

**APPLICATION FOR  
URBAN DESIGN COMMISSION  
REVIEW AND APPROVAL**

**AGENDA ITEM#** \_\_\_\_\_  
**Project #** \_\_\_\_\_

DATE SUBMITTED: <u>March 31, 2010</u>	<input type="checkbox"/> Informational Presentation
UDC MEETING DATE: <u>April 7, 2010</u>	<input checked="" type="checkbox"/> Initial Approval and/or Recommendation
	<input type="checkbox"/> Final Approval and/or Recommendation

PROJECT ADDRESS: 117 N. Charter Street (UW Charter Street Heating Plan Upgrades)

ALDERMANIC DISTRICT: 8 (Alder Eagon)

OWNER/DEVELOPER (Partners and/or Principles):  
State of Wisconsin, UW System Board of Regents  
1220 Linden Drive, Madison, WI 53706

ARCHITECT/DESIGNER/OR AGENT:  
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CONTACT PERSON: Gary A. Brown, FASLA, Director, Campus Planning & Landscape Architecture  
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**TYPE OF PROJECT:**

(See Section A for:)

- Planned Unit Development (PUD)
  - General Development Plan (GDP)
    - Specific Implementation Plan (SIP)
- Planned Community Development (PCD)
  - General Development Plan (GDP)
  - Specific Implementation Plan (SIP)
- Planned Residential Development (PRD)
- New Construction or Exterior Remodeling in an Urban Design District \* (A public hearing is required as well as a fee)
- School, Public Building of Space (Fee may be required)
- New Construction or Addition to or Remodeling of a Retail, Hotel or Motel Building Exceeding 40,000 S.F.
- Planned Commercial Site

(See Section B for:)

- New Construction or Exterior Remodeling in C4 District (Fee required)

(See Section C for:)

- R.P.S.M. Parking Variance (Fee required)

(See Section D for:)

- Comprehensive Design Review\* (Fee Required)
- Street Graphics Variance\* (Fee Required)
- Other \_\_\_\_\_

\* Public Hearing Required (Submission Deadline 3 Weeks in Advance of Meeting Date)

Where fees are required (as noted above) they apply with the first submittal for either initial or final approval of a project.



**Letter of Intent**

**REZONING REQUEST**

**R5, C3 and various zoning districts of the WDOT Rail Corridor  
within the defined Project Site Limit**

to

**Planned Unit Development (PUD-GDP)**

for the

**Charter Street Heating Plant Re-Build**

Plan Commission Application Submittal Date: March 10, 2010 for April 26, 2010 Meeting  
UDC Application for initial approval of the GDP: March 31, 2010 for their April 7, 2010 Meeting

The scope of the Charter Street Heating Plant (CSHP) Project is to rebuild the existing facility by constructing a new 350,000 lbs/hour biomass boiler facility. The new boiler will be housed separately from the existing boilers requiring the construction of a building to house the boiler and the necessary distribution systems. The existing coal fired boilers will either be removed or retired, and their capacity replaced by new natural gas boilers. New steam turbine driven electrical generation will be installed in a new turbine building. The Project will also upgrade the rail delivery system at the site and provide a fuel handling system for biomass fuels with an on-site storage capacity for three to four days of use. The proposed rail delivery system includes modifications to the WSOR rail line extending from North Charter St. to West Washington Ave., including widening of the North Park St. bridge for a new main rail line, two sidings for rail car handling between North Park St. and West Washington Ave., and an adjustment in the location of the Southwest Bike Path located in the railroad right-of-way, east of East Campus Mall.

The project has been noticed to the local alderpersons through both the Joint Southeast and Joint West Campus Area Committee meetings on a regular basis. We will continue to meet with both committees to share our developing plans. We also hope to gain initial approval of the GDP from the Urban Design Commission at their April 7, 2010 meeting.

**Division of State Facilities (DSF) Project Information:**

**Project Number:** 09A2L  
**Project Title:** Charter Street Heating Plant Re-Build  
**For the:** University of Wisconsin-Madison  
Madison, Wisconsin  
**Type of Project:** Major Project / New Construction

**Project Participants:**

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**Architect/Engineer:** P3M (Owner's Engineer and Architect)  
(includes the following Architectural and Engineering Firms)

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**Engineering and Procurement Contractor (EPC): To be selected Summer 2010**

## **PROJECT BACKGROUND & GENERAL INFORMATION**

### **Development Assistance Team (DAT) Meetings**

This Project was first presented to the City of Madison Development Assistance Team in September 2009 to begin the dialog between the Owner, the Project Design Team, and the City of Madison Department of Planning and Development. The scope and complexity of the Project was presented, as well as the anticipated method of project delivery.

Project delivery will be via Engineering and Procurement Contractor (EPC Contractor). This entity will be selected by the Owner and will be responsible for the final detail design and engineering of the project, as well as the construction of the Project.

It was explained in the DAT meeting by P3M that major equipment will be bid and selected by the EPC Contractor to provide the Owner with a competitive purchasing process for the procurement of major project components from pre-qualified equipment vendors. Various vendor's equipment range in size and physical configuration, thereby limiting the ability of the P3M design team to define precisely the architectural appearance and sizes of buildings, as they will vary based upon the vendor's specific equipment.

At the September meeting, it was determined that the two step approval process allowed by the General Development Plan / Specific Implementation Plan (GDP/SIP) approach to Land Use Approval would be appropriate for this Project.

At a second DAT meeting in November 2009, the City Planning and Development staff and Madison Fire Department saw an updated presentation of the Project. The State of Wisconsin Department of Commerce has delegated the role of Authority Having Jurisdiction (AHJ) to the City of Madison Fire Department for design considerations related to fire safety design, since the local Fire Department will be first responders in an emergency event.

Specific requirements to the P3M design team that came out of this second meeting were that the Project must include the following information with the GDP application:



- Comprehensive Description of the Proposed Plant's Operations
- A noise study to indicate current and proposed noise levels in the near vicinity of the Project
- Complete Agreements for the Land Ownership issues tied to the Project's use of WISDOT Owned Property and Property Owned by the City of Madison and a private land owner.
- A Comprehensive Risk Management Plan document defining the details of interest to the Madison Fire Department, where the Madison Fire Department supports the content of the Risk Management Plan.
- Draft information about the Air Permit for the Project.

The information listed above has been developed and is available under separate cover.

**University of Wisconsin-Madison  
Design Review Board (DRB)**

The Project was presented to the University of Wisconsin Design Review Board (DRB) in July 2009 as an Informational Presentation, and later in October 2009 as a Concept Design Presentation. The Board is made up of design professionals who advise the chancellor and the Campus Planning Committee.

It was explained to the DRB that the Project is heavily engineering driven, and with the EPC Contractor delivery method, precise architectural building elevations and sizes of buildings will vary based upon selected vendor's specific equipment.

In July, the Board recognized the Project's design challenges, and considered the Project an interesting design opportunity.

In October, the Board complimented the P3M design team for the advancement of the aesthetic design from the time of the Informational Presentation. Updates to the DRB were made in December and February, 2010.

The DRB will review the Project again twice at the Specific Implementation Plan (SIP) level for each of the SIP's required to complete the Project. The reviews will be for Schematic Design Approval and Final Design Approval.

The Owner will retain the professional services of the P3M Team to act as Owner's Architect and Engineer, to review the design development work of the EPC Contractor, as well as to make future design presentations to the DRB on behalf of the Owner and EPC Contractor.

**Joint Southeast  
Campus Area  
Committee**

The University of Wisconsin acts to fill the role of liaison between the University and the Joint Southeast Campus Advisory Committee (JSCAC). The University will continue to fill this role and provide opportunities to inform the RSSC of the progress of this Project at key intervals of the Project's development.

**Urban Design  
Commission**

The Project was presented to the Urban Design Commission in October 2009 for an Informational Presentation.

Again, it was explained to the UDC that the Project is heavily engineering driven, and with the EPC Contractor delivery method, precise architectural building elevations and sizes of buildings will vary based upon selected vendor's specific equipment.

Feedback to P3M by the UDC at this presentation was similar to that of the DRB. They recognized the challenges of the Project, and also recognized the design opportunity the Project presents to the design professional. University representatives explained that the appearance of the Project will, by necessity, be markedly different than typical State owned University buildings; specifically that the Project will not be all masonry and architectural precast construction materials; and also that the overall aesthetic of the complex may have more of an industrial visual aesthetic due to the functional requirements of the facility, and this is to be embraced and celebrated.

**PROJECT SITE GENERAL DESCRIPTION & GENERAL ZONING INFORMATION**

The existing Charter Street Heating Plant consists of structures build during the time period from 1957 to present on the land bounded by Charter Street on the west, Dayton Street on the north, Mills Street on the east, and the WISDOT rail corridor on the south. This parcel is currently zoned R5 and the plant operates as a conditional use as a coal fired power plant. For the Charter Street Heating Plant Re-Build, this parcel will be referred to as the Heating Plant Site. Its postal address is 117 N Charter Street.

The Project will add to the lands of the Charter Street Heating Plant the triangular parcel due east of the existing Charter Street Heating Plant. This parcel is bounded by Mills Street on the west, and the WISDOT owned lands on the north and south, currently leased to railroad operator WSOR. This parcel is currently zoned C3 and is owned by the University and used as Parking Lot 45 and the UW Physical Plant Building. This parcel will be referred to as the Fuel Handling Site. Its postal address will remain 115 N Mills Street.

Due to the rail delivery requirements for the Re-Built Plant to receive bio-fuels, the Plant will conduct fuel delivery operations on the lands owned by WISDOT and City of Madison as described herein. Some of the proposed structures on the Fuel Handling Site extend onto the WISDOT property, but in a manner that is acceptable to the railroad operators and WISDOT, and with agreements in place for these encroachments to be built on the WISDOT owned land.

**Project Location  
Within Regent Street/South  
Campus Neighborhood**

P3M reviewed the Regent Street South Campus (RSSC) Neighborhood Plan (City of Madison, Adopted July 1, 2008, Legislative File No: 09234) for planning and zoning considerations for the general arrangement plan and the design of this Project. Refer to exhibits following this narrative for visual diagrams that highlight the extent of this Project within the boundary and scope of the RSSC Neighborhood Plan.

## **PLANT OPERATIONS**

### **Project Summary**

The scope of the Charter Street Heating Plant Rebuild (CSHP) Project is to replace the steam capacity of existing coal fired boilers by constructing a new biomass boiler which will produce 350,000 lbs/hour of steam and two package boilers which will have a steam capacity of 225,000 lbs/hour for each boiler. The total steam production capacity of CSHP will be increased to 1,150,000 lbs/hour of steam by the end of the year 2013.

The steam will be used to generate electricity heat UW Madison campus buildings and produce chilled water for cooling. The new boiler will be housed separately from the existing boilers in a new Boiler #8 Building. The package boilers will also be housed in a new building called Dayton St. Building.

An existing 300,000 lbs/hr rated Boiler 5 which burns natural gas and has the capability to burn ultra low sulfur distillate oil as backup fuel will remain in operation.

The existing coal fired boilers will either be removed or retired.

A new steam turbine driven electrical generator will be installed in the Dayton St. Building with the package boilers. This generator will provide additional electrical capacity for UW Campus consumption.

The Project will also upgrade the rail delivery system at the site and provide a fuel handling system for biomass fuels with an on-site storage capacity for three to four days of use. The proposed rail delivery system includes modifications to the WSOR rail line extending from North Charter Street to West Washington Ave., including widening of the North Park Street bridge for a new main rail line, two sidings for rail car handling between North Park Street and West Washington Ave., and an adjustment in the location of the Southwest Bike Path located in the railroad right-of-way, east of the Campus Mall.

### **Project Background**

The State of Wisconsin conducted a planning study for the main heating plants servicing the UW-Madison campus and other state office buildings. The study was a result of an agreement between Departments of Administration, the Department of Natural Resources, the University of Wisconsin and the Sierra Club to analyze the feasibility of alternatives to bring the CSHP into compliance with the Clean Air Act and for making necessary upgrades to other state owned heating plants in Madison, Wisconsin.

Independent of the study, the state decided to phase out the use of coal at the CSHP and to increase fuel diversity, primarily by the inclusion of significant renewable biomass resources in the plant's fuel mix.

### **Plant Description Overview**

The existing Charter St. Heating Plant (CSHP) project site is located in the City of Madison, Wisconsin. The site is surrounded by a mixture of University of Wisconsin campus buildings, and privately owned student housing apartment buildings. A main railroad track with railcar storage spur tracks are located adjacent to the site to the north, south and east.

The CSHP is believed to have been constructed in the year 1957 with the installation of three coal burning boilers. An additional coal burning boiler was installed in the year 1965. A natural gas and fuel oil burning boiler

was installed in 1970. At the southwest side of the site, chilled water equipment and large elevated industrial cooling towers were installed in the years 1966 and 1973.

The chilled water is distributed through the campus underground distribution system to cool UW Madison campus buildings.

**New Boiler Unit(s) of  
Capacity at 350,000 #/hr**

The Project will include the installation of a new water-cooled vibrating grate Boiler Unit #8 at 350,000 lbs/hr, fueled by biomass fuel and/or natural gas with ultra low sulfur distillate oil back-up. Air pollution control equipment for SO<sub>x</sub>, NO<sub>x</sub>, and particulates including a single new double flue stack. Current design plans consider the addition of a future Boiler Unit #9 of similar capacity.

**New Boiler Units of  
Capacity at 225,000 #/hr**

The Project will include the installation of two New Package Boilers – Units # 6 & # 7. Each boiler will have a steam production capacity of 225,000 #/hr, fueled by natural gas with ultra low sulfur distillate oil as a back-up. Air pollution limits for NO<sub>x</sub> will be met by using the flue gas recirculation type of air pollution control equipment. Limits for SO<sub>x</sub>, CO, VOC and Particulates will be met without using any air pollution control equipment.

**New Steam Turbine  
Generator(s)**

The Project includes the addition of a New Steam Turbine Generator Unit #2. The steam turbine is a controlled extraction back pressure type. The electrical generator will have a nominal capacity of 22 MW. The Project will provide space and connections for the future installation of Steam Turbine Generator Unit #3 of similar capacity.

**Fuel System Conversion**

The Project includes the conversion of the coal fuel handling system to a biomass fuel system. This work will include the:

- Demolition of the existing coal handling and storage system
- Demolition of the FPM Building at 115 Mills Street for a new biomass fuel receiving and handling system
- Construction of new biomass fuel receiving, unloading, storage, handling and conveying systems and equipment including a rotary car unloader.

The Project also includes adjacent off-site rail and bike path construction and related Project work. It is anticipated that mainline rail expansion and industrial track storage spurs work will be on rail road right-away and will be under the direction of the local railroad.

**Biomass Fuel Utilization**

The Project includes the effective and efficient utilization of biomass fuels. This includes finalizing the determination of biomass fuel specifications and fuel quality analyses ranges and maximums. These parameters will be defined and refined as the project proceeds.

**Coordination and Interface  
with Existing Operations**

This Project needs to be completed and coordinated with the existing plant operations and capacity for steam and cooling supplies being maintained and in service. The new plant Project tie-ins and conversions will be required to tie into the existing plant systems and U W Systems are part of this Project.

**Electric Distribution  
System Enhancements**

The Project also includes plant electric distribution systems enhancements and modifications, including a new substation to be installed in a location to be determined in the future. An evaluation is underway which considers a location across the street from the existing boiler building on the north side of Dayton St.; and other locations including in the areas of the existing boiler building, and the new Package Boilers / Steam Turbine Generator building.

**Water Treatment  
System Enhancements**

The Project will include the installation of a New Water Treatment System, to replace the existing one.

**Cooling Tower  
System Enhancements**

The Project will include the installation of a New Cooling Tower Unit #6, to replace existing Cooling Towers Units 1, 2 & 3. The New Cooling Tower #6 will have increased cooling capacity.

**Standby Electricity  
System Enhancements**

The Project will include the installation of a new diesel engine driven electrical generator with a projected capacity of 1 MW of electricity. There is an existing diesel engine driven electrical generator with a 1 MW electrical capacity.

