based on CO2 levels.
4. A dedicated outside air component to the unit is included to pre-condition the outside to reduce the need for reheat. The Administration AHU will also contain an energy recovery wheel.
5. Outdoor air condensing units will be utilized with direct expansion cooling coils in the air handling units to provide mechanical cooling for the office areas.
6. Ductwork will be constructed in accordance with SMACNA Standards for appropriate pressure class. Ductwork will be sealed to meet SMACNA Seal Class A as a minimum and to limit ductwork leakage not exceeding 1% of the design flow rate for high pressure ductwork and 2% for low pressure ductwork.

Design Criteria

1. Air Handling Unit Component Sizing
   - Maximum allowable nominal face velocities or pressure drop are as follows:
     - Cooling Coils: 500 fpm
     - Heating Coils: 600 fpm
     - Pre-filters and Final-filters: 500 fpm
2. Duct System Distribution Criteria
   - Supply Ductwork Sizing (based on diversified CFM)
     - From Air Handling Unit to Air terminal (AT) Device
       Maximum pressure drop of 0.10"/100 ft.
     - Duct size to AT device = AT inlet size up to 10 ft. from AT.
     - Air Terminal Device to Supply Diffuser
       Maximum pressure drop of 0.10"/100 ft.
   - Exhaust Ductwork Sizing
     - Maximum pressure drop of 0.10"/100 ft.
   - All supply ducts above ceilings will be externally insulated.
   - All Exterior ductwork will be externally insulated with fiberglass insulation with VentureClad Jacketing or equal.
   - Ductwork will be internally lined for 5' downstream of supply VAV air terminal units.
   - The use of duct lining will be limited to the following:
     - Those instances where the lining is beneficial because of its acoustical properties in supply or return duct, the use of a secondary perforated metal inner liner will be used.
     - The exhaust and outside air duct will not be lined.
3. Reserve Capacity
   - Air handling system will be sized with 10% reserve capacity.

Equipment and Material

1. The air handling unit will be of painted, galvanized steel with double wall construction. The unit will consist of the following components:
   - Outside air intake damper.
   - 2" (Merv 8) efficient pre-filters and 4" (Merv 13) efficient filters (as rated on ASHRAE Standard 52.1).
   - Cooling coils.
   - Pumped hot water heating coils.
   - Return fan with VFD.
   - Supply fan with VFD.
   - Smoke detector in supply and return air ductwork.
2. Supply fans will be centrifugal plenum type with airfoil blades. Fan speed and air volume will be modulated through variable frequency drives (VFDs) controlled by supply duct static pressure controller.
3. Return/ Exhaust fans will be contained within the AHUs and will be centrifugal plenum type fans. Fan speed and air volume will be modulated through VFDs controlled by building static pressure controller.
4. The supply air terminals (ATs), equal to Accutrol, will be provided with system pressure independent DDC controllers with 24 volt electric actuators.
5. Humidification will not be provided for HVAC systems.

Distribution

1. Medium pressure galvanized steel ductwork will distribute supply air from the air handling unit to the supply air terminal devices.
2. Low pressure galvanized steel ductwork will be utilized downstream of supply terminal devices to distribute supply air to the spaces.
   - Supply air ductwork will be externally insulated with fiberglass insulation.
   - Ductwork lining will be provided upstream and downstream of the air handling unit and downstream of the supply air terminals for sound attenuation.

Ventilation Systems Descriptions

Maintenance Vehicle Repair: Gas-Fired Makeup Air Units

System Description

1. Semi-custom make-up air units will serve the maintenance vehicle repair area. The MAUs will be located on roof. Semi-custom unit manufacturers equal to Innovate or Venmar.
2. Gas-fired makeup air units serving the maintenance vehicle repair area is 18,000 cfm each, (Qty. 3).
3. Spaces doesn't required compressed Natural Gas (CNG) requirements.
4. System will be constant volume with ventilation control based on normal mode. During "normal" mode, the system will supply air conventionally with air supplied high into the space and exhausted from floor level.
5. Ductwork will be constructed in accordance with SMACNA Standards for appropriate pressure class. Ductwork will be sealed to meet SMACNA Seal Class A as a minimum and to limit ductwork leakage not exceeding 1% of the design flow rate for high pressure ductwork and 2% for low pressure ductwork.

Equipment and Material

1. The MAU unit will be of painted galvanized steel. The units will consist of the following components:
    - Outside air intake damper.
    - 4" (Merv 8) Efficient Prefilters (as rated on ASHRAE Standard 52.1).
    - Plate type heat recovery module.
    - Gas-fired heat exchanger, direct gas fired.
    - Supply fan.
    - Exhaust fan.

Bus Parking: Gas-Fired Makeup Air Units

System Description

1. Semi-custom, gas-fired make-up air units will serve the Bus Parking area. The MAUs will be located on new structure mezzanine. Semi-custom unit manufacturers equal to Innovate or Venmar.
2. Gas-fired makeup air units serving the Bus Parking area is 20,000 cfm each (Qty. 4).
3. Spaces doesn't required compressed Natural Gas (CNG) requirements.
4. System will be constant volume with ventilation control based on normal mode. During "normal" mode, the system will supply air conventionally with air supplied high into the space and exhausted from floor level.
5. Ductwork will be constructed in accordance with SMACNA Standards for appropriate pressure class. Ductwork will be sealed to meet SMACNA Seal Class A as a minimum and to limit ductwork leakage not exceeding 1% of the design flow rate for high pressure ductwork and 2% for low pressure ductwork.

Equipment and Material

1. The MAU unit will be of painted galvanized steel. The units will consist of the following components:
    - Outside air intake damper.
    - 4" (Merv 8) Efficient Prefilters (as rated on ASHRAE Standard 52.1).
    - Plate type heat recovery module (aluminum).
    - Gas-fired heat exchanger, direct gas fired.
    - Supply fan.
    - Exhaust fan.

Service Line: Gas-Fired Makeup Air Unit

System Description

1. 100% OA gas-fired make-up air unit will serve the Service Line area. The MAUs will be located on the roof. Unit manufacturers equal to Modline, or Trane.
2. Gas-fired makeup air unit serving the Service Line area is 10,000 cfm.
3. System will be constant volume with ventilation control based on normal mode. During "normal" mode, the system will supply air conventionally with air supplied at floor level into the space and exhausted at ceiling.
4. Ductwork will be constructed in accordance with SMACNA Standards for appropriate pressure class. Ductwork will be sealed to meet SMACNA Seal Class A as a minimum and to limit ductwork leakage not exceeding 1% of the design flow rate for high pressure ductwork and 2% for low pressure ductwork.

Equipment and Material

1. The MAU unit will be of painted galvanized steel.
2. The units will consist of the following components:
    - Outside air intake damper.
    - 4" (Merv 8) Efficient Prefilters (as rated on ASHRAE Standard 52.1).
    - Gas-fired heat exchanger, direct gas fired.
    - Supply fan.
    - Ductwork will be stainless steel for supply and exhaust ductwork.

Exhaust Fan Description

Toilet Exhaust Systems

Description

1. The system will service toilet rooms, janitor's closets, locker rooms, etc.
2. The exhaust will be ducted back to the energy recovery unit where practical. Otherwise there will be small in-line or ceiling mounted fans ducted to the exterior.

Design Criteria

1. Duct Distribution Criteria
    - Exhaust ductwork sizing:
        - Maximum pressure drop of 0.08"/100 ft. of ductwork.
        - Maximum velocity of 1500 fpm.
2. Reserve Capacity and Redundant Systems
    - There will be no redundancy.
    - During power outages the toilet exhaust fan will be off.

Equipment and Materials

1. The exhaust system will consist of the following components:
    - Exhaust fans are contained in the Administration AHU. Any small, remote restrooms will be standalone exhaust system with no heat recovery due to the small exhaust air quantity.
    - Ductwork will be galvanized steel for toilet and Janitor closets; aluminum for showers.

Energy Recovery Ventilator

1. Energy recovery system (ERV) shall serve remote toilet/shower rooms/relief air to precondition the outdoor air. Unit shall be located in above toilet/shower room.
2. The hot water reheat coil downstream of energy recovery unit ERV will temper the ventilation system serving the maintenance's lockers, toilets, janitorial, and ventilation air adjacent offices.

Maintenance Repair Area Exhaust

Description

1. Exhaust Systems
    - Exhaust fans are contained within the MAUs.
    - The general exhaust fans will be interlocked with the associated supply fan in the unit.
    - The exception to the above is the unit in the maintenance vehicle repair area as previously discussed.

- Automatic operation of the system shall not reduce the ventilation rate below 0.05 cfm per square foot of the floor area and the system shall be capable of producing a ventilation rate of 0.75 cfm/ft^2 of floor area for at least 5 hours in each 24-hour period.

Design Criteria

1. Duct Distribution Criteria
   - Exhaust ductwork sizing:
     - Maximum pressure drop of 0.10"/100 ft. of ductwork.
     - Maximum velocity of 1500 fpm.
2. Reserve Capacity and Redundant Systems
   - Source capture exhaust systems will used for vehicle repair operations.

Equipment and Materials

1. The exhaust systems will consist of the following components:
   - Inline exhaust fans.
   - Motorized backdraft damper at fan inlet.
   - Ductwork will be galvanized steel.

Vehicle Exhaust

1. Source capture exhaust systems for fume extraction will used for vehicle repair operations via retractable hose reels.

Bus Storage Area Exhaust

Description

1. Exhaust Systems
   - Exhaust fans are contained within the MAUs.
   - The general exhaust fans will be interlocked with the associated supply fan in the unit.
   - Automatic operation of the system shall not reduce the ventilation rate below 0.05 cfm per square foot of the floor area and the system shall be capable of producing a ventilation rate of 0.75 cfm/ft^2 of floor area for at least 5 hours in each 24-hour period.
   - The system shall be arranged to operate automatically by means of carbon monoxide detectors (CO) applied in conjunction with nitrogen dioxide (NO2) detectors.

Design Criteria

1. Duct Distribution Criteria
   - Exhaust ductwork sizing:
     - Maximum pressure drop of 0.10"/100 ft. of ductwork.
     - Maximum velocity of 1500 fpm.

Equipment and Materials

1. The exhaust systems will consist of the following components:
   - Inline exhaust fans.
   - Motorized backdraft damper at fan inlet.
   - Ductwork will be galvanized steel.

Hazardous Storage Rooms: Flammable and Battery Room

Description

1. Exhaust Systems
    - The exhaust systems will service hazardous storage room in maintenance service area etc. The exhaust fans shall run continuously. Make-up air shall be from the adjacent Maintenance Service Shop area. Continuous ventilation shall be provided at a rate of not less than 1 cfm/ft^2 of floor area of the room.

Design Criteria

1. Duct Distribution Criteria
    - Exhaust ductwork sizing:
        - Maximum pressure drop of 0.10"/100 ft. of ductwork.
        - Maximum velocity of 1500 fpm.

Reserve Capacity and Redundant Systems

1. There will be no redundancy.
2. During power outages, the exhaust fan will be off.

Equipment and Materials

1. The exhaust system will consist of the following components:
    - Inline exhaust fan.
    - Motorized backdraft damper at fan discharge near louver.
    - Ductwork will be galvanized steel.

Welding Room Exhaust

Description

1. Exhaust Systems
    - A dedicated exhaust system will serve a welding room in maintenance service area. The exhaust fans shall run continuously. Make-up air shall be from the adjacent Maintenance Service Shop area. The ventilation shall be provided at a rate of not less than 1 cfm/ft^2 of floor area of the room. Intakes/exhaust will be though the roof.

Design Criteria

1. Duct Distribution Criteria
    - Exhaust ductwork sizing:
        - Maximum pressure drop of 0.10"/100 ft. of ductwork.
        - Maximum velocity of 1500 fpm.

Reserve Capacity and Redundant Systems

1. There will be no redundancy.
2. During power outages, the exhaust fan will be off.

Equipment and Materials

1. The exhaust system will consist of the following components:
    - Utility set exhaust fan up-blast arrangement with stack.
    - Canopy hood – stainless steel.
    - Motorized backdraft damper at fan discharge at roof.
    - Ductwork will be stainless steel or galvanized.

Main Electrical and Mechanical Room

Description

1. Exhaust Systems
    - The exhaust system will serve the main electrical room. The exhaust fan will be interlocked with local space temperature.
    - The exhaust fan shall have ECM motor with package controls to regulate fan speed base on the space temperature setpoint. ECM packaged controls equal to Vari-Green ® or equal.
    - Make-up air shall be from adjacent Maintenance Service Shop area.

Design Criteria

1. Duct Distribution Criteria
    - Exhaust ductwork sizing:
        - Maximum pressure drop of 0.10"/100 ft. of ductwork.
        - Maximum velocity of 1500 fpm.

Reserve Capacity and Redundant Systems

1. There will be no redundancy.
2. During power outages, the exhaust fan will be off.

Equipment and Materials

1. Ductwork will be galvanized steel.
2. The exhaust system will consist of the following components:
    - Inline exhaust fan.
    - Motorized backdraft damper at fan discharge near louver.

Destratification Fans

Description

1. Variable speed industrial ceiling fans (16’ diameter) extruded aluminum will be provided to maintain air movement and reduce stratification. Fan manufacturers shall be equivalent to Big Ass Powerfoil X3.0 or approved equal.
2. Provide destratification fans in maintenance vehicle repair area and maintenance service areas. Destratification fan area coverage is approximately 7,500 sq. ft. per fan in service bay areas. (Qty. 4 to 6).

Ductless Split Systems Descriptions

Ductless Split Systems

Description

1. Maintenance Service Shop – Offices/Lockers (Remote)
    - Ductless split system heat pump unit will be provided for any remote office or locker areas. The packaged energy recovery unit (ERV) will provide minimum space ventilation requirements in the space.
    - Indoor units will be wall mounted.
    - An associated air-cooled condensing unit will be located on roof and have refrigeration piping and control wiring running between the two pieces of equipment.
    - The new DDC system will monitor the systems for temperature and alarms.

2. Telecommunications Rooms
    - Ductless split system heat pump unit will be provided for each telecommunication communications room. No humidification will be provided.
    - Indoor units will be wall mounted.
    - An associated air-cooled condensing unit will be located on roof and have refrigeration piping and control wiring running between the two pieces of equipment.
    - The new DDC system will monitor the systems for temperature and alarms.

Door Air Curtains Systems Descriptions

Door Air Curtain Systems

Description

1. Main Service Vehicle Entry
    - The packaged door air curtains units will provide minimum space ventilation requirements in the space for infiltration loss for main vehicle service entries into the facility.
    - Indoor units will be ceiling mounted and located above the service entries into facility.
    - The hot water heating coil will temper the ventilation system serving the main service entry doors. (Qty. 8)

Specialty Systems Descriptions

Central System

Description

1. Facility will not have any specialty mechanical systems identified for the project.

Control Systems Descriptions

Building Automation System

Description

1. Mechanical systems will be controlled and monitored through a DDC based Building Automation System (BAS) with distributed processing at the local level. All valves and dampers shall have electric actuation.
2. System will monitor temperature, pressure, status, alarms, runtime, positions, occupancy, etc. as required to provide owner operators adequate feedback to diagnose system operation.
3. Acceptable Direct Digital Controls (DDC) controls manufacturers are: Honeywell Spyder with Niagra supervisory level controllers. Honeywell Niagra AX v3.8 for BAS system.

Design Criteria

1. DDC controllers will utilize distributed architecture and will not rely on "front-end" or higher level controller to perform required control sequence.
2. Each DDC controller will have a minimum of 10% spare points of each type (DI, DO, AI and AO) at each panel. For universal joints, the spares will be divided evenly between the analog and digital types of points.
3. All DDC system primary LAN controllers, PCs and communications equipment that monitors life safety and critical points (fire alarm, etc.).

4. Direct digital controls will be used to control and monitor the boilers, pumps, make-up units, air handling units, booster coils, supply VAV air terminals units, in-floor radiant, etc.
5. DDC controllers will utilize distributed architecture and will not rely on "front-end" or higher level controller to perform required control sequence.
6. The DDC system will monitor critical plumbing systems and equipment. This would include but not limited to sump pump alarms, water heater status, etc.
7. Electricity, water, and natural gas usage will be monitored by the DDC system for data collection. Additional information is also required to determine whether smart meters are currently in place on the existing utilities.

Electrical

Due to the age and deterioration of the electrical equipment and inefficient HID and fluorescent lighting. The intent of the electrical systems for the Madison Metro Transit building will be to replace 100% of the existing buildings electrical distribution with all new incoming service, normal power distribution, emergency power generation and distribution, interior and exterior lighting, centralized lighting control, fire alarm, and grounding.

Base Design Criteria – System Design

1. Overall normal building power is calculated based on the following values. Where VA/SF values are given, these values are taken over the entire building area or, in the case of exterior lighting, over the entire illuminated area.

Item	Load	Unit
General Purpose Receptacles	2.00	VA/SF
Interior Lighting	1.00	VA/SF
Exterior Lighting	0.25	VA/SF
Low Voltage Systems	2.00	VA/SF
Mechanical Equipment	As Scheduled	
Plumbing Equipment	As Scheduled	
Equipment (Lifts, Welders, etc.)	As Scheduled	

2. The generator will be sized to maintain owner-specified operations of the building during power outages. These specific areas of the building have yet to be determined. Preliminary generator size is roughly 350 KW. The unit shall be capable of picking up their rated capacity in one step and provide a transition time for the life safety loads of (10) seconds or less from instant failure of the normal power source to the emergency generator source. Non-life safety loads shall transfer within (15) seconds from failure of the normal power source.
3. Lighting levels will be in accordance with recommendations of the Illuminating Engineering Society (IES) and as indicated below. Areas designed by the Lighting Designer will have maintained levels as selected by that designer.

Area	Maintained Footcandles
General Circulation	5-15
Offices	30-40
Meeting Rooms	30-40
Toilet and Locker Rooms	10-20
Mechanical and Electrical Rooms	20-30
Low Voltage System Rooms	30-40
Parking Lots (Basic Security)	0.2-0.5
Maintenance Garage Repairs	60-75
Exterior Walkways	1-3
Exterior Entrances	5-15
Loading Docks	10-20
Vehicle Wash Bay	10-20
Active Traffic Areas	10-20
Task at Work Benches	100
Bus Parking	10-20

Electrical Quality Level

1. Equipment selections will be from manufacturers whose products comply will current industry accepted design and testing standards.
2. Equipment selection, specification and installation practices will reflect a commitment to long- term longevity of system, ease of maintenance and energy efficiency.
3. The intended level of quality of all wiring devices will be specification grade.
4. The intended level of quality of all lighting fixtures will be specification grade.
5. Proposed manufacturers of major equipment will be as indicated below.

Equipment	Manufacturer(s)
Power Distribution Equipment	Square D, Eaton, Siemens, GE
Generators	Cummins, Caterpillar, Kohler, MTU
Automatic Transfer Switches	ASCO, Cummins, Kohler, MTU, Caterpillar
Wiring Devices	Hubbell, Leviton, Pass & Seymour
Fire Alarm Devices	Notifier, Siemens, Simplex

6. Spare capacities for this project will be as indicated below.

Equipment	Spare Capacity
Switchboards (1600A and larger)	10%
Panelboards (600A to 1600A)	15%
Panelboards (400A and smaller)	25%
Transformers	20%

Descriptions of Systems and Equipment

Power Distribution System

System Description

1. The power distribution system is comprised of a normal, emergency, and optional standby power systems**.** Major system components include switchboards, panelboards, transformers, generators and transfer switches.
2. Emergency systems are typically those which are required for life safety such as egress lighting and fire alarm. Optional standby systems are typically those which life safety does not depend on the performance of the system but which the Owner would like to have on back-up power.
3. Incoming normal electrical service will be 480Y/277V, 3 phase, 4 wire, 1200A. Service will originate from Utility- provided transformer and be comprised of one service lateral. The lateral will terminate in a 1200A single-ended switchboard.
4. Metering of the normal service will be achieved by Utility- provided metering equipment comprised of a meter and CT cabinet located within the main switchboard.
5. From the incoming normal service equipment in the Main Electrical Room, normal power will be distributed at 480V via conduit and wire to other electrical rooms throughout the facility. 480V power will be transformed via 480V:208Y/120V, 3 phase, 4 wire transformers for 208V within each electrical room. Maximum single 480V:208Y/12V transformer size in any electrical room shall be 150kVA. All 480V and 208V power will be distributed throughout the facility from these electrical rooms.
6. Emergency Supply system will include an emergency and optional standby branch, all served from a single emergency feeder. Emergency feeder will be 480Y/277V, 3 phase, 4 wire, 600A. Feeder will originate from new 350kW, 437.5kVA, 0.8 PF, 480Y/277V diesel generator and will terminate in a 480Y/277V, 3 phase, 4 wire single-ended fusible switchboard with separate distribution panel tubs for each emergency supply system. This single-ended switchboard will in turn serve an emergency and optional standby automatic transfer switch. Each automatic transfer switch will in turn serve a 480Y/277V, 3 phase, 4 wire panelboard or distribution panel. Emergency panelboard will be 200A and optional standby switchboard will be 600A for estimating purposes.
7. 480V emergency power for each branch of emergency power will be transformed via a 480V:208Y/120V, 3 phase, 4 wire, 30 kVA transformer for 208V within the Main Emergency Electrical Room. Each transformer will in turn serve a 208Y**/**120V, 3 phase, 4 wire panelboard. Emergency panelboard will be 125A, all 480V and 208V power will be distributed throughout the facility from this Main Emergency Electrical Room.
8. In general, lighting and appliance branch panelboards will be located in electrical rooms. Exceptions to this include panelboards such as those serving telecommunications equipment. In these cases, panelboards will be located within the respective spaces they serve.