**Plant Operations Overview**

The Charter Street Heating Plant (CSHP) operates continuously year round, providing steam, chilled water and electricity for the University of Wisconsin Madison campus buildings. Staff is on site 24 hours, 7 days a week.

**Secure Regulated site**

The CSHP is operated by University of Wisconsin personnel on a secure site, with full site enclosure, and no public access. The plant operates under an Air Permit regulated by the State of Wisconsin Department of Natural Resources Bureau of Energy.

**On-site Buildings  
and Equipment Enclosures**

The rebuilt CSHP will include the construction of several new buildings, equipment enclosures, and structures to store and convey bio-fuel, and to secure the site. With the exception of the wood chip fuel delivery operations described below, all operations of the plant occur on site within the site enclosure, including staff parking. No un-supervised public access will be allowed.

## **Operating Personnel**

Generally, the staff that operates the existing plant will be retained and trained to operate the new plant. In the current plant, there are typically a maximum of about 14 personnel on site during the day and about 4 over the night shifts. Personnel monitor the plant equipment from a central location within the plant. The rebuilt plant will operate in much the same way, with a similar staff size.

## **Safety Protocols**

The rebuilt CSHP will be built in accordance with all current building codes and standards, and operate under an air permit regulated by the DNR, and in compliance with all other regulations in effect. Design for this plant occurred with the input of all Authorities Having Jurisdiction.

New buildings and conveyor galleries will be designed to be equipped throughout with fire protection systems and other safety features requested by the Madison Fire Department and the Wisconsin Department of Commerce.

A new private underground fire hydrant system with diesel engine driven and electric jockey fire water pumps will be installed.

The design of the entire facility is "above code minimum" for systems and features related to safety.

Maintenance and inspection of equipment and systems occur on a periodic basis. Emergency operations plans will be updated. The City of Madison Fire Department conducts routine inspections of the facility on a regular basis.

## **Fuel Delivery Operations – Overview**

The rebuilt plant will burn blended wood chips, agricultural and paper pellets, and Tire Derived Fuel chips (in the future).

The rebuilt plant will include a fuel handling yard on the east side of Mills Street, which has direct access to the WDOT land on which the WSOR railroad operates.

The conversion to bio-fuel will result in change that will be the most obvious to the public. The current coal fired plant burns on average the equivalent of 3 rail cars of coal a day to meet the demand for power. There is a large stockpile of coal on the existing site which provides several days worth of inventory fuel on site, so rail delivery of the coal fuel occurs roughly weekly. The rail line runs through the site, and the coal is off-loaded on site.

The quantity of bio-fuel required to produce the equivalent energy from coal fuel is significantly greater by volume. It is anticipated that at peak operation, the plant will require 28-34 rail cars of fuel each day.

A remote fuel depot will receive process, store and load the biomass fuel for delivery to the CHSP in Madison.

## **Delivery Operations – Rail**

The majority of wood chips will be supplied by open top railcar and emptied utilizing a side rail car dumper. The fuel will be received into the Railcar Dumper Hopper. The hopper can hold a complete railcar contents and will discharge onto an Unload Conveyor. From the Unload Conveyor, the biomass fuel will travel to the Incline Conveyor. The Incline Conveyor discharges to the Upper Distribution Gate which directs it to the Wood Fuel Silo Feed Conveyor. The Wood Fuel Silo Feed Conveyor then directs the biomass to Wood Fuel Silo No.1 or No.2 based on silo inventories. An alternate process flow is to flop the Upper Distribution Gate, biomass travels to the Lower Distribution Gate where it goes into the Pellet Silo.

The anticipated delivery operation at peak design capacity is to receive and unload two to three trains per day, with up to 16 railcars of fuel in each train. Two rail sidings within the existing WDOT rail corridor will be used for the delivery and unloading operations, one for full cars, the other for empty cars. When a train arrives to deliver 16 full cars, it will pull 16 empty cars away and return them back to the fuel yard outside of Madison. Full rail cars will be pulled from the rail siding to the unloader building located on the fuel handling site via track-mobile in strings of 4 cars at a time

## **Delivery Operations – Truck**

Normally, wood pellets, paper pellets, agriculture waste pellets and TDF chips (future) will be shipped from the manufacturer's source by truck, although railcar deliveries of pellets and TDF chips (future) are feasible. Fuel pellets and TDF chips (future) will be weighed then discharged directly into a truck dumper reclaim hopper. Fuel from the hopper will be metered onto the Truck Dump Conveyor. A chute will transfer the pellets to the Unload Conveyor. From the Unload Conveyor, the pellets will travel to the Incline Conveyor. The Incline Conveyor discharges to the Upper Distribution Gate which directs it to the Lower Distribution Gate and to the Pellet Silo.

Trucks will be processed by entering the CSHP site where they will be weighed on a scale located near the south side of the site. They will then enter the Fuel Handling yard by crossing North Mills Street. They will maneuver within the yard so as to back into the fuel handling building where they will off-load the fuel via live bottom off-loader into the fuel hopper, where it is then conveyed to the appropriate storage silo. Once emptied, the truck will re-weigh on a scale located in the Fuel Handling yard, and then leave the yard and facility. It is anticipated that under normal planned operations, the number of trucks that will unload fuel as described above will be in the range of 4 to 15 per day. It is possible to receive and unload wood chip fuel via truck in the event of an emergency, such as an event where rail delivery is not possible, but this would occur only in this circumstance.

## **Delivery Operations – Other Fuels**

The new Boiler #8 is designed with the capability to burn a mix of fuels, which include fuel categories of ADF/PDF (agriculturally derived fuels/pelletized derived fuels), wood pellets, natural gas and ultra low sulfur distillate (ULSD) oil, in addition to the wood chips. New Package Boilers 6 and 7 will burn natural gas and have the capability to burn ULSD as a back-up/emergency fuel.

ULSD oil will be stored on the CSHP site as a back-up emergency fuel. This fuel will be delivered via tanker truck in a manner similar to other fuels, where truck arrives, weighs in, unloads, re-weighs, then leaves the site. Since this fuel is designed for use as an emergency fuel, daily delivery of this fuel is not required or anticipated. ULSD oil has a shelf life and it will be necessary to burn the fuel at intervals so as to maintain a usable supply of this fuel at all times.

Natural gas is available at the site and does not require special means for delivery.

#### **Delivery Operations - Plant related**

The new Boiler 8 will have Fly ash and bottom ash as bi-products of combustion. Limestone or sodium bicarbonate will be used to treat the gaseous mixture exiting the boiler to reduce pollutants. Aqueous ammonia is used on site as well as water treatment chemicals.

Silos located in an open area between the existing Charter St. Heating Plant building and the new Boiler 8 will hold the limestone or sodium bicarbonate, aqueous ammonia, fly ash, and bottom ash. These materials will arrive or leave the site via truck of the appropriate type for the product being moved. The daily trucking activities for all of these materials will be in the range of 4 to 5 trucks per day at peak plant operation.

Chemicals used for water treatment will arrive by smaller size delivery truck on interval as needed. Chemicals are brought into the building by hand truck and stored in appropriate containers.

There are no other regular trucking activities required in the operation of the Plant beyond that described above.

#### **Emissions Controls**

The #8 Boiler will implement the following emissions control equipment:

- Fabric Filter Baghouse for particulate control
- Selective Catalytic Reactor for NOx control
- Oxidation Catalyst for CO Control
- Sorbent Injection for Acid Gas Control (if required)

The systems above are proven technology and represent the equipment prescribed in the air permit application submitted to the Wisconsin Department of Natural Resources.

The new 225,000 lbs/hr each Package Boilers will primarily burn natural gas. Air pollution limits for NOx will be met by using the flue gas recirculation type of air pollution control equipment. Limits for SOx, CO, VOC and Particulates will be met without using any air pollution control equipment.

#### **Noise Control**

The City of Madison Noise Control Regulation (Chapter 24, Section 24.08 in the Code of Ordinances) provides the regulatory framework governing noise emissions within the city. The maximum allowable daytime and nighttime sound levels of a continuous sound located across the street from the site within residential developments are listed in the Table below



**Maximum Allowable Sound Level – City of Madison  
(Within Residential Developments)**

<b>Receiving Zone Classified</b>	<b>Source Level Zoned</b>	<b>Maximum Permitted Sound Level (dBA)</b>
Residential, Conservancy, Wetlands, PCD, PUD, Planned Community Mobile Home Park District	All Zoning Districts	65 (Day or Night)

In addition, a reduction of 5 dB(A) will apply to the above for impulse noises. An impulse noise is defined as a sound of short duration, usually less than one second, with an abrupt onset and rapid decay. Examples include explosions, drop forge impacts and the discharge of firearms.

The ordinance contains an exemption from the 65 or 60 dB(A) noise limit for construction purposes between the hours of 7:00 am and 7:00 pm of any day of the year.

Sound levels at the existing CSHP are similar to those at other industrial plants. Sound level measurements in the community surrounding the plant were taken continuously for twenty-four hours between 6:00 pm on January 26, 2010 and 6:00 pm on January 27, 2010. The sound level measured included both noise from the CSHP, as well as street traffic noise from trucks, cars, busses and Vespa motorized scooters. Due to the cold January weather, the CSHP chillers and cooling towers were not operating during the ambient noise survey.

Noise levels were measured in 7 different locations around the perimeter of the proposed site. The highest existing noise level measured was 58 dB(A), measured at two locations. One was at the intersection of Dayton St and Mills St, on the northwest corner in the general area of a University of Wisconsin Noland Zoology campus building. The other was on the west side of Charter St. and east side of the Weeks Hall for Geological Sciences campus building.

Other measured values ranged from 50 to 54 dB(A). For comparison, 55 dB(A) is the approximate level of a quiet subdivision during daylight hours.

To comply with the City of Madison Noise Ordinance, various techniques for attenuating noise will be performed as part of the project. Some equipment will be installed in the buildings' concrete wall basements. Other sound sources will have noise attenuating mufflers and silencers. Special noise attenuating gas ducts and building wall louvers will be installed where required.

In summary, after the project has been completed, the continuous noise that residences located across the street from the project will not exceed 65 dB(A) during the day or night; and will not exceed 60 dB(A) day or night for impulse noises.

**Dust Control and Deflagration System**

Many of the fuels characterized as biomass derived fuels are considered dust generating fuels. For this reason consideration in the air permit, fire protection design, and safety of personnel and equipment dust control

and deflagration equipment has been included with the scope of the project.

To contain and remove dust generated during the unloading, and transfer of the biomass fuels used on the site a vacuum collection system will be installed. The primary components for this system are induced draft fans and filter baghouses. The site will have three separate systems due to the proximity requirements of the systems. The systems will be located as follows:

- Baghouse 1 – Near the fuel unloading area east of Mill Street
- Baghouse 2 – Near the fuel silos east of Mill Street
- Baghouse 3 – Near the #8 Boiler on the roof of the proposed Dayton Street Building

Baghouse 1 will primarily be used to remove dust created during the unloading of trucks and rail cars in the Unload Building. Vacuum generated by the ID Fan will carry the dust to the baghouse filter via round ductwork and separate it from the air prior to the air being discharged. In addition to the vacuum system used on the rail unload area, a fogging system is being proposed to augment the dust control system. This is still under investigation.

Baghouse 2 will primarily be used to remove dust from the conveyor transfer points located above and below the fuel silos. The dust will be drawn to the baghouse from pickup points above and below each conveyor transfer point by the ID fan. Once the dust is filtered from the air it can be discharged back to the atmosphere.

Baghouse 3 will primarily be used to remove dust from the conveyor transfer points located above and below on the west side of Mills Street. The dust will be drawn to the baghouse from pickup points above and below each conveyor transfer point by the ID fan. Once the dust is filtered from the air it can be discharged back to the atmosphere.

Dust from combustible materials creates a safety risk due to its ability to rapidly combust and expand the air volume in confined areas (explode). The conveying, storage, and dust collection systems being provided for the Charter Street Heating Plant will contain measures to minimize the risk to the employees, the public, and the equipment for this to occur. These items will include explosion relief panels, explosion suppression canisters, as well as the dust collection system which will limit the fuel for such events. The design will be within the recommended guidelines stated by NFPA, and the industry standards for this type of installation.

### **Required Lighting and Light Pollution**

By safe practice, interior lighting of buildings and structures that require daily routine inspection at all work shifts will remain on constantly at a safe ambient light level. It is anticipated that Fuel Handling operations will occur during the day, so the Fuel Handling Yard not be in operation at night, and will only be illuminated to a safe ambient light level within the yard. Light from interior light sources will be visible through glazed areas of building enclosures. No exterior architectural lighting is included in the design. The rebuilt CSHP will comply with City of Madison Lighting Ordinances.

## **OTHER INFORMATION**

### **Project Approvals General Requirement**

The nature of this Project necessitates that it receive many approvals from many authorities and governing bodies in addition to the City of Madison Department of Planning and Development, to insure the Project is constructed and operates in a manner that meets all of the requirements of these various agencies and approvals.

The details of this GDP/SIP land use application and subsequent approval is considered in context with these other Project approvals. Any condition of another required approval will be considered a condition of the GDP/SIP approval.

### **Air Permit**

The Project will be designed, built, and operated in accordance with all of the provisions, conditions, and restrictions mandated by the approved Air Permit.

### **Environmental Impact Statement**

The Project will be designed, built, and operated in accordance with all of the provisions, conditions, and restrictions mandated by the approved Environmental Impact Statement, and pursuant to all national, state, and UW System WEPA/NEPA guidelines.

### **Risk Management Plan**

The Project will be designed, built, and operated in accordance with all of the provisions, conditions, and restrictions mandated by the recorded Risk Management Plan. This document was prepared by P3M with the input of the Owner, Plant Operators, University's Insurance Carrier, and most importantly, the Madison Fire Department, who is the Authority Having Jurisdiction for issues related to Fire Prevention and protection of the public from hazards related to the operation of this facility.

### **Developer's Agreement**

The Project will be designed, built, and operated in accordance with all of the provisions, conditions, and restrictions mandated by the approved Developer's Agreement between the City of Madison and the State of Wisconsin.

### **Other Required Permits and Reviews**

The Project will be designed, permitted, built, and operated in accordance with all of the provisions, conditions, and restrictions of these City Departments and other governing authorities:

- City of Madison Water Utility Review for well head protection zone
- City of Madison Board of Public works for pedestrian path and bike path committee reviews
- City of Madison Engineering Departments under Planning and Development
- State of Wisconsin DNR Bureau of Energy

## Site Layout

The general site plan arrangement of the new for the CSHP is depicted on the plan following this section. The plan includes labels to identify all of the buildings, equipment enclosures, and structures which are planned to occupy the site. Exact sizes of some of the elements are subject to change based upon final equipment selections and completion of detailed design and engineering work

## Building Sizes

The anticipated sizes of buildings and equipment enclosures are listed in the matrix following the site plan arrangement drawing. Again, exact sizes of some of the buildings and elements are subject to change based upon final equipment selections and completion of detailed design and engineering work. This facility is located within the Capitol View Preservation zone, and is in compliance with this zoning regulation.

## Architectural Description

The Charter Street Heating Plant (CSHP) Project includes construction of several new buildings and structures. The goals of the architectural design effort are to make the facility a good neighbor to its surrounding urban context, including UW Madison Campus and near by private property. Special attention was paid to including structures in the design program to secure the site and contain noise, dust, and light pollution; with a visual appeal that included pedestrian scale considerations.

The architectural concept for the facility is to celebrate the removal of all coal from the site per the Governor's mandate, and show off the bio-fuel material delivery, storage, and handling as it is moved across Mills Street to the new Boiler where it is burned to produce clean energy.

Building enclosure materials are selected and utilized in a visually composed manner for their aesthetic qualities so as to tell the story of this facility, and to fit within the overall budget. Some aesthetic upgrades to the existing buildings to remain is anticipated.

## Energy Efficiency

The Charter Street Heating Plant (CSHP) Project will comply with the Governor's initiative on energy efficient buildings (Executive Order 145) which stipulates that new buildings will be designed to be 30% better than the code in effect at the time of the Order.

The design effort to achieve this goal will be pursued through the detail design of Electrical and HVAC.

## Project Construction Schedule

The Charter Street Heating Plant (CSHP) Project is planned for construction to start in the late summer of 2010 and be complete by Fall or 2013. The detail of the construction schedule shall be developed by the EPC Contractor. There is a general concept for the phasing of the construction to allow the Plant to remain operational during the construction phase:

- Build the E half of the Dayton Street Building to bring Package Boilers #6 and #7 on line.
- Burn off all inventory of coal fuel on site and retire coal fired boilers.
- Remove on-site rail spurs and demolish existing buildings on site planned for removal.

- Build remainder of the Dayton Street Building, new Boiler #8, and other structures on the CSHP site.

Construction of structures on the Fuel Handling Site and construction on the WDOT rail corridor may be able to precede the sequence described for the CSHP site. Construction may occur in several areas concurrently. It is anticipated that Mills Street will require temporary street closure for some duration during the project construction phase. The Southwest Bike Path will remain open, but may be detoured during periods of time during the construction phase.

\*\*\*\*\* END \*\*\*\*\*

# ZONING TEXT

## Charter Street Heating Plant Re-Build Project 117 N Charter Street and 115 N Mills Street

<b>Statement of Purpose</b>	This document rezoning land parcel from R5 and C3, to a new PUD/GDP/SIP is established to encompass the new operations proposed for the Charter Street Heating Plant Rebuild Project.
<b>Permitted Uses</b>	The permitted use of this PUD/GDP/SIP shall include the following: a) Public utility and services uses, including but not limited to the generation of steam heat, chilled water and electricity b) Electric substations c) Storage, handling and warehousing of solid fuel d) Railroad operations facilities e) Accessory uses related thereto, including temporary building for storage of building materials and equipment for construction purposes
<b>Lot Area, Bulk and Yard Requirements</b>	Lot area, building heights, floor area ratio; front, side, and rear yards; and open space shall be as shown on the approved specific implementation plans.
<b>Off-Street Parking and Loading</b>	Off-street parking for plant personnel and off-street loading to maintain required plant operations will be provided as shown on the approved specific implementation plans.
<b>Landscaping</b>	Landscaping will be designed in accordance with City of Madison ordinance for public ROW lands, and as shown on the approved specific implementation plans.
<b>Exterior Lighting</b>	Exterior lighting will be designed in accordance with City of Madison ordinance for public ROW lands, as shown on the approved specific implementation plans.
<b>Exterior Signage</b>	Exterior signage will be designed in accordance with City of Madison ordinance for public ROW lands, as shown on the approved specific implementation plans.
<b>Alterations and Revisions</b>	No alteration or revision of this GDP and subsequent SIP shall be permitted unless approved by the City Plan Commission. However, the Zoning Administrator may approve minor alterations which are approved by the Director of Planning and Development and the district Alderperson and are compatible with the concept stated in the underlying GDP/SIP approved by the Plan Commission.





*Mills Street looking South*



*Dayton Street looking Southeast*



*Mills Street looking South at night*



*Dayton & Mills Street Intersection looking Southeast*



*Dayton Street looking West*

**EXTERIOR PERSPECTIVES**

**CHARTER STREET HEATING PLANT REBUILD  
CITY OF MADISON URBAN DESIGN COMMISSION INITIAL APPROVAL  
APRIL 7, 2010**







**POWER ENGINEERS  
COLLABORATIVE LLC**  
150 Sundry Slope Road  
Suite 110  
Brookfield, Wisconsin 53005  
WWW.PECLLC.COM



PLJ Project No:  
2009.07.00

State of Wisconsin  
Department of Administration  
Division of State Facilities



Agency/Institution:  
UNIVERSITY OF WISCONSIN SYSTEM

UDC INITIAL APPROVAL 04.07.10

**CHARTER STREET HEATING  
PLANT REBUILD**

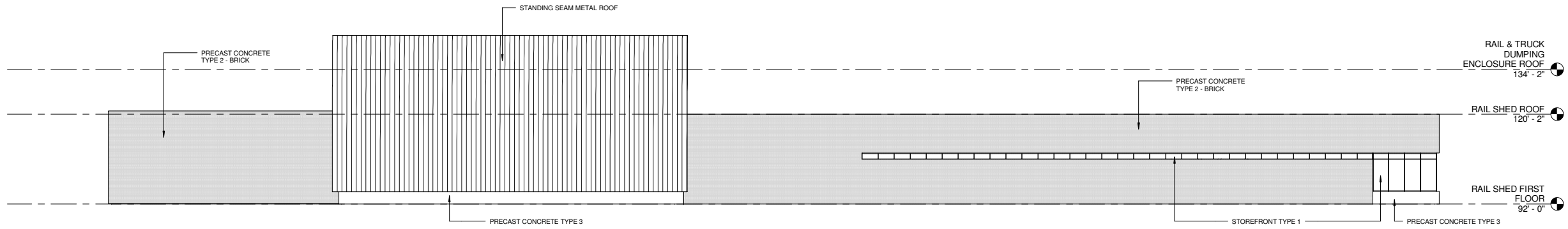
MADISON, WI

BUILDING ELEVATIONS

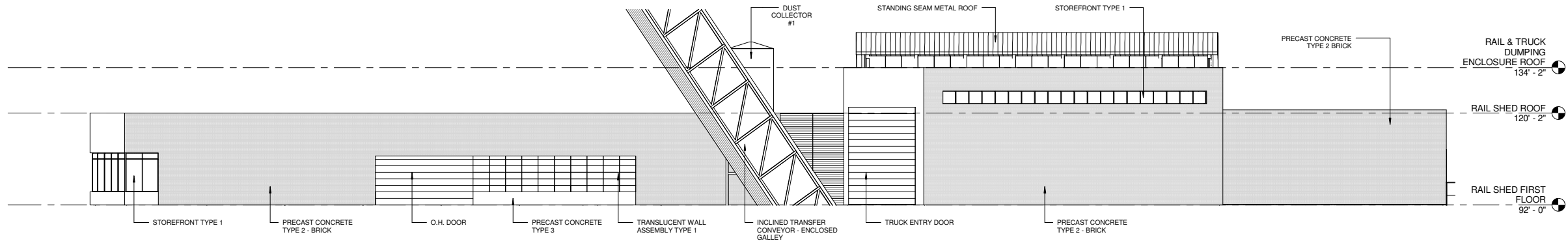
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Sheet Title:

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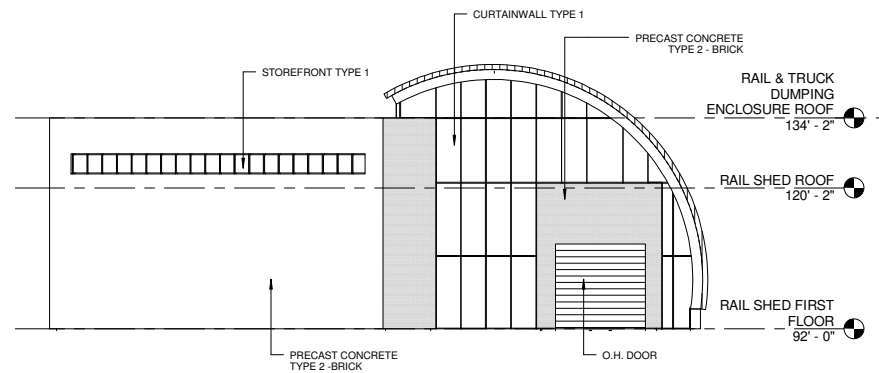
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Date Issued	03-10-10
Sheet Number	<b>A206</b>



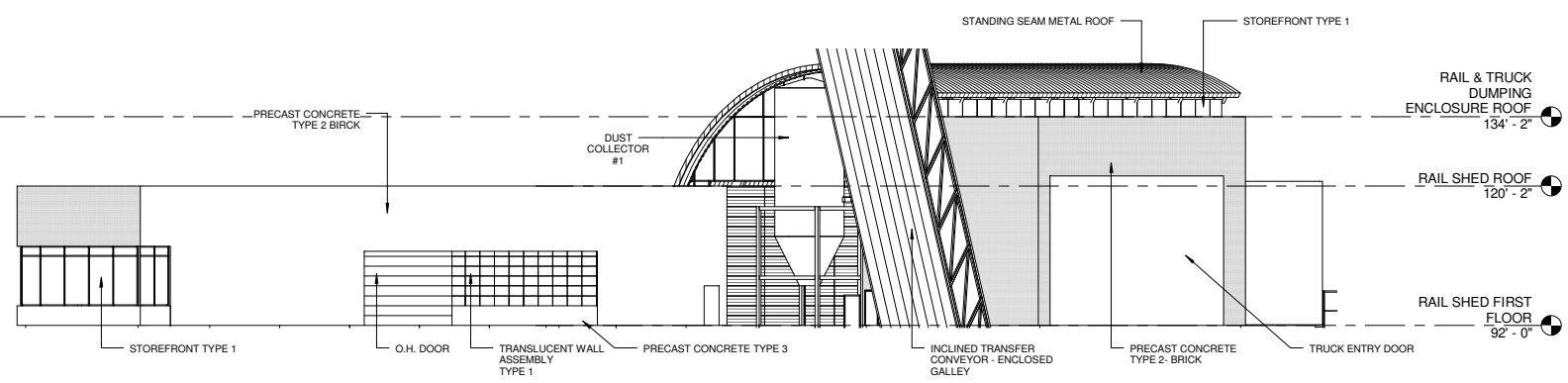
**1 RAIL SHED & HOPPER - NORTH ELEVATION**  
A206 1/16" = 1'-0"



**2 RAIL SHED & HOPPER SOUTH ELEVATION**  
A206 1/16" = 1'-0"



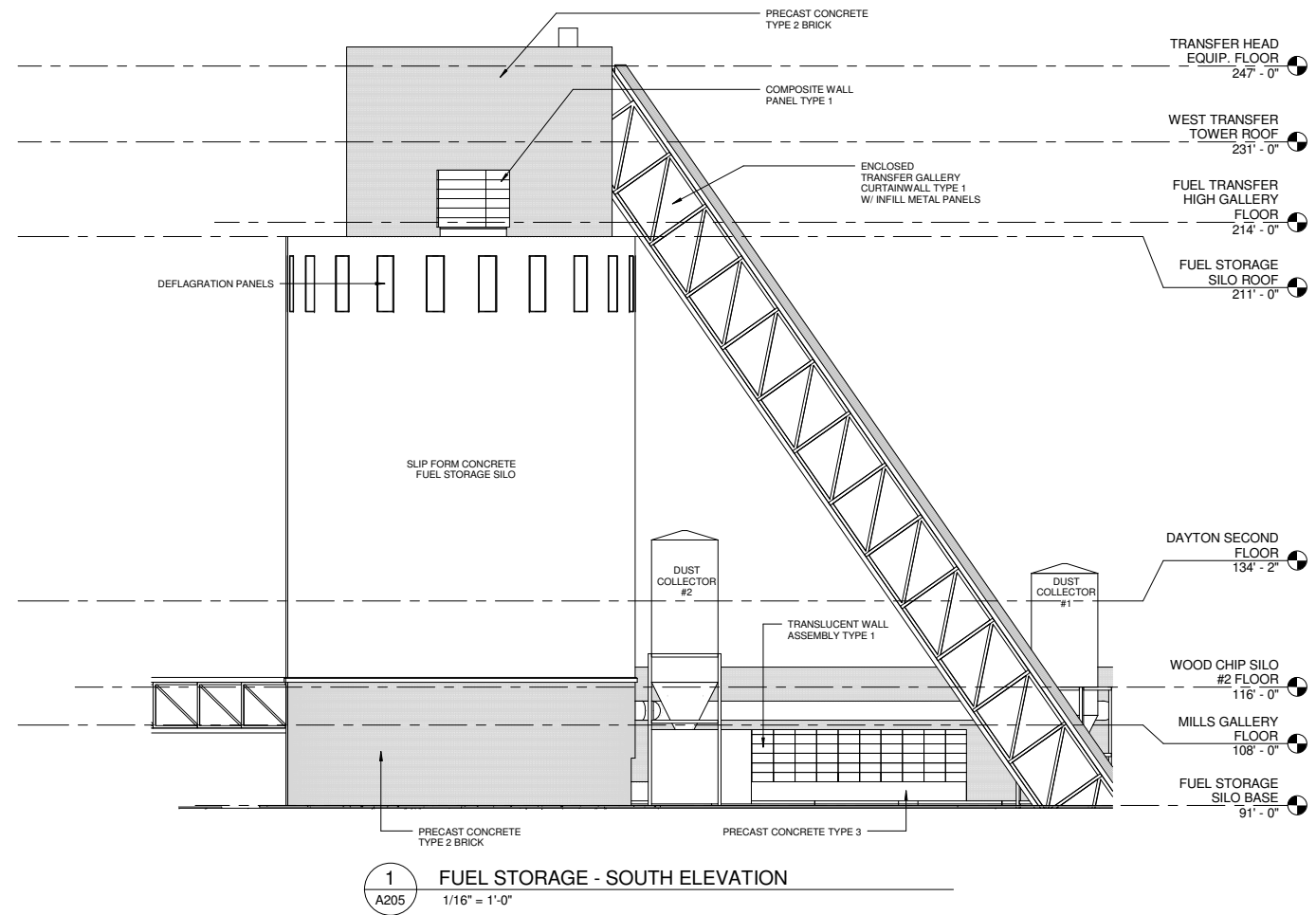
**4 RAIL SHED - EAST ELEVATION**  
A206 1/16" = 1'-0"



**3 RAIL SHED WEST ELEVATION**  
A206 1/16" = 1'-0"

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**PÖYRY**  
PÖYRY AMERICA LLC  
APPLICON, WISCONSIN

**middough**

**Potter Lawson**

PLI Project No:  
2009.07.00

State of Wisconsin  
Department of Administration  
Division of State Facilities



Agency/ Institution:  
UNIVERSITY OF WISCONSIN SYSTEM

UDC INITIAL APPROVAL 04.07.10

**CHARTER STREET HEATING  
PLANT REBUILD**

Project Location:  
MADISON, WI

Sheet Title:  
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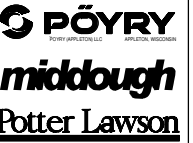
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Revisions:

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Date Issued	03-10-10
Sheet Number	<b>A205</b>



POWER ENGINEERS  
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Department of Administration  
Division of State Facilities



Agency/Institution:  
UNIVERSITY OF WISCONSIN SYSTEM

UDC INITIAL APPROVAL 04.07.10

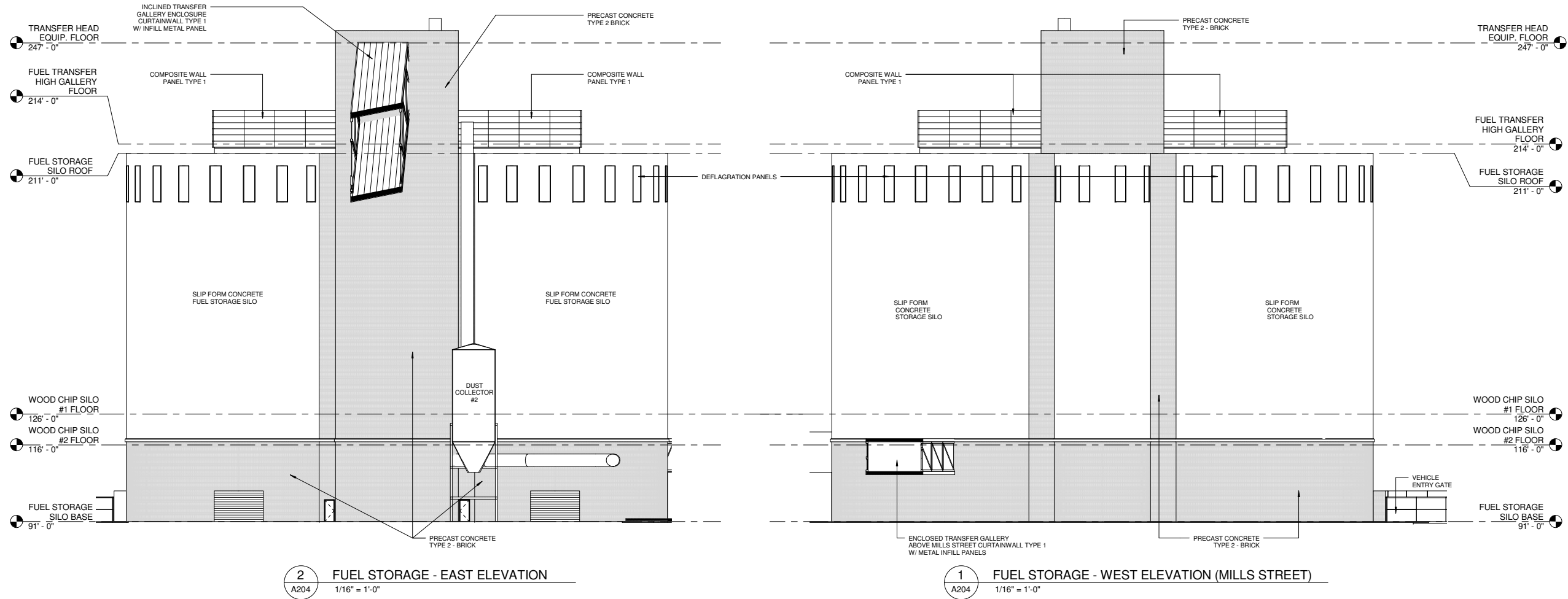
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CHARTER STREET HEATING  
PLANT REBUILD