System Design Criteria

1. Switchboards (Circuit Breaker)
    - Comparable to Square D QED style; front-connected, front-accessible; rated for 3 phase, 4 wire, 60 Hz service and listed for use as service entrance equipment (when required).
    - Enclosure will be NEMA Type 1 for indoor dry locations.
    - Main devices to be fixed, individually mounted. Branch devices to be panel mounted.

- Phase, neutral and ground buses will be hard-drawn copper, tin-plated. All busses will be uniform capacity for entire length of switchboard and shall allow for future extensions from both ends. Neutral bus will be 100% of the ampacity of the phase buses.
- Overcurrent protection will be electronic trip circuit breakers. Ground fault protection will be provided for all 480V services 1000A or greater.
- Conductor connectors will be compression type.
- All switchboards will be floor mounted on a housekeeping pad.

2. Switchboards (Fusible Type)
   - Comparable to Square D QED style; front-connected, front-accessible; rated for 3 phase, 4 wire, 60 Hz service and listed for use as service entrance equipment (when required).
   - Enclosure will be NEMA Type 1 for indoor dry locations.
   - Main devices to be fixed, individually mounted. Branch devices to be panel mounted.
   - Phase, neutral and ground buses will be hard-drawn copper, tin-plated. All busses will be uniform capacity for entire length of switchboard and shall allow for future extensions from both ends. Neutral bus will be 100% of the ampacity of the phase buses.
   - Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
   - Conductor connectors will be compression type.
   - All switchboards will be floor mounted on a housekeeping pad.
3. Panelboards
   - Comparable to Square D I-Line style; Lighting and appliance panelboards comparable to Square D NF (480V) and NQOD (480V) style; Load Centers comparable to Square D QO style; rated for 3 phase, 4 wire, 60 Hz service.
   - Enclosures will be NEMA Type 1 for indoor dry locations, NEMA Type 3R for outdoor locations, NEMA Type 4 for other wet or damp indoor locations, NEMA Type 12 for indoor locations subject to dust, falling dirt and dripping non-corrosive liquids.
   - Main devices to be fixed, individually mounted. Branch devices to be bolt-on.
   - Phase, neutral and ground buses will be hard-drawn copper, tin-plated.
   - Conductor connectors will be compression type.
   - All panelboards in public areas will be flush mounted. All panelboards in back of house areas shall be surface mounted unless subject to potential damage in which case they will be flush mounted.
4. Transformers
   - Enclosure will be ventilated, NEMA Type 2 for indoor transformers.
   - Primary shall be 480V delta connected; secondary shall be 208Y/120V wye connected; rated for 60 Hz service.
   - Transformers 15kVA and higher will comply with 10 CFR 431 (DOE 2016) efficiency levels.
   - Taps shall be provided as indicated below.

Transformer Size	Taps
15 - 24 kVA	(2) 5% taps below rated voltage
25 kVA and >	(2) 2.5% taps above and (4) 2.5% taps below rated voltage

- Insulation class will be 220-degree C, UL component recognized system with a maximum of 150-degree C rise above 40-degree C ambient temperature.
- All transformers will be capable of being floor or wall mounted. All floor mounted transformers will be mounted on a housekeeping pad. Only transformers 75 kVA or smaller will be allowed to be wall mounted.

5. Circuit Breakers
   - All circuit breakers will be provided with AL/CU listed connector lugs and will be bolt on type.
   - All circuit breakers will be fully rated for the available fault current.
   - Thermal magnetic circuit breakers will be provided with an inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits in each pole. Adjustable magnetic trip setting for circuit breaker sizes 150A and larger will be provided.
   - Adjustable, instantaneous-trip circuit breakers will be provided with a fount-mounted, field-adjustable trip setting magnetic trip element.
   - Electronic trip circuit breakers will be provided with field-replaceable rating plug, rms sensing and with the following field-adjustable settings; instantaneous trip, long- and short-time pickup levels, long- and short-time adjustments, ground-fault pickup level, time delay and I2t response.
   - GFCI circuit breakers will be provided with Class A ground-fault protection (6 mA trip) for personnel protection.
   - GFP circuit breakers will be provided with Class B ground-fault protection (30 mA trip) for equipment protection.
   - Where required to achieve systems coordination with upstream and downstream overcurrent devices, solid-state circuit breakers will be provided.
6. Fuses
   - Fuses will be nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
7. Generator
   - Generator sized for standby generation.
   - Generator will be sized to limit voltage drop to 25%.
   - Generator will be sized to support the following loads: 100% of exit sign lighting, 100% of all egress path lighting, all fire protection and fire alarm systems, all sump pumps (if provided) and all Owner yet to be determined areas of the building to provide full operation during a power outage.
   - Generator annunciator will be located in Main Emergency Electrical Room. Generator remote stop will be located at unit and in Main Emergency Electrical Room.
   - Double wall base mounted tank will be sized for 12 hours of operation at 100%, resulting in a 900-gallon tank.
   - SPD will be provided on emergency panelboard and optional standby switchboard.
   - Generator will be mounted indoor on concrete housekeeping pad.
8. Automatic Transfer Switches
   - ATS(s) comparable to ASCO 300 series.
   - ATS(s) will be 4-pole.
   - Enclosure(s) will be NEMA Type 1.
   - ATS(s) will be wall mounted or floor mounted on a concrete housekeeping pad.

9. Surge Protection Device
    - Surge suppression equipment shall be connected via a circuit breaker to allow for ease of maintenance.

Raceway and Wiring System

System Description

1. The raceway and wiring system is comprised of conduit, boxes, conductors and support equipment.

System Design Criteria

1. Conduit
    - Conduit type will be as indicated below.

Location	Conduit Type
Exterior Exposed	RGS
Exterior Concealed	RGS
Underground (outside building foundation)	PVC Sch 40 (normal)
Underground (below slab)	PVC Sch 40
Interior Dry (not exposed to physical damage)	EMT
Interior Dry (exposed to physical damage)	RGS (below switch height) EMT (above switch height)
Interior Dry (concealed)	EMT
Interior Damp/Wet	RGS (below 96" AFF) EMT (above 96" AFF)
Interior Corrosive	PVC Sch 40
Connection to Vibrating Equipment	FMC (dry) LFNC (damp/wet/corrosive)

    - Minimum conduit size shall be ¾"".
    - (1) 1" spare conduit from panelboard to above accessible ceiling will be provided for each (3) spaces or spare breakers in panelboards. All spare conduits will be provided with a pull string and will be labeled at each end with the terminus of opposite end.
    - Conduit in areas exposed to the public will be run parallel or perpendicular to structure and will be painted to match surrounding finish.
2. Boxes
    - Box type will be as indicated below.

Location	Box Type
Exterior	Ferrous Alloy
In Concrete	Ferrous alloy
Interior Dry	Galvanized steel
Interior Damp/Wet	Ferrous Alloy
Interior Corrosive	PVC

    - Minimum box size shall be 4" square.

3. Support Equipment
    - Hangers and supports will be as indicated below.

Location	Support Material
Exterior	Hot-Dip Galvanized Steel
Interior Dry	Hot-Dip Galvanized Steel
Interior Damp/Wet	Non-Metallic
Interior Corrosive	Non-Metallic

4. Conductors and Cables
    - All branch circuits will be copper. All feeders will be copper.
    - Conductor insulation shall be type THHN/THWN.
    - Conductors to first device on a branch circuit shall be No. 12 minimum.
    - Conductors shall be continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes.
    - MC Cable will not be used.
5. Feeders
    - Each raceway will contain only those conductors constituting a single feeder circuit.
    - Where multiple raceways are used for a single feeder, each raceway will contain a conductor or each phase and neutral, if used, and a grounding conductor.
    - Where feeder conductors are run in parallel, conductors will be of same length, material, size and insulation type and will be terminated in same manner.
    - Feeders will be sized for a maximum voltage drop of 2%.
6. Branch Circuits
    - Other branch circuits will be sized for maximum voltage drop of 3%.
    - All 120V and 277V branch circuits will have a dedicated neutral conductor for each circuit.
    - All current carrying conductors will be considered current carrying for derating purposes.
    - No more than three 120V or 277V circuits will be allowed in a single home run.

Grounding System

System Description

1. The grounding system is comprised of conductors, bus bars, ground rods and service grounding equipment.
2. Systems to be bonded together to common ground include but are not limited to all power distribution systems, lightning protection systems (if required), low voltage systems and building steel structural system. At no point shall multiple, independently grounded system exist.
3. Ground bus bars will be provided in all electrical and low voltage system rooms. Ground bus bars in electrical rooms will be bonded back to the main electrical ground bus bar in accordance with NEC requirements. All ground bus bars in low voltage system rooms will be bonded together with No. 4 AWG minimum back to the main electrical room ground bus bar. At no point will low voltage system ground bus bars be bonded to electrical room ground bus bars except at the main electrical room.
4. All low voltage cable tray, conduits and equipment racks will be bonded with no. 6 AWG minimum.

5. Service ground will consist of ground rods in quantity as required (minimum of three) to achieve indicated resistance to ground values.
6. Service ground will bond building steel, water piping, lighting protection system (if required), rebar and ground rods together to one common ground bus bar located in the main electrical room in accordance with NEC requirements.

System Design Criteria

1. Bus Bars will be predrilled rectangular bars of annealed copper located in main electrical and telecommunications rooms. Bars will be provided with stand-off insulators.
2. Pipe connections will be copper or copper alloy, bolted pressure type with at least two bolts; bus bar connections will be cast silicon bronze, solderless compression type, long-barrel with two bolts; all welded connections will be exothermic type.
3. Ground rods for lighting protection system (if required) and service entrance will be copper-clad steel, 3/4" diameter by 10’ long sections.

Power Utilization System

System Description

1. Power utilization system is comprised of receptacles, switches, disconnects and starters allowing for connection of equipment to the power distribution system.
2. Interior convenience receptacles will be located throughout the facility such that any point along the floor can be reached with a 25’ extension cord. Exterior convenience receptacles will be located adjacent to exterior entrances.
3. Receptacles in back-of-house service areas and mechanical/electrical spaces will be mounted a minimum of 46” AFF. All other receptacles will be mounted at 18” AFF unless specific needs require otherwise.
4. Switches shall be mounted at 48” AFF unless specific needs require otherwise.
5. Disconnects will be located directly adjacent to equipment being served unless such an installation would prove a safety hazard.
6. Generally, non-fusible switches shall be used for loads below 240V or where the fault current is below 10,000A. Generally, fusible switches shall be used for loads above 240V or where the fault current is above 10,000A.
7. For fractional horsepower loads, horsepower-rated switches will be used.
8. Controllers will be located directly adjacent to equipment being served unless such an installation would prove a safety hazard. Controllers will be located in motor control centers where large groups of equipment are located together and within plane site of the motor control center.
9. Combination controller/disconnects shall be used wherever practical.
10. Receptacles:
    - Convenience receptacles will be specification grade 125V, 20A, NEMA 5-20R configuration. All other receptacles will be specification grade of rating and configuration to match intended use.Receptacles connected to normal system will be provided in color matching surrounding finish as closely as possible.
    - Receptacles in areas not subject to physical damage will be provided with nylon covers. Receptacles in back-of-house areas subject to physical damage will be provided with stainless steel covers.

- Receptacles installed in all exterior and interior damp/wet locations will be of the GFCI type and provided with in-use weatherproof covers.

11. Switches
    - Switches will be specification grade 125V, 20A and rated for 120/277 Volts. Switches will have quiet action toggle type mechanism and silver alloy contacts for longevity.
    - Switches installed in all exterior and interior damp/wet locations shall be of the weatherproof type.
12. Disconnects
    - Enclosure shall be steel NEMA Type 1 for interior dry locations; NEMA Type 3R for exterior wet locations; NEMA Type 4X fiberglass for interior corrosive areas and NEMA 4X stainless steel for exterior corrosive areas.
    - Fusible and non-fusible switches shall be heavy duty, single throw, 240V and 600V, 1200A and smaller.
    - Fusible and non-fusible switches shall be capable of being locked in the open position.
    - Fusible and non-fusible switches shall be provided with an equipment ground kit, neutral kit, auxiliary contact kit ((2) NO/NC form "C" contacts) and compression type lugs.
13. Controllers
    - Enclosure shall be steel NEMA Type 1 for interior dry locations; NEMA Type 3R for exterior wet locations; NEMA Type 4X fiberglass for interior corrosive areas and NEMA 4X stainless steel for exterior corrosive areas.
    - Accessories (Hand-Off-Auto, LED pilot lights, auxiliary contacts, etc.) shall be provided as required.
    - Manual controllers shall be general purpose, Class A, with "quick-make, quick-break" toggle action, marked to show whether unit is "Off," "On," or "Tripped."
    - Magnetic controllers shall be Class A, full voltage, non-reversing, across the line unless noted otherwise

Lighting System

System Description

1. All light fixtures will utilize LED technology unless noted otherwise.
2. LED modules will be rated for a minimum of L70 light level. LED modules will have a minimum CRI of 85 and will generally be provide with a color temperature of 3500K (exterior) or 4000K (interior).
3. Lighting system is comprised of fixtures, controls and emergency lighting equipment. This basis of design covers support and back-of-house lighting only. All front-of-house lighting will be as selected by the lighting designer.
4. Emergency and exit/egress lighting will be provided in accordance with NFPA 101 and local codes.
5. Back-of-house lighting fixtures will be as indicated below.

Area	Fixture Type
General Circulation (unfinished areas)	Surface or pendant mounted LED strips with wire guards
General Circulation (finished areas)	Recess mounted LED lensed troffers
Offices	Recess mounted LED volumetric troffers
Meeting Rooms	Recess mounted LED volumetric troffers
Toilet and Locker Rooms	Recess mounted self-coving perimeter fixtures over toilet stalls/urinals and recess mounted LED downlights in center of toilet/locker rooms
Mechanical and Electrical Rooms	Pendant mounted LED strips with wire guards
Low Voltage System Rooms	Recess mounted LED lensed troffers
Maintenance Rooms	Pendant mounted LED high-bays.
Exit Signs	Thermoplastic LED (back of house) Edge-lit LED (front of house)
Exterior Lighting	Pole mounted / wall mounted LED fixtures.

6. Lighting control will be as indicated below.

Area	Control Type
General Circulation	Ceiling mounted occupancy/vacancy sensors
Offices	Dimming control with occupancy/vacancy sensors
Meeting Rooms	Dimming control with occupancy sensors
Toilet and Locker Rooms	Ceiling mounted occupancy sensors
Mechanical Rooms	Wall switches
Electrical Rooms	Wall switches
Low-voltage System Rooms	Wall switches
Maintenance Bays	Digital lighting control system with switch stations.
Exterior Lighting	Digital lighting control system with photocell control.
Vehicle Wash bay	Wall switches
Active Traffic Areas	Digital lighting control system with switch stations.
Task at Work Benches	Wall switches
Bus Parking	Dimming control with occupancy sensors

<u>Explanation of Operation</u>

1. Lighting Control
   - Wall switches are used in locations where an unsafe condition would exist if the lights were turned off automatically.

- Occupancy sensors are used in locations where occupancy is deemed intermittent. Occupancy sensors will turn lights off at a predetermined amount of time. Where occupancy sensing switches are used, the occupant will be given the ability to turn the lights off upon existing the room.

2. Emergency Lighting
   - Under normal conditions, lighting will be provided by the normal lighting fixtures. Upon loss of normal power, the emergency generator will start and restore power to the normal lighting fixtures.

System Design Criteria

1. Fixtures
   - Fixtures located exterior to the building and/or in unconditioned damp spaces and under cover from direct weather exposure shall be UL listed as "Suitable for Damp Locations" unless noted otherwise.
   - Fixtures located exterior to the building and/or in unconditioned wet spaces and in direct contact with the weather or in wash down areas shall be UL listed as "Suitable for Wet Locations" unless noted otherwise.
2. Digital Lighting Control
   - Digital lighting control panelboards will be comparable to a WattStopper Greengate.
   - For emergency lighting controlled by a wall switch, an ELCU (emergency shunt relay) will be provided to automatically turn emergency lighting on in the event of loss of normal power.
3. Emergency Lighting
   - Emergency lighting will be achieved through the use of normal lighting circuit's power by a generator.

Fire Alarm System

System Description

1. Fire alarm system is comprised of the fire alarm control panel, remote annunciator, detection appliances, notification appliances and connections to ancillary systems as required.
2. Per NFPA 101 and IBC 2012 requirements, the fire alarm system will be a digital, addressable non-voice evacuation system. Fire alarm control panel will be located in the main electrical room. Remote annunciator will be coordinate with AHJ.
3. Fire alarm detection and notification appliances will be designed to meet the requirements of NFPA 72.
4. Fire alarm emergency power will be achieved through connection to the generator.
5. Initiating devices will include manual pull stations, smoke detectors, duct smoke detectors, heat detectors, flow switches and tamper switches.
6. Notification devices will include visual, audio and combination devices. Notification devices shall be red (if wall mounted) and white if ceiling mounted.
7. Ancillary equipment will include connections to HVAC digital control system.

Explanation of Operation

1. Upon alarm, fire alarm system will alarm to an offsite central monitoring station via a DACT.

System Design Criteria

1. Fire Alarm Control Panel
   - FACP and FAA locations noted above will be coordinated with Owner and local fire department to ensure compliance. FAA location to be at main point of fire department entrance into the building.

2. Detection Appliances
    - All appliance locations will be coordinated with NFPA 72 and local building codes.
    - Heat detectors will be used in areas of high humidity, dirty/dusty environments and outside.
    - Flow and tamper switches will be coordinated with the sprinkler system.
    - Duct detectors will be coordinated with the mechanical system.
3. Notification Appliances
    - All appliance locations will be coordinated with NFPA 72 and local building codes.
    - No visual devices will be provided within stairwells.

Lightning Protection System (if required)

System Description

1. The lightning protection system is comprised of lightning terminal devices, conductors and ground rods.
2. A Franklin rod system will be used if required.
3. System will be designed and installed in accordance with NFPA 780 and will carry a UL Master Label.

Explanation of Operation

1. System is a passive system. In the event of a lighting strike, the electrical energy will be sent to the ground and dissipated through the lightning protection grounding system.

System Design Criteria

1. System will be designed in accordance with NFPA 780.

C. Special Considerations

Please note that the items listed below are based on general knowledge of the area and noted items on the existing drawings. Actual investigative services have not been provided as part of this contract.

Hazardous Materials

Asbestos-containing materials were identified on the 1979 addition drawings, and are assumed to still be in place, although possibly encapsulated. Due to the vintage of the additions and the original Gisholt building, it is likely that lead-based paint is present. Most of the building has multiple layers of paint and may have been painted over (encapsulated) since that time, but will likely still register at levels above regulated limits when tested.

A complete hazardous materials investigation should be performed at the beginning of any project design to identify current asbestos-containing materials, lead-based paint, and other known hazards in the existing facility to be incorporated into the work.

Soil Contamination

Much of downtown Madison's Isthmus is contaminated with soils containing fly ash, due to its prior uses and the MG&E coal plant nearby. A higher groundwater level is also a challenge to working on the Isthmus. It is highly recommended that soil borings be taken to determine soil content, weight capacities, foundation recommendations, and ground water levels before any project takes place. Soils disturbed during these construction activities must remain on site, or it is recommended to utilize a unit price bidding structure for contaminated soil disposal and replacement. Groundwater generated from construction dewatering activities will also require documented procedures with the City of Madison.

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Madison Metro Transit Building Master Plan Report

MEAD & HUNT COST ESTIMATE

MARCH 9, 2018

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MASTER PLAN

OPINION OF PROBABLE CONSTRUCTION COST

Madison Metro Transit Facility Study
Madison, WI
17001729-00

9 MARCH 2018

Submitted to:

Madison Metro Transit

Prepared by:

MEAD & HUNT, INC.
2440 DEMING WAY
MIDDLETON, WI 53562
(608)-273-6380
M & H Project Number: 4503500-170148.01

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MASTER PLAN

COST ESTIMATE EXECUTIVE SUMMARY

SUBMITTAL STAGE:	MASTER PLAN
LOCATION:	Madison, WI
PROJECT NUMBER:	17001729-00
TITLE:	Madison Metro Transit Facility Study

Existing Option		
	Dispatch & Support	$3,180,456
	Bus Maintenance	$9,477,125
	Service Line	$1,954,514
	Bus Storage & Circulation	$16,537,923
Total		$31,150,019
Remodeling Option 1		
	Dispatch & Support	$6,714,863
	Bus Maintenance	$10,726,759
	Service Line	$2,549,593
	Bus Storage & Circulation	$15,876,995
Total		$35,868,209
Remodeling Option 2		
	Dispatch & Support	$6,714,863
	Bus Maintenance	$9,331,652
	Service Line	$2,549,593
	Bus Storage & Circulation	$15,448,751
Total		$34,044,857
EQUIPMENT REPLACEMENT		$3,450,143
FF&E		$469,890

* Construction contingency, permits, procurement costs, fees, and other additional costs are not included unless sp
listed under SEPARATE CONTRACT COSTS.