Project Location:  
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Sheet Title:  
BUILDING ELEVATIONS

Revisions:			
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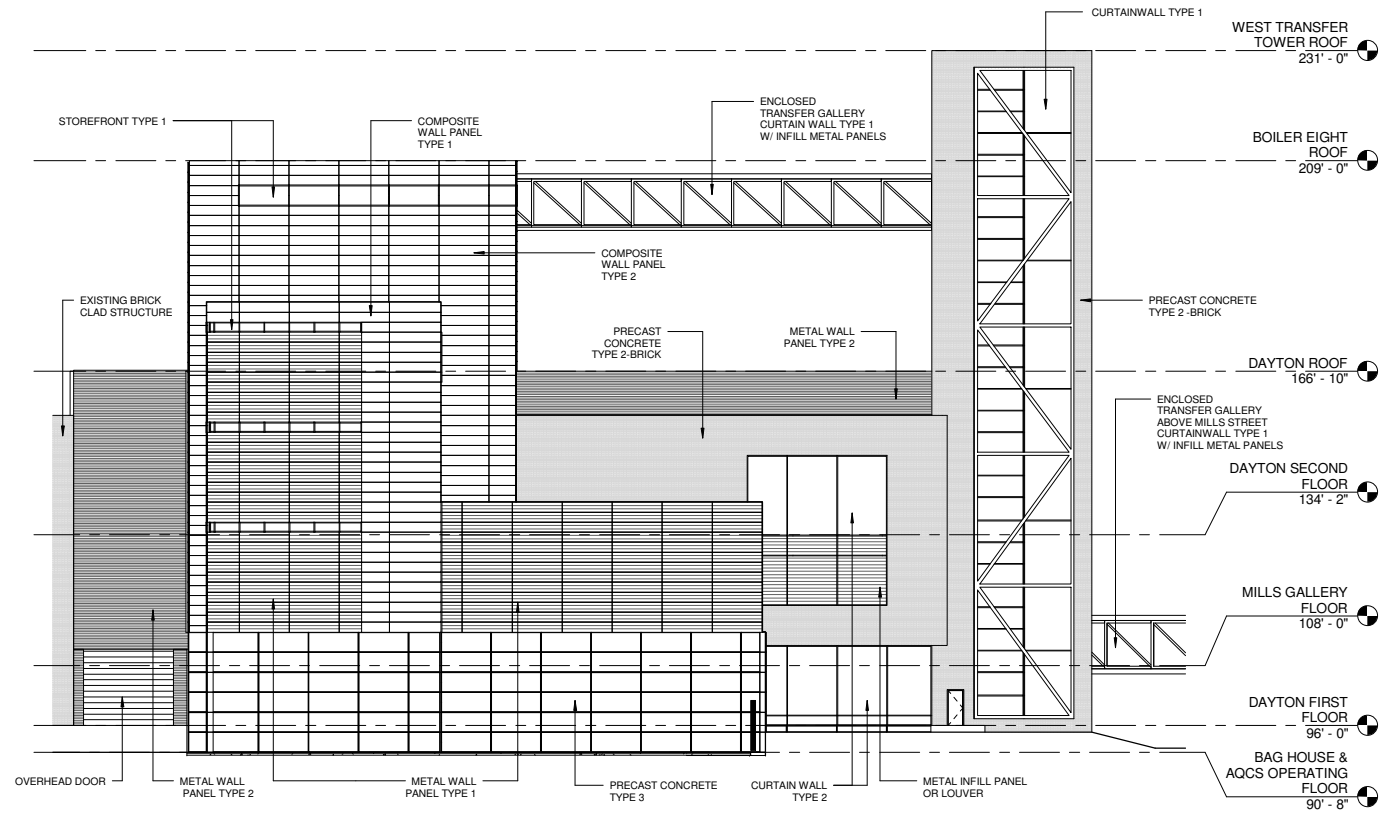
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Set Type	PR
Date Issued	03-10-10
Sheet Number	<b>A204</b>



2 FUEL STORAGE - EAST ELEVATION  
A204 1/16" = 1'-0"

1 FUEL STORAGE - WEST ELEVATION (MILLS STREET)  
A204 1/16" = 1'-0"

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1 SOUTH ELEVATION - HEATING PLANT  
A203 1/16" = 1'-0"

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**PÖYRY**  
POLYMERIZATION LLC  
APPLICATIONS  
MILWAUKEE, WISCONSIN

**middough**

**Potter Lawson**

PLJ Project No:  
2009.07.00

State of Wisconsin  
Department of Administration  
Division of State Facilities



Agency/Institution:  
UNIVERSITY OF WISCONSIN SYSTEM

UDC INITIAL APPROVAL 04.07.10

**CHARTER STREET HEATING PLANT REBUILD**

MADISON, WI

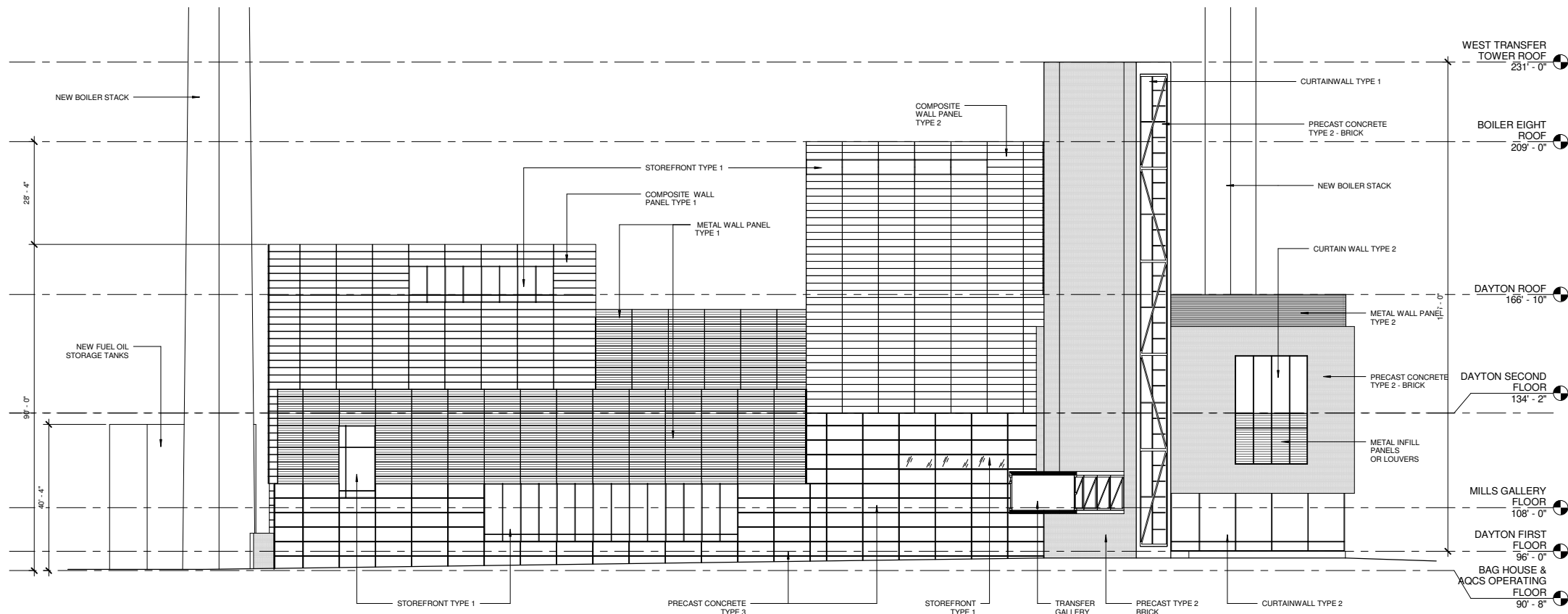
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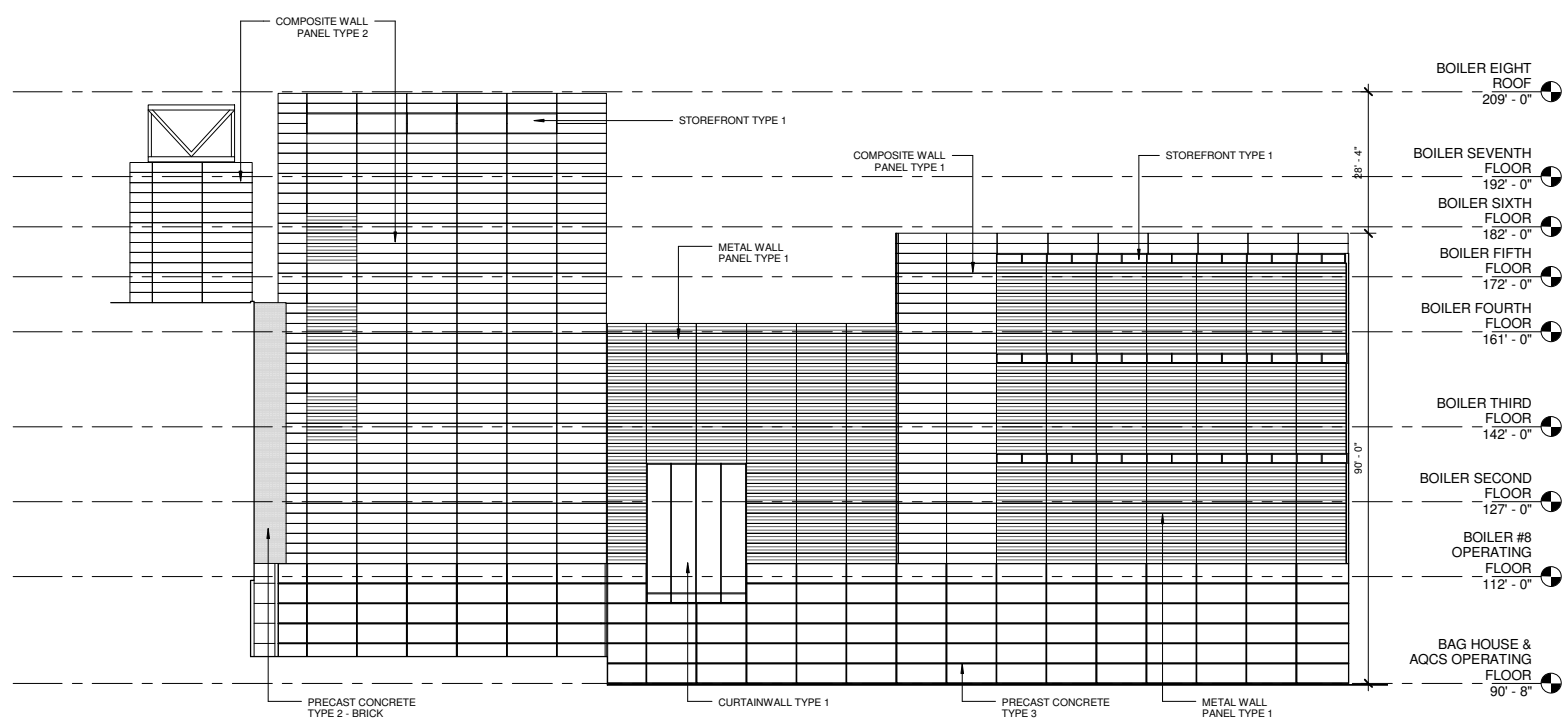
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Set Type	PR
Date Issued	03-10-10
Sheet Number	<b>A203</b>



**1 EAST ELEVATION - HEATING PLANT**  
 A202 1/16" = 1'-0"



**2 WEST ELEVATION - HEATING PLANT**  
 A202 1/16" = 1'-0"

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 150 Sundry Stage Road  
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**PÖYRY**  
 POTTER LAWSON LLC  
 MILWAUKEE, WISCONSIN

**middough**  
 POTTER LAWSON

PLJ Project No:  
 2009.07.00

State of Wisconsin  
 Department of Administration  
 Division of State Facilities



Agency / Institution:  
 UNIVERSITY OF WISCONSIN SYSTEM

UDC INITIAL APPROVAL 04.07.10

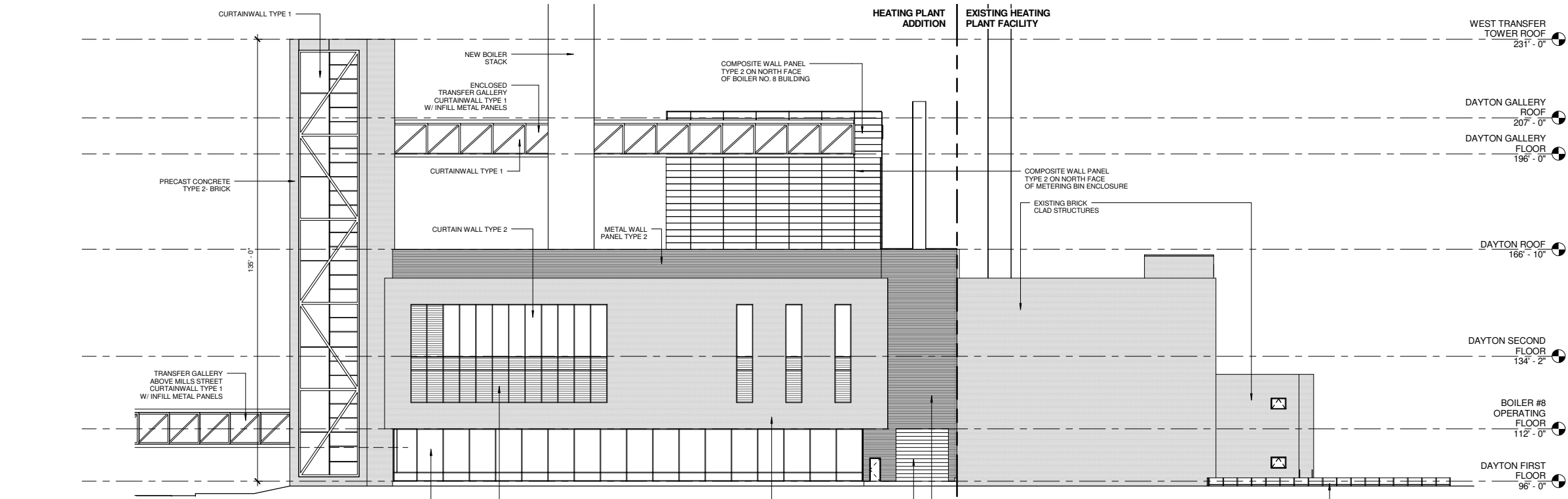
**CHARTER STREET HEATING  
 PLANT REBUILD**  
 MADISON, WI  
 BUILDING ELEVATIONS

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 Sheet Title:

Revisions:

No.	Date:	By:	Description:

Graphic Scale	
DSF Number	09A2L
Set Type	PR
Date Issued	03-10-10
Sheet Number	<b>A202</b>



**MATERIAL LEGEND**

**03 40 00 PRECAST CONCRETE TYPES**

- TYPE 1 - HOLLOWCORE INSULATED WALL PANEL WITH 2" EXTERIOR ARCHITECTURAL WYTH AND 2" RIGID INSULATION
- TYPE 2 - ARCHITECTURAL PRECAST CONCRETE PANELS W/ BRICK VENEER
- TYPE 3 - ARCHITECTURAL PRECAST CONCRETE PANELS W/ HORIZONTAL 4'X10' REVEAL PATTERN

**07 42 13 METAL WALL PANEL TYPES**

- TYPE 1 - HORIZONTAL - B.O.D. CENTRIA EXPOSED FASTENER PROFILE SERIES SUPER RIBBED "GRAY VELVET" FINISH OR BLACK OVER COMPOSITE WALL PANEL TYPE 3 OR EQUAL
- TYPE 2 - HORIZONTAL - B.O.D. CENTRIA EXPOSED FASTENER PROFILE SERIES BR5-36 "GRAY VELVET" FINISH OR BLACK OVER COMPOSITE WALL PANEL TYPE 3 OR EQUAL

**07 42 43 COMPOSITE WALL PANEL TYPES**

- TYPE 1 - 2'X10' HORIZONTAL - B.O.D. CENTRIA FORMAWALL DIMENSION SERIES 2" THICK NOMINAL FLAT - XL SILVER COLOR
- TYPE 2 - 2'X10' HORIZONTAL - B.O.D. CENTRIA FORMAWALL DIMENSION SERIES 2" THICK NOMINAL FLAT - COLONEL RED COLOR
- TYPE 3 - B.O.D. CENTRIA VERSAWALL 2" THICK NOMINAL FLAT PANEL OR EQUAL

**08 44 00 STOREFRONT TYPES**

- TYPE 1 -

**08 44 00 CURTAINWALL TYPES**

- TYPE 1 - WEST TRANSFER TOWER
- TYPE 2 - DAYTON STREET BUILDING FIRST FLOOR

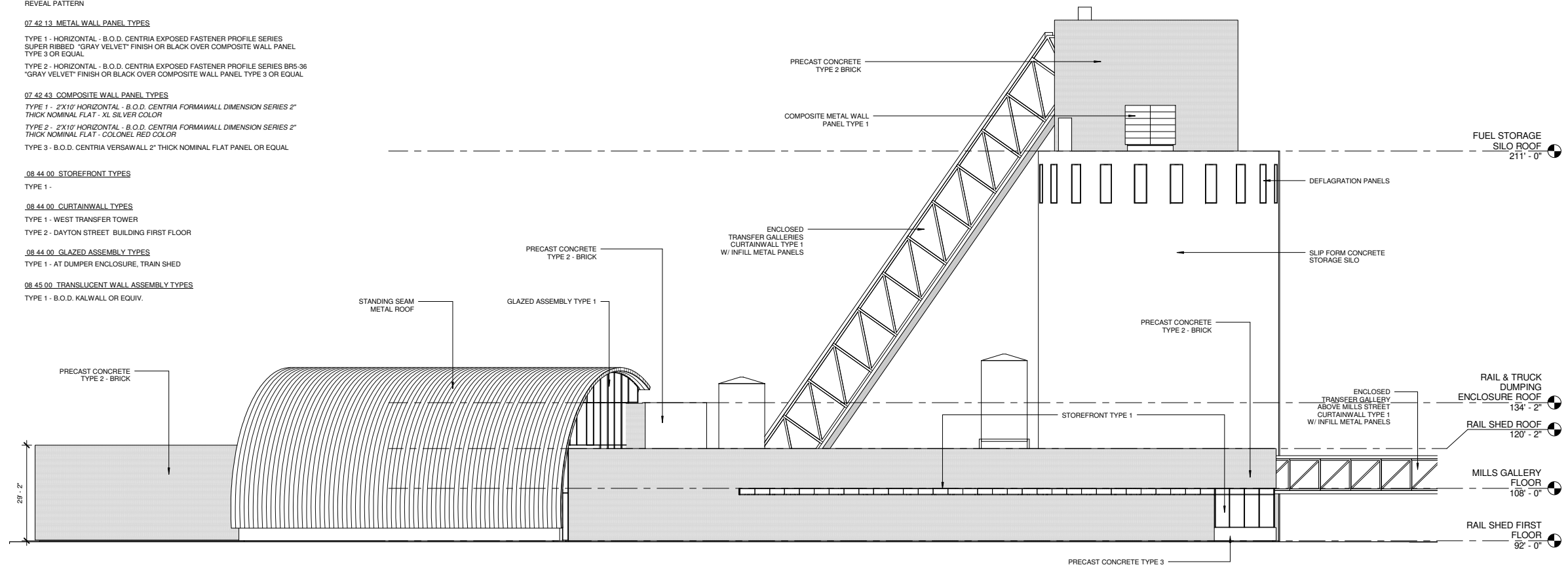
**08 44 00 GLAZED ASSEMBLY TYPES**

- TYPE 1 - AT DUMPER ENCLOSURE, TRAIN SHED

**08 45 00 TRANSLUCENT WALL ASSEMBLY TYPES**

- TYPE 1 - B.O.D. KALWALL OR EQUIV.

**1 NORTH ELEVATION - DAYTON STREET (EAST)**  
A201 1/16" = 1'-0"



**2 NORTH ELEVATION - DAYTON STREET (WEST)**  
A201 1/16" = 1'-0"



**POWER ENGINEERS COLLABORATIVE LLC**  
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Brookfield, Wisconsin 53005  
WWW.PECLLC.COM



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2009.07.00

State of Wisconsin  
Department of Administration  
Division of State Facilities



Agency/ Institution:  
UNIVERSITY OF WISCONSIN SYSTEM

UDC INITIAL APPROVAL 04.07.10

**CHARTER STREET HEATING PLANT REBUILD**

MADISON, WI

BUILDING ELEVATIONS

Project Title:  
Project Location:  
Sheet Title:

Revisions:			
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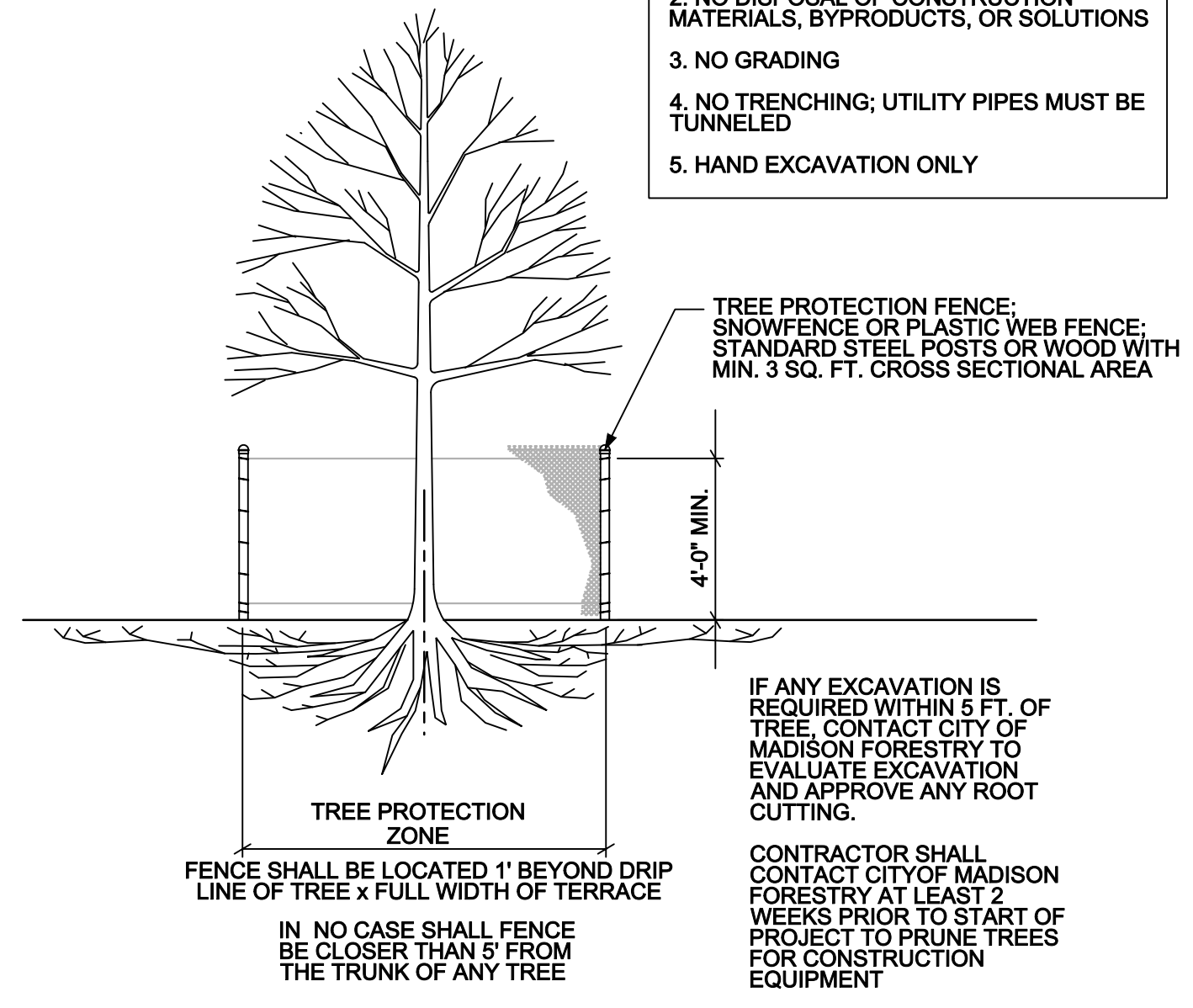


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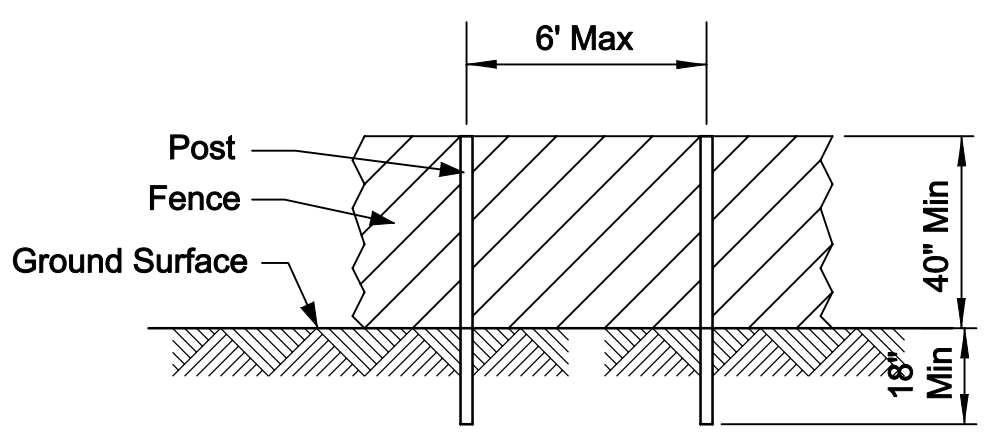
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Graphic Scale	
DSF Number	09A2L
Set Type	PR
Date Issued	03-10-10
Sheet Number	L-010

- PROHIBITED WITHIN TREE PROTECTION ZONE:**
1. NO CONSTRUCTION STAGING OR MATERIALS STORAGE
  2. NO DISPOSAL OF CONSTRUCTION MATERIALS, BYPRODUCTS, OR SOLUTIONS
  3. NO GRADING
  4. NO TRENCHING; UTILITY PIPES MUST BE TUNNELED
  5. HAND EXCAVATION ONLY

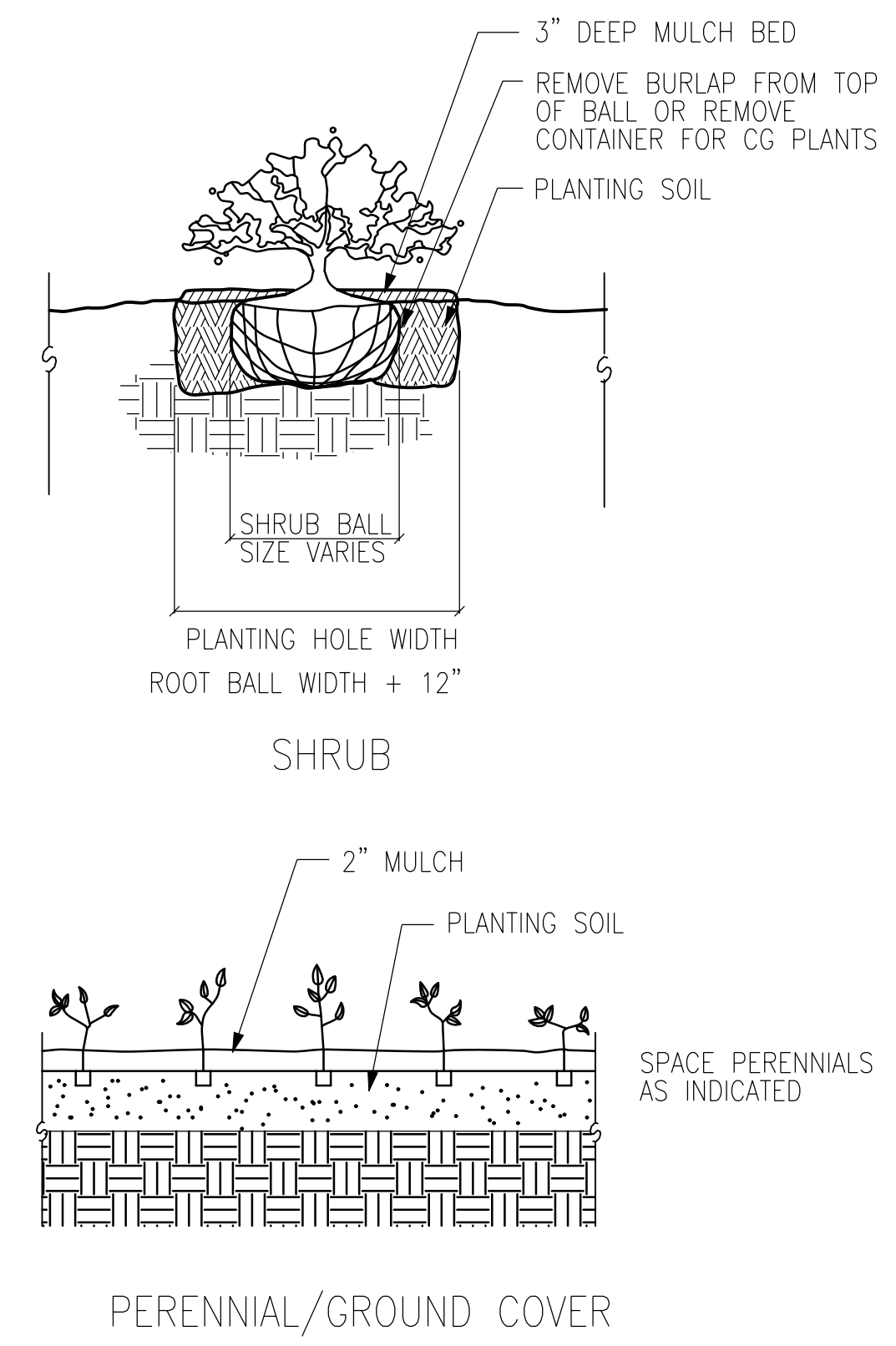
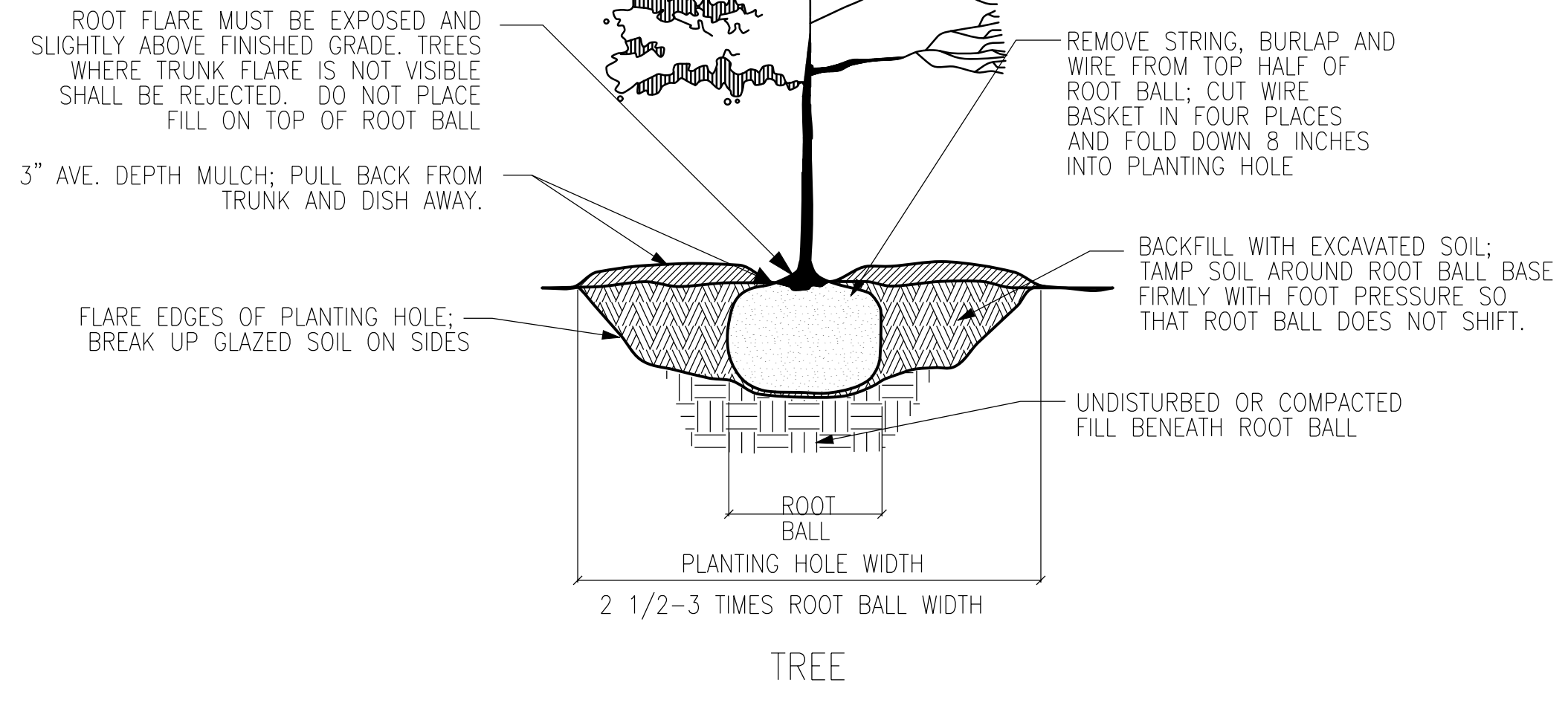