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MASTER PLAN

OPINION OF PROBABLE CONSTRUCTION COST

Madison Metro Transit Facility Study
Madison, WI
17001729-00

9 MARCH 2018

EXISTING OPTION

Submitted to:

Madison Metro Transit

Prepared by:

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(608)-273-6380
M & H Project Number: 4503500-170148.01

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OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY EXISTING OPTION - DISPATCH & SUPPORT - 16,180 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.4%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$1.72	$1.72	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Cut & Patch Existing Floor	---	$1.72	$1.72	1.9%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$9.25	$9.25	11.9%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.3%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Existing to Remain/Patching	s.f.	$1.82	$1.82	13.9%
1020	Interior doors	Hollow Metal ETR - Painting	s.f.	N/A	$0.62	
1030	Fittings	Lockers, Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	ETR	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/40%glazed coating/10% C.T.	s.f.	$5.64	$5.64	
3020	Floor finishes	Rubber Flooring/Carpet/C.T.	s.f.	$5.86	$5.86	
3030	Ceiling finishes	Acoustic tile, paint 20% of Area	s.f.	$1.63	$1.63	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	One hydraulic passenger elevator	each	$65,600.00	$4.05	3.4%
	D20 Plumbing					
2010	Plumbing fixtures	Kitchen, toilet and service fixtures, supply and drainage	s.f.	$5.41	$5.41	11.0%
2020	Domestic water distribution	Gas-fired water heater	---	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	N/A	---	$0.00	$0.00	
2035	demolition	N/A	s.f.	$1.00	$1.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	24.2%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Unit with DOAS	---	$10.00	$10.00	
3050	Terminal & package units	VAV system	s.f.	$5.00	$5.00	
3055	Permiter Radiation	Hot Water Perimeter Radiation	s.f.	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$1.50	$1.50	
3090	Controls	DDC Controls	s.f.	$5.00	$5.00	
3095	Commissioning	Major Equipment	s.f.	$2.50	$2.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$2.75	$2.75	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	4.8%
	D50 Electrical					
5010	Electrical service/distribution	Service, panel boards and feeders	s.f.	$4.38	$4.38	20.7%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$7.57	$7.57	
5030	Branch Devices & Mech Conn	Branch Devices & Mech Conn	s.f.	$2.30	$2.30	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.50	$0.50	
5090	Fire Alarm	Fire detection & alarm	s.f.	$2.00	$2.00	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/Paging	s.f.	$4.75	$4.75	
5030	Security	Cameras, Card Access	s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment	N/A	---	$0.00	$0.00	2.8%
1020	Institutional equipment	N/A	---	$0.00	$0.00	
1030	Vehicular equipment	N/A	---	$0.00	$0.00	
1090	Other equipment	Kitchen equipment, cabinets, countertops, furniture	s.f.	$2.88	$2.88	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.47	$0.47	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	0.8%
1040	Special facilities	N/A	s.f.	$0.00	$0.00	
	Demolition of structures	N/A	---	$1.00	$1.00	
G. BUILDING SITEWORK						
	Site preparation	N/A	s.f.	$0.00	$0.00	0.0%
	Utility services	N/A	s.f.	$0.00	$0.00	
	Paving	N/A	s.f.	$0.00	$0.00	
	Landscaping	N/A	s.f.	$0.00	$0.00	
	Amenities	N/A	s.f.	$0.00	$0.00	
				SUB-TOTAL	$120.96	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$36.29	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$39.31	
				TOTAL BUILDING COST	**$197**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$3,180,456**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY EXISTING OPTION - BUS MAINTENANCE - 55,228 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	9.3%
1030	Slab on grade	6" + 9" reinforced replacement	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.5%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$9.25	$9.25	13.7%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.8%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Existing to Remain/Patching	s.f.	$1.82	$1.82	8.7%
1020	Interior doors	Hollow Metal ETR - Painting	s.f.	N/A	$0.62	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$4.21	$4.21	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	2.5%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	35.7%
3020	Heat generating systems	New Hot Water Boilers and Pumps. Included in 3030	s.f.	$14.00	$14.00	
3030	Cooling generating systems	Make-Up Air Units	s.f.	$16.00	$16.00	
3040	Exhaust Systems	Specialty Exhaust Fans	s.f.	$1.25	$1.25	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$3.00	$3.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.50	$0.50	
3090	Controls	DDC Controls	s.f.	$1.75	$1.75	
3095	Commissioning	Major Equipment	s.f.	$0.50	$0.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$0.75	$0.75	
	D40 Fire protection					
4010	Sprinklers	Reconfigure Existing System	s.f.	$1.75	$1.75	1.7%
	D50 Electrical					
5010	Electrical Distribution	Panelboards and feeders	s.f.	$3.41	$3.41	23.8%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Generator, Distribution Panel, Transfer Sw. and Feeder	s.f.	$1.35	$1.35	
5090	Fire Alarm	Fire detection & alarm	s.f.	$3.25	$3.25	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/Paging	s.f.	$4.75	$4.75	
5030	Security	Cameras, Card Access	s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.3%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment	cabinets, countertops	s.f.	$0.25	$0.25	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	0.0%
1040	Special facilities	Hazmat Abatement	s.f.	$0.00	$0.00	
	Demolition	Demolition of interior components	s.f.	$0.00	$0.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.0%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.00	$0.00	
				SUB-TOTAL	$105.60	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$31.68	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$34.32	
				TOTAL BUILDING COST	**$172**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$9,477,125**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY EXISTING OPTION - SERVICE LINE - 11,665 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	9.6%
1030	Slab on grade	6" + 9" reinforced replacement	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.5%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$13.49	$13.49	15.6%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows		s.f.	$0.00	$0.00	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.9%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	CMU Enclosure	s.f.	$6.82	$6.82	17.3%
1020	Interior doors	Hollow Metal ETR - Painting	s.f.	N/A	$0.00	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$4.21	$4.21	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Waterproof Coating at Structure	s.f.	$4.21	$4.21	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	2.2%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.38	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	28.6%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$15.00	$15.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$5.00	$5.00	
3055	Permiter Radiation	Door Air Curtains	---	$2.00	$2.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$1.25	$1.25	
3090	Controls	DDC Controls	---	$3.00	$3.00	
3095	Commissioning	Major Equipment	---	$1.75	$1.75	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$1.50	$1.50	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$1.75	$1.75	1.7%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$1.50	$1.50	19.7%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Panel, Feeder and devices	s.f.	$2.00	$2.00	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.50	$0.50	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.75	$0.75	
	D50 Technology Systems					
5030	Communications	Voice/Data/Paging	s.f.	$4.75	$4.75	
5030	Security	Cameras, Card Access	s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.1%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment		L.S.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	0.7%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Removal of equipment	---	$0.75	$0.75	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.2%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.16	$0.16	
				SUB-TOTAL	$103.11	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$30.93	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$33.51	
				TOTAL BUILDING COST	**$168**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$1,954,514**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY EXISTING OPTION - BUS STORAGE/CIRCULATION - 194,184 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.4%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$0.75	$0.75	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Steel Grate Mezzanine	s.f.	$1.42	$1.42	4.7%
1020	Roof construction	Modify Interior Sawtooth Roof Structure	s.f.	$1.04	$1.04	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$3.75	$3.75	13.2%
2015	Exterior Masonry Repair	Gisholt Repointing and Repair	s.f.	$1.20	$1.20	
2020	Exterior windows	Insulated Sandwich Panels	s.f.	$1.43	$1.43	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$0.55	$0.55	
	B30 Roofing					
3010	Roof coverings	Ballast Roof at Interior Removed Sawtooth	s.f.	$1.75	$1.75	6.9%
3020	Roof openings	Metal Panel enclosure of Sawtooth	s.f.	$1.87	$1.87	
C. INTERIORS						
1010	Partitions	Existing to Remain/Patching	s.f.	$0.91	$0.91	10.1%
1020	Interior doors	N/A	s.f.	N/A	$0.00	
1030	Fittings	Accessories	s.f.	$1.13	$1.13	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$2.11	$2.11	
3020	Floor finishes	Sealed Concrete	s.f.	$1.15	$1.15	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	each	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	3.5%
2020	Domestic water distribution		s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	N/A	---	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	s.f.	$0.00	$0.00	24.1%
3020	Heat generating systems	Included in 3030	s.f.	$0.00	$0.00	
3030	Cooling generating systems	Make-Up Air Units	s.f.	$10.00	$10.00	
3040	Exhaust Systems	Specialty Exhaust Fans	s.f.	$0.37	$0.37	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$0.75	$0.75	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.20	$0.20	
3090	Controls	DDC Controls	s.f.	$0.75	$0.75	
3095	Commissioning	Major Equipment	s.f.	$0.25	$0.25	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$0.30	$0.30	
	D40 Fire protection					
4010	Sprinklers	Replace Heads Only	s.f.	$0.25	$0.25	0.5%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$0.75	$1.35	30.9%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$2.05	$3.75	
5030	Branch Devices & Mech Cor	Branch Devices & Mech Conn	s.f.	$0.75	$1.33	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.16	$0.32	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.98	$1.93	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.37	$0.75	
	D50 Technology Systems					
5030	Communications	Voice/Data/Paging	s.f.	$4.75	$4.75	
5030	Security	Cameras, Card Access	s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	0.2%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.11	$0.11	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	2.9%
1040	Special facilities	Hazmat Abatement	s.f.	$1.00	$1.00	
	Demolition of structures	Demolition of sawtooth roof	s.f.	$0.50	$0.50	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.2%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.08	$0.08	
				SUB-TOTAL	$52.41	98.6%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$15.72	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$17.03	
				TOTAL BUILDING COST	**$85**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$16,537,923**	

MASTER PLAN

OPINION OF PROBABLE CONSTRUCTION COST

Madison Metro Transit Facility Study
Madison, WI
17001729-00

9 MARCH 2018

REMODELING OPTION 1

Submitted to:

Madison Metro Transit

Prepared by:

MEAD & HUNT, INC.
2440 DEMING WAY
MIDDLETON, WI 53562
(608)-273-6380
M & H Project Number: 4503500-170148.01

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OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 - DISPATCH & SUPPORT - 30,698 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.3%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$1.72	$1.72	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Cut & Patch Existing Floor	---	$1.72	$1.72	1.7%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$9.25	$9.25	10.7%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.0%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Concrete block, gypsum on metal stud (10sf/lf part)	s.f.	$6.82	$6.82	16.9%
1020	Interior doors	Hollow metal, metal frames	each	$1,168.00	$1.52	
1030	Fittings	Lockers, Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	ETR	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/40%glazed coating/10% C.T.	s.f.	$5.64	$5.64	
3020	Floor finishes	Rubber Flooring/Carpet/C.T.	s.f.	$5.86	$5.86	
3030	Ceiling finishes	Acoustic tile, paint 20% of Area	s.f.	$1.63	$1.63	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	One hydraulic passenger elevator	each	$65,600.00	$2.14	1.6%
	D20 Plumbing					
2010	Plumbing fixtures	Kitchen, toilet and service fixtures, supply and drainage	s.f.	$5.41	$5.41	9.9%
2020	Domestic water distribution	N/A	---	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	N/A	---	$0.00	$0.00	
2035	demolition	N/A	s.f.	$1.00	$1.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	21.7%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Unit with DOAS	---	$10.00	$10.00	
3050	Terminal & package units	VAV system	---	$5.00	$5.00	
3055	Permiter Radiation	Hot Water Perimeter Radiation	---	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$1.50	$1.50	
3090	Controls	DDC Controls	---	$5.00	$5.00	
3095	Commissioning	Major Equipment	s.f.	$2.50	$2.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Control	s.f.	$2.75	$2.75	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	4.3%
	D50 Electrical					
5010	Electrical service/distribution	Service, panel boards and feeders	s.f.	$4.38	$4.38	18.6%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$7.57	$7.57	
5030	Branch Devices & Mech Cor	Branch Devices & Mech Conn	s.f.	$2.30	$2.30	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.50	$0.50	
5090	Fire Alarm	Fire detection & alarm	s.f.	$2.00	$2.00	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment	N/A	---	$0.00	$0.00	2.5%
1020	Institutional equipment	N/A	---	$0.00	$0.00	
1030	Vehicular equipment	N/A	---	$0.00	$0.00	
1090	Other equipment	Kitchen equipment, cabinets, countertops, furniture	s.f.	$2.88	$2.88	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.47	$0.47	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	4.5%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$6.00	$6.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.16	$0.16	3.5%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	General Site upgrades	s.f.	$1.23	$1.23	
	Amenities	Outdoor Courtyard/Break Areas	s.f.	$3.27	$3.27	
				SUB-TOTAL	$134.61	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$40.38	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$43.75	
				TOTAL BUILDING COST	**$219**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$6,714,863**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 - BUS MAINTENANCE - 58,122 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	8.7%
1030	Slab on grade	9" reinforced concrete	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.5%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$9.25	$9.25	12.7%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.5%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Concrete block, gypsum on metal stud (10sf/lf part)	s.f.		$0.00	6.5%
1020	Interior doors	Hollow metal, metal frames	each	$1,168.00	$0.60	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$4.21	$4.21	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	2.3%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	35.6%
3020	Heat generating systems	New Hot Water Boilers and Pumps. Included in 3030	s.f.	$14.00	$14.00	
3030	Cooling generating systems	Make-Up Air Units	s.f.	$16.00	$16.00	
3040	Exhaust Systems	Specialty Exhaust Fans	s.f.	$1.40	$1.40	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$3.00	$3.00	
3055	Underfloor Radiation	Radiant Infloor Heating	---	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.50	$0.50	
3090	Controls	DDC Controls	s.f.	$1.75	$1.75	
3095	Commissioning	Major Equipment	s.f.	$0.50	$0.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$0.75	$0.75	
	D40 Fire protection					
4010	Sprinklers	Reconfigure Existing System	s.f.	$1.75	$1.75	1.5%
	D50 Electrical					
5010	Electrical Distribution	Panelboards and feeders	s.f.	$3.41	$3.41	22.1%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Generator, Distribution Panel, Transfer Sw. and Feeder	s.f.	$1.35	$1.35	
5090	Fire Alarm	Fire detection & alarm	s.f.	$3.25	$3.25	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.3%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment	cabinets, countertops	s.f.	$0.25	$0.25	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	6.2%
1040	Special facilities	Hazmat Abatement	s.f.	$0.00	$0.00	
	Demolition	Demolition of interior components	---	$7.00	$7.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.1%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.16	$0.16	
				SUB-TOTAL	$113.57	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$34.07	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$36.91	
				TOTAL BUILDING COST	**$185**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$10,726,759**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 - SERVICE LINE - 10,000 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	Strip and spread ftgs., foundation walls	s.f.	$5.13	$5.13	9.5%
1030	Slab on grade	6" + 9" reinforced replacement	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	2.1%
1020	Roof construction	Metal deck, open web steel joists	s.f.	$3.22	$3.22	
	B20 Exterior enclosure					
2010	Exterior walls	New CMU Rain Screen Walls w/ Metal Panel	s.f.	$26.89	$26.89	25.1%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	N/A	s.f.	$0.00	$0.00	
2030	Exterior doors	Rapid Coiling overhead, FRP	s.f.	$12.45	$12.45	
	B30 Roofing					
3010	Roof coverings	Ballasted Roof	s.f.	$5.63	$5.63	6.1%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	CMU Infill at Bus Storage Wall	s.f.	$6.82	$6.82	8.6%
1020	Interior doors	Hollow Metal / FRP	each	$1,568.00	$1.57	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	Paint	s.f.	$2.56	$2.56	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$5.41	$5.41	7.8%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.00	$0.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	18.8%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$15.00	$15.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$5.00	$5.00	
3055	Permiter Radiation	Door Air Curtains	---	$2.00	$2.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$1.25	$1.25	
3090	Controls	DDC Controls	---	$3.00	$3.00	
3095	Commissioning	Major Equipment	---	$1.75	$1.75	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Contro	s.f.	$1.50	$1.50	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	3.7%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$1.50	$1.50	13.0%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Panel, Feeder and devices	s.f.	$2.00	$2.00	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.50	$0.50	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.75	$0.75	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.1%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment		L.S.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	1.3%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$2.00	$2.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$4.05	$4.05	4.0%
	Utility services	Water, sanitary, storm	s.f.	$0.86	$0.86	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.94	$0.94	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.40	$0.40	
				SUB-TOTAL	$156.90	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$47.07	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$50.99	
				TOTAL BUILDING COST	**$255**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$2,549,593**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 - BUS STORAGE/CIRCULATION - 188,437 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.4%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$0.75	$0.75	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Steel Grate Mezzanine	s.f.	$1.42	$1.42	4.7%
1020	Roof construction	Modify Interior Sawtooth Roof Structure	s.f.	$1.04	$1.04	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$3.75	$3.75	13.4%
2015	Exterior Masonry Repair	Gisholt Repointing and Repair	s.f.	$1.20	$1.20	
2020	Exterior windows	Insulated Sandwich Panels	s.f.	$1.43	$1.43	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$0.55	$0.55	
	B30 Roofing					
3010	Roof coverings	Ballast Roof at Interior Removed Sawtooth	s.f.	$1.75	$1.75	7.0%
3020	Roof openings	Metal Panel enclosure of Sawtooth	s.f.	$1.87	$1.87	
C. INTERIORS						
1010	Partitions	Existing to Remain/Patching	s.f.		$0.00	8.5%
1020	Interior doors	N/A	s.f.	N/A	$0.00	
1030	Fittings	Accessories	s.f.	$1.13	$1.13	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$2.11	$2.11	
3020	Floor finishes	Sealed Concrete	s.f.	$1.15	$1.15	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	each	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	3.6%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	N/A	---	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	24.3%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$10.00	$10.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$0.37	$0.37	
3055	Permiter Radiation	Door Air Curtains	---	$0.75	$0.75	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$0.20	$0.20	
3090	Controls	DDC Controls	---	$0.75	$0.75	
3095	Commissioning	Major Equipment	---	$0.25	$0.25	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Control	s.f.	$0.30	$0.30	
	D40 Fire protection					
4010	Sprinklers	Replace Existing Heads Only	s.f.	$0.25	$0.25	0.5%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$0.75	$1.35	31.9%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$2.05	$4.10	
5030	Branch Devices & Mech Cor	Branch Devices & Mech Conn	s.f.	$0.75	$1.33	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.16	$0.32	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.98	$1.93	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.37	$0.75	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	0.2%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.11	$0.11	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	2.9%
1040	Special facilities	Hazmat Abatement	s.f.	$1.00	$1.00	
	Demolition of structures	Demolition of sawtooth roof	s.f.	$0.50	$0.50	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.2%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.08	$0.08	
				SUB-TOTAL	$51.85	98.6%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$15.56	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$16.85	
				TOTAL BUILDING COST	**$84**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$15,876,995**	

MASTER PLAN

OPINION OF PROBABLE CONSTRUCTION COST

Madison Metro Transit Facility Study
Madison, WI
17001729-00

9 MARCH 2018

REMODELING OPTION 2

Submitted to:

Madison Metro Transit

Prepared by:

MEAD & HUNT, INC.
2440 DEMING WAY
MIDDLETON, WI 53562
(608)-273-6380
M & H Project Number: 4503500-170148.01