**1 TREE PROTECTION DETAIL**  
 L-010 NTS

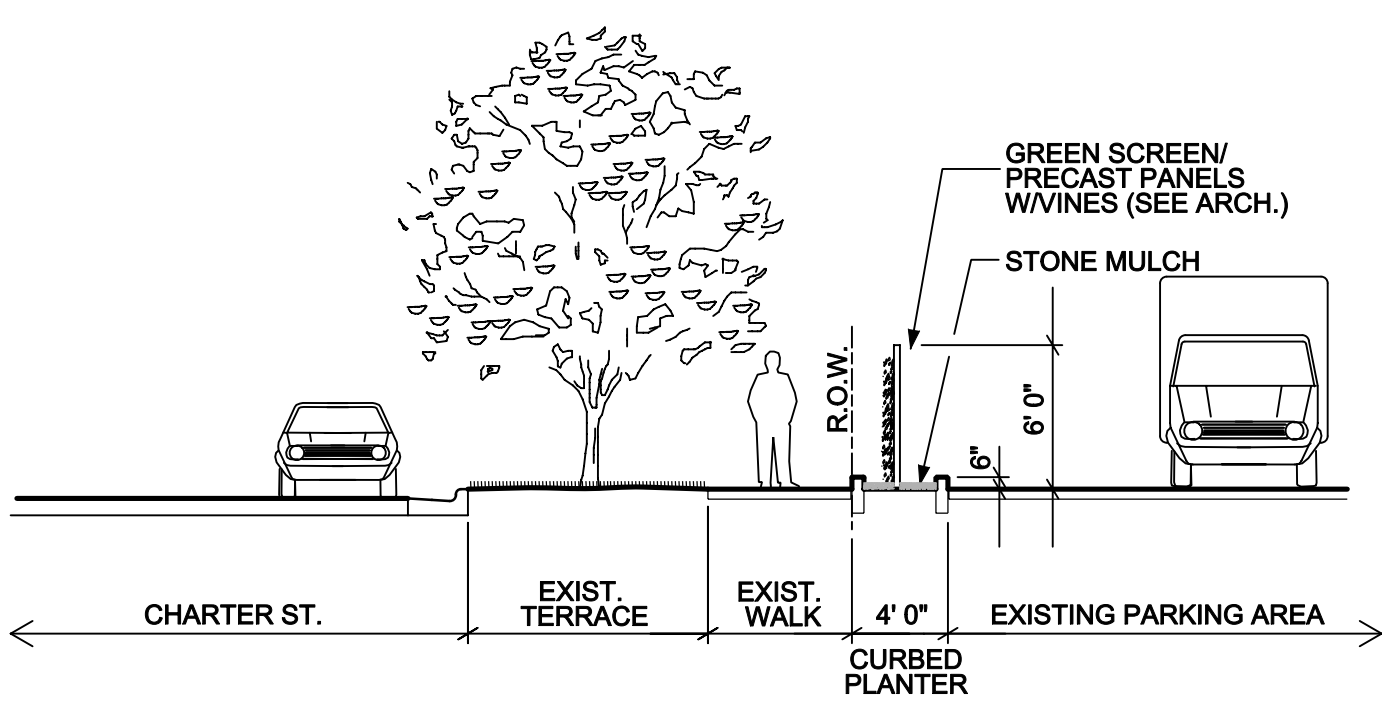


- NOTES:**
1. FENCE POSTS SHALL BE EITHER STANDARD STEEL POSTS OR WOOD POSTS WITH MIN. CROSS SECTIONAL AREA OF 3.0 SQ. IN.
  2. FENCE MAY BE EITHER 40" HIGH SNOW FENCE OR 40" PLASTIC WEB FENCING.

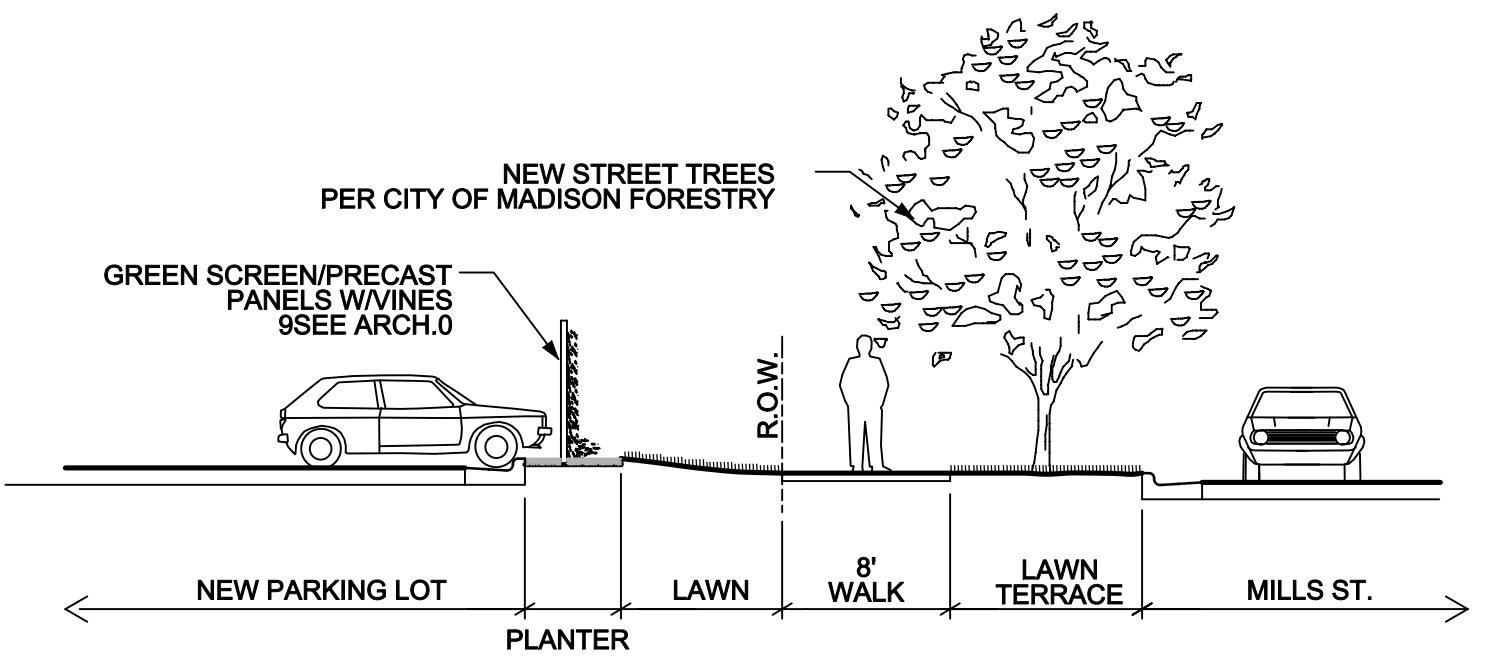
**2 TYPICAL PLANTING DETAILS**  
 L-010 NTS



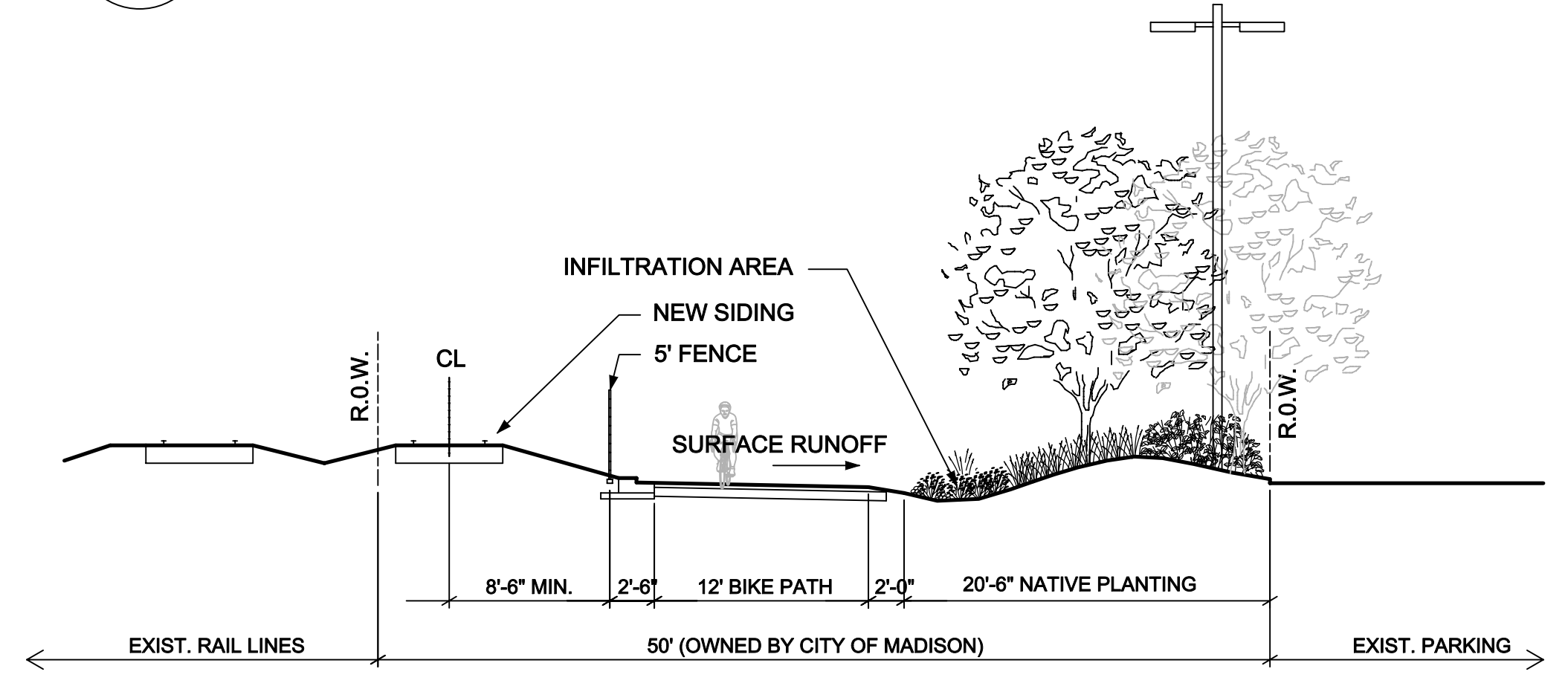
**PERENNIAL/GROUND COVER**



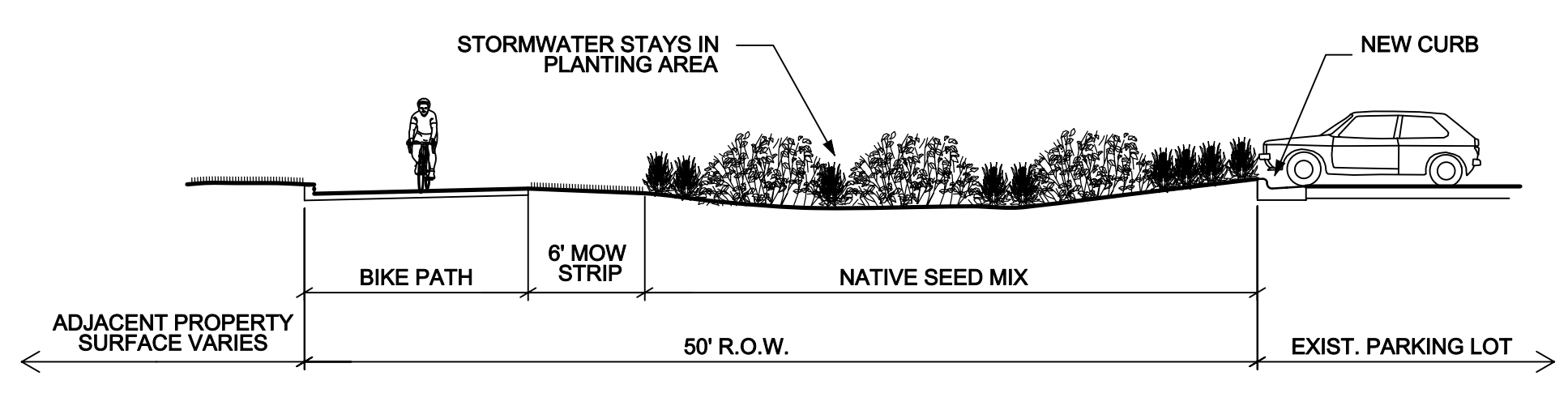
**3 SECTION - CHARTER STREET**  
 L-010 1/8"-1'-0"