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OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 2 - DISPATCH & SUPPORT - 30,698 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.3%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$1.72	$1.72	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Cut & Patch Existing Floor	---	$1.72	$1.72	1.7%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$9.25	$9.25	10.7%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.0%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Concrete block, gypsum on metal stud (10sf/lf part)	s.f.	$6.82	$6.82	16.9%
1020	Interior doors	Hollow metal, metal frames	each	$1,168.00	$1.52	
1030	Fittings	Lockers, Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	ETR	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/40%glazed coating/10% C.T.	s.f.	$5.64	$5.64	
3020	Floor finishes	Rubber Flooring/Carpet/C.T.	s.f.	$5.86	$5.86	
3030	Ceiling finishes	Acoustic tile, paint 20% of Area	s.f.	$1.63	$1.63	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	One hydraulic passenger elevator	each	$65,600.00	$2.14	1.6%
	D20 Plumbing					
2010	Plumbing fixtures	Kitchen, toilet and service fixtures, supply and drainag	s.f.	$5.41	$5.41	9.9%
2020	Domestic water distribution	N/A	---	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	N/A	---	$0.00	$0.00	
2035	demolition	N/A	s.f.	$1.00	$1.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	21.7%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Unit with DOAS	---	$10.00	$10.00	
3050	Terminal & package units	VAV system	s.f.	$5.00	$5.00	
3055	Permiter Radiation	Hot Water Perimeter Radiation	s.f.	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$1.50	$1.50	
3090	Controls	DDC Controls	s.f.	$5.00	$5.00	
3095	Commissioning	Major Equipment	s.f.	$2.50	$2.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Contro	s.f.	$2.75	$2.75	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	4.3%
	D50 Electrical					
5010	Electrical service/distributior	Service, panel boards and feeders	s.f.	$4.38	$4.38	18.6%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$7.57	$7.57	
5030	Branch Devices & Mech Co	Branch Devices & Mech Conn	s.f.	$2.30	$2.30	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.50	$0.50	
5090	Fire Alarm	Fire detection & alarm	s.f.	$2.00	$2.00	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security	Advantor	s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	2.5%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment	Kitchen equipment, cabinets, countertops, furniture	s.f.	$2.88	$2.88	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.47	$0.47	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	4.5%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$6.00	$6.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.16	$0.16	3.5%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	General Site upgrades	s.f.	$1.23	$1.23	
	Amenities	Outdoor Courtyard/Break Areas	s.f.	$3.27	$3.27	
				SUB-TOTAL	$134.61	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$40.38	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$43.75	
				TOTAL BUILDING COST	**$219**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$6,714,863**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 2 - BUS MAINTENANCE - 45,792 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	7.9%
1030	Slab on grade	6" + 9" reinforced replacement	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.4%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$9.25	$9.25	11.5%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.2%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Concrete block, gypsum on metal stud (10sf/lf part)	s.f.	$6.82	$6.82	11.4%
1020	Interior doors	Hollow metal, metal frames	each	$1,168.00	$0.77	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$4.21	$4.21	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	2.1%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	32.1%
3020	Heat generating systems	New Hot Water Boilers and Pumps. Included in 3030	s.f.	$14.00	$14.00	
3030	Cooling generating systems	Make-Up Air Units	s.f.	$16.00	$16.00	
3040	Exhaust Systems	Specialty Exhaust Fans	s.f.	$1.25	$1.25	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$3.00	$3.00	
3055	Underfloor Radiation	Radiant Infloor Heating	---	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.50	$0.50	
3090	Controls	DDC Controls	s.f.	$1.75	$1.75	
3095	Commissioning	Major Equipment	s.f.	$0.50	$0.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$0.75	$0.75	
	D40 Fire protection					
4010	Sprinklers	Reconfigure existing system	s.f.	$1.75	$1.75	1.4%
	D50 Electrical					
5010	Electrical Distribution	Panelboards and feeders	s.f.	$3.41	$3.41	20.0%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Generator, Distribution Panel, Transfer Sw. and Feeder	s.f.	$1.35	$1.35	
5090	Fire Alarm	Fire detection & alarm	s.f.	$3.25	$3.25	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.3%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment	cabinets, countertops	s.f.	$0.25	$0.25	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	9.6%
1040	Special facilities	Hazmat Abatement	s.f.	$0.00	$0.00	
	Demolition	Demolition of interior components	s.f.	$12.00	$12.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.1%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.16	$0.16	
				SUB-TOTAL	$125.41	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$37.62	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$40.76	
				TOTAL BUILDING COST	**$204**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$9,331,652**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 2 - SERVICE LINE - 10,000 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	Strip and spread ftgs., foundation walls	s.f.	$5.13	$5.13	9.5%
1030	Slab on grade	9" reinforced concrete	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	2.1%
1020	Roof construction	Metal deck, open web steel joists	s.f.	$3.22	$3.22	
	B20 Exterior enclosure					
2010	Exterior walls	New CMU Rain Screen Walls w/ Metal Panel	s.f.	$26.89	$26.89	25.1%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	N/A	s.f.	$0.00	$0.00	
2030	Exterior doors	Rapid Coiling overhead, FRP	s.f.	$12.45	$12.45	
	B30 Roofing					
3010	Roof coverings	Ballasted Roof	s.f.	$5.63	$5.63	6.1%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	CMU Infill at Bus Storage Wall	s.f.	$6.82	$6.82	8.6%
1020	Interior doors	Hollow Metal/FRP	s.f.	$1,568.00	$1.57	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	Paint	s.f.	$2.56	$2.56	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$5.41	$5.41	7.8%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.00	$0.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	18.8%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$15.00	$15.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$5.00	$5.00	
3055	Permiter Radiation	Door Air Curtains	---	$2.00	$2.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$1.25	$1.25	
3090	Controls	DDC Controls	---	$3.00	$3.00	
3095	Commissioning	Major Equipment	---	$1.75	$1.75	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Contro	s.f.	$1.50	$1.50	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	3.7%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$1.50	$1.50	13.0%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Panel, Feeder and devices	s.f.	$2.00	$2.00	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.50	$0.50	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.75	$0.75	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security	Advantor	s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.1%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment		L.S.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	1.3%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$2.00	$2.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$4.05	$4.05	4.0%
	Utility services	Water, sanitary, storm	s.f.	$0.86	$0.86	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.94	$0.94	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.40	$0.40	
				SUB-TOTAL	$156.90	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$47.07	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$50.99	
				TOTAL BUILDING COST	**$255**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$2,549,593**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 2 - BUS STORAGE/CIRCULATION - 199,432 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.6%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$0.75	$0.75	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Steel Grate Mezzanine	---	$1.42	$1.42	5.2%
1020	Roof construction	Modify Interior Sawtooth Roof Structure	s.f.	$1.04	$1.04	
	B20 Exterior enclosure					
2010	Exterior walls	Replace Metal Panels/Add Insulation/Brick Cleaning	s.f.	$3.75	$3.75	14.5%
2015		Gisholt Repointing and Repair	s.f.	$1.20	$1.20	
2020	Exterior windows	Insulated Sandwich Panels	s.f.	$1.43	$1.43	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$0.55	$0.55	
	B30 Roofing					
3010	Roof coverings	Ballast Roof at Interior Removed Sawtooth	s.f.	$1.75	$1.75	7.6%
3020	Roof openings	Metal Panel enclosure of Sawtooth	s.f.	$1.87	$1.87	
C. INTERIORS						
1010	Partitions	Existing to Remain/Patching	s.f.	$0.91	$0.91	11.1%
1020	Interior doors	N/A	s.f.	N/A	$0.00	
1030	Fittings	Accessories	s.f.	$1.13	$1.13	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$2.11	$2.11	
3020	Floor finishes	Sealed Concrete	s.f.	$1.15	$1.15	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	each	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.48	$0.48	4.7%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	N/A	s.f.	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.38	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	s.f.	$0.00	$0.00	26.5%
3020	Heat generating systems	Included in 3030	s.f.	$0.00	$0.00	
3030	Cooling generating systems	Make-Up Air Units	s.f.	$10.00	$10.00	
3040	Exhaust Systems	Specialty Exhaust Fans	s.f.	$0.37	$0.37	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$0.75	$0.75	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.20	$0.20	
3090	Controls	DDC Controls	s.f.	$0.75	$0.75	
3095	Commissioning	Major Equipment	s.f.	$0.25	$0.25	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$0.30	$0.30	
	D40 Fire protection					
4010	Sprinklers	Replace Existing Heads Only	s.f.	$0.25	$0.25	0.5%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$0.75	$0.75	24.8%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$2.05	$2.05	
5030	Branch Devices & Mech Cor	Branch Devices & Mech Conn	s.f.	$0.75	$0.75	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.16	$0.16	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.98	$0.98	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.37	$0.37	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	0.2%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.11	$0.11	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	3.1%
1040	Special facilities	Hazmat Abatement	s.f.	$1.00	$1.00	
	Demolition of structures	Demolition of sawtooth roof	s.f.	$0.50	$0.50	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.2%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.08	$0.08	
				SUB-TOTAL	$47.67	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$14.30	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$15.49	
				TOTAL BUILDING COST	**$77**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$15,448,751**	

Madison Metro Transit Building Master Plan Report

MIDDLETON CONSTRUCTION ESTIMATE

MARCH 9, 2018

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Middleton Construction Consulting

6009 Cottontail Trail.
Madison, WI 53718
608.960.9444 P

www.middleton-cc.com

Mead and Hunt Inc.
City of Madison
Transit Maintenance

Madison, WI

January 2, 2018

Based upon
Madison, WI Wage Rates

Prepared For:
Mead and Hunt Inc

6501 Watts Road
Madison, WI 53719

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NOTES REGARDING PREPARATION OF ESTIMATE

This estimate was prepared based on the following documents provided by Mead and Hunt Inc.

1. Estimate is based upon drawings received from Mead and Hunt on 10/15/17

2. Information regarding the project was also obtained via meetings, phone conversations and email messages that clarified the project scope.

BIDDING PROCESS - MARKET CONDITIONS

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other work not covered in the drawings or specifications, as stated within this document. Unit rates have been obtained from historical records and/or discussion with contractors. The unit rates reflect current bid costs in the area. All unit rates relevant to subcontractor work include the subcontractors overhead and profit unless otherwise stated.

Pricing reflects probable construction costs obtainable in the Madison, WI area on the bid date. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors with a minimum of 3 bidders for all items of subcontracted work and a with a minimum of 3 bidders for a general contractor. Experience indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.

Since Middleton Consulting has no control over the cost of labor, material, equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions at the time of bid, this statement of probable construction cost is based on industry practice, professional experience and qualifications, and represents Middleton Consulting's best judgment as professional construction cost consultants familiar with the construction industry. However, Middleton Consulting cannot and does not guarantee that the proposals, bids, or the construction cost will not vary from opinions of probable cost prepared by them.

ASSUMED CONSTRUCTION PARAMETERS

The pricing is based on the following project parameters:

1. A construction start date of Summer 2018
2. Construction Costs have been adjusted to anticipated start dates.
3. The contract will be competitively bid to multiple general contractors.
4. All contractors will be required to pay prevailing wages.
5. The general contractors will have full access to the site during normal working hours
6. Estimate includes pricing as of December 2017.
7. Asbestos and Environmental abatement is not included.
8. Sitework and roadwork not shown on the civil plans

EXCLUSIONS

The following are excluded from the cost of this estimate:

1. Professional Design Fees
2. Testing Fees
3. Owner Contingencies/Scope Changes
4. Premium Time / Restrictions on Contractor Working Hours
5. Finance and Legal Charges
6. Environmental Abatement Costs
7. Contaminated Soil Removal
8. Lead and Radio Frequency Shielding
9. Temporary Facilities
10. Loose Furniture
11. Equipment (Owner Furnished/Installed)
12. Artwork
14. Phased Work

	COST SUMMARY-BASE BUILDING	266,533 GSF	$/SF	BUILDING TOTAL
01000	TEMPORARY REQUIREMENTS		$0.00	$0
02000	EXISTING CONDITIONS-SITE PREPARATION		$3.11	$829,981
03000	CONCRETE & PRECAST		$1.99	$529,779
04000	MASONRY		$1.59	$424,823
05000	METALS		$7.35	$1,958,822
06000	WOODS, PLASTICS & COMPOSITES		$0.02	$5,600
07000	THERMAL & MOISTURE PROTECTION SYSTEM		$18.59	$4,954,086
08000	OPENINGS		$3.06	$814,569
09000	FINISHES		$31.73	$8,457,493
10000	SPECIALTIES		$0.00	$800
11000	EQUIPMENT-GARAGE		$0.00	$0
12000	FURNISHINGS		$0.00	$0
13000	SPECIAL CONSTRUCTION		$0.00	$0
14000	CONVEYING EQUIPMENT		$0.00	$0
21000	FIRE SUPPRESSION-ALTERNATE		$3.18	$848,584
22000	PLUMBING		$8.41	$2,241,601
23000	HEATING, VENTILATING & AIR CONDITIONING		$22.96	$6,118,411
26000	ELECTRICAL		$20.04	$5,341,812
27000	COMMUNICATIONS		$2.29	$609,615
28000	ELECTRONIC SAFETY AND SECURITY		$3.11	$827,995
31000	EARTHWORK		$0.73	$195,352
32000	EXTERIOR IMPROVEMENTS		$0.33	$87,703
33000	UTILITIES		$0.20	$53,123
	SUBTOTAL		**$128.69**	**$34,300,149**
	GENERAL CONDITIONS/BOND/INSURANCE	6.0%	$7.72	$2,058,009
	CONTRACTOR'S FEES	4.0%	$5.46	$1,454,326
	DESIGN CONTINGENCY	5.0%	$7.09	$1,890,624
	ESCALATION TO 2018 BID	3.0%	$4.47	$1,191,093
	TOTAL ESTIMATED BID		**$153.43**	**$40,894,202**
	EQUIPMENT ALLOWANCE		$12.94	$3,450,143
	FF& E ALLOWANCE		$1.76	$469,890
	TOTAL ESTIMATED CONSTRUCTION COSTS		**$168.14**	**$44,814,235**

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
EXISTING CONDITIONS				
02000 EXISTING CONDITIONS				
Remove metal siding	61,962	SQFT	1.28	79,181
Remove Sawtooth Roof System	79,500	SQFT	6.91	549,448
Remove windows or Translucent Panels	9,317	SQFT	5.11	47,622
Remove reinforced SOG for radiant heating & Equipment	55,800	SQFT	2.76	153,729
TOTAL: EXISTING CONDITIONS				**$829,981**
TOTAL: EXISTING CONDITIONS				**$829,981**
CONCRETE				
03000 CONCRETE				
Formwork for strip footings- 3' wide x 1.5' tall	1,440	SQFT	6.59	9,490
Formwork for strip footings- Interior Footings 2' x 1'	2,370	SQFT	6.59	15,618
Reinforcement in strip footings, avg 100 lbs/cy	4	TONS	2,309.95	9,240
Concrete in strip footings, 4,000 psi	80	CUYD	158.33	12,667
Concrete slab on grade, 8" thk @ Service	10,000	SQFT	5.93	59,302
Concrete slab on grade, 8" thk, @ heated Slab	55,850	SQFT	5.93	331,202
Vapor barrier at slab	65,850	SQFT	0.97	63,782
Control Joints	10,400	LNFT	1.51	15,714
Isolation Joints	1,920	LNFT	1.45	2,782
PC hollow core plank @ buildouts for Service area	700	SQFT	14.26	9,982
Vehicle Equipment Allowance- Moved to Below the Construction Budget	1	LSUM	0.00	0
TOTAL: CONCRETE				**$529,779**
TOTAL: CONCRETE				**$529,779**
MASONRY				
04000 MASONRY				
8" CMU backup	11,520	SQFT	14.70	169,309
8" CMU partition @ interior buildout	1,616	SQFT	13.72	22,176
Clean Brick/Stone Facade	28,710	SQFT	3.10	89,067
Tuckpoint Brick/Stone-Allowance	28,710	SQFT	5.03	144,271
TOTAL: MASONRY				**$424,823**
TOTAL: MASONRY				**$424,823**
METALS				
05000 METALS				
Infill roof System at Sawtooth Removal to create flat roof	79,500	SQFT	10.68	848,663
Structural steel system for roof	10,000	SQFT	9.64	96,372
Metal roof deck, galvanized, 1-1/2" thk, 18 ga	10,000	SQFT	2.18	21,816
Metal roof deck, galvanized, At roof Infill	79,500	SQFT	3.51	279,252
Miscellaneous angles, channels, lintels, etc.	10,000	SQFT	1.32	13,246
Bollards at OH doors (4) per	8	EACH	605.76	4,846

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Steel railing system, painted @ mezzanine	118	LNFT	114.22	13,478
Steel Mezzanine	23,100	SQFT	29.49	681,150
TOTAL: METALS				**$1,958,822**
TOTAL: METALS				**$1,958,822**
WOODS, PLASTICS & COMPOSITES				
06000 WOODS, PLASTICS & COMPOSITES				
Miscellaneous wood blocking & rough carpentry	10,000	SQFT	0.56	5,600
TOTAL: WOODS, PLASTICS & COMPOSITES				**$5,600**
TOTAL: WOODS, PLASTICS & COMPOSITES				**$5,600**
THERMAL & MOISTURE PROTECTION				
07000 THERMAL & MOISTURE PROTECTION				
Remove roof and insul @ 1982 Roof	69,100	SQFT	2.45	169,122
Spray on Air Barrier	70,242	SQFT	3.46	242,806
Spray Foam insulation @ rain screen	70,242	SQFT	3.10	217,729
Metal Panel Replacement	61,962	SQFT	34.80	2,156,488
Rain Screen Metal Panels	8,280	SQFT	34.80	288,174
EPDM roofing including insulation @ 1982 Roof Replacement	69,100	SQFT	12.62	872,339
EPDM roofing including insulation @ Sawtooth Roof Replacement	79,500	SQFT	12.62	1,003,632
Miscellaneous caulking & sealants	10,000	SQFT	0.38	3,796
TOTAL: THERMAL & MOISTURE PROTECTION				**$4,954,086**
TOTAL: THERMAL & MOISTURE PROTECTION				**$4,954,086**
OPENINGS				
08000 OPENINGS				
Aluminum frame-Double Exterior	1	EACH	724.73	725
Aluminum frame-Single Exterior	4	EACH	574.73	2,299
FRP Door	6	EACH	696.22	4,177
Replace exsiting OH Doors	4	EACH	19,367.00	77,468
Elect operated OH door @ exterior	2	EACH	27,012.57	54,025
Transluscent Panel or glass replacement	9,317	SQFT	48.00	447,214
Solar Tubes at Existing Roof	210	EA	1,073.80	225,498
Hardware set, single	4	EACH	507.94	2,032
Hardware set, double	1	EACH	1,130.78	1,131
TOTAL: OPENINGS				**$814,569**
TOTAL: OPENINGS				**$814,569**
FINISHES				
09000 FINISHES				
Build-out of Office Space-Including Locker Rooms-Option 2	30,698	SQFT	110.00	3,376,780
Build-out of Maintenance Area	58,122	SQFT	65.00	3,777,930

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Patching of Former Service Lane	11,665	SQFT	5.00	58,325
Build-out/Painting of Bus Parking and Staging Area	188,437	SQFT	5.00	942,185
Concrete sealer	200,102	SQFT	1.08	215,110
Epoxy flooring- 3 part	10,000	SQFT	5.61	56,133
Rhino Lining Wall Finish at Wash Bays to 24'-00"	3,120	SQFT	5.01	15,616
Paint O.H. Doors	2	EACH	560.66	1,121
Prime & paint cmu walls, by sprayer, 3 coats	11,520	SQFT	0.93	10,710
Misc Painting	1	LS	3,582.83	3,583
TOTAL: FINISHES				**$8,457,493**
TOTAL: FINISHES				**$8,457,493**

SPECIALTIES

10000 SPECIALTIES

Interior signage -Allowance	1	LS	800.00	800
TOTAL: SPECIALTIES				**$800**
TOTAL: SPECIALTIES				**$800**

EQUIPMENT

11000 EQUIPMENT

2 Post vehicle Lift- 50,000LB	17	EA	0.00	0
Vehicle Equipment	3	LSUM	0.00	0
3 Post vehicle Lift- 75,000LB	1	EA	0.00	0
6" Exhaust Reel Roll-Ups	23	EA	0.00	0
7 Product Reel Banks	13	EA	0.00	0
Air/Electric Drops	23	EA	0.00	0
Waste Oil Pumps	8	EA	0.00	0
Air Compressor- 100HP	1	EA	0.00	0
Heavy Duty Steel Work Benches	23	EA	0.00	0
(2) Lane Fuel System	1	EA	0.00	0
Vacuum Sytem Two Station	1	EA	0.00	0
Lane Jet Wash with Underbody Chassis System	2	EA	0.00	0
16 x 24 Spray Booth	1	EA	0.00	0
Fare Vaulting Stations and (2) Bins	2	EA	0.00	0
Fume Extractor	1	EA	0.00	0
Misc Equipment/Contingency	1	EA	0.00	0
Equipment- TBD- Contingency	1	EA	0.00	0
TOTAL: EQUIPMENT				**$0**
TOTAL: EQUIPMENT				**$0**

FIRE SUPPRESSION

21000 FIRE SUPPRESSION

Wet sprinkler system - $/SF	265,257	SQFT	3.20	848,584
TOTAL: FIRE SUPPRESSION				**$848,584**

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
TOTAL: FIRE SUPPRESSION				**$848,584**
PLUMBING				
22000 PLUMBING				
Remove Plumbing Fixtures and Piping	276,922	SQFT	0.79	219,184
Water closet, wall hung, battery-op flush valve	10	EACH	2,268.79	22,688
Lavatory, manual faucet	10	EACH	2,419.92	24,199
Urinal, wall hung, battery-op automatic flush valve	5	EACH	2,196.39	10,982
Electric water cooler, ADA-bilevel	2	EACH	4,665.13	9,330
Shower- Assemblies	5	EACH	1,715.90	8,580
Mop basin, floor fixture	2	EACH	2,046.58	4,093
Emergency shower/eyewash combination fixture	10	EACH	1,341.34	13,413
Wall hydrant, nonfreeze	34	EACH	522.65	17,770
Domestic water heater, gas-fired, 300 mbh	2	EACH	5,486.73	10,973
Domestic water heater, electric, 50 gal., 36 kW for Wash Racks	2	EACH	4,691.50	9,383
High Pressure Water Heating system	1	EACH	4,845.75	4,846
Water Softener System	1	EACH	9,383.00	9,383
Expansion tank	1	EACH	381.34	381
Plumbing Supply Piping in building	30,698	SQFT	5.23	160,514
Plumbing Supply Piping in building	58,122	SQFT	3.75	217,946
Plumbing Supply Piping in building	188,102	SQFT	1.10	206,912
Sanitary/ Waste Piping in Building	276,922	SQFT	3.50	970,224
Storm Piping in Building	98,820	SQFT	1.62	160,543
Storm Piping in Building	178,102	SQFT	0.90	160,256
TOTAL: PLUMBING				**$2,241,601**
TOTAL: PLUMBING				**$2,241,601**
HEATING VENTILATION & AIR CONDITIONING				
23000 HEATING VENTILATION & AIR CONDITIONING				
Remove HVAC Equipment and Ductwork	276,922	SQFT	0.71	197,722
MAU's-20,000 CFM	4	EA	30,000.00	120,000
MAU's	2	LS	60,000.00	120,000
MAU's-18,000 CFM	3	EA	35,000.00	105,000
Rooftop unit, packaged (based on 12,000 CFM)	1	EACH	44,757.45	44,757
Energy recovery unit (based on 10,000 cfm - POA)	1	EACH	130,757.45	130,757
AC split system & Piping	2	EACH	11,598.41	23,197
AC split system @ telecommunications Room	1	EACH	11,598.41	11,598
Exhaust 60,000CFM	1	EACH	93,000.00	93,000
Exhaust 197,000 CFM	1	EACH	275,000.00	275,000
Exhaust 45,000CFM	1	EACH	64,140.00	64,140
Exhaust 591,000CFM	1	EACH	827,400.00	827,400
S. Steel duct, rectangular	20,000	LBS	14.32	286,452
S. Steel duct, rectangular	89,300	LBS	14.32	1,279,008
Duct insulation @ supply	31,500	SQFT	5.44	171,499
Registers, grilles and diffusers	3	LS	1,500.00	4,500

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Registers, grilles and diffusers	1	LS	4,000.00	4,000
Registers, grilles and diffusers	1	LS	6,000.00	6,000
Large Circulation Fans	33	EACH	16,959.58	559,666
Louvers- Actuators	1	LS	20,000.00	20,000
HW boilers, for heating system	2	EACH	80,000.00	160,000
Radiant flooring-Zones, Manifolds Valves etc.	30	EA	3,500.00	105,000
Radiant flooring	55,800	SQFT	5.00	279,000
Hot Water Pumps	4	EACH	19,181.37	76,725
Packaged Door Air Curtains	4	EACH	11,575.16	46,301
DDC Controls	276,922	SQFT	4.00	1,107,688
TOTAL: HEATING VENTILATION & AIR CONDITIONING				**$6,118,411**
TOTAL: HEATING VENTILATION & AIR CONDITIONING				**$6,118,411**
ELECTRICAL				
26000 ELECTRICAL				
Disconnect and remove associated conduit and wiring	198,437	SQFT	0.60	119,062
Disconnect and remove associated conduit and wiring	30,698	SQFT	0.82	25,215
Disconnect and remove associated conduit and wiring	58,122	SQFT	0.73	42,441
Lightning protection system per code	266,533	SQFT	1.33	354,116
Electrical	88,820	SQFT	23.00	2,042,860
Electrical	188,437	SQFT	14.00	2,638,118
Electrical	10,000	SQFT	12.00	120,000
TOTAL: ELECTRICAL				**$5,341,812**
TOTAL: ELECTRICAL				**$5,341,812**
COMMUNICATIONS				
27000 COMMUNICATIONS				
Telecommunication/Data & Television System, complete	58,122	SQFT	4.25	247,024
Telecommunication/Data & Television System, complete	30,698	SQFT	4.25	130,466
Telecommunication/Data & Television System, complete	188,437	SQFT	1.20	226,124
Telecommunication/Data & Television System, complete	10,000	SQFT	0.60	6,000
TOTAL: COMMUNICATIONS				**$609,615**
TOTAL: COMMUNICATIONS				**$609,615**
ELECTRONIC SAFETY & SECURITY				
28000 ELECTRONIC SAFETY & SECURITY				
Fire alarm System, complete	30,698	SQFT	2.10	64,469
Fire alarm System, complete	256,559	SQFT	1.65	423,348
Intrusion Detection System, Complete	10,000	SQFT	0.90	8,998
Intrusion Detection System, Complete	188,437	SQFT	0.90	169,556
Intrusion Detection System, Complete	58,122	SQFT	1.25	72,647
Intrusion Detection System, Complete	30,698	SQFT	2.90	88,978
TOTAL: ELECTRONIC SAFETY & SECURITY				**$827,995**

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
TOTAL: ELECTRONIC SAFETY & SECURITY				**$827,995**
EARTHWORK				
31000 EARTHWORK				
Underpinning at Service Lane addition	1	LS	15,000.00	15,000
Saw cut concrete paving, 6" thk @ service lane	480	LNFT	7.05	3,385
Fine grading @ SOG Removal for radiant Heating	55,850	SQFT	0.49	27,177
Excavate for SOG	370	CUYD	3.70	1,368
Excavate for foundations	444	CUYD	10.56	4,689
Excavate stone base for radiant heating	1,034	CUYD	10.56	10,920
Backfill with inported Material	814	CUYD	7.65	6,230
6" Base Course at SOG	185	CUYD	32.64	6,039
Backfill with sand	1,034	CUYD	20.10	20,787
Haul off excavated material as CCDD	1,034	CUYD	33.83	34,982
Haul off excavated material from Foundations	814	CUYD	29.86	24,303
Contaminated Soils- Cut,Haul, and Replace	400	CUYD	101.18	40,474
TOTAL: EARTHWORK				**$195,352**
TOTAL: EARTHWORK				**$195,352**
EXTERIOR IMPROVEMENTS				
32000 EXTERIOR IMPROVEMENTS				
Recycled base, 4" thk at concrete walk	19	CUYD	19.59	372
Concrete walk, 5" PC concrete -Patch	1,500	SQFT	4.89	7,331
Landscaping/Site work allowance	1	LSUM	80,000.00	80,000
TOTAL: EXTERIOR IMPROVEMENTS				**$87,703**
TOTAL: EXTERIOR IMPROVEMENTS				**$87,703**
UTILITIES				
33000 UTILITIES				
Line flushing, cleaning, and testing	2	LSUM	1,533.38	3,067
Replace Existing Storm Systems On site	1	LS	30,055.90	30,056
Replace Existing Sanitary on Site	1	LS	20,000.00	20,000
TOTAL: UTILITIES				**$53,123**
TOTAL: UTILITIES				**$53,123**

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Madison Metro Transit Building

Phasing & Capital Budgets

Report prepared for

City of Madison – Metro Transit

Madison, Wisconsin

Report prepared by

Mead & Hunt

www.meadhunt.com

KUENY ARCHITECTS, LLC

DESTREE architecture & design

M&H project. # 4503500-170148.01

March 9, 2018

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A. Phasing Strategy

As the key stakeholders and the design team began a strategy for phasing, many factors needed to be considered to bring all of the projects together in a concise plan for the projects over time. A series of prime considerations were developed to guide timelines and priorities. These considerations were then cross-evaluated with the staff and key stakeholders' top priorities of indoor air quality, safety, and toilet room renovations. The categories for evaluation were:

- The critical paths for system failure and life safety.
- Operational efficiencies.
- The need for ongoing operations through the duration of construction and its effects.

General goals for desired construction start, timelines for construction, and overall budget package amounts were then established through discussions with the stakeholders. The flat roof replacement project is already underway in 2018. The first construction project is desired to start in 2019, with subsequent annual projects over the next five years. Remodeling Option 1 rising as the preferred option by all key stakeholders is the only option considered for phasing.

B. Prime Considerations

Critical Paths for System Failure and Life Safety

With no major alterations to the current building in the last forty years, the deferred maintenance of the facility and systems are coming to a head. Many of the systems are past their useful life, or are already experiencing failures.

The main points of consideration ranked by the stakeholder's priorities are as follows:

1. The HVAC system is already revealing signs of failure including noticeably bad indoor air quality. The Mechanical engineers foresee the system will be in total failure in the next 5-7 years.
2. The fire alarm and fire protection upgrades throughout the entire facility are a key factor in life safety, and will have major effects on renovation costs.
3. Low light levels throughout the maintenance and storage areas are a challenge to safety in the facility. Adding Egress Lighting is viewed as a key factor for renovation.
4. Flooding from storm water overflows and general plumbing issues are a continued challenge to the operations of the facility and should be considered a key priority.
5. The buildings preventative maintenance for the exterior envelope, plumbing, and electrical distribution are past their useful life and require capital expenditure to function as a modern building.

Operational Efficiencies

With no major alterations in the last 40 years, Metro Transit has been working with a facility designed for the operation of 140 buses. With the current bus load of 223, they have continued operations by fitting and

filling the space, rather than having the space fit for their operations. A primary goal of the study was to develop options to make the facility more effective and efficient for Metro Transit Staff.

The spaces for renovation below are ranked by the ability to realize significant efficiencies and paybacks:

1. The service lane addition provides many benefits. The primary payback is through its removal from the center of the building, which provides a major reduction of pollution through the building. It also helps with the new circulation paths through the building allowing for left-hand turns.
2. The maintenance department probably suffers the most from building layout inefficiencies with service and storage areas at the far ends of the building. The reconfiguration of these bays and the potential to add service bays, could increase production as much as 20%
3. The driver dispatch and support areas are also in substandard condition and generally create undue stress upon the drivers and their support staff. Providing an enhanced environment with even moderate amenities are proven factors in reducing stress and promoting better driving habits.
4. The storage area renovations will considerably increase the safety of the facility.

Critical Operation Considerations through Construction

The Metro Transit Facility is a 24 hour, 7 days a week operation, the buses must be on their routes every day. The Metro Transit calendar year is effectively divided into two primary periods within a year: the school year, when the bus fleet is nearly triple that of general operations; and then summer when mechanics are in a heavy push to address bus fleet maintenance in preparation for the school year.

Construction activities for bus service and storage would ideally be during the summer when buses could be parked outside or stored at alternative facilities. The Maintenance area renovations will need to be sequenced in such a way to allow for continuous operations. Ultimately, the construction phasing for any area renovation must not impede the work flow and staging necessary to deliver the buses to their routes.

The main points of consideration as ranked by the stakeholder's priorities are as follows:

1. The daily servicing and cleaning of the bus fleet cannot be disrupted. The service lane addition can be constructed independent of the rest of the building, allowing for the uninterrupted serving and cleaning of the bus fleet.
2. Disruption of scheduled maintenance of the bus fleet cannot be long term. The need to address temporary facilities or construction sequencing options to maintain short-term and long-term fleet maintenance will require careful consideration.
3. Bus driver staging for shift check-in/check-out, along with support for the drivers on a split shift, could take place in trailers in the parking lot. However, they are location sensitive, requiring close proximity to the bus storage. Ideally the disruption to this area would take place during the summer when driver shifts are less.
4. Toilet room renovations have some critical points to overall building operations. With four of the five pairs in the driver dispatch and support areas, their construction sequencing will be sensitive to that areas renovation priorities as well. Multi-stall toilet trailers are a solution to lessen the construction effect to operations.

5. Staging and storage of buses will need to be carefully considered when renovations take place in the storage stall areas. It is advised for the City to consider alternative locations to store buses. Construction timelines should also consider an expeditious schedule in the summer months due to decreased bus service and decreased effect on the buses themselves.

C. Phasing Projects and Timeline

To address the considerations outlined in the design planning meetings, and reinforced by staff interviews, the stakeholders cross-evaluated the projects with their values for increased air quality and safety and staff operational support upgrades. The priorities for construction projects are as follows:

1. 2019 - New Service Lane addition and remodeling. By providing for a new service lane(s) as a building addition, it allows for the continued use of the existing lanes until the new lanes are operational. This eliminates any downtime or suspension of service activities for daily bus maintenance and cleaning. The resultant reclamation of the area of the old service lane provides extra area for bus maintenance and starts the separation for internal zoning of Mechanical ventilation systems. This construction project is estimated to require 9 months.
2. 2020 - New mechanical/electrical distribution system upgrades to support the existing maintenance areas and bus storage areas, exclusive of the administrative support area. This upgrade would also include the creation of physical separations between work area activities, such as maintenance and the administration and bus storage. This separation provides for distinct areas that can support individual area ventilation requirements and vastly improve air quality within the existing building. This construction project is estimated to require 12 months.
3. 2021 - Remodeling of the existing Maintenance, Driver Dispatch, and support areas. This construction phase would reconfigure the existing Maintenance bays and provide for new equipment to support the Maintenance Department along with the remodeling of the existing Driver Dispatch and support area and building life safety systems upgrades. This construction activity would have to be supported by temporary relocation of Maintenance, Driver Dispatch, and support areas to other facilities or temporary on-site facilities. Thus, the sequencing of this construction activity is more critical to maintaining Metro Transit Operations. This construction project is estimated to require 18 months.
4. 2022 - On-going Building Maintenance is for the restoration of the existing building envelope, such as metal wall panel replacement and masonry tuckpointing and possible “Gisholt” clerestory roof replacement in the bus storage area. This also would provide for miscellaneous mechanical and electrical system upgrades not addressed in previous projects. This construction project is estimated to require 12 months.

D. Capital Budget Summary

The project budgets presented are considered total project costs, including soft costs for A/E Fees, permitting costs, temporary facilities, inflation, and construction contingencies. See attached project summary sheets and construction detail estimates.

Year	Phase		Design	Construction	Equipment
2018	1	Design: Service Line/Body Shop	$458,878		
2019	1	Service Line/Body Shop Construction		$4,681,269	
	1	Service Line/Body Shop Equipment			$1,260,173
	2	Design: HVAC Bus Maint. & Storage	$711,144		
2020	2	HVAC Bus Maintenance & Storage		$7,227,288	
	3	Design: Bus Maint., Dispatch/Support, Bus Storage	$2,438,010		
2021	3	Bus Maintenance, Dispatch/Support, & Bus Storage Renovations		$24,755,843	
	3	Renovation Equipment & Furniture			$2,738,260
	4	Design: Ongoing Maintenance	$977,083		
2022	4	Ongoing Maintenance		$9,911,304	
TOTAL			**$4,126,238**	**$46,575,705**	**$3,998,434**

Madison Metro Transit Building Master Plan Report

PHASING DRAWINGS

MARCH 9, 2018

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PHASING TIMELINE

2018 Roof Replacement of 1982 Addition

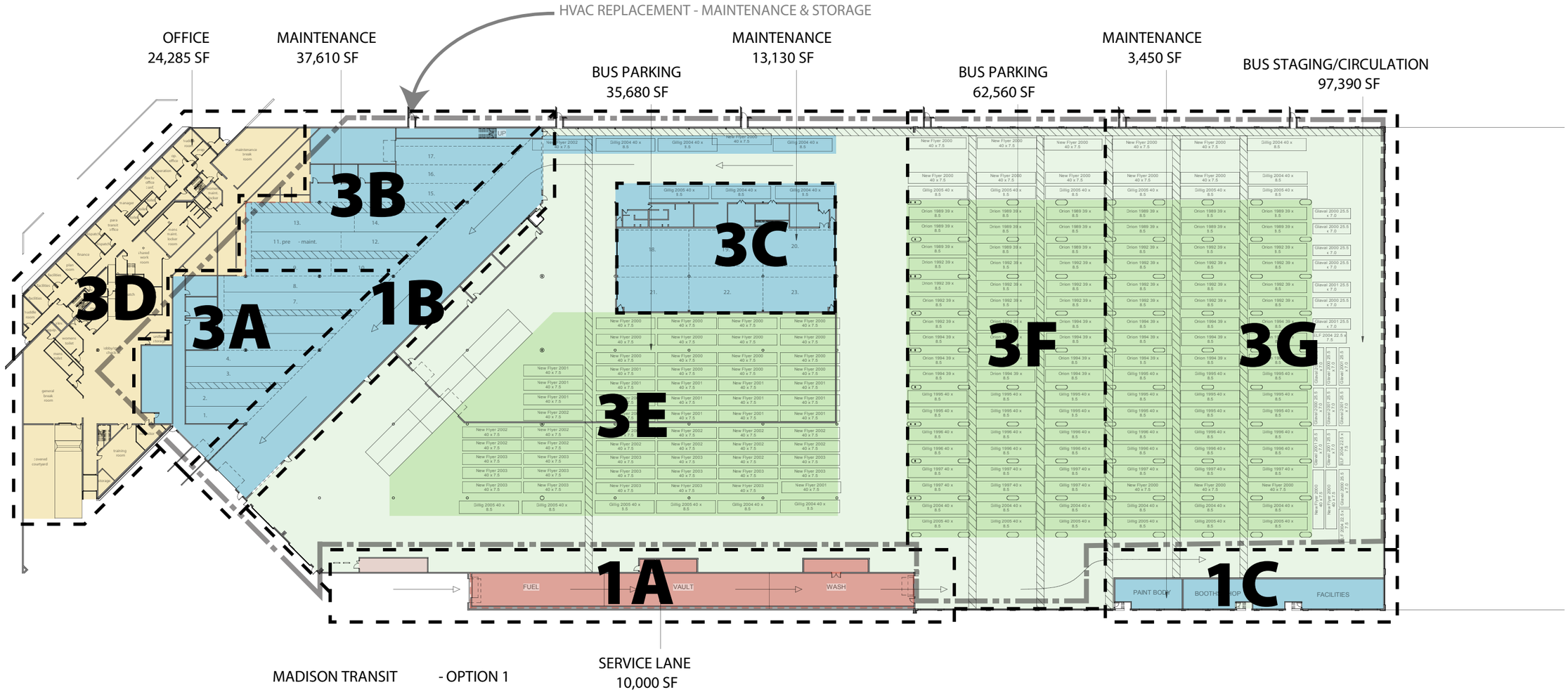
phase 1 | 2019 - Service Lane/ Workshop/ Body Shop
- Maintenance Equipment For Electric Buses
- Fire Detection System Replacement
- Other? (Storm Drains)
- Partial Photovolatic Installation

phase 2 | 2020 HVAC (Whole Building except Administration)

phase 3 | 2021 - Maintenance/ Administration (Admin. HVAC)/ Interior Renovations
- Maintenance Equipment
- Administration Furnishings
- Electrical Service Distribution
- Final Photovoltaic Installation

phase 4 | 2022 Ongoing Maintenance
- Boilers
- Brick Tuck pointing
- Exterior Metal Panels
- Add Wall Insulation
- Landscape Previsions
- Gisholt Roof

MADISON TRANSIT COLOR LEGEND	AREA
Office/Support	24,295 SF
Bus parking arking	98,240 SF
Maintenance enance	54,190 SF
Service lane ce lane	10,000 SF
Bus staging/circulation	97,390 SF



MADISON TRANSIT - OPTION 1

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CONSTRUCTION PHASING TOPICS

INDOOR AIR QUALITY + SAFETY + TOILETS = VALUES

CRITICAL PATHS + SYSTEM FAILURE + LIFE SAFETY

1. HVAC (5-7 YEAR)
2. FIRE ALARM/FIRE PROTECTION
3. EGRESS LIGHTING
4. REPLACE SANITARY/ STORM PIPING
5. DEFERED MAINTENANCE IN GENERAL
   - PLUMBING
   - ELECTRICAL DISTRIBUTION

OPERATIONAL EFFICIENCIES

1. SERVICE LANE
2. MAINTENANCE
3. ADMIN. AREA
4. STORAGE

ONGOING OPERATIONS

THROUGH CONSTRUCTION

1. **SERVICE LANE**
   CRITICAL
   NO "OTHER" PLACE
2. **MAINTENANCE**
   50/50 SPLIT
   REASONABLE
3. **DRIVER DISPATCH**
   TRAILERS?
4. **TOILETS**
   TRAILERS?
5. **STORAGE**
   FLEET + OUTDOOR

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Madison Metro Transit Building Master Plan Report

TOTAL PROJECT ESTIMATE SUMMARIES

MARCH 9, 2018

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PHASE 1 – 2019

Service Line/Body Shop Construction

PROJECT ESTIMATE SUMMARY

	CONSTRUCTION	EQUIPMENT
CONSTRUCTION SUB-TOTAL w/ INFLATION APPLIED	$4,248,871	
CONSTRUCTION CONTINGENCY (8%)	$339,910	
PERMITTING	$42,489	
TEMPORARY FACILITIES	$50,000	
EQUIPMENT SUB-TOTAL w/ INFLATION APPLIED		$1,235,464
INTERIOR/EQUIPMENT VENDOR FEES (2%)		$24,709
Construction Subtotal	$4,681,269	
A/E FEES (10%)	$458,878	
TOTAL	**$5,140,147**	**$1,260,173**

PHASE 2 – 2020

HVAC Bus Maintenance & Storage

PROJECT ESTIMATE SUMMARY

	CONSTRUCTION	EQUIPMENT
CONSTRUCTION SUB-TOTAL w/ INFLATION APPLIED	$6,584,668	
CONSTRUCTION CONTINGENCY (8%)	$526,773	
PERMITTING	$65,847	
TEMPORARY FACILITIES	$50,000	
EQUIPMENT SUB-TOTAL w/ INFLATION APPLIED		$0
INTERIOR/EQUIPMENT VENDOR FEES (2%)		$0
Construction Subtotal	$7,227,288	
A/E FEES (10%)	$711,144	
TOTAL	**$7,938,432**	**$0**

PHASE 3 – 2021

Bus Maintenance, Dispatch/Support, & Bus Storage Renovations

PROJECT ESTIMATE SUMMARY

	CONSTRUCTION	EQUIPMENT
CONSTRUCTION SUB-TOTAL w/ INFLATION APPLIED	$22,574,168	
CONSTRUCTION CONTINGENCY (8%)	$1,805,933	
PERMITTING	$225,742	
TEMPORARY FACILITIES	$150,000	
EQUIPMENT SUB-TOTAL w/ INFLATION APPLIED		$2,684,569
INTERIOR/EQUIPMENT VENDOR FEES (2%)		$53,691
CONSTRUCTION SUB-TOTAL	$24,755,843	
A/E FEES (10%)	$2,438,010	
TOTAL	**$27,193,853**	**$2,738,260**

PHASE 4 – 2022

Ongoing Maintenance

PROJECT ESTIMATE SUMMARY

	CONSTRUCTION	EQUIPMENT
CONSTRUCTION SUB-TOTAL w/ INFLATION APPLIED	$9,047,068	
CONSTRUCTION CONTINGENCY (8%)	$723,765	
PERMITTING	$90,471	
TEMPORARY FACILITIES	$50,000	
EQUIPMENT SUB-TOTAL w/ INFLATION APPLIED		$0
INTERIOR/EQUIPMENT VENDOR FEES (2%)		$0
CONSTRUCTION SUB-TOTAL	$9,911,304	
A/E FEES (10%)	$977,083	
TOTAL	**$10,888,387**	**$0**

Madison Metro Transit Building Master Plan Report

MIDDLETON PHASED CONSTRUCTION ESTIMATE DETAIL

MARCH 9, 2018

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Middleton Construction Consulting

6009 Cottontail Trail.
Madison, WI 53718
608.960.9444 P

www.middleton-cc.com

City of Madison
Transit Maintenance
Multi- Phased Option

Madison, WI

January 2, 2018

Based upon
Madison, WI Wage Rates

Prepared For:
Mead and Hunt Inc

6501 Watts Road
Madison, WI 53719

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NOTES REGARDING PREPARATION OF ESTIMATE

This estimate was prepared based on the following documents provided by Mead and Hunt Inc.