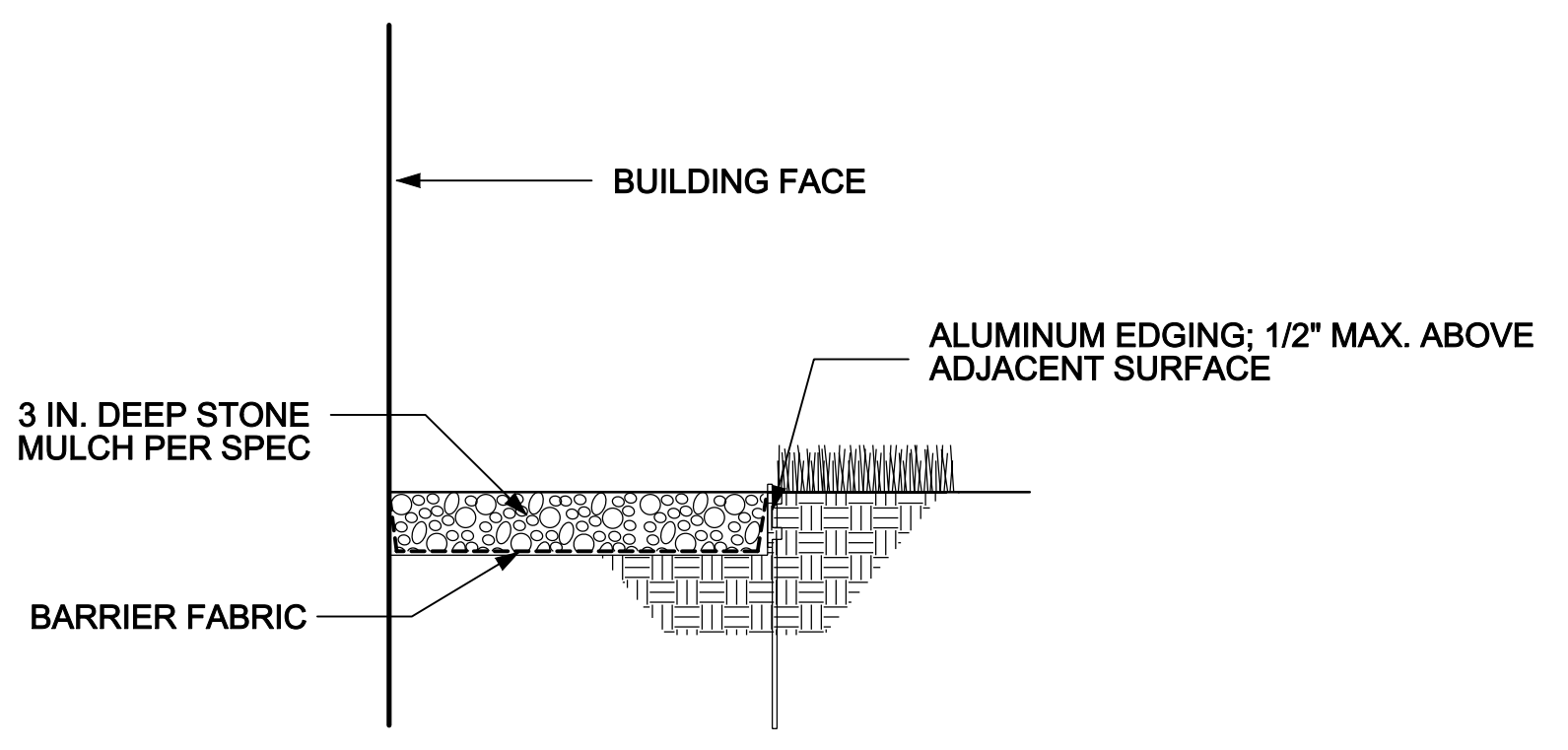
**4 SECTION - MILLS STREET**  
 L-010 1/8"-1'-0"



**5 SECTION - BIKE PATH AND NEW PARALLEL SIDING**  
 L-010 1/8"-1'-0"



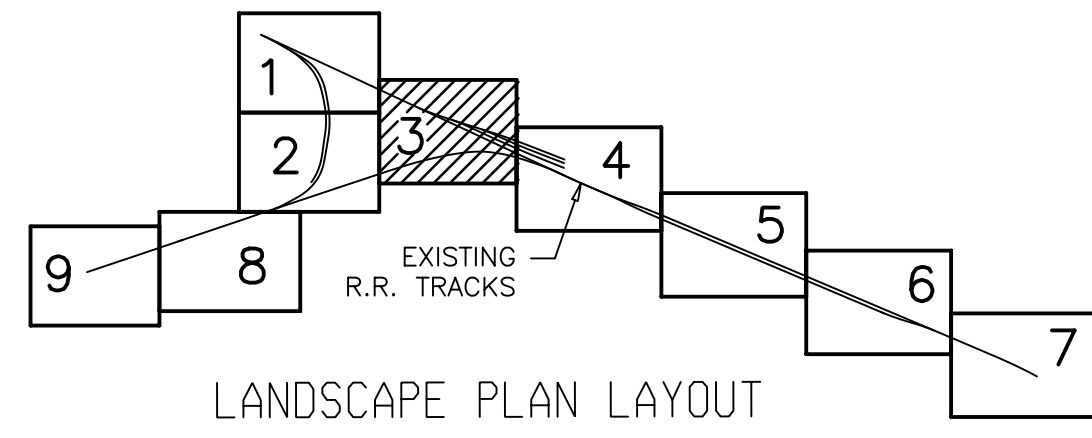
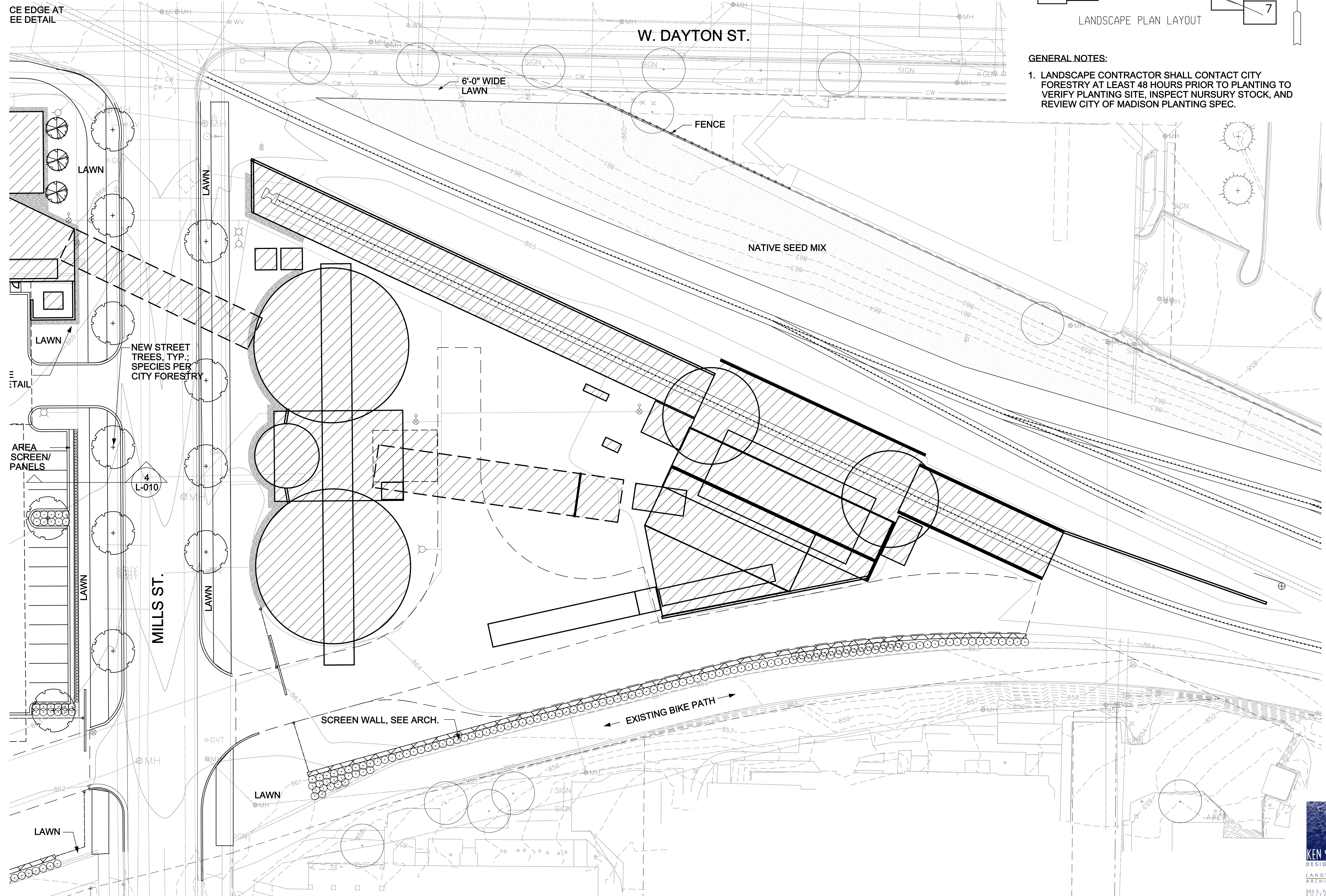
**6 SECTION - BIKE PATH - RANDALL ST. TO CHARTER ST.**  
 L-010 1/8"-1'-0"



**7 STONE MAINTENANCE EDGE**  
 L-010 1'-1'-0"



SEE EDGE AT  
SEE DETAIL



LANDSCAPE PLAN LAYOUT

**GENERAL NOTES:**

1. LANDSCAPE CONTRACTOR SHALL CONTACT CITY FORESTRY AT LEAST 48 HOURS PRIOR TO PLANTING TO VERIFY PLANTING SITE, INSPECT NURSERY STOCK, AND REVIEW CITY OF MADISON PLANTING SPEC.



303 S. PATTERSON  
SOUTH WAUWATAMOSI  
MADISON, WI 53703  
Phone: 608.951-3600  
Fax: 608.951-3228  
www.ksid.com

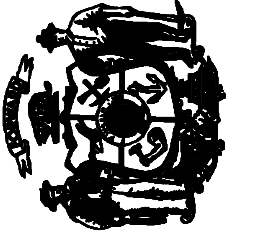
**PEC**  
POWER ENGINEERS  
COLLABORATIVE LLC  
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**Potter Lawson**

State of Wisconsin  
Department of Administration  
Division of State Facilities



Agency / Institution:  
UNIVERSITY OF WISCONSIN, MADISON

Project Title:  
**CHARTER STREET REBUILD**

Project Location:  
**MADISON, WI.**

Sheet Title:  
GDP LANDSCAPE PLAN

Revisions:

No.	Date:	By:	Description:

Graphic Scale: 0 10 20

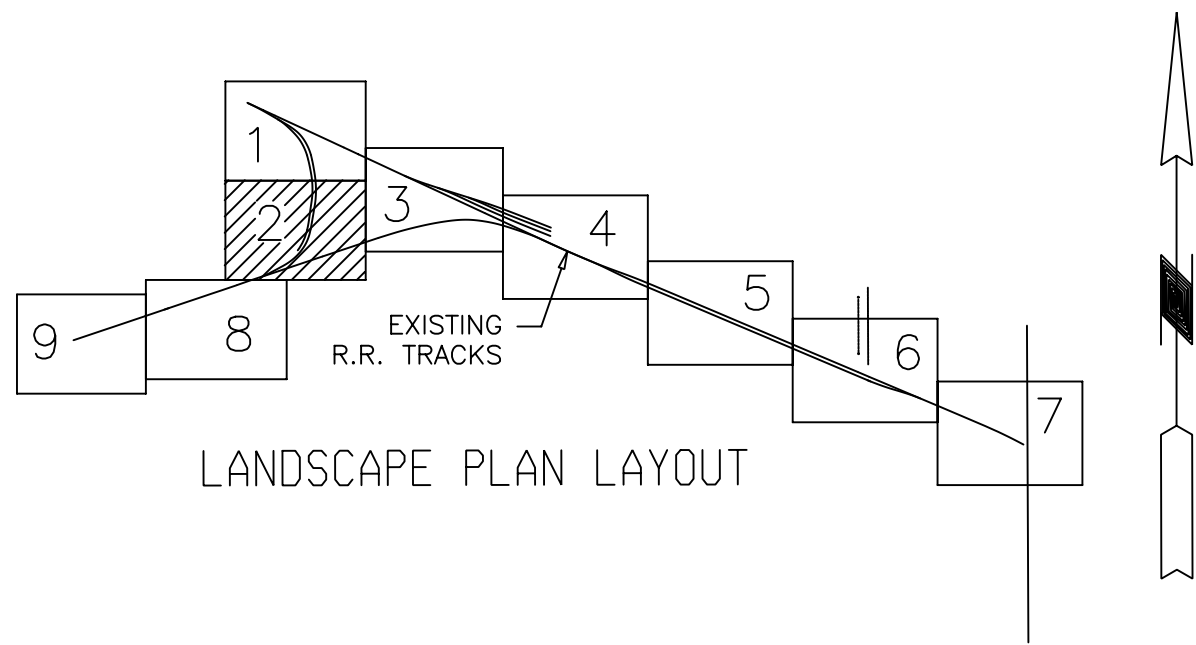
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Set Type: PR

Date Issued: 03-10-10

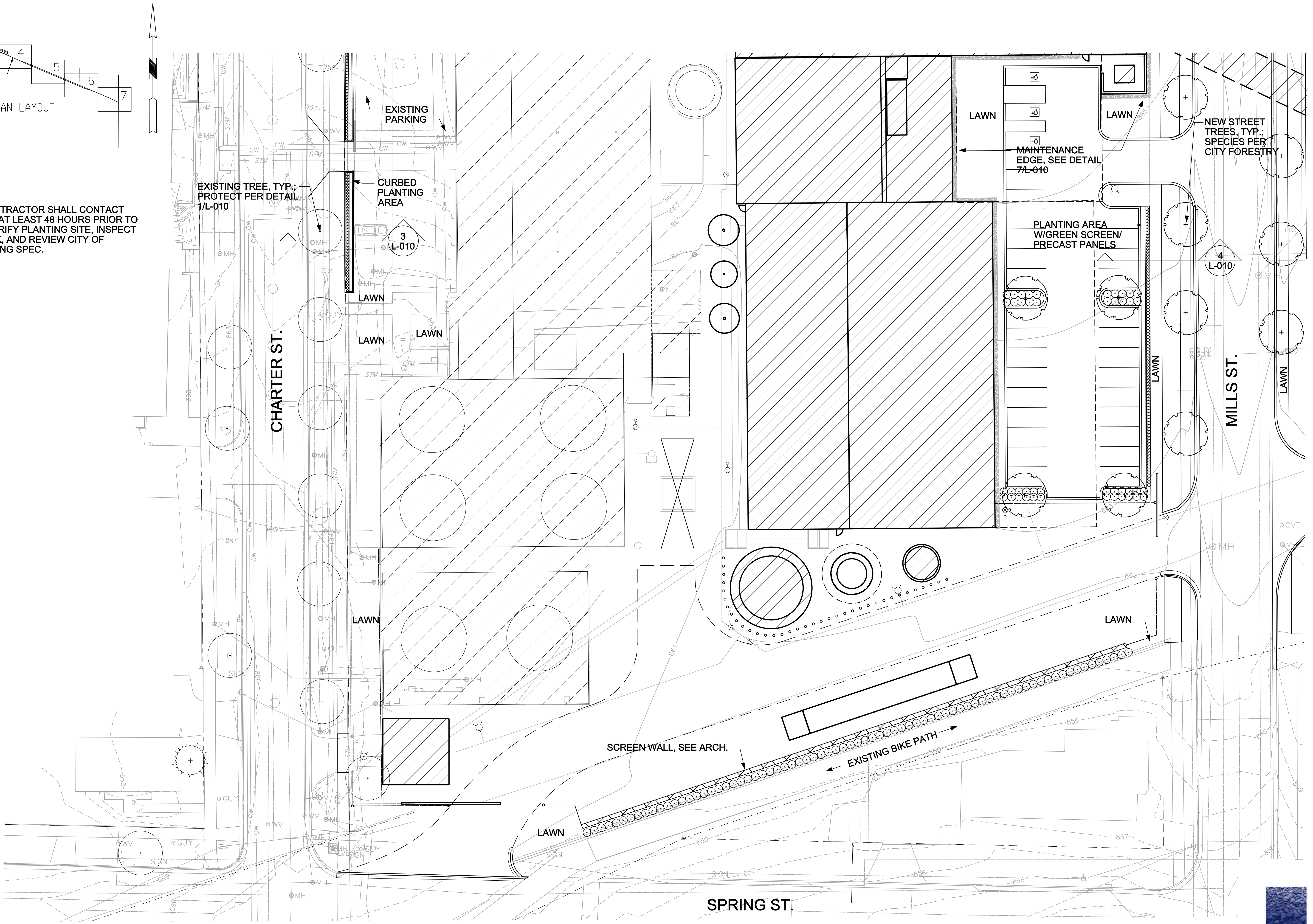
Sheet Number: L-003





**GENERAL NOTES:**

- LANDSCAPE CONTRACTOR SHALL CONTACT CITY FORESTRY AT LEAST 48 HOURS PRIOR TO PLANTING TO VERIFY PLANTING SITE, INSPECT NURSERY STOCK, AND REVIEW CITY OF MADISON PLANTING SPEC.