1. Estimate is based upon drawings received from Mead and Hunt on 10/15/17

2. Information regarding the project was also obtained via meetings, phone conversations and email messages that clarified the project scope.

BIDDING PROCESS - MARKET CONDITIONS

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other work not covered in the drawings or specifications, as stated within this document. Unit rates have been obtained from historical records and/or discussion with contractors. The unit rates reflect current bid costs in the area. All unit rates relevant to subcontractor work include the subcontractors overhead and profit unless otherwise stated.

Pricing reflects probable construction costs obtainable in the Madison, WI area on the bid date. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors with a minimum of 3 bidders for all items of subcontracted work and a with a minimum of 3 bidders for a general contractor. Experience indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.

Since Middleton Consulting has no control over the cost of labor, material, equipment, or over the contractor's method of determining prices, or over the competitive bidding or market conditions at the time of bid, this statement of probable construction cost is based on industry practice, professional experience and qualifications, and represents Middleton Consulting's best judgment as professional construction cost consultants familiar with the construction industry. However, Middleton Consulting cannot and does not guarantee that the proposals, bids, or the construction cost will not vary from opinions of probable cost prepared by them.

ASSUMED CONSTRUCTION PARAMETERS

The pricing is based on the following project parameters:

1. A construction start date of Summer 2018
2. Construction Costs have been adjusted to anticipated start dates.
3. The contract will be competitively bid to multiple general contractors.
4. All contractors will be required to pay prevailing wages.
5. The general contractors will have full access to the site during normal working hours
6. Estimate includes pricing as of December 2017.
7. Asbestos and Environmental abatement is not included.
8. Sitework and roadwork not shown on the civil plans

EXCLUSIONS

The following are excluded from the cost of this estimate:

1. Professional Design Fees
2. Testing Fees
3. Owner Contingencies/Scope Changes
4. Premium Time / Restrictions on Contractor Working Hours
5. Finance and Legal Charges
6. Environmental Abatement Costs
7. Contaminated Soil Removal
8. Lead and Radio Frequency Shielding
9. Temporary Facilities
10. Loose Furniture
11. Equipment (Owner Furnished/Installed)
12. Artwork
14. Phased Work

Description	Totals
Phase 0- 1982 Roof Replacement	$1,223,595
Phase 1	$4,248,871
Phase 2	$6,584,668
Phase 3	$22,574,168
Phase 4	$9,047,068
Total for all options	**$43,678,370**
Service Line Equipment	$1,235,464
Garage Equipment	$2,214,679
FFE Allowance for Phase 3	$469,890
Total for all options	**$47,598,403**

	COST SUMMARY-PHASE 0	69,100 GSF	$/SF	BUILDING TOTAL
01000	TEMPORARY REQUIREMENTS		$0.00	$0
02000	EXISTING CONDITIONS-SITE PREPARATION		$0.00	$0
03000	CONCRETE & PRECAST		$0.00	$0
04000	MASONRY		$0.00	$0
05000	METALS		$0.00	$0
06000	WOODS, PLASTICS & COMPOSITES		$0.00	$0
07000	THERMAL & MOISTURE PROTECTION SYSTEM		$15.07	$1,041,461
08000	OPENINGS		$0.00	$0
09000	FINISHES		$0.00	$0
10000	SPECIALTIES		$0.00	$0
11000	EQUIPMENT-GARAGE		$0.00	$0
12000	FURNISHINGS		$0.00	$0
13000	SPECIAL CONSTRUCTION		$0.00	$0
14000	CONVEYING EQUIPMENT		$0.00	$0
21000	FIRE SUPPRESSION-ALTERNATE		$0.00	$0
22000	PLUMBING		$0.00	$0
23000	HEATING, VENTILATING & AIR CONDITIONING		$0.00	$0
26000	ELECTRICAL		$0.00	$0
27000	COMMUNICATIONS		$0.00	$0
28000	ELECTRONIC SAFETY AND SECURITY		$0.00	$0
31000	EARTHWORK		$0.00	$0
32000	EXTERIOR IMPROVEMENTS		$0.00	$0
33000	UTILITIES		$0.00	$0
	SUBTOTAL		**$15.07**	**$1,041,461**
	GENERAL CONDITIONS/BOND/INSURANCE	6.0%	$0.90	$62,488
	CONTRACTOR'S FEES	4.0%	$0.64	$44,158
	DESIGN CONTINGENCY	5.0%	$0.83	$57,405
	ESCALATION TO 2018 BID	1.5%	$0.26	$18,083
	TOTAL ESTIMATED BID		**$17.71**	**$1,223,595**
	TOTAL ESTIMATED CONSTRUCTION COSTS		**$17.71**	**$1,223,595**

	COST SUMMARY-PHASE 1	10,000 GSF	$/SF	BUILDING TOTAL
01000	TEMPORARY REQUIREMENTS		$0.00	$0
02000	EXISTING CONDITIONS-SITE PREPARATION		$15.37	$153,729
03000	CONCRETE & PRECAST		$52.98	$529,779
04000	MASONRY		$19.15	$191,485
05000	METALS		$14.98	$149,758
06000	WOODS, PLASTICS & COMPOSITES		$0.56	$5,600
07000	THERMAL & MOISTURE PROTECTION SYSTEM		$34.63	$346,257
08000	OPENINGS		$6.44	$64,389
09000	FINISHES		$13.72	$137,163
10000	SPECIALTIES		$0.08	$800
11000	EQUIPMENT-GARAGE		$0.00	$0
12000	FURNISHINGS		$0.00	$0
13000	SPECIAL CONSTRUCTION		$0.00	$0
14000	CONVEYING EQUIPMENT		$0.00	$0
21000	FIRE SUPPRESSION-ALTERNATE		$3.20	$31,991
22000	PLUMBING		$8.44	$84,353
23000	HEATING, VENTILATING & AIR CONDITIONING		$95.37	$953,739
26000	ELECTRICAL		$12.00	$120,000
27000	COMMUNICATIONS		$0.60	$6,000
28000	ELECTRONIC SAFETY AND SECURITY		$49.96	$499,635
31000	EARTHWORK		$16.04	$160,370
32000	EXTERIOR IMPROVEMENTS		$0.77	$7,703
33000	UTILITIES		$5.31	$53,123
	SUBTOTAL		**$349.59**	**$3,495,874**
	GENERAL CONDITIONS/BOND/INSURANCE	6.0%	$20.98	$209,752
	CONTRACTOR'S FEES	4.0%	$14.82	$148,225
	DESIGN CONTINGENCY	5.0%	$19.27	$192,693
	ESCALATION TO 2019 BID	5.0%	$20.23	$202,327
	TOTAL ESTIMATED BID		**$424.89**	**$4,248,871**
	SERVICE LINE EQUIPMENT		$123.55	$1,235,464
	TOTAL ESTIMATED CONSTRUCTION COSTS		**$548.43**	**$5,484,335**

	COST SUMMARY-PHASE 2	246,559 GSF	$/SF	BUILDING TOTAL
01000	TEMPORARY REQUIREMENTS		$0.00	$0
02000	EXISTING CONDITIONS-SITE PREPARATION		$0.00	$0
03000	CONCRETE & PRECAST		$0.00	$0
04000	MASONRY		$0.00	$0
05000	METALS		$0.00	$0
06000	WOODS, PLASTICS & COMPOSITES		$0.00	$0
07000	THERMAL & MOISTURE PROTECTION SYSTEM		$0.91	$225,330
08000	OPENINGS		$0.00	$0
09000	FINISHES		$0.00	$0
10000	SPECIALTIES		$0.00	$0
11000	EQUIPMENT		$0.00	$0
12000	FURNISHINGS-		$0.00	$0
13000	SPECIAL CONSTRUCTION		$0.00	$0
14000	CONVEYING EQUIPMENT		$0.00	$0
21000	FIRE SUPPRESSION		$0.00	$0
22000	PLUMBING		$0.00	$0
23000	HEATING, VENTILATING & AIR CONDITIONING		$20.45	$5,041,892
26000	ELECTRICAL		$0.00	$0
27000	COMMUNICATIONS		$0.00	$0
28000	ELECTRONIC SAFETY AND SECURITY		$0.00	$0
31000	EARTHWORK-		$0.00	$0
32000	EXTERIOR IMPROVEMENTS		$0.00	$0
33000	UTILITIES-RELOCATE THE GAS PUMPS		$0.00	$0
	SUBTOTAL		**$21.36**	**$5,267,222**
	GENERAL CONDITIONS/BOND/INSURANCE	6.0%	$1.28	$316,033
	CONTRACTOR'S FEES	4.0%	$0.91	$223,330
	DESIGN CONTINGENCY	5.0%	$1.18	$290,329
	ESCALATION TO 2020	8.0%	$1.98	$487,753
	TOTAL ESTIMATED BID		**$26.71**	**$6,584,668**
	TOTAL ESTIMATED CONSTRUCTION COSTS		**$26.71**	**$6,584,668**

	COST SUMMARY-PHASE 3	276,922 GSF	$/SF	BUILDING TOTAL
01000	TEMPORARY REQUIREMENTS		$0.00	$0
02000	EXISTING CONDITIONS-SITE PREPARATION		$0.00	$0
03000	CONCRETE & PRECAST		$0.90	$250,000
04000	MASONRY		$0.00	$0
05000	METALS		$0.00	$0
06000	WOODS, PLASTICS & COMPOSITES		$0.00	$0
07000	THERMAL & MOISTURE PROTECTION SYSTEM		$0.00	$0
08000	OPENINGS		$0.81	$225,498
09000	FINISHES		$24.53	$6,794,031
10000	SPECIALTIES		$0.00	$0
11000	EQUIPMENT-GARAGE-BELOW		$0.00	$0
12000	FURNISHINGS		$0.00	$0
13000	SPECIAL CONSTRUCTION		$0.00	$0
14000	CONVEYING EQUIPMENT		$0.00	$0
21000	FIRE SUPPRESSION-ALTERNATE		$3.20	$885,901
22000	PLUMBING		$8.03	$2,222,305
23000	HEATING, VENTILATING & AIR CONDITIONING		$5.48	$1,516,934
26000	ELECTRICAL		$18.86	$5,221,812
27000	COMMUNICATIONS		$2.18	$603,615
28000	ELECTRONIC SAFETY AND SECURITY		$1.20	$331,208
31000	EARTHWORK		$0.13	$34,982
32000	EXTERIOR IMPROVEMENTS		$0.00	$0
33000	UTILITIES		$0.00	$0
	SUBTOTAL		**$65.31**	**$18,086,286**
	GENERAL CONDITIONS/BOND/INSURANCE	6.0%	$3.92	$1,085,177
	CONTRACTOR'S FEES	4.0%	$2.77	$766,859
	DESIGN CONTINGENCY	2.0%	$1.44	$398,766
	ESCALATION TO 2021	11.0%	$8.08	$2,237,080
	TOTAL ESTIMATED BID		**$81.52**	**$22,574,168**
	EQUIPMENT-GARAGE		$8.00	$2,214,679
	FF& E ALLOWANCE		$1.70	$469,890
	TOTAL ESTIMATED CONSTRUCTION COSTS		**$91.21**	**$25,258,737**

	COST SUMMARY-PHASE 4	276,922 GSF	$/SF	BUILDING TOTAL
01000	TEMPORARY REQUIREMENTS		$0.00	$0
02000	EXISTING CONDITIONS-SITE PREPARATION		$2.44	$676,252
03000	CONCRETE & PRECAST		$0.00	$0
04000	MASONRY		$0.84	$233,338
05000	METALS		$6.53	$1,809,064
06000	WOODS, PLASTICS & COMPOSITES		$0.00	$0
07000	THERMAL & MOISTURE PROTECTION SYSTEM		$12.88	$3,566,368
08000	OPENINGS		$1.89	$524,685
09000	FINISHES		$0.00	$0
10000	SPECIALTIES		$0.00	$0
11000	EQUIPMENT-GARAGE		$0.00	$0
12000	FURNISHINGS		$0.00	$0
13000	SPECIAL CONSTRUCTION		$0.00	$0
14000	CONVEYING EQUIPMENT		$0.00	$0
21000	FIRE SUPPRESSION-ALTERNATE		$0.00	$0
22000	PLUMBING		$0.00	$0
23000	HEATING, VENTILATING & AIR CONDITIONING		$0.58	$160,000
26000	ELECTRICAL		$0.03	$8,000
27000	COMMUNICATIONS		$0.00	$0
28000	ELECTRONIC SAFETY AND SECURITY		$0.00	$0
31000	EARTHWORK		$0.00	$0
32000	EXTERIOR IMPROVEMENTS		$0.29	$80,000
33000	UTILITIES		$0.00	$0
	SUBTOTAL		**$25.49**	**$7,057,707**
	GENERAL CONDITIONS/BOND/INSURANCE	6.0%	$1.53	$423,462
	CONTRACTOR'S FEES	4.0%	$1.08	$299,247
	DESIGN CONTINGENCY	2.0%	$0.56	$155,608
	ESCALATION TO BID 2022	14.0%	$4.01	$1,111,043
	TOTAL ESTIMATED BID		**$32.67**	**$9,047,068**
	TOTAL ESTIMATED CONSTRUCTION COSTS		**$32.67**	**$9,047,068**

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
1982 ROOF REPLACEMENT				
07000 THERMAL & MOISTURE PROTECTION				
Remove roof and insul @ 1982 Roof	69,100	SQFT	2.45	169,122
EPDM roofing including insulation @ 1982 Roof Replacement	69,100	SQFT	12.62	872,339
TOTAL: THERMAL & MOISTURE PROTECTION				**$1,041,461**
TOTAL: 1982 ROOF REPLACEMENT				**$1,041,461**
PHASE 1 2019				
02000 EXISTING CONDITIONS				
Remove reinforced SOG for radiant heating @ equipment	55,800	SQFT	2.76	153,729
TOTAL: EXISTING CONDITIONS				**$153,729**
03000 CONCRETE				
Formwork for strip footings- 3' wide x 1.5' tall	1,440	SQFT	6.59	9,490
Formwork for strip footings- Interior Footings 2' x 1'	2,370	SQFT	6.59	15,618
Reinforcement in strip footings, avg 100 lbs/cy	4	TONS	2,309.95	9,240
Concrete in strip footings, 4,000 psi	80	CUYD	158.33	12,667
Concrete slab on grade, 8" thk @ Service	10,000	SQFT	5.93	59,302
Concrete slab on grade, 8" thk, @ heated Slab	55,850	SQFT	5.93	331,202
Vapor barrier at slab	65,850	SQFT	0.97	63,782
Control Joints	10,400	LNFT	1.51	15,714
Isolation Joints	1,920	LNFT	1.45	2,782
PC hollow core plank @ buildouts for Service area	700	SQFT	14.26	9,982
TOTAL: CONCRETE				**$529,779**
04000 MASONRY				
8" CMU backup	11,520	SQFT	14.70	169,309
8" CMU partition @ interior buildout	1,616	SQFT	13.72	22,176
TOTAL: MASONRY				**$191,485**
05000 METALS				
Structural steel system for roof	10,000	SQFT	9.64	96,372
Metal roof deck, galvanized, 1-1/2" thk, 18 ga	10,000	SQFT	2.18	21,816
Miscellaneous angles, channels, lintels, etc.	10,000	SQFT	1.32	13,246
Bollards at OH doors (4) per	8	EACH	605.76	4,846
Steel railing system, painted @ mezzanine	118	LNFT	114.22	13,478
TOTAL: METALS				**$149,758**
06000 WOODS, PLASTICS & COMPOSITES				
Miscellaneous wood blocking & rough carpentry	10,000	SQFT	0.56	5,600
TOTAL: WOODS, PLASTICS & COMPOSITES				**$5,600**
07000 THERMAL & MOISTURE PROTECTION				
Spray on Air Barrier	8,280	SQFT	3.46	28,621

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Spray Foam insulation @ rain screen	8,280	SQFT	3.10	25,666
Rain Screen Metal Panels	8,280	SQFT	34.80	288,174
Miscellaneous caulking & sealants	10,000	SQFT	0.38	3,796
TOTAL: THERMAL & MOISTURE PROTECTION				**$346,257**
08000 OPENINGS				
Aluminum frame-Double Exterior	1	EACH	724.73	725
Aluminum frame-Single Exterior	4	EACH	574.73	2,299
FRP Door	6	EACH	696.22	4,177
Elect operated OH door @ exterior	2	EACH	27,012.57	54,025
Hardware set, single	4	EACH	507.94	2,032
Hardware set, double	1	EACH	1,130.78	1,131
TOTAL: OPENINGS				**$64,389**
09000 FINISHES				
Patching of Former Service Lane	10,000	SQFT	5.00	50,000
Epoxy flooring- 3 part	10,000	SQFT	5.61	56,133
Rhino Lining Wall Finish at Wash Bays to 24'-00"	3,120	SQFT	5.01	15,616
Paint O.H. Doors	2	EACH	560.66	1,121
Prime & paint cmu walls, by sprayer, 3 coats	11,520	SQFT	0.93	10,710
Misc Painting	1	LS	3,582.83	3,583
TOTAL: FINISHES				**$137,163**
10000 SPECIALTIES				
Interior signage -Allowance	1	LS	800.00	800
TOTAL: SPECIALTIES				**$800**
11000 EQUIPMENT				
Vehicle Equipment	2	LSUM	0.00	0
TOTAL: EQUIPMENT				**$0**
21000 FIRE SUPPRESSION				
Wet sprinkler system - $/SF	10,000	SQFT	3.20	31,991
TOTAL: FIRE SUPPRESSION				**$31,991**
22000 PLUMBING				
Remove Plumbing Fixtures and Piping	10,000	SQFT	0.79	7,915
Emergency shower/eyewash combination fixture	2	EACH	1,341.34	2,683
Wall hydrant, nonfreeze	4	EACH	522.65	2,091
Domestic water heater, electric, 50 gal., 36 kW for Wash Racks	2	EACH	4,691.50	9,383
Plumbing Supply Piping in building	10,000	SQFT	1.10	11,000
Sanitary/ Waste Piping in Building	10,000	SQFT	3.50	35,036
Storm Piping in Building	10,000	SQFT	1.62	16,246
TOTAL: PLUMBING				**$84,353**
23000 HEATING VENTILATION & AIR CONDITIONING				

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Remove HVAC Equipment and Ductwork	10,000	SQFT	0.71	7,140
MAU's	2	LS	60,000.00	120,000
Exhaust 60,000CFM	1	EACH	93,000.00	93,000
S. Steel duct, rectangular	4,800	LBS	14.32	68,748
Duct insulation @ supply	2,400	SQFT	5.44	13,067
Registers, grilles and diffusers	2	LS	1,500.00	3,000
Large Circulation Fans	6	EACH	16,959.58	101,757
Radiant flooring	55,800	SQFT	5.00	279,000
Radiant flooring-Zones, Manifolds Valves etc.	30	EA	3,500.00	105,000
Hot Water Pumps	4	EACH	19,181.37	76,725
Packaged Door Air Curtains	4	EACH	11,575.16	46,301
DDC Controls	10,000	SQFT	4.00	40,000
TOTAL: HEATING VENTILATION & AIR CONDITIONING				**$953,739**
26000 ELECTRICAL				
Electrical	10,000	SQFT	12.00	120,000
TOTAL: ELECTRICAL				**$120,000**
27000 COMMUNICATIONS				
Telecommunication/Data & Television System, complete	10,000	SQFT	0.60	6,000
TOTAL: COMMUNICATIONS				**$6,000**
28000 ELECTRONIC SAFETY & SECURITY				
Fire alarm System, complete	30,698	SQFT	2.10	64,469
Fire alarm System, complete	256,559	SQFT	1.65	423,348
Intrusion Detection System, Complete	10,000	SQFT	1.18	11,818
TOTAL: ELECTRONIC SAFETY & SECURITY				**$499,635**
31000 EARTHWORK				
Underpinning at Service Lane addition	1	LS	15,000.00	15,000
Saw cut concrete paving, 6" thk @ service lane	480	LNFT	7.05	3,385
Fine grading @ SOG Removal for radiant Heating	55,850	SQFT	0.49	27,177
Excavate for SOG	370	CUYD	3.70	1,368
Excavate for foundations	444	CUYD	10.56	4,689
Excavate stone base for radiant heating	1,034	CUYD	10.56	10,920
Backfill with inported Material	814	CUYD	7.65	6,230
6" Base Course at SOG	185	CUYD	32.64	6,039
Backfill with sand	1,034	CUYD	20.10	20,787
Haul off excavated material from Foundations	814	CUYD	29.86	24,303
Contaminated Soils- Cut,Haul, and Replace	400	CUYD	101.18	40,474
TOTAL: EARTHWORK				**$160,370**
32000 EXTERIOR IMPROVEMENTS				
Recycled base, 4" thk at concrete walk	19	CUYD	19.59	372
Concrete walk, 5" PC concrete -Patch	1,500	SQFT	4.89	7,331
TOTAL: EXTERIOR IMPROVEMENTS				**$7,703**

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
33000 UTILITIES				
Line flushing, cleaning, and testing	2	LSUM	1,533.38	3,067
Replace Existing Storm Systems On site	1	LS	30,055.90	30,056
Replace Existing Sanitary on Site	1	LS	20,000.00	20,000
TOTAL: UTILITIES				**$53,123**
TOTAL: PHASE 1 2019				**$3,495,872**
PHASE 2 2020				
07000 THERMAL & MOISTURE PROTECTION				
Roof patching and Wall Patching	1	LS	225,330.00	225,330
TOTAL: THERMAL & MOISTURE PROTECTION				**$225,330**
23000 HEATING VENTILATION & AIR CONDITIONING				
Remove HVAC Equipment and Ductwork	277,257	SQFT	0.71	197,961
MAU's-18,000 CFM	3	EA	35,000.00	105,000
MAU's-20,000 CFM	4	EA	30,000.00	120,000
Rooftop unit, packaged (based on 12,000 CFM)	1	EACH	44,757.45	44,757
Energy recovery unit (based on 10,000 cfm - POA)	1	EACH	130,757.45	130,757
AC split system & Piping	2	EACH	11,598.41	23,197
AC split system @ telecommunications Room	1	EACH	11,598.41	11,598
Exhaust 45,000CFM	1	EACH	64,140.00	64,140
Exhaust 591,000CFM	1	EACH	827,400.00	827,400
Exhaust 197,000 CFM	1	EACH	275,000.00	275,000
S. Steel duct, rectangular	104,500	LBS	14.32	1,496,712
Duct insulation @ supply	29,100	SQFT	5.44	158,432
Large Circulation Fans	27	EACH	16,959.58	457,909
Louvers/Actuators	1	LS	20,000.00	20,000
DDC Controls	277,257	SQFT	4.00	1,109,028
TOTAL: HEATING VENTILATION & AIR CONDITIONING				**$5,041,892**
TOTAL: PHASE 2 2020				**$5,267,222**
PHASE 3 2021				
03000 CONCRETE				
Remove Existing Lifts	1	LSUM	250,000.00	250,000
TOTAL: CONCRETE				**$250,000**
08000 OPENINGS				
Solar Tubes at Existing Roof	210	EA	1,073.80	225,498
TOTAL: OPENINGS				**$225,498**
09000 FINISHES				
Build-out of Office Space-Including Locker Rooms-Option 2	30,698	SQFT	78.00	2,394,444
Build-out of Maintenance Area	58,122	SQFT	56.00	3,254,832
Build-out/Painting of Bus Parking and Staging Area	188,437	SQFT	5.00	942,185

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Concrete sealer	188,437	SQFT	1.08	202,570
TOTAL: FINISHES				**$6,794,031**
11000 EQUIPMENT				
2 Post vehicle Lift- 50,000LB	17	EA	0.00	0
3 Post vehicle Lift- 75,000LB	1	EA	0.00	0
Vehicle Equipment	1	LSUM	0.00	0
6" Exhaust Reel Roll-Ups	23	EA	0.00	0
7 Product Reel Banks	13	EA	0.00	0
Air/Electric Drops	23	EA	0.00	0
Waste Oil Pumps	8	EA	0.00	0
Air Compressor- 100HP	1	EA	0.00	0
Heavy Duty Steel Work Benches	23	EA	0.00	0
(2) Lane Fuel System	1	EA	0.00	0
Vacuum Sytem Two Station	1	EA	0.00	0
Lane Jet Wash with Underbody Chassis System	2	EA	0.00	0
16 x 24 Spray Booth	1	EA	0.00	0
Fare Vaulting Stations and (2) Bins	2	EA	0.00	0
Fume Extractor	1	EA	0.00	0
Misc Equipment/Contingency	1	EA	0.00	0
Equipment- TBD- Contingnecy	1	EA	0.00	0
TOTAL: EQUIPMENT				**$0**
21000 FIRE SUPPRESSION				
Wet sprinkler system - $/SF	276,922	SQFT	3.20	885,901
TOTAL: FIRE SUPPRESSION				**$885,901**
22000 PLUMBING				
Remove Plumbing Fixtures and Piping	277,257	SQFT	0.79	219,449
Water closet, wall hung, battery-op flush valve	10	EACH	2,268.79	22,688
Lavatory, manual faucet	10	EACH	2,419.92	24,199
Urinal, wall hung, battery-op automatic flush valve	5	EACH	2,196.39	10,982
Electric water cooler, ADA-bilevel	2	EACH	4,665.13	9,330
Shower- Assemblies	5	EACH	1,715.90	8,580
Mop basin, floor fixture	2	EACH	2,046.58	4,093
Emergency shower/eyewash combination fixture	8	EACH	1,341.34	10,731
Wall hydrant, nonfreeze	30	EACH	522.65	15,680
Domestic water heater, gas-fired, 300 mbh	2	EACH	5,486.73	10,973
High Pressure Water Heating system	1	EACH	4,845.75	4,846
Water Softener System	1	EACH	9,383.00	9,383
Expansion tank	1	EACH	381.34	381
Plumbing Supply Piping in building	30,698	SQFT	5.23	160,514
Plumbing Supply Piping in building	58,122	SQFT	3.75	217,946
Plumbing Supply Piping in building	188,437	SQFT	1.10	207,281
Sanitary/ Waste Piping in Building	277,257	SQFT	3.50	971,398
Storm Piping in Building	88,820	SQFT	1.62	144,297
Storm Piping in Building	188,437	SQFT	0.90	169,556

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
TOTAL: PLUMBING				**$2,222,305**
23000 HEATING VENTILATION & AIR CONDITIONING				
HVAC Systems at Admin Buildouts	30,698	SQFT	32.00	982,336
HVAC Systems at Maintenance Buildouts	58,122	SQFT	9.00	523,098
Registers, grilles and diffusers	1	LS	4,000.00	4,000
Registers, grilles and diffusers	1	LS	1,500.00	1,500
Registers, grilles and diffusers	1	LS	6,000.00	6,000
TOTAL: HEATING VENTILATION & AIR CONDITIONING				**$1,516,934**
26000 ELECTRICAL				
Disconnect and remove associated conduit and wiring	30,698	SQFT	0.82	25,215
Disconnect and remove associated conduit and wiring	58,122	SQFT	0.73	42,441
Disconnect and remove associated conduit and wiring	198,437	SQFT	0.60	119,062
Lightning protection system per code	266,533	SQFT	1.33	354,116
Electrical	188,437	SQFT	14.00	2,638,118
Electrical	88,820	SQFT	23.00	2,042,860
TOTAL: ELECTRICAL				**$5,221,812**
27000 COMMUNICATIONS				
Telecommunication/Data & Television System, complete	30,698	SQFT	4.25	130,466
Telecommunication/Data & Television System, complete	188,437	SQFT	1.20	226,124
Telecommunication/Data & Television System, complete	58,122	SQFT	4.25	247,024
TOTAL: COMMUNICATIONS				**$603,615**
28000 ELECTRONIC SAFETY & SECURITY				
Intrusion Detection System, Complete	30,698	SQFT	2.90	89,006
Intrusion Detection System, Complete	58,122	SQFT	1.25	72,647
Intrusion Detection System, Complete	188,437	SQFT	0.90	169,556
TOTAL: ELECTRONIC SAFETY & SECURITY				**$331,208**
31000 EARTHWORK				
Haul off excavated material as CCDD	1,034	CUYD	33.83	34,982
TOTAL: EARTHWORK				**$34,982**
TOTAL: PHASE 3 2021				**$18,086,287**
PHASE 4 2022				
02000 EXISTING CONDITIONS				
Remove metal siding	61,962	SQFT	1.28	79,181
Remove Sawtooth Roof System	79,500	SQFT	6.91	549,448
Remove windows or Translucent Panels	9,317	SQFT	5.11	47,622
TOTAL: EXISTING CONDITIONS				**$676,252**
04000 MASONRY				
Clean Brick/Stone Facade	28,710	SQFT	3.10	89,067

DESCRIPTION	QTY	UM	UNIT COST	TOTAL COST
Tuckpoint Brick/Stone-Allowance	28,710	SQFT	5.03	144,271
TOTAL: MASONRY				**$233,338**
05000 METALS				
Infill roof System at Sawtooth Removal to create flat roof	79,500	SQFT	10.68	848,663
Metal roof deck, galvanized, At roof Infill	79,500	SQFT	3.51	279,252
Steel Mezzanine	23,100	SQFT	29.49	681,150
TOTAL: METALS				**$1,809,064**
07000 THERMAL & MOISTURE PROTECTION				
Spray on Air Barrier	61,962	SQFT	3.46	214,184
Spray Foam insulation @ rain screen	61,962	SQFT	3.10	192,064
Metal Panel Replacement	61,962	SQFT	34.80	2,156,488
EPDM roofing including insulation @ Sawtooth Roof Replacement	79,500	SQFT	12.62	1,003,632
TOTAL: THERMAL & MOISTURE PROTECTION				**$3,566,368**
08000 OPENINGS				
Elect operated OH door @ existing	4	EACH	19,367.61	77,470
Transluscent Panel or glass replacement	9,317	SQFT	48.00	447,214
TOTAL: OPENINGS				**$524,685**
23000 HEATING VENTILATION & AIR CONDITIONING				
HW boilers, for heating system	2	EACH	80,000.00	160,000
TOTAL: HEATING VENTILATION & AIR CONDITIONING				**$160,000**
26000 ELECTRICAL				
Connections for HVAC equipment	1	EACH	8,000.00	8,000
TOTAL: ELECTRICAL				**$8,000**
32000 EXTERIOR IMPROVEMENTS				
Landscaping/Site work allowance	1	LSUM	80,000.00	80,000
TOTAL: EXTERIOR IMPROVEMENTS				**$80,000**
TOTAL: PHASE 4 2022				**$7,057,705**

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Madison Metro Transit Building Master Plan Report

PHASED PROJECT CONSTRUCTION ESTIMATE DETAIL

MARCH 9, 2018

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PROGRAMMING

OPINION OF PROBABLE CONSTRUCTION COST

Madison Metro Transit Facility Study
Madison, WI
17001729-00

9 MARCH 2018

REMODELING OPTION 1

With Phasing Applied

Submitted to:

Madison Metro Transit

Prepared by:

MEAD & HUNT, INC.
2440 DEMING WAY
MIDDLETON, WI 53562
(608)-273-6380
M & H Project Number: 4503500-170148.01

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COST ESTIMATE EXECUTIVE SUMMARY

TITLE: Madison Metro Transit Facility Study

PROJECT NUMBER: 17001729-00

		Construction	Equipment
2019	Service Line/Body Shop Construction	$2,511,931	
	Total	**$2,511,931**	
	Service Line/Body Shop Equipment		$1,235,464
2020	HVAC Bus Maintenance	$3,410,813	
	HVAC Bus Storage	$5,239,965	
	Total	**$8,650,778**	
2021	Bus Maintenance Renovations	$7,025,539	
	Dispatch/Support Renovations	$6,401,577	
	Bus Storage Renovations	$4,700,325	
	Total	**$18,127,442**	
	Renovation Equipment & Furniture		$2,718,621
2022	Ongoing Maintenance	$12,224,459	
	Total	**$12,224,459**	
TOTALS		$41,514,609	$3,954,085

Note: Escalation compounded annual inflation interest rate of 3%

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OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Service Line_Paint Body Shop - 10,000 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	Strip and spread ftgs., foundation walls	s.f.	$5.13	$5.13	10.0%
1030	Slab on grade	6" + 9" reinforced replacement	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	2.1%
1020	Roof construction	Metal deck, open web steel joists	s.f.	$3.22	$3.22	
	B20 Exterior enclosure					
2010	Exterior walls	New CMU Rain Screen Walls w/ Metal Panel	s.f.	$26.89	$26.89	26.2%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	N/A	s.f.	$0.00	$0.00	
2030	Exterior doors	Rapid Coiling overhead, FRP	s.f.	$12.45	$12.45	
	B30 Roofing					
3010	Roof coverings	Ballasted Roof	s.f.	$5.63	$5.63	6.4%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	CMU Infill at Bus Storage Wall	s.f.		$0.00	4.4%
1020	Interior doors	Hollow Metal / FRP	each	$1,568.00	$1.57	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	Paint	s.f.	$2.56	$2.56	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$5.41	$5.41	8.2%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.00	$0.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	19.7%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$15.00	$15.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$5.00	$5.00	
3055	Permiter Radiation	Door Air Curtains	---	$2.00	$2.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$1.25	$1.25	
3090	Controls	DDC Controls	---	$3.00	$3.00	
3095	Commissioning	Major Equipment	---	$1.75	$1.75	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Contro	s.f.	$1.50	$1.50	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	3.8%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$1.50	$1.50	13.6%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution	Panel, Feeder and devices	s.f.	$2.00	$2.00	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.50	$0.50	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.75	$0.75	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.1%
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment		L.S.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	1.3%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$2.00	$2.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$4.05	$4.05	4.2%
	Utility services	Water, sanitary, storm	s.f.	$0.86	$0.86	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.94	$0.94	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.40	$0.40	
				SUB-TOTAL	$150.08	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$45.02	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$48.78	
				TOTAL BUILDING COST	**$244**	
	Escalation to Construction Year 2019 (compounded annual inflation interest rate of 3%)			3.00%	$7	
	Programmatic Construction Project Cost				**$2,511,931**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Service Line_Paint Body Shop Equipment - 10,000 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	Strip and spread ftgs., foundation walls	s.f.	$0.00	$0.00	0.0%
1030	Slab on grade	6" + 9" reinforced replacement	s.f.	$0.00	$0.00	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.0%
1020	Roof construction	Metal deck, open web steel joists	s.f.	$0.00	$0.00	
	B20 Exterior enclosure					
2010	Exterior walls	New CMU Rain Screen Walls w/ Metal Panel	s.f.	$0.00	$0.00	0.0%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	N/A	s.f.	$0.00	$0.00	
2030	Exterior doors	Rapid Coiling overhead, FRP	s.f.	$0.00	$0.00	
	B30 Roofing					
3010	Roof coverings	Ballasted Roof	s.f.	$0.00	$0.00	0.0%
3020	Roof openings	Sono Tubes	s.f.	$0.00	$0.00	
C. INTERIORS						
1010	Partitions	CMU Infill at Bus Storage Wall	s.f.		$0.00	0.0%
1020	Interior doors	Hollow Metal / FRP	each	$0.00	$0.00	
1030	Fittings	Accessories	s.f.	$0.00	$0.00	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	Paint	s.f.	$0.00	$0.00	
3020	Floor finishes	Sealed Concrete	s.f.	$0.00	$0.00	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Toilet and service fixtures, supply and drainage	s.f.	$0.00	$0.00	0.0%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.00	$0.00	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.00	$0.00	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.00	$0.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	0.0%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$0.00	$0.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$0.00	$0.00	
3055	Permiter Radiation	Door Air Curtains	---	$0.00	$0.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$0.00	$0.00	
3090	Controls	DDC Controls	---	$0.00	$0.00	
3095	Commissioning	Major Equipment	---	$0.00	$0.00	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Contro	s.f.	$0.00	$0.00	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$0.00	$0.00	0.0%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$0.00	$0.00	0.0%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$0.00	$0.00	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$0.00	$0.00	
5040	Emergency Distribution	Panel, Feeder and devices	s.f.	$0.00	$0.00	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.00	$0.00	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.00	$0.00	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$0.00	$0.00	
5030	Security		s.f.	$0.00	$0.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment	Lane Fuel System, Vacuum,	L.S.	$253,680.00	$25.37	100.0%
1030	Vehicular equipment	Vacuum System, Two Station	L.S.	$231,000.00	$23.10	
1030	Vehicular equipment	Lane Jet/Wash w/ Underbody Chassis System	L.S.	$600,000.00	$60.00	
1090	Other equipment	Fare Vaulting System	L.S.	$70,000.00	$7.00	
1090	Paint Booth	Spray Booth	L.S.	$44,800.00	$4.48	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	0.0%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$0.00	$0.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.0%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.00	$0.00	
				SUB-TOTAL	$119.95	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			0%	$0.00	
	DESIGN CONTINGENCY FOR PROGRAMMING			0%	$0.00	
				TOTAL BUILDING COST	**$120**	
	Escalation to Construction Year 2019 (compounded annual inflation interest rate of 3%)			3.00%	$4	
	Programmatic Construction Project Cost				**$1,235,464**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - HVAC Bus Maintenance - 58,122 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations		s.f.	$0.00	$0.00	0.0%
1030	Slab on grade		s.f.	$0.00	$0.00	
B. SHELL						
	B10 Superstructure					
1010	Floor construction		---	$0.00	$0.00	1.6%
1020	Roof construction	Mech Framing/Structure	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Wall Patching	s.f.	$1.00	$1.00	4.4%
2015			s.f.	$0.00	$0.00	
2020	Exterior Opening	Louvers	s.f.	$0.50	$0.50	
2030	Exterior doors		s.f.	$0.00	$0.00	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	2.9%
3020	Roof openings	Roof Patching	s.f.	$1.00	$1.00	
C. INTERIORS						
1010	Partitions		s.f.	$0.00	$0.00	0.0%
1020	Interior doors		each	$0.00	$0.00	
1030	Fittings		s.f.	$0.00	$0.00	
2010	Stair construction		---	$0.00	$0.00	
3010	Wall finishes		s.f.	$0.00	$0.00	
3020	Floor finishes		s.f.	$0.00	$0.00	
3030	Ceiling finishes		s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures		s.f.	$0.00	$0.00	2.2%
2020	Domestic water distribution		s.f.	$0.00	$0.00	
2030	Drain, waste & vent		s.f.	$0.00	$0.00	
2030	Compressed Air		s.f.	$0.00	$0.00	
2035	demolition		s.f.	$0.00	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	70.2%
3020	Heat generating systems		s.f.	$0.00	$0.00	
3030	Cooling generating systems	Make-Up Air Units	s.f.	$16.00	$16.00	
3040	Exhaust Systems	Specialty Exhaust Fans	s.f.	$1.40	$1.40	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$3.00	$3.00	
3055	Underfloor Radiation		---	$0.00	$0.00	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.50	$0.50	
3090	Controls	DDC Controls	s.f.	$1.75	$1.75	
3095	Commissioning	Major Equipment	s.f.	$0.50	$0.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Controls	s.f.	$0.75	$0.75	
	D40 Fire protection					
4010	Sprinklers		s.f.	$0.00	$0.00	0.0%
	D50 Electrical					
5010	Electrical Distribution		s.f.	$0.00	$0.00	15.0%
5020	Lighting & branch wiring		s.f.	$0.00	$0.00	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$5.10	$5.10	
5040	Emergency Distribution		s.f.	$0.00	$0.00	
5090	Fire Alarm		s.f.	$0.00	$0.00	
5095	Demolition Electrical		s.f.	$0.00	$0.00	
	D50 Technology Systems					
5030	Communications		s.f.	$0.00	$0.00	
5030	Security		s.f.	$0.00	$0.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.0%
1030	Vehicular equipment			$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings		s.f.	$0.00	$0.00	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction		---	$0.00	$0.00	3.7%
1040	Special facilities	Hazmat Abatement	s.f.	$0.25	$0.25	
	Demolition	Demolition of interior components	---	$1.00	$1.00	
G. BUILDING SITEWORK						
	Site preparation		s.f.	$0.00	$0.00	0.0%
	Utility services		s.f.	$0.00	$0.00	
	Paving		s.f.	$0.00	$0.00	
	Landscaping		s.f.	$0.00	$0.00	
	Amenities		s.f.	$0.00	$0.00	
				SUB-TOTAL	$34.04	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$10.21	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$11.06	
				TOTAL BUILDING COST	**$55**	
	Escalation to Construction Year 2020 (compounded annual inflation interest rate of 3%)			6.09%	$3	
	Programmatic Construction Project Cost				**$3,410,813**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - HVAC Bus Storage_Circulation - 188,437