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**PÖYRY**  
PÖYRY (AMERICA) LLC - APPLETON, WISCONSIN

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**Potter Lawson**

State of Wisconsin  
Department of Administration  
Division of State Facilities

Agency / Institution:  
UNIVERSITY OF WISCONSIN, MADISON

Project Title:  
**CHARTER STREET REBUILD**

Project Location:  
**MADISON, WI.**

Sheet Title:  
**GDP LANDSCAPE PLAN**

Revisions:

No.	Date	By	Description

Graphic Scale  
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DSF Number  
**09A2L**

Set Type  
**PR**

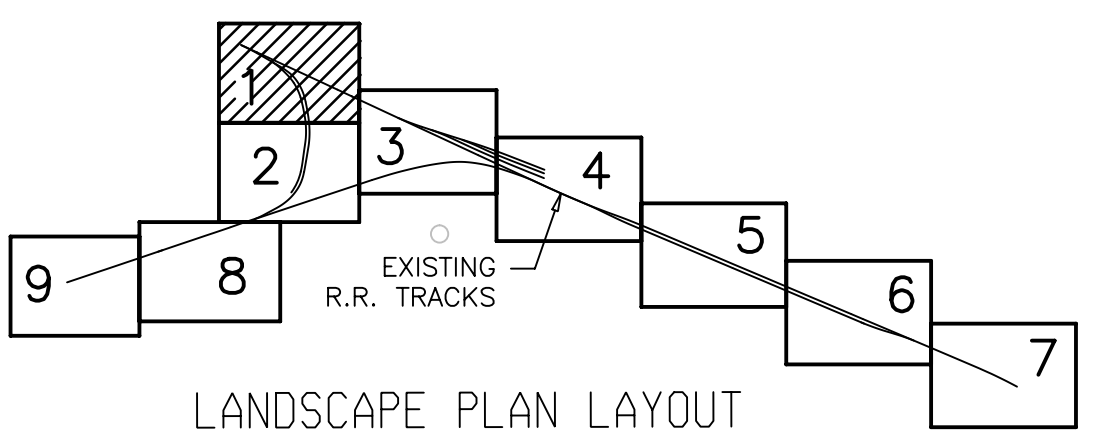
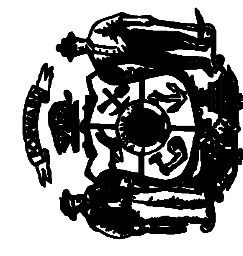
Date Issued  
**03-10-10**

Sheet Number  
**L-002**

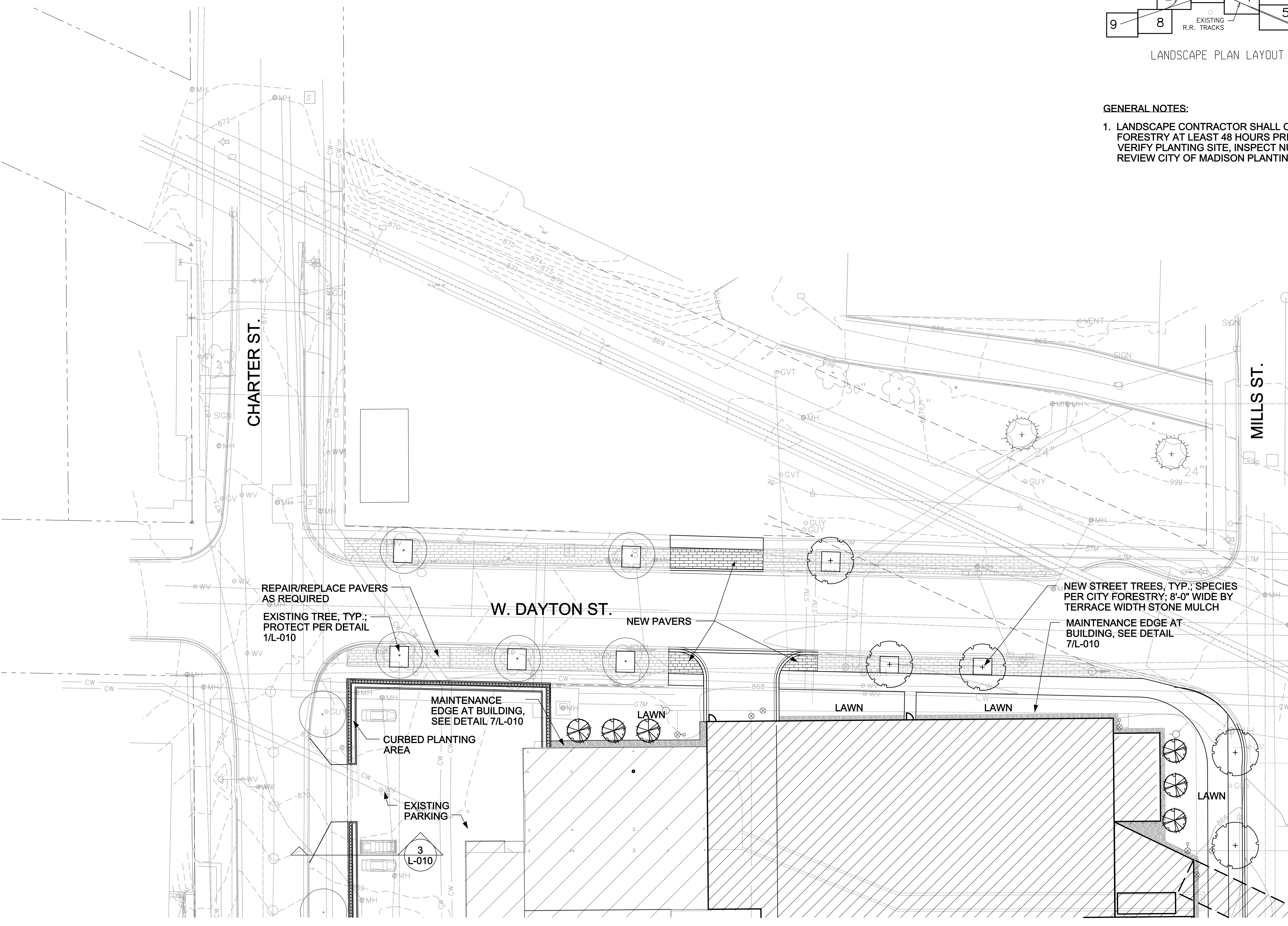
**KEN SALKI**  
DESIGN INC  
LANDSCAPE ARCHITECTS

303 S. PATERSON  
SUITE 110 - 10TH FLOOR  
MADISON, WI 53713  
Phone: 608 951-3600  
Fax: 608 951-2300  
www.ksgid.com





**GENERAL NOTES:**  
 1. LANDSCAPE CONTRACTOR SHALL CONTACT CITY FORESTRY AT LEAST 48 HOURS PRIOR TO PLANTING TO VERIFY PLANTING SITE, INSPECT NURSURY STOCK, AND REVIEW CITY OF MADISON PLANTING SPEC.

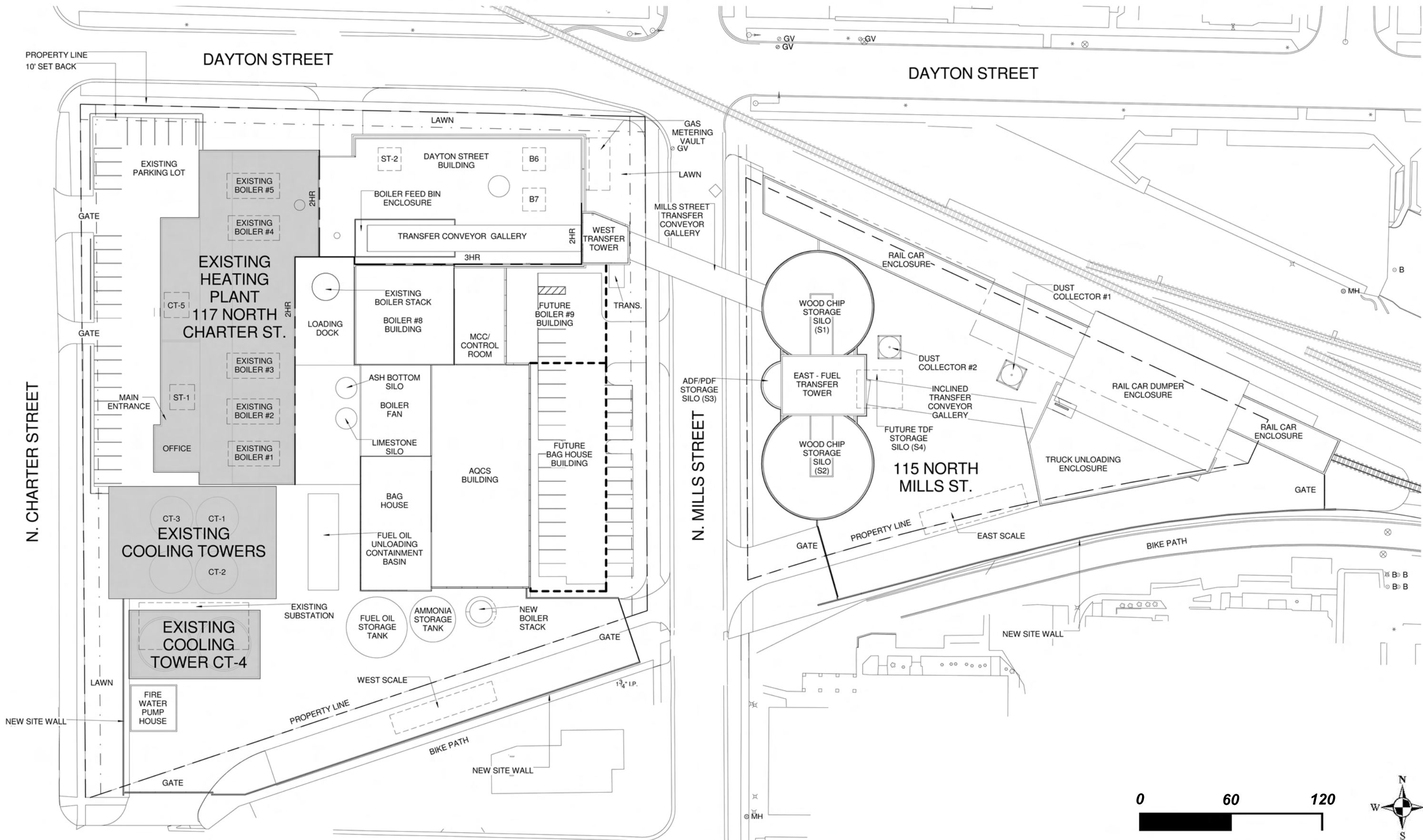


Revisions:

No.	Date:	By:	Description:

Graphic Scale	
DSF Number	09A2L
Set Type	PR
Date Issued	03-10-10
Sheet Number	L-001





**SITE PLAN**

**CHARTER STREET HEATING PLANT REBUILD**  
**CITY OF MADISON URBAN DESIGN COMMISSION INITIAL APPROVAL**  
**APRIL 7, 2010**







1



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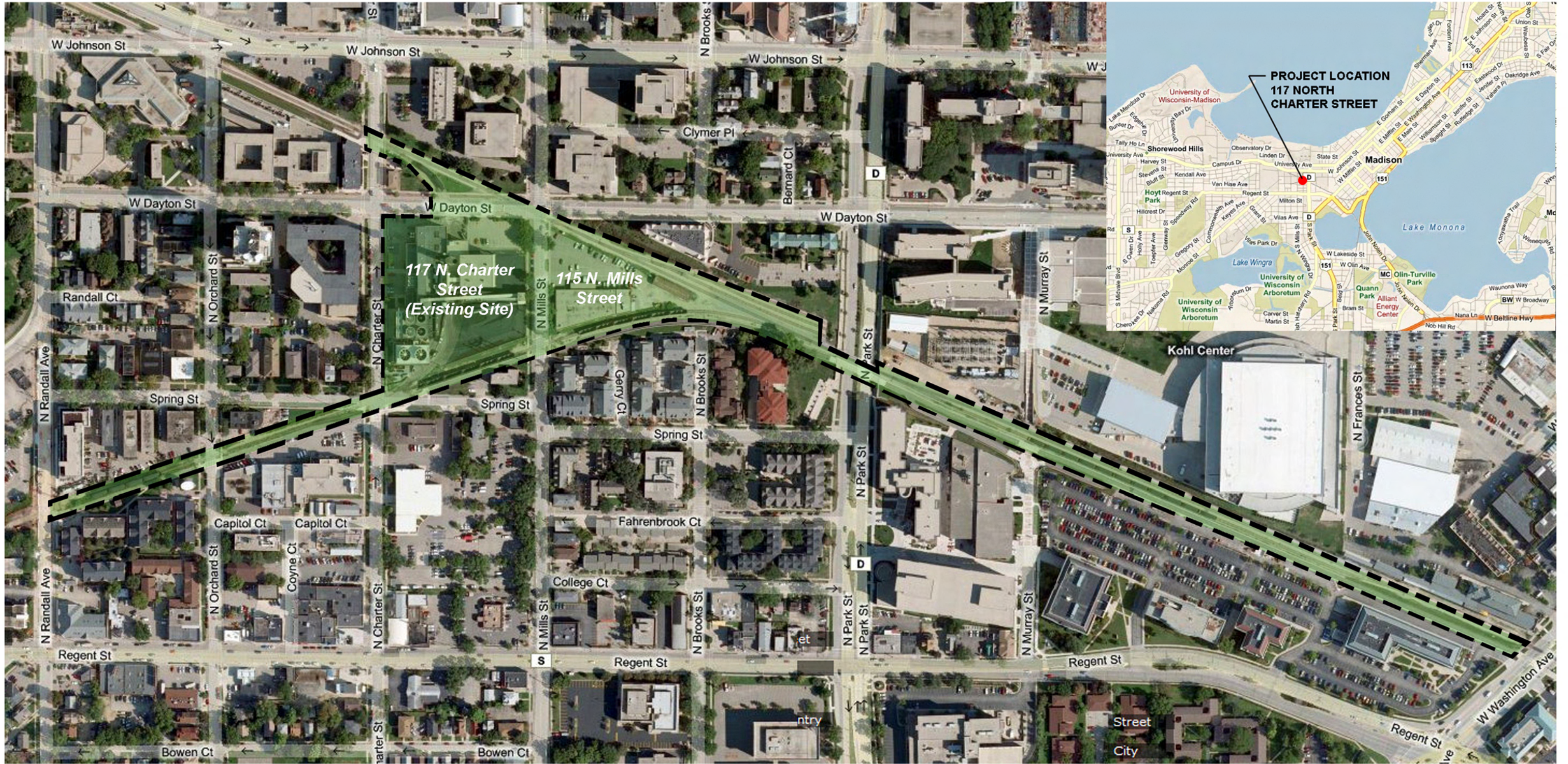



## SITE CONTEXT

**CHARTER STREET HEATING PLANT REBUILD**  
**CITY OF MADISON URBAN DESIGN COMMISSION INITIAL APPROVAL**  
**APRIL 7, 2010**







 Charter Street Heating Plant Rebuild Project Extents

**LOCATOR MAP**

**CHARTER STREET HEATING PLANT REBUILD  
CITY OF MADISON URBAN DESIGN COMMISSION INITIAL APPROVAL  
APRIL 7, 2010**







*Mills Street looking Northwest from bike path*



*Mills Street looking North*



*Bike Path looking West*



*Mills Street looking West*

**EXTERIOR PERSPECTIVES**

**CHARTER STREET HEATING PLANT REBUILD**  
**CITY OF MADISON URBAN DESIGN COMMISSION INITIAL APPROVAL**  
**APRIL 7, 2010**