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	0.0%
1030	Slab on grade		s.f.	$0.00	$0.00	
B. SHELL						
	B10 Superstructure					
1010	Floor construction		s.f.	$0.00	$0.00	1.6%
1020	Roof construction	Mech Framing/Structure	s.f.	$0.26	$0.26	
	B20 Exterior enclosure					
2010	Exterior walls	Wall Patching	s.f.	$0.50	$0.50	4.6%
2015	Exterior Masonry Repair		s.f.	$0.00	$0.00	
2020	Exterior windows	Louvers	s.f.	$0.25	$0.25	
2030	Exterior doors		s.f.	$0.00	$0.00	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.1%
3020	Roof openings	Roof Patching	s.f.	$0.50	$0.50	
C. INTERIORS						
1010	Partitions		s.f.	$0.00	$0.00	0.0%
1020	Interior doors		s.f.	$0.00	$0.00	
1030	Fittings		s.f.	$0.00	$0.00	
2010	Stair construction		---	$0.00	$0.00	
3010	Wall finishes		s.f.	$0.00	$0.00	
3020	Floor finishes		s.f.	$0.00	$0.00	
3030	Ceiling finishes		s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	each	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures		s.f.	$0.00	$0.00	0.0%
2020	Domestic water distribution		s.f.	$0.00	$0.00	
2030	Drain, waste & vent		s.f.	$0.00	$0.00	
2030	Compressed Air		---	$0.00	$0.00	
2035	demolition		s.f.	$0.00	$0.75	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	78.2%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Units	---	$10.00	$10.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	---	$0.37	$0.37	
3055	Permiter Radiation	Door Air Curtains	---	$0.75	$0.75	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$0.20	$0.20	
3090	Controls	DDC Controls	---	$0.75	$0.75	
3095	Commissioning	Major Equipment	---	$0.25	$0.25	
3055	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Control	s.f.	$0.30	$0.30	
	D40 Fire protection					
4010	Sprinklers		s.f.	$0.00	$0.00	0.0%
	D50 Electrical					
5010	Electrical Distribution		s.f.	$0.00	$0.00	4.6%
5020	Lighting & branch wiring		s.f.	$0.00	$0.00	
5030	Branch Devices & Mech Cor	Branch Devices & Mech Conn	s.f.	$0.75	$0.75	
5040	Emergency Distribution		s.f.	$0.00	$0.00	
5090	Fire Alarm		s.f.	$0.00	$0.00	
5095	Demolition Electrical		s.f.	$0.00	$0.00	
	D50 Technology Systems					
5030	Communications		s.f.	$0.00	$0.00	
5030	Security		s.f.	$0.00	$0.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	0.0%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings		s.f.	$0.00	$0.00	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction		---	$0.00	$0.00	3.1%
1040	Special facilities	Hazmat Abatement	s.f.	$0.25	$0.25	
	Demolition of structures	Demolition of interior components	s.f.	$0.25	$0.25	
G. BUILDING SITEWORK						
	Site preparation		s.f.	$0.00	$0.00	0.0%
	Utility services		s.f.	$0.00	$0.00	
	Paving		s.f.	$0.00	$0.00	
	Landscaping		s.f.	$0.00	$0.00	
	Amenities		s.f.	$0.00	$0.00	
				SUB-TOTAL	$16.13	95.4%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$4.84	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$5.24	
				TOTAL BUILDING COST	**$26**	
	Escalation to Construction Year 2020 (compounded annual inflation interest rate of 3%)			6.09%	$2	
	Programmatic Construction Project Cost				**$5,239,965**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Bus Maintenance Renovations - 58,122 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	14.5%
1030	Slab on grade	9" reinforced concrete	s.f.	$9.85	$9.85	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.8%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Add Insulation	s.f.	$1.75	$1.75	10.2%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	5.9%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Concrete block, gypsum on metal stud (10sf/lf part)	s.f.		$0.00	10.8%
1020	Interior doors	Hollow metal, metal frames	each	$1,168.00	$0.60	
1030	Fittings	Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$4.21	$4.21	
3020	Floor finishes	Sealed Concrete	s.f.	$1.29	$1.29	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Sanitary and Storm Piping	s.f.	$0.48	$0.48	3.8%
2020	Domestic water distribution	Gas-fired water heater	s.f.	$0.60	$0.60	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	Pipe, hangars & supports	s.f.	$0.13	$0.13	
2035	demolition	N/A	s.f.	$0.38	$0.75	
	D30 HVAC					
3010	Energy supply		---	$0.00	$0.00	9.5%
3020	Heat generating systems		s.f.	$0.00	$0.00	
3030	Cooling generating systems		s.f.	$0.00	$0.00	
3040	Exhaust Systems		s.f.	$0.00	$0.00	
3050	Air Distribution	Supply and Exhaust Ductwork Systems	s.f.	$3.00	$3.00	
3055	Underfloor Radiation	Radiant Infloor Heating	---	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	s.f.	$0.50	$0.50	
3090	Controls		s.f.	$0.00	$0.00	
3095	Commissioning		s.f.	$0.50	$0.50	
3095	Demolition HVAC		s.f.	$0.00	$0.00	
	D40 Fire protection					
4010	Sprinklers	Reconfigure Existing System	s.f.	$1.75	$1.75	2.6%
	D50 Electrical					
5010	Electrical Distribution	Panelboards and feeders	s.f.	$3.41	$3.41	30.9%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$3.75	$3.75	
5030	Branch Device and Conn.	Branch Devices & Mech Conn	s.f.	$1.00	$1.00	
5040	Emergency Distribution	Generator, Distribution Panel, Transfer Sw. and Feeder	s.f.	$1.35	$1.35	
5090	Fire Alarm	Fire detection & alarm	s.f.	$3.25	$3.25	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment		L.S.	$0.00	$0.00	0.5%
1030	Vehicular equipment			$0.00	$0.00	
1030	Vehicular equipment		L.S.	$0.00	$0.00	
1090	Other equipment	cabinets, countertops	s.f.	$0.25	$0.25	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.08	$0.08	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	10.3%
1040	Special facilities	Hazmat Abatement	s.f.	$0.00	$0.00	
	Demolition	Demolition of interior components	---	$7.00	$7.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.2%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	Topsoil and seeding	s.f.	$0.00	$0.00	
	Amenities	Bollards	s.f.	$0.16	$0.16	
				SUB-TOTAL	$68.07	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$20.42	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$22.12	
				TOTAL BUILDING COST	**$111**	
	Escalation to Construction Year 2021 (compounded annual inflation interest rate of 3%)			9.27%	$10	
	Programmatic Construction Project Cost				**$7,025,539**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Dispatch & Support - 30,698

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	1.5%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$1.72	$1.72	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Cut & Patch Existing Floor	---	$1.72	$1.72	1.9%
1020	Roof construction	Sono Tube Cutting	s.f.	$0.54	$0.54	
	B20 Exterior enclosure					
2010	Exterior walls	Add Insulation	s.f.	$1.75	$1.75	5.9%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows	Aluminum, insulated glass	s.f.	$2.60	$2.60	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$2.60	$2.60	
	B30 Roofing					
3010	Roof coverings	N/A	s.f.	$0.00	$0.00	3.4%
3020	Roof openings	Sono Tubes	s.f.	$4.01	$4.01	
C. INTERIORS						
1010	Partitions	Concrete block, gypsum on metal stud (10sf/lf part)	s.f.		$0.00	13.5%
1020	Interior doors	Hollow metal, metal frames	each	$1,168.00	$1.52	
1030	Fittings	Lockers, Accessories	s.f.	$1.26	$1.26	
2010	Stair construction	ETR	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/40%glazed coating/10% C.T.	s.f.	$5.64	$5.64	
3020	Floor finishes	Rubber Flooring/Carpet/C.T.	s.f.	$5.86	$5.86	
3030	Ceiling finishes	Acoustic tile, paint 20% of Area	s.f.	$1.63	$1.63	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	One hydraulic passenger elevator	each	$65,600.00	$2.14	1.8%
	D20 Plumbing					
2010	Plumbing fixtures	Kitchen, toilet and service fixtures, supply and drainage	s.f.	$5.41	$5.41	11.3%
2020	Domestic water distribution	N/A	---	$4.59	$4.59	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$2.29	$2.29	
2030	Compressed Air	N/A	---	$0.00	$0.00	
2035	demolition	N/A	s.f.	$1.00	$1.00	
	D30 HVAC					
3010	Energy supply	N/A - alternative energy systems	---	$0.00	$0.00	24.9%
3020	Heat generating systems	Included in 3030	---	$0.00	$0.00	
3030	Cooling generating systems	Rooftop Unit with DOAS	---	$10.00	$10.00	
3050	Terminal & package units	VAV system	---	$5.00	$5.00	
3055	Permiter Radiation	Hot Water Perimeter Radiation	---	$2.50	$2.50	
3085	TAB Services	Water and Air: Test, Adjust and Balancing	---	$1.50	$1.50	
3090	Controls	DDC Controls	---	$5.00	$5.00	
3095	Commissioning	Major Equipment	s.f.	$2.50	$2.50	
3095	Demolition HVAC	Demolition of Ductwork, Piping, Equipment and Control	s.f.	$2.75	$2.75	
	D40 Fire protection					
4010	Sprinklers	Wet pipe sprinkler system	s.f.	$5.75	$5.75	4.9%
	D50 Electrical					
5010	Electrical service/distribution	Service, panel boards and feeders	s.f.	$4.38	$4.38	21.3%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$7.57	$7.57	
5030	Branch Devices & Mech Con	Branch Devices & Mech Conn	s.f.	$2.30	$2.30	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.50	$0.50	
5090	Fire Alarm	Fire detection & alarm	s.f.	$2.00	$2.00	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$1.50	$1.50	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment	N/A	---	$0.00	$0.00	2.9%
1020	Institutional equipment	N/A	---	$0.00	$0.00	
1030	Vehicular equipment	N/A	---	$0.00	$0.00	
1090	Other equipment	Kitchen equipment, cabinets, countertops	s.f.	$2.88	$2.88	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.47	$0.47	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	5.1%
1040	Special facilities	N/A	---	$0.00	$0.00	
	Demolition of structures	Demolition of interior components	---	$6.00	$6.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.16	$0.16	1.5%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	General Site upgrades	s.f.	$0.00	$0.00	
	Amenities	Outdoor Courtyard/Break Areas	s.f.	$1.65	$1.65	
				SUB-TOTAL	$117.44	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$35.23	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$38.17	
				TOTAL BUILDING COST	**$191**	
	Escalation to Construction Year 2021 (compounded annual inflation interest rate of 3%)			9.27%	$18	
	Programmatic Construction Project Cost				**$6,401,577**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Bus Storage Renovations - 188,437 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	4.9%
1030	Slab on grade	Cut & Patch Existing Floor	s.f.	$0.75	$0.75	
B. SHELL						
	B10 Superstructure					
1010	Floor construction		s.f.	$0.00	$0.00	0.0%
1020	Roof construction		s.f.	$0.00	$0.00	
	B20 Exterior enclosure					
2010	Exterior walls		s.f.	$0.00	$0.00	0.0%
2015	Exterior Masonry Repair		s.f.	$0.00	$0.00	
2020	Exterior windows		s.f.	$0.00	$0.00	
2030	Exterior doors		s.f.	$0.00	$0.00	
	B30 Roofing					
3010	Roof coverings		s.f.	$0.00	$0.00	0.0%
3020	Roof openings		s.f.	$0.00	$0.00	
C. INTERIORS						
1010	Partitions		s.f.	$0.00	$0.00	7.5%
1020	Interior doors		s.f.	$0.00	$0.00	
1030	Fittings		s.f.	$0.00	$0.00	
2010	Stair construction		---	$0.00	$0.00	
3010	Wall finishes		s.f.	$0.00	$0.00	
3020	Floor finishes	Sealed Concrete	s.f.	$1.15	$1.15	
3030	Ceiling finishes		s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	each	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures	Sanitary & Storm Piping	s.f.	$0.48	$0.48	7.4%
2020	Domestic water distribution		s.f.	$0.00	$0.00	
2030	Drain, waste & vent	Pipe, hangars & supports	s.f.	$0.65	$0.65	
2030	Compressed Air	N/A	---	$0.00	$0.00	
2035	demolition	N/A	s.f.	$0.00	$0.75	
	D30 HVAC					
3010	Energy supply		---	$0.00	$0.00	0.0%
3020	Heat generating systems		s.f.	$0.00	$0.00	
3030	Cooling generating systems		---	$0.00	$0.00	
3050	Air Distribution		---	$0.00	$0.00	
3055	Permiter Radiation		---	$0.00	$0.00	
3085	TAB Services		---	$0.00	$0.00	
3090	Controls		---	$0.00	$0.00	
3095	Commissioning		---	$0.00	$0.00	
3055	Demolition HVAC		s.f.	$0.00	$0.00	
	D40 Fire protection					
4010	Sprinklers	Replace Existing Heads Only	s.f.	$0.25	$0.25	1.6%
	D50 Electrical					
5010	Electrical Distribution	Panel boards and feeders	s.f.	$0.75	$0.75	73.0%
5020	Lighting & branch wiring	Lighting, controls and branch wiring	s.f.	$2.05	$2.05	
5030	Branch Devices & Mech Cor	Branch Devices & Mech Conn	s.f.	$0.15	$0.15	
5040	Emergency Distribution	Panelboards and feeders	s.f.	$0.16	$0.16	
5090	Fire Alarm	Fire detection & alarm	s.f.	$0.98	$0.98	
5095	Demolition Electrical	Demolition Lighting, Devices. FA, Power	s.f.	$0.37	$0.37	
	D50 Technology Systems					
5030	Communications	Voice/Data/MNS, CATV	s.f.	$4.75	$4.75	
5030	Security		s.f.	$2.00	$2.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	0.7%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings	Signage, entrance mats	s.f.	$0.11	$0.11	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	0.0%
1040	Special facilities		s.f.	$0.00	$0.00	
	Demolition of structures		s.f.	$0.00	$0.00	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	0.0%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	General Site Upgrades	s.f.	$0.00	$0.00	
	Amenities	General Site Amenities & Bollards	s.f.	$0.00	$0.00	
				SUB-TOTAL	$15.35	95.1%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$4.61	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$4.99	
				TOTAL BUILDING COST	**$25**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			0.00%	$0	
	Programmatic Construction Project Cost				**$4,700,325**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Renovation Equipment & Furniture - 88,820 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	0.0%
1030	Slab on grade		s.f.	$0.00	$0.00	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	N/A	---	$0.00	$0.00	0.0%
1020	Roof construction		s.f.	$0.00	$0.00	
	B20 Exterior enclosure					
2010	Exterior walls		s.f.	$0.00	$0.00	0.0%
2015			s.f.	$0.00	$0.00	
2020	Exterior windows		s.f.	$0.00	$0.00	
2030	Exterior doors		s.f.	$0.00	$0.00	
	B30 Roofing					
3010	Roof coverings		s.f.	$0.00	$0.00	0.0%
3020	Roof openings		s.f.	$0.00	$0.00	
C. INTERIORS						
1010	Partitions		s.f.	$0.00	$0.00	0.0%
1020	Interior doors		each	$0.00	$0.00	
1030	Fittings		s.f.	$0.00	$0.00	
2010	Stair construction		---	$0.00	$0.00	
3010	Wall finishes		s.f.	$0.00	$0.00	
3020	Floor finishes		s.f.	$0.00	$0.00	
3030	Ceiling finishes		s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	---	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures		s.f.	$0.00	$0.00	0.0%
2020	Domestic water distribution		s.f.	$0.00	$0.00	
2030	Drain, waste & vent		s.f.	$0.00	$0.00	
2030	Compressed Air		s.f.	$0.00	$0.00	
2035	demolition		s.f.	$0.00	$0.00	
	D30 HVAC					
3010	Energy supply		---	$0.00	$0.00	0.0%
3020	Heat generating systems		s.f.	$0.00	$0.00	
3030	Cooling generating systems		s.f.	$0.00	$0.00	
3040	Exhaust Systems		s.f.	$0.00	$0.00	
3050	Air Distribution		s.f.	$0.00	$0.00	
3055	Underfloor Radiation		---	$0.00	$0.00	
3085	TAB Services		s.f.	$0.00	$0.00	
3090	Controls		s.f.	$0.00	$0.00	
3095	Commissioning		s.f.	$0.00	$0.00	
3095	Demolition HVAC		s.f.	$0.00	$0.00	
	D40 Fire protection					
4010	Sprinklers		s.f.	$0.00	$0.00	0.0%
	D50 Electrical					
5010	Electrical Distribution		s.f.	$0.00	$0.00	0.0%
5020	Lighting & branch wiring		s.f.	$0.00	$0.00	
5030	Branch Device and Conn.		s.f.	$0.00	$0.00	
5040	Emergency Distribution		s.f.	$0.00	$0.00	
5090	Fire Alarm		s.f.	$0.00	$0.00	
5095	Demolition Electrical		s.f.	$0.00	$0.00	
	D50 Technology Systems					
5030	Communications		s.f.	$0.00	$0.00	
5030	Security		s.f.	$0.00	$0.00	
E. EQUIPMENT & FURNISHINGS						
1030	Vehicular equipment	Lifts	L.S.	$1,489,294.00	$16.77	100.0%
1030	Vehicular equipment	Air compressor/reels/pumps/extractors	L.S.	$528,739.00	$5.95	
1090	Other equipment	Dispatch Support Furniture	s.f.	$469,890.00	$5.29	
2010	Fixed furnishings		s.f.	$0.00	$0.00	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction		---	$0.00	$0.00	0.0%
1040	Special facilities		s.f.	$0.00	$0.00	
	Demolition		---	$0.00	$0.00	
G. BUILDING SITEWORK						
	Site preparation		s.f.	$0.00	$0.00	0.0%
	Utility services		s.f.	$0.00	$0.00	
	Paving		s.f.	$0.00	$0.00	
	Landscaping		s.f.	$0.00	$0.00	
	Amenities		s.f.	$0.00	$0.00	
				SUB-TOTAL	$28.01	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			0%	$0.00	
	DESIGN CONTINGENCY FOR PROGRAMMING			0%	$0.00	
				TOTAL BUILDING COST	**$28**	
	Escalation to Construction Year 2021 (compounded annual inflation interest rate of 3%)			9.27%	$3	
	Programmatic Construction Project Cost				**$2,718,621**	

OPINION OF PROBABLE CONSTRUCTION COST

Client: Madison Metro Transit
City: Madison, WI
Date: 9 MARCH 2018

Project Name: Madison Metro Transit Facility Study
Project Number: 17001729-00
M & H Project Number: 4503500-170148.01

MFS 1101 FACILITY STUDY REMODELING OPTION 1 w/ PHASING - Ongoing Maintenance - 188,437 SF

LINE ITEM	COMPONENT	DESCRIPTION & ASSUMPTIONS	UNITS	UNIT COST	COST PER S.F.	% OF SUB-TOTAL
A. SUBSTRUCTURE						
1010	Standard foundations	N/A	s.f.	$0.00	$0.00	0.0%
1030	Slab on grade		s.f.	$0.00	$0.00	
B. SHELL						
	B10 Superstructure					
1010	Floor construction	Steel Grate Mezzanine	s.f.	$1.42	$1.42	6.9%
1020	Roof construction	Modify Interior Sawtooth Roof Structure	s.f.	$1.04	$1.04	
	B20 Exterior enclosure					
2010	Exterior walls	Building Wide Replace Metal Panels/Add Insulation/Bric	s.f.	$10.62	$10.62	38.9%
2015	Exterior Masonry Repair	Gisholt Repointing and Repair	s.f.	$1.20	$1.20	
2020	Exterior windows	Insulated Sandwich Panels	s.f.	$1.43	$1.43	
2030	Exterior doors	Hollow Metal & Aluminum	s.f.	$0.55	$0.55	
	B30 Roofing					
3010	Roof coverings	Ballast Roof at Interior Removed Sawtooth	s.f.	$2.75	$2.75	26.6%
3020	Roof openings	Metal Panel enclosure of Sawtooth	s.f.	$6.68	$6.68	
C. INTERIORS						
1010	Partitions	Existing to Remain/Patching	s.f.	$0.00	$0.00	5.9%
1020	Interior doors	N/A	s.f.	N/A	$0.00	
1030	Fittings		s.f.	$0.00	$0.00	
2010	Stair construction	N/A	---	$0.00	$0.00	
3010	Wall finishes	50% Paint/Metal Liners	s.f.	$2.11	$2.11	
3020	Floor finishes		s.f.	$0.00	$0.00	
3030	Ceiling finishes	Exposed Ceilings	s.f.	$0.00	$0.00	
D. SERVICES						
	D10 Conveying					
1010	Elevators & lifts	N/A	each	$0.00	$0.00	0.0%
	D20 Plumbing					
2010	Plumbing fixtures		s.f.	$0.00	$0.00	0.0%
2020	Domestic water distribution		s.f.	$0.00	$0.00	
2030	Drain, waste & vent		s.f.	$0.00	$0.00	
2030	Compressed Air	N/A	---	$0.00	$0.00	
2035	demolition	N/A	s.f.	$0.00	$0.00	
	D30 HVAC					
3010	Energy supply		---	$0.00	$0.00	10.1%
3020	Heat generating systems	New Hot Water Boilers and Pumps.	s.f.	$3.60	$3.60	
3030	Cooling generating systems		---	$0.00	$0.00	
3050	Air Distribution		---	$0.00	$0.00	
3055	Permiter Radiation		---	$0.00	$0.00	
3085	TAB Services		---	$0.00	$0.00	
3090	Controls		---	$0.00	$0.00	
3095	Commissioning		---	$0.00	$0.00	
3055	Demolition HVAC		s.f.	$0.00	$0.00	
	D40 Fire protection					
4010	Sprinklers		s.f.	$0.00	$0.00	0.0%
	D50 Electrical					
5010	Electrical Distribution		s.f.	$0.00	$0.00	0.7%
5020	Lighting & branch wiring		s.f.	$0.00	$0.00	
5030	Branch Devices & Mech Cor	Mech Connections	s.f.	$0.25	$0.25	
5040	Emergency Distribution		s.f.	$0.00	$0.00	
5090	Fire Alarm		s.f.	$0.00	$0.00	
5095	Demolition Electrical		s.f.	$0.00	$0.00	
	D50 Technology Systems					
5030	Communications		s.f.	$0.00	$0.00	
5030	Security		s.f.	$0.00	$0.00	
E. EQUIPMENT & FURNISHINGS						
1010	Commercial equipment		---	$0.00	$0.00	0.0%
1020	Institutional equipment		---	$0.00	$0.00	
1030	Vehicular equipment		---	$0.00	$0.00	
1090	Other equipment		s.f.	$0.00	$0.00	
2010	Fixed furnishings		s.f.	$0.00	$0.00	
F. SPECIAL CONSTRUCTION & DEMOLITION						
1020	Integrated construction	N/A	---	$0.00	$0.00	9.2%
1040	Special facilities	Hazmat Abatement	s.f.	$0.75	$0.75	
	Demolition of structures	Demolition of sawtooth roof	s.f.	$2.50	$2.50	
G. BUILDING SITEWORK						
	Site preparation	Clearing, grading, excavation and fill	s.f.	$0.00	$0.00	1.6%
	Utility services	Water, sanitary, storm	s.f.	$0.00	$0.00	
	Paving	Base, ballast, pavement, appurtenances	s.f.	$0.00	$0.00	
	Landscaping	General Site Upgrades	s.f.	$0.15	$0.15	
	Amenities	General Site Amenities & Bollards	s.f.	$0.42	$0.42	
				SUB-TOTAL	$35.47	100.0%
	CONTRACTOR FEES (General requirements, 10%, Overhead 10%, Profit 10%)			30%	$10.64	
	DESIGN CONTINGENCY FOR PROGRAMMING			25%	$11.53	
				TOTAL BUILDING COST	**$58**	
	Escalation to Construction Year (compounded annual inflation interest rate of 3%)			12.55%	$7	
	Programmatic Construction Project Cost				**$12,224,459**	

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